COMPUTER SCIENCE

STUDY MATERIAL

XII – STANDARD

(BASED ON THE NEW SYLLABUS AND NEW TEXT BOOK FOR THE YEAR 2024-2025)

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CHAPTER 1 TO 16 ONE WORD BOOK BACK &PUBLIC QUESTION WITH ANSWERS

(CHAPTER-1)(FUNCTION)

1. The small sections of code that are used to perform a particular task is called --- **[S-2021,M-2023]**
   (A) Subroutines (B) Files (C) Pseudo code (D) Modules
2. Which of the following is a unit of code that is often defined within a greater code structure? **[J-2022]**
   (A) Subroutines **(B) Function** (C) Files (D) Modules
3. Which of the following is a distinct syntactic block? **[M-2022]**
   (A) Subroutines (B) Function **(C) Definition** (D) Modules
4. The variables in a function definition are called as ------ **[J-2023]**
   (A) Subroutines (B) Function (C) Definition **(D) Parameters**
5. The values which are passed to a function definition are called ------- **[J-2024]**
   (A) Arguments (B) Subroutines (C) Function (D) Definition
6. Which of the following are mandatory to write the type annotations in the function definition?
   (A) { } **(B) ( )** (C) [ ] (D) < >
7. Which of the following defines what an object can do? **[M-2024]**
   (A) O.S (B) Compiler **(C) Interface** (D) Interpreter
8. Which of the following carries out the instructions defined in the interface?
   (A) O.S (B) Compiler **(C) Implementation** (D) Interpreter
9. The functions which will give exact result when same arguments are passed are called – **[M-2020]**
   (A) Impure (B) Partial (C) Dynamic **(D) Pure**
10. The functions which cause side effects to the arguments passed are called --------
    (A) Impure (B) Partial (C) Dynamic (D) Pure

1. ..... are the basic building blocks of computer programs. **[S-2020]**
   (A) Subroutines (B) Variables (C) Classes (D) Arrays

(CHAPTER-2)(DATA ABSTRACTION)

1. Which of the following functions that build the abstract data type? **[S-2020,2021 & J-2023]**
   (A) Constructors (B) Destructors (C) recursive (D) Nested
2. Which of the following functions that retrieve information from the data type? **[M-2022]**
   (A) Constructors **(B) Selectors** (C) recursive (D) Nested
3. The data structure which is a mutable ordered sequence of elements is called
   (A) Built in **(B) List** (C) Tuple (D) Derived data
4. A sequence of immutable objects is called **[M-2020, J-2023, J-2024]**
   (A) Built in (B) List **(C) Tuple** (D) Derived data
5. The data type whose representation is known are called --- **[M-2023]**
   (A) Built in (B) Derived **(C) Concrete** (D) Abstract
6. The data type whose representation is unknown are called---- **[M-2024]**
   (A) Built in (B) Derived (C) Concrete **(D) Abstract data type**
7. Which of the following is a compound structure?
   (A) Pair (B) Triplet (C) single (D) quadrat
8. Bundling two values together into one can be considered as **…….**
   (A) Pair (B) Triplet (C) single (D) quadrat
9. Which of the following allow to name the various parts of a multi-item object?
   (A) Tuples (B) Lists **(C) Classes** (D) quadrats
10. Which of the following is constructed by placing expressions within square brackets?
    (A) Tuples **(B) Lists** (C) Classes (D) quadrats

(CHAPTER-3)(SCOPING)

1. Which of the following refers to the visibility of variables in one part of a program to another part of the same program.
   (A) Scope (B) Memory (C) Address (D) Accessibility
2. The process of binding a variable name with an object is called---- **[S-2020,2021]**
   (A) Scope **(B) Mapping** (C) late binding (D) early binding
3. Which of the following is used in programming languages to map the variable and object?
   (A) :: (B) := **(C) =** (D) ==
4. Containers for mapping names of variables to objects is called --------- **[M-2022, J-2023]**
   (A) Scope (B) Mapping (C) Binding **(D) Namespaces**
5. Which scope refers to variables defined in current function? **[J-2022]**
   (A) Local (B) Global scope (C) Module scope (D) Function Scope

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6. The process of subdividing a computer program into separate sub-programs is-
(A) Procedural **(B) Modular** (C) Event Driven (D) Object oriented
7. Which of the following security technique that regulates who can use resources in a computing environment?
(A) Password (B) Authentication **(C) Access control** (D) Certification **[M-2024]**
8. Which of the following members of a class can be handled only from within the class----- **[M-2020, J-2024]**
(A) Public (B) Protected (C) Secured **(D) Private**
9. Which members are accessible from outside the class? **[M-2023]**
(A) Public (B) Protected (C) Secured (D) Private
10. The members that are accessible from within the class and are also available to its sub-classes is called --
(A) Public **(B) Protected** (C) Secured (D) Private

(CHAPTER-4)(ALGORITHMIC STRATEGIES)

1. The word comes from the name of a Persian mathematician Abu Jaffa Mohammed ibn-i Musa al Khwarizmi is called?
(A) Flowchart (B) Flow **(C) Algorithm** (D) Syntax. **[S-2021, M-2022]**
2. From the following sorting algorithms which algorithm needs the minimum number of swaps?
(A) Bubble (B) Insert **(C) Selection** (D) All the above
3. Two main measures for the efficiency of an algorithm are---------- **[M-2020,J-2023]**
(A) Processor (B) Complexity and capacity **C) Time and space** (D) Data and space
4. The algorithm that yields expected output for a valid input in called as-------
(A) Algorithmic solution (B) Algorithmic outcomes (C) Algorithmic problem (D) Algorithmic coding
5. Which of the following is used to describe the worst case an algorithm? **[M-2024]**
(A) Big A (B) Big S (C) Big W **(D) Big O**
6. Big Ω the reverse of
(A) Big O (B) Big Θ (C) Big A (D) Big S
7. Binary search is also called as ---
(A) Linear (B) Sequential (C) Random **(D) Half-Interval**
8. The Θ notation in asymptotic evaluation represents
(A) Base case **(B) Average case** (C) Worst case (D) NULL case
9. If a problem can be broken into sub problems which are reused several times, the problem possesses which property?
(A) Overlapping sub problems (B) Optimal substructure (C) Memorization (D) Greedy
10. In dynamic programming, the technique of storing the previously calculated values is called— **[M-2023, J-2024]**
(A) Saving value property (B) Storing value property **(C) Memorization** (D) Mapping
1. ---not a factor measure the execution time of an algorithm? **[S-2020]**
(A) Speed of the machine (B) O.S (C) Programming language used **(D) Selection**

(CHAPTER-5)(PYTHON - VARIABLES AND OPERATORS)

1. Who developed Python? **[J-2024]**
(A) Ritche **(B) Guido Van Rossum** (C) Bill Gates (D) Sunder Pitchai
2. The Python prompt indicates that Interpreter is ready to accept instruction.
(A) >>> (B) <<< (C) # (D) <<
3. Which of the following shortcut is used to create new Python Program? **[J-2022, 2023]**
(A) Ctrl + C (B) Ctrl + F (C) Ctrl + B **(D) Ctrl + N**
4. Which of the following character is used to give comments in python program?
(A) # (B) & (C) @ (D) $
5. This symbol is used to print more than one item on a single line. **[J-2022]**
(A) Semicolon (;) (B) Dolor ($) **(C) comma (,)** (D) Colon (:)
6. Which of the following is not a token?
(A) Interpreter (B) Identifiers (C) Keyword (D) Operators
7. Which of the following is not a Keyword in Python? **[M-2023]**
(A) break (B) while (C) continue **(D) operators**
8. Which operator is also called as Comparative operator? **[M-2022]**
(A) Arithmetic **(B) Relational** (C) Logical (D) Assignment
9. Which of the following is not logical operator?
(A) and (B) or (C) not **(D) Assignment**
10. Which operator is also called as Conditional operator?
(A) Ternary (B) Relational (C) Logical (D) Assignment
1. Expand IDLE **[M-2020]**
(A) Integrated Design Learning Environment (B) Insert Development Learning Environment
(C) Integrated Develop Learning Environment **(D) Integrated Development Learning Environment**
2. Which key is pressed to execute python script? **[S-2020, M-2024]**
(A) F5 (B) F2 (C) F1 (D) F3

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(CHAPTER-6)(CONTROL STRUCTURES)

1. How many important control structures are there in Python? **[M-2023]**
   (**A) 3** (B) 4 (C) 5 (D) 6
2. elif can be considered to be abbreviation of ----- **[M-2022, J-2023]**
   (A) nested if (B) if..else (**C) else if** (D) if..elif
3. What plays a vital role in Python programming? **[S-2021]**
   (A) Statements (B) Control (C) Structure (**D) Indentation**
4. Which statement is generally used as a placeholder? **[J-2024]**
   (A) continue (B) break (**C) pass** D) goto
5. The condition in the if statement should be in the form of
   (A) Arithmetic or Relational expression (B) Arithmetic or Logical expression
   (**C) Relational or Logical expression** (D) Arithmetic
6. Which of the following is known as definite loop?
   (A) do..while (B) while (**C) for** (D) if..elif
7. What is the output of the following snippet? i=1 while True: if i%3 ==0: break print(i,end=") i +=1
   (**A) 1 2** (B) 123 (C) 1234 (D) 124
8. What is the output of the following snippet? T=1 while T: print(True) break
   (A) False (**B) True** (C) 0 (D) no output
9. Which amongst this is not a jump statement?
   (**A) for** (B) goto (C) continue (D) break
10. Which punctuation should be used in the blank? if <condition>_ statements-block 1 else: statements-block 2
    (A) ; (**B) :** (C) :: (D) !
1. What is the output of the following snippet? For i in range (2,10,2): Print (i ,end = ' ') **[M-2020]**
   (A) 8 6 4 2 (B) 2 4 6 8 10 **(C) 2 4 6 8** (D) 2 4
2. Which is the most comfortable loop? **[J-2022]**
   (A) do..while (B) while **(C) for** (D) if..elif
3. --- is used to skip the remaining part of the loop and start with next iteration? **[S-2020]**
   (A) break (B) pass **(C) continue** (D) null
4. What is the output of the following snippet? for x in range (5): if x==2: continue print(x,end='') **(M-2024)**
   (A) 0 1 3 4 (B) 0 1 2 (C) 0 1 2 3 4 (D) 0 1 2 3

(CHAPTER-7)(PYTHON FUNCTIONS)

1. A named blocks of code that are designed to do one specific job is called as
   (A) Loop (B) Branching **(C) Function** (D) Block
2. A Function which calls itself is called as---- **[M-2023]**
   (A) Built-in **(B) Recursion** (C) Lambda (D) return
3. Which function is called anonymous un-named function------- **[M-2022, J-2023, J-2024]**
   (A) Lambda (B) Recursion (C) Function (D) define
4. Which of the following keyword is used to begin the function block? **[S-2020, J-2022]**
   (A) define (B) for (C) finally **(D) def**
5. Which of the following keyword is used to exit a function block? **[S-2021]**
   (A) define **(B) return** (C) finally (D) def
6. While defining a function which of the following symbol is used.
   (A) ; (semicolon) (B) . (dot) **(C) : (colon)** (D) $ (dollar)
7. In which arguments the correct positional order is passed to a function?
   (A) Required (B) Keyword (C) Default (D) Variable - length
8. Read the following statement and choose the correct statement(s)
   (I) In Python, you don't have to mention the specific data types while defining function
   (II) Python keywords can be used as function name
   (A) I is correct and II is wrong (B) Both are correct
   (C) I is wrong and II is correct (D) Both are wrong
9. Pick the correct one to execute the given statement successfully. **(M-2024)**
   if ____ : print(x, " is a leap year")
   (A) x%2=0 **(B) x%4==0** (C) x/4=0 (D) x%4=0
10. Which of the following keyword is used to define the function test python?
    (A) define (B) pass **(C) def** (D) while
1. Evaluate the following function and write the output. X=14.4 Print (math .floor(X)) **[M-2020]**
   (A)13 **(B) 14** (C) 15 (D) 14.3

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(CHAPTER-8)(STRINGS AND STRING MANIPULATION)

1. Which of the following is the output of the following python code? str1="TamilNadu" print(str1[::-1])
(A) Tamilnadu (B) Tmlau (C) udanlimaT. **(D) udaNlimaT**

2. What will be the output of the following code? str1 = "Chennai Schools" str1[7] = "-" **[M-2022]**
(A) Chennai-Schools (B) Chenna-School **(C) Type error** (D) Chennai

3. Which of the following operator is used for concatenation? **[M-2023, J-2024]**
(A) + (B) & (C) * (D) =

4. Defining strings within triple quotes allows creating:
(A) Single line **(B) Multiline** (C) Double line (D) Multiple

5. Strings in python: **[S-2021]**
(A) Changeable (B) Mutable **(C) Immutable** (D) flexible

6. Which of the following is the slicing operator? **[M-2024]**
(A) { } **(B) [ ]** (C) < > (D) ( )

7. What is stride? **[J-2022]**
(A) index value of slide operation (B) first argument of slice operation
(C) second argument of slice operation **(D)third argument of slice operation**

8. Which of the following formatting character is used to print exponential notation in upper case?
(A) %e **(B) %E** (C) %g (D) %n

9. Which of the following is used as placeholders or replacement fields which get replaced along with format ( ) function?
(A) { } (B) < > (C) ++ (D) ^^ **[J-2023]**

10. The subscript of a string may be:
(A) Positive (B) Negative (C) Both (a) and (b) **(D) Either (a) or (b)**

1. What will be the output of the following code? str = "NEW DELHI" str 3 = " " **[M-2020]**
(A)NEW-DELHI.. (B) NE-DELHI (C) NEW DELHI (D) Type error

2. In python, which operator is used to display a sting multiple number of times? **[S-2020]**
(A) *(Multiplication) (B) + (Addition) (C) – (Subtraction) (D) / (Division

(CHAPTER-9)(LISTS, TUPLES, SETS AND DICTIONARY)

1. Pick odd one in connection with collection data type **[J-2023]**
(A) List (B) Tuple (C) Dictionary **(D) Loop**

2. Let list1=[2,4,6,8,10], then print(List1[-2]) will result in --- **[S-2021]**
(A) 10 **(B) 8** (C) 4 (D) 6

3. Which of the following function is used to count the number of elements in a list?
(A) count() (B) find() **(C) len()** (D) index()

4. If List=[10,20,30,40,50] then List[2]=35 will result **[M-2024]**
(A) [35,10,20,30,40] (B) [10,0,40,50,35] **(C) [10,20,35,40,50]** (D) [10,35,30,40,50]

5. If List=[17,23,41,10] then List. append(32) will result --- **[M-2022]**
(A) [32,17,23,41,10] **(B) [17,23,41,10,32]** (C) [10,17,23,32,41] (D) [41,32,23,17,10]

6. Which of the following Python function can be used to add more than one element within an existing list?
(A) append( ) (B) append_more( ) **(C) extend( )** (D) more( )

7. What will be the result of the following Python code? S=[x**2 for x in range(5)] print(S) **[J-2022]**
(A) [0,1,2,4,5] **(B) [0,1,4,9,16]** (C) [0,1,4,9,16,25] (D) [1,4,9,16,25]

8. What is the use of type() function in python? **[J-2024]**
(A) To create a Tuple (B) To know the type of an element in tuple
(C) To know the data type of python object (D) To create a list

9. Which of the following statement is not correct?
(A) A list is mutable (B) A tuple is immutable
(C) The append() function is used to add an element.
(D) The extend() function is used in tuple to add elements in a list

10. Let setA={3,6,9}, setB={1,3,9} print(setA|setB) What will be the result of the following snippet? **[M-2023]**
(A) {3,6,9,1,3,9} (B) {3,9} (C) {1} **(D) {1,3,6,9}**

11. Which of the following set operation includes all the elements that are in two sets but not the one that are common to two sets?
(A) Symmetric difference (B) Difference (C) Intersection (D) Union

12. The keys in Python, dictionary is specified by-- (A) = (B) ; (C) + **(D) :** **[M-2020]**

1. Marks = [20,40,60,80,100] print(Marks[-2]) What will be the output? **[S-2020]**
(A) 60 (B) 100 (C) 40 **(D) 80**

CHAPTER-10) (PYTHON CLASSES AND OBJECTS)

1. Which of the following are the key features of an object oriented programming language?
(A) Constructor and Classes (B) Constructor and Object
(C) Classes and Objects (D) Constructor and Destructor

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2. Functions defined inside a class:
(A) Functions (B) Module **(C) Methods** (D) section
3. Class members are accessed through which operator? **[M-2020, J-2022, M-2023]**
(A) & **(B) .** (C) # (D) %
4. Which of the following method is automatically executed when an object is created?
(A) __object__( ) (B) __del__( ) (C) __func__( ) **(D) __init__( )**
5. A private class variable is prefixed with **[J-2024]**
(A) __ (B) && (C) ## (D) **
6. Which of the following method is used as destructor? **[M-2022]**
(A) __init__( ) (B) __dest__( ) (C) __rem__( ) **(D) __del__( )**
7. Which of the following class declaration is correct? **[S-2020]**
(A) class class_name (B) class class_name<>
(C) class class_name: (D) class class_name[ ]
8. Which of the following is the output of the following program?
class Student: def __init__(self, name): self.name=name S=Student("Tamil")
(A) Error **(B) Tamil** (C) name (D) self
9. Which of the following is the private class variable?
(A) __num (B) ##num (C) $$num (D) &&num
10. The process of creating an object is called as------ **[S-2021, J-2023, M-2024]**
(A) Constructor (B) Destructor (C) Initialize **(D) Instantiation**

(CHAPTER-11)(DATABASE CONCEPTS)

1. What is the acronym of DBMS? **[S-2021]**
(A) Data Base Management Symbol (B) Database Managing System
(C) Data Base Management System (D) Data Basic Management System
2. A table is known as ---- **[J-2022, J-2023]**
(A) tuple (B) attribute **(C) relation** (D) entity
3. Which database model represents parent-child relationship? **(M-2023]**
(A) Relational (B) Network **(C) Hierarchical** (D) Object
4. Relational database model was first proposed by--- **[S-2020]**
(A) E F Codd (B) E E Codd (C) E F Cadd (D) E F Codder
5. What type of relationship does hierarchical model represents? **[J-2024]**
(A) one-to-one **(B) one-to-many** (C) many-to-one (D) many-to-many
6. Who is called Father of Relational Database from the following?
(A) Chris Date (B) Hugh Darween **(C) Edgar Frank Codd** (D) Edgar Frank Cadd
7. Which of the following is an RDBMS?
(A) Dbase (B) Fox pro **(C) Microsoft Access** (D) Microsoft Excel
8. What symbol is used for SELECT statement? **[M-2020, M-2024]**
(A) σ (B) Π (C) X (D) Ω
9. A tuple is also known as -- **[M-2023]**
(A) table **(B) row** (C) attribute (D) field
10. Who developed ER model?
(A) Chen (B) EF Codd (C) Chend (D) Chand

(CHAPTER-12) (STRUCTURED QUERY LANGUAGE)

1. Which commands provide definitions for creating table structure, deleting relations, and modifying relation schemas?
(A) DDL (B) DML (C) DCL (D) DQL
2. Which command lets to change the structure of the table?
(B) SELECT (B) ORDER BY (C) MODIFY **(D) ALTER**
3. The command to delete a table is ----- **[M-2020, J-2022]**
(A) DROP (B) DELETE (C) DELETE ALL (D) ALTER TABLE
4. Queries can be generated using --- **[J-2024]**
(A) SELECT (B) ORDER BY (C) MODIFY (D) ALTER
5. The clause used to sort data in a database **[S-2021, M-2022, J-2023, M-2024]**
(A) SORT BY **(B) ORDER BY** (C) GROUP BY (D) SELECT
1. ------command is used to remove a table from the database **[M-2023]**
(A) DELETE ALL **(B) DROP TABLE** (C) ALTER TABLE (D) DELETE
2. Which is Data Control language command in SQL? **[S-2020]**
(A) Alter **(B) Grand** (C) Truncate (D) Commit

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(CHAPTER-13)(PYTHON AND CSV FILES)

1. A CSV file is also known as a …. **[M-2020, M-2024]**
   (A) Flat File (B) 3D File (C) String File (D) Random File
2. The expansion of CRLF is ---- **[M-2022, J-2024]**
   (A) Control Return and Line Feed (B) Carriage Return and Form Feed
   (C) Control Router and Line Feed **(D) Carriage Return and Line Feed**
3. Which of the following module is provided by Python to do several operations on the CSV files?
   (A) py (B) xls **(C) csv** (D) os
4. Which of the following mode is used when dealing with non-text files like image or exe files? **[J-2022, M-2023]**
   (A) Text **(B) Binary mode** (C) xls mode (D) csv mode
5. The command used to skip a row in a CSV file is --- **[J-2023]**
   (A) next( ) (B) skip( ) (C) omit( ) (D) bounce( )
6. Which of the following is a string used to terminate lines produced by writer () method of csv module?
   (A) Line Terminator (B) Enter key (C) Form feed (D) Data Terminator
7. What is the output of the following program?
   import csv d=csv.reader(open('c:\PYPRG\ch13\city.csv')) next(d) for row in d: print(row)
   if the file called "city.csv" contain the following details
   (A) chennai,mylapore **(B) mumbai,andheri**
   (C) chennai mumba (D) chennai,mylapore mumbai,andheri
8. Which of the following creates an object which maps data to a dictionary?
   (A) listreader() (B) reader() (C) tuplereader() **(D) DicReader ( )**
9. Making some changes in the data of the existing file or adding more data is=
   (A)Editing (B) Appending **(C) Modification** (D) Alteration
10. What will be written inside the file test.csv using the following program
    import csv D = [['Exam'],['Quarterly'],['Halfyearly']] csv.register_dialect('M',lineterminator = '\n')
    with open('c:\pyprg\ch13\line2.csv', 'w') as f: wr = csv.writer(f,dialect='M') wr.writerows(D) f.close()
    (A) Exam Quarterly Halfyearly (B) Exam Quarterly Halfyearly
    (C) E QH **(D) Exam, Quarterly, Halfyearly**

1. The module which allows interface with the windows operating system is: **[S-2021, J-2023]**
   (A) csv module **(B) OS module** (C) getopt module (D) sys module
2. CSV is expanded as: **[S-2020]**
   (A) Comma separated vales (C) Condition Separated values
   (B) Comma Special values (D) Condition special values

(CHAPTER-14)(IMPORTING C++ PROGRAMS IN PYTHON)

1. Which of the following is not a scripting language?
   (A) JavaScript (B) PHP (C) Perl **(D) HTML**
2. Importing C++ program in a Python program is called--- **[M-2023]**
   (A) Wrapping (B) Downloading (C) Interconnecting (D) Parsing
3. The expansion of API is
   (A) Application Programming Interpreter **(B) Application Programming Interface**
   (C) Application Performing Interface (D) Application Programming Interlink
4. A framework for interfacing Python and C++ is---- **[M-2020, M-2022]**
   (A) Ctypes (B) SWIG (C) Cython **(D) Boost**
5. Which of the following is a software design technique to split your code into separate parts?
   (A) Object oriented Programming **(B) Modular programming**
   (C) Low Level Programming (D) Procedure oriented Programming
6. The module which allows you to interface with the Windows operating system is – **[J-2023]**
   (A) OS module (B) sys module (C) csv module (D) getopt module
7. getopt() will return an empty array if there is no error in splitting strings to **[J-2022]**
   (A) argv variable (B) opt variable **(C) args variable** (D) ifile variable
8. Identify the function call statement in the following snippet.
   if __name__ =='__main__': main(sys.argv[1:])
   (A) main(sys.argv[1:]) **(B) __name__** (C) __main__ (D) argv
9. Which of the following can be used for processing text, numbers, images, and scientific data?
   (A) HTML (B) C (C) C++ **(D) PYTHON**
10. What does __name__ contains?
    (A) C++ filename (B) main() name **(C) python filename** (D) os module name

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1. Which of the following not scripting language? **[S-2020]**
   (A) Ruby **(B) DBMS** (C) Perl (D) JavaScript

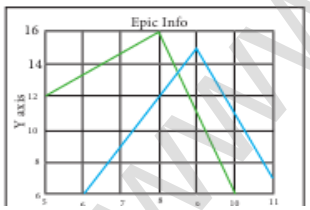
(CHAPTER-15)(DATA MANIPULATION THROUGH SQL)

1. Which of the following is an organized collection of data? **[M-2020]**
   (A) Database (B) DBMS (C) Information (D) Records
2. SQLite falls under which database system? **(S-2021, M-2022]**
   (A) Flat file database system **(B) Relational database system**
   (C) Hierarchical database system (D) Object oriented Database system
3. Which of the following is a control structure used to traverse and fetch the records of the database?
   (A) Pointer (B) Key **(C) Cursor** (D) Insertion point
4. Any changes made in the values of the record should be saved by the command
   (A) Save (B) Save As **(C) Commit** (D) Oblige
5. Which of the following executes the SQL command to perform some action?
   (A) Execute( ) (B) Key( ) (C) Cursor( ) (D) run( )
6. Which of the following function retrieves the average of a selected column of rows in a table?
   (A) Add( ) (B) SUM( ) **(C) AVG( )** (D) AVERAGE( )
7. The function that returns the largest value of the selected column is – **[J-2022, M-2023]**
   (A) MAX( ) (B) LARGE( ) (C) HIGH( ) (D) MAXIMUM()
8. Which of the following is called the master table?
   (A) sqlite_master (B) sql_master (C) main_master (D) master_main
9. The most commonly used statement in SQL is----- **[J-2023, M-2024]**
   (A) cursor **(B) select** (C) execute (D) commit
10. Which of the following keyword avoid the duplicate? **[J-2024]**
    (A) Distinct (B) Remove (C) Where (D) Group By
1. Which SQL function returns the number of rows in a table? **(S-2020)**
   (A) SUM() (B) MAX() (C) CHECK() **(D) COUNT**

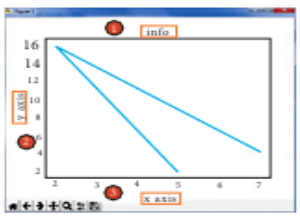
(CHAPTER-16) (DATA VISUALIZATION USING PYPLOT: LINE, PIE AND BAR CHAT)

1. Which is a python package used for 2D graphics?
   (A) matplotlib.pyplot (B) matplotlib.pip (C) matplotlib.numpy (D) matplotlib.plt
2. Identify the package manager for Python packages, or modules.
   (A) Matplotlib **(B) PIP** (C) plt.show() (D) python package
3. Which of the following feature is used to represent data and information graphically?
   (A) Data List (B) Data Tuple (C) Classes Objects **(D) Data Visualization**
4. --- is a collection of resources assembled to create a single unified visual display. **(M-2024)**
   (A) Interface **(B) Dashboard** (C) Objects (D) Graphics
5. Which of the following module should be imported to visualize data and information in python? **[J-2024]**
   (A) csv (B) getopt (C) mysql **(D) matplotlib**
6. --- is a type of chart which displays information as a series of data points connected by straight line segments
   (A) csv (B) Pie chat (C) Bar chart (D) All the above
7. Read the code: import matplotlib.pyplot as plt plt.plot(3,2) plt.show()
   Identify the output for the above coding.

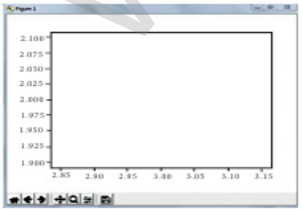
a.



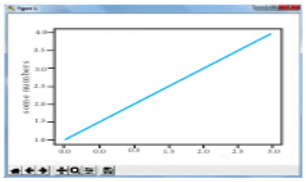
b.



c.



d.



8. Identify the right type of chart using the following hints.
   Hint 1: This chart is often used to visualize a trend in data over intervals of time.
   Hint 2: The line in this type of chart is often drawn chronologically.
   (A) Line chart (B) Bar chart (C) Pie chart (D) Scatter plot

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9. Read the statements given below. Identify the right option from the following for pie chart.
Statement A: To make a pie chart with Matplotlib, we can use the plt.pie() function.
Statement B: The autopct parameter allows us to display the percentage value using the python string formatting.
(A) Statement A is correct (B) Statement B is correct
(C) **Both the statements are correct** (D) Both the statements are wrong

1. Using Matplotlib from within a python script, which method inside the file will display your plot? **[S-2021]**
(A) plot() (B) disp () (C) clear () **(D) show ()**

CHAPTER 1 TO 16 ONE WORD BOOK INSIDE QUESTION & ANSWERS

(CHAPTER-1)(FUNCTION)

1. ..... are the basic building blocks of computer programs.
(A) Subroutines (B) Variables (C) Classes (D) Arrays

2. Which of the following are mandatory to write the type annotations in the function definition?
(A) {} **(B) ( )** (C) [ ] (D) < >

3. A function definition which call itself------
(A) Pure (B) Impure (C) Normal **(D) Recursive**

4. ---- are not treated as definitions
(A) Subroutines **(B) Expression** (C) Statement (D) Algorithm

5. ------ function remove the redundant extra calls.
(A) pure (B) impure (C) friend (D) none

6. In object oriented programming ------ are the interface.
(A) function **(B) classes** (C) structures (D) pointer

7. ----- are expressed using statements of a programming language.
(A) function (B) subroutine **(C) algorithm** (D) structure

8. The most important criteria in writing and evaluating algorithm is
(a) Number of lines (b) Number of blocks **(c)Time to complete a task** d) Storage capacity

9. Which of the following are the building blocks of computer programs?
(a) Function (b) Definitions (c) Parameters **(d) Subroutines**

10. Which of the following are small section of code that are used to perform particular task repeatedly?
(a) Function (b) Definitions **(c) Subroutines** (d) Programs

11. In programming languages, subroutines are also called as
(a) Functions (b) Definitions (c) Parameters (d) Subroutines

12. Which of the following is a unit of code that is often defined within a greater code structure?
(a) Function (b) Definitions (c) Parameters (d) Subroutines

13. a:=(24) is a
(a) Initialization (b) Declaration **(c) Function definition** (d) Assignment

14. Which of the following is a distinct syntactic block?
(a) Function **(b) Definitions** (c) Parameters (d) Subroutines

15. The variables used in function definition is called
(a) Arguments **(b) Parameters** (c) Both a and b (d) None of the above

16. The values which are passed to a function definition is
(a) Arguments b) Parameters (c) Both a and b (d) None of the above

17. The syntax to define function begins with
(a) fun (b) func **(c) let** (d) rec

18. The syntax for function definition is
(a) fun rec fn a1,a2..an:=k (b) func rec fn a1,a2..an:=k
(c) rec fn a1,a2..an:=k **(d) let rec fn a1,a2..an:=k**

19. Which of the following key indicate that the function is a recursive function?
(a) rec (b) recursive (c) recur (d) recu

20. A function definition which call itself is called
(a) main function (b) self-function (c) function definition **(d) recursive function**

21. Which of the following syntax represents the type of a function that gets an input of type 'x' and returns an output of type 'y'?
(a) x=y (b) x=>y (c) x*y **(d) x->y**

22. Which of the following is a set of action that an object can do?
(a) Function (b) Implementation **(c) Interface** (d) Object

23. When you press a light switch, the light goes on, you not have cared how it splashed the light. It is an example for,
(a) Function (b) Implementation (c) Object **(d) Interface**

24. Which of the following is a description of all functions that a class must have in OOP language?
(a) Function (b) Implementation **(c) Interface** (d) Object

25. An instance created for the class is
a) Function b) Variables **c) Objects** d) Constructors

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26. Which of the following defines an object's visibility to the outside world?
a) Interface b) Implementation c) Both a and b d) Function

27. In OOP's classes are
a) Interface b) Implementation c) Both a and b d) Function

28. In OOP's, how the object is processed and executed is
a) Interface **b) Implementation** c) Both a and b d) Function

29. The functions which will give exact result when the same arguments are passed is called ---------
a) User defined **b) Pure functions** c) Impure functions d) Assigned functions

30. sin(0) is a function, which is example for
a) User defined **b) Pure functions** c) Impure functions d) Assigned functions

31. The variables used inside the function may cause side effects through the functions which are not passed with any arguments are called
a) User defined b) Pure functions **c) Impure functions** d) Assigned functions

32. Which of the following do not have any side effects?
a) User defined **b) Pure functions** c) Impure functions d) Assigned functions

33. Which of the following are expressed using statements of a programming language?
a) Specifications b) Pseudo Code **c) Algorithms** d) Flowchart

34. Which of the following carries out the instructions defined in the interface?
a) Function **b) Implementation** c) Interface d) Object

35. The following function is an example for let rec sum x y: Return x + y
a) User defined b) Recursive function c) Normal function d) Assigned function

36. The algorithm can be depicted as
a) Specifications b) Pseudo Code **c) Algorithm** d) Flowchart

37. The function definition is introduced by the keyword
a) def **b) let** c) rec d) requires

38. …… are the basic building blocks of computer programs.
a) Code **b) Subroutines** c) Modules d) Variables

39. In programming languages, subroutines are called as ……..
a) Functions b) Task c) Modules d) Code

40. All functions are ……. definitions.
a) datatype b) dynamic c) return **d) static**

41. …… binds values to names.
a) Algorithms b) Variables c) Interface **d) Definitions**

42. Random() is an example of …… function.
a) user-defined **b) impure** c) pure d) recursive

43. In the function definition, the pre-condition is given by ……
(a) Needed (b) Let (c) Returns **(d) Requires**

44. In the function definition, post condition is given by ……
(a) Needed (b) Let **(c) Returns** (d) Requires

45. ……. bind values to names.
a) Modules b) Subroutines **c) Definition** d) Function

46. The formula should be written after …….. sign
(a) + (b) – **(c) =** (d) ++

47. To define a recursive function ……. is used.
(a) Let (b) Let r (c) Let rfn **(d) Let rec**

48. A …….. combine the external interface with an implementation of that interface.
(a) class (b) static **(c) class declaration** (d) rec

49. An …… is an instance created from the class.
(a) Object (b) Functions (c) Subroutines (d) Definitions

50. An …… attributes and behaviour is controlled by sending functions to the object.
(a) classes **(b) objects** (c) fn (d) let rec

51. The class template specifies the …….. to enable an object to be created and operated properly.
(a) interfaces (b) implementation (c) classes (d) objects

52. The accelerator is the …… between the driver and the engine.
(a) Interface (b) Object (c) Instruction (d) Code

53. sin (0) = 0 is an example for ……. function.
(a) Impure **(b) Pure** (c) Interface (d) Instruction

54. Find the impure function from the following.
(a) Sin (0) (b) Square x (c) Strlen (s) **(d) None of these**

55. The function random ( ) is an example for …….. functions.
(a) pure **(b) impure** (c) dynamic (d) static

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56. Which function definition, doesn't modify the arguments passed to them?
(a) Pure function (b) Impure function (c) Object (d) Interface

57. How many parameters are defined in the function let rec gcd a b : =
(a) 0 (b) 1 **(c) 2** (d) 3

58. In the function definition, the keyword let is followed by ……
(a) Function name (b) Arguments (c) Parameters (d) Implementations

59. If a function is not a recursive one, then ……. is used
(a) abc (b) gcd **(c) let** (d) let rec

60. Find the name of the function, let rec even x : =
(a) Let (b) Rec **(c) Even** (d) x

61. Match the following function definitions with their terms. let rec odd xy : =
Keyword – (i) Xy Recursion – (ii) Odd Function name – (iii) Rec Parameters – (iv) let
(a) 1 – (iv) 2 – (iii) 3 – (ii) 4 – (i) (b) 1 – (i) 2 – (ii) 3 – (iii) 4 – (iv)
(c) 1 – (iv) 2 – (i) 3 – (ii) 4 – (iii) (d) 1 – (i) 2 – (iv) 3 – (ii) 4 – (iii)

62. In an object-oriented programming language, and is a description of all functions that a class must have
(a) Object (b) Class **(c) Interface** (d) Code

63. The …… defines an object's visibility to the outside world.
(a) Object **(b) Interface** (c) Pure function (d) Impure function

(CHAPTER-2)(DATA ABSTRACTION)

1. Expansion of ADT.
(A) Abstract data tuple (B) All data template
(C) Abstract data type (D) Application data type

2. ADT can be implemented using …..
(A) Singly linked list (B) doubly linked list
(C) either A or B (D) neither A or B

3. The process of providing only the essentials and hiding the details is known as-----
(A) Hiding **(B) Abstraction** (C) Providing (D) Calling

4. := is called ------
(A) Equal (B) colon operator **(C) assigned as** (D) Same

5. What allows data abstraction is that we can give a name to a set of memory cells?
(a) Tuple (b) Set (c) Dictionary **(d) List**

6. The Splitting of the program into many modules are called as ……
(a) Modularity (b) Structures (c) Classes (d) List

7. The list can also be called as
a) Functions b) Class **c) Pairs** d) Structure

8. A linked list is of ……..
(a) Single (b) Double (c) Multiple **(d) Both a and b**

9. The process of providing only the essentials and hiding the details is known as ……..
(a) Modularity (b) Structure (c) Tuple **(d) Abstraction**

10. A powerful strategy for designing programs is ……
a) Data Abstraction **b) 'wishful thinking'** c) Concrete data type d) Abstract Data Template

11. : = is called as ……..
(a) Assigned as (b) Becomes **(c) Both a and b** (d) None of these

12. In list 1st [(0, 10), (1, 20)] – 0 and 1 represents ……..
(a) Value **(b) Index** (c) List identifier (d) Tuple

13. Which of the following function that facilitates the data abstraction?
a) Constructors b) Destructors c) Selectors **d) a and c**

14. nums [0] represent that you are accessing …….. element.
(a) 0 **(b) 1** (c) 2 (d) 3

15. nums [1] indicate that we are accessing …….. element.
(a) 0 (b) 1 **(c) 2** (d) many

16. Which provides modularity?
a) Data types b) Subroutines **c) Abstraction** d) Classes

(CHAPTER-3)(SCOPING)

1. A variable which is declared inside a function which contains another function definition
(A) Local (B) Global (C) Enclosed (D) Build-in

2. Which are loaded as soon as the library files are imported to the program?
(A) Build-in (B) Enclosed (C) Global (D) Local

3. Which of the following is not the example of modules?
(A) Procedures (B) Subroutines (C) Class (D) functions

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4. The Kind of scope of the variable 'a' used in the pseudo code given below Disp(): a:=7 Print a Disp()
(A) Local (B) Global (C) Enclosed (D) Build-in

5. Which scope has the higher priority?
(A) local (B) enclosed (C) global (D) built in

6. Which scope is widest scope?
(A) local (B) enclosed (C) global **(D) built in**

7. ------ programming debug pieces of the program independently.
(A) low level (B) high level **(C) modular** (D) basic

8. What is fundamental concept in access control?
(A) Minimizes risk to object (B) easy access to object
(C) User friendly (D) None

9. The duration for which a variable is alive is called its ……..
(a) End time (b) Scope time **(c) Lifetime** (d) Visible time

10. Write the output (value stored in b) 1. a: = 5 2. b: = a
(a) 0 (b) 3 **(c) 5** (d) 2

11. A Function always the first lookup for a variable name in its ……. scope
(a) Enclosed **(b) Local** (c) Global (d) Built-in

12. The ……. of a variable is that part of the code where it is visible.
(a) Scope (b) data (c) List (d) Tuple

13. ……. can be separately compiled and stored in a library
(a) Characteristics **(b) Modules** (c) Syntax (d) None of these

14. …… also defines the order in which variables have to be mapped to the object in order to obtain the value.
(a) Scope (b) Local (c) Event (d) Object

15. The …… rule is used to decide the order in which the scopes are to be searched for scope resolution.
(a) List (b) Tuple (c) Class **(d) LEGB**

16. The part of a program that can see or use the variables are called
(a) Parameter **(b) Scope** (c) Function (d) Indentation

17. A function will first lookup for a variable name in its …… scope.
(a) Local (b) Enclosed (c) Global (d) Built-in

18. Which of the following keeps track of all these mappings with namespaces?
(a) Application software **(b) Programming languages** (c) System software (d) MySQL

19. A …… variable can be accessed inside or outside of all the functions in a program.
(a) Local **(b) Global** (c) Enclosed (d) Built-in

20. A function defined within another function is called …… function
(a) Member (b) Looping **(c) Nested** (d) Invariant

21. Functions are otherwise called……..
(a) Methods (b) Attributes (c) Class (d) Structures

22. Which of the following variable can be accessed inside or outside of all the functions in a program?
(a) Local (b) Enclosed **(c) Global** (d) Built-in

23. When a compiler or interpreter search for a variable in a program, it first search and then search … scope
(a) L, E (b) EG (c) GB (d) BL

24. Built-in scopes are called as …… scope.
(a) Local (b) Global (c) Class **(d) Module**

25. Any variable or module defined in the library functions has …… scope.
(a) Local (b) Global **(c) Built-in** (d) Enclosed

26. The arrangement of private instance variables and public methods ensure- the principle of
a) Inheritance b) Polymorphism c) Abstraction **d) Encapsulation**

27. Identify which is not a variable scope.
(a) Module (b) Built – in (c) Enclosed **(d) Pointer**

28. A single …… can contain one or several statements closely related to each other.
(a) Module (b) Local (c) Global (d) Enclosed

29. A …… is a part of a program.
(a) Code **(b) Module** (c) Flowchart (d) System software

30. Scope refers to the visibility of …….
a) Variables b) Parameters **c) All of these** d) Functions

31. Find the wrong statement from the following
(a) Modules contains data and instructions (b) Modules can be included in a program
(c) Modules cannot have processing logic (d) Modules can be separately combined

32. Which is true about modular programming?
(a) Single procedure can be reused (b) Single procedure cannot be reused

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33. The arrangement of private instance variables and public methods ensures the principle of ……
(a) Security **(b) Data encapsulation** (c) Inheritance (d) Class
34. All members in a python class are by …… default.
(a) Private **(b) Public** (c) Protected (d) Local
35. The members in C ++ and Java, by default, are ……
(a) Private (b) Public (c) Protected (d) Local

(CHAPTER-4)(ALGORITHMIC STRATEGIES)

1. ---not a factor measure the execution time of an algorithm?
(A) Speed (B) O.S (C) Programming **(D) Selection**
2. Which of the following is a finite set of instructions to accomplish a particular task?
(A) Flow char (B) Flow **(C) Algorithm** (D) Syntax
3. Step by step procedure for solving a given problem:
(A) Program (B) Pseudo code (C) flow chart **(D) Algorithm**
4. Which of the following is not a characteristic of an algorithm?
(A) Input **(B) Program** (C) Finiteness (D) Simplicity
5. This is a theoretical performance analysis of an algorithm.
(A) Priori estimates (B) Posteriori (C) Space factor (D) Time factor
6. Which of the following algorithmic approach is similar to divide and conquer approach?
(A) Insertion **(B) Dynamic** (C) Selection (D) Bubble
7. What is another name for Binary search?
(A) Linear **(B) Half interval** (C) Decimal (D) Boolean
8. Which is measured by counting the number of key operation?
(A) time (B) space (C) fixed time (D) variable part
9. Space is measured by the ----memory space required by the algorithm.
(A) zero (B)minimum (C) average **(D) maximum**
11. The complexity of linear search algorithm is
(A) O(n) (B) O(log n) (C) O(n2) (D) O(n log n)
12. From the following sorting algorithms which has the lowest worst case complexity?
(A) Bubble sort (B) Quick sort **(C) Merge sort** (D) Selection sort
13. Which of the following is not a stable sorting algorithm?
(A) Insertion sort **(B) Selection sort** (C) Bubble sort (D) Merge sort
14. Time complexity of bubble sort in best case is
(A) θ (n) (B) θ (nlogn) (C) θ (n2) (D) θ (n(logn) 2
15. ---------is an example of
a) worst case **b) best case** c) Average case d) Null case
16. The word Algorithm has come to refer to a method ……
(a) Solve a problem (b) Insert a data (c) Delete data (d) Update data
17. Binary search also called
a) Half-interval search b) Sequential search c) Unordered search d) Full-interval search
18. An algorithm that yields expected output for a valid input is called as ……
(a) algorithm **(b) Algorithmic solutions** (c) Binary search (d) half interval
19. The program should be written for the selected language with specific ……
(a) Input (b) Output **(c) Syntax** (d) Algorithm
20. …… is an expression of the algorithm in a programming language.
(a) Program (b) Algorithm (c) Syntax (d) Input
21. …….. is a step-by-step procedure for solving a given problem
a) Program **b) Algorithm** c) Statements d) Structure
22. Which one of the following is a theoretical performance analysis of an algorithm?
(a) A posteriori testing **(b) A priori estimates** (c) A preposition (d) A post preori
23. …… is called performance measurement.
(a) A posteriori testing (b) A priori estimates (c) A preposition (d) A post preori
24. Which of the following statement is true?
(a) Space Factor is the maximum memory space required by an algorithm
(b) Space Factor is the minimum memory spaces required by an algorithm
25. In space complexity, the space required by an algorithm is equal to the sum of …… part and …… part.
(a) Fixed, Variable (b) Sum, Avg (c) Rec, Let (d) Avg, Sum
26. …… is an example of a variable part of space complexity.
(a) Variable (b) Algorithm **(c) Recursion** (d) Structure

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27. Which of the following component is defined as the total space required by variables, which sizes depends on the problem and its iteration?
a) Time part **b) Variable part** c) Fixed part d) Memory part

28. How many asymptotic notations are used to represent the time complexity of algorithms?
(a) 1 (b) 2 **(c) 3** (d) 4

29. Which of the following is not a factor used to measure the time efficiency of an algorithm?
a) Speed of the machine b) Operating system c) Programming language **d) Designing an algorithm**

30. …… is the reverse of Big O.
(a) Big Ω (b) Big Θ (c) Big C (d) Big ⊗

31. …… describes the worst case of an algorithm.
(a) Big Q (b) Big Θ **(c) Big O** (d) Big C

32. …….. Describe the lower bound of an algorithm.
(a) Big Ω (b) Big Θ (c) Big O (d) Big ⊗

33. Which search technique is also called sequential search techniques?
(a) Binary (b) Binary Tree (c) Hash **(d) Linear**

34. What value will be returned by the linear search technique if the value is not found?
(a) 0 (b) 1 **(c) -1** (d) +1

35. Which search algorithm is called a Half-Interval search algorithm?
(a) Binary (b) Binary Tree (c) Hash (d) Linear

36. Which technique is followed by the Binary Search algorithm?
(a) Subroutines (b) Mapping **(c) Divide and conquer** (d) Namespaces

37. In Binary Search, if the search element is …….. to the middle element of the array, then the index of the middle element is returned.
(a) > (b) < **(c) =** (d) < >

38. In Binary search, if the search element is greater than the number in the middle index, then select the elements to the side of the middle index.
(a) Right (b) Left (c) Middle (d) Bottom

39. …… is a simple sorting algorithm.
(a) Binary **(b) Bubble** (c) Selection (d) Insertion

40. Which one of the following is not a characteristic of Bubble Sort?
(a) Simple (b) Too slow **(c) Too fast** (d) Less efficient

41. In selection sort, there will be …….. exchange for every pass through the list.
(a) 0 **(b) 1** (c) 2 (d) 3

42. How many passes are used in the Insertion Sort to get the final sorted list?
(a) 0 (b) 1 (c) n **(d) n -1**

43. …….. approach is similar to divide and conquer.
(a) Dynamic programming (b) Modular (c) Procedural (d) Divide and Conquer

44. …… is an example of a dynamic programming approach.
(a) Fibonacci (b) Prime (c) Factorial (d) Odd or Even

45. Match the following.
(1) Linear search – (i) $o(n^2)$ (2) Binary – (ii) o(n) (3) Bubble Sort – (iii) o(log n) (4) Merge Sort – (iv) o(n log n)
(a) 1 – (ii), 2 – (iii), 3 – (i), 4 – (iv) (b) 1 – (i), 2 – (ii), 3 – (iii), 4 – (iv)
(c) 1 – (iv), 2 – (iii), 3 – (ii), 4 – (i) (d) 1 – (iv), 2 – (ii), 3 – (i), 4 – (iii)

46. Time complexity of bubble sort in worst case is ……..
(a) θ(n) (b) θ(n log n) **(c) θ(n2)** (d) θ(n(log n)2)

47. The complexity of Merge Sort is ……
(a) θ(n) **(b) o(n log n)** (c) θ(n2) (d) θ(n(log n)2)

(CHAPTER-5)(PYTHON - VARIABLES AND OPERATORS)

1. Which key is pressed to execute python script?
(A) F5 (B) F2 (C) F1 (D) F3

2. This symbol is used to print more than one item on a single line?
(A) Semicolon (;) (B) Dollar ($) **(C) Comma (,)** (D) Colon (:)

4. What will be the value of X from the following code snipped? A,B=10,3 X=A if(A/B==3) else B print(X)
(A) 3 (B) 10 (C) True **(D) False**

5. In how many ways programs can be written in python?
(A) Two (B) Three (C) Four (D) Five

6. Which of the following is the valid python program file name?
(A) pycpp.py (B) pycpp.cpp (C) pycpp.c (D) pycpp.js

7. The floor division operator in Python.
(A) / (B) % (C) % % **(D) //**

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8. Extension of python files is
(A) .pyt (B) .txt (C) .Odm **(D) .Py**

9. ----- separation is necessary between tokens.
(A) ; (B) Delimiter **(C) White Space** (D) :

10. Python language was released in …..
(A) 1992 **(B) 1991** (C) 1994 (D) 2001

11. Which of the following is the command prompt symbol of Python?
(A) >> (B) << **(C) >>>** (D) <<<

12. Which of the following python built-in function is used to display result on the screen?
(A) display( ) (B) show( ) (C) output( ) **(D) print( )**

13. Python supports ---- programming approaches.
(A) procedural (B) object oriented **(C) both** (D) assembly

14. A script is a ----- file.
(A) binary (B) Hexadecimal (C) html **(D) text**

15. Numeric literals are of ---- types
(A) 4 **(B) 3** (C) 8 (D)5

16. Numeric literals --------
(A) mutable **(B) immutable** (C) both (D) none

17. Python got its name from ……
(a) Monthly Python's Flying Square (b) Monthly Python's Flying Circus
(c) Monty Python's Flying Circus (d) Monty Python's Flying Square

18. In Python, the script mode programs can be stored with the extension.
a) .pyt **b) .py** c) .pyh d) .pon

19. How many modes of programming are there in python?
(a) 2 (b) 3 (c) 4 (d) 5

20. A sequence of elementary lexical components of Python statement is known as
a) Tokens b) Keywords c) Delimiters d) Literals

21. …… mode is used to create and edit Python source file.
(a) Line **(b) Script** (c) Interactive (d) Interface

22. Which mode can be used as a simple calculator?
(a) Line (b) Script **(c) Interactive** (d) Interface

23. The …….. command is used to open the Python shell window.
a) File → File New b) File→ New c) File → File Open **d) File → New File**

24. Which command is used to get output ……
(a) Cout **(b) Print** (c) Print f (d) Write

25. Find the correct one from the following.
(a) Scripts are reusable and not editable (b) Scripts are not reusable and they are editable
(c) Scripts are not reusable, not editable **(d) Scripts are both reusable and editable**

26. In Python, ……..is a simple assignment operator
a) = **b) =** c) == d) #

27. What is the default name for a blank script text editor?
(a) Untitled **(b) Untitled 1** (c) Document 1 (d) Editor 1

28. What is the keyboard shortcut to Run?
(a) F5 (b) Alt + F5 (c) Shift + F5 (d) Ctrl + F5

29. A complex number is made up of two ……. values.
a) Integer b) String c) octal **d) floating-point**

30. Errors in the python script appear in …… color.
(a) Yellow **(b) Red** (c) Blue (d) Black

31. …… function helps to enter data at run time by the user.
(a) Input () (b) Output () (c) Plus (d) Def

32. If …… is not given in input ( ), no message is displayed on the screen.
(a) Equal (b) Red **(c) Prompt string** (d) Octal

33. Identify the wrong statement from the following. The input ( ) accepts all data as
(a) Strings (b) Characters **(c) Numbers** (d) All the above

34. The …… function is used to convert string data as integer data explicitly.
(a) Int () (b) main () (c) Void () (d) Def ()

35. …… are ignored by the python interpreter.
(a) Keywords (b) Tokens **(c) Delimiters** (d) Comments

36. Comments are of …… or …… lines.
(a) One. Two **(b) Single ,Multi** (c) Int , Float (d) Str, Chr

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37. …… are used to indicate blocks of codes in python.
(a) Whitespaces (b) { } (c) [ ] (d) < >

38. Python breaks each logical line into a sequence of elementary lexical components called …
(a) Whitespaces **(b) Tokens** (c) Commands (d) Curly braces

39. How many types of tokens are there?
(a) 1 (b) 2 **(c) 5** (d) 10

40. Pick the odd one out.
(a) Identifiers (b) Keywords (c) Delimiters **(d) Comments**

41. An identifier is a name used to identify a ……
(a) Variable (b) Function (c) Class **(d) All of these**

42. Pick the odd one out.
(a) Sum, regno, numl, 12Name, – Marks (b) False, class, is, as, if, end
(c) Relational, while, logical, Assignment, (d) + * % ** = =

43. Find the correct statement from the following
(a) Continue is an identifier (b) Sum is a keyword
(c) ** = is a delimiter (d) = = is an assignment operator

44. How many types of operators are there?
(a) 2 (b) 3 (c) 4 **(d) 5**

45. Match the following
1. // – (i) Modulus 2. # – (ii) Floor division 3. % – (iii) Strings 4. ||| ||| – (iv) Comments
(a) 1 – (ii), 2 – (iv), 3 – (i), 4 – (iii) (b) 1 – (i), 2 – (ii), 3 – (iii), 4 – (iv)
(c) 1 – (iv), 2 – (ii), 3 – (i), 4 – (iii) (d) 1 – (iv), 2 – (i), 3 – (iii), 4 – (ii

46. …… are special words used by Python Interpreter
(a) Intentifier **(b) Keywords** (c) Operator (d) Literals

47. The value of an operator used is ……
(a) 0 (b) 1 **(c) Operands** (d) NULL

48. Which operator checks the relationship between two operands?
(a) Relational (b) Comparative **(c) Both** (d) None of the these

49. Identify Not equal to the operator in python?
(a) < > (b) == (c) NOT EQUAL **(d) ! =**

50. How many logical operators are there?
(a) 2 **(b) 3** (c) 4 (d) 5

51. How many comparative operators are there?
(a) 4 (b) 5 **(c) 6** (d) 7

52. …… is the simple assignment operator.
(a) ! = (b) > (c) >> **(d) =**

53. Compound operators come under the category of …… operators.
(a) Arithmetic (b) Logical (c) Plus **(d) Assignment**

54. Identify which is not a delimiter
(a) & = (b) : (c) ; **(d) ::**

55. How many types of literals are there?
(a) 2 **(b) 3** (c) 4 (d) 5

56. Numeric literals are ……
(a) Integer, Float, Complex (b) Int, Float, Void (c) Int, Float, Char (d) Int, Float, Boolean

57. Strings in python are represented using
(a) ” (b) “” (c) ‘‘‘ ‘‘‘ **(d) All of these**

58. Multiline string literal is given by ……
(a) ‘ Single (b) ‘’ Double **(c) ‘‘‘ ‘‘‘ triple quotes** (d) None

59. The two values accepted by Boolean literals are…… or ……
(a) Yes, No **(b) True, False** (c) +,- (d) =, +

60. …… is the escape character.
(a) + (b) t **(c) ** (d) %

61. Which one of the following is the newline character?
(a) \t (b) \v (c) \r **(d) \n**

62. …… is the escape character for carriage return.
(a) \t (b) \v **(c) \r** (d) \n

63. How much Integer data are there?
(a) 2 **(b) 3** (c) 4 (d) 5

64. OX represents …… integer.
(a) Decimal **(b) Hexadecimal** (c) Octal (d) Binary

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65. Octal integer uses …… to denote octal digits
(a) OX **(b) O** (c) OC (d) Od

66. Find the hexadecimal Integer.
(a) 0102 (b) 0876 (c) 0432 **(d) 0X102**

67. How many floating-point values are there is a complex number?
(a) 1 **(b) 2** (c) 3 (d) 4

68. What is another name for fundamental data type?
(a) Class **(b) Built – in** (c) Type def (d) User defined

69. Which one of the following statements is wrong?
(a) Octal Integer uses upper and lower case O (b) Hexadecimal Integer uses upper and lower case OX
(c) Long integer uses upper and lower case 1.

(CHAPTER-6)(CONTROL STRUCTURES)

1. What is the output of the following snippet? For i in range (2,10,2): Print (i ,end = ' ')
(A) 8 6 4 2 (B) 2 4 6 8 10 **(C) 2 4 6 8** (D) 2 4 6

2. Which is the most comfortable loop?
(A) do..while (B) while **(C) for** (D) if..elif

3. --- is used to skip the remaining part of the loop and start with next iteration?
(A) break (B) pass **(C) continue** (D) null

4. In Python, for loop uses the --- function in the sequences to specify the initial, final and increment /decrement values.
(A) range () (B) input () (C) Stop (D) Print ()

5. In python programming – statement is a null statement and it is used as a place holder.
(A) break (B) continue **(C) Pass** (D) None

6. What will be the output of the following python code? For i in range (1,10,2): Print (i ,end = ' ')
(A) 1 3 5 7 9 (B) 1 2 4 6 8 (C) 2 4 6 8 10 (D) 1 3 5 7 10

7. What will be the output of the following python snippet? A=5 While (a<=20): Print (a%a, end= ' ') i=i+1
(A) 15 16 17 18 19 20 (B) 20 19 18 17 16 15 (C) 0 0 0 0 0 0 (D) 1 1 1 1 1 1

8. Match the following :
(A) If..elif – (i) jump (B) While – (ii) block (C) Pass - (iii) Loop (D) indentation – (iv) Branching
(A) (a)- (iv), (b)- (iii), (c)- (i), (d)- (ii) (B) (a)- (i), (b)- (iii), (c)- (iv), (d)- (ii)
(C) (a)- (iv), (b)- (i), (c)- (iii), (d)- (ii) (D) (a)- (i), (b)- (iv), (c)- (ii), (d)- (iii)

9. The optional parameter of range ( ) function in Python
(A) Start (B) stop **(C) Step** (D) slice

10. Which of the following is not a jump keyword.
(A) Pass (B) continue **(C) skip** (D) break

11. A program statement that causes a jump of control from one part of the program to another is called..
(A) Control Statements (B) Control Structure
(C) Either (A) or (B) (D) Neither (A) nor (B)

12. …….. statement allows to execute a statement or group of statements multiple times ---
(A) Branching (B) Conditional (C) Jumping **(D) Loop**

13. The output of the Segment: for in range (10, 0, 2) print(i)
(A) 10 9 6 4 2 0 (B) 10 8 6 4 2 (C) 0 2 4 6 8 10 **(D) Error**

14. Which is optional part in range () function?
(A) End **(B) step** (C) stop (D) start

15. Which statement is used to skip the remaining part of a loop and start with next iteration?
(A) break **(B) continue** (C) return (D) goto

16. In if statement which statement has no limit?
(A) Else **(B) elif** (C) nested if (D) nested else

17. Which statement is null statement?
(A) break (B) continue **(C) pass** (D) all of these

18. What is the syntax of range()
(A) Range (start,step,stop) (B) Range (stept,starp,stop)
(C) Range (start, stop, step) **(D) range(start, stop, step)**

19. ------ only creates block and sub blocks
(A) tokens (B) keywords (C) operators **(D) indentation**

20. Executable segments that yield the result are ……..
a) Operator **b) Statements** c) Keywords d) Identifiers

21. A program statement that causes a jump of control from one part of the program to another is called …
(a) Control statement **(b) Control structure** (c) Keywords (d) Operator

22. The type which we learned through alternative or branching statements is?
a) looping **b) decision making** c) functions d) classes

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23. A …… is composed of a sequence of statements which are executed one after the another.
a) alternative **(b) Sequential** (c) Function (d) Statement

24. The statement in python used to transfer the control from one part of the program to another unconditionally is
a) Jump b) loop c) alternative d) iterative

25. …… is the simplest of all decision making statements.
(a) Simple if (b) if..else (c) else if (d) Switch

26. …….. statement provides control to check the true block as well as the false block.
(a) Simple if **(b) if..else** (c) else if (d) Switch

27. In for loop of Python, the …….. refers to the initial, final, and increment value.
a) else b) sequence **c) range** d) b or c

28. How many types of looping constructs are there?
(a) 1 **(b) 2** (c) 3 (d) 4

29. The …….. part of while is optional.
a) else b) sequence c) range d) b or c

30. Control of the program flows to the statements immediately after the body of the loop by using statements.
a) continue b) pass **c) break** d) go to

31. Which one of the following is the entry check loop type?
(a) While (b) Do while (c) If (d) If…else

32. How many parameters are there in the print function?
(a) 2 (b) 3 (c) 4 (d) 5

33. Escape sequences can be given using ……. parameter in print ( ) function.
(a) Ret (b) Let **(c) End** (d) Sep

34. Which parameter is used to specify any special characters?
(a) Ret (b) Let (c) End **(d) Sep**

35. If the condition is checked at the beginning of the loop, then it is called as …… loop.
(a) Exit (b) Exit check **(c) Entry check** (d) Multiple

36. Range ( ) generates a list of values starting from start till ……
(a) Start 1 (b) Start -1 **(c) Stop -1** (d) End

37. Which is the optional part in the range( ) function?
(a) Start (b) Stop **(c) Step** (d) Incr

38. The end value of the range (30, 3, -3) is ……..
(a) 30 (b) -3 (c) 3 **(d) 6**

39. Range(20) has the range value from …… to ……
(a) 0 to 19 (b) 0 to 20 (c) 0 to 18 (d) 0 to 17

40. Range ( ) cannot take the values from …… ……..
(a) String **(b) Print** (c) List (d) Dictionary

41. A loop placed within another loop is called as ……
a) continue b) pass **c) Nested loop** d) go to

42. …….. statements are used to unconditionally transfer the control from one part of the program to another.
(a) While **(b) Jump** (c) For (d) If

43. How many keywords are there to achieve Jump statements in python?
(a) 1 (b) 2 **(c) 3** (d) 4

44. Pick the odd one out.
(a) break **(b) for** (c) continue (d) pass.

45. ……. is used to come out of the loop.
(a) Break (b) For (c) Continue (d) Pass

46. If a loop is left by …… then the else part is not executed.
(a) break (b) for (c) continue (d) pass.

47. …….. statement forces the next iteration to takes place.
(a) Break (b) For **(c) Continue** (d) Pass

48. ……. is the null statement.
(a) Break (b) For (c) Continue **(d) Pass**

49. Python …….. will throw an error for all indentation errors.
(a) Break (b) For (c) Continue **(d) Interpreter**

(CHAPTER-7)(PYTHON FUNCTIONS)

1. Evaluate the following function and write the output.X=14.4 Print (math .floor(X))
(A)13 **(B) 14** (C) 15 (D) 14.3

2. How many spaces are there in per indentation in the python?
(A) 4 (B) 3 (C) 6 (D) 8

3. A variable, with --- scope can be used anywhere in the program.
(A) Local **(B) Global** (C) Default (D) Required

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4. The –Statement causes your function to exit and returns a value to its caller**.**
(A) for (B) def **(C) return** (D) define

5. Which function is called anonymous function?
(A) Lambda (B) Recursion (C) Function (D) define

6. Which of the following special character is used to define variable length arguments?
(A) & (B) $ **(C) *** (D) #

7. Which keyword to be used to define a function in Python?
(A) def (B) local (C) rec (D) global

8. Non-keyword variable arguments are called as
(A) Sets (B) List **(C) Tuples** (D) Dictionary

9. What will be the output of the following Python snippet**?** c=5 def add(): c=c+5 print(c) add()
(A) 5 (B) 10 (C) 15 **(D) Error**

10. Which of the following is not an argument type?
(A) Required (B) Default (C) Keyword **(D) Fixed length**

11. The bin() function returns a binary string prefixed with---
(A) 0 (B) 1 **(C) 0b** (D) 1b

12. What is the output of the following program--- c = 1 def add(): print(c) add()
(A) 1 (B) 0 (C) none (D) C

13. What is the output of the function Print (Chr(66))?
(A) A (B) C (C) b **(D) B**

14. Evaluate the following function and write the output. x = –37.9 print(math.cell(x))
(A) –38 (B) –39 (C) –36 **(D) –37**

15. How many methods are there to pass variable length arguments?
(A) 2 **(**B) 3 (C) 4 (D) 5

16. The condition that is applied in any recursive function is known as ------
(A) condition (B) composition **(C) base condition** **(**D) find condition

17. When more than one arguments has to pass than have already specified which type of argument is used?
(A) required (B) keyword **(C) variable length** **(**D) default

18. The ------ arguments are also local to functions
(A) formal **(**B) actual (C) required (D) keyword

19. Which provide better modularity for application?
(A) structure **(B) function** (C) statement (D) none

20. Which of the following avoids repetition and makes high degree of code reusing?
a) Loop **b) Functions** c) Branching d) Dictionaries

21. A ……. is one or more lines of code, grouped together.
(a) Code – **(b) Block** (c) Function (d) Arguments

22. A block of code begins when a line is indented by ……. spaces usually.
(a) 2 (b) 3 **(c) 4** (d) 5

23. A block within a block is called …… block.
(a) Nested (b) Loop (c) Def (d) In

24. How many types of arguments are used to call a function?
a) 3 b) 5 **c) 4** d) 2

25. How many types of function arguments are there?
(a) 2 (b) 3 **(c) 4** `(d) 5

26. The arguments can be given in improper order in ……. arguments.
(a) Required **(b) Keyword** (c) Default (d) Variable – length

27. Which of the following keyword is used to define an anonymous function?
a) Def b) Alpha c) Range **d) Lambda**

28. How many methods of arguments passing are there in the variable-length method.
(a) 2 (b) 3 (c) 4 (d) 5

29. In python's …….. function supports variable-length arguments.
(a) Input (b) Write (c) Output **(d) Print**

30. Functions that are anonymous un_named are called …….
a) User-defined **b) Lambda** c) Built-in d) Recursive

31. Lambda function can only access …….. variables.
(a) Local (b) Function **(c) Global** (d) Nested

32. How many types of scopes are there?
(a) 2 (b) 3 (c) 4 (d) 5

33. Any loop can be converted into …….
a) Composition **b) Recursion** c) Function d) Branching

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34. The …… function is the inverse of chr ( ) function.
(a) Ord ( ) (b) Abs ( ) (c) Chr ( ) (d) Bin ( )

35. ……. function is the alternative for bin ( ) function.
(a) Ord ( ) **(b) Format ( )** (c) Binary ( ) (d) Ord ( )

36. bin ( ) returns the binary string prefixed with …… for the given integer number
(a) b **(b) ob** (c) obin (d) bin

37. Find the output. d = 43 print('A =ord(d))
(a) 67 (b) 95 (c) 97 **(d) 65**

38. Find the output, d = 43 print (chr(d))
(a) – **(b) +** (c) * (d) /

39. The default precision for fixed-point number is ……
(a) 2 (b) 4 **(c) 6** (d) 8

40. How many formats are there for the format ( ) functions?
(a) 12 (b) 5 **(c) 3** (d) 1

41. ……. function returns the smallest integer greater than or equal to x
(a) Sqrt (b) Flow (c) Floor **(d) Cell**

42. ……. function is used to evaluate the input value.
(a) Input (b) Valuate **(c) Eval** (d) Val

43. Find true statement
(a) Recursive function call itself (b) Recursive function have to be called externally

(CHAPTER-8)(STRINGS AND STRING MANIPULATION)

1. What will be the output of the following code? str = "NEW DELHI" str 3 = "_"
(A)NEW-DELHI (B) NE-DELHI (C) NEW DELHI (D) Type error

2. Which command can be used to remove entire string variable in Python?
(A) rem (B) remove **(C) del** (D) delete

3. In python, which operator is used to display a sting multiple number of times?
(A) * (Multiplication) (B) + (Addition) (C) – (Subtraction) (D) / (Division)

4. ----- character is used to define a string.
(A) Single quotes (B) Double (C) Triple (D) All of these

5. What will be output of the following code? Str1="SCHOOL" Print(str1.replace("O","U"))
(A) SCHOOL (B) SCHUUL (C) SCHL (D) SCHOOUUL

6. What will be output of the following code? Str1="hello" Print(str1.replace("e","a"))
(A) Hella (B) Helle (C) Hell (D) Hallo

7. In Python, --- data type cannot be changed during execution?
(A) Numeric (B) character (C) string (D) float

8. What will be the output of the following snippet? str1="COMPUTER" print(str1[::2])
(A) ER (B) CO (C) OPTR **(D) CMUE**

9. The positive and negative index values of 'P' in the string Str1='COMPUTER' are
(A) 3, –4 (B) 4, –4 **(C) 3, –5** (D) 4, –5

10. Which operator is used for string appending?
(A) + **(B) + =** (C) - (D) *

11. Escape sequence starts with a ------ symbol.
(A) / **(B) ** (C) * (D) +

12. Which of the following is used to handle an array of characters in python?
a) Functions b) Composition **c) String** d) Arguments

13. Strings which contains double quotes should be defined with …….. quotes
(a) Single (b) Double **(c) Triple** (d) All the these

14. Which of the following allows the creation of multiline strings
a) ' ' b) " " **c) """" """"** d) None of these

15. In strings, the negative index assigned from the last character to the first character in reverse order begins with
(a) 0 (b) 1 **(c) -1** (d) -2

16. How will you modify the string?
(a) A new string value can be assigned to the existing string variable
(b) Updating the string character by character

17. The positive subscript always starts with
a) 0 b) 1 c) -1 d) 0.1

18. Which command is used to remove the entire string variable?
(a) Remove **(b) Del** (c) Delete (d) Strike

19. The joining of two or more strings is called……..
(a) Append (b) Repeating **(c) Concatenation** (d) Strike

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20. ……. are immutable in python.
a) Characters **b) Strings** c) Numbers d) Functions

21. Find the wrongly matched pair from the following.
(a) Append ⇒ + = (b) Concate ⇒ + **(c) Repeat ⇒ /** (d) Slice ⇒ [ ]

22. Which operator is used to append a new string with an existing string?
(a) + **(b) + =** (c) * (d) * =

23. The multiplication operator is also called…….
(a) Append (b) Concatenate **(c) Repeat** (d) Slice

24. Which is used to display a string multiple times?
(a) Repeating (b) * (c) Multiplication operator (d) All the above

25. ……. is a substring of the main string.
(a) Slice (b) String (c) Repeat (d) Strike

26. The formatting operator is used to replacing parts of strings with the data stored in variables.
a) # **b) %** c) :: d) ,

27. The default value of stride is ……
(a) 0 **(b) 1** (c) n (d) n – 1

28. If the stride is negative, then it will prints
(a) Third character (b) the Third word (c) Full string **(d) Reverse order**

29. ……. is the formatting character for signed decimal integer.
(a) %d or %i (b) %d and %i (c) %d %u (d) %i &u

30. Find the wrong match
(a) Backslash – \b **(b) Backslash – //** (c) Carriage return – \r (d) Line feed – \n

31. Which function returns the length of the string?
(a) str len( ) **(b) len(str)** (c) length( ) (d) strlength( )

32. How many membership operators are there?
(a) 2 (b) 3 (c) 4 (d) 5

33. ……. is the membership operator.
(a) is (b) at (c) to **(d) in**

34. ……. function is a powerful function used for formatting strings
(a) Format ( ) (b) String () (c) Slice () (d) Decimal

35. The ……. and…. operators can be used with strings to determine whether a string is present another string.
(a) And, or (b) In, Not in (c) Xnor, Xor (d) And, In

(CHAPTER-9)(LISTS, TUPLES, SETS AND DICTIONARY)

1. Marks = [20,40, 60, 80,100] Print(Marks[-2]) What will be the output?
(A) 60 (B) 100 (C) 40 **(D) 80**

2. The keys in Python, dictionary is specified by….
(A) = (B) ; (C)+ **(D) :**

3. Which function is used to include an element your desired position in a list
(A) append () (B) Extend **(C) insert ()** (D) add ()

4. --- is an ordered collection of values enclosed within square brackets.
(A) Tuple (B) Set **(C) List** (D) Dictionary

5. The –function in python is used to find the length of a list.
(A) count () (B) find **(C) len ()** (D) index

6. --- consists of a number of values separated by comma and enclosed within parentheses
(A) List (B) set **(C) Tuples** (D) Dictionary

7. Which of the following set operation includes all the elements that are in two sets but not the one that are common to two sets?
(A) Symmetric difference (B) Difference (C) Intersection (D) Union

8. What is the positive index value of 56 in the list given below? MyList=[45, 85, 36, 56]
(A) 4 (B) -4 **(C) 3** (D) -1

9. The function used to create a tuple from a list
(A) tuple.list( ) (B) list.tuple( ) **(C) tuple( )** (D) list( )

10. The elements in a tuple:
(A) can be change **(B) cannot be change** (C) can be deleted (D) cannot be deleted

11. Which function is used to find length of a list in Python?
(A) for() (B) range() **(C) len()** (D) length

12. Which Function is used to generate a series of values in Python?
(A) series() **(B) range()** (C) list() (D) tuple()

13. Which is a mutable and unordered collection of elements without duplicates?
(A) List (B) Tuple **(C) Set** (D) Dictionary

14. How many elements are in the list given below? MyList=[78, 91, 34, [32, 61, 85], 65]
(A) 3 (B) 4 **(C) 5** (D) 7

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15. Which command deletes the elements and it retains list.
(A) remove() (B) del() **(C) Clear( )** (D) Pop ()

16. ___ is the mixed collection of elements.
(A) Lists (B) Sets **(C) Dictionary** (D) Tuples

17. Which of the following set operation includes all the elements that are in two sets but not the one that are common to two sets?
(A) Symmetric difference (B) difference (C) intersection (D) union

18. The keys in python, dictionary is specified by ----
(A) = **(B) ;** (C) + (D) :

19. How many data type are there in python?
(A) 2 **(B) 4** (C) 6 (D) 5

20. List is an ordered collection of values enclosed within ---
(A) [ ] (B) ( ) (C) < > (D) { }

21. The elements of list can be----
(A) replaced (B) added (C) removed **(D) all of these**

22. Choose odd one out:
(A) append( ) **(B) range( )** (C) extend( ) (D) insert( )

23. What is the output of the snippet? >>>Mylist=[34,45,48] >>> Mylist.append(90) >>> print(Mylist)
(A) [90,34,45,48] (B) [34,48,90,45] (C) [34,90,45,48] **(D) [34,45,48,90]**

24. What is the output of the snippet?>>>Mylist=[34,45,48 >>> Mylist.extend(71,32,29) >>> print(Mylist)
(A) [34,45,48,71,32,29] (B) [71,32,29,34,48,90,45] (C) [29,32,34,90,45,48,71] (D) [71,48,45,34,32,29]

25. What is the output of the snippet? >>>Mylist=[34,45,48] >>> Mylist.insert(2,90) >>> print(Mylist)
(A) [90,34,45,48] (B) [2,90,34,48,45] (C) [34,45,48,2,90] **(D) [34,45,90,48]**

26. Which is used to delete unknown elements?
(A) del( ) **(B) remove( )** (C) erase ( ) (D) clear( )

27. Which function delete an elements using the index value?
(A) remove ( ) **(B) pop ( )** (C) clear( ) (D) del statement

28. When clear( ) function is executed the screen displays----
(A) ( ) (B) 0 **(C) [ ]** (D) { }

29. .------- creates a sequence of elements that satisfy a certain condition.
(A) list **(B) list comprehension** (C) sets (D) dictionary

30. Tuples are enclosed within -----
(A) ( ) (B) < > (C) [ ] (D) { }

31. Creating a tuple with one element is called ----- tuple
(A) single (B) one **(C) singleton** (D) only one

32. A set is a -------
(A) mixed data type (B) none data type (C) collection data type (D) fixed data type

33. Which of the following is not a data type in Python?
a) List b) Tuples **c) String** c) Set

34. A …… is a sequence data type like strings.
(a) List (b) Tuples (c) Set (d) Dictionary

35. Which of the following data type enclosed with [ ]?
a) Tuples **b) List** c) Dictionary d) Set

36. The position of an element is indexed with numbers beginning with …
(a) n (b) n-1 **(c) 0** (d) 1

37. Match the following :
(1) mylist[ ] – (i) tuple (2) mylist[10,[2,4,6]] – (ii) Empty tuple
(3) t=(23,56,89) – (iii) Nested list (4) lis=( ) – (iv) empty list
(a) 1-(iv), 2-(iii), 3-(i), 4-(ii) (b) 1-(i), 2-(ii), 3-(iii), 4-(iv)
(c) 1-(iv), 2-(ii), 3-(i), 4-(iii) (d) 1-(i), 2-(iii), 3-(iv), 4-(ii)

38. …… is used to access an element in a list
(a) element (b) I **(c) index** (d) tuple

39. Sim = ['S', 2,3, [4,5,6]] is an example of
a) Tuple b) Set **c) List** d) Dictionary

40. ……. are used to access all elements from a list.
(a) If **(b) loop** (c) array (d) tuple

41. Find the Output: marks = [10, 23, 41, 75] i = -1 while i >= – 4: print(marks[i]) i = i + – 1
(a) 1 2 3 4 (b) 10, 23, 41, 75 **(c) 75, 41, 23, 10** (d) 0, 41, 23, 0

42. Which of the following operator can be used to alter the range of elements in the list?
a) = = b) :: **c) =** . d) :

43. In changing list elements, ……. is the upper limit of this range.
(a) Index from **(b) Index to** (c) Index with (d) Index

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44. If the range is specified as [1 : 5], it will update the elements from ……..
(a) 2 to 4 (b) 1 to 5 **(c) 1 to 4** (d) 2 to 5

45. …….. function is used to add a single element to the list.
(a) append( ) (b) Extend () (c) Pop () (d) clear ()

46. Which function can also be used to delete an element using the given index value.
a) erase **b) pop** c) delete () d) push()

47. list = [34, 45, 48] list.extend([71, 32, 29]) results in …….
(a) [35, 45, 48, 71, 32, 29] (b) [71,32,29,34,45,48] (c) [71,32,29] (d) [34.45,38]

48. …… function is used to insert an element at any position of a list.
(a) Insert( ) (b) Extend () (c) Pop () (d) clear ()

49. Find the correct statement from the following
(a) when a new element is inserted into the list, the existing elements shift one position to the right
(b) when a new element is inserted in the list, the existing element shifts one position to the left.

50. How many ways of deleting the elements from a list are there?
(a) 1 **(b) 2** (c) 3 (d) 4

51. The two ways of deleting elements from a list are …….. and ……
(a) del and remove( ) (b) Pop and clear (c) Insert, Extend (d) Insert and delete

52. Which function is used to delete elements of a list if its index is unknown?
(a) del (b) delete **(c) remove( )** (d) backspace

53. Which statement is used to delete known elements?
(a) del (b) delete (c) remove (d) rem

54. …… statement deletes the entire list.
(a) del (b) delete (c) remove (d) rem

55. …….. function deletes the element using the given index value.
(a) pop( ) (b) remove (c) clear (d) rem

56. …… function is used to generate a series of values in python
(a) range (b) series (c) Fill series (d) Auto fill

57. The range( ) function has ……. arguments.
(a) 1 (b) 2 **(c) 3** (d) 4

58. Which is an optional argument in range( ) function ……..
(a) start value (b) end value **(c) step value** (d) default

59. The …… function is used to create a list in python
(a) list( ) (b) Tuple () (c) Set () (d) dict ()

60. …….. returns a copy of the list
(a) copy( ) (b) Remove () (c) Clear () (d) Rem

61. x = mylist = [36, 12, 12] x = mylist.count(12) print(x) gives the vlaue as
(a) 2 (b) 3 (c) 0 (d) 1

62. How many arguments are there in the sort( ) function?
(a) 1 **(b) 2** (c) 3 (d) 4

63. …… consists of a number of values separated by a comma and enclosed within parenthesis
(a) list **(b) tuples** (c) dictionary (d) sets

64. The term ……. in Latin represents an abstraction of the sequence of numbers.
(a) list **(b) tuples** (c) set (d) dictionary

65. Identify the wrong statement from the following:
(a) The elements of the tuple are enclosed by parenthesis. (b) The elements of a tuple can be even defined without parenthesis
(c) The list elements have to be given in square brackets **(d) Iterating list is faster than tuples.**

66. The …… function is used to create tuples from a list.
(a) tuple( ) (b) list () (c) Set () (d) dict ()

67. Creating a tuple with one element is called …….. tuple.
(a) Singleton (b) List (c) Set (d) Rem

68. Find the wrong tuple.
(a) mytup = (10) (b) mytup = (10) (c) print(tup[:]) **(d) tup(10, 20)**

69. To delete an entire tuple, …….. command is used.
(a) del (b) delete (c) clear (d) remove

70. Which operator is used to join two tuples?
(a) – (b) _ **(c) +** (d) +:

71. …….. assignment is a powerful feature in python.
(a) Tuple (b) Set (c) List (d) Dict

72. Which one of the following is the tuple assignment operator?
(a) += **(b) =** (c) == (d) *=

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73. How many values can be returned by the functions in python?
(a) 1 (b) 2 (c) 3 **(d) many**

74. A tuple defined in another tuple is called as …….
(a) Nested tuple (b) List (c) Set (d) Dict

75. ……. feature is used to include membership testing and eliminate duplicate elements.
(a) Set (b) Insert (c) Assignment (d) del

76. A …… is a mutable and unordered collection of elements without duplicates.
(a) Set (b) Insert (c) Assignment (d) del

77. Which is true related to sets?
(a) mutable (b) unordered (c) No duplicates **(d) All are true**

78. A list of tuples can be converted as set by using ……. function?
(a) set (b) create set (c) change (d) alter

79. Which operator joins two sets?
(a) + **(b) |** (c) || (d) &

80. Join is called as …… in sets
(a) union (b) intersection (c) difference (d) symmetric difference

81. Identify the intersection operator.
(a) + (b) – (c) . **(d) &**

82. Which operator is used to do a difference in the set?
(a) + **(b) –** (c) : (d) &

83. Which is the symmetric difference operator?
(a) + (b) – **(c) ^** (d) &

84. ……. is used to separate the elements in the dictionary
(a) Comma (b) Semi colon (c) dot (d) dollor

85. The key-value pairs are enclosed with ……
(a) <> (b) [ ] **(c) { }** (d) ( )

86. The mixed collection of elements are called…….
(a) list (b) tuples (c) sets **(d) dictionary**

87. Identify the correct statement.
(a) The dictionary type stores an index along with its element
(b) The dictionary type stores a key along with its element

88. Which part is optional in dictionary comprehension?
(a) If (b) expression (c) var (d) sequences

89. Find the statement which is wrong. When you assign a value to the key
(a) it will be appended (b) it will overwrite the old data

90. Pick an odd one with including elements in the list.
(a) append( ) (b) extend( ) (c) insert( ) **(d) include**

91. Pick the odd one with deleting elements from a list.
(a) del (b) remove( ) (c) pop( ) **(d) clear**

(CHAPTER-10) (PYTHON CLASSES AND OBJECTS)

1. Class members are accessed through which operator?
(A) & **(B) .(Dot)** (C) # (D) %

2. In Python the class method must have which named argument as first argument?
(A) self (B) rec (C) global (D) key

3. The function defined inside a class is called as _____.
(A) Attribute (B) Parameter (C) Arguments **(D) Methods**

4. The symbol of project in relational algebra of DBMS :
(A) σ **(B) Π** (C) ∩ (D) ∪

5. A variable prefixed with double underscore is….
(A) private (B) public (C) protected (D) static

6. The class method must have first argument named as -----
(A) self **(**B) variable (C) class (D) function

7. Which operator refers the protected members?
(A) dot **(B) single underscore** **(**C) double underscore (D) comma

8. ……. are also called instances of a class or class variable.
(a) objects (b) Classes (c) variable (d) List

9. …….. is called as instances of a class or class variable?
a) Methods **b) Objects** c) Functions d) Data types

10. All the string variables are of the object of class ……..
(a) strings b) Objects c) Functions d) Data types

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11. class is defined by the keyword ……
(a) objects **(b) Class** (c) variable (d) List

12. …….. a valid class definition.
a) Class classname () statement_1 b) Class classname :: statement_1
c) Class classname:statement_1 d) Class classname statement_1

13. …….. and ……. are called as members of the class
(a)class variables and methods (b) List and variables (c) del and remove (d) List and Tuple

14. The first argument of the class method is …….
(a) class (b) func (c) def **(d) self**

15. Which argument does not need a value when we call the method?
a) this **b) self** c) var d) first

16. …….. is used to initialize the class variables.
(a) constructor (b) destructor (c) class (d) objects

17. Find the correct statement from the following.
(a) constructor function can be defined with arguments
(b) constructor function can be defined without arguments
(c) constructor function can be defined with or without argument
(d) constructor function cannot be defined

18. …….. is automatically executed when an object of a class is created.
a) constructor b) destructor c) class **d) init**

19. The variables which are defined inside the class is by default.
(a) private **(b) public** (c) protected (d) local

20. Which variables can be accessed anywhere in the program using dot operator?
(a) private **(b) public** (c) protected (d) auto

21. In Python, …….. method is used as the destructor.
a) – – init – – () b) _des_ () **c) _del_ ()** d) – – destructor – – ()

22. Match the following
1. constructor – (i) def process(self) 2. Destructor – (ii) S.x 3. method – (iii) _del_(self) 4. object – (iv) _init_(self, num)
(a) 1-(iv) 2-(iii) 3-(i) 4-(ii) (b) 1-(i) 2-(ii) 3-(iii) 4-(iv)
(c) 1-(iv) 2-(ii) 3-(i) 4-(iii) (d) 1-(i) 2-(iii) 3-(iv) 4-(ii)

(CHAPTER-11)(DATABASE CONCEPTS)

1. A column in database table is known as an :
(A) Attribute **(B) Relation** (C) Tuple (D) Data

2. Which is the entire collection of related data in one table?
(A) tuple (B) attribute **(C) table** (D) software

3. The data model developed by IBM is
(A) Hierarchical (B) Relational (C) Network (D) ER

4. Which model database created by dividing the object into entity and its characteristics into attributes?
(A) Hierarchical (B) Relational (C) Network **(D) ER database**

5. The DBMS can be divided into ----- major components.
(A) 4 **(B) 5** (C) 6 (D) 7

6. Each column represents a ------
(A) table (B) row **(C) attribute** (D) record

7. Hierarchical model was developed by -----
(A) Microsoft **(B) IBM** C) Bell labs (D) none

8. Which model is faster to access data?
(A) relational **(B) network** (C) ER model (D) object

9. Which function eliminates duplicates?
(A) Selection **(B) union** (C) intersection (D) projection

10. …….is an organized collection of data.
a) Word Processor b) Spreadsheet c) Programming language **d) Database**

11. ……. gives meaningful information
(a) data **(b) Information** (c) row (d) tuple

12. Data contain …….
a) Character b) text c) Word **d) All of these**

13. …… is a software that allows us to create, define and manipulate databases
(a) data (b) Information **(c) DBMS** (d) Tuple

14. Which one of the following is not a characteristic of DBMS?
(a) Redundancy (b) consistency (c) Normalization **(d) Insecure**

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15. ……. is not an example of DBMS.
a) Foxpro b) Dbase **c) COBOL** d) Ms-Access

16. How many major components of DBMS are there?
(a) 2 (b) 3 (c) 4 **(d) 5**

17. Which one of the following is not a component of DBMS?
(a) Data (b) Methods (c) Data Base Access **(d) Modules**

18. ……. makes the data more meaningful and connected in the database?
a) Ingress b)) DBMS **c) Relationship** d) Data models

19. A column is known as an …….
(a)Attribute (b) Table (c) Row (d) Column

20. The entire collection of related data in one table is referred to as …… or ……
(a) File or Table (b) Foxpro or table (c) Row or column (d) Data or methods

21. Each table …….. represents a Field
(a)Attribute (b) Table (c) Row **(d) Column**

22. Each …… in the table represents a record.
(a)Attribute (b) Table **(c) Row** (d) Column

23. How many different types of data models are there?
(a) 2 (b) 3 (c) 4 **(d) 5**

24. Which of the following in a table represents a field?
a) row **b) column** c) data d) files

25. Which database Model is the extended form of hierarchical data Model?
(a) Network (b) Relational (c) Flat File (d) Object

26. Match the following:
1. Relational – (i) classes 2. object model – (ii) Mainframe 3. ER model – (iii) key 4. Hierarchical – (iv) Entity
(a) 1-iii, 2-i, 3-iv, 4-ii (b) 1-i, 2-ii, 3-iii, 4-iv (c) 1-iv, 2-iii, 3-i, 4-ii (d) 1-iv, 2-ii, 3-i, 4-iii

27. ……. model is mainly used in IBM Main Frame computers.
a) ER model **b) Hierarchical** c) Network database d) Object model

28. …… uniquely identifies a particular tuple in a table
(a) Relation key (b) Attribute (c) Super key (d) Table

29. Which model establishes many to many relationships?
(a) Network (b) Relational (c) Hierarchical (d) Object

30. ……. is the one who manages the complete database management system.
a) Database Designer **b) Database Administrator** c) Database Architect d) Data Analyst

31. ER Model was developed in the year ……
(a) 1978 (b) 1972 **(c) 1976** (d) 1975

32. In ER Model, objects are said to be ……..
(a) entity (b) Key (c) Value (d) object

33. A column in the database is known as an …….
a) Attribute b) Relation c) Tuple d) Data

34. …….. represents the relationship in ER diagrams.
(a) Diamonds (b) Rectangle (c) triangle (d) Circl

35. GIS stands for ……
(a) Geographic Inform System **(b) Geographic Information System**
(c) Geographic Inline system (d) Geographic Inside Sys

36. Which model is used in file management systems?
(a) object (b) Hierarchical (c) Network (d) ER

37. DBA means ……
(a) Database Administrators (b) Database admin (c) Database Accuracy (d) Database assignment

38. …….. is one who manages the complete database management system
(a) Manager (b) Engineer **(c) DBA** (d) Service Person

39. …….. are the ones who stores, retrieve, update and delete data.
(a) End-User (b) Admin (c) Data (d) Info

40. RDBMS means ……..
(a) Relational Database Manipulation System **(b) Relational Database Management system**
(c) Rapid DataBase Management Server

41. Pick the odd out.
(a) Oracle **(b) Foxpro** (c) MariaDB (d) SQLite

42. Find the true statement
(a) Data redundancy is exhibited by DBMS (b) Data redundancy is not present in DBMS

43. Find the false statement
(a) Distributed Databases supported by DBMS (b) Distributed Databases supported by RDBMS

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44. ……. Model of data storage is used in DBMS.
(a) Navigational (b) Arrow (c) Table (d) List

45. In which database systems, transaction management is efficient?
(a) DBMS **(b) RDBMS** (c) ERDMS (d) DBMS

46. How many types of relationships are there?
(a) 1 (b) 2 (c) 3 **(d) 4**

47. Identify which one of the following is an example for many to one relationship?
(a) a student with exam number **(b) many staff members in one department**
(c) customer, products (d) Books and students

48. …… is a procedural query language used to query the database tables using SQL
(a) Relational Algebra (b) Set theory (c) Cartisian (d) Relational

49. Find the wrong pair
(a) Union U **(b) cartesian product P** (c) project n (d) select o

50. Which method defines a relation that contains a vertical subset of relations?
(a) project (b) select (c) difference (d) union

51. The duplicate row is removed in …….
(a) o **(b) π** (c) x (d) –

52. ……. is used to merge columns from two relations.
(a) σ (b) π **(c) x** (d) –

(CHAPTER-12) (STRUCTURED QUERY LANGUAGE)

1. ------command is used to remove a table from the database
(A) DELETE ALL **(B) DROP TABLE** (C) ALTER TABLE (D) DELETE

2. SQLite falls under which database
(A) Hierarchical database system (B) Flat Database system
(C) Object oriented database system **(D) Relational Database system**

3. Which is Data Control language command in SQL?
(A) Alter **(B) Grand** (C) Truncate (D) Commit

4. What symbol is used for SELECT statement?
(A) σ (B) Π (C) X (D) Ω

5. Pick odd one.
(A) Commit (B) Roll back (C) Save point **(D) Revoke**

6. Pick Odd one.
(A) INSERT (B) DELETE (C) UPDATE **(D) TRANCATE**

7. The TCL command used to restores the database to the last commit state.
(A) Commit (B) Save Point (C) Insert **(D) Rollback**

8. The statement in SQL is used to retrieve data from a table in a database.
(A) SELECT (B) CREATE (C) DISTINCT (D) ORDER BY

9. The SQL command 'Truncate' comes under.
(A) DDL (B) DML (C) TCL (D) DQL

10. Match the following.
(A) DELETE - (i) DDL (B) DROP - (ii) DQL (C) SELECT - (iii) TCL (D) COMMIT- (iv) DML
(A) a-iv, b-iii, c-ii, d-i **(B) a-iv, b-i, c-ii, d-iii**
(C) a-i, b-iv, c-iii, d-ii (D) a-i, b-iii, c-iv, d-ii

11. Pick odd one.
(A) CREATE **(B) UPDATE** (C) ALTER (D) DROP

12. Which command saves any transaction in database permanently?
(A) save (B) save point **(C) commit** (D) roll back

13. The original version of SQL is released in the year _____.
(A) 1970 (B) 1980 (C) 1986 (D) 1992

14. Which of the following is not a Relational operator?
(A) = **(B) = =** (C) > = (D) < =

15. SQL commands are divided into ------ categories.
(A) 4 **(B) 5** (C) 6 (D) 8

16. How many types are DML?
(A) 2 (B) 4 (C) 6 (D) 8

17. Choose odd one out:
(A) commit (B) rollback (C) save point **(D) create**

18. .------ constraint apply only to individual column.
(A) column (B) table (C) row (D) none

19. Which constraint helps to set a limit value placed for a field?
(A) check (B) unique (C) key (D) constant

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20. Which keyword retains duplicate rows?
(A) DISTINCT (B) ALTER (C) NOT IN (C) HAVING

21. Sorting can be done on ------- fields.
(A) single (B) double **(C) multiple** (D) none of these

22. Earlier version of SQL name is -----
(A) Dbase (B) Foxpro (C) Wordstar **(D) Sequel**

23. Which of the following is a standard programming language to access and manipulate databases?
a) MySQL **b) SQL** c) PHP d) Python

24. SQL originally called as
a) DBMS b) RDBMS **c) Sequel** d) SQLITE

25. ANSI Published SQL standard in the year ……..
(a) 1986 (b) 1982 (c) 1984 (d) 1989

26. The latest SQL was released in …….
(a) 1987 (b) 1992 **(c) 2008** (d) 2012

27. The latest SQL standard as of now is …….
(a) SQL 2008 (b) SQL 2009 (c) SQL 2006 (d) SQL 2005

28. DML stands for
a) Data Manipulation language b) Data Meaningful Language
c) Directional Manipulate Language d) Data Management Language

29. A …… is a collection of tables.
(a) database (b) SQL (c) Mysql (d) Python

30. CRUD means ……
(a) creative reasoning under development **(b) create read update delete**
(c) create row update drop (d) calculate relate update data

31. A …… is a collection of related data entries and it consists of rows and columns.
(a) table (b) Row (c) Column (d) Set

32. The DQL command …….. is used to display all the records from the table.
a) Select b) display c) Show d) Select all

33. A …… is a horizontal entity in the table.
(a) record (b) Row (c) Set (d) Column

34. Match the following:
1. DDL – (i) Modify Tuples 2. Informix – (ii) Create Indexes 3. DML – (iii) MySQL 4. DCL – (iv) Grant
(a) 1-ii, 2-iii, 3-i, 4-iv (b) 1-i, 2-ii, 3-iii, 4-iv (c) 1-iv, 2-iii, 3-ii, 4-I (d) 1-iv, 2-i, 3-ii, 4-iiii

35. Double data type precision may exceed
a) 74 b) 54 c) 14 **d) 64**

36. Which is used to serve live websites?
(a) WAMP (b) SAMP (c) DAMP (d) TAMP

37. How many components of SQL are there?
(a) 3 (b) 4 **(c) 5** (d) 6

38. …….. command is used to delete all the rows in the table.
a) DELETE ALL FROM tablename b) DELETE tablename
c) DELETE* FROM tablename d) DELETE * FROM tablename ALL

39. Which is used to define database structure or schema?
(a) DML **(b) DDL** (c) DCL (d) DQL

40. Identify which is not a SQL DDL command?
(a) create **(b) delete** (c) drop (d) truncate

41. …….. command is used to withdraw the access permission given by the GRANT statement is
a) WITHDRAWN **b) REMOVE** c) DELETE d) REVOKE

42. Identify which statement is given wrongly?
(a) DDL statement should specify the proper data type **(b) DDL should not identify the type of data division**
(c) DDL may define the range of values (d) DDL should define the size of the data item

43. Identify which is wrong? DML means
(a) Insertion (b) Retrieval (c) Modification **(d) alter**

44. Pick the odd one
a) Commit b) Rollback c) Savepoint **d) Revoke**

45. Pick the odd out
a) Insert b) update **c) alter** c) delete

46. Grant and Revoke commands comes under ……..
(a) DML **(b) DCL** (c) DQL (d) DDL

47. …….. is a DQL command
(a) select (b) commit (c) update (d) delete

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48. Which one restores the database to last commit state?
(a) commit (b) Grant **(c) rollback** (d) savepoint
49. Which is used to query or retrieve data from a database?
(a) DQL (b) DML (c) DCL (d) DCM
50. The variable width character string is given by the data type …….
(a) char **(b) varchar** (c) dec (d) real
51. If the precision exceeds 64, then it is
(a) float (b) real (c) float (d) decimal
52. …… have special meaning in SQL
(a) keywords (b) commands (c) clauses (d) arguments
53. Each table must have at least ……. column
(a) 1 (b) 2 (c) 3 (d) 4
54. Which one of the following ensures the accuracy and reliability of the data in the database?
(a) Arguments **(b) constraints** (c) column (d) clauses
55. How many types of constraints are there?
(a) 2 (b) 3 **(c) 4** (d) 5
56. Which key helps to uniquely identify the record in the table?
(a) unique **(b) primary** (c) secondary (d) null
57. Which constraint is used to assign a default value for the field?
(a) unique (b) primary (c) secondary **(d) default**
58. The check constraint may use …….. operators for the condition.
(a) relational (b) logical **(c) both** (d) None of these
59. When the constraint is applied to a group of fields of the table, then it is ……. constraint.
(a) table (b) column (c) multiple (d) primary
60. The …….. command is used to insert, delete and update rows into the table.
(a) DCL **(b) DML** (c) DTL (d) TCL
61. If the data is to be added for all columns in a table
(a) specifying column is optional (b) specifying column is must
62. Find the wrong statement from the following delete command
(a) permanently removes one or more records (b) removes entire row
(c) removes individual fields (d) deletes the record
63. The update command specifies the rows to be changed using the …….. clause.
(a) where (b) why (c) what (d) how
64. Set keyword in update command is used to assign new data.
a) True b) false
65. Find the wrong one about alter command
(a) remove a column (b) remove all columns (c) rename a column **(d) delete row**
66. How many types of sorting are there?
(a) 2 (b) 3 (c) 4 (d) 5
67. Which is to count the records?
(a) + **(b) *** (c) = (d) /

(CHAPTER-13)(PYTHON AND CSV FILES)

1. The module which allows interface with the windows operating system is:
(A) csv module **(B) OS module** (C) getopt module (D) sys module
2. CSV is expanded as:
(A) Comma separated vales (C) Condition Separated values
(B) Comma Special values (D) Condition special values
3. The human readable text file where each line has a number of fields, separated by commas:
(A) txt files (B) py files **(C) csv files** (D) doc file
4. The file extension of Excel.
(A) exl **(B) xls** (C) cel (D) Ecl
5. The python file mode opens a file for exclusive creation:
(A) w **(B) x** (C) b (D) a
6. In csv.register_dialect(),Which of the following parameter is used for removing whitespaces?
(A) removespace **(B) skipinitialspace** (c) skipspace (d) removeinitialspace
7. To read a CSV file into a dictionary can be done by using _____.
(A) Reader **(B) DictReader** (C) CSVReader (D) FileReader
8. How many ways are read to csv files?
(A) 2 (B) 4 (C) 6 (D) 8
9. The default is reading in ----- mode.
(A) binary **(B) text** (C) xlsx (D) csv

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10. What is the csv files default delimiter?
(A) Quotation (B) Parenthesis **(C) comma** (D) square brackets

11. Which of the following gives the python programmer the ability to parse CSV files?
a) sys module **b) CSV module** c) parse module d) CSV flat file

12. The file extension to save excel files are
(a) xls Civdsx (b) XL (c) exc or XL (d) XL or xlx

13. .. is a human-readable text file where each line has a number of fields, separated by commas or some other delimiter.
a) CSV file b) Column separated values
c) CSV sheet d) Condition systematic values

14. Identify the wrong statement
(a) Excel is a binary file (b) csv is a plain text **(c) Excel is a plain text** (d) csv has tabular information

15. Identify the statement which is correct.
(a) csv consumes less memory and faster (b) Excel consumes less memory and slower

16. There are ……. ways to read a CSV file.
a) 2 b) 3 c) 4 d) Only one

17. How will you open a new file in Notepad?
(a) File → New (b) Ctrl + N **(c) both a and b** (d) shift + N

18. If the fields of data in the csv file have commas, then it should be given with ……
(a) , **(b) ”** (c) ‘ (d) :

19. The CSV file contents can be read with the help of the method
a) read () b) open () c) with open () **d) reader ()**

20. If the fields contain double quotes as part of the data, the internal quotation marks need to be
(a) same (b) quarter **(c) doubled** (d) tripled

21. The line white indicates
(a) the first two fields of the row are empty (b) It can be deleted
(c) comma not necessary (d) only one field is there and, can be deleted

22. …….. allows creating, store and re-use various formatting parameters for CSV file in reading and writing.
a) class **b) dialect** c) write() d) read()

23. There are ……. ways to read a csv file.
(a) 1 **(b) 2** (c) 3 (d) 4

24. … method returns a writer object which converts the user’s data into delimited strings on the given file-like object.
a) csv.writer() b) csv.write user () c) csv.writes () d) csv_writer ()

25. The default mode when you open a file is
(a) r (b) w (c) x (d) a

26. Excel files are saved with extension ……
a) xlsx b) CSV c) Wordpad d) Notepad

27. What will happen when you open a file for writing and a file already exists there?
(a) creates a new file **(b) truncates the file** (c) overwrite the file (d) append the contents

28. To open the file updating data, click ……
(a) a (b) b (c) t **(d) +**

29. …… opens a file for exclusive creation.
(a) r (b) w **(c) x** (d) +

30. …….. opens the file for read and write in binary mode.
(a) r (b) b (c) x + b **(d) r + b**

31. closing a file will free up the resources that were tied with the file and is done by ……. method.
(a) Exit **(b) close** (c) Quit (d) None of thes

32. ……. is used to sort by more than one column.
a) Colsort **b) itemgetter ()** c) sor_ter () d) more_item ()

33. How many arguments are there in csv.reader( ) functions?
(a) 2 **(b) 3** (c) 4 (d) 5

34. Which one of the following cannot be omitted in cav. reader?
(a) file object (b) delimiter (c) fmtparams (d) space

35. By default, what will be the value of skip initial space?
(a) True **(b) False** (c) 0 (d) 1

36. Which of the following is used to display all the characters after double-quotes.
(a) Quote **(b) Quote-all** (c) double quotes (d) single quotes

37. Which one of the following is used to add the elements to the list.
(a) add (b) insert **(c) append** (d) update

38. Which one of the following cannot be used as a column separator?
(a) delimiter (b) pipe (c) comma **(d) #**

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39. List literals are written using ……..
(a) [ ] (b) ( ) (c) { } (d) <>

40. An ordered sequence of elements which are mutable or changeable are called ……..
(a) object (b) tuple **(c) list** (d) dictionary

41. To sort the second column which option have to be selected?
(a) itemgetter(0) **(b) itemgetter(1)** (c) itemgetter(2) (d) itemgetter(3)

42. Which function is used to print the data in dictionary format without order?
(a) dictionary (b) print( ) **(c) dict( )** (d) dictprint( )

43. Which is a dictionary subclass that saves the order in which its contents are added?
(a) orderedDist (b) SortDist (c) DistSort (d) Sorting

44. The number of parameters in csv.writer( ) …….
(a) 2 **(b) 3** (c) 4 (d) 5

45. Identify the wrong statement.
(a) The writerow( ) writes one row at a time (b) The writerows( ) writes all the data at once
(c) No such writerows( ) function in csv

46. Identify the true statement.
(a) writerow( ) takes 1 dimensional data (b) writerows( ) takes 2 dimensional data
(c) both are true (d) both are false

(CHAPTER-14)(IMPORTING C++ PROGRAMS IN PYTHON)

1. Which of the following not scripting language?
(A) Ruby **(B) DBMS** (C) Perl (D) JavaScript

2. C++ is a:
(A) Programming language (B) Scripting language
(C) Glue language (D) B or C

3. Which of the following is the special variable which by default stores the name of the file?
(A) __name__ (B) __init__ (C) __del__ (D) __def__

4. _____ is a built-in variable which evaluates to the name of the current module.
(A) __name__ (B) __main__ (C) __mode__ (D) __init__

5. In language data type or not required while declaring a variable.
a) C++ b) C c) Java **d) Python**

6. Find the correct statement.
(a) C++ is a dynamic typed language **(b) python is a dynamic typed language**

7. _____ is designed for integrating and communicating with other programming languages.
a) Modular language b) Procedural language **c) Scripting language** d) Procedural language

8. Pick the odd one out
a) Perl b) Ruby c) ASP **d) Java**

9. _____ is an expansion of SWIG?
a) Simplified Wrapper Interface Generator b) Software Wrapper Information Generator
c) Simplified Wrapper Interface Generator d) System Wrapper Interface Generator

10. ……..is an array holding the command line arguments of the program
a) g++ **b) argv** c) Opts d) Getop

11. ……. is the best compiler for C++ on windows.
(a) MinGW-w64 (b) MinGW-w63 (c) MinGW-w62 (d) MinGW-w60

12. MinGW allows to compile and execute C++ program dynamically through python program using
(a) C++ (b) g++ (c) a++ **(d) x++**

13. g++ is a program that calls GNU C compiler called ……
(a) GCC (b) CCC (c) GGC (d) GGG

14. The command to change directory is ……
(a) cc **(b) cd** (c) dc (d) changed

15. _____ module of python helps you to split command-line options and arguments.
a) OS **b) Getopt** c) Sys d) All of these

16. Which command is used to clear the screen?
(a) clear (b) clean **(c) cls** (d) clrscr

17. Which is the list of command-line arguments passed to the python program.
(a) sys.ar **(b) sys.argv** (c) sys.sys (d) sys.opt

18. Match the following related to the OS module.
1. g++ – (i) Name of C++file 2. variable namel – (ii) General compiler
3. mode – (iii) input output mode 4. variable_name2 – (iv) Name of exe file
(a) 1-i, 2-ii, 3-iii, 4-iv **(b) 1-ii, 2-i, 3-iii, 4-iv** (c) 1-iv, 2-iii, 3-ii, 4-I (d) 1-iv, 2-i, 3-iii, 4-ii

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19. Which of the following is the special variable which by default stores the name of the file?
a) _name_ b) _init_ c) _del_ d) _def_
20. Which module helps to parse(split) command-line options and arguments?
(a) getopt (b) argopt (c) get (d) putopt
21. How many functions are there in getopt module to enable command-line argument parsing?
(a) 1 **(b) 2** (c) 3 (d) 4
22. getopt mode is given by …….
(a) ; (b) = (c) # **(d) :**
23. The argument of long options in the getopt method is followed by …….
(a) ‘ **(b) =** (c) # (d) :
24. When the command to run a python program is given to the interpreter, code at ……. indentation is executed.
(a) level 0 (b) level 1 (c) level 2 (d) level 3
25. Which one is a special variable which by default stores the name of the file?
(a) main (b) none **(c) _name_** (d) get
26. Which command of the os module executes the exe file?
(a) run (b) system( ) (c) main (d) name
27. Which operator is used to access the functions of an imported value?
(a) + (b) * **(c) .** (d) /

(CHAPTER-15)(DATA MANIPULATION THROUGH SQL)

1. Which SQL function returns the number of rows in a table?
(A) SUM() (B) MAX() (C) CHECK() **(D) COUNT**
2. Which method uses the SQL command to get all the data from the table?
(A) get (B) select **(C) execute** (D) Query
3. Which is not a SQL clause?
(A) GROUP BY (B) ORDER BY (C) HAVING **(D) CONDITION**
4. Which of the following clause avoid the duplicate?
(A) Distinct (B) Remove (C) Where (D) Group By
5. .. refers to a set of runtime header files used in compiling and linking the code of C, C++, Fortran to run on window os
(a) MaxGW (b) CountGW **(c) MinGW** (d) AvgGW
6. …….. statement in SQL is used to retrieve or fetch data from a table in a database.
a) select b) inset c) create d) fetch
7. Which method is used to create a connection with the database file?
(a) connect( ) (b) pass( ) (c) link( ) (d) create( )
8. ……..keyword is used to fetch only the unique value.
a) UNIQUE **b) DISTINCT** c) GROUPBY d) HAVING
9. What is the extension for database files?
(a) dot (b) database **(c) .db** (d) .dot
10. The SQL commands have to be defined with ……. quotes.
(a) single (b) double **(c) triple** (d) No quotes
11. ……..command updates some or all data values in a database.
a) MODIFY b) SELECT **c) UPDATE** d) CHANGE
12. Which command is used to populate the records in the table?
(a) populate (b) create (c) pop **(d) Insert**
13. Which command in SQL is used to retrieve or fetch data from a table in the database?
(a) Select (b) Fetch (c) retrieve (d) create
14. Which method is used to fetch all rows from the database table?
(a) Fetch( ) **(b) fetchall( )** (c) printall( ) (d) retrieveall( )
15. Which method run the SQL command to perform some action.
a) run b) select c) execution **d) execute**
16. What will be the result of fetchone( ) method if no row is left?
(a) 1 (b) 2 (c) 3 **(d) none**
17. Which one of the following methods displays the specified number of records?
(a) fetchone( ) **(b) fetchmany( )** (c) fetchall( ) (d) fetchsome( )
18. Which one of the following is a newline character?
(a) \n (b) \r (c) \t (d) \nl
19. The path of a file can be either represented as…… in Python.
a) /or b) \\ or / c) \ or ? d) // or ?
20. The clauses in SQL can be called through
(a) C (b) C++ **(c) Python script** (d) DOS

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21. In SQL, the ……. clause is used to extract only those records that fulfill a specified condition.
(a) why (b) what **(c) where** (d) how

22. Which clause returns are recorded for each group?
(a) Select (b) group in (c) group with **(d) group by**

23. Identify the statement which is wrong?
(a) Group by clause is used with aggregate functions
(b) group by clause groups records into summary rows
(c) group by clause is used to filter data

24. Pick the odd one out.
(i) count, max, min, OR, SUM (ii) AND, OR, MAX, NOT (iii) COUNT, NULL, AVG, SUM

25. How many types of sorting are there?
(a) 2 (b) 3 (c) 4 (d) 5

26. Which command is used to display the records in ascending or descending order?
(a) Group by **(b) order by** (c) group with (d) order with

27. Find the Incorrect statement?
(a) The WHERE clause can be combined with AND, OR, NOT
(b) Having clause is used to filter data based on the group function
(c) WHERE cannot be used with NOT

28. Which operators are used to filtering records based on more than one condition?
(a) AND (b) NOT (c) OR **(d) a & c**

29. How many values are returned from the aggregate functions?
(a) 1 (b) 2 (c) 3 (d) 4

30. Find the correct answer.
(i) count functions returns the number of rows in a table satisfying the criteria
(ii) count returns 0 if there were no matching rows
(iii) Null values are counted
(a) (i), (ii) – True (b) (ii), (iii) – true (c) (i), (ii), (iii) – True (d) (i),.(ii), (iii) – False

31. Find the correct statement.
(a) A record can be deleted using SQL command (b) A record can be deleted with python **(c) both are true**

32. Which command is used to accept data during run time in python?
(a) Insert( ) **(b) input( )** (c) create( ) (d) update( )

33. A) Query result can be stored in csv file. R) To display the query output in a tabular form
(a) R is the reason for A (b) R is wrong (c) A is wrong (d) both are not related

34. The path of a python file can be represented as ……. and ……
(a) /, // (b) \, \\ **(c) /, ** (d) \, //

35. Which table holds the key information about the database tables?
(a) page (b) select (c) primary **(d) Master**

36. Which function returns the smallest value of the selected columns?
(a) MIN( ) (b) MINIMUM( ) (c) SMALL( ) (d) LEAST( )

(CHAPTER-16) (DATA VISUALIZATION USING PYPLOT: LINE , PIE AND BAR CHAT)

1. Using Matplotlib from within a python script, which method inside the file will display your plot?
(A) plot() (B) disp () (C) clear () (D) show ()

2. Which key is used to run the module?
(A) F6 (B) F4 (C) F3 **(D) F5**

3. The most popular data visualization library which allows creating charts in few line of code in Python.
(A) Matplotlib (B) Info graphics (C) Data visualization (D) pip

4. The function to make a pie chart with Matplotlib:
(A) plt.bar() (B) pie.plt() (C) bar.plt() **(D) plt.pie()**

5. Which of the following is not a type of visualization under matplotlib?
(A) Histogram (B) Pie chart (C) Box plot **(D) SQLite**

6. _____ plot is a type of plot that shows the data as a collection of points.
(A) Line **(B) Scatter** (C) Box (D) Pie

7. Which of the following matplotlib function is used to draw line chart?
(A) pie() **(B) line()** (C) bar() (D) plot()

8. In Line Chart or Line Graph displays information as a series of data points called.
(A) Markers (B) Points (C) Dots (D) Lines

9. To make a bar chart with Matplotlib, which function should be used?
(A) plt.bar() (B) plt.chart() (C) pip.bar() (D) pip.chart()

10. ------ chart shows the relationship between a numerical variable and a categorical variable.
(A) bar **(B)** pie (C) line (D) scatter

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11. The ---------- plot is a standard way of displaying the distribution of data based on the five number summary.
(A) bar (B) pie (C) line (D) scatter

12. The default x.vector has the same length of y but starts with---
(A) 3 (B) 2 (C) 1 **(D) 0**

13. In python matplotlib is a ----------
(A) control structure (B) dictionary **(C) library** (D) list

14. Which kind of data encoded visually communicate a quantitative message?
(A) string **(B) Numbers** (C) images (D) none

15. In which plot the width of the bars may or may not be same.
(A) histogram (B) pie (C) line (D) bar

16. Pick the odd one out.
a) Tables **b) databases** c) Maps Infographics d) Dashboards

17. The Series of data points connected by straight line segment is called _____
a) Matplot **b) markers** c) plot d) lib

18. Read the statements given below. Identify the right option from the following.
Statement A: Dashboards are used to detect patterns and relationships easily. Statement B: Dashboard is a type of game.
(a) A is correct (b) B is correct (c) Both are correct (d) Both are wrong

19. Various types of visualizations are available in
(a) stdlib (b) graphics (c) library **(d) matplotlib**

20. Which of the following one indicates discontinuity?
a) Histogram b) Pie **c) Bar graph** d) None of these

21. The terms minimum, first quartile, median, third quartile maximum are related to …… type of plot.
(a) Box (b) scatter (c) pie (d) Bar

22. The position of a point in scatter plot is ……. value
(a) ID **(b) 2D** (c) 3D (d) U shaped

23. Which method is used to display the plot?
(a) disp( ) (b) display( ) (c) print( ) **(d) show( )**

24. Data visualization uses ……. graphics.
a) 2D b) 3D **c) Statistical** d) Image

25. The name to the x-axis in the plot is given by ……
(a) label (b) x **(c) x label** (d) x axis

26. Which one of the following is the cross-looking button that allows you to click it, and drag the graph around?
(a) x-axis (b) y-axis **(c) pan axis** (d) plot axis

27. ……. data may be encoded using dots, lines, or bars, to visually communicate a quantitative message.
a) String **b) Numerical** c) Images d) None of these

28. …….. assign values to the labels specified in the bar chart.
(a) usage (b) label (c) values (d) =

29. Find the Incorrect statement
(a) Histogram is drawn in such a way that there is a gap between the bars.
(b) Histogram represents numerical data (c) Bar graph shows categorical data

30. ……. plot displays the distribution of data based on the five-number summary.
a) Scatter plot b) Line plot **c) Box plot** d) Chart plot

31. Match the following
1. pie chart – (i) Series of data point
2. Histogram – (ii) Parts out of a whole
3. line chart – (iii) Quartile
4. Box plot – (iv) Freqency distribution
(a) 1-i, 2-ii, 3-iii, 4-iv (b) 1-iv, 2-iii, 3-ii, 4-I **(c) 1 -ii, 2-iv, 3-i, 4-iii** (d) 1-iv, 2-i, 3-ii, 4-iii

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AUTHOR NAMES / ETC

1. Algorithm	–	Abu Jafar Mohammed ibn Musa al Khowarizmi (c.825 AD(CE))
2. Python	-	Guido Van Rossum (1991 Netharlands)(CWI)
3. Relational Database	-	E.F.Codd (1970)
4. E.R Model	-	Chen (1976)
5. Data Normalization	-	Dr.Edgar F Codd
6. Relational Algebra	-	Edgar F Codd
7. Sql Original name	-	Sequel (1970's)
8. ANSI Published	-	1986
9. SQL Updated	-	1992
10.SQL Latest version	-	2008 (SQL 2008)

ABBREVIATIONS

1.	ADT	-	Abstract Data Type.
2.	CDT	-	Concrete data type
3.	LEGB	-	Local Enclosed Global Built-in
4.	CWI	-	Centrum Wiskunde & Informatics
5.	NRI	-	National Research Institute.
6.	GUI	-	Graphical User Interface
7.	IDE	-	Integrated Development Environment.
8.	IDLE	-	Integrated Development Learning Environment
9.	CMD	-	Command
10.	OOP	-	Object Oriented Programming
11.	DBMS	-	Database management system.
12.	ER	-	Entity Relationship Model
13.	RDBMS	-	Relational Database Management System.
14.	SQL	-	Structured Query Language
15.	DDL	-	Data Definition Language
16.	DML	-	Data Manipulation Language
17.	EDML	-	Embedded Data Manipulation Language
18.	DCL	-	Data Control Language
19.	TCL	-	Transactional Control Language
20.	DQL	-	Data Query Language.
21.	CSV	-	Comma Separated Values
22.	API	-	Application Programming Interface
23.	SWIG	-	Simplified Wrapper Interface Generator
24.	MinGW	-	Minimalist GNU for Windows
25.	OS	-	Operating System
26.	GCD	-	Greatest Common divisor
27.	CRLF	-	Carriage Return and Line Feed

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CHAPTER- 1 TO 16 IMPORTANT KEY POINTS

(CHAPTER-1)(FUNCTION)

- A **function** is a unit of code.
- **Subroutine**s are the basic blocks of computer programs.
- In programming languages subroutines are called **functions**.
- **Functions** contains a set of code that works on many kinds of inputs like variants expressions and produces a concrete output.
- Parameters are **variables.**
- Arguments are **values**.
- A function definition which call itself called **recursive** function.
- An **interface** is a set of action that an object can do.
- **Implementation** carries out the instruction defined in the interface.
- **Pure functions** are functions which will give exact result when the same arguments are passed.
- **Impure function** cause side effects.
- When you write the type annotations the **parentheses** are mandatory.
- **Definitions** are distinct syntactic blocks.
- **Definitions** bind values to names.
- In function definitions: Keyword specifies the **precondition requires.**
- In function definitions: Keyword specifies the **post condition returns.**
- The function definitions is introduced by the keyword **let rec**

(CHAPTER-2)(DATA ABSTRACTION)

- Splitting a program is called **modules**.
- **Abstract data type** is a type for objects whose behavior is defined by a set of values and operations.
- To facilitate data abstraction, we will need to create two functions **constructor, Selectors**.
- **Constructors** are functions that build the abstract data type.
- **Selectors** are functions that retrieve information from the data type.
- A **rational** number is a ratio of integers.
- A **tuple** is a comma separated values surrounded with parentheses.
- A class is bundled **data** and **functions.**
- Bundling of two values together into one called **pair.**
- **Pair** is a compound structure.
- **List** is constructed by placing expressions within square brackets separated by commas.
- The elements of a list can be accessed in **two** ways.
- The two ways of accessing element in list is **multiple assignment, element selection operator.**
- A representation of data type is known is called **concrete data type.**
- A representation of data type is unknown is called **abstract data type.**

(CHAPTER-3)(SCOPING)

- **Scope** refers to visibility of variables.
- **Namespaces** are containers for mapping names of variables to objects.
- **= sign** is used to map variable name to object
- The process of binding variable name with an object is called **mapping.**
- The **scope** of variable is part of code where it is visible.
- **LEGB** rule is used to decide the order in which the scopes are to be searched for scope resolution.
- There are **4** types of variable scope.
- **Local scope** refers to variable defined in current function.
- A **module** is a part of program.
- A variable which is declared outside of all functions is known as **Global scope.**
- A function with in another function is called **nested function**.
- Preloaded program scope refers to **build- in scope**.
- Module segments can be invoked by its **names** and **parameters.**
- **Access control** is a security technique that regulates who or what can view or use resources in computing environment.
- All members in a python class are **public** by default.
- **Protected members** of class are accessible with in class and its sub class.
- A variable can be changed as private by adding **double underscore** before variable name.
- All members in C++ java are **private** by default.
- Object oriented languages are **C++** and **JAVA**.
- Modules contains **instruction, processing logic** and **data.**

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(CHAPTER-4)(ALGORITHMIC STRATEGIES)

- An **algorithm** is a finite set of instruction to accomplish a particular task.
- The way of defining an algorithm is called **algorithm strategy.**
- An algorithm that yields expected output for a valid input called an **algorithmic solution**.
- Analysis of algorithms and performance evolution can be divided in to **two phases (i.e.) priori estimates, posteriori testing.**
- Two main factors of algorithm **time factor, space factor.**
- **Asymptotic** notations are languages that uses meaningful statements about time and space.
- **Big O** is used to describe worst case of an algorithm.
- **Big Ω** is used to describe best case of an algorithm.
- **Big Θ** is used to describe better case of an algorithm.
- **Linear search** is called sequential search.
- **Binary search** is called as half interval search algorithm.
- **Bubble sort** algorithm compares each pair of adjacent elements and swap them if they are in the sorted order.
- **Memorization** is a technique to store the results of programming language.
- **Fibonacci series** generates the subsequent of numbers by **adding two** previous numbers.
- **Selection sort** needs minimum number of swaps.
- When a sub problem used several times, the problem poses **overlapping** sub problems.

(CHAPTER-5)(PYTHON - VARIABLES AND OPERATORS)

- Python language created by **Guido Van Rossum.**
- Python language released in **1991.**
- Python program can be written in **interactive mode** and **script mode.**
- The interactive can also be used as **simple calculator.**
- Python scripts are **reusable** code.
- Creating script in python by choose **File->new** file or **CTRL+N.**
- The >>> prompt indicates that interpreter ready to accept instruction.
- python files are save with **extension .py**
- To execute python script choose **Run->Run** module of **press F5.**
- **Comma (,)** is used as separator in print ().
- In python comments begin with **# symbol**.
- Python uses whitespaces such as **spaces** and **tabs.**
- Python breaks each logical line into a sequence of elementary lexical components known as **tokens**.
- Tokens are classified into **five** types.
- Python identifier is **case** sensitive.
- **Operators** are symbols which represent computation, conditional matching.
- Values and variables when used with operator are known as **operands.**
- A relational operator is also called as **comparative** operator.
- **AND, OR, NOT** are logical operators.
- Simple assignment operator is **=**
- Ternary operator is known as **conditional operator**.
- **Literal** is raw data given in variable or constant.
- In python there are **three** types of literals.
- Numeric literal supports **3** types such as **integer, float, constant.**
- Sequence of characters surrounded by quotes called **string.**
- Triple quotes used for **multiline string.**
- Python has **6** built in data types such as **number, string, boolean, tuples, list, dictionary.**
- All data values in python are **objects.**
- **Backslash (\ )** is called as escape character.
- Boolean data can have two values **true or false.**
- **Keywords** are special words.

(CHAPTER-6)(CONTROL STRUCTURES)

- Programs contains set of **statements.**
- A program statement that causes a jump of control from one part of program to another part is called **control structures.**
- Execute set of statements multiple times called **iteration or looping.**
- Skip a segment and execute another segment based on test condition is called **alternative or branching**.
- In python there are **3** control structures.
- **Elif** can be used instead of 'else'.
- **Elif** clause combines if...else-if..else statement.
- A **loop** statement allows to execute statements or set of statements.
- Python provide two types of looping. (i.e) **while loop** and **for loop**.

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- **For loop** is most comfortable loop in python.
- For loop and while loop is called as **entry check** loop.
- **Indentation** plays major role in python.
- Jump statements in python are **break, continue, pass.**
- **Break** statement terminates the loop.
- **Pass** statement is used as place holder.

(CHAPTER-7)(PYTHON FUNCTIONS)

- **Functions** are named block of code.
- In python there are **4** types of function. (i.e.) **user defined function, built in function, lambda function, recursive function.**
- **Function** help us to divide a program in to modules.
- Function arguments are 4 types (i.e.) **required arguments, keyword arguments, default , variable length arguments.**
- **Required** arguments are the arguments passed to a function in correct positional order.
- **Keyword** arguments will invoke the function after the parameter are recognized by their parameter names.
- **Default** arguments takes default value if no value is provided.
- Non keyword variable length arguments are called **tuples.**
- Lambda function can only access **global** variable.
- To define a function **def** keyword is used.
- At the end function declaration**:** should be used.
- We should use **global** keyword when we call global keyword inside a function.
- ASCII value of A is **65**.
- Id () returns the **address** of variable.
- Type () returns the **data type** of given object.
- Chr () returns the **Unicode character** of given ASCII value.
- Value returned by a function can be used by another function is called **composition.**
- System limitation can be changed by **sys. Set recursion limit (limit value).**
- ***** is used for unknown **variable length arguments.**
- The condition is applied in function is called **base condition**

(CHAPTER-8)(STRINGS AND STRING MANIPULATION)

- Array of characters is **string.**
- String in python can be created by using **single, double, triple quotes.**
- Strings are **immutable.**
- To remove entire string by using **Del command.**
- **+ Operator** is used to concatenate strings in python.
- **Slice** is a substring of main string.
- Slicing operator is **[ ]**
- Python consider as start value as **0.**
- Python consider the end value as **n-1.**
- Stride refers stride as **third argument**.
- The formatting operator is **%.**
- %c denotes **character.**
- %s denotes **string.**
- %u denotes **unsigned decimal integer.**
- %o denotes **octal integer.**
- %f denotes **floating point numbers**.
- %e or %E denotes **Exponential notation.**
- %g or %G denotes **short numbers in floating point or exponential notation.**
- The format () used with **strings.**
- **Len ()** is used to returns the length of the string.
- Capitalize () is used to capitalize the **first character** of the string.
- **Ord ()** returns the ASCII code of the character.
- **Chr ()** is used to returns the character represented by a ASCII.
- **In** and **not in** operators can be used with strings to determine whether a string is present in another string.
- Membership operators are **in** and **not in.**
- Escape sequence starts with a **backslash**.
- The substring may be **positive** or **negative.**
- In a string python allocate an index value is known **as subscript**.
- Defining strings within triple quotes treated as **multiline string.**
- The format () used {} used as **placeholders or replacement fields.**
- The default value of stride is **1**.

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- Python take last value as **n-1.**
- Python takes value in reverse order by **negative value.**
- **Del command** is used to delete entire string.

(CHAPTER-9)(LISTS, TUPLES, SETS AND DICTIONARY)

- Python programming language has **four** data types such as **list, tuples, set, dictionary.**
- **List** is sequence data type.
- List is ordered collection of values enclosed within **[ ]**.
- Each value of list is called as **elements.**
- List containing another list is known as **nested list.**
- Index value of list begins with **zero.**
- The initial value of loop must be **0.**
- Python sets **-1** as the index value for the last element in list.
- Get last element in a list and so on is called as **reverse indexing.**
- **For loop** is used to access all the elements in a list one by one.
- List element or range of elements can be changed by using **simple assignment operator =.**
- **Insert ()** is used to insert an element at any position of a list.
- **Del statement** is used to delete known elements.
- **Remove ()** is used to delete unknown elements.
- **Clear ()** is used to delete all the elements in a list but retains the list.
- **Pop ()** deletes and returns the last element of a list if the index is not given.
- **Pop ()** is used to delete only one element from a list.
- **Range (),** list () can create a list with series of values.
- Range () has **three** arguments.
- **Copy ()** returns a copy of list.
- **Count ()** returns the number of similar elements present in the list.
- **Index ()** returns the index value of first recurring element.
- **Reverse ()** is used to reverse the order of the element in the list.
- **Sort ()** is used to sort the elements in list.
- **Sort ()** will affect the original list.
- In sort () **ascending** is default.
- If you want to sort elements in descending set reverse is **true.**
- **Max ()** returns the maximum value in a list.
- **Min ()** returns the minimum value in a list.
- **Sum ()** returns the sum values in a list.
- **Tuple** is comma separated values enclosed within parentheses.
- Iterating tuple is **faster** than list.
- **Tuple ()** is used to create tuples from a list.
- **Type ()** is used to know the data type of python object.
- Tuple with one element is called **singleton tuple**.
- **Print** statement is used to print the elements.
- Tuple can be defined inside another tuple is called **nested tuple.**
- **For loop** will be useful to access all elements in a list.
- **Set** is unordered collection of elements without duplicates.
- Set eliminating **duplicate** elements.
- Set is **mutable.**
- Sets cannot be **repeated.**
- Set is created by placing all the elements within pair of **curly brackets**.
- **Set ()** is used to create sets in python.
- **Dictionary** is a mixed collection of elements.
- The keys in python dictionary is separated by a **colon (:)**
- Dictionary key value pairs are enclosed with **curly braces{}**
- **Append (), Extend () and Insert ()** are used to include more elements in a list.

(CHAPTER-10) (PYTHON CLASSES AND OBJECTS)

- Python is an **object oriented programming** language.
- **Classes and objects** are key features of object oriented programming.
- **Class** is main building block min python.
- Object is collection of **data and function**.
- **Class** is a template for the object.
- Every class has a unique name followed by a **colon(:)**

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- Variables defined inside a class are called as **class variable.**
- Functions defined inside class are called as **methods.**
- Variables and methods are together known as **members** of the class.
- Class can be defined **anywhere** in the program.
- Class member can be accessed by using **dot(.)** operator.
- The process of creating object is called as **class instantiation**.
- Class method must have first argument named as **self.**
- Statement defined inside the class must be properly **indented.**
- **Init()** is act as constructor.
- Init() executed automatically when object is **created.**
- Init() can be defined **with or without arguments.**
- Init() is used to **initialize** class variables.
- In python variables defined in a class is **public** by default.
- A variable prefixed with double underscore becomes **private.**
- __del__() is used as **destructor.**
- A class is defined by a keyword **class.**

(CHAPTER-11)(DATABASE CONCEPTS)

- A database is an organized collection of **data.**
- Data are **raw facts.**
- Information is **formatted** data.
- **Database** is a repository collection of related data.
- A DBMS is a **software**.
- Database can be divided in to **5** major components such as **hardware, software, data, methods, database access language.**
- Popular DBMS are **FoxPro, Dbase.**
- Each row in a table represents a **record**.
- Each column in a table represents a **field.**
- Row is known as **TUPLE**.
- Column is known as **ATTRIBUTE.**
- Database model classified in to **five** types.
- Hierarchical model was developed by **IBM.**
- **Relational** model was first proposed by **E.F.CODD in 1970.**
- **Hierarchica**l database model like a **tree structure.**
- Hierarchical database model represents **one-to-many relationship**.
- Hierarchical database model used in **Mainframe** computers.
- **Network model** represents **many-to-many** relationship.
- ER model developed by **chen** in **1976.**
- **ER model** is easy to design logical view of data.
- **Object model** used in geographic information system (GIS), scientific experiments, engineering design and manufacturing.
- **Object model** represents real world objects.
- Manage complete database by **Data Base Administrator (DBA).**
- **DBA** manages the license keys,user accounts and access etc.
- **Application programmers or software developers** involved in developing and designing the parts of DBMS.
- Database normalization was first proposed by **Dr.Edgar F Codd.**
- Types of relationship used in database is 4.
- Relational algebra was first created by Edgar F Codd at IBM.
- Unary relational operations are **SELECT (σ), PROJECT (π).**
- SELECT working with **tuples.**
- PROJECT working with **Attributes.**
- **Cross product(X)** is used to combine two relations.
- **Redundancy** means duplication of data in database.
- **Data integrity** is security from unauthorized users.
- Table is known as **relation**
- Examples of **RDBMS** are **mysql , oracle, sqlserver, ibm db2.**

(CHAPTER-12) (STRUCTURED QUERY LANGUAGE)

- **SQL** is programming language is used to access database.
- The original version of SQL developed at **IBM in 1970.**
- In **1986** ANSI published an SQL.
- Latest SQL was released in **2008.**
- The various processing skills of SQL are **DDL, DML, EBML, VIEW, AUTHORIZATION, INTEGRITY, TRANSACTION.**

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- **WAMP** stands for Windows, Apache, Mysql, PHP.
- Components of SQL divided in to **5** categories.
- Types of DML **procedural DML, Non procedural DML.**
- **Constraint i**s a condition applicable on a field or set of fields.
- Condition apply only on **individual column** is called column constraint.
- Condition apply to one or more columns called **table constraint.**
- Constraint classified in to **4** types such as **unique** constraint, **primary key** constraint, **default** constraint, **check** constraint.
- Check constraint may use **relational** and **logical** operators.
- **DISTINCT** keyword eliminates redundant data.
- DISTINCT keyword used along with **SELECT** command.
- **ALL(*)** keywords retains duplicate rows.
- Sort the data used **by ORDER BY** clause.
- **ORDER BY** does not affect the original table.
- **GROUP BY** used in aggregate functions.
- **HAVING** clause used along with GROUP BY clause
- ROLL BACK command is used to **restore the database.**
- COMMIT command is used to **save permanently.**
- SAVEPOINT is used to **save temporarily.**
- Sorting can be done on **multiple** fields.
- The logical operators are **AND,OR,NOT**
- The ***** is used with COUNT to include **NULL values.**
- MySQL is a **database management system.**

(CHAPTER-13)(PYTHON AND CSV FILES)

- CSV is human readable **text file.**
- CSV file is known as **flat file.**
- File saved in excel cannot be opened or edited by **text editors.**
- CSV file cannot store **charts** or **graphs.**
- The expansion of CSV is **Comma Separated Values.**
- CSV cannot contain formatting**, macros, formulas.**
- CSV file should be save with the extension **.csv.**
- By default CSV file will be opened in **MS Excel.**
- Two ways to read a CSV file is **reader() and Dict reader class**
- Open () returns a file object is called a **handle**
- The default reading is **text mode.**
- **Binary** mode dealing with non text files.
- Python has a **garbage** collector to clean up unreferenced objects.
- A **dialect** describes the format of the CSV file that is to be read.
- **Skipinitialspace** is used for removing whitesapaces after the delimiter.
- A dialect is a **class** of CSV module.
- **pipe(|)** is considered as **column separator**.
- List literals are written within **square brackets [ ].**
- The first row should be skipped by busing the command **next ( ).**
- **Sort ()** is used to arrange values in ascending order.
- To sort more than one column use **itemgetter** with multiple indices.
- Csv.writer works with **list/tuple.**
- Csv.DictReader and csv.Dict Writer works with **dictionary.**
- Writerow() writes **one row** at a time.
- To write all the data by **writerows().**
- Default delimiter is **comma.**
- Writerow takes **1 dimensional** data.
- Writerows takes **2 dimensional** data(multiple rows).
- Python csv module can only accepts **\r,\n** as line terminator.
- Adding a new row at the end of the file is called **appending a row.**

(CHAPTER-14)(IMPORTING C++ PROGRAMS IN PYTHON)

- Python and C++ is **general purpose** language.
- Python is mostly used as s**cripting** language.
- Java script, Vb, PHP, perl, python, ruby,ASP, tcl are **scripting** language.
- C++ is **statically** typed language.
- Python deletes **unwanted objects.**
- Python code **5 to 10** times shorter than C++.
- Framework for interfacing python and C++ is **Boost. python**.

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- The expansion of SWIG is **Simplified Wrapper Interface generator.**
- The expansion of MinGW is **Minimalist GNU for windows.**
- The expansion API is **Application Programming Interface.**
- Python contains many **modules.**
- To clear the screen **cls** command is used.
- The **dot(.)** operator is used to access the functions.
- **Sys.argv** is the list of command line arguments passed to the python program.
- To use sys.argv will have to import **sys.**
- **OS module** allows you to interface with windows operating system with python.
- **Getopt** module of python helps you to p[arse command line options.
- Getopt method consist of **two arguments** such as opts and args.
- Python is **dynamic** typed language.
- C++ is **compiler** based language.

(CHAPTER-15)(DATA MANIPULATION THROUGH SQL)

- A **DATABASE** is organized collection of data.
- SQLite is simple **relational** database system.
- Database server program such as **MYSQL, Oracle.**
- Python has native **library.**
- **Cursor** is a control structure is used to traverse and fetch the records of the database.
- To populate (add record) the table by **INSERT** command.
- **Cursor** is used for performing all sql commands.
- **SELECT** command is mostly used statement in SQL.
- **Cursor.fetchall ()** is used to fetch all rows from the database table.
- **Cursor.fetchone ()** is used to returns next row of the query result.
- **Cursor.fetchmany()** returns next number of rows of the result set.
- **DISTINCT** clause is used to give records without duplicate
- **ORDER BY** clause is used along with SELECT to sort data.
- **HAVING** clause is used to filter data based on GROUP ().
- WHERE clause can be combined with **AND, OR, NOT** operators.
- Aggregate functions ignored **NULL** values.
- **COUNT ()** returns 0 if there were no matching rows.
- **Cursor.description** contain each column heading.
- Path of file represented by **'/' or '\\'** in python
- WHERE cannot be used with **GROUPBY**
- **Sqlite_master** is the master table which holds key information.

(CHAPTER-16) (DATA VISUALIZATION USING PYPLOT: LINE , PIE AND BAR CHAT)

- **Data visualization** is the graphical representation of data.
- Data visualization uses **statistical graphics**.
- Data visualization helps user to **analyses and interpret** the data.
- An **info graphic** is the representation of information in a graphic format.
- A **dashboard** is a collection of resources.
- **Matplotlib** is the most popular data visualization library in python.
- A **scatter plot** is a type of plot that shows the data as a collection of points.
- The **box plot** is standardized way of displaying the distribution of data based on the **five** number.
- There are **six** types of data visualization under matplotlib.
- **Pip** is a management software for installing python packages.
- **Plt.show()** is used to display graph
- **Plot()** is a versatile command take an arbitrary number of arguments.
- **Legend()** is used to invoke default legend.
- **Home button** is used to return original view.
- **Configure** subplots allows you to configure various spacing options with your figure.
- **Save figure** is used to save your figure in various forms.
- **Pan axis** is used to drag your graph around.
- **Zoom tool** is used to click and drag a square that you would like to zoom in to specifically.
- A line chart is a type of chart which displays information as a series of data points called **markers.**
- A **bar plot** is one of the most common type of plot.
- **Plt.bar()** is used to make a bar chart.
- A **histogram** represents the frequency distribution of continuous variables.
- **Pie chart** is a circular graph which is divided into slices to illustrate numerical proportion.
- The points of a **pie chart** is to show the relationship of parts out of a whole
- Plt .pie() is used to make **pie chart**.
- **Bar plot** shows the relationship between a numerical variable and a categorical variable.
- **Bar graph** and **Histogram** are the two ways to display data in the form of a diagram

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CHAPTER 1 TO 16 LIST OUTS / TYPES / SUB HEADINGS

	CHAPTER – 1 (FUNCTION)
1.	**Parameters (and arguments): 1.** Parameter without Type 2. Parameter with Type
2.	**Function works (input):** Variables, Expressions
3.	**Examples of Impure functions:** Random(), Date ()
4.	**Pure function:** 1.The return value of the pure functions solely depends on its arguments passed. 2.They do not have any side effects. 3.They do not modify the arguments which are passed to them
5.	**Impure function:** 1.The return value of the impure functions does not solely depend on its arguments passed. 2.They have side effects. 3.They may modify the arguments which are passed to them
	CHAPTER – 2 (DATA ABSTRACTION)
1.	**ADT can be implemented** using singly linked list or doubly linked list. Stack ADT Queue.
2.	**Create two types of functions:** Constructors and Selectors.
3.	**Function (create object like city)** city:= makecity (name, lat, lon)
4.	**Examples of constructor and selectors:** 1.getname(city) 2.getlat(city) 3.getlon(city)
5.	**The elements of a list can be accessed in two ways.**1. Multiple Assignment 2. Element Selection Operator
	CHAPTER- 3 (SCOPING)
1.	**Types of Variable Scope**: 1.Local, 2.Enclosed, 3.Global, 4.Build in
2.	**Local** - Defined inside function/class // Variables defined in current function **Global** - A variable which is declared outside of all the functions // Defined at the uppermost level **Enclosed** - Defined inside enclosing functions **Built-in (B)** - Reserved names in built-in functions (modules) // Pre-loaded
3.	**Characteristics of Modules:** 1.Instructions, 2.Processing logic, 3.data.
4.	**Benefits of modular programming:** 1.Less code to be written. 2.The code is stored across multiple files. 3.Code is short, simple and easy to understand. 4.The same code can be used in many applications. 5.The scoping of variables can easily be controlled.
5.	**Access Control:** C++ and Java, control the access to class members by **p**ublic, **p**rivate and **p**rotected keywords.
6.	**Public members** - Accessible from outside the class. **Protected members** - Accessible from within the class / sub-classes **Private members** - They can be handled only from within the class.
	CHAPTER – 4 (ALGORITHMIC STRATEGIES)
1.	**Examples for data structures** are arrays, structures, list, tuples, dictionary etc.
2.	**Characteristics of an Algorithm:** 1. Input 2.Output 3. Finiteness 4. Definiteness 5. Effectiveness 6. Correctness 7. Simplicity 8. Unambiguous 9. Feasibility 10. Portable 11. Independent
3.	**Analysis of algorithms:** 1.A Priori estimates 2. A Posteriori testing
4.	**Complexity of an Algorithm :** 1.Time Complexity 2.Space Complexity
5.	**Two main factors** : 1.Time 2.Space
6.	**Space Complexity : Two main components**: A fixed part & A variable part
7.	**Method for determining Efficiency:**1.Speed of the machine 2.Compiler and other system Software tools 3.Operating System 4.Programming language used 5.Volume of data required
8.	**Asymptotic Notations:** Big O, Big Ω ,Big Θ
9.	**Searching Techniques:** Linear Search Binary Search
10.	**Sorting Techniques:** Bubble sort, Selection sort Insertion sort.
11.	**Binary search working formulas:** **mid** = low + (high - low) / 2 **low** = mid + 1 **high** = mid -1 Here it is, 0 + (9 - 0) / 2 = 4 mid = low + (high - low) / 2 mid = low + (high - low)/2
	CHAPTER – 5 (PYTHON - VARIABLES AND OPERATORS)
1.	**Python features:** 1) It is a general purpose programming language 2) Scientific and non-scientific programming. 3) It is a platform independent programming language. 4) The programs written in Python are easily readable and understandable.
2.	**Python, programs can be written** in two ways namely Interactive mode and Script mode.
3.	**Invoking Python IDLE :** Start → All Programs → Python 3.x → IDLE (Python 3.x)
4.	**Script mode Programming :** Creating Scripts,, Saving Python, Executing Python Script

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5.	**Creating Scripts & Save & Execute in Python:** ❖ Choose File → **New File** or press Ctrl + N ❖ Choose File → **Save** or Press Ctrl + S // Python files are by default saved with extension .py. ❖ Choose Run → **Run** Module or Press **F5**
6.	**Comments in Python:** 1) # It is Single line Comment 2) ''' It is multiline comment which contains more than one line '''
7.	**Indentation (White spaces):** Spaces and Tabs
8.	**Tokens:** 1) Identifiers, 2) Keywords, 3) Operators, 4) Delimiters 5) Literals.
9.	**Identifiers:** 1.Variable,function, class, module or object, 2.Must start with an alphabet (A..Z and a..z) or underscore (_).
10.	**Keywords:** false, class, If, el if, else, pass, break, continue, with, none etc.
11.	**Operators:** Arithmetic, Relational, Logical, Assignment, Conditional operator.
12.	**Delimiters :** Expressions, lists, dictionaries and strings
13.	**Literals:** 1) Numeric 2) String 3) Boolean
14.	**Numeric Literals :** Integer, Float and Complex
15.	**String Literals :** Single, Double and Triple quotes
16.	**Boolean Literals:** True or False.
17.	**Escape Sequences:** **"\t"** is a tab, **"\n"** is a newline, and **"\r"** is a carriage return
18.	**Python Data types:** Number, String, Boolean, tuples, lists and dictionaries.
19.	**Number Data type:** Integers, Floating point numbers and Complex numbers.
20.	**Exponent data:** Digit part, Decimal point, Exponent part
21.	**Boolean Data type:** True or False.
22.	**String Data type:** Single, Double and Triple quotes.
	CHAPTER – 6 (CONTROL STRUCTURES)
1.	**Control structures :** Sequential, Alternative or Branching, Iterative or Looping
2.	**Alternative or Branching Statement: 1.**Simple if statement 2.if..else 3. if..elif
3.	**Looping constructs:** While loop ,For loop
4.	**Syntax of range():**1.start – initial value 2.stop – final value 3.step –increment value.
5.	**Jump Statements in Python:** Break, continue, pass
6.	**Examples for Range():** Range (1,30,1) — will start the range of values from 1 and end at 29 Range (2,30,2) — will start the range of values from 2 and end at 28 Range (30,3,-3) — will start the range of values from 30 and end at 6 Range (20) — will consider this value 20 as the end value(or upper limit) and starts the range count from 0 to 19 (remember always range() will work till stop -1 value only)
	CHAPTER – 7 (PYTHON FUNCTIONS)
1.	**Types of Functions:** User-defined, Built-in, Lambda, Recursion Functions
2.	**Function Arguments:** Required, Keyword, Default, Variable-length.
3.	**Variable Length arguments**: 1. Non keyword 2. Keyword variable
4.	**Use of lambda or anonymous function:** filter(), map(), reduce().
5.	**Scope of Variables:** local scope and global scope.
6.	**Variable Length arguments we can pass the arguments using two methods:** 1. Non keyword variable arguments - Tuples 2. Keyword variable arguments
7.	**Functions using libraries :** **Built-in functions:** abs () ord () chr () bin () type () id () min () max () sum () format () round () pow () **Mathematical functions:** floor () ceil () sqrt ()
	CHAPTER – 8 (STRINGS AND STRING MANIPULATIONS)
1.	**String Unicode characters:** ❖ Letters, Numbers, or special symbols enclosed within single, double or even triple quotes.
2.	**Accessing characters in a String:** **The positive subscript: [First character** 0 last character : n-1], **The negative index assigned** [The last character to the first character in reverse order begins with -1.]
3.	**General format of replace function:** replace("char1", "char2")
4.	**General format of slice operation:** str[start:end]
5.	**String Operators:** **1) Concatenation (+) :** Joining of two or more strings is called as Concatenation **2) Append (+ =) :** Adding more strings at the end of an existing string is known as append **3) Repeating (*) :** To display a string in multiple number of times. **4) String slicing [] :** To slice one or more substrings from a main string.

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	5) Stride when slicing string: ❖ When the slicing operation, you can specify a third argument as the stride, which refers to the number of characters to move forward after the first character is retrieved from the string. ❖ The default value of stride is 1.
6.	**Formatting characters :** 1) %c **C**haracter 2) %d (or) %i Signed **d**ecimal integer 3) %s **S**tring 4) %u **U**nsigned decimal integer 5) %o **O**ctal integer 6) %x or %X He**x**adecimal integer 7) %e or %E **E**xponential notation 8) %f **F**loating point numbers 9) %g or %G Short numbers in floating point or exponential notation.
7.	**Escape sequences supported by python** **1) \ newline** - Backslash and newline ignored 2) \\ Backslash 3) \' Single quote 4) \" Double quote **5) \a** ASCII Bell 6) **\b** ASCII Backspace 7) **\f** ASCII Form feed 8) **\n** ASCII Linefeed **9) \r** ASCII Carriage Return 10) **\t** ASCII Horizontal Tab 11) **\v** ASCII Vertical Tab **12) \ooo** Character with octal value ooo 13) **\xHH** Character with hexadecimal value HH
8.	**Built-in String functions :** 1) l**en**(str), 2) capitalize(), 3) center(width, fillchar), 4) find(sub[,start[, end]]), 5) isalnum(), 6) isalpha(), 7) isdigit(),8) lower(),9) islower(),10) isupper( ), 11) upper(), 12) title(), 13) swapcase(), 14) count(str, beg, end), 15) ord(char), 16) chr(ASII)
9.	**Membership operators:** The 'in' and 'not in' operators can be used
	CHAPTER – 9 (LISTS, TUPLES, SETS AND DICTIONARY)
1.	**Python data types** List, Tuples,Set Dictionary.
2.	**List elements can be modified or mutable** : Replaced, added or removed
3.	**Accessing List elements:** (i) Accessing all elements of a list, (ii) Reverse Indexing
4.	**Other important list function:** 1.copy ( ),2. count ( ),3. index ( ),4. reverse ( ),5. sort ( )6. max( )7. min( )8. sum( )
5.	**Accessing List elements:** **Positive value** of index counts from the beginning of the list. **Negative value** means counting backward from end of the list
6.	**1.Apend()** - Add a single element 2.**Extend()** - Add more than one element **3.Del statement** -Delete elements whose index is known \ Delete entire list. **4.Remove()** - Delete elements of a list if its index is unknown **5.Pop()** - Delete an element using the given index value. 6.**Clear()** - Delete all the elements in list. **7.Range()** - Generate a series of values in Python.
7.	**Comparison of List and Tuple:** **List:** 1.List are changeable (mutable 2.List Elements of a list are enclosed within square brackets 3.Iterating lists is slow **Tuple:**1.Tuple are unchangeable (immutable) 2.The elements of a tuple are enclosed by parenthesis. 3.Iterating tuples is faster.
8.	**Set Operations:** **1.Union:** It includes all elements from two or more sets [The | operator is used] **2.Intersection:** It includes the common elements in two sets [The operator & is used] **3.Difference:** It includes all elements that are in first set (say set A) but not in the second set (say set B) [The minus (-) operator] **4.Symmetric difference:** It includes all the elements that are in two sets (say sets A and B) but not the one that are common to two sets. [The caret (^) operator is used]
	CHAPTER – 10 (PYTHON CLASSES AND OBJECTS)
1.	**Key features** of Object Oriented Programming: Classes and Objects
2.	**Creating Objects:** Object_name = class_name ( )
3.	**Parameters** are the variables in the function definition. **Arguments** are the values passed to the function definition.
4.	**Constructor** : [Special function][Automatically executed][Class is created][_init_] **Destructor:** [Special method][Destroy the objects][_del_]
	CHAPTER – 11 (DATABASE CONCEPTS)
1.	**Examples of DBMS software are:** Foxpro, dbase.
2.	**Characteristics of Database Management System:** 1. Data stored into Tables, 2. Reduced Redundancy, 3.Data Consistency 4. Support Multiple user and Concurrent Access, 5.Query Language, 6. Security, 7. DBMS Supports Transactions
3.	**Advantages of DBMS:** 1. Segregation of application program **2.**Minimal data duplication or Data Redundancy 3.Easy retrieval of data using the Query Language 4.Reduced development time and maintenance
4.	**Components of DBMS:** 1.Hardware 2.Software 3.Data 4.Procedures/Methods 5.Database Access Languages
5.	**Database Structure:** 1) A Table- RELATION 2) A Row -TUPLE 3) A column –ATTRIBUTE

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6.	**Data Model:** 1.Hierarchical 2.Relational 3.Network 4.Database 5.Entity Relationship 6 Object Model.
7.	**Object Model Example:** Shape, Circle, Rectangle,Triangle. **1) Circle** has the attribute **radius. 2) Rectangle** has the attributes **length and breadth.** **3) Triangle** has the attributes **base and height**. **4)** The objects Circle, Rectangle and Triangle inherit from the object **Shape**.
8.	**Types of DBMS Users:** 1.Database Administrators 2.Application Programmers or Software Developers 3.End User 4.Database designers
9.	**RDBMS examples:** SQL server, Oracle, mysql, MariaDB, SQLite.
10.	**Types of Relationships:** 1. One-to-One Relationship 2. One-to-Many Relationship 3. Many-to-One Relationship 4. Many-to-Many Relationship
11.	**Relational Algebra is divided into various groups:** **Unary Relational Operations: 1.**SELECT (symbol : σ) **2.**PROJECT (symbol : Π) **Relational Algebra Operations from Set Theory:** 1.UNION (∪) 2.INTERSECTION (∩) 3.DIFFERENCE (−) 4.CARTESIAN PRODUCT (X)
	CHAPTER – 12 (STRUCTURED QUERY LANGUAGE)
1.	**RDBMS packages:** Oracle, MySQL, MS SQL Server, IBM DB2 and Microsoft Access
2.	**CRUD**: Create, Read, Update and Delete operations
3.	**The fields in a student table** may be of the type AdmnNo, StudName, StudAge, StudClass, Place etc.
4.	**Processing Skills of SQL:** 1. Data Definition Language (DDL), 2. Data Manipulation Language (DML) 3. Embedded Data Manipulation Language 4. View Definition 5. Authorization 6. Integrity 7. Transaction control
5.	**MySQL** - SQL Server, Oracle, Informix, Postgres, etc. **WAMP** - Windows, Apache, MySQL and PHP
6.	**Components of SQL:** 1.DML - Data Manipulation Language 2.DDL - Data Definition Language 3.DCL - Data Control Language 4.TCL – Transaction Control Language 5.DQL – Data Query Language
7.	**DATA DEFINITION LANGUAGE SQL commands:** Create Alter Drop Truncate
8.	**DATA MANIPULATION LANGUAGE SQL commands:** Insert Update Delete
9.	**The DML is basically of two types:** Procedural DML Non-Procedural DML
10.	**DATA CONTROL LANGUAGE SQL commands:** Grant Revoke
11.	**TRANSACTIONAL CONTROL LANGUAGE SQL commands:** Commit ,Roll back ,Save point
12.	**DATA QUERY LANGUAGE SQL commands:** Select
13.	**Data Types:** Char (Character), varchar, dec (Decimal), numeric, int (Integer), smallint, float, real, double.
14.	**SQL Commands and their Functions:** 1. DDL Commands 2.Type of Constraints 3. DML COMMANDS 4. Some Additional DDL Commands 5. DQL COMMAND– SELECT command
15.	**Type of Constraints:** 1.Unique 2.Primary Key **3.**Default **4.**Check
16.	**Some Additional DDL Commands:** ALTER , TRUNCATE , DROP TABLE
17.	**DQL COMMAND– SELECT command:** 1.DISTINCT Keyword,2. ALL Keyword, 3. BETWEEN and NOT BETWEEN Keywords, 4. IN Keyword 5. ORDER BY clause, 6. WHERE clause, 7. GROUP BY clause, 8.HAVING
	CHAPTER – 13 (PYTHON AND CSV FILES)
1.	**CSV can be opened with any text editor in Windows** like notepad, MS Excel, Open Office etc.
2.	**CSV File cannot store**: charts or graphs.
3.	**CSV does not contain:** formatting, formulas, macros, etc.
4.	**Read a CSV File Using Python:** 1. Use the csv module's reader function 2. Use the Dict Reader class
5.	**A file operation takes places: Step 1** Open a file **Step 2** Perform Read or write operation **Step 3** Close the file
6.	**Python File Modes:** **1) 'r'** Open a file for reading. **2) 'w'** Open a file for **w**riting. **3) 'x'** Open a file for e**x**clusive creation. **4) 't'** Open in **t**ext mode. **5) 'a'** Open for **a**ppending at the end of the file without truncating it. **6) 'b'** Open in **b**inary mode. **7) '+'** Open a file for updating (reading and writing)
7.	**CSV Module's Reader Function:** Using this method one can read data from csv files of different formats like 1.quotes (" "), 2.pipe (|) 3.comma (,).
8.	**Writing Data Into Different Types in Csv Files:** 1.Creating A New Normal CSV File 2.Modifying An Existing File 3.Writing On A CSV File with Quotes 4.Writing On A CSV File with Custom Delimiters 5.Writing On A CSV File with Line terminator 6.Writing On A CSV File with Quote chars Writing CSV File Into A Dictionary 7.Getting Data At Runtime And Writing In a File
	CHAPTER – 14 (IMPORTING C++ PROGRAMS IN PYTHON)
1.	**Scripting languages:** JavaScript, VBScript, PHP, Perl, Python, Ruby, ASP and Tcl.

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2.	**Programming language:** C, C++, Java, Python
3.	**Applications of Scripting Languages:** 1. To automate certain tasks in a program 2. Extracting information from a data set 3. Less code intensive as compared to traditional programming language 4. can bring new functions to applications and glue complex systems together
4.	**Importing C++ Files in Python: 1.**Python-C-API **2.**Ctypes **3.**SWIG **4.**Cython **5.**Boost 6.Python 7.MinGW
5.	**MinGW Interface: (**Compiling and linking) C, C++ and FORTRAN
6.	**Import the modules :** os, sys and getopt
7.	**getopt.getopt function parameter:** argv,options,long_options
	CHAPTER – 15 (DATA MANIPULATION THROUGH SQL)
1.	**SQLite use:** Step 1 Import sqlite3 Step 2 Create a connection using connect () method and pass the name of the database File Step 3 Set the cursor object cursor = connection. cursor ()
2.	**Database server program**: MySQL or Oracle
3.	**SQL Query Using Python:** **1. SELECT Query:** 1.Displaying all records using fetch all(), 2.Displaying A record using fetch one(), 3.Displaying all records using fetch one(), 4.Displaying using fetch many ()
4.	**CLAUSES IN SQL: 1.**DISTINCT **2.**WHERE **3.**GROUP BY **4.**ORDER BY **5.**HAVING
5.	**WHERE CLAUSES:** AND, OR, and NOT
6.	**Aggregate Functions: 1.**COUNT() 2.AVG() **3.**SUM() 4.MAX() **5.**MIN()
	CHAPTER – 16 (DATA VISUALIZATION USING PYPLOT: LINE , PIE AND BAR CHAT)
1.	**Numerical data using:** dots, lines, or bars,
2.	**General types of Data Visualization 1.**Charts **2.**Tables **3.**Graphs **4.**Maps **5.**Infographics **6.**Dashboards
3.	**Types of Visualizations in Matplotlib:** 1.Line plot 2.Scatter plot 3.Histogram 4.Box plot 5.Bar chart 6.Pie chart
4.	**Scatter plot:** (Two-dimensional value) Horizontal or Vertical dimension
5.	**Box plot:** Minimum, First quartile, Median, Third quartile, and Maximum.
6.	**Buttons in the output:** 1. Home Button 2.Forward / Back Buttons Zoom Button 3.Save the Figure Button. 4.Pan Axis Button 5.Configure Subplots Button
7.	**Special Plot Types:**1.Line Chart, 2.Bar Chart, 3.Pie Chart
8.	**Bar Chart:** (Plotted) Vertically or horizontally

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GLOSSARY

Terminology	Meaning
Access control	• Security technique that regulates who or what can view or use resources in a computing environment
Access modifiers	• Private , Protected and Public
Alternative	• One of two choices
append()	• Used to add an element in a list
Argument	• Argument is the actual value of this variable that gets passed to function.
argv	• An array containing the values passed through command line argument
Attribute	• Data items that makes up an object
Authorization	• Giving permission or access
Block	• Set of Statements
Boolean	• Means Logical
break	• Exit the control
c = sqlite3.connect('test.db')	• Create a database connection to the SQLite database 'test.db'. • You can also supply the special name. memory: to create a database in RAM.
c.close()	• To release the connection of the database
c.commit()	• To save the changes made in the table
c.execute()	• Executes all SQL commands • Accepts two kinds of placeholders: question marks ? • ("qmark style") and named placeholders :name ("named style").
Cartesian product	• Cartesian operation is helpful to merge columns from two relations
cd	• cd command refers to change directory
Class	• Template of creating objects.
Class variable	• An ordinary variable declared inside a class
cls	• To clear the screen in command window
Comma(,)	• Comma is used to separate each data in a csv file
compiler	• Scans the entire program and translates it as a whole into machine code. It generates the error message only after scanning the whole program. Hence debugging is comparatively hard.
Conjunction	• Concurrence, coincidence
Constraint	• Restriction or limitation
Constructor	• A special function get execution automatically when an object enter into scope.
continue	• To skip the remaining part and start with next iteration.
CRUD	• Create, Read, Update and Delete
csv.reader()	• The reader function is designed to take each line of the file and make a list of all columns
csv.register_dialect()	• A dialect describes the format of the csv file that is to be read
CsvQuote All	• If quoting is set to csv quote all, then write row() will quote all fields.
cur = c.cursor()	• Creating cursor object
cur.fetchall()	• Method to get a list of the matching rows.
cur.fetchmany()	• Method that returns the next number of rows (n) of the result set
cur.fetchone()	• Method to retrieve a single matching row
CWI	• Centrum Wiskunde & Informatica
DBA	• Data Base Administrator
DBMS	• Database Management System
def	• This keyword is used to define function.
Destructor	• A special function get execution automatically when an object exit from its scope.
dict()	• It is used to print the data in dictionary format without orderdict
Dictionary	• Collection of Key-Value pairs
DictReader()	• Works by reading in the first line of the CSV and using each column comma separated value in this line as a dictionary key.
Dictwriter()	• Write dictionary data into a CSV file
elif	• else…if
Embedded	• Firmly attached
Enter key	• Enter key or newline is used to create rows in a csv file
eval()	• This function is used to evaluate the value of a string.

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Father of Relational Database	• Dr. Edgar Frank Codd
g++	• Compiler to compile c++ program
GIS	• Geographic Information System
global Scope	• A variable, with global scope can be used anywhere in the program.
Glue language	• A glue language makes it easy to do that (convenient syntax, good support for inter-process communication and data managing, no compilation step etc).
id ()	• It returns the memory address of the given object.
IDLE	• Integrated Development Environment
immutable	• Unchangeable
Implementation	• Implementation carries out the operation declared in the interface
import	• Import in python is similar to #include header_file in C++. • Python modules can get access to code from another module by importing the file/function using "import" statement.
Impure Functions	• Any function that changes the internal state of one of its arguments or the value of some external variable is an impure function.
Instantiation	• Process of creating an object
Integrity	• Whole and undivided
Interactive Mode	• A way of using the Python interpreter by typing command and expressions at the prompt.
Interface	• Interface defines what an object can do, but doesn't actually do it
interpreter	• Translates program one statement at a time. • It continues translating the program until the first error is met, in which case it stops. • Hence debugging is easy.
Intersection	• Intersection defines a relation consisting of a set of all tuple that are in both A and B.
Key	• Data that is mapped to a value in a dictionary
lambda	• Lambda function is mostly used for creating small and one- time anonymous function.
LEGB rule	• Local → Enclosed → Global → Built-in scope
List	• Mutable ordered collection of values
local Scope	• A variable declared inside the function's body or in a block is called local scope.
Looping	• Repetition
Mapping	• The process of binding a variable name with an object
Method	• A function declared and defined inside a class.
module	• A module is a file containing Python definitions and statements. • The file name is the module name with the suffix .py appended. • Within a module, the module's name (as a string) is available as the value of the global variable name.
Namespaces	• containers for mapping names of variables to objects
Nested Block	• A block within a block is called nested block.
next()	• The next() function returns the next item from the iterator. It can also be used to skip a row of the csv file
Object	• Collection of Data and Functions.
Object Oriented Programming	• Computer Programming concept based on real world objects.
operator.itemgetter(col_no)	• To sort by more than one column from a csv file
os.system()	• Used to execute system command and here in our python program is used to compile the c++ program using g++
Parameter	• Parameter is variable in the declaration of function definition.
parse	• To split an input into pieces of data that can be easily stored or manipulated.
pass	• Can be used as placeholder in functions and loops.
Projection (π)	• The projection eliminates all attributes of the input relation but those mentioned in the projection list
Prompt	• Character (<<<) displayed by the interpreter to indicate that it is ready to take input from the user.
Pure Functions	• Pure functions always returns the same result if the same arguments are passed in
Python prompt	• >>>
Queue	• Queue is an abstract data structure, somewhat similar to Stacks. • Unlike stacks, a queue is open at both its ends. One end is always used to insert data (en queue) and the other is used to remove data(de queue). • Queue follows First-In-First-Out methodology, i.e., the data item stored first will be accessed first.
RDBMS	• Relational Database Management System
recursion	• When a function calls itself is known as recursion.

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Redundant	• Duplication of data
Routines	• Routines are otherwise called as functions or methods. • In Python it is also called as definition
Schema	• Structure or model
Scope	• Visibility of variables, parameters and functions in one part of a program to another part of the same program.
Script	• A Python program stored in a file.
Script Mode	• A way of using the Python interpreter by typing command and expressions at the prompt.
Select (σ)	• The SELECT operation is used for selecting a subset of the tuples according to a given selection condition
Selectors	• Functions that retrieve information from the data type.
Sequential	• One after another
Set difference(-)	• (-) symbol denotes it. • The result of A-B is a relation which includes all tuples that are in A but not in B.
skipinitialspace=true	• When true, whitespace immediately following the delimeter is ignored. • The default is false
slicing	• Cut
Stack	• A stack (sometimes called a “push-down stack”) is an ordered collection of items where the addition of new items and the removal of existing items always takes place at the same end. • This end is commonly referred to as the “top.” • The end opposite the top is known as the “base. • This ordering principle is sometimes called LIFO, last- in first-out.
stride	• A long step
string	• Sequence of letters, numbers or symbols
subscript	• An index number
Syntax	• The structure of a program
Syntax Error	• An error in a program that makes it impossible to parse.
Token	• One of the basic elements of the syntactic structure of a program.
Tuple	• It is a sequence of immutable(not changeable) objects. • Tuples are sequences, just like lists. • Tuples are defined by having values between parentheses ( ).
Union operation(U)	• Union is symbolized by symbol, it includes all tuples that are in tables A or in B.
variable	• Memory box to store values
writer ow()	• Method to write a single row of data in a file
writer ows()	• Method to write multiple rows of data in a file
FALSE	• Logical value 0
TRUE	• Logical value 1

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CHAPTER 1 TO 16 TWO MARK BOOK BACK & PUBLIC QUESTION WITH ANSWERS

CHAPTER – 1(FUNCTION)

1. What is a subroutine?

- Subroutines are the basic building blocks of computer programs.
- Subroutines are small sections of code that are used to perform a particular task that can be used repeatedly.
- In Programming languages these subroutines are called as functions.

2. Define Function with respect to Programming language. (S-2021)

- A function is a unit of code that is often defined within a greater code structure.
- Specifically, a function contains a set of code that works on many kinds of inputs, like variants, expressions and produces a concrete output.

3. Write the inference you get from X:=(78).

- In X:=(78), (78) is a function definition that binds the value 78 to the name 'X'. **(OR)**
- X:= (78) has an expression in it but (78) is not itself an expression. Rather, it is a function definition.
- Definitions bind values to names, in this case the value 78 being bound to the name 'a'.

4. Differentiate interface and implementation (J-2023)

Interface	Implementation
❖ Interface just defines what an object can do, but won't actually do it	❖ Implementation carries out the instructions defined in the interface.

5. Which of the following is a normal function definition and which is recursive function definition

i) let sum x y:
return x + y

ii) let disp :
print 'welcome'

iii) let rec sum num:
if (num!=0) then return num + sum (num-1)
else return num

i. Normal ii. Normal iii. Recursive function

1. List the characteristics of Interface: (S-2020)

- The class template specifies the interfaces to enable an object to be created and operated properly.
- An object's attributes and behaviour is controlled by sending functions to the object.

CHAPTER – 2(DATA ABSTRACTION)

1. What is abstract data type? (M-2022, M-2024)

- Abstract Data type (ADT) is a type (or class) for objects whose behaviour is defined by a set of value and a set of operations.

2. Differentiate constructors and selectors. (J-2022, J-2024)

Constructors	Selectors
❖ Constructors are functions that build the abstract data type	❖ Selectors are functions that retrieve information from the data type
❖ Constructors create an object, bundling together different pieces of information	❖ Selectors extract individual pieces of information from the object

3. What is a Pair? Give an example. (M-2020, J-2023)

- Pair is a compound structure which is made up of list or Tuple.
- Any way of bundling two values together into one can be considered as a pair.

Example: lst := [10, 20]

4. What is a List? Give an example.

- List is constructed by placing expressions within square brackets separated by commas.
- Such an expression is called a list literal.
- List can store multiple values.
- Each value can be of any type and can even be another list.

Example: lst [10, 20]

5. What is a Tuple? Give an example. (M-2023)

- A tuple is a comma-separated sequence of values surrounded with parentheses.
- Tuple is similar to a list.
- The difference between the two is that you cannot change the elements of a tuple once it is assigned whereas in a list, elements can be changed

Example: colour= ('red', 'blue', 'Green')

(CHAPTER-3)(SCOPING)

1. What is a scope? (M-2023)

- Scope refers to the visibility of variables, parameters and functions in one part of a program to another part of the same program.

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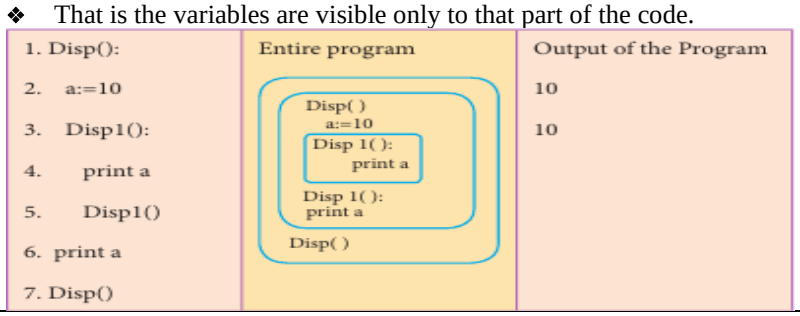
2.	**Why scope should be used for variable. State the reason.** ❖ The scope should be used for variables because; it limits a variable's scope to a single definition. ❖ That is the variables are visible only to that part of the code. 
3.	**What is Mapping? (M-2022)** ❖ The process of binding a variable name with an object is called **mapping.** ❖ **= (equal to sign)** is used in programming languages to map the variable and object.
4.	**What do you mean by Namespaces? (M-2020, J-2022, J-2024)** ❖ Namespaces are containers for mapping names of variables to objects. **Example:** a:=5 (Here the variable 'a' is mapped to the value '5'
5.	**How Python represents the private and protected Access specifies?** ❖ Python prescribes a convention of prefixing the name of the **variable or method with single or double underscore to emulate** the behaviour of protected and private access specifies. ❖ All members in a python class are public by default. **Example:** a, _num**.**
1.	**What are the characteristics of modules? (S-2020)** ❖ Modules contain instructions, processing logic, and data. Modules can be separately compiled and stored in a library. ❖ Modules can be included in a program. Module segments can be used by invoking a name and some parameters. ❖ Module segments can be used by other modules.
	CHAPTER – 4(ALGORITHMIC STRATEGIES)
1.	**What is an Algorithm? (M-2020)** ❖ An algorithm is a finite set of instructions to accomplish a particular task. ❖ It is a step-by-step procedure for solving a given problem.
2.	**Write the phases of performance evaluation of an algorithm.** **1. A Priori estimates:** ❖ This is a theoretical performance analysis of an algorithm. ❖ Efficiency of an algorithm is measured by assuming the external factors. **2. A Posteriori testing:** ❖ This is called performance measurement. ❖ In this analysis, actual statistics like running time and required for the algorithm executions are collected.
3.	**What is Insertion sort?** ❖ Insertion sort is a simple sorting algorithm. ❖ It works by taking elements from the list one by one and inserting then in their correct position in to a new sorted list.
4.	**What is Sorting?** ❖ The process of arranging the list items in ascending or descending order is called sorting. **Example:** Bubble Sort, Selection Sort, Insertion Sort.
5.	**What is searching? Write its types. (M-2022, M-2024)** ❖ A Searching is a process of finding a particular value presenting a given set of numbers. ❖ To search an item in a data structure is known as searching. **Types:** 1.Liner search 2.Binary search
	CHAPTER – 5(PYTHON - VARIABLES AND OPERATORS)
1.	**What are the different modes that can be used to test Python Program? (S-2021, M-2022)** ❖ In Python, programs can be written in two ways namely interactive mode and Script mode**.** ❖ Interactive mode allows us to write codes in Python command prompt(>>>) ❖ Script mode is used to create and edit python source file with the extension.py
2.	**Write short notes on Tokens. (S-2020, J-2023)** ❖ Python breaks each logical line into a sequence of elementary lexical components known as Tokens. ❖ The normal token types are 1) Identifiers, 2) Keywords, 3) Operators, 4) Delimiters 5) Literals.
3.	**What are the different operators that can be used in Python? (M-2024)** ❖ 1. Arithmetic operator 2. Relational or comparative operator 3. Logical operator ❖ 4. Assignment operator 5. Conditional and Ternary operator.

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4.	**What is a literal? Explain the types of literals? (J-2024)** ❖ Literal is a raw data given in a variable or constant. ❖ In Python, there are various **types** of literals. **1.Numeric Literals** consists of digits and are immutable **2.String literal** is a sequence of characters surrounded by quotes. **3.Boolean literal** can have any of the two values: True or False.
5.	**Write short notes on Exponent data?** ❖ An Exponent data contains decimal digit part, decimal point, exponent part followed by one or more digits. **Example:** (12.E04, 24.e04 # Exponent data)
	CHAPTER – 6 (CONTROL STRUCTURES)
1.	**List the control structures in Python. (J-2023)** ❖ There are three important control structures are, ❖ **1.**Sequential **2.**Alternative **or** Branching **3.**Iterative or Looping
2.	**Write note on break statement. (S-2021, J-2024)** ❖ The **break** statement terminates the loop containing it. ❖ Control of the program flows to the statement immediately after the body of the loop. **Syntax:** break

3.	**Write is the syntax of if.. else statement:**
	Syntax:
	if <condition>:
	statements-block 1
	else:
	statements-block 2

4.	**Define control structure.** ❖ A program statement that causes a jump of control from one part of the program to another is called control structure or control statement.
5.	**Write note on range () in loop. (M-2020, J-2022, M-2023)** ❖ In Python, **for** loop uses the range () function in the sequence to specify the initial, final and increment values. ❖ Range () generates a list of values starting from start till stop-1. ❖ The syntax of range() is as follows: range (start, stop,[step])
	CHAPTER – 7(PYTHON FUNCTIONS)
1.	**What is function?** ❖ Functions are named blocks of code that are designed to do specific job. ❖ Functions are nothing but a group of related statements that perform a specific task. ❖ Function blocks begin with the keyword **"def"** followed by function name and parenthesis ().
2.	**Write the different types of function. (S-2021, M-2024)** 1.User-defined functions :Functions defined by the users themselves. 2.Built-in functions :Functions that are inbuilt with in Python. 3.Lambda functions :Functions that are anonymous un-named function. 4.Recursion functions :Functions that calls itself is known as recursive
3.	**What are the main advantages of function? (J-2023)** ❖ It avoids repetition and makes high degree of code reusing. ❖ It provides better modularity for your application
4.	**What is meant by scope of variable? Mention its types. (J-2022)** ❖ Scope of variable refers to the part of the program, where it is accessible, i.e., area where you can refer (use) it. ❖ We can say that scope holds the current set of variables and their values. ❖ Two types of scopes –**local scope** and **global scope**
5.	**Define global scope:** ❖ A variable, with global scope can be used anywhere in the program. ❖ It can be created by defining a variable outside the scope of any function/block
6.	**What is base condition in recursive function?** ❖ A recursive function calls its self. ❖ The condition that is applied in any recursive function is known as base condition. ❖ A base condition is must in every recursive function otherwise it will continue to execute like an infinite loop
7.	**How to set the limit for recursive function? Give an example.** ❖ Python stops calling recursive function after 1000 calls by default. ❖ So, it also allows you to change the limit using sys.setrecursionlimit(limit_value). **Example:** import sys sys.setrecursionlimit(3000)

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```
def fact(n):
    if n == 0:
    return 1
    else:
    return n * fact(n-1)
print(fact (2000)
```

CHAPTER – 8(STRINGS AND STRING MANIPULATION)

1. What is String? (S-2021, J-2024)

- String is a data type in python, which is used to handle array of characters.
- String is a sequence of Unicode characters that may be a combination of letters, numbers, or special symbols enclosed within single, double or even triple quotes.

2. Do you modify a string in Python?

- Yes we can modify the string by the following method,
- A new string value can be assign to the existing string variable.
- When defining a new string value to the existing string variable.
- Python completely overwrite new string on the existing string.

3. How will you delete a string in Python? (M-2023)

- Python will not allow deleting a particular character in a string.
- Delete command is used to remove entire string variable.

Example>>> del str1[2]

4. What will be the output of the following python code? (J-2022)

str1 = "School" **output:** SchoolSchoolSchool
print(str1*3)

5. What is slicing?

- Slice is a substring of a main string.
- A substring can be taken from the original string by using [ ] operator and index or subscript values.
- Thus, [ ] is also known as slicing operator.
- Using slice operator, you have to slice one or more substrings from a main string.
- General format of slice operation: **str [start: end]**

1. What is the use of replace ( ) in python? Write the general format of replace ( ) (S-2020)

- Python does not support any modification in its strings.
- But, it provides a function replace() to temporarily change all occurrences of a particular character in a string.
- The changes done through replace () does not affect the original string.

General formate of replace function: replace("char1", "char2")

- The replace function replaces all occurrences of char1 with char2.

2. What will be the output of the given python program (M-2020)

str= "COMPUTER SCIENCE"

a) print(str*2) **Ans:** COMPUTER SCIENCECOMPUTER SCIENCE
b) print (str[0:7]) **Ans:** COMPUTE

CHAPTER – 9(LISTS, TUPLES, SETS AND DICTIONARY)

1. What is List in Python? (S-2021)

- A list in Python is known as a "sequence data type" like strings.
- It is an ordered collection of values enclosed within square brackets [ ].
- Each value of a list is called as element.
- It can be of any type such as numbers, characters, strings and even the nested lists as well.

Syntax: Variable = [element-1, element-2, element-3 ……element-n]

2. How will you access the list elements in reverse order?

- Python enables reverse or negative indexing for the list elements.
- Thus, python lists index in opposite order.
- The python sets -1 as the index value for the last element in list and -2 for the preceding element and so on.
- This is called as **Reverse Indexing.**

3. What will be the value of x in following python code?

List1=[2,4,6[1,3,5]] **Ans:** The value of x is **4**
x=len(List1)

4. Differentiate del with remove ( ) function of List.

del function	Remove( ) function
❖ **del** statement is used to delete known elements	❖ **Remove ()** function is used to delete elements of a list if its index is unknown.
❖ The **del**statement can also be used to delete entire list.	❖ The **remove ()** function can be used to delete only one or more elements if the index value is not known

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5. **Write the syntax of creating a Tuple with n number of elements.** **(M-2022)**

Syntax:

Tuple_Name = (E1, E2, E2……. En) # Tuple with n number elements

Tuple_Name = E1, E2, E3…..En # Elements of a tuple without parenthesis.

6. **What is set in Python?** **(J-2022, J-2023)**

- In python, a set is another type of collection data type.
- A Set is a mutable and an unordered collection of elements without duplicates.
- That means the elements within a set cannot be repeated.
- This feature used to include membership testing and eliminating duplicate elements.

1. **Write the syntax to create a list with suitable example** **(S-2020)**

- A list is simply created by using square bracket. The elements of list should be specified within square brackets.

Syntax: Variable = [element-1, element-2, element-3 …… element-n]

Example: 1. Marks = [10, 23, 41, 75] **2.**Fruits = [“Apple”, “Orange”, “Mango”, “Banana”] **3.**MyList = [ ]

2. **What will be output of the python code?** **(M-2023)**

```
Squares = [x**2 for x in range (1,11)] print (Squares)
```

Output

[1,4,9,16,25,36,49,64,81,100]

3. **Write the use of pop () function in Python.** **(M-2024)**

- Pop() function is used to delete a particular element from a list using its index value.
- Pop () function is used to delete only one element from a list.

CHAPTER – 10(PYTHON CLASSES AND OBJECTS)

1. **What is class?** **(M-2023, J-2024)**

1. Class is the main building block in Python. 2. Class is a template for the object

2. **What is instantiation?**

- Once a class is created, next you should create an object or instance of that class.
- The process of creating object is called as “Class Instantiation”.

Syntax: Object_name = class_name( )

3. **What is the output of the following program?**

```
Class Sample: >>>
    __num=10 10
defdisp(self):
    print(self.__num)
    S=Sample()
S.disp()
    print(S.__num)
```

Output

```
line 7, in <module>
print (S._num)
```

Attribute error:‘Sample’ object has no attribute ‘_num’

4. **How will you create constructor in Python?**

- “init” is a special function begin an end with double under score in python act as a constructor.
- Constructor function automatically executed when an object of a class is created.
- **General format of __init__ method** (Constructor function)

```
def __init__(self, [args ……..]):
<statements>
```

5. **What is the purpose of Destructor?**

- **Destructor** is also a special method gets executed automatically when an object exit from the scope.
- In python, _del_ () method is used as destructor.
- It is just opposite to constructor.
- **General format :**

```
def_del_(self):
    <statements>
```

CHAPTER – 11(DATABASE CONCEPTS)

1. **Mention few examples of a database.** **(J-2022)**

- Fox pro, dbase, IBM DB2, Microsoft access, Microsoft excel, My SQL

2. **List some examples of RDBMS:** IBM DBZ, SQL server, Oracle, MY SQL, Maria DB, SQLite.

3. **What is data consistency?** **(J-2023)**

- Data Consistency means that data values are the same at all instances of a database.
- On live data, it is being continuously updated and added, maintaining the consistency of data can become a challenge.
- But DBMS handles it by itself.

4. **What is the difference between Hierarchical and Network data model?** **(M-2024)**

Hierarchical Data Model	Network Data Model
1. A child record has only one parent	1. A child record may have many parent nodes.
2. It represents one to many relationships.	2. It represents many- to- many relationships
3. Difficult to access data	3. Easy to access data

5. **What is normalization?**

- Normalization is an integral part of RDBMS in order to reduce data redundancy and improve data integrity.

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1. Write advantages of DBMS? (S-2020)(S-2021)

1.Segregation of application program 2.Minimal data duplication or Data Redundancy
3.Easy retrieval of data using the Query Language 4.Reduced development time and maintenance.

CHAPTER – 12(STRUCTURED QUERY LANGUAGE)

1. Write a query that selects all students whose age is less than 18 in order wise.

- SELECT * FROM student WHERE age<=18 ORDER BY Name;

2. Differentiate Unique and Primary Key constraint. (M-2022, J-2024)

Unique constraint	Primary Key constraint
❖ This constraint ensures that no two rows have the same value in the specified columns.	❖ This constraint declares a field as a Primary key which helps to uniquely identify a record.
❖ The **UNIQUE** constraint can be applied only to fields that have also been declared as **NOT NULL**.	❖ The primary key does not allow **NULL** values and therefore a field declared as primary key must have the **NOT NULL** constraint.

3. Write the difference between table constraint and column constraint? (J-2023)

Table constraint	Column constraint
❖ Table constraints apply to a group of one or more columns.	❖ Column constraints apply only to individual column.

4. Which component of SQL lets insert values in tables and which lets to create a table?

Command	Description	Component
1. Insert	Inserts data into a table	DML
2. Create	To create tables in the database.	DDL

5. What is the difference between SQL and My SQL?

SQL	My SQL
❖ Structured Query Language is a language used for accessing databases	❖ **MYSQL** is a database management system, like SQL Server, Oracle, Informix, Postgres.
❖ **SQL** is a **DBMS**	❖ **My SQL** is a **RDBMS**.

1. What is Data Manipulation language? (M-2023)

- A Data Manipulation Language (DML) is a computer programming language used for adding (inserting), removing (deleting), and modifying (updating) data in a database.

2. Write categories of SQL Commands: (M-2020)

1.DML - Data Manipulation Language 2.DDL - Data Definition Language 3.DCL - Data Control Language
4.TCL - Transaction Control Language 5.DQL - Data Query Language

CHAPTER – 13(PYTHON AND CSV FILES)

1. What is CSV File? (S-2021, M-2022, M-2024)

- A **CSV** file is a human readable text file where each line has a number of fields, separated by commas or some other delimiter.
- A CSV file is also known as a Flat File.

2. Mention the two ways to read a CSV file using Python. (S-2020)

1. Use the csv module's reader function 2. Use the Dict Reader class

3. Mention the default modes of the File. (M-2023)

- The default is reading ('r') in text mode.
- In this mode, while reading from the file the data would be in the format of **strings.**

4. What is use of next () function? (J-2024)

- **The "next ()" command** is used to avoid or skip the first row or row heading.

Example :

- While sorting the row heading is also get sorted, to avoid that the first is skipped using next ().
- Then the list is sorted and displayed.

5. How will you sort more than one column from a CSV file? Give an example statement.

- To sort by more than one column you can use **item getter** with multiple indices.

Syntax: operator.itemgetter (col_no)
Sortedlist = sorted(data, key=operator.itemgetter(Col_number),reverse=True)
Example: sorted list = sorted (data,key=operator.itemgetter(1))

CHAPTER – 14(IMPORTING C++ PROGRAMS IN PYTHON)

1. What is the theoretical difference between Scripting language and other programming language? (S-2021)

Scripting language	Programming language
❖ A scripting language requires an interpreter.	❖ A programming language requires a compiler.
❖ A scripting language need not be compiled.	❖ A programming languages needs to be compiled before running.
❖ **Example:** JavaScript, VBScript, PHP, Perl, Python, Ruby, ASP.	❖ **Example:** C, C++, Java, C# etc.

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2. Differentiate compiler and interpreter. (J-2022)

Compiler	Interpreter
❖ Compiler generates an Intermediate Code.	❖ Interpreter generates Machine Code.
❖ Compiler reads entire program for compilation	❖ Interpreter reads single statement at a time for interpretation.
❖ Error deduction is difficult.	❖ Error deduction is easy.
❖ Comparatively faster.	❖ Slower
❖ **Example:** gcc, g++, Borland Turbo C	❖ **Example**: Python, Basic, Java

3. Write the expansion of 1.SWIG 2.MinGW (M-2020)
1.SWIG : Simplified Wrapper Interface Generator **2.MinGW:** Minimalist GNU for Windows

4. What is the use of modules?
- ❖ We use modules to break down large programs into small manageable and organized files.
- ❖ Furthermore, modules provide reusability of code.
- ❖ We can define our most used functions in a module and import it, instead of copying their definitions into different programs

5. What is the use of cd command? Give an example.
- ❖ **Syntax:** cd: < absolute path>
- ❖ **"cd"** command used to change directory and absolute path refers to the complete path where python is installed.

Example : "cd c:\program files\openoffice4\Program"

1. Write the syntax of getopt.getopt method (M-2022)
<opts>,<args>=getopt.getopt(argv, options, [long_options])

CHAPTER – 15(DATA MANIPULATION THROUGH SQL)

1. Mention the users who uses the Database:
- ❖ Users of database can be human users, other programs or applications.

2. Which method is used to connect a database? Give an example.
- ❖ Create a connection using **connect () method** and pass the name of the database file.

Example:

```
import sqlite3
            # connecting to the database
connection = sqlite3.connect ("Academy.db")
             # cursor
cursor = connection.cursor()
```

3. What is the advantage of declaring a column as "INTEGER PRIMARY KEY"? (M-2020)
- ❖ If a column of a table is declared to be an INTEGER PRIMARY KEY, that column will be automatically auto incremented. **(OR)**
- ❖ If a column of a table is declared to be an INTEGER PRIMARY KEY, then whenever a NULL will be used as an input for this column, the NULL will be automatically converted into an integer which will one larger than the highest value so far used in that column.
- ❖ If the table is empty, the value 1 will be used.

4. Write the command to populate record in a table. Give an example:
- ❖ To populate (add record) the table "INSERT" command is passed to SQLite.
- ❖ The "execute" method executes the SQL command to perform some action.

Example:

```
sql_command = """INSERT INTO Student (Rollno, Sname, Grade, gender, Average, birth_date) VALUES (NULL, "Akshay", "B",
                "M","87.8", "2001-12-12");"""
cursor.execute(sql_command
```

5. Which method is used to fetch all rows from the database table? (J-2022, M-2024)
- ❖ The fetchall() method is used to fetch all rows from the database table.

Example :result = cursor.fetchall()

1. Write notes on MAX ( ) and MIN ( ) (J-2023)
- ❖ The MAX() function returns the largest value of the selected column.
- ❖ The MIN() function returns the smallest value of the selected column.

CHAPTER – 16(DATA VISUALIZATION USING PYPLOT: LINE , PIE AND BAR CHAT)

1. What is Data Visualization? (M-2022)
- ❖ Data Visualization is the graphical representation of information and data.
- ❖ The objective of Data Visualization is to communicate information visually to users.
- ❖ For this, data visualization uses statistical graphics.
- ❖ Numerical data may be encoded using dots, lines, or bars, to visually communicate a quantitative message.

2. List the general types of data visualization. (M-2020, M-2023, J-2024)
1. Charts 2.Tables 3.Graphs 4.Maps 5.Infographics 6.Dashboards.

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3. **List the types of Visualizations in Mat plot lib.** **(S-2020, M-2024)**
1. Line plot, 2.Scatter plot, 3.Histogram, 4.Box plot, 5.Bar chart 6.Pie chart.

4. **How will you install Mat plot lib?**
- **Mat plot lib** can be installed using pip software.
- Pip is a management software for installing python packages.
- Importing Mat plot lib using the command: import matplotlib.pyplot asplt
- Mat plot lib can be imported in the workspace

5. **Write the difference between the following functions.**
plt.plot([1,2,3,4]), plt. plot([1,2,3,4],[1,4,9,16])

plt.plot([1,2,3,4])	**plt.plot([1,2,3,4],[1,4,9,16])**
❖ It refers y value as [1,2,3,4]	❖ It refers x and y values as ([1,2,3,4], [1,4,9,16])
❖ Indirectly it refers x values as [0,1,2,3] (0,1) (1,1) (2,3) (3,4)]	❖ Directly x and y values are given as [(1,1) (2,4) (3,9) (4,16)]

CHAPTER 1 TO 16 BOOK INSIDE TWO MARKS QUESTION WITH ANSWERS

CHAPTER – 1 (FUNCTION)

1. **Give one example of pure function.**
```
let square x:=          let length s:=
    return: x * x       i:=0
                        if i < strlen (s) then
                        -- Do something which doesn't affect s   ++i
```

2. **What are called function?**
- A function is a unit of code that is often defined within a greater code structure
- A function contains a set of code that works on many kinds of inputs and produces a concrete output

3. **What is Definitions?**
- Definitions are not expressions, at the same time expressions are also not treated as definitions.
- Definitions are distinct syntactic blocks.
- Definitions can have expressions nested inside them, and vice-versa.

4. **Differentiate Parameters and Arguments.**

Parameters	**Arguments**
Parameters are the variables in a function definition	Arguments are the values which are passed to a function definition

5. **What is recursive function?** A function definition which call itself is called recursive function.

6. **Write syntax for function definitions:** let rec fna1 a2 ... an := k
- Here the **'fn'** is a variable indicating an identifier being used as a function name.
- The names **'a1'** to **'an'** are variables indicating the identifiers used as parameters.
- The keyword **'rec'** is required if **'fn'** is to be a recursive function

7. **Write syntax for function types.** x → y x1 → x2 → y x1 → ... → xn → y
- The **'x'** and **'y'** are variables indicating types.
- The type x → y is the type of a function that gets an input of type 'x' and returns an output of type 'y'

8. **Static compare dynamic function:**
- All functions are static definitions.
- There is no dynamic function definitions.

9. **Define pure function. Give one example.**
- Pure functions are functions which will give exact result when the same arguments are passed.

Ex: let square x return: x*x

10. **Define Impure function. Give one example. .**
- The variables used inside the function may cause side effects though the functions which are not passed with any arguments.
- In such cases the function is called impure function.

Ex: let random number := a := random() if a > 10 then return: a else return: 10

CHAPTER – 2 (DATA ABSTRACTION)

1. **What is modularity?**
- Abstraction provides modularity (modularity means splitting a program in to many modules).
- Classes (structures) are the representation for "Abstract Data Types", (ADT)

2. **What is abstraction?**
- The process of providing only the essentials and hiding the details is known as abstraction.

3. **What different ways is implemented?**
- There can be different ways to implement an ADT, for example, the List ADT can be implemented using singly linked list or doubly linked list. Similarly, stack ADT and Queue ADT can be implemented using lists

4. **What is constructor?**Constructors are functions that build the abstract data type.
- Constructors create an object, bundling together different pieces of information

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5.	**What is selector?** ❖ Selectors are functions that retrieve information from the data type. ❖ Selectors extract individual pieces of information from the object.
6.	**What is wishful thinking?** ❖ We are using here a powerful strategy for designing programs: 'wishful thinking'. ❖ Wishful Thinking is the formation of beliefs and making decisions according to what might be pleasing to imagine instead of by appealing to reality.
7.	**What are the types of elements of list?** ❖ The elements of a list can be accessed in two ways. ❖ The first way is via multiple assignment and the second method is by the element selection operator.
	(CHAPTER-3)(SCOPING)
1.	**What are Modules?** ❖ A module is a part of a program. Programs are composed of one or more independently developed modules.
2.	**What is LEGB rule?** ❖ The LEGB rule is used to decide the order in which the scopes are to be searched for scope resolution.
	Local(**L**) Defined inside function/class
	Enclosed(**E**) Defined inside enclosing functions (Nested function concept)
	Global(**G**) Defined at the uppermost level
	Built-in (**B**) Reserved names in built-in functions (modules)
3.	**Write the types of scopes of variable**. ❖ There are four types of variables ,1.Local 2.Enclose 3.Global 4.Build in scope
4.	**What is modular programming?** ❖ The process of subdividing a computer program into separate sub-programs is called Modular programming.
5.	**Give some examples of modules.** ❖ The examples of modules are procedures, subroutines, and functions.
6.	**What is module scope?** ❖ Any variable or module which is defined in the library functions of a programming language has Built-in or module scope.
7.	**What is access control?** ❖ Access control is a security technique that regulates who or what can view or use resources in a computing environment. ❖ It is a fundamental concept in security that minimizes risk to the object.
8.	**What is data encapsulation?** ❖ The object of the same class is required to invoke a public method. ❖ This arrangement of private instance variables and public methods ensures the principle of data encapsulation.
9.	**What is public members?** ❖ Public members (generally methods declared in a class) are accessible from outside the class.
10.	**What is private members?** ❖ Private members of a class are denied access from the outside the class. ❖ They can be handled only from within the class.
11.	**What is protected members?** ❖ Protected members of a class are accessible from within the class and are also available to its sub-classes.
	CHAPTER – 4(ALGORITHMIC STRATEGIES)
1.	**What is algorithmic solution?** ❖ An algorithm that yields output for a valid input is called an algorithmic solution.
2.	**What is algorithmic strategy?** ❖ The way of defining an algorithm is called algorithmic strategy
3.	**Give some examples of data structures?** ❖ Examples for data structures are arrays, structures, list, tuples, dictionary etc.
4.	**What is algorithm analysis?** ❖ An estimation of the time and space complexities of an algorithm for varying input sizes is called algorithm analysis.
5.	**What is Time factor?** ❖ Time is measured by counting the number of key operations like comparisons in the sorting algorithm.
6.	**What is space factor?** ❖ Space is measured by the maximum memory space required by the algorithm.
7.	**The execution time that you measure in this case would depend on a number of factors such as:** • Speed of the machine • Compiler and other system Software tools • Operating System • Programming language used • Volume of data required
8.	**What is Space-Time trade off?** ❖ A space-time or time-memory trade-off is a way of solving in less time by using more storage space or by solving a given algorithm in very little space by spending more time.

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9. What is linear search?
- Linear search also called sequential search is a sequential method for finding a particular value in a list.
- This method checks the search element with each element in sequence until the desired element is found or the list is exhausted.

10. What is binary search?
- Binary search also called half-interval search algorithm.
- It finds the position of a search element within a sorted array.
- The binary search algorithm can be done as divide-and-conquer search algorithm and executes in logarithmic time.

11. What is bubble sort?
- Bubble sort is a simple sorting algorithm.
- The algorithm starts at the beginning of the list of values stored in an array.
- It compares each pair of adjacent elements and swaps them if they are in the unsorted order.

12. What is selection sort?
- The selection sort is a simple sorting algorithm that improves on the performance of bubble sort by making only one exchange for every pass through the list.
- This algorithm repeatedly selects the next-smallest element and swaps in into the right place for every pass. Hence it is called selection sort.

13. What is Insertion sort?
- Insertion sort is a simple sorting algorithm.
- It works by taking elements from the list one by one and inserting then in their correct position in to a new sorted list.

14. What is Dynamic programming?
- Dynamic programming is an algorithmic design method that can be used when the solution to a problem can be viewed as the result of a sequence of decisions. Dynamic programming approach is similar to divide and conquer.
- The given problem is divided into smaller and yet smaller possible sub-problems.

15. What is Memorization?
- Memorization or memorisation is an optimization technique used primarily to speed up computer programs by storing the results of expensive function calls and returning the cached result when the same inputs occur again.

16. What is used for Omega?
- Big Omega is used to describe the lower bound which is best way to solve the space complexity.

CHAPTER – 5(PYTHON - VARIABLES AND OPERATORS)

1. What are keywords in python?

false	class	finally	is	return	raise	In	except	
none	continue	for	lambda	try	break	pass	import	
true	def	from	nonlocal	while	else	assert	yield	
and	del	global	not	with	or	If	elif	as

2. What are the key features of python?
- It is a general purpose programming language which can be used for both scientific and non- scientific programming.
- It is a platform independent programming language.
- The programs written in Python are easily readable and understandable.

3. Define Operator and Operand. (.)
- **Operators** are categorized as Arithmetic, Relational, Logical, Assignment, Conditional etc.
- Value and variables when used with operator are known as **operands**.

Arithmetic operators:
- An arithmetic operator is a mathematical operator that takes two operands and performs a calculation on them. They are used for simple arithmetic.
- Most computer languages contain a set of such operators that can be used within equations to perform different types of sequential calculations.

4. Write a command to execute the python script. Run ---> Run Module (or) F5

5. What is keyword? Give examples.
- **Key**words are special words used by Python interpreter to recognize the structure of program.
- As these words have specific meaning for interpreter, they cannot be used for any other purpose.

Example:1. False, 2. Class, 3. Finally, 4.is 5. Return, 6. None, 7. Continue.

6. Write a short notes on floor division operator.
- // = performed floor division on operators and assign value to the left operand. **Ex:**>>> x//=3

7. Write about input statements in python (or) Input function in python
- The **input()** function helps to enter data at run time by the user.
- The input( ) function is used to accept data as input at run time. **Syntax** Variable = input ("prompt string")

8. Why the python interpreter does not read the lines which begins with (#) hash symbol? Justify your answer.
- Because the interactive mode allows us to write codes in Python command prompt (>>>) whereas in script mode programs can be written and stored as separate file with the extension **.py** and executed

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	❖ In interactive mode Python code can be directly typed and the **interpreter** displays the result(s) immediately. ❖ The interactive mode can also be used as a **simple calculator.**
9.	**Invoking Python IDLE** :Start → All Programs → Python 3.x → IDLE (Python 3.x)
10.	**What is interactive mode?** ❖ The Interactive mode allows us to write codes in Python command prompt (>>>)
11.	**What is script mode?** ❖ The script mode programs can be written and stored as separate file with the extension **.py** and executed. ❖ Script mode is used to create and edit python source file.
12.	**What is input function?** ❖ The **input ()** function helps to enter data at run time by the user. ❖ The input () function is used to accept data as input at run time
13.	**What is output function?** ❖ The output function **print ()** is used to display the result of the program on the screen after execution.
14.	**What are called comments?** ❖ In Python, comments begin with hash symbol **(#)**. ❖ The lines that begins with **#** are considered as comments and ignored by the Python interpreter. Comments may be single line or no multi-lines. **Types:**1) # It is Single line Comment 2) ''' It is multiline comment which contains more than one line '''
15.	**What is indentation?** ❖ Python uses whitespace such as **spaces** and **tabs** to define program blocks whereas other languages like C, C++, java use curly braces { } to indicate blocks of codes for class, functions or body of the loops and block of selection command.
16.	**What is Delimiters:** ❖ Delimiters are sequence of one or more characters used to specify the boundary between separate, independent regions in plain text or other data streams. ❖ Python uses the symbols and symbol combinations as delimiters in expressions, lists, dictionaries and strings. **Ex:**( ) [ ] { } , : . ' = ;
17.	**Give few examples of Build-in or fundamental data types.** ❖ Number, String, Boolean, tuples, lists and dictionaries
18.	**Explain the data types.** **1.Number Data type:** ❖ The built-in number objects in Python supports integers, floating point numbers and complex numbers. **Example:** 102, 4567, 567 # Decimal integers ❖ **A floating point** data is represented by a sequence of decimal digits that includes a decimal point. **Example :** 123.34, 456.23, 156.23 # Floating point data ❖ **An Exponent data** contains decimal digit part, decimal point, exponent part followed by one or more digits. **Example:** 12.E04, 24.e04 # Exponent data **2.Boolean Data type:** A Boolean data can have any of the two values: True or False. **Example:**Bool_var1=True Bool_var2=False **3.String Data type:** String data can be enclosed in single quotes or double quotes or triple quotes. **Example:** Char data = 'A'
	CHAPTER – 6 (CONTROL STRUCTURES)
1.	**What will be the output of the following snippet?** alpha=list(range(65,70 for x in alpha: print(chr(x),end='\t')End of the loop **Output:** A B C D E
2.	**What are the types of loop?** 1. while loop 2.for loop
3.	**Write python program to print** **1** **12** **123** **1234** **12345** i=1 While(i<=6) for j in range (1,i) print(j,end='/t) print(end='/n') i+=1
4.	**What is control structure or statement?** ❖ A program statement that causes a jump of control from one part of the program to another is called **control structure** or **control statement.**
5.	**What is sequential statement?** ❖ A **sequential statement** is composed of a sequence of statements which are executed one after another.

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6.	**What is if-statement?** ❖ **Simple** if is the simplest of all decision making statements. ❖ Condition should be in the form of relational or logical expression.
7.	**What is if-else statement?** ❖ The **if ..else** statement provides control to check the true block as well as the false block.
8.	**What is Nested if..elif...else statement?** ❖ When we need to construct a chain of if statement(s) then 'elif' clause can be used instead of 'else'.
9.	**What is Loop?** ❖ A **loop** statement allows to execute a statement or group of statements multiple times.
10.	**What is While loop?** ❖ In the **while** loop, the condition is any valid Boolean expression returning True or False. ❖ The **else** part of while is optional part of **while**. ❖ The **statements block1** is kept executed till the condition is True. ❖ If the **else** part is written, it is executed when the condition is tested False.
11.	**What is for loop?** ❖ **for** loop is the most comfortable loop. ❖ It is also an entry check loop. ❖ The condition is checked in the beginning and the body of the loop(statements-block 1) is executed if it is only ❖ True otherwise the loop is not executed.
12.	**What is nested loop structure?** ❖ A loop placed within another loop is called as nested loop structure. ❖ One can place a **while** within another **while; for** within another **for; for** within **while** and **while** within **for** to construct such nested loops.
13.	**What is indentation?** ❖ In Python, indentation is important in loop and other control statements. ❖ Indentation only creates blocks and sub-blocks like how we create blocks within a set of { } in languages like C, C++ etc.
14.	**What is Jump statement? Write it types.** ❖ The jump statement in Python, is used to unconditionally transfer the control from one part of the program to another. ❖ **Types:** break, continue, pass
15.	**What is break statement?** ❖ The break statement terminates the loop containing it. ❖ Control of the program flows to the statement immediately after the body of the loop.
16.	**What is continue statement?** ❖ Continue statement unlike the break statement is used to skip the remaining part of a loop and start with next iteration.
17.	**What is Pass statement?** ❖ **Pass** statement in Python programming is a null statement. ❖ Pass statement when executed by the interpreter it is completely ignored.
	CHAPTER – 7(PYTHON FUNCTIONS)
1.	**Write the syntax of creating user defined function in python** def <function_name ([parameter1, parameter2…])> : <Block of Statements> return <expression / None>
2.	**What is the use of lambda or anonymous function?** ❖ Lambda function is mostly used for creating small and one-time anonymous function. ❖ Lambda functions are mainly used in combination with the functions like filter(), map() and reduce().
3.	**Describe the abs ( ) and chr ( ) function.** 1.abs ( ) – Returns an absolute value of a number 2. chr( ) – Returns the ASCII value for the given Unicode character.
4.	**Define Short note on floor division operator.** **floor ( )** – Returns the largest integer less than or equal to x **Syntax :** math.floor (x) **Output:** 26 -27 -24 x=26.7 y=-26.7 z=-23.2 print (math.floor (x)) print (math.floor (y)) print (math.floor (z))
5.	**What are the advantages of User-defined Functions?** ❖ Functions help us to divide a program into modules. This makes the code easier to manage. ❖ It implements code reuse. Every time you need to execute a sequence of statements, all you need to do is to call the function. ❖ Functions, allows us to change functionality easily, and different programmers can work on different functions.

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6. What is Block?
- A block is one or more lines of code, grouped together so that they are treated as one big sequence of statements while execution.
- In Python, statements in a block are written with indentation.

7. What is Nested Block?
- A block within a block is called nested block.
- When the first block statement is indented by a single tab space, the second block of statement is indented by double tab spaces.

8. What are the types of arguments?
- Required arguments, Keyword arguments, Default arguments and Variable-length arguments.

9. What is Required arguments?
- "Required Arguments" are the arguments passed to a function in correct positional order.

10. What is Keyword arguments?
- Keyword arguments will invoke the function after the parameters are recognized by their parameter names.

11. What is Default arguments?
- In Python the default argument is an argument that takes a default value if no value is provided in the function call.

12. What is variable-length arguments?
- In some instances you might need to pass more arguments than have already been specified.
- Going back to the function to redefine it can be a tedious process. Variable-Length arguments can be used instead.

13. What are the types of variable length argument passing methods? 1. Non keyword variable 2. Keyword variable

14. What is anonymous function?
- In Python, anonymous function is a function that is defined without a name.
- While normal functions are defined using the **def** keyword, in Python anonymous functions are defined using the **lambda** keyword.
- Hence, anonymous functions are also called as **lambda** functions.

CHAPTER – 8 (STRINGS AND STRING MANIPULATION)

1. What will be the output of the following Python code? Str1 = "Madurai" print(Str1*3)
- Madurai Madurai Madurai

2. What are membership operators in Python?
- The 'in' and 'not in' operators can be used with strings to determine whether a string is present in another string.
- Therefore, these operators are called as Membership Operators.

Example :

```
str1=input ("Enter a string: ")
str2="Chennai"
if str2 in str1:
print ("Found")
else:
 print ("Not Found")
```

Output:1

Enter a string: Chennai GHSS, Saidapet
Found

Output:2

Enter a string: Govt GHSS, Saidapet
Not Found

3. What will be the output of the following Python snippet? str1="THOLKAPPIYAM"

1) print(str1([4:]) **Ans:** KAPPIYAM 2) print(str1[4::2]) **Ans:** KPIA
3) print(str1[::3]) **Ans:** TLPY 4) print(str1[:: -3]) **Ans**: MIAO

4. What is the positive and negative subscript value of the character 'h' in string 'school'?
- Positive value = 2 Negative value = –4

5. What will be the output of the following Python Code? str="Chennai" print(str*4)
- Chennai Chennai Chennai Chennai

6. Explain the following function:

Syntax	Description	Example
lower()	Returns the exact copy of the string with all the letters in lowercase.	>>>str1='SAVE EARTH' >>>print(str1.lower( )) **ans :**save earth

7. Write about the following python string functions i) islower() ii) title ()

islower( )	Returns True if the string is in lowercase.	>>> str1='welcome' >>>print (str1.islower( )) **True**
title( )	Returns a string in title case	>>> str1='education department' >>> print(str1.title()) **Education Department**

8. Write the general format of slicing operation: str[start:end]

9. What is the use of replace ( ) in python? Write the general format of replace ( )
- Python does not support any modification in its strings.
- But, it provides a function replace () to temporarily change all occurrences of a particular character in a string.
- The changes done through replace () does not affect the original string.

General format of replace function: **replace("char1", "char2")**
- The replace function replaces all occurrences of char1 with char2.

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10.	**How to access the characters in string?** ❖ Once you define a string, python allocate an index value for its each character. ❖ These index values are otherwise called as subscript which are used to access and manipulate the strings. ❖ The subscript can be positive or negative integer numbers.
11.	**What is the use of operator += in python** ❖ Adding more strings at the end of an existing string is known as append. ❖ The operator += is used to append a new string with an existing string. **Example** >>> str1="Welcome to " >>> str1+="Learn Python" >>> print (str1) **Output:** Welcome to Learn Python
	CHAPTER – 9(LISTS, TUPLES, SETS AND DICTIONARY)
1.	**Write the syntax of creating dictionary in Python.** **Syntax:** Dict = { expression for variable in sequence [if condition]}
2.	**What will be output of the following snippet?** **Output** Mydict={chr(x):x for x in range(97,102)} {97:98, 98:99, 99:100, 100:101, 101:102} Print (Mydict)
3.	**What will be output of the following snippet?** **Output** Set_A = {'A',2,4,'D'} {'A','D'} Set_B={'A','B','C','D'} Print (Set_A&Set_B)
4.	**What are the collection data types available in Python?** ❖ Python programming language has four collections of data types such as List, Tuples, Set and Dictionary.
5.	**Write the syntax to create a list with suitable example** ❖ A list is simply created by using square bracket. The elements of list should be specified within square brackets. **Syntax:** Variable = [element-1, element-2, element-3 …… element-n] **Example:** 1. Marks = [10, 23, 41, 75] 2.Fruits = ["Apple", "Orange", "Mango", "Banana"] 3.MyList = [ ]
6.	**Write note about tuple Assignment.** ❖ Tuple assignment is a powerful feature in Python. ❖ It allows a tuple variable on the left of the assignment operator to be assigned to the values on the right side of the assignment operator. ❖ Each value is assigned to its respective variable.
7.	**What is list comprehensions?** ❖ List comprehension is a simplest way of creating sequence of elements that satisfy a certain condition. **Syntax:** List = [expression for variable in range]
8.	**What is singleton tuple?** ❖ While creating a tuple with a single element, add a comma at the end of the element. ❖ In the absence of a comma, Python will consider the element as an ordinary data type; not a tuple. ❖ Creating a Tuple with one element is called "Singleton" tuple.
9.	**What are called Nested list? With example.** ❖ Mylist contains another list as an element. This type of list is known as **"Nested List".** ❖ Nested list is a list containing another list as an element. **Ex:** Mylist = ["Welcome", 3.14, 10, [2, 4, 6]]
10.	**Len () function:** ❖ The len() function in Python is used to find the length of a list. ❖ The len() function is used to set the upper limit in a loop to read all the elements of a list.
11.	**For loop:** ❖ The for loop is used to access all the elements in a list one by one. ❖ This is just like the for keyword in other programming language such as C++.
12.	**Append () function:** ❖ Append() function is used to add a single element. ❖ Append() function in Python is used to add more elements in a list.
13.	**Extend () function:** ❖ Extend() function is used to add more than one element to an existing list. ❖ Extend() function, multiple elements should be specified within square bracket as arguments of the function.
14.	**Insert function:** ❖ The insert() function is used to insert an element at any position of a list.
15.	**Delete statement:** ❖ Del statement is used to delete elements whose index is known. ❖ The del statement can also be used to delete entire list.

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16.	**Remove function:** ❖ **Remove()** function is used to delete elements of a list if its index is unknown. ❖ The remove() function can also be used to delete one or more elements if the index value is not known.
17.	**POP ()function:** ❖ Pop() function can also be used to delete an element using the given index value. ❖ Pop() function deletes and returns the last element of a list if the index is not given. ❖ Pop() function is used to delete only one element from a list
18.	**Clear () function:** ❖ The function clear() is used to delete all the elements in list, it deletes only the elements and retains the list.
19.	**Range () function:** ❖ The range() is a function used to generate a series of values in Python. ❖ Using range() function, you can create list with series of values.
	CHAPTER – 10 (PYTHON CLASSES AND OBJECTS)
1.	**Write the syntax of class instantiation.** 1.Object_name = class_name() 2.Note that the class instantiation uses function notation.3.ie.class_name
2.	**What are called class variable & methods?** ❖ Variables defined inside a class are called as "Class Variable" and functions are called as "Methods". ❖ Class variable and methods are together known as members of the class.
3.	**What are called constructor and destructor?** **Constructor:** ❖ Constructor is the special function that is automatically executed when an object of a class is created. ❖ In Python, there is a special function called "init" which act as a Constructor. **Destructor:** ❖ Destructor is also a special method to destroy the objects. ❖ In Python, _ _del_ _( ) method is used as destructor. It is just opposite to constructor.
	CHAPTER – 11(DATABASE CONCEPTS)
1.	**What are the advantages of RDBMS? (.)** 1.Segregation of application program 2.Minimal data duplication or Data Redundancy 3.Easy retrieval of data using the Query Language 4.Reduced development time and maintenance.
2.	**Examples of DBMS & RDBMS:** **1.DBMS:** Foxpro, dbase 2.**RDBMS:** MySQL,Oracle, MS Access etc.
3.	**Describe the database structure.** ❖ Table is the entire collection of related data in one table, referred to as a File or Table where the data is organized as row and column. ❖ Each row in a table represents a record, which is a set of data for each database entry. ❖ Each table column represents a Field, which groups each piece or item of data among the records into specific categories or types of data. Ex. StuNo. StuName, StuAge, StuClass, StuSec. 1.A Table is known as a RELATION 2.A Row is known as a TUPLE 3.A column is known as an ATTRIBUTE
4.	**List the types of database Model.** 1. Hierarchical, 2.Relational, 3.Network Database, 4.Entity relationship, 5. Object model.
5.	**What is Data Manipulation language?** ❖ **A Data Manipulation Language (DML)** is a computer programming language used for adding (inserting), removing (deleting), and modifying (updating) data in a database.
6.	**Define database?** ❖ A database is an organized collection of data, generally stored and accessed electronically from a computer system. ❖ The term "database" is also used to refer to any of the DBMS, the database system or an application associated with the database.
7.	**What is data base?** ❖ Database is a repository collection of related data organized in a way that data can be easily accessed, managed and updated. ❖ Database can be a software or hardware based, with one sole purpose of storing data.
	CHAPTER – 12(STRUCTURED QUERY LANGUAGE)
1.	**List any four DDL commands:** 1) ALTER 2) TRUNCATE 3) DROP 4) DELETE
2.	**Write a Python code to create a database in SQLite.** ❖ To create a database, type the following command in the prompt: CREATE DATABASE database_name; ❖ For example : To create a database to store the tables: CREATE DATABASE stud;
3.	**What are DCL commands in SQL?** **(i) Grant :** Grants permission to one or more users to perform specific tasks. **(ii) Revoke:** Withdraws the access permission given by the GRANT statement.

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4.	**Define primary key constraint.** ❖ This constraint declares a field as a primary key which helps to uniquely identify a record. ❖ It is similar to unique constraint except that only one field of a table can be set as primary key.
5.	**Write categories of SQL Commands** 1.DML - Data Manipulation Language 2.DDL - Data Definition Language 3.DCL - Data Control Language 4.TCL - Transaction Control Language 5.DQL - Data Query Language
6.	**Write any three DDL command?** 1. Create – To create tables in the database. 2. Alter – Alters the structure of the database. 3. Drop – Delete tables from database.4. Delete
7.	**Give one examples of CREATE TABLE command:** **CREATE TABLE** <table-name> (<column name><data type>[<size>] (<column name><data type>[<size>]……); CREATE TABLE Student (Admno integer, Name char(20), Gender char(1), Age integer, Place char(10),);
8.	**Give one examples of INSERT command:** ❖ INSERT INTO <table-name> [column-list] VALUES (values); ❖ INSERT INTO **Student** (Admno, Name, Gender, Age, Place) **VALUES** (100, 'Ashish', 'M', 17, 'Chennai');
9.	**Give one examples of DELETE command:** ❖ DELETE FROM table-name WHERE condition; ❖ DELETE FROM Student WHERE Admno=104;
10.	**Give one examples of UPDATE command:** ❖ UPDATE <table-name> SET column-name = value, column-name = value,… WHERE condition; ❖ UPDATE Student SET Age = 20 WHERE Place = ´Bangalore';
11.	**Give one examples of SELECT command:** ❖ SELECT <column-list>FROM<table-name>; ❖ SELECT Admno, Name FROM Student; ❖ SELECT * FROM STUDENT;
12.	**What are the types of DML?** ❖ The DML is basically of two types: ❖ Procedural DML – Requires a user to specify what data is needed and how to get it. ❖ Non-Procedural DML - Requires a user to specify what data is needed without specifying how to get it.
13.	**What is Table?** ❖ A table is a collection of related data entries and it consist of rows and columns.
14.	**What is a field?** ❖ A field is a column in a table that is designed to maintain specific related information about every record in the table. ❖ It is a vertical entity that contains all information associated with a specific field in a table. ❖ The fields in a student table may be of the type AdmnNo, StudName, StudAge, StudClass, Place etc.
15.	**What is record?** ❖ A Record is a row, which is a collection of related fields or columns that exist in a table. ❖ A record is a horizontal entity in a table which represents the details of a particular student in a student table.
16.	**Write the SQL statements using "BETWEEN" and "NOT BETWEEN" keywords. (.)** **BETWEEN:** ❖ The **BETWEEN** keyword defines a range of values the record must fall into to make the condition true. ❖ The range may include an upper value and a lower value between which the criteria must fall into. ❖ **SELECT Admno, Name, Age, Gender FROM Student WHERE Age BETWEEN 18 AND 19;** **NOT BETWEEN** ❖ The **NOT BETWEEN** is reverse of the **BETWEEN** operator where the records not satisfying the condition are displayed. ❖ **SELECT Admno, Name, Age FROM Student WHERE Age NOT BETWEEN 18 AND 19;**
	CHAPTER – 13(PYTHON AND CSV FILES)
1.	**What is Excel?** ❖ Excel is a binary file that holds information about all the worksheets in a file, including both content and formatting.
2.	**How the CSV file operation takes place in python?(or)** **What are the steps involved in file operation of Python?** Step 1 : Open a file Step 2 : Perform Read or write operation Step 3 : Close the file
3.	**What is line terminator?** ❖ A Line Terminator is a string used to terminate lines produced by writer. ❖ The default value is \r or \n.

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	❖ We can write csv file with a line terminator in Python by registering new dialects using csv.register_dialect() class of csv module
4.	**What is the use of skip initial space?** ❖ In dialects the parameter "skipinitialspace" is used for removing whitespaces after the delimiter. ❖ By default "skipinitialspace" has a value false
5.	**How to create and save a extension of csv file?** ❖ To create a CSV file in Notepad, First open a new file using **File →New or ctrl +N.** ❖ Save this content in a file with the extension .csv . ❖ You can then open the same using Microsoft Excel or any other spreadsheet program.
6.	**List out writing data into different types in CSV files.** 1.Creating A New Normal CSV File 2.Modifying An Existing File 3.Writing On A CSV File with Quotes 4.Writing On A CSV File with Custom Delimiters 5.Writing On A CSV File with Line terminator 6.Writing On A CSV File with Quote chars 7.Writing CSV File Into A Dictionary 8.Getting Data At Runtime And Writing In a File
	CHAPTER – 14(IMPORTING C++ PROGRAMS IN PYTHON)
1.	**Write the syntax of getopt. getopt method :** ❖ <opts>,<args>=getopt.getopt(argv, options, [long_options])
2.	**Write the syntax of python OS module. (.)** ❖ os.system ('g++ ' + <variable_name1> ' -<mode> ' + <variable_name2>
3.	**Differentiate PYTHON and C++** **PYTHON :**1.Python is typically an "interpreted" language 2.Python is a dynamic-typed language **C++ :**1.C++ is typically a "compiled" language 2.C++ is compiled statically typed language
4.	**What is scripting language with examples?** ❖ A scripting language is a programming language designed for integrating and communicating with other programming languages. ❖ Example: JavaScript, VBScript, PHP, Perl, Python, Ruby, ASP and Tcl.
5.	**What is garbage collection?** ❖ Python deletes unwanted objects (built-in types or class instances) automatically to free the memory space. ❖ The process by which Python periodically frees and reclaims blocks of memory that no longer are in use is called Garbage Collection.
6.	**List out importing c++ files in python interfaces:** ❖ Python-C-API (API-**Application Programming Interface** for interfacing with C programs) ❖ Ctypes (for interfacing with c programs) ❖ SWIG (Simplified Wrapper Interface Generator- Both C and C++) ❖ Cython (Cython is both a Python-like language for writing C-extensions) ❖ Boost. Python (a framework for interfacing Python and C++) ❖ MinGW (Minimalist GNU for Windows)
7.	**Define Static typed language** ❖ A static typed language like C++ requires the programmer to explicitly tell the computer what "data type" each data value is going to use.
8.	**Define Dynamic typed language** ❖ A dynamic typed language like Python, doesn't require the data type to be given explicitly for the data. Python manipulate the variable based on the type of value.
	CHAPTER – 15(DATA MANIPULATION THROUGH SQL)
1.	**List the classes used in the SQL SELECT statement.** 1. DISTINCT 2. WHERE 3. GROUP BY 4. ORDER BY 5. HAVING
2.	**What is SQLite? What are its advantages?** ❖ SQLite is a simple relational database system, which saves its data in regular data files or even in the internal memory of the computer. **Advantages:** ❖ It is designed to be embedded in applications, instead of using a separate database server program such as My SQL or Oracle. ❖ SQLite is fast, rigorously tested, and flexible, making it easier to work. Python has a native library for SQLite.
3.	**Explain 1) cursor.fetchall() 2) cursor.fetchone() 3) cursor.fetchmany()** ❖ Cursor.fetchall() - The fetchall () method is to fetch all rows from the database table ❖ Cursor.fetchone() - The fetchone () method returns the next row of a query result set or None in case there is no row left. ❖ Cursor.fetchmany() method that returns the next number of rows (n) of the result set
4.	**Which clause used for AND, OR, NOT operators?** ❖ The WHERE clause can be combined with AND, OR, and NOT operators. ❖ The AND and OR operators are used to filter records based on more than one condition

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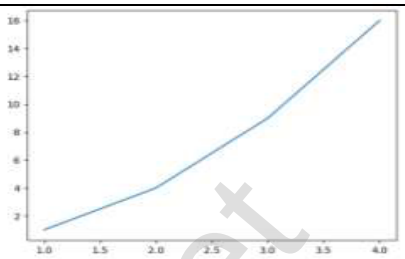
5.	**What is sqlite_master?** ❖ The master table holds the key information about your database tables and it is called sqlite_master.
6.	**What is Cursor?** ❖ Cursor is a control structure used to traverse and fetch the records of the database. ❖ All the SQL commands will be executed using cursor object only.
	CHAPTER – 16(DATA VISUALIZATION USING PYPLOT: LINE , PIE AND BAR CHAT)
1.	**What is Matplotlib?** ❖ Matplotlib is the most popular data visualization library in Python. ❖ It allows to create charts in few lines of code.
2.	**What will be the output of the following python code?** Import matplotlib.pyplot as plt plt.plot([1,2,3,4], [1,4,9,16]) plt.show( ) 
3.	**What is Pip?** ❖ 1.Matplotlib installed using pip. ❖ 2.Pip is a management software for installing python packages.
4.	**Write any two differences between Histogram and bar graph.** **Histogram:** 1.A graphical representation that displays data by way of bars to show the frequency of numerical data. 2.Presents numerical data **Bar graph:** 1.A pictorial of data that uses bars to compare different categories of data. 2.Shows categorical data
5.	**What is info graphics?** ❖ An info graphic (information graphic) is the representation of information in a graphic format.
6.	**What Dashboard?** ❖ A dashboard is a collection of resources assembled to create a single unified visual display. ❖ Data visualizations and dashboards translate complex ideas and concepts into a simple visual format. ❖ Patterns and relationships that are undetectable in text are detectable at a glance using dashboard.
7.	**What is scatter plot?** ❖ A scatter plot is a type of plot that shows the data as a collection of points. ❖ The position of a point depends on its two-dimensional value, where each value is a position on either the horizontal or vertical dimension.

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CHAPTER 1 TO 16 THREE MARK BOOK BACK & PUBLIC QUESTION WITH ANSWERS

CHAPTER – 1 (FUNCTION)

1. Mention the characteristics of Interface. **(M-2023, J-2024)**

- The class template specifies the interfaces to enable an object to be created and operated properly.
- An object's attributes and behaviour is controlled by sending functions to the object.

2. Why strlen is called pure function?

- Strlen is a pure function because the function takes one variables as a parameter, and accesses it to find its length.
- This function reads external memory but does not change it, and the value returned derives from the external memory accessed.

3. What is the side effect of impure function? Give example.

- Function impure **(has side effect)** is that it doesn't take any arguments and it doesn't return any value.
- Function depends on variables or functions outside of its definition block.
- It never assure you that the function will behave the same every time it's called.

Example:

```
let y:=0
  (int) inc (int)x
   y:=y+x;
   return(y)
```

- Here, the result of **inc ()** will change every time if the value of **'y'** get changed inside the function definition.
- Hence, the side effect of inc () function is changing the data of the external variable **'y'.**

4. Differentiate pure and impure function. **(M-2020, M-2024)**

Pure Function	Impure Function
❖ Pure functions will give exact result when the same arguments are passed.	❖ Impure functions never assure you that the function will behave the same every time it's called.
❖ Hence, if you call the pure functions with the same set of arguments, you will always get the same return values.	❖ Hence, if you call the impure functions with the same set of arguments, you might get the different return values
❖ They do not have any side effects.	❖ They have side effects.
❖ They do not modify the arguments which are passed to them	❖ They may modify the arguments which are passed to them
❖ Example: strlen (), sqrt()	❖ Example: random(), Date()

CHAPTER – 2 (DATA ABSTRACTION)

1. Differentiate concrete data type and abstract data type.

Concrete data type	Abstract data type
❖ Concrete data types or structures (CDT's) are direct implementations of a relatively simple concept.	❖ Abstract Data Types (ADT's) offer a high level view (and use) of a concept independent of its implementation.
❖ A concrete data type is a data type whose representation is known.	❖ Abstract data type the representation of a data type is unknown.

2. Which strategy is used for program designing? Define that Strategy.

- A powerful strategy for designing programs: **'wishful thinking'**.
- Wishful Thinking is the formation of beliefs and making decisions according to what might be pleasing to imagine instead of by appealing to reality.

3. Identify Which of the following are constructors and selectors?

(a) N1:=number( ) – **Constructors** (b) accetnum(n1) - **Selectors**
(c) displaynum(n1) - **Selectors** (d) eval(a/b) - **Selectors**
(e) x,y:= makeslope (m), makeslope(n)- **Constructors** (f) display( ) - **Selectors**

4. What are the different ways to access the elements of a list. Give example **(M-2024)**

- The elements of a list can be accessed in two ways.

1.Multiple assignment:

- This method which unpacks a list into its elements and binds each element to a different name.

Example: lst := [10, 20]
x, y := lst [***x*** will become10 and ***y*** will become 20]

2.Element selection operator:

- It is expressed using square brackets.
- Access the elements in a list is by element selection operator

Example:

```
lst[0]
10
lst[1]
20
```


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5. **Identify Which of the following are List, Tuple and class?**

(a) arr [1, 2, 34] - **List** (b) arr (1, 2, 34)- **Tuple**

(c) student [rno, name, mark]- **Class** (d) day:= ('sun', 'mon', 'tue', 'wed')- **Tuple**

(e) x:= [2, 5, 6.5, [5, 6], 8.2] – **List** (f) employee [eno, ename, esal, eaddress]- **Class**

1. **Define abstraction. What is abstract data types? (S-2021)**

Abstraction:

- The process of providing only the essentials and hiding the details is known as abstraction.

Abstract data type:

- Abstract Data type (ADT) is a type (or class) for objects whose behaviour is defined by **a set of value and a set of operations**.
- The definition of ADT only mentions what operations are to be performed but not how these operations will be implemented.

2. **What is selector? What are the parts of a program? (S-2020)**

Selector:

- Selectors are functions that retrieve information from the data type.
- Selectors extract individual pieces of information from the object.

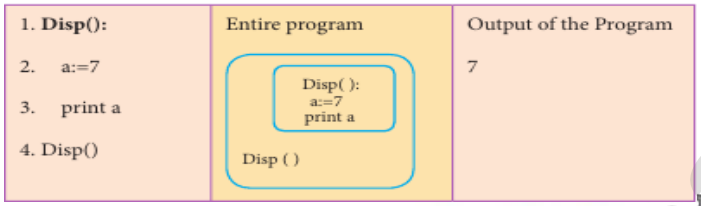
Program parts:

- Any program consist of two parts.
- The two parts of a program are, the part that operates on abstract data and the part that defines a concrete representation.

(CHAPTER-3)(SCOPING)

1. **Define Local scope with an example. (S-2021)**

- Local scope refers to variables defined in current function.
- A function will always look up for a variable name in its local scope.
- Only if it does not find it there, the outer scopes are checked.

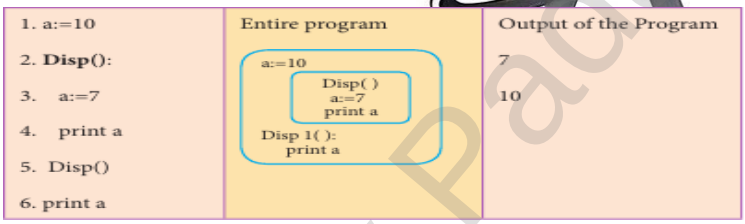


Example:

- On execution of the above code the variable a displays the value 7, because it is defined and available in the local scope.

2. **Define Global scope with an example. (J-2024)**

- A variable which is declared outside of all the functions in a program is known as global variable.
- Global variable can be accessed inside or outside of all the functions in a program.

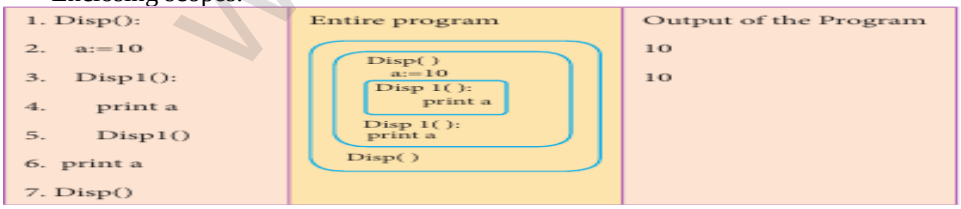


Example:

- On execution of the above code the variable a which is defined inside the function displays the value 7 for the function call Disp () and then it displays 10, because a is defined in global scope.

3. **Define Enclosed scope with an example.**

- A variable which is declared inside a function which contains another function definition with in it, the inner function can also access the variable of the outer function. This scope is called enclosed scope.
- When a compiler or interpreter searches for a variable in a program, it first search Local, and then search Enclosing scopes.



Example:

- In the above example Disp1() is defined within Disp ().
- The variable „a" defined in Disp () can be even used by Disp1() because it is also a member of Disp ().

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4. Why access control is required?

- Access control is a security technique that regulates who or what can view or use resources in a computing environment.
- It is a fundamental concept in security that minimizes risk to the object.
- In other words access control is a selective restriction of access to data.
- In OOPS Access control is implemented through access modifiers.

5. Identify the scope of the variables in the following pseudo code and write its: output.

```
color:= Red
mycolor():
b:=Blue
myfavcolor():
g:=Green
printcolor, b, g
myfavcolor()
printcolor, b
mycolor()
print color
```

output:

Red Blue Green
Red Blue
Red

Scope of Variables:

Variable	-	Scope
Color:=Red	-	Global
b:=Blue	-	Enclosed
G:=Green	-	Local

1. Write any three characteristics of modules. (J-2023)

1. Modules contain instructions, processing logic, and data.2.Modules can be separately compiled and stored in a library.
3. Modules can be included in a program. 4. Module segments can be used by other modules.
5. Module segments can be used by invoking a name and some parameters.

CHAPTER – 4 (ALGORITHMIC STRATEGIES)

1. List the characteristics of an algorithm. (M-2022)

1. Input 2.Output 3. Finiteness 4. Definiteness 5. Effectiveness 6. Correctness
7. Simplicity 8. Unambiguous 9. Feasibility 10. Portable 11. Independent

2. Discuss about Algorithmic complexity and its types.

- The complexity of an algorithm f(n) gives the running time and/or the storage space required by the algorithm in terms of n as the size of input data.

1.TimeComplexity:

- The Time complexity of an algorithm is given by the number of steps taken by the algorithm to complete the process.

2.SpaceComplexity:

- **Space complexity** of an algorithm is the amount of memory required to run to its completion.
- The space required by an algorithm is equal to the sum of fixed part and variable part.

3. What are the factors that influence time and space complexity?

1.Time Factor:

- Time is measured by counting the number of key operations like comparisons in the sorting algorithm.

2.Space Factor:

- Space is measured by the maximum memory space required by the algorithm.

4. Write a note on Asymptotic notation. (M-2020, J-2023, M-2024)

- Asymptotic Notations are languages that uses meaningful statements about time and space complexity.

(i) Big O:

- Big O is often used to describe the worst-case of an algorithm.

(ii) Big Ω:

- Best case of an algorithm
- Big Omega is the reverse Big O,
- **Example :** if Big O is used to describe the upper bound worst - case) of a asymptotic function, Big Omega is used to describe the lower bound (best-case)

(iii) Big Θ:

- Complexity case of an algorithm (or) lower bound = upper bound
- When an algorithm has a complexity with lower bound = upper bound, say that an algorithm has a complexity O (n log n) and Ω (n log n.
- Time complexity is n log n in both best- case and worst-case.

5. What do you understand by Dynamic programming? (S-2020, M-2023)

- Dynamic programming is used when the solution to a problem can be viewed as the result of a sequence of decisions.
- Dynamic programming approach is similar to divide and conquer (i.e) the problem can be divided into smaller sub-problems.
- Dynamic algorithms uses Memorization.

1. What is an Algorithm? List any three characteristics of an algorithm. (S-2021)

Algorithm:

- An algorithm is a finite set of instructions to accomplish a particular task.
- It is a step-by-step procedure for solving a given problem.
- An algorithm can be implemented in any suitable programming language.

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List the characteristics of an algorithm:

1. Input 2.Output 3. Finiteness 4. Definiteness 5. Effectiveness 6. Correctness
7. Simplicity 8. Unambiguous 9. Feasibility 10. Portable 11. Independent

CHAPTER – 5 (PYTHON - VARIABLES AND OPERATORS)

1. Write short notes on Arithmetic operator with examples. (S-2021, M-2022)

- An arithmetic operator is a mathematical operator that takes two operands and performs a calculation on them.
- They are used for simple arithmetic.
- Most computer languages contain a set of such operators that can be used within equations to perform different types of sequential calculations.

Operator - Operation	Examples	Result
Assume a=100 and b=10. Evaluate the following expressions		
+ (Addition)	>>> a + b	110
- (Subtraction)	>>>a – b	90
* (Multiplication)	>>> a*b	1000
/ (Divisioin)	>>> a / b	10.0
% (Modulus)	>>> a % 30	10
** (Exponent)	>>> a ** 2	10000
// (Floor Division)	>>> a//30 (Integer Division)	3

2. What are the assignment operators that can be used in Python?

- '=' is a simple assignment operator to assign values to variable.
- There are various compound operators in Python like **+=, -=, *=, /=, %=,**= and** //= are also available.

Example:

```
a=5              # assigns the value 5 toa
a,b=5,10     # assigns the value 5 to a and 10 to b
a+=2           # a=a+2, add 2 to the value of „a‟ and stores the result in 'a'(Left hand operator)
```

3. Explain Ternary operator with examples. (M-2020, M-2023)

- Ternary operator is also known as **conditional operator**
- It evaluates something based on a condition being true orfalse.

Syntax: Variable Name = [on_true] if [Test expression] else [on_false]

Example:

```
min = 50 if 49<50else70        # Output: min = 50
min = 50 if 49>50else70        # Output: min = 70
```

4. Write short notes on Escape sequences with examples. (J-2024)

- In Python strings, the backslash **"\"**is a special character, also called the **"escape"** character.
- It is used in representing certain whitespace characters: **"\t"** is a tab, **"\n"** is a newline, and **"\r"** is a carriage return.

For example to print the message "It's raining", the Python command is

```
>>> print ("It\'s raining")      It's rainning
```

- Python supports the following escape sequence characters.

Escape sequence character	Description	Example	Output
\\	Backslash	>>> print("\\test")	\test
\'	Single-quote	>>> print("Doesn\'t")	Doesn't
\"	Double-quote	>>> print("\"Python\"")	"Python"
\n	New line	print("Python","\n","Lang..")	Python Lang..
\t	Tab	print("Python","\t","Lang..")	Python Lang..

5. What are string literals? Explain. (J-2023)

- In Python a string literal is a **sequence of characters** surrounded by **quotes**.
- Python supports **single, double and triple quotes** for a string.
- A character literal is a **single character** surrounded by **single or double quotes**.
- The value with **triple-quote "' '"** is used to give **multi-line** string literal.

Example :

```
strings = "This is Python"
    char = "C"
    multiline_str = "'This is a multiline string with more than one line code."'
    Print (strings)
    print (char)
    print (multi line_str)
```

Output: This is Python C This is a multiline string with more than one line code.

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CHAPTER – 6 (CONTROL STRUCTURES)

1. Write a program to display. (M-2022)

```
A
A B
A B C
A B C D
A B C D E
```

```
a=['A','B','C','D','E']
for i in range(0,6):
for j in range(0,i):
print(a[j],end=" ")
else:
```

2. Write note on if.. else structure. (J-2023)

- The **if...else** statement provides control to check the true block as well as the false block.
- **if.. else** statement thus provides two possibilities and the condition determines which BLOCK is to be executed.

Syntax:

```
if <condition>:
statements-block 1
else:
statements-block 2
```

3. Using if.. else.. elif statement write a suitable program to display largest of 3 numbers. (M-2024)

Code:

```
a= int(input("Enter the first number:"))
b= int(input("Enter the second number:"))
c= int(input("Enter the third number:"))
if(a>b)and(a>c):
    print(a, ”is the largest number”)
elif(b>c):
    print(b, ”is the largest number”)
else:
    print(c, ”is the largest number”)
```

4. Write the syntax of while loop. (J-2022, M-2023, J-2024)

```
while <condition>:
        statements block 1
[else:
        statements block2]
```

5. List the differences between break and continue statements. (M-2022)

break	continue
❖ The **break** statement terminates the loop containing it.	❖ The **Continue** statement is used to skip the remaining part of a loop
❖ Control of the program flows to the statement immediately after the body of the loop.	❖ Control of the program flows start with next iteration
❖ **Syntax: break**	❖ **Syntax:** continue

1. Write the syntax of Nested if elif .else statement with example. (S-2020)

Syntax:

```
if <condition-1>:
statements-block 1
elif <condition-2>:
statements-block 2
else:
statements-block n
```

Example : (nested if statement)

Average	Grade
>=80 and above	A
>=70 and <80	B
>=60 and <70	C
>=50 and <60	D
Otherwise	E

Coding:

```
m1=int (input(“Enter mark in first subject : ”))
m2=int (input(“Enter mark in second subject : ”))
avg= (m1+m2)/2
if avg>=80:
print (“Grade : A”)
elif avg>=70 and avg<80:
```


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```
print ("Grade : B")
elif avg>=60 and avg<70:
print ("Grade : C")
elif avg>=50 and avg<60:
print ("Grade : D")
else:
print ("Grade : E")
```

Output 1: Enter mark in first subject : 34
Enter mark in second subject : 78
Grade : D

Output 2 : Enter mark in first subject : 67
Enter mark in second subject : 73
Grade : B

CHAPTER – 7 (PYTHON FUNCTIONS)

1. Write the rules of local variable. **(M-2022)**

- A variable with local scope can be accessed only within the function/block that it is created in.
- When a variable is created inside the function/block, the variable becomes local to it.
- A local variable only exists while the function is executing.
- The format arguments are also local to function.

2. Write the basic rules for global keyword in python. **(J-2022, J-2024)**

- When we define a variable outside a function, it's global by default.
- You don't have to use global keyword.
- We use global keyword to read and write a global variable inside a function.
- Use of global keyword outside a function has no effect.

3. What happens when we modify global variable inside the function?

- If we modify the global variable, we can see the change on the **global** variable outside the function also.

Example:

```
c=1                #global variable
def add ( ):
    c=c+2          #increment c by 2
    print c
    add ( )
```

4. Differentiate ceil () and floor () function. **(M-2023)**

ceil()	floor()
❖ Returns the smallest integer greater than or equal to x.	❖ Returns the largest integer less than or equal to x.
❖ **Eg:** print (math.ceil (26.3)) **Output :**7	❖ **Eg:** print (math.floor (26.7)) **Output:**26

5. Write a Python code to check whether a given year is leap year or not. **(J-2023)**

```
n=int(input("Enter the year"))
if(n%4==0):
print ("Leap year")
else
print(Not Leap year")
```

Output:
Enter the year 2012
Leap Year

6. What is composition in functions? **(J-2023)**

- The value returned by a function may be used as an argument for another function in a nested manner.
- This is called **composition.**

Example:

- if we wish to take a numeric value as a input from the user, we take the input string from the user using the function **input ()** and apply **eval ()** function to evaluate its value.

7. How recursive function works? **(M-2020)**

- Recursive function is called by some external code.
- If the base condition is met then the program gives meaningful output and exits.
- Otherwise, function does some required processing and then calls itself to continue recursion.

8. What are the points to be noted while defining a function?

- Function blocks begin with the keyword **"def"** followed by function name and **parenthesis ().**
- Any input parameters should be placed within these parentheses when you define a function.
- The code block always comes after **a colon (:)** and is indented.
- The statement "return [expression]" exits a function, optionally passing back an expression to the caller.
- A **"return"** with no arguments is the same as return none.

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CHAPTER – 8 (STRINGS AND STRING MANIPULATION)

1. Write a Python program to display the given pattern. (M-2023)

```
C O M P U T E R
C O M P U T E
C O M P U T
C O M P U
C O M P
C O M
C O
C
```

Coding:

```
str1="COMPUTER"
index =len(str)
for i in str1:
print (str1 [0:index] )
index - =1
```

2. Write a short about the followings with suitable example. (a) capitalize() (b) swap case() (M-2024)

Function	Purpose	Example
1. **capitalize( )**	❖ Used to capitalize the first character of the string	>>> city="chennai" >>> print(city.capitalize()) **Output**: Chennai
2. **Swap case( )**	❖ It will change case of every character to its opposite case vice-versa.	>>> str1="tAmiLNaDu">>> print(str1.swapcase()) **Output**: *TaMIlnAdU*

3. What will be the output of the given python program?

str1 = "welcome" str2 = "to school" str3=str1[:2]+str2[len(str2)-2:] print(str3) **Output** - weol

4. What is the use of format ( )? Give an example.

❖ The format () function used with strings is very versatile and powerful function used for formatting strings.
❖ The curly braces {} are used as placeholders or replacement fields which get replaced along with format () function.

Example: **Output:**

```
num1=int (input("Number 1: "))                                  Number 1: 34
num2=int (input("Number 2: "))                                  Number 2: 54
print ("The sum of { } and { } is { }".format(num1, num2,(num1+num2)))   The sum of 34 and 54 is 88
```

5. Write a note about count () function in python.

❖ Returns the number of substrings occurs within the given range.
❖ Remember that substring may be a single character.
❖ Range (beg and end) arguments are optional. If it is not given, python searched in whole string.
❖ Search is case sensitive.

Syntax: count (str, beg,end) **Example:**

```
>>> str1="Raja RajaChozhan"
>>> print(str1.count('Raja'))
```

Output 2

1. What will be the output of the given Python program? (S-2020) **Output**

a = "Computer" b = "Science" x = a[:4] +b[len(b)-3:] print(x) Compnce

CHAPTER – 9 (LISTS, TUPLES, SETS AND DICTIONARY)

1. What are difference between List and Tuple?

List	Tuple
❖ A list is an ordered collection of values or elements of any type	❖ Tuples consists of a number of values separated by comma and enclosed within parentheses
❖ It is enclosed within square brackets [ ]	❖ It is enclosed within parentheses ()
❖ The commas work as a separator for the elements.	❖ The elements of a tuple can be even defined without parenthesis
Syntax: Variable = [element-1, element-2, element-3…element-n]	**Syntax:** # Empty tuple **Tuple_Name = ( )** # Tuple with n number elements **Tuple_Name = (E1, E2, E2 ……. En)** # Elements of a tuple without parenthesis **Tuple_Name = E1, E2, E3 ….. En**

2. Write a shot note about sort( ) (J-2024)

1.It sorts the element in list. 2.Sort () will affect the original list.

Syntax: List.sort(reverse=True|False,key=myFunc)

Description of the Syntax:

1. Both arguments are optional, 2.If reverse is set as True, list sorting is in descending order.
3. Ascending is default. 4.Key= myFunc;
5."myFunc" - The name of the user defined function that specifies the sorting criteria.

3. What will be the output of the following code?

list = [2**x for x in range(5)] print(list) **Output**: [1,2,4,8,16]

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4. Explain the difference between del and clear( ) in dictionary with an example

del	Clear ()
❖ The **del** statements is used to delete known elements.	❖ The function **clear ()** is used to delete all the elements in list
❖ The **del** statement can also be used to delete entire list	❖ It deletes only the elements and retains the list

5. List out the set operations supported by python.

- ❖ **Union** : It includes all elements from two or more sets.
- ❖ **Intersection:** It includes the common elements in two sets.
- ❖ **Difference** : It includes all elements that are in first set (say set A) but not in the second set (say set B).
- ❖ **Symmetric difference:** It includes all the elements that are in two sets (say sets A and B) but not the one that are common to two sets.

6. What are the difference between List and Dictionary? (J-2023)

List	Dictionary
❖ A list is an ordered collection of values or elements of any type	❖ A dictionary is a mixed collection of elements and it stores a key along with its element.
❖ It is enclosed within square brackets []	❖ The key value pairs are enclosed with curly braces {}.
❖ The commas work as a separator for the elements.	❖ The keys in a Python dictionary is separated by a colon (:) while the commas work as a separator for the elements.
Syntax: Variable = [element-1, element-2, element-3 …… element-n]	**Syntax:** Dictionary_Name = {Key_1:Value_1,Key_2:Value_2,Key_n:Value_n }

1. What are the advantages of Tuples over a list? (S-2021)

- ❖ The elements of a list are changeable (mutable) whereas the elements of a tuple are unchangeable (immutable), this is the key difference between tuples and list.
- ❖ The elements of a list are enclosed within square brackets.
- ❖ But, the elements of a tuple are enclosed by parenthesis. Iterating tuples is faster than list.

2. What will be the output of the following code? (M-2020)

list = [3**x for x in range(5)] print(list) **Output :** [1,3,9,27,81]

CHAPTER – 10 (PYTHON CLASSES AND OBJECTS)

1. What are class members? How do you define it? (S-2021)

- ❖ Variables defined inside a class are called as "Class Variable" and functions are called as "Methods".
- ❖ Class variable and methods are together known as members of the class.
- ❖ The class members should be accessed through objects or instance of class.
- ❖ A class can be defined anywhere in a Python program

Syntax:

```
class class_name:
   statement_1
   statement_2
   ……..
   ……..
   statement_n
```

2. Write a class with two private class variables and print the sum using a method.

```
Class Sample:
def_init_(self,n1,n2):
        self._n1=n1
        self._n2=n2
def sum(self):
    print ("Class variable 1:", self._n1)
    print ("Class variable 2:", self._n2)
S=Sample (5,10)
S.sum()
```

Output:

```
Class variable 1 :5
Class variable 2 :10
Sum : 15
```

3. Find the error in the following program to get the given output?

Error code :

```
class Fruits:
def __init__(self, f1, f2):
self.f1=f1
self.f2=f2
def display(self):
print("Fruit 1 = %s, Fruit 2 = %s" %(self.f1, self.f2))
F = Fruits ('Apple', 'Mango')
del F.display
F.display()
Output :Fruit 1 = Apple, Fruit 2 = Mango
```

Error :

```
Line 8, in <module>
 del F.display
 Attribute error: display
```

Correct code

```
class Fruits:
 def __init__(self, f1, f2):
  self.f1=f1
  self.f2=f2
  def display(self):
  print("Fruit 1 = %s, Fruit 2 = %s" %(self.f1, self.f2))
  F = Fruits ('Apple', 'Mango')
 F.display()
```

Output :

```
 Fruit 1 = Apple, Fruit 2 = Mango
```


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4. **What is the output of the following program?** **(J-2022)**

```
class Greeting:
def __init__(self, name):
self.__name = name
def display(self):
print("Good Morning ", self.__name)
obj=Greeting('BinduMadhavan')
obj.display()
```

Output

Good Morning BinduMadhavan

5. **How do define constructor and destructor in Python?** **(M-2024)**

1.CONSTRUCTOR:

- Constructor is the special function that is automatically executed when an object of a class is created.
- _init_ () method is used as constructor.

General format of constructor:

```
def _ _init__(self,[args……]):
    <statements>
```

2.DESTRUCTOR:

- Destructor is also a special method to destroy the objects.
- In Python, _ _del_ _( ) method is used as destructor.
- It is just opposite to constructor.

General format of destructor:

```
def _ _del_ _(self):
    <statements>
```

1. **Write a short note on Public and Private data member in Python?** **(S-2020)**

- The variables which are defined inside the class is public by default.
- These variables can be accessed anywhere in the program using dot operator.
- A variable prefixed with double underscore becomes private in nature.
- These variables can be accessed only within the class

2. **What is the output of the following program?** **(M-2020)**

```
class Greeting:
def __init__(self, name):
self.__name = name
def display(self):
print("Welcome to ", self.__name)
obj=Greeting('Python Programming')
obj.display()
```

Output

Welcome to Python Programming

CHAPTER – 11 (DATABASE CONCEPTS)

1. **What is the difference between Select and Project command?**

Select command	Project command
❖ The **SELECT** operation is used for selecting a subset with tuples according to a given condition C.	❖ The projection method defines a relation that contains a horizontal subset of Relation.
❖ Select filters out all tuples that do not satisfy C.	❖ The projection eliminates all attributes of the input relation but those mentioned in the projection list.
❖ **Symbol :** σ	❖ **Symbol :** Π
❖ **General form :** $\sigma_c(R)$ ❖ **Example :** σ_{course} = "Big Data" **(STUDENT)**	❖ **Example :** Π_{course} (STUDENT)

2. **What is the role of DBA?** **(J-2023)**

- Database Administrator or DBA is the one who manages the complete database management system.
- DBA takes care of the security of the DBMS, managing the license keys, managing user accounts and access etc.

3. **Explain Cartesian Product with a suitable example.**

- Cross product is a way of combining two relations.
- The resulting relation contains, both relations being combined.
- This type of operation is helpful to merge columns from two relations.

Example: A x B means A times B, where the relation A and B have different attributes.

4. **Explain Object Model with example.**

- Object model stores the data in the form of objects, attributes and methods, classes and Inheritance.
- This model handles more complex applications, such as Geographic information System (GIS), scientific experiments, engineering design and manufacturing.
- It is used in file Management System.

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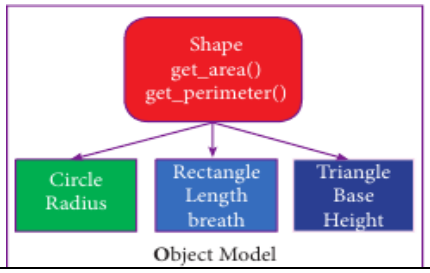
❖ It represents real world objects, attributes and behaviours.



5. Write a note on different types of DBMS users. **(S-2020, J-2024)**

1.Database Administrators:

❖ Database Administrator or DBA is the one who manages the complete database management system.

2.Application Programmers or Software Developers:

❖ This user group is involved in developing and designing the parts of DBMS.

3.End User:

❖ End users are the one who store, retrieve, update and delete data.

4.Database designers:

❖ They are responsible for identifying the data to be stored in the database for choosing appropriate structures to represent and store the data

CHAPTER – 12 (STRUCTURED QUERY LANGUAGE)

1. What is a constraint? Write short note on Primary key constraint.

❖ Constraint is a condition applicable on a field or set of fields.
❖ Primary constraint declares a field as a Primary key which helps to uniquely identify a record.
❖ It is similar to unique constraint except that only one field of a table can be set as primary key.
❖ The primary key does not allow **NULL** values and therefore a primary key field must have the **NOT NULL** constraint.

2. Write a SQL statement to modify the student table structure by adding a new field. **(J-2022)**

Syntax: ALTER TABLE < table-name> ADD <column-name><data type><size>;

❖ To add a new column "Address" of type 'char' to the Student table, the command is used as

Statement: ALTER TABLE Student ADD Address char;

3. Write any three DDL commands. **(S-2021)**

1.Create Command: To create tables in the database.

❖ CREATE TABLE Student (Admno integer, Name char(20), Gender char(1), Age integer);

2.Alter Command: Alters the structure of the database.

❖ ALTER TABLE Student ADD Address char;

3.Drop Command: Delete tables from database.

❖ DROP TABLE Student;

4. Write the use of Save point command with an example.

❖ The **SAVEPOINT** command is used to temporarily save a transaction so that you can roll back to the point whenever required.
❖ The different states of our table can be saved at any time using different names and the rollback to that state can be done using the **ROLLBACK** command.

Syntax: SAVEPOINT save point_ name;

Example: UPDATE Student SET Name = 'Mini WHERE Admno = 105;
SAVEPOINT A;

5. Write a SQL statement using DISTINCT keyword. **(M-2022)**

❖ The DISTINCT keyword is used along with the SELECT command to eliminate duplicate rows in the table.
❖ This helps to eliminate redundant data.

Example: SELECT DISTINCT Place FROM Student;

1. What is the use of DELETE, TRUNCATE and DROP commands in SQL? **(S-2020)**

DELETE	TRUNCATE	DROP
❖ The DELETE command permanently removes one or more records from the table. ❖ It removes the entire row, not individual fields of the row. ❖ so no field arguments is needed. **Syntax :** DELETE FROM tablename WHERE condition;	❖ The TRUNCATE command is used to delete all the rows from the table, the structure remains and the space is freed from the table. **Syntax :** TRUNCATE TABLE tablename;	❖ The DROP TABLE command is used to remove a table from the database once a table is dropped we cannot get it back, so be careful while using DROP TABLE command. **Syntax :** DROP TABLE table-name;

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2. Write short notes on TCL commands in SQL (M-2020, M-2024)

1. **Commit** : Saves any transaction into the database permanently. Syntax: COMMIT;
2. **Roll back :** Restores the database to last commit state. Syntax: ROLL BACK TO save point name;
3. **Save point:** Temporarily save a transaction so that you can roll back. Syntax: SAVEPOINT savepoint_name;

CHAPTER – 13 (PYTHON AND CSV FILES)

1. Write a note on open () function of python. What is the difference between the two methods? (J-2022)

- Python has a built-in function open () to open a file.
- This function returns a file object, also called a handle, as it is used to read or modify the file accordingly.
- The default is reading in text mode.
- In this mode, while reading from the file the data would be in the format of strings.
- On the other hand, binary mode returns bytes and this is the mode to be used when dealing with non-text files like image or exe files.

2. Write a Python program to modify an existing file. (J-2022)

Program: student.csv

```
import csv
row = [„3“, „Meena“,“Bangalore“]
with open(„student.csv“, „r“) as read File:
reader = csv.reader(read File)
lines = list(reader)
lines[3] = row
with open('student.csv', 'w') as write File:
writer = csv.writer(write File)
writer.write rows(lines)
read File.close()
write File.close()
```

- In this program, the third row of "student.csv" is modified andsaved.
- First the "student.csv" file is read by using csv.reader () function.
- Then, the list() stores each row of thefile.
- The statement lines[3] = row", changed the third row of the file with the new content in"row".
- The file object writer using write rows (lines) writes the values of the list to "student.csv"file.

3. Write a Python program to read a CSV file with default delimiter comma (,)

```
import csv
with open('c:\\pyprg\\sample1.csv', 'r') as F:
reader = csv.reader(F)
print(row)
F.close()
```

Output

```
['SNO', 'NAME', 'CITY']
['12101', 'RAM', 'CHENNAI']
['12102', 'LAVANYA', 'TIRUCHY']
['12103', 'LAKSHMAN', 'MADURAI']
```

4. What is the difference between the write modes and append mode? (S-2021)

'w'-write mode	'a' Append mode
❖ Opens a file forwriting.	❖ Open for appending at the end of the file without truncating it.
❖ Creates a new file if it does not exist or truncates the file if it exists.	❖ Create a new file if it does not exist.

5. What is the difference between reader () method and DictReader() class? (M-2020, M-2023)

reader( ) method	Dict Reader( ) class
❖ The reader method is designed to take each line of the file and make a list of all columns	❖ DictReader works by reading the first line of the CSV and using each comma separated value in this line as a dictionary key.
❖ Using this method one can read data from csv files of different format like quotes (“),(pip (|), and comma(,).	❖ DictReader is a class of csv module is used to read a CSV file into a dictionary.
❖ csv. Reader works with list\tuple.	❖ It creates an object which maps data to a dictionary.
Syntax: csv.reader(fileobject,delimiter,fmtparams)	**Syntax:** Csv.DictReader work with dictionay

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CHAPTER – 14 (IMPORTING C++ PROGRAMS IN PYTHON)

1. Differentiate PYTHON and C++ (S-2021, J-2023)

PYTHON	C++
❖ Python is typically an "interpreted" language	❖ C++ is typically a "compiled" language
❖ Python is a dynamic-typed language	❖ ++ is compiled statically typed language
❖ Data type is not required while declaring variable	❖ Data type is required while declaring variable
❖ It can act both as scripting and general purpose language	❖ It is a general purpose language.

2. What are the applications of scripting language? (S-2020, M-2024)

1.To automate certain tasks in a program
2. Extracting information from a data set
3. Less code intensive as compared to traditional programming language
4. Can bring new functions to applications and glue complex systems together.

3. What is MinGW? What is its use? (J-2024)

- ❖ MinGW refers to a set of runtime header files.
- ❖ It is used in compiling and linking the code of C, C++ and FORTRAN to be run on Windows Operating System.
- ❖ MinGW allows to compile and execute C++ program dynamically through Python program using g++.
- ❖ Python program that contains the C++ coding can be executed through either by using command prompt or by using run terminal.

4. Identify the module, operator, definition name for the following: Welcome **.** display() **(J-2022)**

Welcome - **Definition name**
. - **Dot Operator**
Display - **Module name**

5. What is sys.argv? What does it contain? (M-2022)

- ❖ **Sys.argv** is the list of command-line arguments passed to the Python program.
- ❖ **Argv** contains all the items that come along via the command-line input, it's basically an array holding the command-line arguments of the program.

To use sys.argv, you will first have to import sys.

- ❖ **Sys.argv[0]** is always the name of the program as it was invoked.
- ❖ **Sys.argv[1]** is the first argument you pass to the program.

Main(sys.argv[1])

- ❖ Accepts the program file(py program) and the input file (C++ file)as a list(array)
- ❖ Argv [0] contains the python program which is need not to be passed because by default _main_ contains source code reference.
- ❖ Argv [1] contains the name of the C++ file which is to be processed.

1. Write about the steps of python program executing C++ program using control statement (M-2023)

1. Type the c++ program in notepad and save it as with **.cpp** extension.
2. Type the python program and save it as with **.py** extension.
3. Click the Run Terminal and open the command window
4. Type the command python <program_name.py> -i<c++ program>

CHAPTER – 15 (DATA MANIPULATION THROUGH SQL)

1. What is SQLite? What is it advantage?

- ❖ SQLite is a simple relational database system, which saves its data in regular data files or even in the internal memory of the computer.
- ❖ It is designed to be embedded in applications, instead of using a separate database server program such as MySQL or Oracle.

Advantages:

- ❖ SQLite is fast, rigorously tested, and flexible, making it easier to work.
- ❖ Python has a native library for SQLite.

2. Mention the difference between fetch one ( ) and fetch many ( ) (M-2020, J-2022, M-2023, J-2024)

fetch one ()	Fetch many ()
❖ The fetch one () method returns the next row of a query result set or none in case there is no row left.	❖ The fetch many () method returns the next number of rows (n) of the result set.
❖ Using while loop and fetch one() method we can display all the records from a table	❖ Displaying specified number of records is done by using fetch many ()

3. What is the use of Where clause. Give a python statement Using the where Clause. (M-2022, M-2024)

- ❖ The WHERE clause is used to extract only those records that full fill a specified condition.

Example :

```
import sqlite3
connection = sqlite3.connect("Academy.db")
cursor = connection.cursor()
cursor.execute ("SELECT DISTINCT (Grade) FROM student where gender='M'")
result = cursor.fetchall()
print(*result,sep="\n")
```


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4. **Read the following details. Based on that write a python script to display department wise record.**

Databasename :-organization.db
Tablename :-Employee
Columns in the table :- Eno, EmpName, Esal,Dept

Code:

```
import sqlite3
connection = sqlite3.connect(“ organization .db ”)
c= conn.execute(“SELECT * FROM Employee GROUP BYDept”)
for row inc:
print(row)
conn.close()
```

5. **Read the following details. Based on that write a python script to display records in descending order of eno.**

Database name :-organization.db
Table name :-Employee
Columns in the table :- Eno, EmpName, Esal, Dept

Code:

```
import sqlite3
connection = sqlite3.connect(“ organization.db ”)
cursor=connection.cursor()
cursor.execute(“SELECT * FROM Employee ORDER BY Eno DESC”)
result=cursor.fetchall()
print(result)
```

1. **Write a short note on a) Group by b) Order by clause in SQL (S-2020)**

SQL Group By Clause:

- The SELECT statement can be used along with GROUP BY clause.
- The GROUP BY clause groups records into summary rows.
- It returns one records for each group.
- It is often used with aggregate functions (COUNT, MAX, MIN, SUM, AVG) to group the result-set by one or more columns.

SQL ORDER BY Clause:

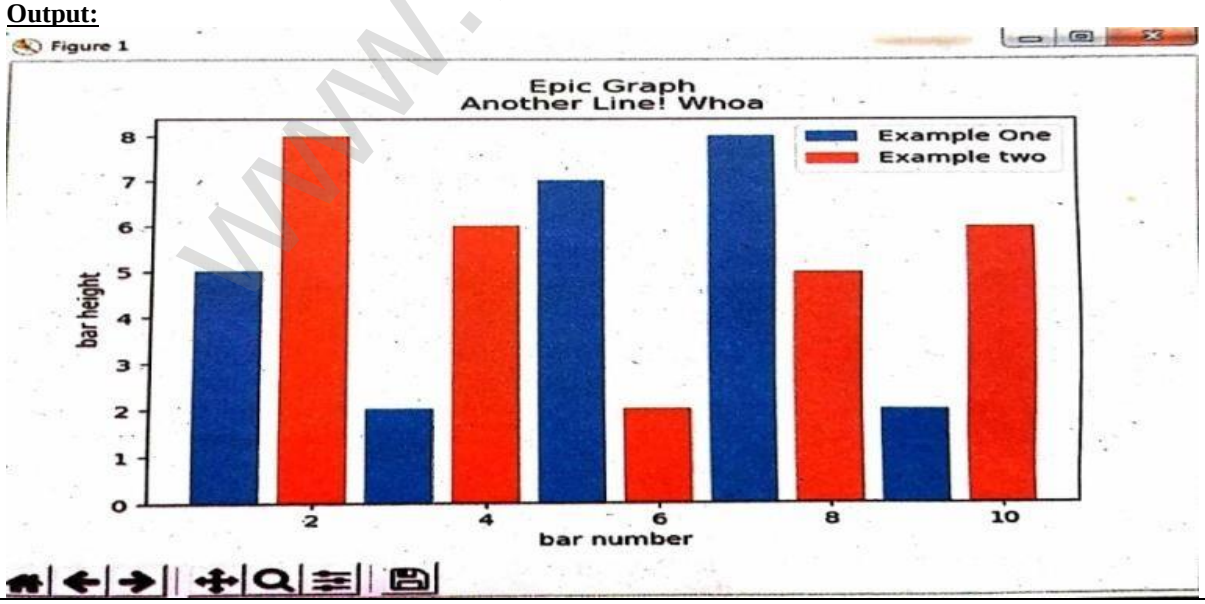
- The ORDER BY Clause can be used along with the SELECT statement to sort the data of specific fields in an ordered way.
- It is used to sort the result-set in ascending or descending order.

CHAPTER – 16 (DATA VISUALIZATION USING PYPLOT: LINE , PIE AND BAR CHAT)

1. **Draw the output for the following data visualization plot.**

```
import matplotlib.pyplot as plt
plt.bar([1,3,5,7,9],[5,2,7,8,2], label=”Example one”)
plt.bar([2,4,6,8,10],[8,6,2,5,6], label=”Example two”, color=’g’)
plt.legend()
plt.xlabel(‘bar number’)
plt.ylabel(‘bar height’)
plt.title(‘Epic Graph\nAnother Line! Whoa’)
plt.show()
```

Output:



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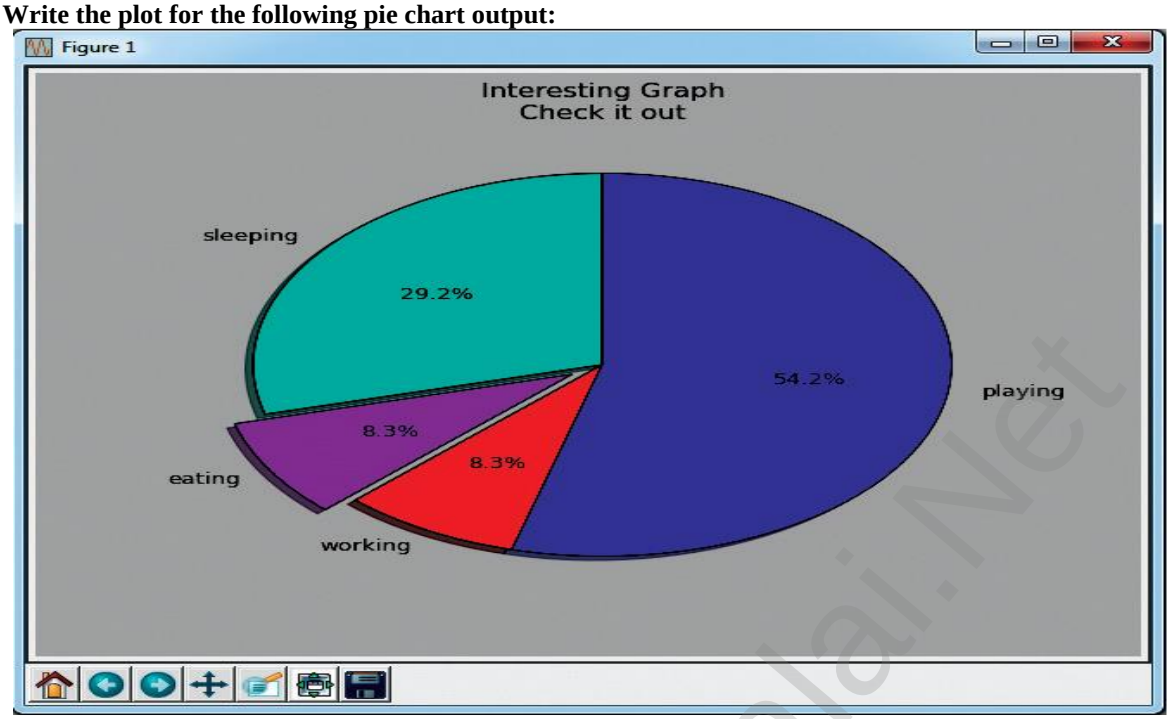
2.	**Write any three uses of data visualization. (M-2022)** ❖ Data Visualization help users to analyse and interpret the data easily. ❖ It makes complex data understandable and usable. ❖ Various Charts in Data Visualization helps to show relationship in the data for one or more variables
3.	**Write the plot for the following pie chart output:**  **Output:** import matplotlib.pyplot as plt slices = [7,2,2,13] activities = [‘sleeping’,‘eating’,’working’,’playing’] plt.pie(slices, labels=activities, atopct = ‘%.1.1f%%’) plt.title(‘Interesting Graph Check It Out’) plt.show()
1.	**List the general types of data visualization. (J-2022)** • 1.Charts • 2.Tables • 3.Graphs • 4.Maps • 5.Infographics • 6.Dashboards.

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CHAPTER 1 TO 16 BOOK INSIDE THREE MARK QUESTION & ANSWERS

	CHAPTER – 1 (FUNCTION)
1.	**Answer to the following questions with the help of the function given below:** **1) let rec pow (a: int) (b: int) : int := 2) if b=0 then 1 3) else a * pow a (b-1)** (a) What is the name assigned to this function? **pow** (b) What are the parameters defined to this function? **a , b** (c) What type of function is this? **recursive**
2.	**Identify in the following program: let sum x+y: return x+y** a) Write the name of the function : **sum** b) Statement which terminates the function : **return x+y** c) Name of the argument variable : **x y**

3.	**Write a function that find the minimum of its 3 arguments**
	let min 3 x y z :=
	if x < y then
	if x < z then x else z
	else
	if y < z then y else z

4.	**Mention the characteristics of interface.** ❖ The class template specifies the interfaces to enable an object to be created and operated properly. ❖ An object's attributes and behaviour is controlled by sending functions to the object.
	CHAPTER – 2 (DATA ABSTRACTION)
1.	**What is selector? What are the parts of a program?** **Selector:** ❖ Selectors are functions that retrieve information from the data type. ❖ Selectors extract individual pieces of information from the object. **Program parts:** ❖ Any program consist of two parts. ❖ The two parts of a program are, the part that operates on abstract data and the part that defines a concrete representation.
2.	**Define abstraction. What is abstract data types?** **Abstraction:** ❖ The process of providing only the essentials and hiding the details is known as abstraction. **Abstract data type:** ❖ Abstract Data type (ADT) is a type (or class) for objects whose behaviour is defined by **a set of value and a set of operations**. ❖ The definition of ADT only mentions what operations are to be performed but not how these operations will be implemented.
3.	**Give an example of Implementing an ADT.** ❖ For the example the list ADT can be implemented using singly linked List or doubly liked list. ❖ Similarly, Stack ADT and Queue ADT can be implemented using lists.
4.	**Examples of constructors and selectors** **Constructors:** - - constructor makepoint(x, y): return x, y **Selectors:** - - selector xcoord(point): return point[0] - -selector ycoord(point): return point[1]
5.	**What are the different ways to access the elements of a list. Give example.** ❖ The elements of a list can be accessed in two ways. ❖ The first way is via our familiar method of multiple assignment, which unpacks a list into its elements and binds each element to a different name. lst := [10, 20] x, y := lst [In the above example ***x*** will become10 and ***y*** will become 20.] ❖ A second method for accessing the elements in a list is by the element selection operator. lst[0] 10 lst[1] 20 [In both the example mentioned above mathematically we can represent list similar to a set]

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(CHAPTER-3) (SCOPING)

1. Write any three characteristics of modules.

1.Modules contain instructions, processing logic, and data.
2.Modules can be separately compiled and stored in a library.
3.Modules can be included in a program.
4.Module segments can be used by invoking a name and some parameters.
5.Module segments can be used by other modules

2. What is outer x variable and inner x variable?

- The value 'outer x variable' is printed when ***x*** is referenced outside the function definition.
- Whereas when display() gets executed, **'inner x variable'** is printed which is the ***x*** value inside the function definition.

3. Compare Public protected and private members:

- Public members (generally methods declared in a class) are accessible from outside the class.
- Protected members of a class are accessible from within the class and are also available to its sub-classes
- Private members of a class are denied access from the outside the class.
- They can be handled only from within the class.

CHAPTER – 4 (ALGORITHMIC STRATEGIES)

1. Write the difference between Algorithm and Program.

Algorithm	Program
❖ Algorithm helps to solve a given problem logically and it can be contrasted with the program	❖ Program is an expression of algorithm in a Programming language
❖ Algorithm can be categorized based on their implementation methods, design techniques etc.	❖ Algorithm can be implemented by structured or objec oriented programming approach.
❖ There is no specific rules for algorithm writing but some guidelines should be followed.	❖ Program should be written for the selected language with specific syntax
❖ Algorithm resembles a pseudo code which can be implemented in any language	❖ Program is more specific to a programming language

2. Write a Pseudo code for linear search.

1. Traverse the array using for loop
2. In every iteration, compare the target search key value with the current value of the list.
3. If the values match, display the current index and value of the array
4. If the values do not match, move on to the next array element.
5. If no match is found, display the search element not found.

3. Write a Pseudo code for bubble sort algorithm.

1. Start with the first element i.e., index = 0, compare the current element with the next element of the array.
2. If the current element is greater than the next element of the array, swap them.
3. If the current element is less than the next or right side of the element, move to the next element.
4. Go to Step 1 and repeat until end of the index is reached.

4. What are the different phases of analysis and performance evaluation of an algorithm?

- Two different phases (1.A priori estimates 2.A posterior testing)

1.A Priori estimates:

- This is a theoretical performance analysis of an algorithm. Efficiency of an algorithm is measured by assuming the external factors.

2.A Posterior testing:

- This is called performance measurement.
- In this analysis, actual statistics like running time and required for the algorithm executions are collected.

5. What are the factors that measure the execution time of an algorithm?

- **A fixed part** is defined as the total space required to store certain data and variables for an algorithm.
- For example, simple variables and constants used in an algorithm.
- **A variable part** is defined as the total space required by variables, which sizes depends on the problem and its iteration.
- For example: recursion used to calculate factorial of a given value n.

CHAPTER – 5 (PYTHON - VARIABLES AND OPERATORS)

1. What are the rules to be followed while creating an identifier in Python?

- An Identifier is a name used to identify a variable, function, class, module or object.
- An identifier must start with an alphabet (A..Z or a… z) or underscore (_).
- Identifiers may contain digits (0 .. 9) Identifiers must not be a **python** keyword.
- Python identifiers are case sensitive i.e. uppercase and lowercase letters are distinct.
- Python does not allow punctuation character such as %,$, @ etc., within identifiers

2. Explain comments in python.

- In Python, comments begin with hash symbol **(#)**.
- The lines that begins with # are considered as comments and ignored by the Python interpreter.
- Comments may be single line or no multi-lines.
- The multiline comments should be enclosed within a set of ''' '''(triple quotes) as given below.

```
# It is Single line Comment     ''' It is multiline comment which contains more than one line '''
```


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3. Explain indentation in python.

- Python uses whitespace such as spaces and tabs to define program blocks whereas other languages like C, C++, java use curly braces { } to indicate blocks of codes for class, functions or body of the loops and block of selection command.
- The number of whitespaces (spaces and tabs) in the indentation is not fixed, but all statements within the block must be indented with same amount spaces.

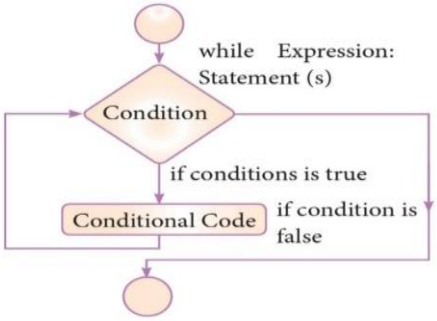
CHAPTER – 6 (CONTROL STRUCTURES)

1. What is the role of range ( ) in for loop of python?

range (1,30,1)	will start the range of values from 1 and end at 29
range (2,30,2)	will start the range of values from 2 and end at 28
range (30,3,-3)	will start the range of values from 30 and end at 6
range (20)	will consider this value 20 as the end value(or upper limit) and starts the range count from 0 to 19 (remember always range() will work till stop -1 value only)

2. Draw a flow chart to explain in while loop.

- In the **while** loop, the condition is any valid Boolean expression returning True or False.
- The **else** part of while is optional part of **while**.
- The **statements block1** is kept executed till the condition is True.
- If the **else** part is written, it is executed when the condition is tested False.
- Recall **while** loop belongs to entry check loop type, that is it is not executed even once if the condition is tested False in the beginning.



3. Write the syntax of if..elif..else statement in python.

```
if <condition-1>:
    statements-block 1
elif <condition-2>:
    statements-block 2
else:
    statements-block n
```

4. Which jump statement is used as placeholder?

Nested loop structure

- A loop placed within another loop is called as nested loop structure.
- One can place a while within another while; for within another for; for within while and while within for to construct such nested loops.

Following is an example to illustrate the use of for loop to print the following pattern

1 1 2 1 2 3 1 2 3 4 1 2 3 4 5

CHAPTER – 7 (PYTHON FUNCTIONS)

1. Evaluate the following function.

a) math. ceil (3.5) = 4 b) abs (–3.2) = 3.2 c) Pow (2,0) = 1

2. What is the use of format () function? Give an example.

Function	Description	Syntax	Example
Format ( )	Returns the output based on the given format **1. Binary format.** base 2. **2. Octal format.** base 8. **3. Fixed-point notation.** Precision is 6.	format (value [,format_spec])	x= 14 y= 25 print ('x value in binary :',format(x,'b')) print ('y value in octal:',format(y,'o')) print('y value in Fixed-point no ',format(y,'f ')) **Output:** x value in binary : 1110 y value in octal : 31 y value in Fixed-point no : 25.000000

3. Write a short note about sort ()

Function	Description	Syntax	Example
sqrt ( )	Returns the square root of x	math.sqrt (x)	import math a= 30 b= 49 c= 25.5 print (math.sqrt (a))

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					print (math.sqrt (b)) print (math.sqrt (c)) **Output:** 5.477225575051661 7.0 5.049752469181039

4. Explain about Return statement.

- The return statement causes your function to exit and returns a value to its caller.
- The point of functions in general is to take inputs and return something.
- The return statement is used when a function is ready to return a value to its caller.
- So, only one return statement is executed at run time even though the function contains multiple return statements.
- Any number of 'return' statements are allowed in a function definition but only one of them is executed at run time.

5. How can you pass parameters in function?

- Parameters or arguments can be passed to functions. def function_name (parameter(s) separated by comma):
- Let us see the use of parameters while defining functions.
- The parameters that you place in the parenthesis will be used by the function itself.
- You can pass all sorts of data to the functions.
- Here is an example program that defines a function that helps to pass parameters into the function.

CHAPTER – 8 (STRINGS AND STRING MANIPULATION)

1. What is the use of the operator += in python string operation. (or)
Write a short note on string slicing with syntax and example.

- Slice is a substring of a main string.
- A substring can be taken from the original string by using [ ] operator and index or subscript values.
- Thus,[] is also known as slicing operator.
- Using slice operator, you have to slice one or more sub strings from a main string.

General format of slice operation: str[start:end]

- Where start is the beginning index and end is the last index value of a character in the string.
- Python takes the end value less than one from the actual index specified.
- For example, if you want to slice first 4 characters from a string, you have to specify it as 0 to 5.
- Because, python consider only the end value as n-1.

Example: slice a single character from a string

```
>>> str1="THIRUKKURAL"
>>> print (str1[0])
```

Ans: T

2. What will be output of the following python program? **Output:** well

```
str1 = "welcome"
str2 = "to school"
str3 = str1[:3]+str2[len(str2)-1:]
print(str3)
```

3. How index value allocated to each character of a string in Python?

- Once you define a string, python allocate an index value for its each character.
- These index values are otherwise called as subscript which are used to access and manipulate the strings.
- The subscript can be positive or negative integer numbers.
- The positive subscript 0 is assigned to the first character and n-1 to the last character, where n is the number of characters in the string.
- The negative index assigned from the last character to the first character inverse order begins with -1.

Example :

String	S	C	H	O	O	L
Positive subscript	0	1	2	3	4	5
Negative subscript	-6	-5	-4	-3	-2	-1

4. Explain about slicing and slicing with stride.

- Slice is a substring of a main string.
- A substring can be taken from the original string by using [ ] operator and index or subscript values.
- Thus, [ ] is also known as slicing operator.
- Using slice operator, you have to slice one or more substrings from a main string.

General format of slice operation : Str[start : end]

- When the slicing operation, you can specify a third argument as the stride, which refers to the number of characters to move forward after the first character is retrieved from the string.
- The default value of stride is 1.

5. Write a note on string formatting operators of python.

- The string formatting operator is one of the most exciting feature of python.
- The formatting operator % is used to construct strings, replacing parts of the strings with the data stored in variables.

Syntax: ("String to be display with %val1 and %val2" %(val1, val2))

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Example:

```
name = "Rajarajan"
mark = 98
print ("Name: %s and Marks: %d" %(name, mark))
```

Output: Name: Rajarajan and Marks: 98

6. Write a python program to display given pattern

```
str1="COMPUTER"
index=0
for i in str1:
print(str[ :index+1])
index+=1
```

```
C
C O
C O M
C O M P
C O M P U
C O M P U T
C O M P U T E
C O M P U T E R
```

7. List out formatting characters

Format characters	USAGE
%c	Character
%d (or) %i	Signed decimal integer
%s	String
%u	Unsigned decimal integer
%o	Octal integer
%x or %X	Hexadecimal integer (lower case x refers a-f; upper case X refers A-F)
%e or %E	Exponential notation
%f	Floating point numbers
%g or %G	Short numbers in floating point or exponential notation.

8. Explain about escape sequences supported by python.

Escape Sequence	DESCRIPTION		
\newline	Backslash and newline ignored	\f	ASCII Form feed
\\	Backslash	\n	ASCII Linefeed
\'	Single quote	\r	ASCII Carriage Return
\"	Double quote	\t	ASCII Horizontal Tab
\a	ASCII Bell	\v	ASCII Vertical Tab
\b	ASCII Backspace	\ooo	Character with octal value ooo
\xHH	Character with hexadecimal value HH	-	-

CHAPTER – 9 (LISTS, TUPLES, SETS AND DICTIONARY)

1. Write execution table for the following Python code.

```
Marks=[10, 20, 30, 40, 50]
i = 0
sum = 0
while i< 4:
sum+=Marks[i]
i+=1
```

Answer:

iteration	i	while i<4	print (Marks [i])	i=i+1
1	0	0<4 True	Marks [0] = 10	0+1=1
2	1	1<4 True	Marks [1] = 20	1+1=2
3	2	2<4 True	Marks [2] = 30	2+1=3
4	3	3<4 True	Marks [3] = 40	3+1=4
5	4	4<4 False	Marks [4] = 50	4+1=5

2. Write a simple python program with list of five marks and print the sum of all the marks using while loop.

```
marks=[ ]
subjects=['Tamil', 'English', 'Physics', 'Chemistry', 'Comp. Science']
for i in range(5):
m=int(input("Enter Mark = "))
marks.append(m)
for j in range(len(marks)):
print ("{ }. { } Mark = { } ".format(j1+,subjects[j],marks[j]))
print("Total Marks = ", sum(marks))
```

Output :

```
Enter Mark = 45     1. Tamil Mark          = 45
Enter Mark = 98     2. English Mark        = 98
Enter Mark = 76     3. Physics Mark        = 76
Enter Mark = 28     4. Chemistry Mark      = 28
Enter Mark = 46     5. Comp. Science Mark = 46 Total Marks = 293
```


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3. What is dictionary?

- In python, a dictionary is a mixed collection of elements.
- Unlike other collection data types such as a list or tuple, the dictionary type stores a key along with its element.
- The keys in a Python dictionary is separated by a colon (:)while the commas work as a separator for the elements.
- The key value pairs are enclosed with curly braces { }.

4. What is reverse using indexing list?

- The python sets-1 the index value for the last element in list and -2 for the preceding element and so on.
- This is called as Reverse Indexing.

5. Write a short note on pop () function in Python.

- Pop () function can IS used to delete an element using the given index value.
- Pop () function deletes and returns the last element of a list if the index is not given.

Example:

```
>>>MyList=[12,34,'Kannan', 'Gowrisankar', 'Lenin']
>>>MyList.pop(1)   Ans: 34
>>> print(MyList) [12, 'Kannan', 'Gowrisankar', 'Lenin']
```

6. Explain list and Tuples :

List:

- A list in Python is known as a **"sequence data type"** like strings.
- It is an ordered collection of values enclosed within square brackets [ ].
- Each value of a list is called as element.
- It can be of any type such as numbers, characters, string.

Tuples:

- Tuples consists of a number of values separated by comma and enclosed with in Parentheses.
- Tuple is similar to list, values in a list can be changed but not in a tuple.

7. Write short note on (i) Remove (ii) clear

(i) Remove:

- Remove ( ) function is used to delete elements of a list if its index is unknown.
- Remove ( ) function can also be used to delete one or more elements if the index value is not known.

(ii) Clear:

- The function clear( ) is used to delete all the elements in list, it deletes only the elements and retains the list
- Clear ( ) function removes only the elements and retains the list

8. Write short note on Sort ( ) function with suitable examples.

Sort ( )

- Sorts the element in list Both arguments are optional
- If reverse is set as true, list sorting is in descending order.Ascending is default.
- Key=myFunc; "myFunc" - the name of the user defined function that specifies the sorting criteria.

Syntax : List.sort(reverse=True False, key=myFunc)

Example :

```
MyList=['Thilothamma', 'Tharani', 'Anitha', 'SaiSree', 'Lavanya']
MyList.sort( )
print(MyList)
MyList.sort(reverse=True)
print(MyList)
```

Output

```
['Anitha', 'Lavanya', 'SaiSree', 'Tharani', 'Thilothamma']
['Thilothamma', 'Tharani', 'SaiSree', 'Lavanya', 'Anitha']
```

CHAPTER – 10 (PYTHON CLASSES AND OBJECTS)

1. Write a short note on Public and Private data member in Python?

- The variables which are defined inside the class is public by default.
- These variables can be accessed anywhere in the program using dot operator.
- A variable prefixed with double underscore becomes private in nature.
- These variables can be accessed only within the class.

2. What is the output of the following program?

```
class Greeting:
def__init__(self, name):
self.__name = name
def display(self):
print("Good Morning", self.__name)
obj=Greeting('Tamil Nadu') obj.display()
```

Output: Good Morning Tamil Nadu

3. What is constructor?

- Constructor is the special function that is automatically executed when an object of a class is created.
- In Python, there is a special function called **"init"** which act as a Constructor.
- It must begin and end with double underscore.
- This function will act as an ordinary function; but only difference is, it is executed automatically when the object is created.
- This constructor function can be defined with or without arguments.

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❖ This method is used to initialize the class variables.

General format of _ _init_ _ method (Constructor function)

def _ _init_ _(self, [args ……..]):
<statements>

4. Write a Python program to check and print if the given number is odd or even using class.

```
class Odd_Even:
even = 0            #class variable
def check(self, num):
if num%2==0:
print(num," is Even number")
else:
print(num," is Odd number")
n=Odd_Even()
x = int(input("Enter a value: "))
n.check(x)
```

5. What is the output of the following program?

```
class Greeting:
def __init__(self, name):
self.__name = name
def display(self):
print("Welcome to ", self.__name)
obj=Greeting('Python Programming')
obj.display()
```

Output

Welcome to Python Programming

CHAPTER – 11 (DATABASE CONCEPTS)

1. **Write a short note on Unary Relational Operations of DBMS.**

❖ A unary operator is an operator that operates on only one operant.

❖ An operator is referred to as binary if it operates on two operands.

Unary Relational Operations: 1.SELECT (Symbol : σ) 2.PROJECT (Symbol : π)

2. **What are the components of DBMS?**

1. Hardware: The computer, hard disk, I/O channels for data, and any other physical component involved in storage of data.

2. Software:

❖ The DBMS software is capable of understanding the Database Access Languages and interprets into database commands for execution.

3. Data: It is the resource for which DBMS is designed.

4. Procedures/Methods:

❖ They are general instructions to use a database management system such as installation of DBMS, manage databases to take backups, report generation, etc.

5. Data Base Access Languages:

❖ They are the languages used to write commands to access, insert, update and delete data stored in any database.

3. **Differentiate between data and information**

1.Data:

❖ Data are raw facts stored in a computer.

❖ A data may contain any character, text, word or a number.

Example : 600006, DPI Campus, SCERT, Chennai, College Road

2.Information:

❖ Information is formatted data, which allows to be utilized in a significant way.

Example: SCERT College Road DPI Campus Chennai 600006

CHAPTER – 12 (STRUCTURED QUERY LANGUAGE)

1. **Write short notes on TCL commands in SQL**

1. Commit : Saves any transaction into the database permanently. **Syntax:** COMMIT;
2. Roll back : Restores the database to last commit state. **Syntax:** ROLL BACK TO save point name;
3. Save point: Temporarily save a transaction. **Syntax:** SAVEPOINT savepoint_name;

2. **Explain about SQL:**

❖ The Structured Query Language (SQL) is a standard programming language to access and manipulate databases. SQL allows the user to create, retrieve, alter, and transfer information among databases.

❖ It is a language designed for managing and accessing data in a Relational Data Base Management System (RDBMS).

❖ There are many versions of SQL.

❖ The original version was developed at IBM's Research centre and originally called as Sequel in early 1970's.

❖ Later the language was changed to SQL. In 1986, ANSI (American National Standard Institute) published an SQL standard that was updated again in 1992, the latest SQL was released in 2008 and named as SQL 2008.

CHAPTER – 13 (PYTHON AND CSV FILES)

1. **Write about CSV files?**

❖ A CSV file is a human readable text file where each line has a number of fields, separated by commas or some other delimiter.

❖ You can assume each line as a row and each field as a column.

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2. How csv.write() function is used to create a normal CSV file in Python?

- The csv.writer() method returns a writer object which converts the user's data into delimited strings on the given file-like object.
- The writerow() method writes a row of data into the specified file.
- **The syntax for csv.writer() is** csv. writer (fileobject, delimiter, fmtparams)where

fileobject :passes the path and the mode of the file
delimiter :an optional parameter containing the standard dilects like , | etc can be omitted
fmtparams :optional parameter which help to override the default values of the

- Dialects like skipinitialspace,quoting etc. Can be omitted
- You can create a normal CSV file using writer () method of csv module having default delimiter comma (,)

CHAPTER – 14 (IMPORTING C++ PROGRAMS IN PYTHON)

1. Write about MinGW Interface. (Minimalist GNU for Windows)

- MinGW refers to a set of runtime header files, used in compiling and linking the code of C, C++ and FORTRAN to be run on Windows Operating System.
- MinGw-W64 (version of MinGW) is the best compiler for C++ on Windows.
- To compile and execute the C++ program, you need 'g++' for Windows.
- MinGW allows to compile and execute C++ program dynamically through Python program using g++.

2. Write about the steps of python program executing C++ program using control statement

1. Type the c++ program in notepad and save it as with **.cpp** extension.
2. Type the python program and save it as with **.py** extension.
3. Click the Run Terminal and open the command window
4. Type the command python <program_name.py> -i<c++ program>

CHAPTER – 15 (DATA MANIPULATION THROUGH SQL)

1. Write a short note on(i) fetchall() (ii) fetchone() (iii) fetchmany

(i) cursor.fetchall(): fetchall () method is tofetch all rows from the database table.
(ii) cursor.fetchone(): The fetchone () method returns the next row of a query result set or none in case there is no row left.
(iii) cursor.fetchmany(): Method that returns the next number of rows (n) of the result.

2. Write a short note on a) Group by b) Order by clause in SQL

SQL Group By Clause:

- The SELECT statement can be used along with GROUP BY clause.
- The GROUP BY clause groups records into summary rows. It returns one records for each group.
- It is often used with aggregate functions (COUNT, MAX, MIN, SUM, AVG) to group the result-set by one or more columns.

SQL ORDER BY Clause:

- The ORDER BY Clause can be used along with the SELECT statement to sort the data of specific fields in an ordered way.
- It is used to sort the result-set in ascending or descending order.

CHAPTER – 16 (DATA VISUALIZATION USING PYPLOT: LINE , PIE AND BAR CHAT)

1. Define data visualization. Mention its types and uses.

- Data Visualization is the graphical representation of information and data.
- The objective of Data Visualization is to communicate information visually to users.
- For this, data visualization uses statistical graphics.
- Numerical data may be encoded using dots, lines, or bars, to visually communicate a quantitative message.

General types of Data Visualization:1.Charts 2.Tables 3.Graphs 4.Maps 5.Info graphics 6.Dashboards

Data visualization – Uses:

- Data Visualization help users to analyse and interpret the data easily.
- It makes complex data understandable and usable.
- Various Charts in Data Visualization helps to show relationship in the data for one or more variables.

2. What is pie chart? How will you create pie chart in Python? Give an example.

- Pie Chart is probably one of the most common type of chart.
- It is a circular graphic which is divided into slices to illustrate numerical proportion.
- The point of a pie chart is to show the relationship of parts out of a whole.
- To make a Pie Chart with Matplotlib, we can use the plt.pie()function.
- The autopct parameter allows us to display the percentage value using the Python string formatting.

Example :

```
import matplotlib.pyplot as plt
sizes = [89, 80, 90, 100, 75]
labels = ["Tamil", "English", "Maths", "Science", "Social"]
plt.pie (sizes, labels = labels, autopct = "%.2f ")  plt.axes().set_aspect ("equal")  plt.show()
```


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CHAPTER 1 TO 16 FIVE MARK BOOK BACK &PUBLIC QUESTION WITH ANSWERS

CHAPTER – 1 (FUNCTION)

1. What are called Parameters and write a note on (i) Parameter without Type (ii) Parameter with Type **(M-2022, J-2024)**

- **Parameters** are the variables in a function definition
- **Arguments** are the values which are passed to a function definition.
- Two types of parameter passing are,
  i) Parameter Without Type ii) Parameter With Type

(i) Parameter Without Type:

Let's see an example of a function definition of Parameter Without Type:

```
(requires: b>=0 )
(returns: a to the power of b)
  let rec pow a b:=
  if b=0 then 1
  else a * pow a (b-1)
```

- In the above function definition **variable 'b'** is the **parameter** and the **value** passed **to** the variable **'b'** is the **argument**.
- The precondition **(requires)** and post condition **(returns)** of the function is given.
- We have not mentioned any types: **(data types)**.
- This is called **parameter without type.**
- In the above function definition the expression has type **'int',** so the function's return type also be **'int'** by implicit.

(ii) Parameter With Type:

Now let us write the same function definition with types,

```
(requires: b>=0 )
(returns: a to the power of b)
  let rec pow (a:int)(b:int):int:=
  if b=0 then 1
  else a * pow b (a-1)
```

- In this example we have explicitly annotating the types of argument and return type as **'int'**.
- Here, when we write thetype annotations for 'a' and 'b' the parentheses are mandatory.
- This is the way passing parameter with type which helps the compiler to easily infer them.

2. Identify in the following program.

```
let rec gcd a b :=
if b < > 0 then gcd b (a mod b) else return a
```

i) Name of the function: **gcd**
ii) Identify the statement which tells it is a recursive function: **let rec gcd a b:=**
iii) Name of the argument variable: **a,b**
iv) Statement which invoke the function recursively: **if b < >0 then gcd b (a mod b)**
v) Statement which terminates the recursion : **return a**

3. Explain with example Pure and impure functions.

Pure Function	Impure Function
❖ Pure functions will give exact result when the same arguments are passed.	❖ Impure functions never assure you that the function will behave the same every time it's called.
❖ Pure function does not cause any side effects to its output.	❖ Impure function causes side effects to its output.
❖ The return value of the pure functions solely depends on its arguments passed.	❖ The return value of the impure functions does not solely depend on its arguments passed.
❖ They do not modify the arguments which are passed to them	❖ They may modify the arguments which are passed.
❖ If we call pure functions with same set of arguments, we will always get the same return values	❖ If we call impure functions with same set of arguments, we might get the different return values.
Example: sqrt() let square x return: x*x	Example: let Random number let a:=random( ) if a>10 then return:a else return:10

4. Explain with an example interface and implementation.

Interface :

- An interface is a set of action that an object can do.
- Interface just defines what an object can do, but won't actually do it.
- The interface defines an object's visibility to the outside world.
- In Object Oriented Programming language, an Interface is a description of all functions that a class must have.
- The purpose of interfaces is to allow the computer to enforce the properties of the class which means the class of

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TYPE T must have functions called **X, Y, Z,** etc.

For example

- When you press a light switch, the light goes on, you may not have cared how it splashed the light.
- In our example, anything that **"ACTS LIKE"** a light, should have function definitions like turn_ on () and a turn_ off ().
- An object **"ACTS LIKE"** is an instance created from the class **"LIGHT".**
- All the objects of class **"LIGHT"** will uses all its functions.

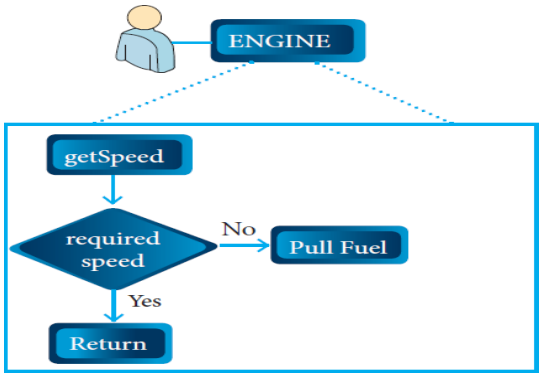
Characteristics of interface:

- The class template specifies the interfaces to enable an object to be created and operated properly.
- An object's attributes and behaviour is controlled by sending functions to the object.

Implementation:

- Implementation carries out the instructions defined in the interface
- How the object is processed and executed is the implementation.
- A class declaration combines the external interface (its local state) with an implementation of that interface (the code that carries out the behaviour).

Example:



- Let's take the example of increasing a car's speed.
- The person who drives the car doesn't care about the internal working.
- To increase the speed of the car he just presses the accelerator to get the desired behaviour.
- Here the accelerator is the interface between the driver (the calling / invoking object) and the engine (the called object).
- In this case, the function call would be Speed (70): **This is the interface.**
- Internally, the engine of the car is doing all the things.
- It's where fuel, air, pressure, and electricity come together to create the power to move the vehicle.
- All of these actions are separated from the driver, who just wants to go faster.
- Thus we separate interface from implementation.

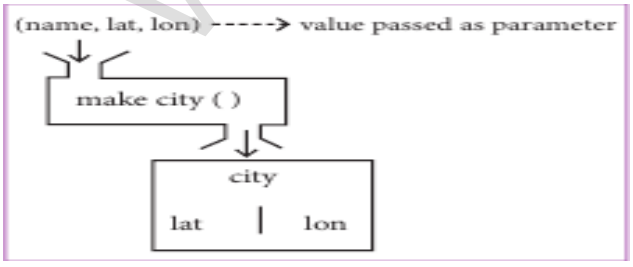
CHAPTER – 2 (DATA ABSTRACTION)

1. How will you facilitate data abstraction? Explain it with suitable example. **(J-2023, M-2024)**

- Data abstraction is supported by defining an abstract data type (ADT), which is a collection of constructors and selectors.
- To facilitate data abstraction, you will need to create two types of functions: **1.Constructor 2.Selectors**

1.Constructor:

- Constructors are functions that build the abstract data type.
- Constructors create an object, bundling together different pieces of information.
- For example, say you have an abstract data type called city.
- This city object will hold the city's name, and its latitude and longitude.
- To create a city object, you'd use a function like **city = make city (name, lat, lon).**
- To extract the information of a city object, you would use functions like
  getname(city) **getlat(city)** **getlon(city)**
- Here make city (name, lat, lon) is the constructor which creates the object city.



2.Selectors:

- Selectors are functions that retrieve information from the data type.
- Selectors extract individual pieces of information from the object.

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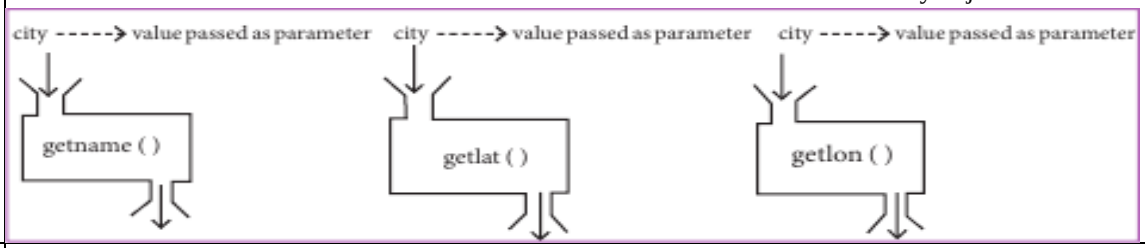
- Therefore in the above cod: **getname(city) getlat(city) getlon(city)**
- These are the selectors because these functions extract the information of the city object



2. What is a List? Why List can be called as Pairs. Explain with suitable example. **(M-2023)**

I. List:

- List is constructed by placing expressions within square brackets separated by commas.
- Such an expression is called a list literal. List can store multiple values.
- Each value can be of any type and can even be another list.
- The elements of a list can be accessed in two ways.

1. Multiple Assignment:

- Which unpacks a list into its elements and binds each element to a different name.

Example: lst := [10, 20] x, y := lst **x** will become10 and **y** will become 20.

2. Element Selection Operator:

- It is expressed using square brackets.
- Unlike a list literal, a square-brackets expression directly following another expression does not evaluate to a list value, but instead selects an element from the value of the preceding expression.

Example: lst[0] 10 lst[1] 20

II. Pair:

- Any way of bundling two values together into one can be considered as a pair.
- Lists are a common method to do so. Therefore List can be called as Pairs.

Example: lst[(0,10),(1,20)]

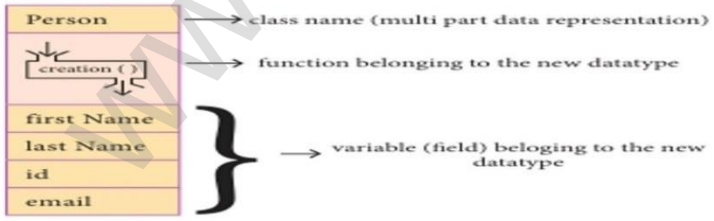
3. How will you access the multi-item? Explain with example.

Multi-item:

- The structure construct in OOP languages it's called class construct is used to represent multi-part objects where each part is named.
- Consider the following **pseudo code:**

```
class Person:
        creation( )
        firstName := " "
        lastName := " "
        id := " "
        email := " "
```

The new data type Person is pictorially represented as,



Let main() contains	
p1:=Person()	statement creates the object.
firstName := " Padmashri "	setting a field called firstName with value Padmashri
lastName :="Baskar"	setting a field called lastName with value Baskar
id :="994-222-1234"	setting a field called id value 994-222-1234
email="compsci@gmail.com"	setting a field called email with value compsci@gmail.com
- - output of firstName : Padmashri	

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- The class (structure) construct defines the form for multi-part objects that represent a person.
- Person is referred to as a class or a type, while p1 is referred to as an object or an instance
- Using class you can create many objects of that type.
- Class defines a data abstraction by grouping related data items.
- A class as bundled data and the functions that work on that data that is using class we can access multi-part items.

CHAPTER - 3 (SCOPING)

1. Explain the types of scopes for variable or LEGB rule with example. **(S-2021, M-2022, M-2024)**

Scope:

- Scope refers to the visibility of variables, parameters and functions in one part of a program to another part of the same program.

Types of variable scope:

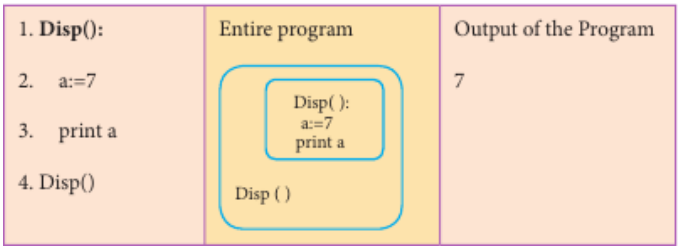
- 1.Local Scope 2.Enclosed Scope 3.Global Scope 4.Built-in Scope

LEGB rule:

- The LEGB rule is used to decide the order in which the scopes are to be searched for scope resolution.
- The scopes are listed below in terms of hierarchy (highest to lowest).

1.Local scope:

- Local scope refers to variables defined in current function.
- A function will always look up for a variable name in its local scope.
- Only if it does not find it there, the outer scopes are checked.

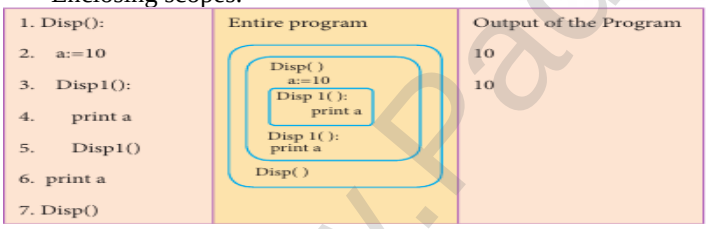


Example:

- On execution of the above code the variable **a** displays the value 7, because it is defined and available in the local scope.

2.Enclosed scope:

- A variable which is declared inside a function which contains another function definition with in it, the inner function can also access the variable of the outer function.
- This scope is called enclosed scope.
- When a compiler or interpreter searches for a variable in a program, it first search Local, and then search Enclosing scopes.

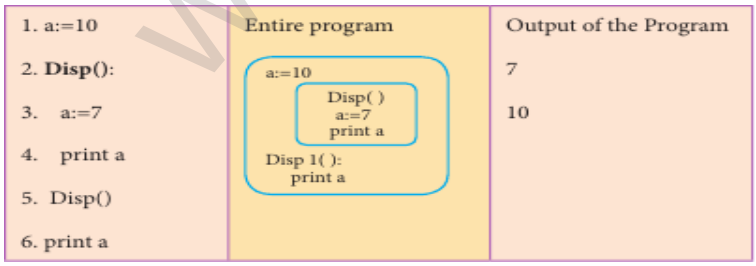


Example:

- In the above example Disp1() is defined within Disp().
- The variable 'a' defined in Disp() can be even used by Disp1() because it is also a member of Disp().

3.Global scope:

- A variable which is declared outside of all the functions in a program is known as global variable.
- Global variable can be accessed inside or outside of all the functions in a program.



Example:

- On execution of the above code the variable **a** which is defined inside the function displays the value 7 for the function call Disp() and then it displays 10, because **a** is defined in global scope.

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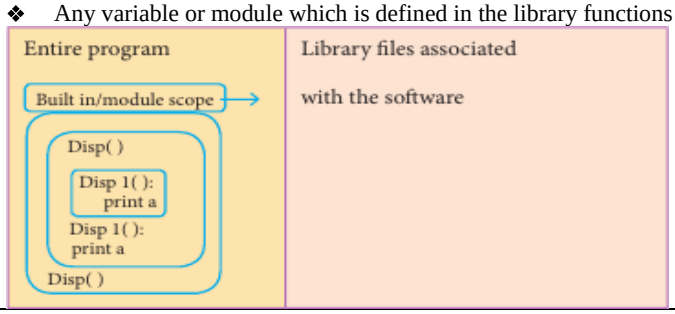
4.Built-in-scope:

- The built-in scope has all the names that are pre-loaded into the program scope when we start the compiler or interpreter.
- Any variable or module which is defined in the library functions of a programming language has Built-in or module scope.



2. Write Five Characteristics of Modules. (J-2024)

1. Modules contain instructions, processing logic, and data.
2. Modules can be separately compiled and stored in a library.
3. Modules can be included in a program.
4. Module segments can be used by invoking a name and some parameters.
5. Module segments can be used by other modules

3. Write any five benefits in using modular programming.

1. Less code to be written.
2. A single procedure can be developed for reuse, eliminating the need to retype the code many times.
3. Programs can be designed more easily because a small team deals with only a small part of the entire code.
4. Modular programming allows many programmers to collaborate on the same application.
5. The code is **stored across multiple files.**
6. Code is short, simple and easy to understand.
7. Errors can easily be identified, as they are localized to a subroutine or function.
8. The same code can be used in many applications.
9. The scoping of variables can easily be controlled

CHAPTER – 4 (ALGORITHMIC STRATEGIES)

1. Explain the characteristics of an algorithm.

1. Input	❖ Zero or more quantities to be supplied
2. Output	❖ At least one quantity is produced.
3. Finiteness	❖ Algorithms must terminate after finite number of steps.
4. Definiteness	❖ All operations should be well defined.
5. Effectiveness	❖ Every instruction must be carried out effectively.
6. Correctness	❖ The algorithms should be error free
7. Simplicity	❖ Easy to implement
8. Unambiguous	❖ Algorithm should be clear and unambiguous.
9. Feasibility	❖ Should be feasible with the available resources
10. Portable	❖ An algorithm should be generic, independent of any programming language or an operating system able to handle all range of inputs.
11. Independent	❖ An algorithm should have step-by-step directions, which should be independent of any programming code.

2. Discuss about Linear search algorithm. (M-2020, J-2020, J-2022, M-2023)

Linear search:

- Linear search also called sequential search is a sequential method for finding a particular value in a list.
- This method checks the search element with each element in sequence until the desired element is found or the list is exhausted.
- In this searching algorithm, list need not be ordered.

Pseudo code:

1. Traverse the array using for loop
2. In every iteration, compare the target search key value with the current value of the list.
   - If the values match, display the current index and value of the array.
   - If the values do not match, move on to the next array element.
3. If no match is found , display the search element not found

Example:

- To search the number 25 in the array given below, linear search will go step by step in a sequential order starting from the first element in the given array if the search element is found that index is returned otherwise the search is continued till the last index of the array.
- In this example number 25 is found at index number 3.

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Index	0	1	2	3	4
Values	10	12	20	25	30

Snippet:
Input: values[ ] = {0, 12,20, **25**, 30}
target = 25 (**Output: 3)**

Example 1:
Input: values[ ] = {5, 34, 65, 12, **77**, 35}
target = 77 **(Output: 4)**

Example 2:
Input: values[ ] = {101, 392, 1, 54, 32, 22, 90, 93}
target = 200

3. What is Binary search? Discuss with example. (S-2021, J-2023, M-2024)

Binary search:

- Binary search also called half-interval search algorithm.
- It finds the position of a search element within a sorted array.
- The binary search algorithm can be done as divide-and-conquer search algorithm and executes in logarithmic time.

Pseudo code for Binary search:

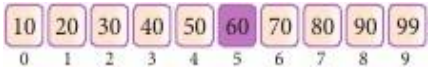
1. Start with the middle element:

a) If the search element is equal to the middle element of the array, then return the index of the middle element.
b) If not, then compare the middle element with the search value,
c) If **(Search element > number in the middle index)**, then select the elements to the right side of the middle index, and go to Step-1.
d) If **(Search element < number in the middle index)**, then select the elements to the left side of the middle index, and start with Step-1.

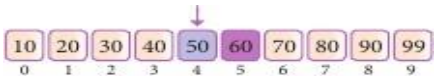
2. When a match is found, display success message with the index of the element matched.
3. If no match is found for all comparisons, then display unsuccessful message.

Binary Search Working principles with example:

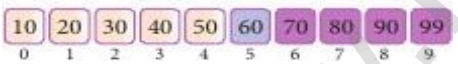
- List of elements in an array must be sorted first for Binary search.
- The array is being sorted in the given example and it is suitable to do the binary search algorithm.
- Let us assume that the **search element is 60** and we need to search the location or index of search element 60 using binary search.



- First, we find index of middle element of the array by using this formula:
  mid = low + (high - low) / 2
- Here it is, 0 + (9 - 0) / 2 = 4. So, 4 is the mid value of the array.



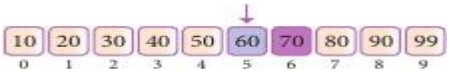
- Now compare the search element with the value stored at mid value location 4.
- The value stored at location or index 4 is 50, which is not match with search element.
- As the search value 60 is greater than 50.



- Now we change our low to mid + 1 and find the new mid value again using the formula.
  low = mid + 1
  mid = low + (high - low) / 2
- Our new mid is 7 now. We compare the value stored at location 7 with our target value 60.

- The value stored at location or index 7 is not a match with search element, rather it is more than what we are looking for.
- So, the search element must be in the lower part from the current mid value location

- The search element still not found. Hence, we calculated the mid again by using the formula.
  high = mid -1
  mid = low + (high - low)/2
- Now the mid value is 5.



- Now we compare the value stored at location 5 with our search element.

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❖ We found that it is a match.

❖ We can conclude that the search element 60 is found at location or index 5.
❖ For example if we take the search element as 95, for this value this binary search algorithm return unsuccessful result.

4. Explain the Bubble sort algorithm with example. (M-2022)

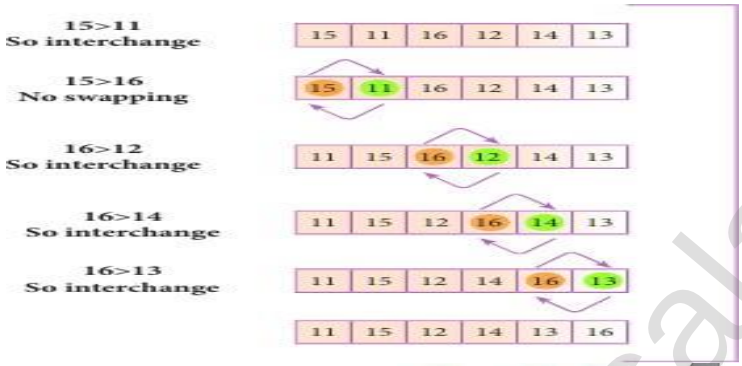
❖ Bubble sort is a simple sorting algorithm, it starts at the beginning of the list of values stored in an array.
❖ It compares each pair of adjacent elements and swaps them if they are in the unsorted order.
❖ This comparison and passed to be continued until no swaps are needed, which shows the values in an array is sorted.
❖ It is named so because, the smaller elements "bubble" to the top of the list.
❖ It is too slow and less efficient when compared to other sorting methods.

Pseudo code:

1. Start with the first element i.e., index = 0, compare the current element with the next element of the array.
2. If the current element is greater than the next element of the array, swap them.
3. If the current element is less than the next or right side of the element, move to the next element.
4. Go to Step 1 and repeat until end of the index is reached.

Example:

❖ Consider an array with values {15, 11, 16, 12, 14, 13}



❖ Below, we have a pictorial representation of how bubble sort.
❖ The above pictorial example is for iteration-1.
❖ Similarly, remaining iteration can be done.
❖ The final iteration will give the sorted array.

5. Explain the concept of Dynamic programming with suitable example. (J-2024)

❖ Dynamic programming is an algorithmic design method that can be used when the solution to a problem can be viewed as the result of a sequence of decisions.
❖ Dynamic programming approach is similar to divide and conquer.
❖ The given problem is divided into smaller and yet smaller possible sub problems.
❖ Dynamic programming is used whenever problems can be divided into similar sub-problems.
❖ So that their results can be re-used to complete the process.
❖ Dynamic programming approaches are used to find the solution in optimized way.

Steps to do Dynamic programming:

❖ The given problem will be divided into smaller overlapping sub-problems.
❖ An optimum solution for the given problem can be achieved by using result of smaller sub- problem.
❖ Dynamic algorithms uses Memorization.

Fibonacci Iterative Algorithm with Dynamic Programming Approach:

❖ The following example shows a simple Dynamic programming approach for the generation of Fibonacci series.
❖ Initialize f0=0, f1 =1
❖ Step-1: Print the initial values of Fibonacci f0 and f1 Step-2: Calculate Fibonacci fib ← f0 + f1
❖ Step-3: Assign f0← f1, f1← fib Step-4: Print the next consecutive value of Fibonacci fib
❖ Step-5: Go to step-2 and repeat until the specified number of terms generated

For example if we generate Fibonacci series up to 10 digits, the algorithm will generate the series as shown below:

❖ The Fibonacci series is :**0 1 1 2 3 5 8 13 21 34 35**

CHAPTER – 5 (PYTHON - VARIABLES AND OPERATORS)

1. Describe in detail the procedure Script mode programming.

Script mode Programming:

1. A script is a text file containing the Python statements. 2. Python Scripts are **reusable** code.
3. Once the script is created, it can be executed again and again without retyping. 4. The Scripts are editable.

i) Creating Scripts in Python:

1. Choose **File → New File** or press **Ctrl + N** in Python shell window.
2. An untitled blank script text editor will be displayed on screen.

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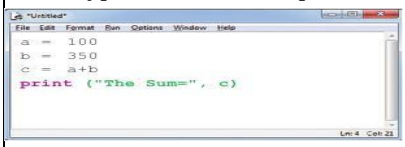
3. Type the code in Script editor as given below,



ii) Saving Python Script:

- Choose **File → Save** or Press **Ctrl + S**
- Now, **Save As** dialog box appears on the screen. In the **Save As** dialog box
- Select the location to save your Python code.
- Type the file name in **File Name** box.
- Python files are by default saved with extension **.py.**
- So, while creating scripts using Python Script editor, no need to specify the file extension.
- Finally, click **Save** button to save your Python script.

iii) Executing Python Script :

- Choose **Run → Run Module** or Press **F5**
- If your code has any error, it will be shown in red colour in the IDLE window, and Python describes the type of error occurred.
- To correct the errors, go back to Script editor, make corrections, save the file and execute it again.
- For all error free code, the output will appear in the IDLE window.

2. Explain input () and print () functions with examples. (M-2020, M-2022, J-2023, M-2024)

Input and output Functions :

- A program needs to interact with the user to accomplish the desired task; this can be achieved using Input-Output functions.
- The **input ()** function helps to enter data at run time by the user.
- The output function **print ()** is used to display the result of the program on the screen after execution.

1.The print() function:

- In Python, the **print ()** function is used to display result on the screen.
- The **syntax** for **print()** is as follows:

```
print ("string to be displayed as output " )
print (variable )
print ("String to be displayed as output ", variable)
Print ("String 1", variable, "String 2", variable, "String 3" ……)
```

Example:

```
>>> print ("Welcome to Python Programming")
    Welcome to Python Programming
>>> x = 5
>>> y = 6
>>> z = x + y
>>> print (z)
        11
>>> print ("The sum = ", z)
    The sum = 11
>>> print ("The sum of ", x, " and ", y, " is ", z)
    The sum of 5 and 6 is 11
```

2.Input() function:

- In Python, input () function is used to accept data as input at run time.
- The syntax for input() function is,

  Variable = input ("prompt string")
- Where, **prompt string** in the syntax is a statement or message to the user, to know what input can be given.
- If a prompt string is used, it is displayed on the monitor; the user can provide expected data from the input device.
- The **input ( )** takes whatever is typed from the keyboard and stores the entered data in the given variable.
- If prompt string is not given in **input ( )** no message is displayed on the screen, thus, the user will not know what is to be typed as input.

Example 1:input( ) with prompt string

```
>>> city=input ("Enter Your City: ")
        Enter Your City: Madurai
```

Example 2:input( ) without prompt string

```
>>> city=input()
    Rajarajan
```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- In example-1, the input () using prompt string takes proper input and produce relevant output.
- In example-2, the input () without using prompt string takes irrelevant input and produce unexpected output
- So, to make your program more interactive, provide prompt string with input ( ).

3. Discuss in detail about Tokens in Python. **(S-2021)(M-2023, J-2024)**

- Python breaks each logical line into a sequence of elementary lexical components known as **Tokens**.
- The normal token types are
  1) Identifiers, 2) Keywords, 3) Operators, 4) Delimiters 5) Literals.

1.Identifiers:

- An Identifier is a name used to identify a variable, function, class, module or object.
- An identifier must start with an alphabet (A..Z or a..z) or underscore (_).
- Identifiers may contain digits (0 .. 9)
- Python identifiers are case sensitive i.e. uppercase and lowercase letters are distinct.
- Identifiers must not be a **python** keyword.
- Python does not allow punctuation character such as %,$, @ etc., within identifiers.

Example of valid identifiers Sum, total_marks, regno, num1
Example of invalid identifiers 12Name, name$, total-mark, continue

2.Keywords:

- Keywords are special words used by Python interpreter to recognize the structure of program.
- As these words have specific meaning for interpreter, they cannot be used for any other purpose.

Example: false, class, If, el if, else, pass, break etc.

3.Operators:

- Operators are special symbols which represent computations, conditional matching etc.
- The value of an operator used is called **operands**.
- Operators are categorized as Arithmetic, Relational, Logical, Assignment, Conditional etc.
- Value and variables when used with operator are known as **operands.**

4.Delimiters :

- Python uses the symbols and symbol combinations as delimiters in expressions, lists, dictionaries and strings.
- Following are the delimiters.

+=	-=	*=	/=	//=	%=
&=	|=	^=	>>=	<<=	**=

5.Literals:

- Literal is a raw data given in a variable or constant.
- In Python, there are various types of literals.
  1. Numeric Literals consists of digits and are immutable.
  2. String literal is a sequence of characters surrounded by quotes.
  3. Boolean literal can have any of the two values: True or False.

1. Explain different types of operators in python. **(J-2020)(J-2022)**

- In computer programming languages operators are special symbols which represent computations, conditional matching etc.
- The value of an operator used is called **operands**.
- Operators are categorized as Arithmetic, Relational, Logical, Assignment, Conditional etc.
- Value and variables when used with operator are known as **operands**.

(i) Arithmetic operators:

- An arithmetic operator is a mathematical operator that takes two operands and performs a calculation on them. They are used for simple arithmetic.

ii) Relational or Comparative operators:

- A Relational operator is also called as Comparative operator which checks the relationship between two operands.
- If the relation is true, it returns True; otherwise it returns False

iii) Logical operators :

- In python, Logical operators are used to perform logical operations on the given relational expressions.
- There are three logical operators they are and, or and not

iv)Assignment operators:

- In Python, = is a simple assignment operator to assign values to variable.
- There are various compound operators in Python like **+=, -=, *=, /=,** %=, ****=** and //= are also available.

v)Conditional operator or Ternary operator :

- Ternary operator is also known as conditional operator that evaluate something based on a condition being true or false.
- **Syntax**: Variable Name = [on_true] if [Test expression] else [on_false]

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CHAPTER – 6 (CONTROL STRUCTURES)

1. Write a detail note on for loop. **(J-2020, S-2021, M-2022, J-2022, J-2024)**

For loop :

- **For** loop is the most comfortable loop. It is also an entry check loop.
- The condition is checked in the beginning and the body of the loop (statements-block 1) is executed if it is only true otherwise the loop is not executed.

Syntax:

```
for counter_ variable in sequence:
    statements-block 1
[else:              # optional block
    statements-block 2]
```

- The counter_ variable is the control variable.
- The sequence refers to the initial, final and increment value.
- For loop uses the range () function in the sequence to specify the initial, final and increment values.
- Range () generates a list of values starting from **start** till **stop-1.**

The syntax of range() is as follows: range (start, stop,[step]) Where,

start – refers to the initial value **stop** – refers to the final value **step** – refers to increment value, this is optional part

Example: **Output**

```
for i in range (2,10,2):
        print (i, end=' ')
else:
        print ("\n End of the loop")
```

2 4 6 8

2. Write a detail note on if..else..elif statement with suitable example.

Nested if..elif...else statement:

- When we need to construct a chain of **if** statement(s) then **'elif'** clause can be used instead of **'else'.**
- **'elif'** clause combines **if.. else - if.. else** statements to one **if..elif… else.**
- **'elif'** can be considered to be abbreviation of **'else if'.**
- In an **'if'** statement there is no limit of **'elif'** clause that can be used, but an **'else'** clause if used should be placed at the end.

Syntax:

```
if <condition-1>:
    statements-block 1
elif <condition-2>:
    statements-block 2
else:
    statements-block n
```

- In the syntax of **if..elif..else** mentioned above, condition-1 is tested if it is true then statements- block 1 is executed.
- Otherwise the control checks condition-2, if it is true statements-block2 is executed and even if it fails statements-block n mentioned in **else** part is executed.

Example: **Output**

```
m1=int (input("Enter mark in first subject : "))
m2=int (input("Enter mark in second subject : "))
avg= (m1+m2)/2
if avg>=80:
        print ("Grade : A")
elif avg>=70 and avg<80:
        print ("Grade : B")
elif avg>=60 and avg<70:
        print ("Grade : C")
elif avg>=50 and avg<60:
        print ("Grade : D")
else:
        print ("Grade : E")
```

Enter mark in first subject : 34
Enter mark in second subject : 78
Grade : D

3. Write a program to display all 3 digit odd numbers.

```
lower=int(input("Enter the lower limit for the range:"))
upper=int(input("Enter the upper limit for the range:"))
for i in range(lower,upper+1):
    if(i%2!=0):
        print(i,end=" ")
```

OUTPUT :

Enter the lower limit for the range: 100 Enter the upper limit for the range:150
101 103 105 107 109 111 113 115 117 119 121 123 125 127 129 131 133 135 137 139 141 143 147 149

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4. **Write a program to display multiplication table for a given number.** **Output**

Code:

```
num=int(input("Enter the number:"))
print("Multiplication Table of ",num)
for i in range(1,11):
print(num 'x' ,num,'=' , num*i)
```

```
Enter the number : 2
Display Multiplication Table of 2
1x2=2  2 x2=4  3x2=6  4x2=8  5x2=10
6x2=12  7x2=14 8x2=16 9x2=18 10x2=20
```

1. **Explain 'continue' statement with examples.** **(M-2023)**

1.Continue statement:

- Continue statement unlike the break statement is used to skip the remaining part of a loop and start with next iteration.

2.Syntax: continue

3.Working of continue statement : Refer book (flow chart)

4.Example: **Output**

```
for word in "Jump Statement":
if word = = "e":
continue
print (word, end = ' ')
print ("\n End of the program")
```

```
Jump Statmnt
End of the program
```

2. **Write output of the following program** **(M-2020)**

```
i=1
While(i<=6)
for j in range (1,i)
print(j,end='/t)
print(end='/n')
i+=1
```

Output

```
1
1 2
1 2 3
1 2 3 4
1 2 3 4 5
```

CHAPTER – 7 (PYTHON FUNCTIONS)

1. **Explain the different types of function with an example.** **(J-2020, J-2022)**

- Functions are named blocks of code that are designed to do specific job.

Types of Functions:

1. User-defined,
2. Built-in,
3. Lambda, 4. Recursion Functions

1.User defined function:

- Functions defined by the users themselves.
- Functions must be defined, to create and use certain functionality.
- Function blocks begin with the keyword **'def'** followed by function name and parenthesis ().

Example:

```
def area(w,h):
    return w * h
print (area (3,5))
```

2. Build in functions:

- Functions that are in built with in Python.
- **Eg**: print ( ) & echo() function

Example:

```
x=20
y=-23.2
print('x = ', abs(x))
print('y = ', abs(y))
```

Output:

```
x = 20
y = 23.2
```

3.Lamda (or) Anonymous function:

- In Python, anonymous function is a function that is defined without a name.
- While normal functions are defined using the **def** keyword, in Python anonymous functions are defined using the **lambda** keyword.
- Hence, anonymous functions are also called as **lambda** functions.

Use of lambda or anonymous function:

- Lambda function is mostly used for creating small and one-time anonymous function.
- Lambda functions are mainly used in combination with the functions like filter (), map () and reduce ().

Example:

```
sum = lambda arg1, arg2: arg1 + arg2
print ('The Sum is :', sum(30,40))
print ('The Sum is :', sum(-30,40))
```

Output:

```
The Sum is : 70
The Sum is : 10
```


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4. Recursive function:

- Function cells itself is known as recursion.

Overview of how recursive function works:

1. Recursive function is called by some external code.
2. If the base condition is met then the program gives meaningful output and exits.
3. Otherwise function does some required processing and then calls itself to continue recursion.

2. Explain the scope of variables with an example. **(J-2023, M-2024)**

Scope of Variables:

- Scope of variable refers to the part of the program, where it is accessible, i.e., area where you can refer (use) it.
- We can say that scope holds the current set of variables and their values.
- We will study two types of scopes - **local scope** and **global scope**.

1.Local Scope:

- A variable declared inside the function's body or in the local scope is known as local variable.

Rules of local variable :

- A variable with local scope can be accessed only within the function/block that it is created in.
- When a variable is created inside the function/block, the variable becomes local to it.
- A local variable only exists while the function is executing.
- The formal arguments are also local to function.

Example : Create a Local Variable **Output:**

```
def loc():                    0
y=0 # local scope
print(y)
loc()
```

2. Global Scope:

- Variable, with global scope can be used anywhere in the program.
- It can be created by defining a variable outside the scope of any function/block.

Rules of global Keyword:

- When we define a variable outside a function, it's global by default.
- You don't have to use global keyword.
- We use global keyword to read and write a global variable inside a function.
- Use of global keyword outside a function has no effect

Example : Accessing global Variable From Inside a Function **Output:**

```
c = 1              # global variable                1
def add():
print(c)
add()
```

3. Explain the following built-in functions. (a) id() (b) chr() (c) round() (d) type() (e) pow() **(M-2020, M-2023)**

Function	Description	Syntax	Example
chr ( )	Returns the Unicode character for the given ASCII value.	chr (i)	c=65 **Output:** d=43 A print (chr (c)) + prin t(chr (d))
type ( )	Returns the type of object for the given single object.	type (object)	x= 15.2 **Output:** y= 'a' <class 'float'> s= True <class 'str'> print (type (x)) <class 'bool'> print (type (y)) print (type (s))
id ( )	id ( ) Return the 'identity' of an object.	id (object)	x=15 **o\p:** address of x is : 1357486752 y='a' address of y is : 13480736 print ('address of x is :',id (x)) print ('address of y is :',id (y))
round( )	Returns the nearest integer to its input. 1.First argument (number) is used to specify the value to be rounded. 2.Second argument (ndigits) is used to specify the number of decimal digits	round (number [,ndigits])	x= 17.9 y= 22.2 z= -18.3 print ('x value is rounded to', round (x)) print ('y value is rounded to', round (y)) print ('z value is rounded to', round (z)) **Output:1** **Output: 2** x value is rounded to 18 18.0 y value is rounded to 22 17.9 z value is rounded to -18 17.89

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		desired after rounding		n1=17.89 print (round (n1,0)) print (round (n1,1)) print (round (n1,2))
	pow ( )	Returns the computation of ab	pow (a,b)	a= 5 b= 2 c= 3.0 **Output** print (pow (a,b)) print (pow (a,c)) 25 print (pow (a+b,3)) 125.0 343

4. Write a Python code to find the L.C.M. of two numbers.

Code: **Output:**

```
def  lcm(x,y):                Enter first number : 2
if x>y:                       Enter second number : 3
  greater = x                 LCM is:  6
else:
  grater = y
while(True):
  if ((grater % x ==0) and (grater % y ==0)):
  lcm = grater
  break
  greater +1
  return lcm
a = int (input("Enter first number:")
b = int (input("Enter second number:")
print("The LCM of",a,"and",b,"is",LCM(a,b))
```

5. Explain recursive function with an example. [J-2024]

- When a function calls itself is known as recursion.
- Recursion works like loop but sometimes it makes more sense to use recursion than loop.
- You can convert any loop to recursion.
- A recursive function calls itself.
- Imagine a process would iterate indefinitely if not stopped by some condition! Such a process is known as infinite iteration.
- The condition that is applied in any recursive function is known as base condition.
- A base condition is must in every recursive function otherwise it will continue to execute like an infinite loop.

Overview of how recursive function works:

- Recursive function is called by some external code.
- If the base condition is met then the program gives meaningful output and exits.
- Otherwise, function does some required processing and then calls itself to continue recursion.
- Here is an example of recursive function used to calculate factorial.

Example: **Output:**

```
def fact(n):                    1
    if n == 0:                  120
        return 1
    else:
       return n * fact (n-1)
    print (fact (0))
    print (fact (5))
```

CHAPTER – 8 (STRINGS AND STRING MANIPULATION)

1. Explain about string operators in python with suitable example. (J-2023, J-2024)

String Operators:

- Python provides the following operators for string operations.
- These operators are useful to manipulate string.

(i) Concatenation (+)

- Joining of two or more strings is called as Concatenation.
- The plus (+) operator is used to concatenate strings in python.

Example: **Output**

```
>>> "welcome" + "Python"      'welcomePython'
```

(ii) Append (+ =)

- Adding more strings at the end of an existing string is known as append.
- The operator += is used to append a new string with an existing string.

Example: **Output**

```
>>> str1="Welcome to "        Welcome to Learn Python
```


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>>> str1+="Learn Python"
>>> print (str1)

(iii) Repeating (*)

- The multiplication operator (*) is used to display a string in multiple number of times.

Example:	**Output**
>>> str1="Welcome "	WelcomeWelcomeWelcomeWelcome
>>> print (str1*4)	

(iv) String slicing :

- Slice is a substring of a main string.
- A substring can be taken from the original string by using [ ] operator and index or subscript values.
- Thus, [ ] is also known as slicing operator.
- Using slice operator, you have to slice one or more substrings from a main string.

General format of slice operation: str[start:end]

- Where **start** is the beginning index and **end** is the last index value of a character in the string.
- Python takes the end value less than one from the actual index specified

Example : slice a substring from index 0 to 4	**Output**
>>> print (str1[0:5])	THIRU

(v) Stride when slicing string:

- When the slicing operation, you can specify a third argument as the stride, which refers to the number of characters to move forward after the first character is retrieved from the string.
- The default value of stride is 1
- Python takes the last value as n-1
- You can also use negative value as stride (third argument).
- If you specify a negative value, it prints in reverse order.

Example:	**Output**
>>> str1 = "Welcome to learn Python"	learn
>>> print (str1[10:16])	nhy re teolW
>>> print (str1[::-2])	

1. **I] What is slicing? (S-2021)**

- Slice is a substring of a main string.
- A substring can be taken from the original string by using [ ] operator and index or subscript values.
- Thus, [ ] is also known as slicing operator.

II] What is output for following python command: str="Thinking with python"

a)print(str[::3]) Ans: Tnnwhyo
b)print(str[::-3]) Ans: nt igkn
c)print(str[9:13]) Ans: with

2. **What will the output of the given python Snippet? str1="Welcome to Python" (M-2020)**

1) print(str1) Ans : **Welcome to Python**
2) print(str 1[11:17]) Ans : **Python**
3) print(str1[11:17:2]) Ans : **Pto**
4) print(str1[: : 4] Ans : **Wotyn**
5) print(str1[: : - 4]) Ans : **nytoW**

CHAPTER – 9 (LISTS, TUPLES, SETS AND DICTIONARY)

1. **What the different ways to insert an element in a list? Explain with suitable example. (J-2023)**

Inserting elements in a list using insert()

- The insert () function helps you to include an element at your desired position.
- The insert () function is used to insert an element at any position of a list.

Syntax: (List.insert (position index, element)

Example:

```
>>> MyList=[34,98,47,'Kannan', 'Gowrisankar', 'Lenin', 'Sreenivasan' ]
>>> print(MyList)
    [34, 98, 47, 'Kannan', 'Gowrisankar', 'Lenin', 'Sreenivasan']
>>> MyList.insert(3, 'Ramakrishnan')
>>> print(MyList)
```

Output: [34, 98, 47, 'Ramakrishnan', 'Kannan', 'Gowrisankar', 'Lenin', 'Sreenivasan']

- In the above example, insert () function inserts a new element 'Ramakrishnan' at the index value 3, ie. at the 4th position.
- While inserting a new element in between the existing elements, at a particular location, the existing elements shifts one position to the right.

Adding more elements in a list using append():

- The append () function is used to add a single element in a list.

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❖ But, it includes elements at the end of a list.

Syntax: List. append (element to be added)

Example: **Output**

```
>>> Mylist=[34, 45, 48]                    [34, 45, 48, 90]
>>> Mylist.append(90)
>>> print(Mylist)
```

Adding more elements in a list using extend():

❖ The extend () function is used to add more than one element to an existing list.

❖ In extend ( ) function, multiple elements should be specified within square bracket as arguments of the function.

Syntax: List. extend (element to be added)

Example: **Output**

```
>>> Mylist=[34, 45, 48]                    [34, 45, 48, 71,32,29]
>>> Mylist.extend([71,32,29])
>>> print(Mylist)
```

2. What is the purpose of range ()? Explain with an example. **(J-2020, S-2021, J-2022, M-2024)**

List and range ( ) function:

❖ The range ( ) is a function used to generate a series of values in Python.

❖ Using range ( ) function, you can create list with series of values.

❖ The range ( ) function has three arguments.

Syntax of range ( ) function:

range (start value, end value, step value)

where,

❖ **Start value** – beginning value of series. Zero is the default beginning value.

❖ **End value** – upper limit of series. Python takes the ending value as upper limit – 1.

❖ **Step value** – It is an optional argument, which is used to generate different interval of values.

Example : Generating whole numbers up to 10 **Output**

```
for x in range (1, 11):                     1 to 10
print(x)
```

Creating a list with series of values :

❖ Using the range () function, you can create a list with series of values.

❖ To convert the result of range ( ) function into list, we need one more function called list ().

❖ The list () function makes the result of range ( ) as a list.

Syntax: List_Varibale = list (range ( ))

Example: **Output**

```
Even_List = list(range(2,11,2))             [2, 4, 6, 8, 10]
>>> print(Even_List)
```

3. What is nested tuple? Explain with an example. **(J-2020, J-2022, M-2023)**

Tuple:

❖ Tuples consists of a number of values separated by comma and enclosed within parentheses.

❖ Tuple is similar to list, values in a list can be changed but not in a tuple.

Nested Tuples:

❖ In Python, a tuple can be defined inside another tuple; called Nested tuple.

❖ In a nested tuple, each tuple is considered as an element.

❖ The for loop will be useful to access all the elements in a nested tuple.

Example:

```
Toppers = (("Vinodini", "XII-F", 98.7), ("Soundarya", "XII-H", 97.5), ("Tharani", "XII-F", 95.3), ("Saisri", "XII-G", 93.8))
for i in Toppers:
print(i)
```

Output:

```
('Vinodini', 'XII-F', 98.7)
('Soundarya', 'XII-H', 97.5)
('Tharani', 'XII-F', 95.3)
('Saisri', 'XII-G', 93.8)
```

4. Explain the different set operations supported by python with suitable example. **(M-2020, M-2022, J-2024)**

Set:

❖ A set is another type of collection data type.

❖ A Set is a mutable and an unordered collection of elements without duplicates

Set operations :

❖ The set operations such as Union, Intersection, difference and Symmetric difference.

(i) Union:

❖ It includes all elements from two or more sets

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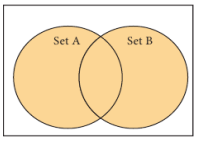
- In python, the operator | is used to union of two sets.
- The function union () is also used to join two sets in python.

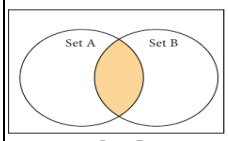


Example: [Program to Join (Union) two sets using union operator]

```
set_A={2,4,6,8}                    Output:
set_B={'A', 'B', 'C', 'D'}         {2, 4, 6, 8, 'A', 'D', 'C', 'B'}
U_set=set_A|set_B
print(U_set)
```

(ii) Intersection:

- It includes the common elements in two sets
- The operator & is used to intersect two sets in python.
- The function inter section ( ) is also used to intersect two sets in python.

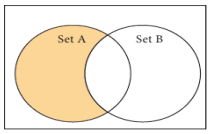


Example: [Program to insect two sets using intersection operator]

```
set_A={'A', 2, 4, 'D'}                Output
set_B={'A', 'B', 'C', 'D'}            {'A', 'D'}
print(set_A & set_B)
```

(iii) Difference

- It includes all elements that are in fi rst set (say set A) but not in the second set (say set B)
- The minus (-) operator is used to difference set operation in python.
- The function difference ( ) is also used to difference operation.

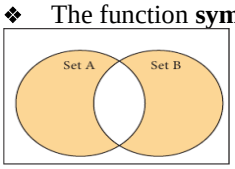


Example: [Program to difference of two sets using minus operator]

```
set_A={'A', 2, 4, 'D'}                Output
set_B={'A', 'B', 'C', 'D'}            {2, 4}
print(set_A - set_B)
```

(iv) Symmetric difference:

- It includes all the elements that are in two sets (say sets A and B) but not the one that are common to two sets.
- The caret (^) operator is used to symmetric difference set operation in python.
- The function **symmetric_ difference( )** is also used to do the same operation



Example: [Program to symmetric difference of two sets using caret operator]

```
set_A={'A', 2, 4, 'D'}                Output:
set_B={'A', 'B', 'C', 'D'}            {2, 4, 'B', 'C'}
print(set_A ^ set_B)
```

CHAPTER – 10 (PYTHON CLASSES AND OBJECTS)

1. Explain about constructor and destructor with example. **(M-2020)**

i) Constructor :

- Constructor is the special function that is automatically executed when an object of a class is created.
- In Python, there is a special function called **"init"** which act as a Constructor.
- It must begin and end with double underscore.

General form:

```
def __init__(self, [args ……..]):
<statements>
```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Example: Program to illustrate Constructor

```
class Sample:
        def __init__(self, num):
                print("Constructor of class Sample...")
                self.num=num
                print("The value is :", num)
         S=Sample(10)
```

ii) Destructor:

- **Destructor** is also a special method gets executed automatically when an object exit from the scope.
- It is just opposite to constructor.
- In Python**, __del__( )** method is used as **destructor.**

Example : Program to illustrate about the __del__( ) method

```
class Sample:
        num=0
        def __init__(self, var):
                Sample.num+=1
                self.var=var
                print("The object value is = ", var)
                print("The value of class variable is= ", Sample.num)
        def __del__(self):
                Sample.num-=1
                print("Object with value %d is exit from the scope"%self.var)
S1=Sample(15)
S2=Sample(35)
S3=Sample(45)
```

CHAPTER – 11 (DATABASE CONCEPTS)

1. Explain the different types of data model.

Data model:

- A data model describes how the data can be represented and accessed from a software after complete implementation.
- It is a simple abstraction of complex real world data gathering environment.

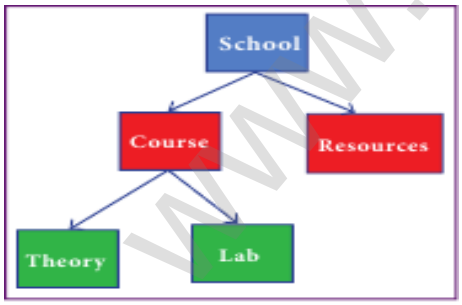
Types of a Data Model

- 1.Hierarchical Model 2.Relational Model 3.Network Database Model
- 4.Entity Relationship Model 5.Object Model

1. Hierarchical Model:

- In Hierarchical model, data is represented as a simple tree like structure form.
- This model represents a one-to-many relationship i.e parent-child relationship.
- One child can have only one parent but one parent can have many children.
- This model is mainly used in IBM Main Frame computers.
- Hierarchical model was developed by IBM as Information Management System.

Example:



Hierarchical Model Fig. 11.3

2. Relational Model :

- The Relational Database model was first proposed by E.F. Codd in 1970.
- Nowadays, it is the most widespread data model used for database applications around the world.
- The basic structure of data in relational model is tables.
- All the information's related to a particular type is stored in rows of that table.
- A relation key is an attribute which uniquely identifies a particular tuple.

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Example:

Stu_id	Name	Age
1	Malar	17
2	Suncar	16
3	Velu	16

Subj_id	Name	Teacher
1	C++	Kannan
2	Php	Ramakrishnan
3	Python	Vidhya

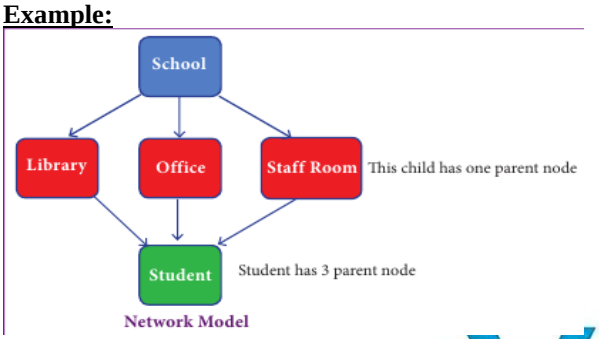
Stu_id	Subj_id	Marks
1	1	92
1	2	89
3	2	96

Relational Model

3. Network Model:

- Network database model is an extended form of hierarchical data model.
- The difference between hierarchical and Network data model is :
  - In hierarchical model, a child record has only one parent node,
  - In a Network model, a child may have many parent nodes.
  - It represents the data in many to-many relationships.
  - This model is easier and faster to access the data.

Example:



Network Model

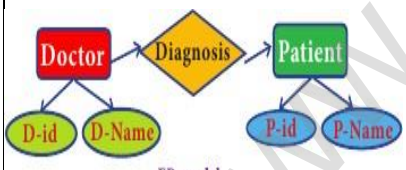
4. Entity Relationship Model. (ER model):

- In this database model, relationship are created by dividing the object into entity and its characteristics into attributes.
- It was developed by Chen in 1976.
- This model is useful in developing a conceptual design for the database.
- It is very simple and easy to design logical view of data.

ER model constructed by,

- Rectangle represents the entities.
- Ellipse represents the attributes.
- Attributes describes the characteristics and each entity.
- Diamond represents the relationship in ER diagrams.

Example: Doctor diagnosis the Patient

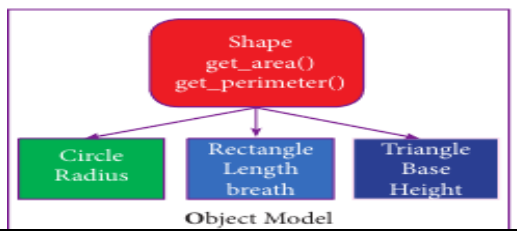


ER model

5. Object Model:

- Object model stores the data in the form of objects, attributes and methods, classes and Inheritance.
- This model handles more complex applications, such as Geographic information System (GIS), scientific experiments, engineering design and manufacturing.
- It is used in file Management System.

Example:



Object Model

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2. Explain the different types of relationship mapping. **(M-2023)**

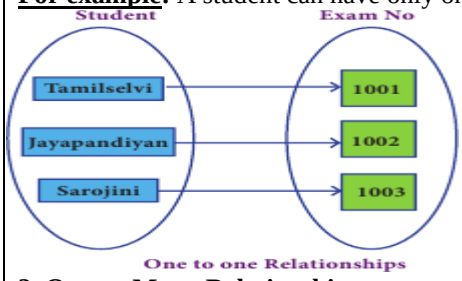
Types of relationships used in a database:

1. One-to-One Relationship 2. One-to-Many Relationship
3. Many-to-One Relationship 4. Many-to-Many Relationship

1. One-to-One Relationship :

- In One-to-One Relationship, one entity is related with only one other entity.
- One row in a table is linked with only one row in another table and vice versa.

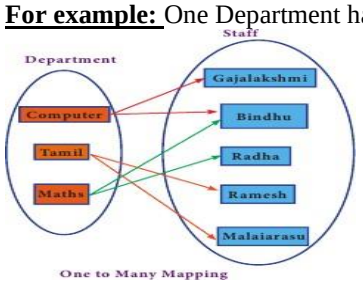
For example: A student can have only one exam number



2. One-to-Many Relationship:

- In One-to-Many relationship, one entity is related to many other entities.
- One row in a table A is linked to many rows in a table B, but one row in a table B is linked to only one row in table A.

For example: One Department has many staff members.

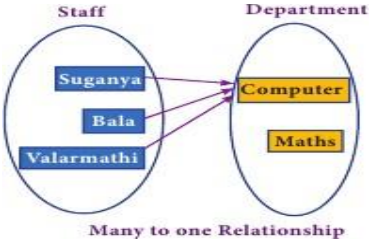


3. Many-to-One Relationship:

- In Many-to-One Relationship, many entities can be related with only one in the other entity.

For example: A number of staff members working in one Department.

- Multiple rows in staff members table is related with only one row in Department table.

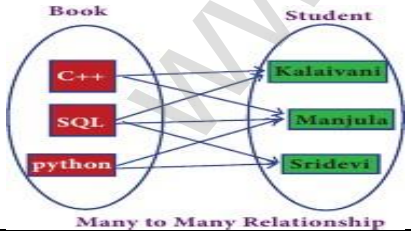


4. Many-to-Many Relationship:

- A many-to-many relationship occurs when multiple records in a table are associated with multiple records in another table.

Example 3: Books and Student.

- Many Books in a Library are issued to many students.



3. Differentiate DBMS and RDBMS. **(M-2020, M-2023, J-2024)**

Basis of Comparison	DBMS	RDBMS
Expansion	Database Management System	Relational Data Base Management System
Data storage	Navigational model ie data by linked records	Relational model.ie data in tables as row and column
Data redundancy	Exhibit	Not Present
Normalization	Not performed	RDBMS uses normalization to reduce redundancy.

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Data access	Consumes more time	Faster, compared to DBMS
Keys and indexes	Does not use.	Used to establish relationship. Keys are used in RDBMS.
Transaction management	Inefficient, Error prone and insecure.	Efficient and secure.
Distributed Databases	Not supported	Supported by RDBMS
Example	Dbase, FoxPro.	SQL server, Oracle, my sql, Maria DB, SQLite.

4. Explain the different operators in Relational algebra with suitable examples.

- Relational Algebra, was first created by **Edgar F Codd** while at IBM.
- It was used for modelling the data stored in relational databases and defining queries on it.

Relational Algebra is divided into various groups

I. Unary Relational Operations: 1.SELECT (symbol : σ) 2.PROJECT (symbol : Π)

II. Relational Algebra Operations from Set Theory:

1.UNION (∪) 2.INTERSECTION (∩) 3.DIFFERENCE (−) 4.CARTESIAN PRODUCT (X)

I.Unary Relational Operations:

1.SELECT (symbol: σ)

- General form $\sigma_{c}(R)$ with a relation R and a condition C on the attributes of R.
- The SELECT operation is used for selecting a subset with tuples according to a given condition.
- Select filters out all tuples that do not satisfy C.

Example: σ_{course} = "Big Data" **(STUDENT)**

2.PROJECT (symbol: II)

- The projection eliminates all attributes of the input relation but those mentioned in the projection list.
- The projection method defines a relation that contains a **vertical** subset of Relation.

Example: Π_{course} (STUDENT)

II. Relational Algebra Operations from Set Theory:

1.UNION (Symbol: ∪)

- It includes all tuples that are in tables A or in B.
- It also eliminates duplicates.
- Set A Union Set B would be expressed as A ∪ B

2.SET DIFFERENCE (Symbol: -)

- The result of A – B, is a relation which includes all tuples that are in A but not in B.
- The attribute name of A has to match with the attribute name in B.

3.INTERSECTION (Symbol: ∩) A ∩ B

- Defines a relation consisting of a set of all tuple that are in both in A and B.
- However, A and B must be union-compatible.

4.PRODUCT OR CARTESIAN PRODUCT (Symbol: X)

- Cross product is a way of combining two relations.
- The resulting relation contains, both relations being combined.
- A x B means A times B, where the relation A and B have different attributes.

5. Explain characteristics of RDBMS. (J-2023)

1. Ability to manipulate data:

- RDBMS provides the facility to manipulate data in a data base.

2. Reduced Redundancy:

- In the modern world hard drives are very cheap, but earlier when hard drives were too expensive, unnecessary repetition of data in database was a big problem But RDBMS follows Normalisation which divides the data in such a way that repetition is minimum.

3.Data Consistency

- On live data, it is being continuously updated and added, maintaining the consistency of data can become a challenge.
- But RDBMS handles it by itself.

4. Support Multiple user and Concurrent Access:

- RDBMS allows multiple users to work on it (update, insert, delete data) at the same time and still manages to maintain the data consistency.

5.Query Language:

- RDBMS provides users with a simple query language, using which data can be easily fetched, inserted, deleted and updated in a database.

6. Security:

- The RDBMS also takes care of the security of data, protecting the data from unauthorized access.

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- In a typical RDBMS, we can create user accounts with different access permissions, using which we can easily secure our data by restricting user access.

7. DBMS Supports Transactions:

- It allows us to better handle and manage data integrity in real world applications where multi-threading is extensively used.

1. Explain the following operators in Relational algebra with suitable examples (M-2024)
(i) UNION (ii) INTERSECTION (iii) DIFFERENCE (iv) CARTESIAN PRODUCT

Relational Algebra Operations from Set Theory:

1.UNION (Symbol: ∪)

- It includes all tuples that are in tables A or in B. It also eliminates duplicates.
- Set A Union Set B would be expressed as A ∪ B

Example: Consider the following tables

Table A		Table B	
Studno	Name	Studno	Name
cs1	Kannan	cs1	Kannan
cs3	Lenin	cs2	GowriShankarn
cs4	Padmaja	cs3	Lenin

Result:

Table A ∪ B	
Studno	Name
cs1	Kannan
cs2	GowriShankar
cs3	Lenin
cs4	Padmaja

2.SET DIFFERENCE (Symbol: -)

- The result of A – B, is a relation which includes all tuples that are in A but not in B.
- The attribute name of A has to match with the attribute name in B.

Example: (Use to union table)

Result:

Table A - B	
cs4	Padmaja

3.INTERSECTION (Symbol: ∩) A ∩ B

- Defines a relation consisting of a set of all tuple that are in both in A and B.
- However, A and B must be union-compatible.

Example: (Use to union table)

Result:

A ∩ B	
cs1	Kannan
cs3	Lenin

4.PRODUCT OR CARTESIAN PRODUCT (Symbol: X)

- Cross product is a way of combining two relations.
- The resulting relation contains, both relations being combined.
- A x B means A times B, where the relation A and B have different attributes.

Example:

Table A		Table B	
studno	name	course	subject
cs1	Kannan	cs28	Big Data
cs2	Gowri Shankar	cs62	R language
cs4	Padmaja	cs25	python programming

Cartesian product : Table A x Table B

studno	**name**	**course**	**subject**
cs1	Kannan	cs28	Big Data
cs1	Kannan	cs62	R language
cs1	Kannan	cs25	python rogramming
cs2	Gowri Shankar	cs28	Big Data
cs2	Gowri Shankar	cs62	R language
cs2	Gowri Shankar	cs25	python programming
cs4	Padmaja	cs28	Big Data
cs4	Padmaja	cs62	R language
cs4	Padmaja	cs25	python programming

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CHAPTER – 12 (STRUCTURED QUERY LANGUAGE)

1. Write the different types of constraints and their functions. (J-2020, S-2021, J-2022)

Constraint:

- Constraint is a condition applicable on a field or set of fields

Types of Constraint:

1. Unique Constraint 2.Primary Key Constraint 3.Default Constraint 4. Check Constraint 5. Table constraint

1.Unique Constraint:

- This constraint ensures that no two rows have the same value in the specified columns.
- For example **UNIQUE** constraint applied on Admno of student table ensures that no two students have the same admission number and the constraint can be used as:

```
CREATE TABLE Student
(
Admno integer NOT NULL UNIQUE, → Unique constraint
Name char (20) NOT NULL,
Gender char (1),
Age integer,
Place char (10),
);
```

- The **UNIQUE** constraint can be applied only to fields that have also been declared as **NOT NULL**.
- When two constraints are applied on a single field, it is known as multiple constraints.
- In the above Multiple constraints **NOT NULL** and **UNIQUE** are applied on a single field Admin no.

2.Primary Key Constraint:

- This constraint declares a field as a Primary key which helps to uniquely identify a record
- It is similar to unique constraint except that only one field of a table can be set as primary key.
- The primary key does not allow **NULL** values and therefore a field declared as primary key must have the **NOT NULL** constraint.

Example

```
CREATE TABLE Student
(
Admno integer NOT NULL PRIMARY KEY, → Primary Key constraint
Name char(20)NOT NULL,
Gender char(1),
Age integer,
Place char(10),
);
```

3.DEFAULT Constraint :

- The **DEFAULT** constraint is used to assign a default value for the field.
- When no value is given for the specified field having **DEFAULT** constraint, automatically the default value will be assigned to the field.

Example:

```
CREATE TABLE Student
(
Admno integer NOT NULL PRIMARY KEY,
Name char(20)NOT NULL,
Gender char(1),
Age integer DEFAULT = "17", → Default Constraint
Place char(10),
);
```

- In the above example the "Age" field is assigned a default value of 17, therefore when no value is entered in age by the user, it automatically assigns 17 to Age.

4. Check Constraint :

- This constraint helps to set a limit value placed for a field.
- When we define a check constraint on a single column, it allows only the restricted values on that field.

Example:

```
CREATE TABLE Student
(
Admno integer NOT NULL PRIMARY KEY
Name char(20)NOT NULL,
Gender char(1),
Age integer (CHECK<=19), → Check Constraint
Place char(10),
);
```

- In the above example the check constraint is set to Age field where the value of age must be less than or equal to 19.

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5.TABLE CONSTRAINT :

- When the constraint is applied to a group of fields of the table, it is known as Table constraint.
- The table constraint is normally given at the end of the table definition.
- Let us take a new table namely Student1 with the following fields Admno, First name, Last name, Gender, Age, Place:

```
CREATE TABLE Student 1
(
Admno integer NOT NULL,
Firstname char(20),
Lastname char(20),
Gender char(1),
Age integer,
Place char(10),
PRIMARY KEY (Firstname, Lastname) → Table constraint
);
```

- In the above example, the two fields, First name and Last name are defined as Primary key which is a Table constraint.

2. Consider the following employee table. Write SQL commands for the Questions. (i) to (v).

EMP CODE	NAME	DESIG	PAY	ALLOWANCE
S1001	Hariharan	Supervisor	29000	12000
P1002	Shaji	Operator	10000	5500
P1003	Prasad	Operator	12000	6500
C1004	Manjima	Clerk	8000	4500
M1005	Ratheesh	Mechanic	20000	7000

1) **To display the details of all employees in descending order of pay.**
   - ✓ SELECT * FROM employee ORDER BY DESC;
2) **To display all employees whose allowance is between 5000 and7000.**
   - ✓ SELECT * FROM employee WHERE allowance BETWEEN 5000 AND 7000;
3) **To remove the employees who are mechanic.**
   - ✓ DELETE FROM employee WHERE desig='Mechanic';
4) **To add a new row.**
   - ✓ INSERT INTO Employee(empcode,name,desig,pay,allowance)VALUES('M1006','Arun','Mechanic',15000,5000)
5) **To display the details of all employees who are operators.**
   - ✓ SELECT * FROM employee WHERE design ='Operator';

3. What are the components of SQL? Write the commands in each. (M-2024)

Components of SQL:

1. DATA DEFINITION LANGUAGE: (DDL) 2. DATA MANIPULATION LANGUAGE : (DML)
3.DATA CONTROL LANGUAGE : (DCL) 4.TRANSFER CONTROL LANGUAGE : (TCL)
5.DATA QUERY LANGUAGE : (DQL)

1. DATA DEFINITION LANGUAGE : (DDL)

- The Data Definition Language (DDL) consist of SQL statements used to define the database structure or schema.
- It simply deals with descriptions of the database schema and is used to create and modify the structure of database objects in databases.
- The DDL provides a set of definitions to specify the storage structure and access methods used by the database system.

SQL commands which comes under Data Definition Language are:

Create	To create tables in the database.
Alter	Alters the structure of the database.
Drop	Delete tables from database.
Truncate	Remove all records from a table, also release the space occupied by those records.

2. DATA MANIPULATION LANGUAGE: (DML)

- **A Data Manipulation Language (DML)** is a computer programming language used for adding (inserting), removing (deleting), and modifying (updating) data in a database.
- In SQL, the data manipulation language comprises the SQL-data change statements, which modify stored data but not the schema of the database table.

SQL commands which comes under Data Manipulation Language are:

Insert	Inserts data into a table
Update	Updates the existing data within a table.
Delete	Deletes all records from a table, but not the space occupied by them.

3.DATA CONTROL LANGUAGE: (DCL)

- A **Data Control Language (DCL)** is a programming language used to control the access of data stored in a database.
- It is used for controlling privileges in the database (Authorization).
- The privileges are required for performing all the database operations such as creating sequences, views of tables etc.

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SQL commands which come under Data Control Language are:

Grant	Grants permission to one or more users to perform specific tasks.
Revoke	Withdraws the access permission given by the GRANT statement.

4.TRANSFER CONTROL LANGUAGE : (TCL)

- **Transactional control language (TCL)** commands are used to manage transactions in the database.
- These are used to manage the changes made to the data in a table by DML statements.

SQL command which come under Transfer Control Language are:

Commit	Saves any transaction into the database permanently.
Roll back	Restores the database to last commit state.
Save point	Temporarily save a transaction so that you can rollback.

5.DATA QUERY LANGUAGE : (DQL)

- The Data Query Language consist of commands used to query or retrieve data from a database.

One such SQL command in Data Query Language is,

Select	It displays the records from the table.

4. Construct the following SQL statements in the student table. **(M-2022)**

(i) SELECT statement using GROUP BY clause:

- The **GROUP BY** clause is used with the **SELECT** statement to group the students on rows or columns having identical values or divide the table in to groups.
- **For example** to know the number of male students or female students of a class, the **GROUP BY** clause may be used.

The syntax:

- SELECT <column-names> FROM <table-name> GROUP BY <column-name>HAVING condition];

To apply the above command on the student table:

SELECT Gender FROM Student GROUP BY Gender;

The following command will give the below given result: **Gender** M F

Result:

Gender	count(*)
M	5
F	3

(ii) SELECT statement using ORDER BY clause:

- The ORDER BY clause in SQL is used to sort the data in either ascending or descending based on one or more columns.
  1. By default ORDER BY sorts the data in ascending order.
  2. We can use the keyword DESC to sort the data in descending order and the keyword ASC to sort in ascending order.

The ORDER BY clause is used as:

Syntax:

- SELECT <column-name>[,<column-name>,….] FROM <table-name> ORDER BY <column1>,<column2>,…ASC| DESC ;

For example :

- To display the students in alphabetical order of their names, the command is used as

SELECT * FROM Student ORDER BY Name;

Admno	Name	Gender	Age	Place
104	Abinandh	M	18	Chennai
101	Adarsh	M	18	Delhi
102	Akshith	M	17	Bangalore
100	Ashish	M	17	Chennai
103	Ayush	M	18	Delhi
106	Devika	F	19	Bangalore
107	Hema	F	17	Chennai
105	Revathi	F	19	Chennai

5. Write a SQL statement to create a table for employee having any five fields and create a table constraint for the employee table. **(M-2020)**

```
CREATE TABLE employee
(
empno integer NOT NULL,
name char(20),
desig char(20),
pay integer,
allowance integer,
PRIMARY KEY (empno)
);
```


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CHAPTER – 13 (PYTHON AND CSV FILES)

1. Differentiate Excel file and CSV file. **(M-2022, J-2024)**

Excel	CSV
❖ Excel is a binary file that holds information about all the worksheets in a file, including both content and formatting.	❖ CSV format is a plain text format with a series of values separated by commas.
❖ XLS files can only be read by applications that have been especially written to read their format, and can only be written in the same way.	❖ CSV can be opened with any text editor in Windows like notepad, MS Excel, Open Office, etc.
❖ Excel is a spreadsheet that saves files into its own proprietary format viz. xls or xlsx	❖ CSV is a format for saving tabular information into a delimited text file with extension .csv
❖ Excel consumes more memory while importing data	❖ Importing CSV files can be much faster, and it also consumes less memory.

2. Tabulate the different mode with its meaning.

Mode	Description
'r'	Open a file for reading. (default)
'w'	Open a file for writing. Creates a new file if it does not exist or truncates the file if it exists.
'x'	Open a file for exclusive creation. If the file already exists, the operation fails.
'a'	Open for appending at the end of the file without truncating it. Creates a new file if it does not exist.
't'	Open in text mode. (default)
'b'	Open in binary mode.
'+'	Open a file for updating (reading and writing)

3. Write the different methods to read a File in Python. **(J-2020, J-2022, J-2023, M-2024)**

❖ There are two ways to read a CSV file.

1. Use the csv module's reader function 2. Use the Dict Reader class.

1) CSV Module's Reader Function:

❖ We can read the contents of CSV file with the help of csv. reader () method.

❖ The reader function is designed to take each line of the file and make a list of all columns.

❖ Using this method one can read data from csv files of different formats like quotes (" "), pipe (|) and comma (,).

The syntax: for csv.reader() is **csv.reader(fileobject,delimiter,fmtparams)**

where

file object	passes the path and the mode of the file
delimiter	an optional parameter containing the standard dilects like , | etc can be omitted.
fmtparams	optional parameter which help to override the default values of the dialects like skipinitialspace,quoting etc. Can be omitted.

Program:

```
import csv
with open('c:\\pyprg\\sample1.csv', 'r') as F:
reader = csv.reader(F)
print(row)
F.close()
```

Output

```
['SNO', 'NAME', 'CITY']
['12101', 'RAM', 'CHENNAI']
['12102', 'LAVANYA', 'TIRUCHY']
['12103', 'LAKSHMAN', 'MADURAI']
```

2.Reading CSV File Into A Dictionary:

❖ To read a CSV file into a dictionary can be done by using DictReader method of csv module which works similar to the reader() class but creates an object which maps data to a dictionary.

❖ The keys are given by the fieldnames as parameter.

❖ DictReader works by reading the first line of the CSV and using each comma separated value in this line as a dictionary key.

❖ The columns in each subsequent row then behave like dictionary values and can be accessed with the appropriate key.

Example:

```
import csv
filename = 'c:\pyprg\sample8.csv'
input_file =csv.DictReader(open(filename,'r'))
for row in input_file:
print(dict(row))
```

Output:

```
{'ItemName ': 'Keyboard ', 'Quantity': '48'}
{'ItemName ': 'Monitor', 'Quantity': '52'}
{'ItemName ': 'Mouse ', 'Quantity': '20'}
```


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4. **Write a Python program to write a CSV File with custom quotes.**

```
import csv
info =[‘SNO’,’Person’,’DOB’],
[‘1’,’SUDHARSHINI’,’15/05/2006’],
[‘2’,’SUDHARSAN’,’18/05/2005’],
[‘3’,’VEYUL’,’13/05/2006’],
[‘4’,’YUVA’,’10/05/2006’],
[‘5’,’CHEGUVERA’,’08/05/2006’],
csv.register_dialect('myDialect',quoting= csv.QUOTE_ALL)
with open('c:\pyprg\ch-13\Person.csv', 'w') as f:
writer = csv.writer(f, dialect='myDialect')
for row in info:
writer.writer(row)
print(“writing completed”)
f.close()
```

Output

```
“SNO”,”PERSON”,”DOB”,
”1”,”SUDHARSHINI”,”15/05/2006’
“2”,”SHDHARSAN”,”18/05/2005”
“3”,”VEYUL”,”13/05/2006”
“4”,”YUVA”,”10/05/2006”
“5”,”CHEGUVERA”,”08/05/2006”
```

5. **Write the rules to be followed to format the data in a CSV file.**

1. Each record (row of data) is to be located on a separate line, delimited by a line break by pressing enter key.
For example: xxx,yyy

2. The last record in the file may or may not have an ending line break
For example: ppp, qqq
yyy, xxx

3. There may be an optional header line appearing as the first line of the file with the same format as normal record lines. .
The header will contain names corresponding to the fields in the file and should contain the same number of fields as the records in the rest of the file.
For example: field_name1,field_name2,field_name3
ppp, qqq
yyy, xxx

4. Within the header and each record, there may be one or more fields, separated by commas.
Spaces are considered part of a field and should not be ignored.
The last field in the record must not be followed by a comma.
For example: Red , Blue

5. Each field may or may not be enclosed in double quotes.
If fields are not enclosed with double quotes, then double quotes may not appear inside the fields.
For example: "Red","Blue","Green"
Black,White,.Yellow

6. Fields containing line breaks (CRLF), double quotes, and commas should be enclosed in double-quotes.
For example: Red,”,” Blue , CRLF
Black, White, Green

7. If double-quotes are used to enclose fields, then a double-quote appearing inside a field must be preceded with another double quote.
For example: “Red, ” “Blue”, “Green”.
, , White

CHAPTER – 14 (IMPORTING C++ PROGRAMS IN PYTHON)

1. **Write any 5 features of Python.** **(M-2020, J-2023) (M-2024)**

Features of Python over C++:

Python:

1.Python uses Automatic Garbage Collection,
2.Python is a dynamically typed language.
3.Python runs through an interpreter
4.Python 5 to 10 times shorter than that written in C++.
5.In python a function may accept an argument of any type, and return multiple values without any kind of declaration beforehand

C++:

1.C++ does not Automatic Garbage Collection
2.C++ is a statically typed language, while
3.C++ is pre-compiled.
4.C++ longer than that written in python.
5.In C++ return statement can return only one value.

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2. **Explain each word of the following command. Python <filename.py> -<i> <C++ filename without cpp extension> (M-2022)**

- This is the syntax to execute the python program.

Example: Python pycpp.py-1 pali

Python	Keyword to execute the Python program from command-line
<filename.py >	Name of the Python program to executed
- < i >	Input mode
<C++ filename without cpp extension>	Name of C++ file to be compiled and executed

1. Python – Keyword
2. Pycpp.py - Name of the Python program
3. i - Input mode
4. Pali - Name of C++ file. (Without extension)

3. **What is the purpose of sys,os,getopt module in Python. Explain.**

i) Python's sys module:

- This module provides access to some variables used by the interpreter and to functions that interact strongly with the interpreter.

sys. argv:

- sys.argv is the list of command-line arguments passed to the Python program.
- **argv contains** all the items that come via the command-line input, it's basically a list holding the command-line arguments of the program.
- To use **sys.argv**, **import sys** should be used. The first argument, sys. argv [0] contains the name of the python program (example pali.py) and sys. argv [1] is the next argument passed to the program (here it is the C++ file).

ii) Python's OS Module :

- The OS module in Python provides a way of using operating system dependent functionality.
- The functions that the OS module allows you to interface with the Windows operating system where Python is running on.

os.system():

- Execute the C++ compiling command (a string contains Unix, C command which also supports C++ command) in the shell (Here it is Command Window).
- For Example to compile C++ program **g++ compiler** should be invoked.
- **Command**: os.system ('g++ ' + <variable_name1> ' -<mode> ' + <variable_name2>
  where each argument contains,

os.system	function system() defined in **os** module to interact with the operating system
g++	General compiler to compile C++ program under windows operating system.
variable_name1	Name of the C++ file along with its path and without extension .cpp in string format
mode	To specify input or output mode. Here it is o prefixed with Hyphen.
variable_name2	Name of the executable file without extension .exe in string format

iii) Python getopt module :

- The getopt module of Python helps you to parse (split) command-line options and arguments.
- This module provides two functions to enable command-line argument parsing.
- This method parses command-line options and parameter list.

Syntax : <opts>,<args>=getopt.getopt(argv, options, [long_options])

Here is the details of the parameters:

1.argv :

- This is the argument list of values to be parsed (splited).
- In our program the complete command will be passed as a list.

2.options :

- This is string of option letters that the Python program recognize as, for input or for output, with options (like 'i' or 'o') that followed by a colon (:).
- Here colon is used to denote the mode.

3.long_options :

- This parameter is passed with a list of strings.
- Argument of Long options should be followed by an equal sign ('=').

4. **Write the syntax for getopt() and explain its arguments and return values Syntax. (M-2023)**

- The getopt module of Python helps you to parse (split) command-line options and arguments.
- This module provides two functions to enable command-line argument parsing.
- This method parses command-line options and parameter list.

Syntax **<opts>,<args>=getopt.getopt(argv, options, [long_options])**

- Here is the detail of the **parameters.**

1.argv :

- This is the argument list of values to be parsed (splited).

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- In our program the complete command will be passed as a list.

2.options :

- This is string of option letters that the Python program recognize as, for input or for output, with options (like 'i' or 'o') that followed by a colon (:).
- Here colon is used to denote the mode.

3.long_options :

- This parameter is passed with a list of strings.
- Argument of Long options should be followed by an equal sign ('=').
- getopt() method returns value consisting of two elements.
- Each of these values are stored separately in two different list (arrays) opts and args.
- args will be an empty array if there is no error in splitting strings by getopt().

For example: opts, args = getopt.getopt (argv, "i:",['ifile='])

where **opts** contains	[('-i', 'c:\\pyprg\\p4')]
-i :-	option nothing but mode should be followed by : (colon)
'c:\\pyprg\\p4'	value nothing but the absolute path of C++ file.

- In our examples since the entire command line commands are parsed and no leftover argument, the **second argument args** will be empty [ ].
- If args is displayed using print () command it displays the output as [ ].

```
>>>print(args)
    [ ]
```

5. Write a Python program to execute the following C++ coding.

```
#include <iostream>
using namespace std;
int main()
{
cout<<"WELCOME";
return(0);
}
```

The above C++ program is saved in a file welcome.cpp

Answer:

```
import sys, os, getopt
def main (argv):
        cpp_file = ''
        exe_file = ''
        opts, args = getopt.getopt (argv, "i:",['ifile='])
        for o, a in opts:
                if o in ("-i", "--ifile"):
                cpp_file = a + '.cpp'
                exe_file = a + '.exe'
                run (cpp_file, exe_file)
def run(cpp_file, exe_file):
        print ("Compiling " + cpp_file)
        os.system ('g++ ' + cpp_file + ' -o ' + exe_file)
        print ("Running " + exe_file)
        print ("--------------------")
        print
        os.system (exe_file)
        print
if __name__ =='__main__':
        main (sys.argv[1:])
```

OUTPUT:

```
------------------
WELCOME
------------------
```


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CHAPTER – 15 (DATA MANIPULATION THROUGH SQL)

1. Write in brief about SQLite and the steps used to use it. **(J-2020, J-2022, J-2023)**

- SQLite is a simple relational database system, which saves its data in regular data files or even in the internal memory of the computer.
- It is designed to be embedded in applications, instead of using a separate database server program such as MySQL or Oracle.

Advantages:

- SQLite is fast, rigorously tested, and flexible, making it easier to work.
- Python has a native library for SQLite.

To use SQLite,

Step1	import sqlite3
Step2	create a connection using connect () method and pass the name of the database File
Step3	Set the cursor object cursor = connection. cursor ()

1. Connecting to a database in step2 means passing the name of the database to be accessed.
2. Cursor in step 3: is a control structure used to traverse and fetch the records of the database.
3. Cursor has a major role in working with Python.

- To create a table in the database, create an object and write the SQL command in it.

Example: sql_ comm = "SQL statement"

- For executing the command use the cursor method and pass the required sql command as a parameter.
- Many number of commands can be stored in the sql_comm and can be executed one after other.
- Any changes made in the values of the record should be saved by the commend "Commit" before closing the "Table connection".

2. Write the Python script to display all the records of the following table using fetchmany () **(S-2021)**

Icode	Item Name	Rate
1003	Scanner	10500
1004	Speaker	3000
1005	Printer	8000
1008	Monitor	15000
1010	Mouse	700

Code:

```
import sqlite3
connection = sqlite3.connect("shop.db")
cursor=connection.cursor()
cursor.execute("SELECT * FROM Materials")
print("Displaying All The Records")
result=cursor.fetchmany(5)
print(result, Sep= "\n")
```

Output:

Displaying All The Records

(1003,	'Scanner',	10500)
(1004,	'Speaker',	3000)
(1005,	'Printer',	8000)
(1008,	'Monitor',	15000)
(1010,	'Mouse',	700)

3. What is the use of HAVING clause? Give an example python script.

HAVING clause:

- Having clause is used to filter data based on the group functions.
- This is similar to WHERE condition but can be used only with group functions.
- Group functions cannot be used in WHERE Clause but can be used in HAVING clause.

Example:

```
import sqlite3
connection = sqlite3.connect("Academy.db")
cursor = connection.cursor()
cursor.execute("SELECT GENDER,COUNT(GENDER) FROM Student
                GROUP BY GENDER HAVING COUNT(GENDER)>3")
result = cursor.fetchall()
co = [i[0] for i in cursor.description]
print(co)
print(result)
```

Output

```
['gender', 'COUNT(GENDER)']
[('M', 5)]
```


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4. **Write a Python script to create a table called ITEM with following specification. Add one record to the table.**

Name of the database :- ABC

Name of the table :- Item

Column name and specification :-

Icode	**:-**	**integer and act as primary key**
Item Name	**:-**	**Character with length 25**
Rate	**:-**	**Integer**
Record to be added	**:-**	**1008, Monitor,15000**

Code:

```
import sqlite3
connection = sqlite3.connect("ABC.db")
cursor=connection.cursor()
sql_command – """ CREATE TABLE Item( Icode INTEGER PRIMARY KEY, ItemName VARCHAR(25), Rate INTEGER) ; """
cursor.execute(sql_command)
sql_command = """ INSERT INTO Item(Icode, ItemName, Rate) VALUES (1008, „Monitor‟,15000); """
cursor.execute(sql_command)
 connection.commit()
connection.close()
print("TABLE CREATED")
```

Output

TABLE CREATED

5. **Consider the following table Supplier and item .Write a python script for (i) to (ii)**

SUPPLIER

Suppno	**Name**	**City**	**Icode**	**SuppQty**
S001	Prasad	Delhi	1008	100
S002	Anu	Bangalore	1010	200
S003	Shahid	Bangalore	1008	175
S004	Akila	Hydrabad	1005	195
S005	Girish	Hydrabad	1003	25
S006	Shylaja	Chennai	1008	180
S007	Lavanya	Mumbai	1005	325

i) Display Name, City and Itemname of suppliers who do not reside in Delhi:

```
import sqlite3
connection = sqlite3.connect("ABC.db")
cursor.execute("SELECT Supplier.Name, Supplier.City,Item.ItemName FROM
                Supplier,Item  WHERE Supplier.Icode = Item.Icode AND
                Supplier.City NOT In Delhi ")
s = [I [0] for I in cursor. description]
print(s)
result = cursor. fetchall()
for r in result:
print r
```

Output:

['Name',	'City',	'ItemName']
['Anu',	'Bangalore',	'Scanner']
['Shahid',	'Bangalore',	'Speaker']
['Akila',	'Hydrabad',	'Printer']
['Girish',	'Hydrabad',	'Monitor']
['Shylaja',	'Chennai',	'Mouse']
['Lavanya',	'Mumbai',	'CPU']

ii) Increment the SuppQty of Akila by 40:

```
import sqlite3
connection = sqlite3.connect("ABC.db")
cursor.execute ("UPDATE Supplier ST SuppQty = SuppQty +40 WHERE Name = „Akila‟ ")
cursor.commit()
result = cursor.fetchall()
print (result)
connection.close()
```

Output: (S004, „Akila‟, „Hydrabad‟, 1005, **235**)

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1. **Construct the following: a) GROUB BY b) ORDER BY clause.** **(M-2022)**

1.SQL Group By Clause:

- The SELECT statement can be used along with GROUP BY clause.
- The GROUP BY clause groups records into summary rows. It returns one records for each group.
- It is often used with aggregate functions (COUNT, MAX, MIN, SUM, AVG) to group the result-set by one or more columns.
- The following example count the number of male and female from the student table and display the result.

Example:

```
import sqlite3
connection = sqlite3.connect("Academy.db")
cursor = connection.cursor()
cursor.execute("SELECT gender,count(gender) FROM student Group BY gender")
result = cursor.fetchall()
print(*result,sep="\n")
```

Output:

('F', 2) ('M', 5)

2.SQL ORDER BY Clause:

- The ORDER BY Clause can be used along with the SELECT statement to sort the data of specific fields in an ordered way.
- It is used to sort the result-set in ascending or descending order.
- In this example name and Rollno of the students are displayed in alphabetical order of names.

Example:

```
import sqlite3
connection = sqlite3.connect("Academy.db")
cursor = connection.cursor()
cursor.execute("SELECT Rollno,sname FROM student Order BY sname")
result = cursor.fetchall()
print(*result,sep="\n")
```

OUTPUT

(1, 'Akshay')
(2, 'Aravind')
(3, 'BASKAR')
(6, 'PRIYA')
(4, 'SAJINI')
(7, 'TARUN')

CHAPTER – 16 (DATA VISUALIZATION USING PYPLOT: LINE , PIE AND BAR CHAT)

1. **Explain in detail the types of pyplots using Matplotlib.**

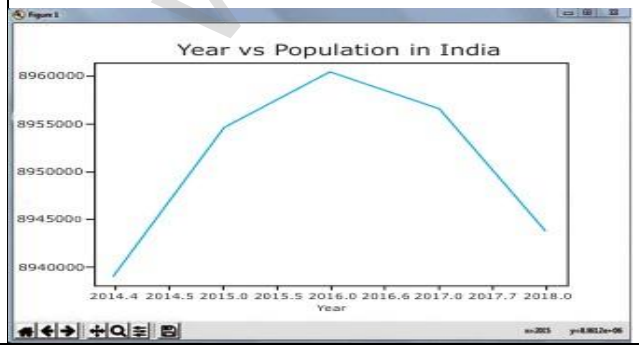
Line Chart :

- A Line Chart or Line Graph is a type of chart which displays information as a series of data points called 'markers' connected by straight line segments.
- A Line Chart is often used to visualize a trend in data over intervals of time – a time series – thus the line is often drawn chronologically.

Example:

```
import matplotlib.pyplot as plt
years = [2014, 2015, 2016, 2017, 2018]
total_populations = [8939007, 8954518, 8960387, 8956741, 8943721]
plt.plot (years, total_populations) plt.title ("Year vs Population in India") plt.xlabel ("Year")
plt.ylabel ("Total Population")
plt.show()
```

Output:



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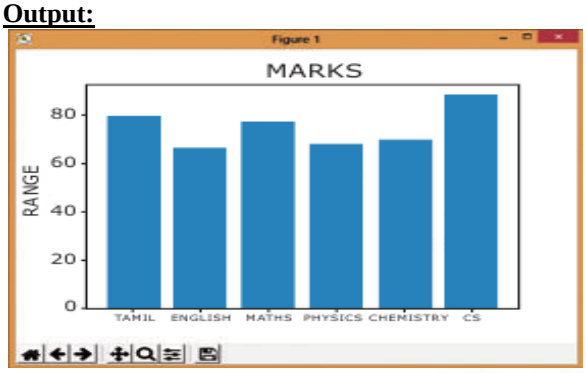
Bar Chart:

- A BarPlot (or BarChart) is one of the most common type of plot.
- It shows the relationship between a numerical variable and a categorical variable.
- Bar chart represents categorical data with rectangular bars.
- Each bar has a height corresponds to the value it represents.
- The bars can be plotted vertically or horizontally.
- It‟s useful when we want to compare a given numeric value on different categories.
- To make a bar chart with Matplotlib, we can use the plt.bar() function

Example:

```
import matplotlib.pyplot as plt
labels = ["TAMIL", "ENGLISH", "MATHS", "PHYSICS", "CHEMISTRY", "CS"]
usage = [79.8, 67.3, 77.8, 68.4, 70.2, 88.5]
y_positions = range (len(labels))
plt.bar (y_positions, usage)
plt.xticks (y_positions, labels)
plt.ylabel ("RANGE")
plt.title ("MARKS") plt.show()
```

Output:



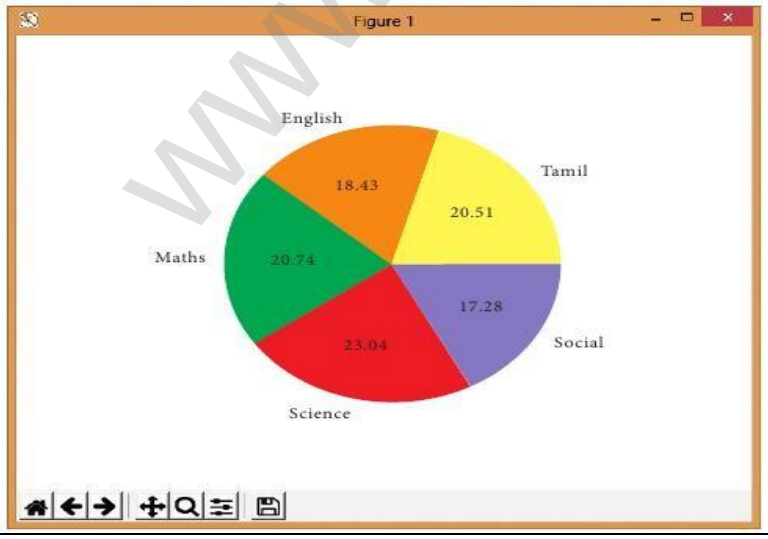
Pie Chart:

- Pie Chart is probably one of the most common type of chart.
- It is a circular graphic which is divided into slices to illustrate numerical proportion.
- The point of a pie chart is to show the relationship of parts out of a whole.
- To make a Pie Chart with Matplotlib, we can use the plt.pie () function.
- The autopct parameter allows us to display the percentage value using the Python string formatting.

Example:

```
import matplotlib.pyplot as plt
sizes = [89, 80, 90, 100, 75]
labels = ["Tamil", "English", "Maths", "Science", "Social"]
plt.pie (sizes, labels = labels, autopct = "%.2f ")
plt.axes().set_aspect ("equal")
plt.show()
```

Output:



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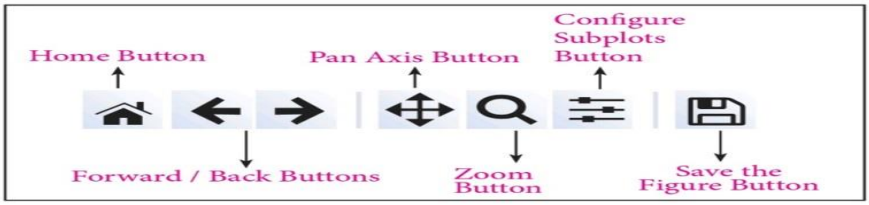
2. **Explain the various buttons in a matplotlib window.** **(M-2024)**



1.Home Button :
- The Home Button will help once you have begun navigating your chart.
- If you ever want to return back to the original view, you can click on this.

2.Forward/Back buttons :
- These buttons can be used like the Forward and Back buttons in your browser.
- You can click these to move back to the previous point you were at, or forward again.

3.Pan Axis :
- This cross-looking button allows you to click it, and then click and drag your graph around.

4.Zoom :
- The Zoom button lets you click on it, then click and drag a square that you would like to zoom into specifically.
- Zooming in will require a left click and drag.
- You can alternatively zoom out with a right click and drag.

5.Configure Subplots :
- This button allows you to configure various spacing options with your figure and plot.

6.Save Figure :
- This button will allow you to save your figure in various forms

3. **Explain the purpose of the following functions.** **(M-2022)**

a. plt.xlabel b. plt.ylabel c. plt.title d. plt.legend() e. plt.show()

a. plt.xlabel	Specifies the lable for X-axis
b. plt.ylabel	Specifies the lable for Y-axis
c. plt.title	Specifies the title of the graph or assigns the plot title.
d. plt.legend()	Invokes the default legend with plt. Calling legent () with no arguments automatically fetches the legend handles and their associated lables.
e. plt.show()	Displays our plot.

1. **What are the key differences between Histogram and Bar graph?** **(S-2021)(M-2023)**

Histogram	**Bar graph**
❖ Histogram refers to a graphical representation; that displays data by way of bars to show the frequency of numerical data	❖ A bar graph is a pictorial representation of data that uses bars to compare different categories of data
❖ A histogram represents the frequency distribution of continuous variables	❖ Conversely, a bar graph is a diagrammatic comparison of discrete variables.
❖ Histogram presents numerical data	❖ Bar graph shows categorical data.
❖ Items of the histogram are numbers, which are categorised together, to represent ranges of data	❖ As opposed to the bar graph, items are considered as individual entities.
❖ The width of rectangular blocks in a histogram may or may not be same	❖ The width of the bars in a bar graph is always same.

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CHAPTER 1 TO 16 BOOK INSIDE FIVE MARK QUESTION WITH ANSWERS

CHAPTER – 1 (FUNCTION)

1. Chameleons of Chrome land problem using function.

- Construct an algorithm that arranges meetings between these two types so that they change their colour to the third type.
- In the end, all should display the same colour.
- Let us represent the number of chameleons of each type by variables *a*, *b* and *c*, and their initial values by *A*, *B* and *C*, respectively.
- Let a = b be the input property.
- The input – output relation is a = b = 0 and c = A + B + C.
- Let us name the algorithm monochromatize.
- The algorithm can be specified as monochromatize (a, b, c)

-- inputs	:	a = A, b = B, c = C, a = b
-- outputs	:	a = b = 0, c = A+B+C

- In each iterative step, two chameleons of the two types (equal in number) meet and change their colours to the third one.
- For example, if A, B, C = 4, 4, 6, then the series of meeting will result in

iteration	a	b	c
0	4	4	6
1	3	3	8
2	2	2	10
3	1	1	12
4	0	0	14

- In each meeting, a and b each decreases by 1, and c increases by 2.
- The solution can be expressed as an iterative algorithm.

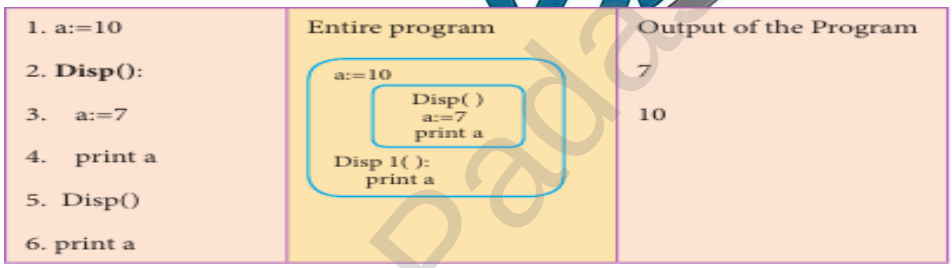
(CHAPTER-3) (SCOPING)

1. Why scope should be used for variable? Explain Global scope with an example.

- Scope should be used for variable.
- Because every part of program can access the variable.

GLOBAL SCOPE: A variable which is declared outside of all the functions in a program is known as global variable.

- Global variable can be accessed inside or outside of all the functions in a program



Example:

- On execution of the above code the variable **a** which is defined inside the function displays the value 7 for the function call Disp() and then it displays 10, because a is defined in global scope.

2. Explain about access control.

- Access control is a security technique that regulates who or what can view or use resources in a computing environment.
- It is a fundamental concept in security that minimizes risk to the object.
- In other words access control is a selective restriction of access to data.
- IN Object oriented programming languages it is implemented through access modifiers.
- Object-oriented languages, such as C++ and Java, control the access to class members by public, private and protected keywords.

1. Private members of a class are denied access from the outside the class.
   They can be handled only from within the class.
2. Public members (generally methods declared in a class) are accessible from outside the class.
   The object of the same class is required to invoke a public method.
   This arrangement of private instance variables and public methods ensures the principle of data encapsulation.
3. Protected members of a class are accessible from within the class and are also available to its sub-classes.
   No other process is permitted access to it.
   This enables specific resources of the parent class to be inherited by the child class.

- Python doesn't have any mechanism that effectively restricts access to any instance variable or method.
- Python prescribes a convention of prefixing the name of the variable or method with single or double underscore to emulate the behaviour of protected and private access specifies.

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CHAPTER – 4 (ALGORITHMIC STRATEGIES)

1. Explain the Insertion Sort algorithm with example.

- Insertion sort is a simple sorting algorithm.
- It works by taking elements from the list one by one and inserting then in their correct position in to a new sorted list.
- This algorithm builds the final sorted array at the end.
- This algorithm uses n-1 number of passes to get the final sorted list as per the pervious algorithm as we have discussed.

Pseudo code:

Step 1 − If it is the first element, it is already sorted. Step 2 − Pick next element
Step 3 − Compare with all elements in the sorted sub-list
Step 4 − Shift all the elements in the sorted sub-list that is greater than the value to be sorted
Step 5 − Insert the value Step 6 − Repeat until list is sorted

44	16	83	07	67	21	34	45	10	Assume 44 is a sorted list of 1 item
16	44	83	07	67	21	34	45	10	inserted 16
16	44	83	07	67	21	34	45	10	inserted 83
07	16	44	83	67	21	34	45	10	inserted 07
07	16	44	67	83	21	34	45	10	inserted 67
07	16	21	44	67	83	34	45	10	inserted 21
07	16	21	34	44	67	83	45	10	inserted 34
07	16	21	34	44	45	67	83	10	inserted 45
07	10	16	21	34	44	45	67	83	inserted 10

At the end of the pass the insertion sort algorithm gives the sorted output in ascending order as shown below:

07	10	16	21	34	44	45	67	83

- Algorithm will try to check the results of the previously solved sub-problems.
- The solutions of overlapped sub-problems are combined in order to get the better solution.

2. Explain the Selection sort algorithm.

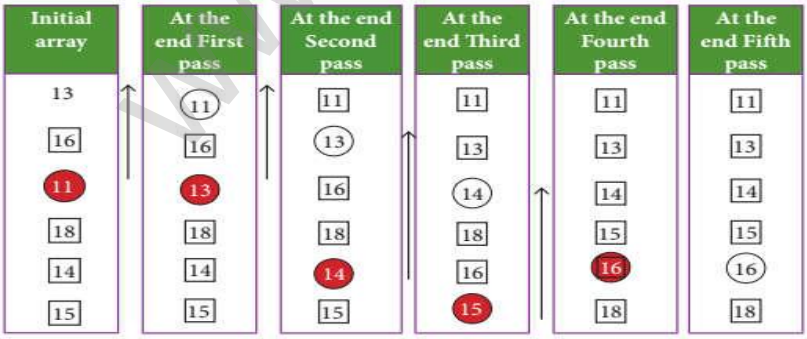
- The selection sort is a simple sorting algorithm that improves on the performance of bubble sort by making only one exchange for every pass through the list.
- This algorithm will first find the smallest elements in array and swap it with the element in the first position of an array, then it will find the second smallest element and swap that element with the element in the second position, and it will continue until the entire array is sorted in respective order.
- This algorithm repeatedly selects the next-smallest element and swaps in into the right place for every pass.
- Hence it is called selection sort.

Pseudo code :

1. Start from the first element i.e., index-0, we search the smallest element in the array, and replace it with the element in the first position.
2. Now we move on to the second element position, and look for smallest element present in the sub-array, from starting index to till the last index of sub – array.
3. Now replace the second smallest identified in step-2 at the second position in the original array, or also called first position in the sub array.
4. This is repeated, until the array is completely sorted.

Let's consider an array with values {13, 16, 11, 18, 14, 15}

- Below, we have a pictorial representation of how selection sort will sort the given array.



- In the first pass, the smallest element will be 11, so it will be placed at the first position.
- After that, next smallest element will be searched from an array.
- Now we will get 13 as the smallest, so it will be then placed at the second position.

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❖ Then leaving the first element, next smallest element will be searched, from the remaining elements.
❖ We will get 13 as the smallest, so it will be then placed at the second position.
❖ Then leaving 11 and 13 because they are at the correct position, we will search for the next smallest element from the rest of the elements and put it at third position and keep doing this until array is sorted.
❖ Finally we will get the sorted array end of the pass as shown above diagram.

3. Explain about Complexity of an algorithm.

❖ Time Factor -Time is measured by counting the number of key operations like comparisons in the sorting algorithm.
❖ Space Factor - Space is measured by the maximum memory space required by the algorithm.
❖ The complexity of an algorithm f (n) gives the running time and/or the storage space required by the algorithm in terms of n as the size of input data.

Time Complexity:

❖ The Time complexity of an algorithm is given by the number of steps taken by the algorithm to complete the process.

Space Complexity:

❖ Space complexity of an algorithm is the amount of memory required to run to its completion.
❖ The space required by an algorithm is equal to the sum of the following two components:

A fixed part is defined as the total space required to store certain data and variables for an algorithm.

❖ For example: simple variables and constants used in an algorithm.

A variable part is defined as the total space required by variables, which sizes depends on the problem and its iteration.

4. Explain about Fibonacci Series with example

❖ Fibonacci series generates the subsequent number by adding two previous numbers.
❖ Fibonacci series starts from two numbers − Fib 0 & Fib 1.
❖ The initial values of Fib 0 & Fib 1 can be taken as 0 and 1.

Fibonacci series satisfies the following conditions :

❖ Fibn = Fibn-1 + Fibn-2
❖ Hence, a Fibonacci series for the n value 8 can look like this Fib 8 = 0 1 1 2 3 5 8 13

Fibonacci Iterative Algorithm with Dynamic programming approach:

❖ Initialize f0=0, f1 =1
❖ step-1: Print the initial values of Fibonacci f0 and f1
❖ step-2: Calculate fibanocci fib ← f0 + f1
❖ step-3: Assign f0← f1, f1← fib
❖ step-4: Print the next consecutive value of fibanocci fib
❖ step-5: Goto step-2 and repeat until the specified number of terms generated

For example if we generate fibobnacci series upto 10 digits, the algorithm will generate the series as shown below:

❖ The Fibonacci series is : 0 1 1 2 3 5 8 13 21 34 55

CHAPTER – 5 (PYTHON - VARIABLES AND OPERATORS)

1. Python Data types:

❖ All data values in Python are objects and each object or value has type.
❖ Python has Built-in or Fundamental data types such as Number, String, Boolean, tuples, lists, sets and dictionaries etc.

1.Number Data type:

❖ The built-in number objects in Python supports integers, floating point numbers and complex numbers.
❖ Integer Data can be decimal, octal or hexadecimal.
❖ Octal integer use digit 0 (Zero) followed by letter 'o' to denote octal digits and hexadecimal integer use 0X (Zero and either uppercase or lowercase X) and L (only upper case) to denote long integer.

Example :

1. 102, 4567, 567 # Decimal integers
2. 0o102, 0o876, 0o432 # Octal integers
3. 0X102, 0X876, 0X432 # Hexadecimal integers
4. 34L, 523L # Long decimal integers

❖ A floating point data is represented by a sequence of decimal digits that includes a decimal point.
❖ An Exponent data contains decimal digit part, decimal point, exponent part followed by one or more digits.

Example :

1. 123.34, 456.23, 156.23 # Floating point data
2. 12.E04, 24.e04 # Exponent data

❖ Complex number is made up of two floating point values, one each for the real and imaginary parts.

2.Boolean Data type:

❖ A Boolean data can have any of the two values: True or False.

Example : 1. Bool_var1=True 2.Bool_var2=False

3.String Data type:

❖ String data can be enclosed in single quotes or double quotes or triple quotes.

1. Char_data = 'A' 2.String_data= "Computer Science"
2. Multiline_data= """String data can be enclosed in single quotes or double quotes or triple quotes.""""

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2. Write an Output for the following python program

```
a=100
b=10
print ("The Sum = ",a+b)
print ("The Difference = ",a-b)
print ("The Product = ",a*b)
print ("The Quotient = ",a/b)
print ("The Remainder = ",a%30)
print ("The Exponent = ",a**2)
print ("The Floor Division =",a//30)
```

Output

```
The Sum = 110
The Difference = 90
The Product = 1000
The Quotient = 10.0
The Remainder = 10
The Exponent = 10000
The Floor Division = 3
```

3. Write a note on : i) Comments ii) Indentation

i) Comments in Python:

- In Python, comments begin with hash symbol (#).
- The lines that begins with # are considered as comments and ignored by the Python interpreter.
- Comments may be single line or no multi-lines.
- The multiline comments should be enclosed within a set of ''' '''(triple quotes) as given below.

```
# It is Single line Comment     ''' It is multiline comment which contains more than one line '''
```

ii) Indentation:

- Python uses whitespace such as spaces and tabs to define program blocks whereas other languages like C, C++, java use curly braces { } to indicate blocks of codes for class, functions or body of the loops and block of selection command.
- The number of whitespaces (spaces and tabs) in the indentation is not fixed, but all statements within the block must be indented with same amount spaces.

4 Explain Operators in Python. [Refer book examples]

- In computer programming languages operators are special symbols which represent computations, conditional matching etc.
- The value of an operator used is called **operands**.
- Operators are categorized as Arithmetic, Relational, Logical, Assignment, Conditional etc.
- Value and variables when used with operator are known as **operands**.

(i) Arithmetic operators:

- An arithmetic operator is a mathematical operator that takes two operands and performs a calculation on them. They are used for simple arithmetic.

ii) Relational or Comparative operators:

- A Relational operator is also called as Comparative operator which checks the relationship between two operands.
- If the relation is true, it returns True; otherwise it returns False

iii) Logical operators :

- In python, Logical operators are used to perform logical operations on the given relational expressions.
- There are three logical operators they are and, or and not

iv)Assignment operators:

- In Python, = is a simple assignment operator to assign values to variable.
- There are various compound operators in Python like **+=, -=, *=, /=, %=, **= and** //= are also available.

v)Conditional operator or Ternary operator :

- Ternary operator is also known as conditional operator that evaluate something based on a condition being true or false.
- **Syntax**: Variable Name = [on_true] if [Test expression] else [on_false]

CHAPTER – 6 (CONTROL STRUCTURES)

1. Write a loop on while loop...

Syntax:

```
while <condition>:
statements block 1
[else:
statements block2]
```

- In the **while** loop, the condition is any valid Boolean expression returning True or False.
- The **else** part of while is optional part of **while**.
- The **statements block1** is kept executed till the condition is true.
- If the **else** part is written, it is executed when the condition is tested False.
- Recall **while** loop belongs to entry check loop type that is it is not executed even once if the condition is tested false in the beginning.

Example: Program to illustrate the use of while loop - to print all numbers from 10 to 15.

```
i=10                    # intializing part of the control variable
while (i<=15):          # test condition
print (i,end='\t')      # statements - block 1
i=i+1                   # Updation of the control variable
```

Output: 10 11 12 13 14 15

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2. **A) Write a python program to display all 3 digit even numbers. Using for loop**

```
for i in range (100,1000,2):
Print (i )
```

B) Write the output for the following program

```
1           i=1                                    1
1 2         while (i<=6):                          1 2
1 2 3               for j in range (1,i):          1 2 3
1 2 3 4                     print (j,end='\t')     1 2 3 4
1 2 3 4 5           print(end='\n')                1 2 3 4 5
                     i+=1
```

3. **Explain briefly about Jump statement in python.**

- The jump statement in Python, is used to unconditionally transfer the control from one part of the program to another.
- There are three keywords to achieve jump statements in Python: **break, continue, and pass.**
- The following flowchart illustrates the use of break and continue.

1.Break statement:

- The **break** statement terminates the loop containing it.
- Control of the program flows to the statement immediately after the body of the loop.
- A **while** or **for** loop will iterate till the condition is tested false, but one can even transfer the control out of the loop (terminate) with help of **break** statement.

2.Continue statement:

- **Continue** statement unlike the break statement is used to skip the remaining part of a loop and start with next iteration.

Syntax: Continue

3.Pass statement:

- **Pass** statement in Python programming is a null statement.
- Pass statement when executed by the interpreter it is completely ignored.

Syntax: pass

4. **What are the different types of Loops in Python? Explain within example.**

1.While loop :

Syntax:

```
while <condition>:
    statements block 1
[else:
    statements block2]
```

- In the **while** loop, the condition is any valid Boolean expression returning True or False.
- The **else** part of while is optional part of **while**.
- The **statements block1** is kept executed till the condition is True.
- If the **else** part is written, it is executed when the condition is tested False.

Example: [program to illustrate the use of while loop - to print all numbers from 10 to 15]

```
i=10                    # intializing part of the control variable
while (i<=15):          # test condition
print (i,end='\t')      # statements - block 1
i=i+1                   # Updation of the control variable
```

Output: 10 11 12 13 14 15

2.For loop :

- **For** loop is the most comfortable loop.
- It is also an entry check loop.
- The condition is checked in the beginning and the body of the loop is executed if it is only True otherwise the loop is not executed.

Syntax:

```
    for counter_ variable in sequence:
        statements-block 1
   [else: # optional block
        statements-block 2]
```

Example: [program to illustrate the use of for loop]

```
for i in range(2,10,2):
        print (i,end=' ')
        else:
        print ("\nEnd of the loop")
```

Output: 2 4 6 8 End of the loop

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3.Nested loop structure:

- A loop placed within another loop is called as nested loop structure.
- One can place a **while** within another **while; for** within another **for; for** within **while** and **while** within **for** to construct such nested loops.

Example:

```
1          i=1
1 2        while (i<=6):
1 2 3      for j in range (1,i):
1 2 3 4    print (end='\n')
1 2 3 4 5  i +=1
```

Output:

```
1
1 2
1 2 3
1 2 3 4
1 2 3 4 5
```

5. Explain 'continue' statement with examples.

1.Continue statement:

- Continue statement unlike the break statement is used to skip the remaining part of a loop and start with next iteration.

2.Syntax: continue

3.Working of continue statement : Refer book (flow chart)

4.Example:

```
for word in "Jump Statement":
if word = = "e":
continue
print (word, end = ' ')
print ("\n End of the program")
```

Output

```
Jump Statmnt
End of the program
```

6. Write a program to check if a number is positive, Negative or Zero.

```
num=int(input("Enter a number:"))
if num> 0:
  print("The number is positive")
elif num< 0:
  Print("The number is negative")
else:
  Print("The number is Zero")
```

Output 1:

```
Enter a number : 26
The number is positive
```

Output 2:

```
Enter a number : 0
The number is Zero
```

Write program to check vowel or not.

```
ch = input (" Enter a character:")
if ch in ('a','A','e','i','I','o','O','u','U'):
print (ch, 'is a vowel')
else:
print(ch,is not a Vowel')
```

Output1:

```
Enter a character : S
S is not a vowel
```

Output2:

```
Enter a character: A
A is a vowel
```

CHAPTER – 7 (PYTHON FUNCTIONS)

1. Explain the following built-in functions.

Function	Description	Syntax	Example
abs ( )	Returns an absolute value of a number.	abs (x)	x=20 y=-23.2 print('x = ', abs(x)) print('y = ', abs(y)) **Output:** x = 20 y = 23.2
ord ( )	Returns the ASCII value for the given Unicode character.	ord (c)	c= 'a' d= 'A' print ('c = ',ord (c)) print ('A = ',ord (d)) **Output:** c = 97 A = 65
bin ( )	Returns a binary string prefixed with "0b" for the given integer number.	bin (i)	x=15 y=101 print ('15 in binary : ',bin (x)) print ('101 in binary : ',bin (y)) **o/p :** 15 in binary : 0b1111 101 in binary : 0b1100101
min ( )	Returns the minimum value in a list.	min (list)	MyList = [21,76,98,23] print ('Minimum of MyList :', min(MyList)) **Output:** Minimum of MyList : 21
max ( )	Returns the maximum value in a list.	max (list)	MyList = [21,76,98,23] print ('Maximum of MyList :', max(MyList)) **Output:** Maximum of MyList : 98
sum ( )	Returns the sum of values in a list.	sum (list)	MyList = [21,76,98,23] print ('Sum of MyList :', sum(MyList)) **Output:** Sum of MyList : 218
format	1. Binary –base 2	format (value [, format_	x= 14 y= 25

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	( )	2. Octal base-8 3. Fixed-point notation.	spec])	print ('x value in binary :',format(x,'b')) print ('y value in octal :',format(y,'o')) print('y value in Fixed-point no ',format(y,'f ')) **Output:** x value in binary : 1110 y value in octal : 31 y value in Fixed-point no : 25.000000
	floor ( )	Returns the largest integer less than or equal to x	math.floor (x)	import math x=26.7 y=-26.7 z=-23.2 print (math.floor (x)) print (math.floor (y)) print (math.floor (z)) **Output:** 26 -27 -24
	Ceil()	Returns the smallest integer greater than or equal to x	math.ceil (x)	import math x= 26.7 y= -26.7 z= -23.2 print (math.ceil (x)) print (math.ceil (y)) print (math.ceil (z)) **Output:** 27 -26 -23
	sqrt ( )	Returns the square root of x	sqrt (x)	import math a= 30 b= 49 c= 25.5 print (math.sqrt (a)) print (math.sqrt (b)) print (math.sqrt (c)) **Output:** 5.477225575051661 7.0 5.04975246918103

2. Explain the functions of return statement with syntax and example.

- The return statement causes your function to exit and returns a value to its caller.
- The point of functions in general is to take inputs and return something.
- The return statement is used when a function is ready to return a value to its caller.
- So, only one return statement is executed at run time even though the function contains multiple return statements.
- Any number of 'return' statements are allowed in a function definition but only one of them is executed at run time.

Syntax of return: return [expression list]

- This statement can contain expression which gets evaluated and the value is returned.
- If there is no expression in the statement or the return statement itself is not present inside a function, then the function will return the None object.

Example:

```
def usr_abs (n):
if n>=0:
return n
else:
return –n
x=int (input("Enter a number :")
print (usr_abs (x))
```

Output 1:

```
Enter a number : 25
25
```

Output 2:

```
Enter a number : -25
25
```

3. Explain about lambda function with suitable example.

- In Python, anonymous function is a function that is defined without a name.
- While normal functions are defined using the def keyword, in Python anonymous functions are defined using the lambda keyword.
- Hence, anonymous functions are also called as lambda functions.

What is the use of lambda function?

- Lambda function is mostly used for creating small and one-time anonymous function.
- Lambda functions are mainly used in combination with the functions like filter (), map () and reduce ( ).

Syntax of Anonymous Functions: lambda [argument(s)] :expression

Example:

```
sum = lambda arg1, arg2: arg1 + arg2
print ('The Sum is :', sum(30,40))
print ('The Sum is :', sum(-30,40))
```

Output:

```
The Sum is : 70
The Sum is : 10
```

- The above lambda function that adds argument arg1 with argument arg2 and stores the result in the variable sum.
- The result is displayed using the print ( ).
- Lambda function can take any number of arguments and must return one value in the form of an expression.
- Lambda function can only access global variables and variables in its parameter list.

4. Explain different types of arguments used in python with an example.

Function Arguments :

- Arguments are used to call a function and there are primarily 4 types of functions that one can use:
  1. Required, 2.Keyword, 3.Default arguments and 4.Variable-length arguments.

1. Required Arguments :

- "Required Arguments" are the arguments passed to a function in correct positional order.
- Here, the number of arguments in the function call should match exactly with the function definition.
- You need at least one parameter to prevent syntax errors to get the required output.

Example:

```
def printstring(str):
  print ("Example - Required arguments ")
```


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```
print (str)
return
```

2. Keyword Arguments:

- Keyword arguments will invoke the function after the parameters are recognized by their parameter names.
- The value of the keyword argument is matched with the parameter name and so, one can also put arguments in improper order (not in order).

Example:

```
def printdata (name):
  print ("Example-1 Keyword arguments")
  print ("Name :",name)
  return
```

3.Default Arguments :

- In Python the default argument is an argument that takes a default value if no value is provided in the function call.

Example:

```
def print info( name, salary = 3500):
   print ("Name: ", name)
   print ("Salary: ", salary)
   return
   print info("Mani")
```

4.Variable-Length Arguments:

- In some instances you might need to pass more arguments than have already been specified.
- Going back to the function to redefine it can be a tedious process.

Example:

```
1.def sum(x,y,z):
2.print("sum of three nos :",x+y+z)
3.sum(5,10,15,20,25)
```

5. Debug the following python program to get the given output.

Output:

Inside add() function x value is:10
In main x value is:10

Program:

```
x=10
define add:
globally x:
x = x+10
print ('Inside add() function x value is:")
add
print ("In main x value is:")
```

Output:

Inside add() function x **V**alue is:10
In main x value is:10

Program:

```
x = 0          # global variable
def add ():
    global x
    x = x+10     # increment by 2
Print ("Inside add() function x value is:", x)
add ()
Print ("In main x value is:",x)
```

CHAPTER – 8 (STRINGS AND STRING MANIPULATION)

1. What is slicing? Explain with suitable example.

- Slice is a substring of a main string.
- A substring can be taken from the original string by using [ ] operator and index or subscript values.
- Thus, [ ] is also known as slicing operator.
- Using slice operator, you have to slice one or more substrings from a main string.

General format of slice operation: str [start: end]

- Where **start** is the beginning index and **end** is the last index value of a character in the string.
- Python takes the end value less than one from the actual index specified.
- For example, if you want to slice first 4 characters from a string, you have to specify it as 0 to 5.
- Because, python consider only the end value as n-1.

Example I : slice a single character from a string

```
>>> str1="THIRUKKURAL"
>>> print (str1[0])
```

T

Example II: slice a substring from index 0 to 4

```
>>> print (str1[0:5])
```

THIRU

Example III: slice a substring using index 0 to 4 but without specifying the beginning index.

```
>>> print (str1[:5])
```

THIRU

Example IV: slice a substring using index 0 to 4 but without specifying the end index.

```
>>> print (str1[6:])
```

KURAL

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2. **Write the output for the following python commands.** **str1="Welcome to Python"**

i) print(str1) Ans : **Welcome to Python**
ii) print(str 1[11:17]) Ans : **Python**
iii) print(str1[11:17:2]) Ans : **Pto**
iv) print(str1[: : 4]) Ans : **Wotyn**
v) print(str1[: : - 4]) Ans : **nytoW**

3. **Write a program to check string palindrome or not.**

```
str1 = input ("Enter a string: ")
str2 = ' '
index=-1
for i in str1:
str2 += str1[index]
index -= 1
print ("The given string = { } \n The Reversed string = { }".format(str1, str2))
if (str1==str2):
print ("Hence, the given string is Palindrome")
else:
print ("Hence, the given is not a palindrome")
```

Output : 1

1.Enter a string: malayalam
2.The given string = malayalam
3.The Reversed string = malayalam
Hence, the given string is Palindrome

Output : 2

1.Enter a string: welcome
2.The given string = welcome
3.The Reversed string = emoclew
Hence, the given string is not a palindrome

4. **Write the short note on the following built-in string functions.**
(i) capitalize() (ii) isalpha() (iii) isalnum() (iv) lower()

Syntax	Description	Example
1.capitalize ( )	Used to capitalize the first character of the string	>>> city="chennai" **Chennai** >>> print(city.capitalize())
2. isalpha()	❖ Returns True if the string contains only letters. ❖ Otherwise return False.	>>>'Click123'.isalpha() False >>>'python'.isalpha( ) True
3.isalnum()	❖ Returns True if the string contains only letters and digit. ❖ It returns False. ❖ If the string contains any special character like _, @, #, *, etc.	>>>str1='Save Earth' False >>>str1.isalnum() The function returns False as space is alphanumeric character. >>>'Save1Earth'.isalnum() True
4. lower()	Returns the exact copy of the string with all the letters in lowercase.	>>>str1='SAVE EARTH' >>>print(str1.lower()) save earth

5. **Explain the following string functions with suitable examples.** (i) center() (ii) find ( )

Syntax	Description	Example

1.center()
(width, fillchar)
	Returns a string with the original string centered to a total of width columns and filled with fillchar in columns that do not have characters	>>> str1="Welcome"
		>>> print(str1.center(15,'*'))
		******Welcome******

2. find ( ) **(sub[, start[, end]])**	❖ The function is used to search the first occurrence of the sub string in the given string. ❖ It returns the index at which the substring starts. ❖ It returns -1 if the substring does not occur in the string.	>>>str1='mammals' >>>str1.find('ma') **0** ❖ On omitting the start parameters, function starts the search from beginning. >>>str1.find('ma',2) **3** >>>str1.find('ma',2,4) **-1** ❖ Displays -1 because the substring c not be found between the index 2 and 1. >>>str1.find('ma',2,5) **3**

CHAPTER – 9 (LISTS, TUPLES, SETS AND DICTIONARY)

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1. Explain the following list function: i) copy ( ) ii) count ( ) iii) index ( ) iv) reverse ( ) v) sort ( )

1.Copy ( )	Returns a copy of the list	List.copy ( )	MyList=[12, 12, 36] x = MyList.copy() print(x) **Output:** [12, 12, 36]
2.Count ( )	Returns the number of similar elements present in the last.	List.count (value)	MyList=[36 ,12 ,12] x = MyList.count(12) print(x) **Output**: 2
3.index ( )	Returns the index value of the first recurring element	List.index (element)	MyList=[36 ,12 ,12] x = MyList.index(12) print(x) **Output:** 1
4.reverse ( )	Reverses the order of the element in the list.	List.reverse( )	MyList=[36 ,23 ,12] **Output:** [12 ,23 ,36] MyList.reverse() print(MyList)
5.sort ( )	Sorts the element in list	List.sort (reverse=True|False,key=myFunc)	MyList=['Thilothamma', 'Tharani', 'Anitha', 'SaiSree', 'Lava MyList.sort( ) print(MyList) MyList.sort(reverse=True) print(MyList) **Output:** ['Anitha', 'Lavanya', 'SaiSree', 'Tharani','Thilotham ['Thilothamma', 'Tharani', 'SaiSree', 'Lavanya', 'Anitha']
6.Max ( )	Returns the maximum value in a list.	max(list)	MyList=[21,76,98,23] print(max(MyList)) **Output:** 98
7.Min ( )	Returns the minimum value in a list.	min(list)	MyList=[21,76,98,23] print(min(MyList)) **Output:** 21
8.Sum ( )	Returns the sum of values in a list.	sum(list)	MyList=[21,76,98,23] print(sum(MyList)) **Output:** 218

2. What will be the output of the following python program?

```
N = [ ]
for x in range(1, 11):
N.append(x)
Num=tuple(N)
print(Num)
for index, i in enumerate(N):
if(i%2==1):
del N[index]
print(N)
```

Output :

The list of numbers from 1 to 10 = [1, 2, 3, 4, 5, 6, 7, 8, 9, 10]
The list after deleting even numbers = [1, 3, 5, 7, 9]

3. How would you access elements of a list?

- Loops are used to access all elements from a list.
- The initial value of the loop must be zero.
- Zero is the beginning index value of a list.

Example :

```
Marks = [10, 23, 41, 75]
i = 0
while i < 4:
print (Marks[i])
i = i + 1
```

Output:

10
23
41
75

- In the above example, Marks list contains four integer elements i.e., 10, 23, 41, 75.
- Each element has an index value from 0.
- The index value of the elements are 0, 1, 2, 3 respectively.
- Here, the while loop is used to read all the elements.
- The initial value of the loop is zero, and the test condition is i < 4, as long as the test condition is true, the loop executes and prints the corresponding output.
- During the first iteration, the value of i is **zero**, where the condition is true.
- Now, the following statement **print** (**Marks [i]**) gets executed and prints the value of Marks [0] element ie. 10.
- The next statement **i = i + 1** increments the value of i from **0** to 1. Now, the flow of control shifts to the while statement for checking the test condition.
- The process repeats to print the remaining elements of **Marks** list until the test condition of while loop becomes false.

The following table shows that the execution of loop and the value to be print

Iteration	i	while i<4	print (Marks [i])	i=i+1
1	0	0<4 True	Marks [0] = 10	0+1=1
2	1	1<4 True	Marks [1] = 23	1+1=2
3	2	2<4 True	Marks [2] = 41	2+1=3
4	3	3<4 True	Marks [3] = 75	3+1=4
5	4	4<4 False	- -	--

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4. **Mylist = [10, 20, 30, 49, 50, 60, 70, 80, 90, 100]**

Write the Python commands for the following based on above list.

1	To print all elements in list.	Mylist=[10, 20, 30, 40, 50, 60, 70, 80, 90,100] for x in mylist: print (x)
2	Find list length	Mylist = [10, 20, 30, 40, 50, 60, 70, 80, 90, 100] len (Mylist)
3	Add multiple elements [110, 120, 130]	Mylist.Extend([110,120,130])
4	Delete from fourth element to seventh element.	del Mylist[4:7]
5	Delete entire list	del(Mylist)

5. **Compare remove (), pop () and clear () function in Python.**

Remove ( )	Pop ( )	Clear ( )
❖ Remove function is used to delete a elements of a list if its index is unknown	❖ Pop function deletes and returns the last element of a list if the index is not given.	❖ The function clear () is used to delete all the elements in list. ❖ It deletes only the elements and retains the list.
❖ Removes element from the set	❖ Removes an arbitrary element	❖ Removes all elements from a set

CHAPTER – 10 (PYTHON CLASSES AND OBJECTS)

1. **Find the output of the following python code.** **Output:**

```
class Sample:
num=0
def __init__(self, var):
Sample.num+=1
self.var=var
print("The object value is = ", var)
print("The count of object created = ", Sample.num)
def __del__(self):
Sample.num-=1
print("Object with value %d is exit from the scope"%self.var)
S1=Sample(15)
S2=Sample(35)
S3=Sample(45)
```

```
The object value is = 15
The count of object created=1
The object value is = 35
The count of object created=2
The object value is = 45
The count of object created=3
```

2. **What will be output of the following python code?** **Output:**

```
class String:
    def __init__(self):
        self.upper=0
        self.lower=0
        self.vowel=0
        self.consonant=0
        self.space=0
        self.string=""
def getstr(self):
        self.string=str(input("Enter a String: "))
def count (self):
    for ch in self.string:
        if (ch.isupper()):
        self.upper+=1
        if (ch.islower()):
        self.lower+=1
        if (ch in ('AEIOUaeiou'):
        self.vowel+=1
        if (ch.isspace()):
        self.space+=1
        self.consonant = self.upper+self.lower - self. vowel
def display(self):
   print("The given string contains...")
   print("%d Uppercase letters"%self.upper)
   print("%d Lowercase letters"%self.lower)
   print("%d Vowels"%self.vowel)
   print("%d Consonants"%self.consonant)
   print("%d Spaces"%self.space)
S = String()
S.getstr()
S.count()
S.display()
```

```
Enter a String: Welcome To Learn Computer Science
The given string contains...
4 Uppercase letters
25 Lowercase letters
12 Vowels
13 Consonants
4 Spaces
```


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3. Rewrite the following program to get the given input

OUTPUT:

```
Enter Radius: 5
The Area = 78.5
The Circumference = 31.400000000000002
```

CODE:

```
class Circle:
pi=3.14
def __init__(self,radius):
   self.radius=radius
DEF area(SELF):
   Return Circle.pi+(self.radius*2)
def circumference(self):
Return 2*Circle.pi*self.radius
r=int(input("Enter Radius: "))
C=Circle(r)
print("The Area :T44E36",C.area())
print("The Circumference =", C.circumference())
```

CODE:

```
Class circle:
 pi=3.14
 def __init__(self,radius):
       self.radius=radius
def area(self):
       return Circle.pi*(self.radius**2)
def circumference(self):
       return 2*Circle.pi*self.radius
r=int(input("Enter Radius: "))
       c=circle(r)
 print("The Area =",c.area())
 print("The Circumference =", c.circumference())
```

4. How to define a class in python? Explain with example.

- In Python, a class is defined by using the keyword class.
- Every class has a unique name followed by a colon (:).

Syntax:

```
class class_name:
statement_1
statement_2
……..
……..
statement_n
```

- Where, statement in a class definition may be a variable declaration, decision control, loop or even a function definition.
- Variables defined inside a class are called as 'Class Variable' and functions are called as "Methods".
- Class variable and methods are together known as members of the class.
- The class members should be accessed through objects or instance of class.
- A class can be defined anywhere in a Python program.

Example:

```
class Sample:
x, y = 10, 20
```

- In the above code, name of the class is Sample and it has two variables x and y having the initial value 10 and 20 respectively.
- To access the values defined inside the class, you need an object or instance of the class.

5. Explain public and private data members with examples.

- The variables which are defined inside the class is public by default.
- These variables can be accessed anywhere in the program using dot operator.
- A variable prefixed with double underscore becomes private in nature.
- These variables can be accessed only within the class.

Example:

```
class Sample:
def __init__(self, n1, n2):
self.n1=n1
self.__n2=n2
def display(self):
print("Class variable 1 = ", self.n1)
print("Class variable 2 = ", self.__n2)
S=Sample(12, 14)
S.display()
print("Value 1 = ", S.n1)
print("Value 2 = ", S.__n2)
```

Output:

```
Class variable 1 = 12
Class variable 2 = 14
Value 1 = 12
```

- In the above program, there are two class variables n1 and n2 are declared.
- The variable n1 is a public variable and n2 is a private variable.
- The display ( ) member method is defined to show the values passed to these two variables.

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6. How will you create the class and objects in python?

Creating Objects :

- Once a class is created, next you should create an object or instance of that class.
- The process of creating object is called as "Class Instantiation".

Syntax: Object_name = class_name( )

Accessing Class Members :

- Any class member ie. class variable or method (function) can be accessed by using object with a **dot (.)** operator.

Syntax:

Object_name . class_member

Example : **Program to define a class and access its member variables**

```
class Sample:    #class variables
x, y = 10, 20
S=Sample( ) # class instantiation
print("Value of x = ", S.x)
print("Value of y = ", S.y)
print("Value of x and y = ", S.x+S.y)
```

Output :

```
Value of x = 10
Value of y = 20
Value of x and y = 30
```

- In the above code, the name of the class is Sample.
- Inside the class, we have assigned the variables **x** and **y** with initial value **10** and **20** respectively.
- These two variables are called as class variables or member variables of the class.
- In class instantiation process, we have created an object **S** to access the members of the class.

CHAPTER – 11 (DATABASE CONCEPTS)

1. Components of DBMS.

1. Hardware:

- The computer, hard disk, I/O channels for data, and any other physical component involved in storage of data

2. Software:

- This main component is a program that controls everything.
- The DBMS software is capable of understanding the Database Access Languages and interprets into database commands for execution.

3. Data:

- It is that resource for which DBMS is designed.
- DBMS creation is to store and utilize data.

4. Procedures/Methods:

- They are general instructions to use a database management system such as installation of DBMS, manage databases to take backups, report generation, etc.

5. DataBase Access Languages:

- They are the languages used to write commands to access, insert, update and delete data stored in any database.
- **Examples of popular DBMS:** Dbase, FoxPro

2. Explain about database structure.

- Table is the entire collection of related data in one table, referred to as a File or Table where the data is organized as row and column.
- Each row in a table represents a record, which is a set of data for each database entry.
- Each table column represents a Field, which groups each piece or item of data among the records into specific categories or types of data. Eg. StuNo., StuName, StuAge, StuClass, StuSec.
- A Table is known as a RELATION
- A Row is known as a TUPLE. A column is known as an ATTRIBUTE

CHAPTER – 12 (STRUCTURED QUERY LANGUAGE)

1. Explain about TCL commands with suitable examples.

COMMIT command:

- The COMMIT command is used to permanently save any transaction to the database.
- When any DML commands like INSERT, UPDATE, DELETE commands are used, the changes made by these commands are not permanent.
- It is marked permanent only after the COMMIT command is given from the SQL prompt.
- Once the COMMIT command is given, the changes made cannot be rolled back.
- The COMMIT command is used as **COMMIT;**

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ROLLBACK command:

- The ROLLBACK command restores the database to the last commited state.
- It is used with SAVEPOINT command to jump to a particular save point location.
- The syntax for the ROLLBACK command is : **ROLL BACK TO save point name;**

SAVEPOINT command

- The SAVEPOINT command is used to temporarily save a transaction so that you can roll back to the point whenever required.
- The different states of our table can be saved at any time using different names and the rollback to that state can be done using the ROLLBACK command. **SAVEPOINT savepoint_name;**

2. Explain about data types

Data Type	Description
char (Character)	Fixed width string value. Values of this type is enclosed in single quotes. For ex. Anu's will be written as 'Anu' 's'.
varchar	Variable width character string. This is similar to char except the size of the data entry vary considerably.
dec (Decimal)	It represents a fractional number such as 15.12, 0.123 etc. Here the size argument consist of two parts : precision and scale.
numeric	It is same as decimal except that the maximum number of digits may not exceed the precision argument.
int(Integer)	It represents a number without a decimal point. Here the size argument is not used.
smallint	It is same as integer but the default size may be smaller than Integer.
float	It represents a floating point number in base 10 exponential notation and may define a precision up to a maximum of 64.
real	It is same as float, except the size argument is not used and may define a precision up to a maximum of 64.
double	Same as real except the precision may exceed 64.

3. Consider the following employee table. Write SQL commands for the Questions.(i) to (v).

Roll No	Name	Group	Roll No	Name	Group
1001	Chandu	A1	1006	Sabari	B1
1002	Dharsan	A2	1007	Srihari	A1
1003	Kavin	B1	1008	Prajith	A2
1004	Karl marx	A1	1009	Livith	B1
1005	Iruleswar	A2			

1. To display the details of all students in ascending order of name:

- SELECT*FROM student ORDER BY name Asc;

2. To display all students in A2 group:

- SELECT*FROM student GROUP By A2.

3. To display the details group wise:

- SELECT*FROM student GROUP By Group;

4. To add new row:

- INSERT INTO student (Rollno,Name,Group) VALUES ('1010', 'Aslan',''A2');

5. To remove students who are in B1 group:

- DELETE FROM Student WHERE Group=B1;

4. Explain about role of SQL in RDBMS.

- RDBMS stands for Relational Data Base Management System.
- Oracle, MySQL, MS SQL Server, IBM DB2 and Microsoft Access are RDBMS packages.
- SQL is a language used to access data in such databases.
- In general, Database is a collection of tables that store sets of data that can be queried for use in other applications.
- A database management system supports the development, administration and use of database platforms.
- RDBMS is a type of DBMS with a row-based table structure that connects related data elements and includes functions related to Create, Read, Update and Delete operations, collectively known as CRUD.
- The data in RDBMS, is stored in database objects, called Tables.
- A table is a collection of related data entries and it consist of rows and columns.
- A field is a column in a table that is designed to maintain specific related information about every record in the table.
- It is a vertical entity that contains all information associated with a specific field in a table.
- The fields in a student table may be of the type AdmnNo, StudName, StudAge, StudClass, Place etc.
- A Record is a row, which is a collection of related fields or columns that exist in a table.
- A record is a horizontal entity in a table which represents the details of a particular student in a student table.

5. Explain about processing skills of SQL.

1.Data Definition Language (DDL):

- The SQL DDL provides commands for defining relation schemas (structure), deleting relations, creating indexes and modifying relation schemas.

2.Data Manipulation Language (DML):

- The SQL DML includes commands to insert, delete, and modify tuples in the database.

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3.Embedded Data Manipulation Language:
- The embedded form of SQL is used in high level programming languages.

4.View Definition:
- The SQL also includes commands for defining views of tables.

5.Authorization:
- The SQL includes commands for access rights to relations and views of tables.

6.Integrity:
- The SQL provides forms for integrity checking using condition.

7.Transaction control:
- The SQL includes commands for file transactions and control over transaction processing.

CHAPTER – 15 (DATA MANIPULATION THROUGH SQL)

1. Write the Python script to display all the records of the following table using fetch many()

Reg.No	Name	Marks
3001	Chithirai	353
3002	Vaigasi	411
3003	Aani	374
3004	Aadi	289
3005	Aavani	507
3006	Purattasi	521

```
import sqlite3
connection = sqlite3.connect("month.db")
cursor=connection.cursor()
cursor.execute("SELECT * FROM Tamil Months")
print("Displaying All The Records")
result=cursor.fetchmany(6)
print(result, Sep= "\n")
```

2. Write a note aggregate functions of SQL.
- These functions are used to do operations from the values of the column and a single value is returned.
  1. COUNT() 2. AVG() 3. SUM() 4. MAX() 5. MIN()

1. COUNT()
- The SQL COUNT() function returns the number of rows in a table satisfying the criteria specified in the WHERE clause.
- COUNT() returns 0 if there were no matching rows.

Example:

```
import sqlite3
connection = sqlite3.connect("Academy.db")
cursor = connection.cursor()
cursor.execute("SELECT COUNT(*) FROM student ")
result = cursor.fetchall()
print(result)
```

Output: [(7,)]

2. AVG()
- The following SQL statement in the python program finds the average mark of all students.

Example:

```
import sqlite3
connection = sqlite3.connect("Academy.db")
cursor = connection.cursor()
cursor.execute("SELECT AVG(AVERAGE) FROM student ")
result = cursor.fetchall()
print(result)
```

Output [(84.65714285714286,)]

3. SUM():
- The following SQL statement in the python program finds the sum of all average in the Average field of "Student table".

Example:

```
import sqlite3
connection = sqlite3.connect("Academy.db")
cursor = connection.cursor()
cursor.execute("SELECT SUM(AVERAGE) FROM student ")
result = cursor.fetchall()
print(result)
```

Output: [(592.6,)]

4.MAX()
- The MAX() function returns the largest value of the selected column.

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5.MIN()

- The MIN() function returns the smallest value of the selected column.

3. Construct the following: a)GROUB BY b) ORDER BY clause

1.SQL Group By Clause:

- The SELECT statement can be used along with GROUP BY clause.
- The GROUP BY clause groups records into summary rows. It returns one records for each group.
- It is often used with aggregate functions (COUNT, MAX, MIN, SUM, AVG) to group the result-set by one or more columns.
- The following example count the number of male and female from the student table and display the result.

Example:

```
import sqlite3
connection = sqlite3.connect("Academy.db")
cursor = connection.cursor()
cursor.execute("SELECT gender,count(gender) FROM student Group BY gender")
result = cursor.fetchall()
print(*result,sep="\n")
```

OUTPUT:

```
('F', 2)
('M', 5)
```

2.SQL ORDER BY Clause:

- The ORDER BY Clause can be used along with the SELECT statement to sort the data of specific fields in an ordered way.
- It is used to sort the result-set in ascending or descending order.
- In this example name and Rollno of the students are displayed in alphabetical order of names.

Example:

```
import sqlite3
connection = sqlite3.connect("Academy.db")
cursor = connection.cursor()
cursor.execute("SELECT Rollno,sname FROM student Order BY sname")
result = cursor.fetchall()
print(*result,sep="\n")
```

OUTPUT

```
(1, 'Akshay')
(2, 'Aravind')
(3, 'BASKAR')
(4, 'PRIYA')
(5, 'SAJINI')
(6, 'TARUN')
(7, 'VARUN')
```

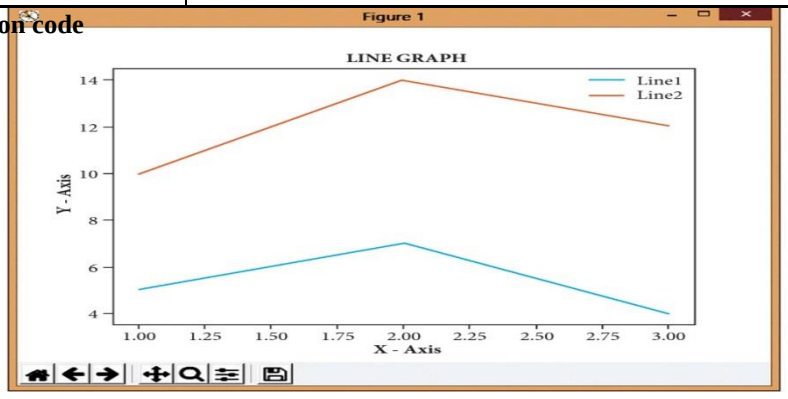
CHAPTER – 16 (DATA VISUALIZATION USING PYPLOT: LINE , PIE AND BAR CHAT)

1. What are the key differences between Histogram and Bar graph?

Histogram	Bar graph
Histogram refers to a graphical representation; that displays data by way of bars to show the frequency of numerical data	A bar graph is a pictorial representation of data that uses bars to compare different categories of data
A histogram represents the frequency distribution of continuous variables	Conversely, a bar graph is a diagrammatic comparison of discret variables.
Histogram presents numerical data	Bar graph shows categorical data.
Items of the histogram are numbers, which are categorised together, to represent ranges of data	As opposed to the bar graph, items are considered as individual entities.
The width of rectangular blocks in a histogram may or may not be same	The width of the bars in a bar graph is always same.

2. Draw the output of the following python code

```
import matplotlib.pyplot as plt
x = [1,2,3]
y = [5,7,4]
x2 = [1,2,3]
y2 = [10,14,12]
plt.plot(x, y, label='Line 1')
plt.plot(x2, y2, label='Line 2')
plt.xlabel('X-Axis')
plt.ylabel('Y-Axis')
plt.title('LINE GRAPH')
plt.legend()
plt.show()
```



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CHAPTER 1 TO 16 BOOK INSIDE IMPORTANT PROGRAMS

CHAPTER – 1 (FUNCTION)

Answer to the following questions with the help of the function given below:

1. let rec pow (a: int) (b: int) : int := 2) if b=0 then 1 3) else a * pow a (b-1)

(a) What is the name assigned to this function? **pow**
(b) What are the parameters defined to this function? **a , b**
(c) What type of function is this? **recursive**

2. Identify in the following program :let sum x+y: return x+y

a) Write the name of the function: **sum**
b) Statement which terminates the function: **return x+y**
c) Name of the argument variable: **x y**

CHAPTER – 5(PYTHON - VARIABLES AND OPERATORS)

1. Input function

```
x = int (input("Enter Number 1: "))
y = int (input("Enter Number 2: "))
print ("The sum = ", x+y)
```

Output:
Enter Number 1: 34
Enter Number 2: 56
The sum = 90

2. Alternate method for the above program

```
x,y=int (input("Enter Number 1 :")),
int(input("Enter Number 2:"))
print ("X = ",x," Y = ",y)
```

Output:
Enter Number 1 :30
Enter Number 2:50
X = 30 Y = 50

3. Arithmetic Operators

```
a=100
b=10
print ("The Sum = ",a+b)
print ("The Difference = ",a-b)
print ("The Product = ",a*b)
print ("The Quotient = ",a/b)
print ("The Remainder = ",a%30)
print ("The Exponent = ",a**2)
print ("The Floor Division =",a//30)
```

Output:
The Sum = 110
The Difference = 90
The Product = 1000
The Quotient = 10.0
The Remainder = 10
The Exponent = 10000
The Floor Division = 3

4. String Literals

```
strings = "This is Python"
char = "C"
multiline_str = '''This is a multiline string with more than one line
code.'''
print (strings)
print (char)
print (multiline_str)
# End of the Program
```

Output:
This is Python
C
This is a multiline string with more than one line code.

5. Evaluate the following python statements and what will be the value of m? (.)

```
a,b = 30,20
m = a if a < b else b
```

Ans: 20

CHAPTER – 6 (CONTROL STRUCTURES)

1. Write a python program to print all numbers from 1 to 5

```
i=1
while (i<=5):
print (i,end='\t')
i=i+1
```

Output:
1 2 3 4 5

2. Write a program to print the following pattern.

1
1 2
12 3

```
i=1
while (i<=4)
    for j in range (1,i):
     print (j,end='\t')
     print (end='\n')
      i +=1
```


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3. Write python program to print

1
12
123
1234
12345

```
i=1
While(i<=6)
 for j in range (1,i)
 print(j,end=’/t)
 print(end=’/n’)
 i+=1
```

4. Write a python program that displays 10 to 15 using While loop

```
i=10
while (i<=15):
print (i,end='\t')
i=i+1
```

Output:
10 11 12 13 14 15

5. What is the output of the following snippet?

```
i=10
while (i<=15):
print (i,end=’\t’)
i=i+1
```

Output:
10 11 12 13 14 15
Value of i when the loop exit 16

6. What will be the output of the following python code?

```
x=20
while(x >= 5):
print (x, end='\t')
x- =5
```

Output: 20 15 10 5

7. What will be the output of the following python code?

```
for i in range (2,10,2):
print (i, end=' ')
```

Output:
2 4 6 8

8. What will be the output of the following snippet?

```
alpha=list(range(65,70)
for x in alpha:
print(chr(x),end=’\t’)
```

Output:
A B C D E

9. What is the output of the following snippet?

```
for word in ‘computer’
Print(word,end=’ ‘)
```

Output
c o m p u t e r

10. Nested if statement

Average	*Grade*
>=80 and above	*A*
>=70 and <80	*B*
>=60 and <70	*C*
>=50 and <60	D
Otherwise	E

```
m1=int (input(“Enter mark in first subject : ”))
m2=int (input(“Enter mark in second subject : ”))
avg= (m1+m2)/2
if avg>=80:
print (“Grade : A”)
elif avg>=70 and avg<80:
print (“Grade : B”)
elif avg>=60 and avg<70:
print (“Grade : C”)
elif avg>=50 and avg<60:
print (“Grade : D”)
else:
print (“Grade : E”)
```

Output 1:
Enter mark in first subject : 34
Enter mark in second subject : 78
Grade : D

Output 2 :
Enter mark in first subject : 67
Enter mark in second subject : 73
Grade : B

11. Jump Statement

```
for word in “Jump Statement”:
if word = = “e”:
break
print (word, end= ' ')
```

Output:
Jump Stat

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12. Break Statement

```
for word in "Jump Statement":
if word = = "e":
break
print (word, end=' ')
else: print ("End of the loop")
print ("\n End of the program")
```

Output:
Jump Stat
End of the program

13. Continue statement

```
for word in "Jump Statement":
if word = = "e":
continue
print (word, end = ' ')
print ("\n End of the program")
```

Output:
Jump Statmnt
End of the program

CHAPTER – 7 (PYTHON FUNCTIONS)

1. **# assume w = 3 and h = 5**

```
def area(w,h):
return w * h
print (area (3,5))
```

Output
15

2. **Variable length argument:**

```
def printnos (*nos):
for n in nos:
print(n)
return
        # now invoking the printnos() function
print ('Printing two values')
printnos (1,2)
print ('Printing three values')
printnos (10,20,30)
```

Output:
Printing two values
1
2
Printing three values
10
20
30

3. **Anonymous Functions**

```
sum = lambda arg1, arg2: arg1 + arg2
print ('The Sum is :', sum(30,40))
print ('The Sum is :', sum(-30,40))
```

Output:
The Sum is : 70
The Sum is : 10

CHAPTER – 8 (STRINGS AND STRING MANIPULATION)

1. **Write a python program to display given pattern**

```
str1="COMPUTER"
index=0
for i in str1:
print(str[ :index+1])
index+=1
```

```
C
C O
C O M
C O M P
C O M P U
C O M P U T
C O M P U T E
C O M P U T E R
```

2. **Write a python program to display given pattern**

```
str1="COMPUTER"
index=len(str1)
for i in str1:
print(str[ 0:index])
index - =1
```

```
C O M P U T E R
C O M P U T E
 C O M P U T
C O M P U
C O M P
C O M
C O
C
```

3. **Write program to display the following pattern**

```
*          str1= '*'
* *        i=1
* * *      while 1<5:
* * * *    print (str1*i)
* * * * *  i+=1
```

```
*
* *
* * *
* * * *
* * *  * *
```

4. **What will be output of the given python program. Str= "COMPUTER SCIENCE"**
   1) print (str*3) **Ans:** COMPUTER SCIENCE COMPUTER SCIENCE COMPUTER SCIENCE
   2) print(str[0:7]) **Ans:** COMPUTE

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5. What will the output of the given python Snippet? str1="Welcome to Python"

1) print(str1) Ans : **Welcome to Python**
2) print(str 1[11:17]) Ans : **Python**
3) print(str1[11:17:2]) Ans : **Pto**
4) print(str1[: : 4] Ans : **Wotyn**
5) print(str1[: : - 4]) Ans : **nytoW**

6. What will the output of the given python Snippet? str1 = "Welcome to learn Python"

1) print (str1[10:16]) Ans : **learn**
2) print (str1[10:16:4]) Ans: **r**
3) print (str1[10:16:2]) Ans: **er**
4) print (str1[::3]) Ans: **Wceoenyo**

7. What will the output of the given python Snippet? str1= "Welcome to public examination"

(i) print (str1[:-13: -1]) Ans : **noitanimaxe**
(ii) print (str1[11:17]) Ans: **public**
(iii) print (str1[:8]+python) Ans: **Welcome python**

8. What will be output of the following python program? Str1= School **Output**

```
print (str1*3)
```
SchoolSchoolSchool

9. What will be output of the following python program? Place ="Tech-Park" **Output**

```
print (place*3)
```
Tech-ParkTech-ParkTech-Park

10. What will be the output of the given python program. str1= "MANIKANDAN"

1) print (str1[0:4]) **Ans:** MANI
2) print (str1[7:]) **Ans:** DAN

11. What is output for following python command: Str="Thinking with python"

a)print(str[::3]) Ans: Tnnwhyo
b)print(str[::-3]) Ans: nt igkn
c)print(str[9:13]) Ans: with

12. What will be output of the following python program? **Output:** well

```
str1 = "welcome"
str2 = "to school"
str3 = str1[:3]+str2[len(str2)-1:]
print(str3)
```

13. What will be output of the following python program?

```
str1 = "welcome"
str2 = "to python programming"
str3 = str1[:2]+str2[len(str2)-2:]
print(str3)
```

Output:
weng

14. What will be the output of the given Python program? (Sep-2020) **Output**

```
a = "Computer"
b = "Science"
x = a[:4] +b[len(b)-3:]
print(x)
```
Compnce

15. What is the output of the following code: .

```
>>> str1="Tamil Nadu"
>>> print(str1.swapcase())
```
Output:
tAMIL nADU

CHAPTER – 9 (LISTS, TUPLES, SETS AND DICTIONARY)

1. What will be output of the python code?

```
Squares = [x**2 for x in range (1,11)]
print (Squares)
```
Output
[1,4,9,16,25,36,49,64,81,100]

2. What will be output of the python code? (.)

```
List = [x**2 for x in range (1,5)]
print (List)
```
Output
[1,4,9,16]

3. Fill in the blank with suitable python code to get the output: [12,23,36] (.)

```
MyList = [36,23,12]
---------- ?
print (MyList)\
```
Ans: MyList .reverse ()

4. What will be the output of the following code?

```
list = [3**x for x in range(5)] print(list)
```
Output : [1,3,9,27,81]

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5. What is the output of the following program?

```
Dict= {x:2*x for  x in range (1,10) }
```

Output: {1:2, 2:4, 3:6, 4:8, 5:10, 6:12, 7:14, 8:16, 9:18 }

6. Write the Output of the following program:

```
>>>num=[ i**2 for i in range(1,11) ]
>>>print(num)
```

Output:
[1, 4, 9, 16, 25, 36, 49, 64, 81, 100]

7. What is the output of the below python program?

```
List=[ ]
for i in range(21):
if(i%4==0):
List.append(i)
print(List)
```

Output:
[0, 4, 8, 12, 16, 20]

8. What will be the output of the following snippet?

```
set_A = {'A', 2, 4 'D'}
set_B = {'A', 'B', 'C', 'D'}
print(set_A&set_B)
```

Output: {'A', 'D'}

9. Write a program that prints the maximum value in a Tuple.

```
MyTup=(22,54,32,9,99,104,87)
print(max(MyTup))
```

Output:
104

10. Accessing values in a Tuple:

```
>>> Tup1 = (12, 78, 91, "Tamil", "Telugu", 3.14, 69.48)
    # to access all the elements of a tuple
>>> print(Tup1)
    (12, 78, 91, 'Tamil', 'Telugu', 3.14, 69.48)
    #accessing selected elements using indices
>>> print(Tup1[2:5])
    (91, 'Tamil', 'Telugu')
    #accessing from the first element up to the specified index value
>>> print(Tup1[:5])
    (12, 78, 91, 'Tamil', 'Telugu')
    # accessing from the specified element up to the last element.
>>> print(Tup1[4:])
    ('Telugu', 3.14, 69.48)
    # accessing from the first element to the last element
>>> print(Tup1[:])
    (12, 78, 91, 'Tamil', 'Telugu', 3.14, 69.48)
```

11. Program to join two tuples

```
Tup1 = (2,4,6,8,10)
Tup2 = (1,3,5,7,9)
Tup3 = Tup1 + Tup2
 print(Tup3)
```

Output
(2, 4, 6, 8, 10, 1, 3, 5, 7, 9)

12. Maximum as well as minimum values in a list

```
def Min_Max(n):
a = max(n)
b = min(n)
return(a, b)
Num = (12, 65, 84, 1, 18, 85, 99)
(Max_Num, Min_Num) = Min_Max(Num)
print("Maximum value = ", Max_Num)
print("Minimum value = ", Min_Num)
```

Output
Maximum value = 99
Minimum value = 1

13. What will be the output of the following code?

```
a=list(range(2,11,2))
print(a)
```

Output
2 4 6 8

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CHAPTER – 10 (PYTHON CLASSES AND OBJECTS)

1. What is the output of the following program?

```
class Greeting:
def __init__(self, name):
self.__name = name
def display(self):
print("Welcome to ", self.__name)
obj=Greeting('Python Programming')
obj.display()
```

Output

Welcome to Python Programming

2. What is the output of the following program?

```
class Greeting:
def__init__(self, name):
self.__name = name
def display(self):
print("Good Morning", self.__name)
obj=Greeting('Tamil Nadu')
obj.display()
```

Output:

Good Morning Tamil Nadu

3. Accessing Class Members

```
class Sample:
x, y = 10, 20 #class variables
S=Sample( ) # class instantiation
print("Value of x = ", S.x)
print("Value of y = ", S.y)
print("Value of x and y = ", S.x+S.y)
```

Output

Value of x =10
Value of y =20
Value of x and y = 30

4. What will be the output of the following program?

```
class Student:
mark1, mark2, mark3 = 45, 91, 71
def process(self):
sum = Student.mark1 + Student.mark2 + Student.mark3
avg = sum/3
print("Total Marks = ", sum)
print("Average Marks = ", avg)
return
S=Student()
S.process()
```

Output:

Total Marks = 207
Average Marks = 69.0

CHAPTER-11

- ✓ **Examples of DBMS softwares:** Foxpro, dbase.
- ✓ **Example of RDBMS:** MySQL,Oracle, MS-Access etc.,SQL server, MariaDB, SQLite,
- ✓ A **Table** is known as a RELATION A **Row** is known as a TUPLE A **column** is known as an ATTRIBUTE

CHAPTER-12

1. Creating Database:

- To create a database, type the following command in the prompt:

CREATE DATABASE database_name; Ex: CREATE DATABASE stud;

- To work with the database, type the following command. USE DATABASE;

For example to use the stud database created, give the command USE stud;

2. DDL Commands:

CREATE TABLE Command:

```
CREATE TABLE <table-name>
(<column name><data type>[<size>]
(<column name><data type>[<size>]……
);
```

Ex:

```
CREATE TABLE Student
(Admno integer,
Name char(20),
Gender char(1),
Age integer,
Place char(10),
);
```

Type of Constraints:

Unique Constraint:

```
CREATE TABLE Student
(
Admno integer NOT NULL UNIQUE, → Unique constraint
Name char (20) NOT NULL,
Gender char (1),
```


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Age integer,
Place char (10),
);

Primary Key Constraint:
CREATE TABLE Student
(
Admno integer PRIMARY KEY, → Primary Key constraint
Name char(20) NOT NULL,
Gender char(1),
Age integer,
Place char(10),
);

DEFAULT Constraint:
CREATE TABLE Student
(
Admno integer PRIMARY KEY,
Name char(20)NOT NULL,
Gender char(1),
Age integer DEFAULT 17, → Default Constraint
Place char(10)
);

Check Constraint
CREATE TABLE Student
(
Admno integer PRIMARY KEY
Name char(20)NOT NULL,
Gender char(1),
Age integer CHECK (Age <=19), → Check Constraint
Place char(10),
);

TABLE CONSTRAINT
CREATE TABLE Student 1
(
Admno integer NOT NULL,
Firstname char(20),
Lastname char(20),
Gender char(1),
Age integer,
Place char(10),
PRIMARY KEY (Firstname, Lastname) → Table constraint
);

3. DML COMMANDS:

INSERT command:
INSERT INTO <table-name> [column-list] VALUES (values);
INSERT INTO Student (Admno, Name, Gender, Age, Place) VALUES (100, 'Ashish', 'M', 17, 'Chennai');

DELETE COMMAND:
DELETE FROM table-name WHERE condition;
DELETE FROM Student WHERE Admno=104;

UPDATE COMMAND:
UPDATE <table-name> SET column-name = value, column-name = value,… WHERE condition;
UPDATE Student SET Age = 20 WHERE Place = ´Bangalore';

ALTER COMMAND:
ALTER TABLE <table-name> ADD <column-name><data type><size>;
ALTER TABLE Student ADD Address char;

ALTER COMMAND:[Modify,Change,drop]
ALTER TABLE <table-name> MODIFY<column-name><data type><size>;
ALTER TABLE Student MODIFY Address char (25);

ALTER TABLE <table-name> CHANGE old-column-name new-column-name new column definition;
ALTER TABLE Student CHANGE Address City char(20);

ALTER TABLE <table-name> DROP COLUMN <column-name>;
ALTER TABLE Student DROP COLUMN City;

TRUNCATE command:
TRUNCATE TABLE table-name;
TRUNCATE TABLE Student;

4. DQL COMMAND

SELECT command
SELECT <column-list>FROM<table-name>;
SELECT Admno, Name FROM Student;
SELECT * FROM STUDENT;

DISTINCT Keyword:
SELECT DISTINCT Place FROM Student;

ALL Keyword:
SELECT ALL Place FROM Student;

SELECT command with WHERE Clause:
SELECT <column-name>[,<column-name>,….] FROM <table-name>WHERE condition>;
SELECT Admno, Name, Place FROM Student WHERE Place = ´Chennai';
SELECT Admno, Name, Age FROM Student WHERE Age >= 18;
SELECT Admno, Name, Age, Place FROM Student WHERE (Age>=18 AND Place = ´Delhi');
SELECT Admno, Name, Age, Place FROM Student WHERE (Age>=18 OR Place =´Delhi');
SELECT Admno, Name, Place FROM Student WHERE (NOT Place =´Delhi');

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BETWEEN and NOT BETWEEN Keywords:
SELECT Admno, Name, Age, Gender FROM Student WHERE Age BETWEEN 18 AND 19;
SELECT Admno, Name, Age FROM Student WHERE Age NOT BETWEEN 18 AND 19;

IN Keyword:
SELECT Admno, Name, Place FROM Student WHERE Place IN (´Chennai', ´Delhi');
SELECT Admno, Name, Place FROM Student WHERE Place NOT IN (´Chennai', ´Delhi');

NULL Value:
SELECT * FROM Student WHERE Age IS NULL;

ORDER BY clause:
SELECT <column-name>[,<column-name>,….] FROM <table-name>ORDER BY <column1>,<column2>,…ASC| DESC ;
SELECT * FROM Student ORDER BY Name;

WHERE clause:
SELECT * FROM Student WHERE Age>=18 ORDER BY Name;
SELECT * FROM Student WHERE Age>=18 ORDER BY Name DESC;

GROUP BY clause:
SELECT <column-names> FROM <table-name> GROUP BY <column-name>HAVING condition];
SELECT Gender FROM Student GROUP BY Gender;
SELECT Gender, count(*) FROM Student GROUP BY Gender;

HAVING clause:
SELECT Place , count(*) FROM Student GROUP BY Place HAVING place = 'Chennai';

5. TCL commands:

COMMIT command
COMMIT;

ROLLBACK command:
ROLL BACK TO save point name;

SAVEPOINT command:
SAVEPOINT savepoint_name;

INSERT INTO Student VALUES (107, 'Beena', 'F', 20 , 'Cochin');
COMMIT;
UPDATE Student SET Name = 'Mini' WHERE Admno=105;
SAVEPOINT A;
INSERT INTO Student VALUES(108, 'Jisha', 'F', 19, 'Delhi');
SAVEPOINT B;
ROLLBACK TO A;

CHAPTER-13

Creating CSV Normal File:

1. To create a CSV file in Notepad, First open a new file using **File →New or ctrl +N.**
2. Microsoft Excel to open a CSV file:
   - You can open Microsoft Excel and in the menu bar, select **File → Open**, and select the CSV file.
   - If the file is not listed, make sure to change the file type to be opened to Text Files (*.prn, *.txt, *.csv).

CHAPTER-14

1. **Write the syntax to execute python program to run the C++ program.**
   Python <filename.py> -i <C++ filename without cpp extension>

2. **Python's OS Module:**
   os.system ('g++ ' + <variable_name1> +' -<mode> ' + <variable_name2>)

3. **getopt.getopt function:**
   <opts>,<args>=getopt.getopt(argv, options, [long_options])

4. **Some more command for wrapping C++ code:**
   if __name__=='__main__':
   main(sys.argv[1:])

5. **__name__ (A Special variable) in Python:**
   if __name__ == '__main__':
   main (sys.argv[1:])

6. **Python program Executing C++ Program using control statement:**
   - Type the C++ program to check whether the input number is palindrome or not in notepad and save it as "pali_cpp.cpp".
   - Type the Python program and save it as pali.py
   - Click the Run Terminal and open the command window
   - Type the command Python pali.py -i pali_cpp

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7. Write a C++ program to enter any number and check whether the number is palindrome or not using while loop.

```
/*. To check whether the number is palindrome or not using while loop.*/
//Now select File->New in Notepad and type the C++ program
#include <iostream>
using namespace std;
int main()
{
int n, num, digit, rev = 0;
cout<< "Enter a positive number: ";
cin>>num;
n = num;
while(num)
{
digit = num % 10;
rev = (rev * 10) + digit;
num = num / 10;
}
cout<< " The reverse of the number is: " << rev <<endl;
if (n == rev)
cout<< " The number is a palindrome";
else
cout<< " The number is not a palindrome";
return 0;
}
// Save this file as pali_cpp.cpp

#Now select File→New in Notepad and type the Python program
# Save the File as pali.py . Program that compiles and executes a .cpp file
# Python c:\pyprg\pali.py -i c:\pyprg\pali_cpp
import sys, os, getopt
def main(argv):
opts, args = getopt.getopt(argv, "i:")
for o, a in opts:
if o in "-i":
run(a)
def run(a):
inp_file=a+'.cpp'
exe_file=a+'.exe'
os.system('g++ ' + inp_file + ' -o ' + exe_file)
os.system(exe_file)
if __name__=='__main__':
main(sys.argv[1:])
```

Output of the above program

Output 1

```
C:\Users\Dell>python c:\pyprg\pali.py -i c:\pyprg\pali_cpp
Enter a positive number: 56765
The reverse of the number is: 56765
The number is a palindrome
```

Output 2

```
C:\Users\Dell>python c:\pyprg\pali.py -i c:\pyprg\pali_cpp
Enter a positive number: 56756
The reverse of the number is: 65765
The number is not a palindrome
```

CHAPTER-15

1. SQLite

To use SQLite,

Step1: import sqlite3

Step2: Create a connection using connect () method and pass the name of the database File

Step3: Set the cursor object cursor = connection. cursor ()

To create a table in the database, create an object and write the SQL command in it.

Example:- sql_comm = "SQL statement"

2. Creating a Database using SQLite:

```
import sqlite3                          # importing module
connection = sqlite3.connect ("Academy.db")   # connecting to the database
cursor = connection.cursor()            # cursor
```

3. Creating a Table:

CREATE TABLE Student (Rollno INTEGER, Sname VARCHAR(20), Grade CHAR(1), gender CHAR(1), Average float(5, 2), birth_date DATE, PRIMARY KEY (Rollno));

Ex:

```
sql_command = """
CREATE TABLE Student (
Rollno INTEGER PRIMARY KEY ,
Sname VARCHAR(20),
Grade CHAR(1),
gender CHAR(1),
Average DECIMAL(5,2),
birth_date DATE);"""
```

4. Adding Records:

```
import sqlite3
connection = sqlite3.connect ("Academy.db")
cursor = connection.cursor()
sql_command = """
CREATE TABLE Student ( Rollno INTEGER PRIMARY KEY , Sname VARCHAR(20), Grade CHAR(1), gender CHAR(1), Average DECIMAL
                    (5, 2), birth_date DATE);"""
cursor.execute(sql_command)
sql_command = """INSERT INTO Student (Rollno, Sname, Grade, gender, Average, birth_date) VALUES (NULL, "Akshay", "B", "M","87.8",
                "2001-12-12");"""
cursor.execute(sql_command)
sql_command = """INSERT INTO Student (Rollno, Sname, Grade, gender, Average, birth_date) VALUES (NULL, "Aravind", "A",
              "M","92.50","2000-08-17");"""
cursor.execute(sql_command)
connection.commit()
connection.close()
```


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```
print("STUDENT TABLE CREATED")
```
OUTPUT
STUDENT TABLE CREATED

5. SQL Query Using Python:

SELECT Query:

```
#save the file as "sql_Academy_query.py"
import sqlite3
connection = sqlite3.connect("Academy.db")
crsr = connection.cursor()
crsr.execute("SELECT * FROM Student") # execute the command to fetch all the data from the table Student
ans= crsr.fetchall()      # store all the fetched data in the ans variable
for i in ans: # loop to print all the data
print(i)
```

Displaying all records using fetchall()

```
import sqlite3
connection = sqlite3.connect("Academy.db")
cursor = connection.cursor()
cursor.execute("SELECT * FROM student")
print("fetchall:")
result = cursor.fetchall()
for r in result:
print(r)
```

fetchall:
(1, 'Akshay', 'B', 'M', 87.8, '2001-12-12')
(2, 'Aravind', 'A', 'M', 92.5, '2000-08-17')
(3, 'BASKAR', 'C', 'M', 75.2, '1998-05-17')
(4, 'SAJINI', 'A', 'F', 95.6, '2002-11-01')
(5, 'VARUN', 'B', 'M', 80.6, '2001-03-14')
(6, 'PRIYA', 'A', 'F', 98.6, '2002-01-01')
(7, 'TARUN', 'D', 'M', 62.3, '1999-02-01')

OUTPUT

Displaying A record using fetchone()

```
import sqlite3
connection = sqlite3.connect("Academy.db")
cursor = connection.cursor()
cursor.execute("SELECT * FROM student")
print("\nfetch one:")
res = cursor.fetchone()
print(res)
```

OUTPUT
fetch one:
(1, 'Akshay', 'B', 'M', 87.8, '2001-12-12')

Displaying all records using fetchone()

```
import sqlite3
connection = sqlite3.connect("Academy.db")
cursor = connection.cursor()
cursor.execute("SELECT * FROM student")
print("fetching all records one by one:")
result = cursor.fetchone()
while result is not None:
print(result)
result = cursor.fetchone()
```

OUTPUT
fetching all records one by one:
(1, 'Akshay', 'B', 'M', 87.8, '2001-12-12')
(2, 'Aravind', 'A', 'M', 92.5, '2000-08-17')
(3, 'BASKAR', 'C', 'M', 75.2, '1998-05-17')
(4, 'SAJINI', 'A', 'F', 95.6, '2002-11-01')
(5, 'VARUN', 'B', 'M', 80.6, '2001-03-14')
(6, 'PRIYA', 'A', 'F', 98.6, '2002-01-01')
(7, 'TARUN', 'D', 'M', 62.3, '1999-02-01')

Displaying Specified number of records using fetchmany(n)

```
import sqlite3
connection = sqlite3.connect("Academy.db")
cursor = connection.cursor()
cursor.execute("SELECT * FROM student")
print("fetching first 3 records:")
result = cursor.fetchmany(3)
print(result)
```

OUTPUT
fetching first 3 records:
[(1, 'Akshay', 'B', 'M', 87.8, '2001-12-12'), (2, 'Aravind', 'A', 'M', 92.5, '2000-08-17'), (3, 'BASKAR', 'C', 'M', 75.2, '1998-05-17')]

Program to display the content of tuples in newline without using loops

```
import sqlite3
connection = sqlite3.connect("Academy.db")
cursor = connection.cursor()
cursor.execute("SELECT * FROM student")
print("fetching first 3 records:")
result = cursor.fetchmany(3)
print(*result,sep="\n") # * is used for unpacking a tuple.
```

OUTPUT
fetching first 3 records:
(1, 'Akshay', 'B', 'M', 87.8, '2001-12-12')
(2, 'Aravind', 'A', 'M', 92.5, '2000-08-17')
(3, 'BASKAR', 'C', 'M', 75.2, '1998-05-17')

[Refer book 15.4.2 to 15.3 to 15.3 programs only]

CHAPTER-16

1. Getting Started

```
import matplotlib.pyplot as plt
```

Example:

```
import matplotlib.pyplot as plt
plt.plot([1,2,3,4])
plt.show()
```

Output

- This window is a matplotlib window, which allows you to see your graph.
- You can hover the graph and see the coordinates in the bottom right.

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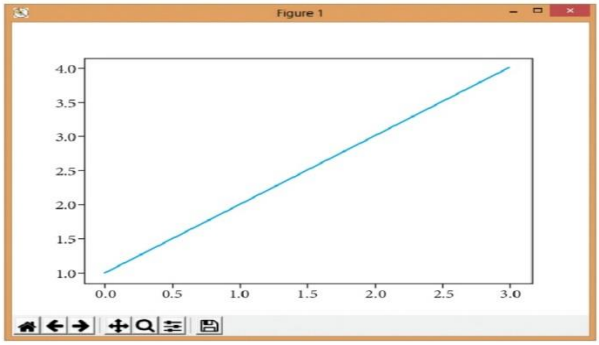
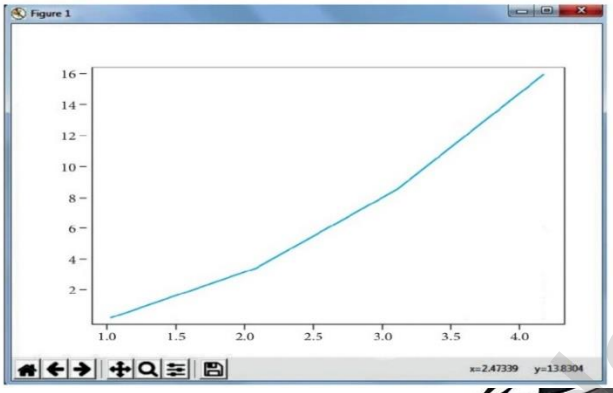


2. **Program**

For example, to plot x and y, you can issue the command:

```
import matplotlib.pyplot as plt
plt.plot([1,2,3,4], [1,4,9,16])
plt.show()
```

- This .plot takes many arguments, but the first two here are 'x' and 'y' coordinates.
- This means, you have 4 co-ordinates according to these lists: (1,1), (2,4), (3,9) and (4,16).



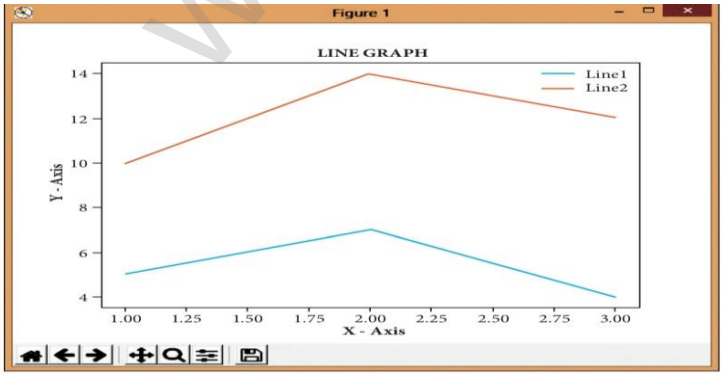
3. **Program:**

Plotting Two Lines: [To plot two lines, use the following code]

```
import matplotlib.pyplot as plt
x = [1,2,3]
y = [5,7,4]
x2 = [1,2,3]
y2 = [10,14,12]
plt.plot(x, y, label='Line 1')
plt.plot(x2, y2, label='Line 2')
plt.xlabel('X-Axis')
plt.ylabel('Y-Axis')
plt.title('LINE GRAPH')
plt.legend()
plt.show()
```

Output

- With plt.xlabel and plt.ylabel, you can assign labels to those respective axis.
- Next, you can assign the plot's title with plt.title, and then you can invoke the default legend with plt. legend().



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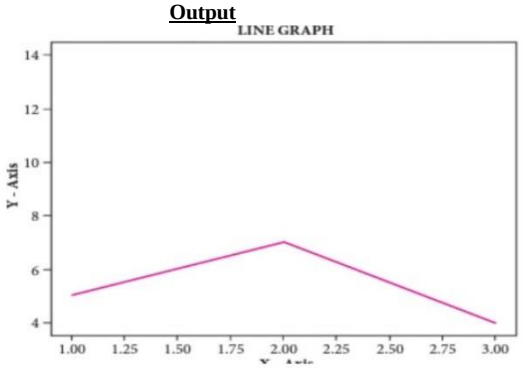
1. **Create a plot. Set the title, the x and y labels for both axes.**

```
import matplotlib.pyplot as plt
x = [1, 2, 3]
y = [5, 7, 4]
plt.plot(x,y)
plt.xlabel('x-axis')
plt.ylabel('y-axis')
plt.title('LINE GRAPH')
plt.show()
```

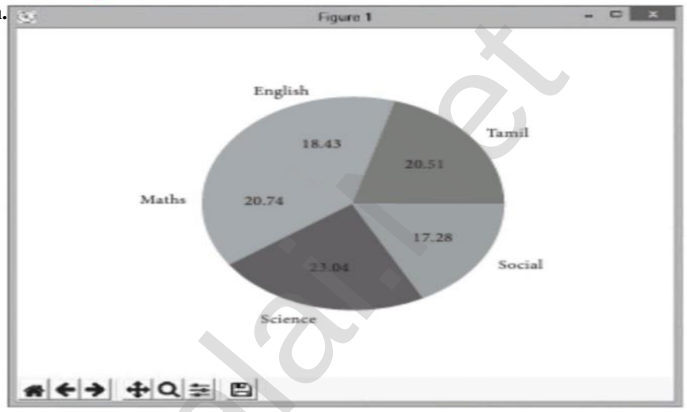
Output



Output :

2. **Plot a pie chart for your marks in the recent examination.**

```
import matplotlib.pyplot as pit
sizes = [89, 80, 90, 100, 75]
labels = ["Tamil", "English", "Maths", "Science","Social"]
plt.pie(sizes, labels = labels, autopct = "%.ef ")
plt.axes().set_aspect("equal")
plt.show()
```



3. **Plot a line chart on the academic performance of Class 12 students in Computer Science for the past 10 years.**

```
import matplotlib.pyplot as plt
years = [2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018]
cs = [65, 70, 75, 76, 78, 80, 82, 85, 87, 92]
plt.plot(years,cs)
plt.title("COMPUTER SCIENCE ACADEMIC PERFORMANCE")
plt.xlabel("cs")
plt.ylabel('years")
plt.show()
```

4. **Plot a bar chart for the number of computer science periods in a week.**

```
import matplotlib.pyplot as plt
labels = ["MON", "TUE", "WED", "THUR", "FRI", "SAT",]
usage = [3, 2, 1, 3, 2, 2]
y_positions = range (len(labels))
plt.bar(y_positions, usage)
plt.xticks(y_positions, labels)
plt.ylabel("PERIODS")
plt.ylabel("years")
plt.title("NO. OF CS PERIODS")
plt.show()
```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PUBLIC EXAMINATION 2 & 3 MARK COMPULSORY QUESTIONS WITH ANSWERS

TWO MARKS (PUBLIC Q.NO :24)

1. What is a literal? Explain the types of literals? (J-2024)

- Literal is a raw data given in a variable or constant.
- In Python, there are various **types** of literals.

1.Numeric Literals consists of digits and are immutable
2.String literal is a sequence of characters surrounded by quotes.
3.Boolean literal can have any of the two values: True or False.

2. Write the use of pop () function in Python. (M-2024)

- Pop() function is used to delete a particular element from a list using its index value.
- Pop () function is used to delete only one element from a list.

3. What is set in Python? (J-2023)

- In python, a set is another type of collection data type.
- A Set is a mutable and an unordered collection of elements without duplicates.
- That means the elements within a set cannot be repeated.
- This feature used to include membership testing and eliminating duplicate elements.

4. What will be output of the python code? (M-2023)

```
Squares = [x**2 for x in range (1,11)]
print (Squares)
```

Output
[1,4,9,16,25,36,49,64,81,100]

5. What will be the output of the following python code? (J-2022)

str1 = "School" print(str1*3) **Output:** School School School

6. Write the syntax of getopt.getopt method (M-2022)

<opts>,<args>=getopt.getopt(argv, options, [long_options])

7. What is List in Python? (S-2021)

- A list in Python is known as a "sequence data type" like strings.
- It is an ordered collection of values enclosed within square brackets [ ].
- Each value of a list is called as element.
- It can be of any type such as numbers, characters, strings and even the nested lists as well.

Syntax: Variable = [element-1, element-2, element-3 …… element-n]

8. What are the advantages of User-defined Functions? (S-2020)

- Functions help us to divide a program into modules. This makes the code easier to manage.
- It implements code reuse. Every time you need to execute a sequence of statements, all you need to do is to call the function.

9. What will be the output of the given python program (M-2020)

str= "COMPUTER SCIENCE"

a) print(str*2) **Ans:** COMPUTER SCIENCE COMPUTER SCIENCE

b) print (str[0:7]) **Ans:** COMPUTE

THREE MARKS (PUBLIC Q.NO :33)

1. Mention the difference between fetch one ( ) and fetch many ( ) (J-2024)

fetch one ()	Fetch many ()
❖ The fetch one () method returns the next row of a query result set or none in case there is no row left.	❖ The fetch many () method returns the next number of rows (n) of the result set.
❖ Using while loop and fetch one() method we can display all the records from a table	❖ Displaying specified number of records is done by using fetch many ()

2. Write short notes on TCL commands in SQL (M-2024)

1. **Commit :** Saves any transaction into the database permanently. Syntax: COMMIT;
2. **Roll back :** Restores the database to last commit state. Syntax: ROLL BACK TO save point name;
3. **Save point:** Temporarily save a transaction. Syntax: SAVEPOINT savepoint_name;

2. Write a program to check if the year is leap year or not. (J-2023)

CODE:

```
n=int(input("Enter the year"))
if(n%4==0):
print ("Leap Year")
else:
print ("Not a Leap Year")
```

Output:

```
Enter the year 2012 (or) 2000
Leap Year
```

3. Write about the steps of python program executing C++ program using control statement (M-2023)

1. Type the c++ program in notepad and save it as with .cpp extension.
2. Type the python program and save it as with .py extension.
3. Click the Run Terminal and open the command window
4. Type the command python <program_name.py> -i <c++ program>

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4. **What is the output of the following program? (J-2022)**

```
class Greeting:
def __init__(self, name):
    self.__name = name
def display(self):
    print("Good Morning ", self.__name)
obj=Greeting('Bindu Madhavan')
obj.display()
```

Output

Good Morning Bindu Madhavan

5. **Write a program to display: (M-2022)**

```
A
A B
A B C
A B C D
A B C D E
```

```
a=['A','B','C','D','E']
for i in range(0,6):
for j in range(0,i):
print(a[j],end=" ")
else:
print()
```

6. **Write short notes on Arithmetic operator with examples. (S-2021)**

- An arithmetic operator is a mathematical operator that takes two operands and performs a calculation on them.
- They are used for simple arithmetic.

Operator - Operation	Examples	Result
Assume a=100 and b=10. Evaluate the following expressions		
+ (Addition)	>>> a + b	110
- (Subtraction)	>>>a – b	90
* (Multiplication)	>>> a*b	1000
/ (Divisioin)	>>> a / b	10.0
% (Modulus)	>>> a % 30	10
** (Exponent)	>>> a ** 2	10000
// (Floor Division)	>>> a//30 (Integer Division)	3

7. **What will be the output of the given Python program? (S-2020)**

```
a = "Computer"
b = "Science"
x = a[:4] +b[len(b)-3:]
print(x)
```

Output

Compnce

8. **What is the output of the following program? (M-2020)**

```
class Greeting:
def __init__(self, name):
self.__name = name
def display(self):
print("Welcome to ", self.__name)
obj=Greeting('Python Programming')
obj.display()
```

Output

Welcome to Python Programming

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CHAPTER 1 TO 16 IMPORTANT SYNTAX / PROGRAMS / EXAMPLES

SN	TOPIC	SYNTAX / EXAMPLES
	CHAPTER - 1	**FUNCTION**
1.	Function definition	let rec fn a1 a2 ... an := k
2.	Function types	x → y ; x1 → x2 → y; x1 → ... → xn → y
3.	Pure functions	let square x:= return: x * x

4.	Impure functions	let randomnumber :=
		a := random()
		if a > 10 then
		return: a
		else
		return: 10

	CHAPTER - 2	**DATA ABSTRACTION**
1.	Constructor Pseudo code	Distance (city1, city2): lt1, lg1 := getlat(city1), getlon(city1) lt2, lg2 := getlat(city2), getlon(city2) return $((lt1 - lt2)**2 + (lg1 - lg2)**2))^{1/2}$
2.	Rational number Pseudo code	x,y:=8,3 rational(n,d) numer(x)/denom(y) - - output : 2.6666666666666665
3.	Multi part object Pseudo code	class Person: creation( ) firstName := " " lastName := " " id := " " email := " "
	CHAPTER - 5	**PYTHON -VARIABLES AND OPERATORS**
1.	The print() function	print ("string to be displayed as output ") print (variable) print ("String to be displayed as output ", variable) print ("String1 ", variable, "String 2", variable, "String 3" ……)
2.	The input() function	Variable = input ("prompt string")
3.	Conditional operator	Variable Name = [on_true] if [Test expression] else [on_false]
	CHAPTER - 6	**CONTROL STRUCTURES**
1.	Simple if statement	if <condition>: statements-block1

2.	if..else statement	if <condition>:
		statements-block 1
		else:
		statements-block 2

3.	Nested if..elif...else	if <condition-1>:
		statements-block 1
		elif <condition-2>:
		statements-block 2
		else: statements-block n

4.	while loop	while <condition>: statements block 1 [else: statements block2]
5.	for loop	for counter_variable in sequence: statements-block 1 [else: # optional block statements-block 2]
6	break statement	break
7.	continue statement	continue

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8.	pass statement	pass
	CHAPTER - 7	**PYTHON FUNCTIONS**
1.	User defined function	def <function_name ([parameter1, parameter2…])> : <Block of Statements> return <expression / None>
2.	Passing Parameters	def function_name (parameter(s) separated by comma):
3.	Variable-Length Arguments	def function_name(*args): function_body return_statement
4.	Anonymous Functions	lambda [argument(s)] :expression
5.	Return statement	return [expression list]
	CHAPTER - 9	**LIST,TUPLES, SETS AND DICTIONARY**
1.	Create a List	Variable = [element-1, element-2, element-3 …… element-n]
2.	Accessing List elements	List_Variable = [E1, E2, E3 …… En] print (List_Variable[index of a element])
3.	Accessing elements using for loop	for index_var in list: print (index_var)
4.	Changing list elements	List_Variable [index of an element] = Value to be changed List_Variable [index from : index to] = Values to changed
5.	Adding more elements in a list	List.append (element to be added) List.extend ([elements to be added])
6.	Inserting elements in a list	List.insert (position index, element)
7.	Deleting elements from a list	del List [index of an element] # to delete a particular element del List [index from : index to] # to delete multiple elements del List # to delete entire list

8.	Remove , Pop , Clear ()	List.remove(element) # to delete a particular element
		List.pop(index of an element)
		List.clear( )

9.	Range ( ) function	range (start value, end value, step value)
10	Creating a list (Rang ())	List_Varibale = list (range ( ))
11	List comprehensions	List = [expression for variable in range]

12	Creating Tuples	Tuple_Name = ( ) # Empty tuple
		Tuple_Name = (E1, E2, E2 ……. En) # Tuple with n number elements
		Tuple_Name = E1, E2, E3 ….. En # Elements of a tuple without parenthesis

13	Creating tuples using tuple( ) function	Tuple_Name = tuple([list elements])
14	Delete Tuple	del tuple_name
15	Creating a Set	Set_Variable = {E1, E2, E3 …….. En}
16	defining a dictionary:	Dictionary_Name = { Key_1: Value_1, Key_2:Value_2, ….. Key_n:Value_n }
17	Creating a Dictionary	# Empty dictionary Dict1 = { } # Dictionary with Key Dict_Stud = { 'RollNo': '1234', 'Name':'Murali', 'Class':'XII', 'Marks':'451'}
18	Deleting a Dictionary	# To delete a particular element. del dictionary_name[key] # To delete all the elements dictionary_name.clear( ) # To delete an entire dictionary del dictionary_name
	CHAPTER - 10	**PYTHON CLASSES AND OBJECTS**
1	Defining classes	class class_name: statement_1 statement_2 …….. …….. statement_n
2.	Creating objects	Object_name = class_name( )
3.	Accessing Class Members	Object_name . class_member
4.	Constructor general format __init__ method	def __init__(self, [args ……..]): <statements>
	CHAPTER - 12	**STRUCTURED QUERY LANGUAGE (SQL)**
1.	Creating data base	1.To create a database, type the following command in the prompt: CREATE DATABASE database_name; For example to create a database to store the tables: **CREATE DATABASE stud;** 2. To work with the database, type the following command. **USE DATABASE;**

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		For example to use the stud database created, give the command **USE stud;**
2.	CREATE TABLE Command	CREATE TABLE <table-name> (<column name><data type>[<size>] (<column name><data type>[<size>]……);
3.	SQL command	CREATE TABLE Student (Admno integer, Name char(20), Gender char(1), Age integer, Place char(10),);
4.	A table created with constraint	CREATE TABLE <table-name> (<column name><data type>[<size>]<column constraint>, (<column name><data type>[<size>]<column constraint>…… <table constraint>(<column name>,[<column name>….])…..);
5.	INSERT command	INSERT INTO <table-name> [column-list] VALUES (values);
6.	DELETE COMMAND	DELETE FROM table-name WHERE condition;
7.	UPDATE COMMAND	UPDATE <table-name> SET column-name = value, column-name = value,… WHERE condition;
8.	ALTER COMMAND	ALTER TABLE <table-name> ADD <column-name><data type><size>; ALTER <table-name> MODIFY<column-name><data type><size>; ALTER <table-name> RENAME old-column-name TO new-column-name; ALTER <table-name> DROP COLUMN <column-name>;
9.	TRUNCATE command	TRUNCATE TABLE table-name;
10	DROP TABLE command	DROP TABLE table-name;
11	SELECT command	SELECT <column-list>FROM<table-name>;
12	DISTINCT Keyword	SELECT DISTINCT Place FROM Student;
13	ALL Keyword	SELECT ALL Place FROM Student;
14	SELECT command with WHERE Clause	SELECT <column-name>[,<column-name>,….] FROM <table-name>WHERE condition>;
15	BETWEEN and NOT BETWEEN Keywords	SELECT Admno, Name, Age, Gender FROM Student WHERE Age BETWEEN 18 AND 19;
16	IN Keyword	SELECT Admno, Name, Place FROM Student WHERE Place IN (“Chennai”, “Delhi”);
17	ORDER BY clause	SELECT <column-name>[,<column-name>,….] FROM <table-name>ORDER BY <column1>,<column2>,…ASC| DESC ;
18	WHERE clause	SELECT * FROM Student WHERE Age>=18 ORDER BY Name;
19	GROUP BY clause	SELECT <column-names> FROM <table-name> GROUP BY <column-name>HAVING condition];
20	HAVING clause	SELECT Gender , count(*) FROM Student GROUP BY Gender HAVING Place = ‘Chennai’ ;
21	COMMIT command	COMMIT;
22	ROLLBACK command	ROLL BACK TO save point name;
23	SAVEPOINT command	SAVEPOINT savepoint_name;
	CHAPTER - 13	**PYTHON AND CSV FILES**
1	csv.reader()	csv.reader(fileobject,delimiter,fmtparams)
2.	Read A CSV File And Store It In A List	list = [] # Start as the empty list list.append(element) # Use append() to add elements
3.	csv.writer()	csv.writer(fileobject,delimiter,fmtparams)
	CHAPTER -14	**IMPORTING C++ PROGRAMS IN PYTHON**
1.	Execute the Python program	Python <filename.py> -i <C++ filename without cpp extension>
2.	Accessing the functions from module	<module name> . <function name>
3.	Python's OS Module **(.)**	os.system (‘g++ ’ + <variable_name1> ‘ -<mode> ’ + <variable_name2>
4.	getopt.getopt method	<opts>,<args>=getopt.getopt(argv, options, [long_options])
5.	command for wrapping C++ code	if __name__=='__main__': main(sys.argv[1:])
	CHAPTER - 15	**DATA MANIPULATION THROUGH SQL**
1.	Creating a Database using SQLit	# importing module import sqlite3 # connecting to the database connection = sqlite3.connect ("Academy.db") # cursor cursor = connection.cursor()
2.	Creating a Table	CREATE TABLE Student (RollnoINTEGER, SnameVARCHAR(20), GradeCHAR(1), gender CHAR(1), Average float(5.2), birth_date DATE, PRIMARY KEY (Rollno));
	CHAPTER - 16	**DATA VISUALIZATION USING PYPLOT: (LINE,PIE, BAR CHART)**
1.	Matplotlib using the command	import matplotlib.pyplot as plt

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CHAPTER 1 TO 16 HANDS ON EXPERIENCE PROGRAMS

CHAPTER – 1 (FUNCTION)

1. Write algorithmic function to find the minimum among 3 numbers (or)
Write a function that find the minimum of its 3 arguments

```
let min 3 x y z :=
if x < y then
if x < z then x else z
else
if y < z then y else z
```

2. Write algorithmic recursive function definition to find the sum of n natural numbers.

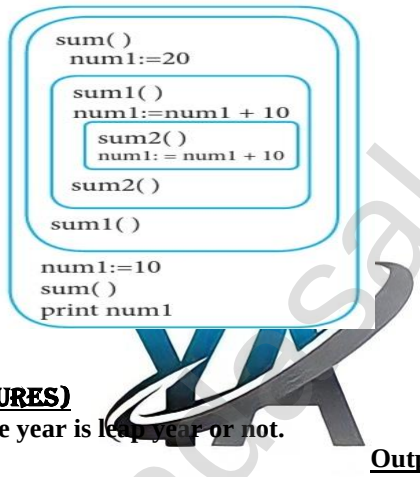
```
let rec sum num:
if (num!=0) then
return num+sum (num-1)
else
return num
```

(CHAPTER-3)(SCOPING)

1. Observe the following diagram and write the Pseudo code for the following :

Answer:

```
sum( ):
      num1:=20
         sum1( ):
num1:=num1+10
         sum2( )
num:=num1+10
sum2( )
sum1 ( )
num1:=10
sum ( )
print num1
```



CHAPTER – 6 (CONTROL STRUCTURES)

1. Write a program to check if the year is leap year or not.

CODE:

```
n=int(input("Enter the year"))
if(n%4==0):
print ("Leap Year")
else:
print ("Not a Leap Year")
```

Output:

```
Enter the year  2012 (or) 2000
Leap Year
```

2. Write program to check vowel or not.

```
ch = input (" Enter a character:")
if ch in ('a','A','e','i','I','o','O','u','U'):
print (ch, 'is a vowel')
else:
print(ch,'is not a Vowel')
```

Output1:

```
Enter a character :S
S is not a vowel
```

Output2:

```
Enter a character: A      A is a vowel
```

3. Using if..else..elif statement check smallest of three numbers.

```
num1=int(input("Enter first number:"))
num2=int(input("Enter second number:"))
num3=int(input("Enter third number:"))
if (num1<num2)and (num1<num3):
smallest=num1
elif(num2<num1)and (num2<num3):
smallest=num2
else:
smallest=num3
print("The smallest number is",smallest)
```

Output:

```
Enter first number:15
Enter second number 9
Enter third number : 21
The smallest number is : 9
```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4. Write a program to check if a number is positive, Negative or Zero.

```
num=int(input("Enter a number:"))
if num> 0:
print("The number is positive")
elif num< 0:
Print("The number is negative")
else:
Print("The number is Zero")
```

Output 1:
Enter a number : 26
The number is positive

Output 2:
Enter a number : 0
The number is Zero

5. Write a program to display Fibonacci series 0112345 ….(up to n terms)

```
n=int (input("Enter the number of terms:"))
print("Fibonacci series is:")
a=-1
b=1
for i in range( 0,n,1):
c=a+b
print(c)
a=b
b=c
```

Output:
Enter the number of terms : 6
Fibonacci series is :
0
1
1
2
3
5

6. Write a program to display sum of natural numbers, Up to n.

```
n=int(input("Enter a number:"))
sum=0
for i in range (i,n=+1):
sum=sum+i
print("Sum=",sum)
```

Output :
Enter any number: 5
sum =15

7. Write a program to check if the given number is palindrome or not.

```
n=int(input("Enter a number:"))
rev=0
num=n
while(num>0):
d=num%10
rev=rev*10+d
    num=num/10
    if n= =rev:
      print("Given no.:",n,"is palindrome")
    else:
    print("Given no.:",n,"is not a palindrome")
```

Output 1:
Enter a number : 1234
Given.:1234 is not a palindrome

Output 2:
Enter a number : 3223
Given.:3223 is a palindrome

8. Write a program to print the following pattern…

```
* * * * *
* * * *
* * *
* *
*
```

```
n=int(input("Enter a number:"))
for i in range (0,5):
for j in range (5,i-1):
print("*"end=" ")
print ( )
```

CHAPTER – 7 (PYTHON FUNCTIONS)

1. Try the following code in the above program

S.no	Code	Result
1.	printinfo("3500")	Error
2.	printinfo("3500","Sri")	Name: Sri Salary:3500
3.	printinfo(name="balu")	Name: Balu Salary:3500
4.	printinfo("Jose",1234)	Name: Jose Salary:1234
5.	printinfo(" ",salary=1234)	Name:Salary: 1234

2. Evaluate the following functions and write the output

S.no	Function	Output
1.	eval('25*2-5*4')	30
2.	math.sqrt(abs(-81))	9.0
3.	math.ceil(3.5+4.6)	8.1
4.	math.floor(3.5+4.6)	9

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3. Evaluate the following functions and write the output

1) abs(-25+12.0))	Ans : 13	2) abs(-3.2)	Ans: 3.2
1) ord('2')	Ans: 50	2) ord('$')	Ans: 36

1) type('s') Ans: <class'str'>

1) bin(16) Ans: 0b10000

1) chr(13) Ans: CR(carriage return (or) ('\r')
2) print(chr(13)) Ans: It moves the cursor to the beginning of same line

1) round(18.2,1)	Ans: 18.0	2) round(18.2,0)	Ans: 18.0
3) round(0.5100,3)	Ans: 0.510	4) round(0.5120,3)	Ans: 0.512

1) format(66, 'c')	Ans: B	2) format(10, 'x')	Ans: a
3) format(10, 'X')	Ans: A	4) format(0b110, 'd')	Ans: 6
5) format(0xa, 'd')	Ans: 10		

1) pow(2,-3)	Ans: 0.125	2) pow(2,3.0)	Ans: 1
3) pow(2,0)	Ans: 8.0	4) pow((1+2),2)	Ans: 9

CHAPTER – 8 (STRINGS AND STRING MANIPULATION)

1. Write a program to find the length of a string.

```
str= input("Enter a string")
print(len(str))
```

Output
Enter a string: Pravit
6

2. Write a program to count the occurrences of each word in a given string

```
s=input("Enter string")
w=input("Enter word")
c=0
for i in s:
if i==w:
c+=1
print(c,"No of times")
```

Output:
Enter string Veyul Santhosh
Enter word h
2 No of times

3. Write a program to add a prefix text to all the lines in a string.

```
Import textwrap
text=""Strings are immutable. Slice is a substring of a main string. Stride is a third argument in slicing operation""
text_without_Identation=textwrap.dedent(text)
wrapped=textwrap.fill(text_withoutIndentation, width=50)
print(textwrap.indent(wrapped,'*')
print()
```

Output:

```
* Strings are immutable. Slice is a
*substring of a main string. Stride
*is a third argument in slicing operation
```

4. Write a program to print integers with '*' on the right of specified width.

```
x=int(input())
print("Formatted number is..."+"{:*<5d}".format(x));
```

Output
Formatted number is...12***

5. Write a program to create a mirror of the given string. Ex:"wel"="lew".

```
a=input("Enter a string : ")
print("The given string is : ", a )
print("The Mirror of the given string is : ",a[::-1] )
```

Output
Enter a string : WEL
The given string is : WEL
The Mirror of the given string is : LEW

6. Write a program to removes all the occurrences of a give character in a string.

```
s="abisheik"
print(s.replace('e',''))
```

Output:
abishik

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7. Write a program to append a string to another string without using += operator.

```
s1="Ahamed"
s2="aslan"
c="".join((s1,s2))
print(c)
```

Output
Ahamedaslan

8. Write a program to swap two strings.

```
s1="Karl"
s2="Marz"
print(s1,s2)
t=s1
s1=s2
s2=t
print(s1,s2)
```

Output
KarlMarz
MarzKarl

9. Write a program to replace a string with another string without using replace().

```
s="YBA"
r=[ ]
for i in s:
if i=='B':
i='A'
r.append(i)
print(s)
print(' '.join(r))
```

Output:
YBA
YAA

10. Write a program to count the number of characters, words and lines in a given string.

```
s=str(input("Enter a String: "))
c=len(s)
w=0
l=0
for i in s:
if(i==' '):
w=w+1
if(i=='.'):
l=l+1
print("Character:",c,"Words:",w,"Lines:",l)
```

Output:
Enter a String: i love india.
Character: 13 Words: 2 Lines: 1

CHAPTER – 9 (LISTS, TUPLES, SETS AND DICTIONARY)

1. **Write a program to remove duplicates from a list.**

```
l=[1,2,3,4,3]
s=set(l)
print(s)
```

Output:
{1, 2, 3, 4}

2. **Write a program that prints the maximum value in a Tuple.**

```
m=( 6,5,8,9,2,4)
print(max(m))
```

Output:
9

3. **Write a program that finds the sum of all the numbers in a Tuples using while loop.**

```
M=(1,2,3,4,5,6)
n=len(m)
s=0
i=0
while(i<n):
s+=m[i]
i+=1
print(s)
```

Output:
21

4. **Write a program that finds sum of all even numbers in a list.**

```
s=0
l=[]
for n in range(2,11,2):
l.append(n)
s=s+n
print(l)
print(s)
```

Output:
[2, 4, 6, 8, 10]

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5. Write a program that reverse a list using a loop

```
s=[1,2,3,4,5]
r=[]
n=len(s)
for i in range(n-1,-1,-1):
r.append(s[i])
print(s)
print(r)
```

Output

```
[1, 2, 3, 4, 5]
[5, 4, 3, 2, 1]
```

6. Write a program to insert a value in a list at the specified location.

```
S=[1,2,3,4,5]
print(s)
s.insert(2,"manoj")
print(s)
```

Output:

```
[1, 2, 3, 4, 5]
[1, 2, 'manoj', 3, 4, 5]
```

7. Write a program that creates a list of numbers from 1 to 50 that are either divisible by 3 or divisible by 6.

```
s=[]
for i in range(1,51,1):
if(i%3==0 or i%6==0):
s.append(i)
print(s)
```

Output

```
[3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36, 39, 42, 45, 48]
```

8. Write a program to create a list of numbers in the range 1 to 20. Then delete all the numbers from the list that are divisible by 3.

```
MyList=[]
for n in range(1,21):
MyList.append(n)
print("List 1 to 20 : ")
print(MyList)
for x in MyList:
if x%3==0:
MyList.remove(x)
print("List after deleting the elements divisible by 3 : ")
print(MyList)
```

Output

```
List 1 to 20 :
[1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20]
List after deleting the elements divisible by 3 :
[1, 2, 4, 5, 7, 8, 10, 11, 13, 14, 16, 17, 19, 20]
```

9. Write a program that counts the number of times a value appears in the list. Use a loop to do the same.

```
s=[4,5,6,4,3,7,8,4]
print(s)
n=int(input())
c=0
for i in s:
if(i==n):
c=c+1
print(c)
```

Output

```
[4, 5, 6, 4, 3, 7, 8, 4]
4
3
```

10. Write a program that prints the maximum and minimum value in a dictionary

```
d={'a':1000,'b':3000,'c':2000}
ma=max(d,key=lambda m:d[m])
mi=min(d,key=lambda n:d[n])
print("Maximum:",d[ma])
print("Minimum:",d[mi])
```

Output:

```
Maximum : 3000
Minimum : 1000
```


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CHAPTER – 10 (PYTHON CLASSES AND OBJECTS)

1. Write a program using class to store name and marks of students in list and print total marks.

```
class Student:
__name=[ ]
__Tam=[ ]
__Eng=[ ]
__Mat=[ ]
defgetData(self):
self.n=int(input("Enter no. of students : "))
for x in range(self.n):
print("Enter details for Student ",x+1)
self.__name.append(input("Enter Name : "))
self.__Tam.append(int(input("Enter Tamil Mark : ")))
self.__Eng.append(int(input("Enter English Mark : ")))
self.__Mat.append(int(input("Enter Maths Mark : ")))
defdispData(self):
print('_'*50)
print("Name \t Tami \t Eng \t Mat \t Total")
print('_'*50)
for x in range(self.n):
tot=self.__Tam[x]+self.__Eng[x]+self.__Mat[x]
print(self.__name[x],'\t',self.__Tam[x], '\t', self.__Eng[x], '\t', self.__Mat[x],'\t',tot)
print('_'*50)
S=Student()
S.getData()
S.dispData()
```

Output

```
Enter no. of students : 2
Enter details for Student 1
Enter Name : kavin
Enter Tamil Mark : 88
Enter English Mark: 80
Enter Maths Mark:80

Enter details for Student 2
Enter Name: Karl
Enter Tamil Mark: 87
Enter English Mark: 80
Enter Maths Mark: 80
```

Name	Tami	Eng	Mat	Total
Kavin	88	80	80	248
Karl	84	80	80	244

2. Write a program using class to accept three sides of a triangle and print its area.

```
#Area of Triangle=sqrt(s(s-a)(s-b)(s-c), Where s=(a+b+c)/2
import math
class Area Of Triangle:
def __init__(self,a,b,c):
self.a=a
self.b=b
self.c=c
def area(self):
s=(self.a+self.b+self.c)/2
area_tri=math.sqrt(s*(s-self.a)*(s-self.b)*(s-self.c))
return area_tri
s1=float(input("Enter side 1 : "))
s2=float(input("Enter side 2 : "))
s3=float(input("Enter side 3 : "))
A=AreaOfTriangle(s1,s2,s3)
print("Area of the Triangle = ",round(A.area(),2))
```

Output:

```
Enter side 1 : 2
Enter side 2 : 3
Enter side 3 : 4
Are of  triangle  : 2.9
```

3. Write menu driven to read, display, add and subtract two distances:

```
class Distance:
def read(self):
self.num1=int(input("Enter distance 1 : "))
self.num2=int(input("Enter distance 2 : "))
defdisp(self):
print("Distance 1 = ", self.num1)
print("Distance 2 = ", self.num2)
def add(self):
return self.num1+self.num2
def sub(self):
return self.num1-self.num2
d=Distance()
print(" 1.Read \n 2.Display \n 3.Add \n 4.Subtract \n 5.Exit")
ch=int(input("Enter your choice (1/2/3/4/5) : "))
while(ch!=5):
```

Output:

```
1.Read  2.Display  3.Add  4.Subtract  5.Exit
Enter your choice (1/2/3/4/5) : 1
Enter distance 1 : 22
Enter distance 2 : 10

Enter your choice (1/2/3/4/5) : 2
Distance 1 = 22
Distance 2 = 10

Enter your choice (1/2/3/4/5) : 3
Added distance = 32

Enter your choice (1/2/3/4/5) : 4
Subtracted distance = 12
```


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```
if(ch==1):
d.read()
elif(ch==2):
d.disp()
elif(ch==3):
print("Added distance = ", d.add())
elif(ch==4):
print("Subtracted distance = ",d.sub())
elif(ch==5):
break
else:
print("Invalid choice")
break
ch=int(input("Enter your choice (1/2/3/4/5) : "))
```

Enter your choice (1/2/3/4/5) : 5

CHAPTER – 12 (STRUCTURED QUERY LANGUAGE)

1. **Create a query of the student table in the following order of fields name, age, place and admno.**
   CRATE TABLE Student(Name char(30), age integer, place char(30), admno integer));
2. **Create a query to display the student table with students of age more than 18 with unique city.**
   SELECT*FROM student WHERE age >=18 GROUP BY city;
3. **Create a employee table with the following fields employee number, employee name, designation, date of joining and basic pay**
   CREATE TABLE EMPLOYEE(empno integer, name char(20), desig char(15), dojdata,basic integer);
4. **In the above table set the employee number as primary key and check for NULL values in any field.**
   ALTER TABLE EMPLOYEE MODIFY empno integernot null primary key;
   SELECT * FROM EMPLOYEE WHERE basic IS NULL;
5. **Prepare a list of all employees who are Managers**
   SELECT * FROM EMPLOYEE WHERE design =“MANAGERS”;

CHAPTER – 13 (PYTHON AND CSV FILES)

1. **Write a Python program to read the following Namelist.csv file and sort the data in alphabetically order of names in a list and display the output**

	A	B	C
1	SNO	NAME	OCCUPATION
2	1	NIVETHITHA	ENGINEER
3	2	ADHITH	DOCTOR
4	3	LAVANYA	SINGER
5	4	VIDHYA	TEACHER
6	5	BINDHU	LECTURE

```
import csv,operator
d=csv.reader(open('Namelist.csv'))
next(d)
s=sorted(d,key=operator.itemgetter(1))
for x in s:
print(x)
```

['2','ADHITH','DOCTOR']
['5','BINDHU','LECTURER']
['3','LAVANYA','SINGER']
['1','NIVETHITHA','ENGINEER']
['4','VIDHYA','TEACHER']

2. **Write a Python program to accept the name and five subject mark of 5 students. Find the total and store all the details of the students in a CSV file.**

```
import csv
csv Data = [['student','m1','m2','m3','m4','m5','total'],
    ['Harshini','90','90','90','90','90','450'],
    ['Sriharini','100','100','100','100',90','490'],
    ['jeya rupika','90','90','100','100',100','480'],
    ['vijay','100','90','90','90',100','470'],
    ['kayman','80','80','80','100',100','440']]
with open('c:\\pyprg\\ch13\\st.csv','w')as CF:
writer = csv.writer(CF)
writer.writerrows(csvData)
CF.close()
```

Student	m1	m2	m3	m4	m5	Total
Karl	90	190	90	90	90	450
Chandru	100	100	100	100	90	490
Dharshan	90	90	100	100	100	480
Kavin	100	90	90	90	100	470

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CHAPTER – 14 (IMPORTING C++ PROGRAMS IN PYTHON)

1. Write a C++ program to create a class called Student with the following details.

Protected member
Rno integer
Public members
void Readno(int); to accept roll number and assign to Rno
voidWriteno(); To display Rno.
Protected member
Mark1 float
Mark2 float
Public members
void Readmark(float, float); To accept mark1 and mark2
void Writemark(); To display the marks
Create a class called Sports with the following detail
Protected members
score integer
Public members
void Readscore(int); To accept the score
void Writescore(); To display the score
Private member
Total float
Public member
void display() assign the sum of mark1, mark2, score in total.
invokeWriteno(), Writemark() and Writescore(). Display the total also.
Save the C++ program in a file called hybrid. Write a python program to execute the hybrid.cpp

Answer :

In Notepad, type the C++ program.

```
#include<iostream>
using namespace std;
class student
{
protected:
int no;
public:
void readno(introllno)
{
mo = rollno;
}
class test: public student
{
protected:
float mark1,mar2;
public:
void readmark(float m1, float m2)
{
mark1 = m1;
mark2 = m2;
}
void writemark()
{
cout<<"\n mark1"<<mark1;
cout<<"\n mark2"<<mark2;
}};
class sports
{


protected:
int score;
public:
void readscore(int s)
{
score = s;
}
void writescore()
{
cout<<"SCORE:"<<score;
}};
class result : public test, public sports
{
private:
float total;
public;
void display()
{
total = mark1 + mark2;
cout<<"TOTAL MARKS: "<<total;
}};
int main()
{
result r;
r.readno(5);
r.readmark(100,100);
r.readscore(200);
r.writeno();
r.writemark();
r.display();
r.writescore();
return ();
}
```

Save this file as hybrid.cpp

Now type the python program in New Notepad file.

```
#python hybrid.py -i hybrid.cpp
import sys,os,getopt
def main(argv);
cpp_file="
exe_file="
opts, args = getopt.getopt(argv, "i:",
[ifile='])
for o, a in opts:
if o, a in opts:
cpp_file=a+'.cpp'
exe_file=a+'.exe'
run(cpp_file, exe_file)
def run(cpp_file, exe_file)
print("Compiling"+cpp_file)
os.system('g++'+ cpp_file + '-o'+ exe_file)
print("Running" + exe_file)
print("------------------")
print os.system(exe_file)
print if__name__=='__main__':
main(sys.argv[1:])
```


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Output:
Rollno : 5
Mark1 : 100
Mark2 : 100
TOTAL MARKS : 200
SCORE : 200

2. Write a C++ program to print boundary elements of a matrix and name the file as Border.cpp. Write a python program to execute the Border.cpp

Select File → New in Notepad and type the C++ program.

```
#include<iostream>
#include<bits/stdc++.h>
using namespace std;
constint MAX = 100;
void printBoundary(int a[][max], int m, int n)
{
for(inti=0; i< m; i++)
{
for(int j=0; j < n; j++)
{
if(i= =0 || j= =0 || i= =n–1 ||
j= =n–1)
cout<<a[i][j]<<" ";
else
cout<<" "
cout<< " ";
}
cout<<"\n;
}}
int main()
{
int a[4][MAX] = { {1,2,3,4}, {5,6,7,8},{1,2,3,4}, {5,6,7,8}};
print Boundary(a,4,4);
return 0;
}
```

save it as Border.cpp

open a New notepad file and type the python program to execute border.cpp

#python border.py -i border.cpp

```
import sys,os,getopt
def main(argv):
cpp_file ="
exe_file ="
opts, args= getopt.getopt(argv, "i:",['ifile="'])
for o, a in opts:
if o in("-i", "--ifile"):
cpp_file = a+'.cpp'
exe_file = a+'.exe
exe_file = a+'.exe'
run(cpp_file, exe_file)
def run(cpp_file, exe_file):
print("Compiling" + cpp_file)
os.system('g++'+ cpp_file + '-o'+ exe_file)
print("Running" + exe_file)
print("----------")
print
os.system(exe_file)
print
if __name__=='__main__':
main(sys.argv[1:])
```

Output :
1 2 3 4
5 8
1 4
5 6 7 8

CHAPTER – 15 (DATA MANIPULATION THROUGH SQL)

1. Create an interactive program to accept the details from user and store it in a csv file using Python for the following table. Database name : DB1 Table name : Customer

Cust_Id	Cust name	Address	Phone _no	City
C008	Sandeep	14/1 pritampura	41206819	Delhi
C010	AnuragBasu	15A, Park Road	61281921	Kolkata
C012	Hrithik	7/2 Vasant Nagar	26121949	Delhi

```
import sqlite3
import csv
d=open("customer.csv","w")
c=csv.writer(d)
con=sqlite3.connect("DB1.db")
cur=con.cursor( )
cur.execute ("""DROP TABLE Customer;""")
cur.execute ("CREATE TABLE Customer (CustID
CHAR(4) PRIMARY KEY, CustName
        CHAR(20), Address
CHAR(30),PhoneNoINTEGER,City CHAR(10))")
print ("Enter 3 Customers names : ")
name=[input( ) for I in range(3)]
print ("Enter their Customer IDs respectively:")
ID=[input( ) for I in range(3)]
print ("Enter their Address respectively : ")
addr=[input( ) for I in range(3)]
print("Enter their Phone Number respectively : ")
Phone=[int(input( )) for I in range(3)]
print("Enter their City respectively : ")
City=[input( ) for I in range(3)]
n=len (name)
for I in range(n):
cur.execute ("INSERT INTO Customer VALUES(?,?,?,?,?)"
        (ID[i],name[i],addr[i],Phone[i],City[i]))
con.commit( )
cur.execute ("SELECT * FROM Customer")
co=[i[0] for I in cur.description]
c.writerow (co)
data=cur.fetchall( )
for item in data:
c.writerow(item)
d.close( )
cur.close( )
```


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```
con.close( )
```

Output :

Customer.csv Excel file :
Enter 3 Customers names:
AnuragBasu
Hrithik
Enter their Customer IDs respectively:
C008
C010
C012
Enter their Address respectively :
14/1 PritamPura
15A, Park Road
7/2 Vasant Nagar
Enter their Phone Number respectively :
41206819
61281921
26121949
Enter their City respectively :
Delhi
Kolkata
Delhi

2. Consider the following table GAMES. Write a python program to display the records for question (i) to (iv) and give outputs for SQL queries (v) to (viii) Table: GAMES

Gcode	Name	Game Name	Number	Prize Money	Schedule Date
101	Padmaja	Carom Board	2	5000	01-23-2014
102	Vidhya	Badminton	2	12000	12-12-2013
103	Guru	Table Tennis	4	8000	02-14-2014
105	Keerthana	Carom Board	2	9000	01-01-2014
108	Krishna	Table Tennis	4	25000	03-19-2014

i) To display the name of all Games with theirGcodes in descending order of their schedule date.

```
print ("Displaying Data in Descending order of Date")
cursor.execute ("SELECT GameName, Gcode, ScheduleDate FROM Games ORDER By ScheduleDate DESC")
ans=cursor.fetchall()
print (*ans,sep='\n')
print( )
```

ii) To display details of those games which are having Prize Money more than 7000.

```
cursor.execute ("SELECT * FROM Games WHERE PrizeMoney>7000")
ans=cursor.fetchall()
print(*ans,sep='\n')
print( )
```

iii) To display the name and game name of the Players in the ascending order of Game name.

```
print ("Displaying Data in Ascending order of Name and GameName")
cursor.execute ("SELECT * FROM Games ORDER By Name, GameName")
ans=cursor.fetchall( )
print (*ans,sep='\n')
print( )
```

iv) To display sum of Prize Money for each of the Number of participation groupings (as shown in column Number 4)

```
print ("Displaying Sum of PrizeMondy for each Games")
cursor.execute ("SELECT GameName, sum (PrizeMoney) FROM Game
GROUP BY GameName")
ans=cursor.fetchall()
print (*ans,sep='\n')
print( )
```

v) Display all the records based on GameName

```
print ("Displaying all the records based on GameName")
cursor.execute ("SELECT * FROM Games ORDER BY GameName")
ans=cursor.fetchall()
print (*ans,sep='\n')
print( )
connection.close ( )
```

Output:

1.Displaying Data in Descending order of Date
('Table Tennis', 108, '2014-03-19')
('Table Tennis', 103, '2014-02-14')
('Carom Board', 101, '2014-01-23')
('Carom Board', 105, '2014-01-01')
('Badminton', 102, '2013-12-12')

2.Displaying Date of PrizeMoney> 7000
(102, 'Vidhya', 'Badminton', 2, 12000, '2013-12-12')
(103, 'Guru', 'Table Tennis', 4, 8000, '2014-02-14')
(105, 'Keerthana', 'Carom Board', 2, 9000, '2014-01-01')
(108, 'Krishna', 'Table Tennis', 4, 25000, '2014-03-19')

3.Displaying Data in Ascending order of Name and Game Name
(103, 'Guru', 'Table Tennis', 4, 8000, '2014-02-14')
(105, 'Keerthana', 'Carom Board', 2, 9000, '2014-01-01')
(108, 'Krishna', 'Table Tennis', 4, 25000, '2014-03-19')
(101, 'Padmaja', 'Carom Board', 2, 5000, '2014-01-23')

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(102, 'Vidhya', 'Badminton', 2, 12000, '2013-12-12')

4.Displaying Sum of Prize Mondy for each Games
('Badminton', 12000)
('Carom Board', 14000)
('Table Tennis', 33000)

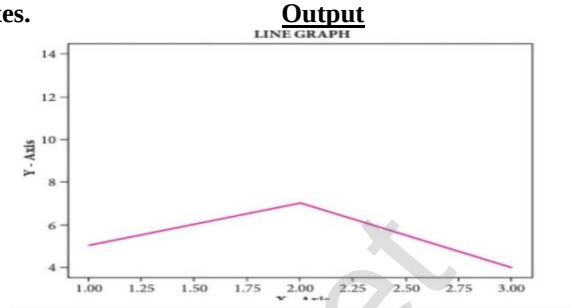
5.Displaying all the records based on Game Name
(102, 'Vidhya', 'Badminton', 2, 12000, '2013-12-12')
(101, 'Padmaja', 'Carom Board', 2, 5000, '2014-01-23')
(105, 'Keerthana', 'Carom Board', 2, 9000, '2014-01-01')
(103, 'Guru', 'Table Tennis', 4, 8000, '2014-02-14')
(108, 'Krishna', 'Table Tennis', 4, 25000, '2014-03-19')

CHAPTER – 16 (DATA VISUALIZATION USING PYPLOT: LINE , PIE AND BAR CHAT)

5. Create a plot. Set the title, the x and y labels for both axes.

```
import matplotlib.pyplot as plt
x = [1, 2, 3]
y = [5, 7, 4]
plt.plot(x,y)
plt.xlabel('x-axis')
plt.ylabel('y-axis')
plt.title('LINE GRAPH')
plt.show()
```

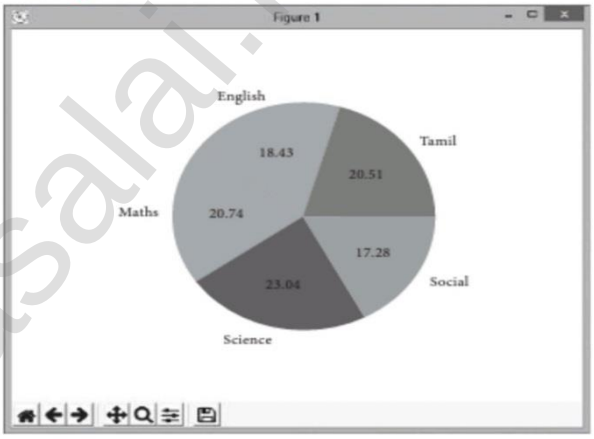
Output



6. Plot a pie chart for your marks in the recent examination.

```
import matplotlib.pyplot as pit
sizes = [89, 80, 90, 100, 75]
labels = ["Tamil", "English", "Maths", "Science","Social"]
plt.pie(sizes, labels = labels, autopct = "%.ef ")
plt.axes().set_aspect("equal")
plt.show()
```

Output :



7. Plot a line chart on the academic performance of Class 12 students in Computer Science for the past 10 years.

```
import matplotlib.pyplot as plt
years = [2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018]
cs = [65, 70, 75, 76, 78, 80, 82, 85, 87, 92]
plt.plot(years,cs)
plt.title("COMPUTER SCIENCE ACADEMIC PERFORMANCE")
plt.xlabel("cs")
plt.ylabel('years")
plt.show()
```

8. Plot a bar chart for the number of computer science periods in a week.

```
import matplotlib.pyplot as plt
labels = ["MON", "TUE", "WED", "THUR", "FRI", "SAT",]
usage = [3, 2, 1, 3, 2, 2]
y_positions = range (len(labels))
plt.bar(y_positions, usage)
plt.xticks(y_positions, labels)
plt.ylabel("PERIODS")
plt.ylabel("years")
plt.title("NO. OF CS PERIODS")
plt.show()
```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