COMPUTER SCIENCE

XII – STANDARD

PUBLIC EXAMINATION QUESTIONS WITH ANSWERS

[MARCH-2020 TO JUN -2024]

Padasalai

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CHAPTER 1 TO 16 ONE-WORD PUBLIC QUESTION WITH ANSWERS [MARCH- 2020 TO JUN 2024]

(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 defines what an object can do? **[M-2024]**
   (A) O.S (B) Compiler **(C) Interface** (D) Interpreter
7. The functions which will give exact result when same arguments are passed are called – **[M-2020]**
   (A) Impure (B) Partial (C) Dynamic **(D) Pure**
8. ..... 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. A sequence of immutable objects is called **[M-2020,J-2023, J-2024]**
   (A) Built in (B) List **(C) Tuple** (D) Derived data
4. The data type whose representation is known are called --- **[M-2023]**
   (A) Built in (B) Derived **(C) Concrete** (D) Abstract
5. The data type whose representation is unknown are called---- **[M-2024]**
   (A) Built in (B) Derived (C) Concrete **(D) Abstract data type**

(CHAPTER-3)(SCOPING)

1. 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
2. Containers for mapping names of variables to objects is called --------- **[M-2022, J-2023]**
   (A) Scope (B) Mapping (C) Binding **(D) Namespaces**
3. Which scope refers to variables defined in current function? **[J-2022]**
   (A) Local (B) Global scope (C) Module scope (D) Function Scope
4. 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]**
5. 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**
6. Which members are accessible from outside the class? **[M-2023]**
   (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. 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
3. 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**
4. 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
5. ---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. 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**
3. This symbol is used to print more than one item on a single line. **[J-2022]**
   (A) Semicolon (;) (B) Dolor ($) **(C) comma (,)** (D) Colon (:)

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4. Which of the following is not a Keyword in Python? **[M-2023]**
(A) break (B) while (C) continue **(D) operators**
5. Which operator is also called as Comparative operator? **[M-2022]**
(A) Arithmetic **(B) Relational** (C) Logical (D) Assignment
6. Expand IDLE **[M-2020]**
(A) Integrated Design Learning Environment (B) Insert Development Learning Environment
(C) Integrated Develop Learning Environment **(D) Integrated Development Learning Environment**
7. Which key is pressed to execute python script? **[S-2020, M-2024]**
(A) F5 (B) F2 (C) F1 (D) F3

(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. 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
6. Which is the most comfortable loop? **[J-2022]**
(A) do..while (B) while **(C) for** (D) if..elif
7. --- 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
8. 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 Function which calls itself is called as---- **[M-2023]**
(A) Built-in **(B) Recursion** (C) Lambda (D) return
2. Which function is called anonymous un-named function------- **[M-2022, J-2023, J-2024]**
(A) Lambda (B) Recursion (C) Function (D) define
3. 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. 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
8. 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

(CHAPTER-8)(STRINGS AND STRING MANIPULATION)

1. 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
2. Which of the following operator is used for concatenation? **[M-2023, J-2024]**
(A) + (B) & (C) * (D) =
3. Strings in python: **[S-2021]**
(A) Changeable (B) Mutable **(C) Immutable** (D) flexible
4. Which of the following is the slicing operator? **[M-2024]**
(A) { } **(B) [ ]** (C) < > (D) ( )
5. 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**
6. Which of the following is used as placeholders or replacement fields which get replaced along with format ( ) function?
(A) { } (B) < > (C) ++ (D) ^^ **[J-2023]**
7. 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
8. In python, which operator is used to display a sting multiple number of times? **[S-2020]**
(A) *(Multiplication) (B) + (Addition) (C) – (Subtraction) (D) / (Division

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(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. 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]

4. 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]

5. 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]

6. 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

7. 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}**

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

9. 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. Class members are accessed through which operator? **[M-2020, J-2022, M-2023]**
(A) & **(B) .** (C) # (D) %

2. Which of the following method is automatically executed when an object is created?
(A) __object__( ) (B) __del__( ) (C) __func__( ) **(D) __init__( )**

3. A private class variable is prefixed with **[J-2024]**
(A) __ (B) && (C) ## (D) **

4. Which of the following method is used as destructor? **[M-2022]**
(A) __init__( ) (B) __dest__( ) (C) __rem__( ) **(D) __del__( )**

5. 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[ ]

6. 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. What symbol is used for SELECT statement? **[M-2020, M-2024]**
(A) σ (B) Π (C) X (D) Ω

7. A tuple is also known as -- **[M-2023]**
(A) table **(B) row** (C) attribute (D) field

(CHAPTER-12) (STRUCTURED QUERY LANGUAGE)

1. The command to delete a table is ----- **[M-2020, J-2022]**
(A) DROP (B) DELETE (C) DELETE ALL (D) ALTER TABLE

2. Queries can be generated using --- **[J-2024]**
(A) SELECT (B) ORDER BY (C) MODIFY (D) ALTER

3. 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

4. ------command is used to remove a table from the database **[M-2023]**
(A) DELETE ALL **(B) DROP TABLE** (C) ALTER TABLE (D) DELETE

5. 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 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
4. The command used to skip a row in a CSV file is **---** **[J-2023]**
   (A) next( ) (B) skip( ) (C) omit( ) (D) bounce( )
5. 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
6. 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. Importing C++ program in a Python program is called--- **[M-2023]**
   (A) Wrapping (B) Downloading (C) Interconnecting (D) Parsing
2. A framework for interfacing Python and C++ is---- **[M-2020, M-2022]**
   (A) Ctypes (B) SWIG (C) Cython **(D) Boost**
3. 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
4. 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
5. 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. The function that returns the largest value of the selected column is – **[J-2022, M-2023]**
   (A) MAX( ) (B) LARGE( ) (C) HIGH( ) (D) MAXIMUM()
4. The most commonly used statement in SQL is----- **[J-2023, M-2024]**
   (A) cursor **(B) select** (C) execute (D) commit
5. Which of the following keyword avoid the duplicate? **[J-2024]**
   (A) Distinct (B) Remove (C) Where (D) Group By
6. 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. --- is a collection of resources assembled to create a single unified visual display. **(M-2024)**
   (A) Interface **(B) Dashboard** (C) Objects (D) Graphics
2. 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**
3. 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 ()**

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CHAPTER 1 TO 16 TWO MARK PUBLIC QUESTION WITH ANSWERS [MARCH-2020 TO JUN-2024]

CHAPTER – 1(FUNCTION)

1. 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.

2. 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.

3. 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 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.

2. 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.

3. 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'

4. 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. 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

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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.
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.
	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 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.	**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
2.	**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
3.	**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**
	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.	**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]
3.	**What will be the output of the following python code?** **(J-2022)** str1 = "School" **output:** SchoolSchoolSchool print(str1*3)
4.	**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.
5.	**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

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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. 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.

3. 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.

4. 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 = [ ]

5. What will be output of the python code? (M-2023) **Output**

Squares = [x**2 for x in range (1,11)] print (Squares) [1,4,9,16,25,36,49,64,81,100]

6. 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

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. 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.

3. 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

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. 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.

2. 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.

3. 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

4. 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.

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5. 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.

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.

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. Write the syntax of getopt.getopt method **(M-2022)**
<opts>,<args>=getopt.getopt(argv, options, [long_options])

CHAPTER – 15(DATA MANIPULATION THROUGH SQL)

1. 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.

2. 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()

3. 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.

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.

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CHAPTER 1 TO 16 THREE MARK PUBLIC QUESTION WITH ANSWERS [MARCH-2020 TO JUN-2024]

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. 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. 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
```

2. 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**

3. 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.

4. 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.

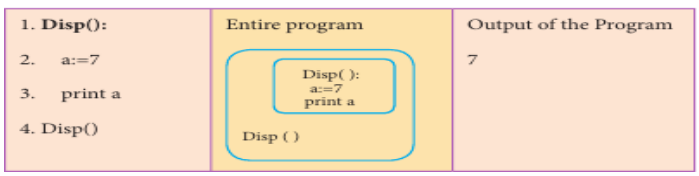
Program parts:

- 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.

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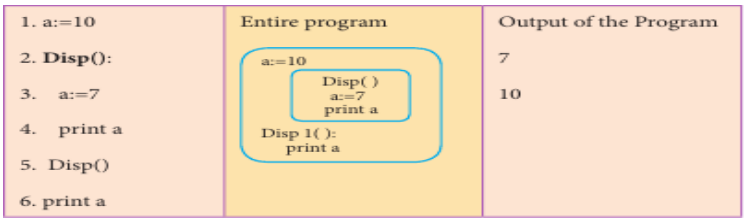
2. Define Global scope with an example. (J-2024)

- 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. 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. 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.

3. 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.

4. 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.

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. 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**

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3. 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..

4. 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.

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

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6. 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 : "))
avg= (m1+m2)/2
print ("Grade : A")
print ("Grade : B")
print ("Grade : C")
print ("Grade : D")
print ("Grade : E")
```

```
m2=int (input("Enter mark in second subject : "))
if avg>=80:
 elif avg>=70 and avg<80:
elif avg>=60 and avg<70:
elif avg>=50 and avg<60:
 else:
```

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. 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

4. 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
```

5. 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.

6. 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.

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
```


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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? (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. **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.

2. **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 }

3. **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.

4. **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. **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

3. **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>
```


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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>

4. 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

5. 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 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.

2. 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. 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;

2. 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;

3. 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;

4. 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;

5. 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;

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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 and saved.
- 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. 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.

4. 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

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**

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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.

6. 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. 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 ()

2. 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")
```

3. 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. 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

2. 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 FIVE MARK PUBLIC QUESTION WITH ANSWERS [MARCH-2020 TO JUNE -2024]

CHAPTER – 1 (FUNCTION)

1. What are called Parameters and write a note on (i) Parameter without Type (ii) Parameter with Type

- **Parameters** are the variables in a function definition **(M-2022, J-2024)**
- **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 alsobe '**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.

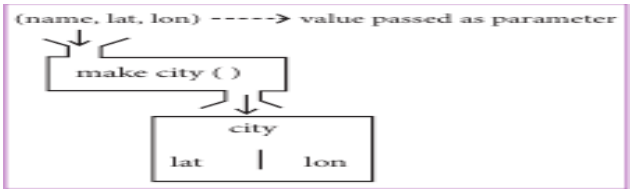
CHAPTER – 2 (DATA ABSTRACTION)

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**

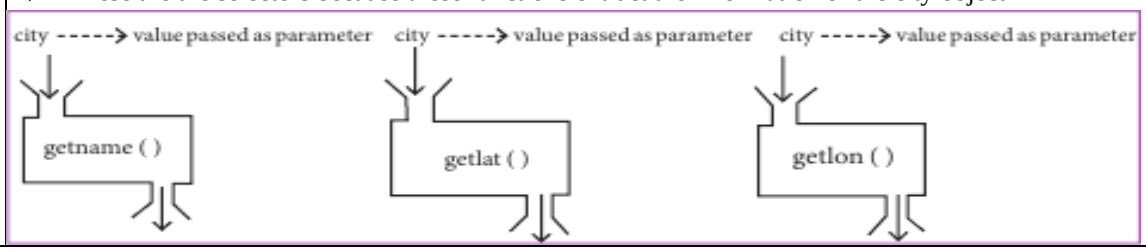
1.Constructor:

- 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.
- 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



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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:

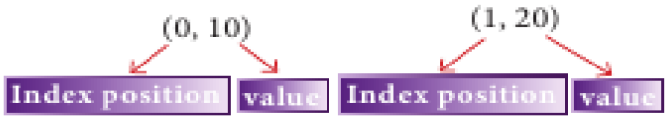
- It is expressed using square brackets.
- Unlike a list literal, a square-brackets expression directly following another expression does not evaluate to a list value, but instead selects an element from the value of the preceding expression.

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)]



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:

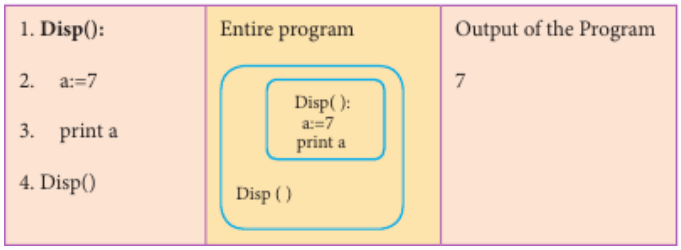
- 1.Local Scope 2.Enclosed Scope 3.Global Scope 4.Built-in Scope

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.

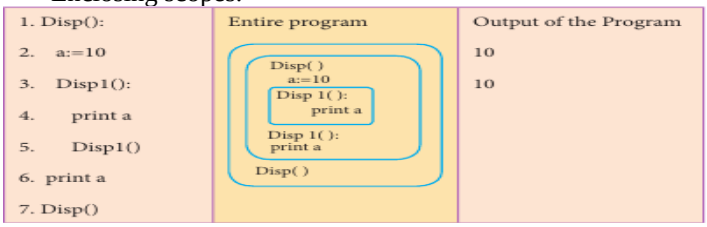


Example:

- 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().

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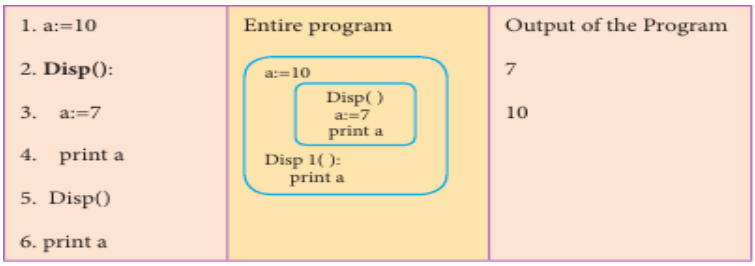
❖ The variable 'a' defined in Disp() can be even used by Disp1() because it is also a member of Disp().

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.



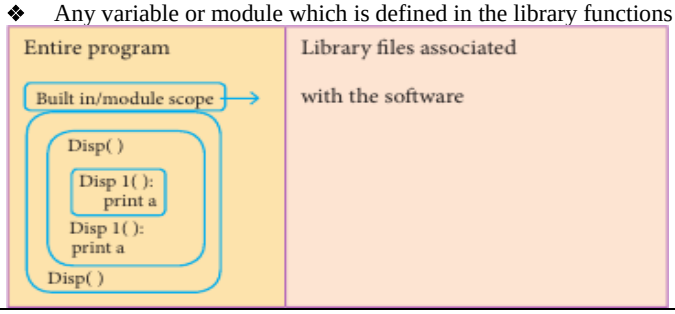
Example:

❖ 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.

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

CHAPTER – 4 (ALGORITHMIC STRATEGIES)

1. 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.

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

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2. 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:

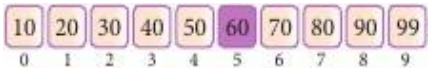
1. Start with the middle element:

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.

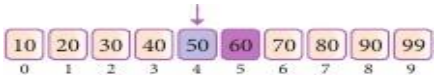
2. When a match is found, display success message with the index of the element matched.
3. If no match is found for all comparisons, then display unsuccessful message.

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.

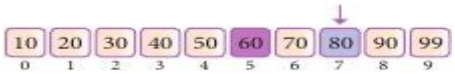


- First, we find index of middle element of the array by using this formula:
  mid = low + (high - low) / 2
- Here it is, 0 + (9 - 0) / 2 = 4. So, 4 is the mid value of the array.



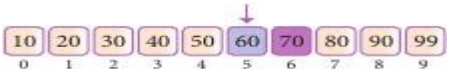
- Now compare the search element with the value stored at mid value location 4.
- The value stored at location or index 4 is 50, which is not match with search element.
- As the search value 60 is greater than 50.

- 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.
- 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.

3. 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.

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- 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.

4. 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. 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
```


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```
>>> 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
```

- 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 ( ).

2. 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.

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3. 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]

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:

```
for i in range (2,10,2):
        print (i, end=' ')
else:
        print ("\n End of the loop")
```

Output

```
2 4 6 8
```

2. 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:

```
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
```

3. 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
```


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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
```

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

```
def loc():
y=0 # local scope
print(y)
loc()
```

Output:

```
0
```

2. Global Scope:

- Variable, with global scope can be used anywhere in the program.

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- 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 desired after rounding	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 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. 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))
```


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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 "
>>> str1+="Learn Python"
>>> print (str1)
	Welcome to Learn Python

(iii) Repeating (*)

- The multiplication operator (*) is used to display a string in multiple number of times.

Example:	**Output**
>>> str1="Welcome " >>> print (str1*4)	WelcomeWelcomeWelcomeWelcome

(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"
>>> print (str1[10:16])
>>> print (str1[::-2])
	learn
	nhy re teolW

2. 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

3. 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.

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❖ 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.

❖ 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):
print(x)
```

1 to 10

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)
```


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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:

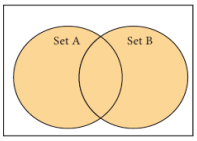
- A set is another type of collection data type.
- A Set is a mutable and an unordered collection of elements without duplicates

Set operations :

- The set operations such as Union, Intersection, difference and Symmetric difference.

(i) Union:

- It includes all elements from two or more sets
- In python, the operator | is used to union of two sets.
- The function union () is also used to join two sets in python.



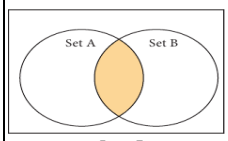
Example: [Program to Join (Union) two sets using union operator]

```
set_A={2,4,6,8}
set_B={'A', 'B', 'C', 'D'}
U_set=set_A|set_B
print(U_set)
```

Output:
{2, 4, 6, 8, 'A', 'D', 'C', 'B'}

(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.



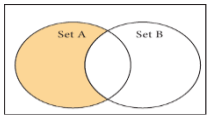
Example: [Program to insect two sets using intersection operator]

```
set_A={'A', 2, 4, 'D'}
set_B={'A', 'B', 'C', 'D'}
print(set_A & set_B)
```

Output
{'A', 'D'}

(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.



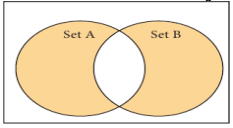
Example: [Program to difference of two sets using minus operator]

```
set_A={'A', 2, 4, 'D'}
set_B={'A', 'B', 'C', 'D'}
print(set_A - set_B)
```

Output
{2, 4}

(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'}
set_B={'A', 'B', 'C', 'D'}
print(set_A ^ set_B)
```

Output:
{2, 4, 'B', 'C'}

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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>
```

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)

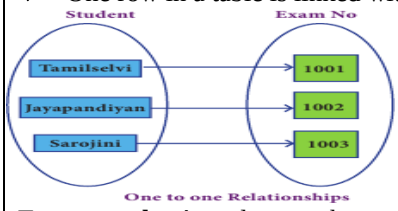
1. Explain the different types of relationship mapping. (M-2023)

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.

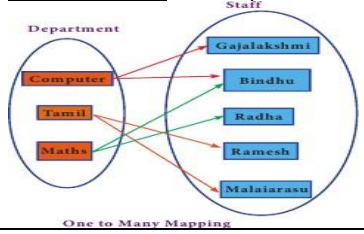


For example: A student can have only one exam number

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.



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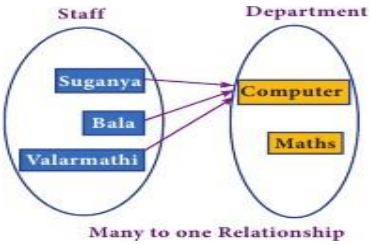
3. Many-to-One Relationship:

- 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.

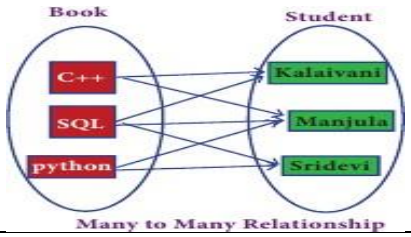


4. Many-to-Many Relationship:

- 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.



2. 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.
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.

3. 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.
- 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.

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7. DBMS Supports Transactions:

- It allows us to better handle and manage data integrity in real world applications where multi-threading is extensively used.

4. 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. 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.

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.

3. 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.

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❖ **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

4. 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)
);
```

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. 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.

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❖ 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'}
```

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.

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)

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3. 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).
- 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)
    [ ]
```

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")
```


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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. 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()
```


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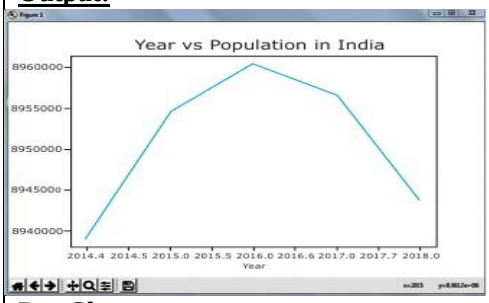
Output:



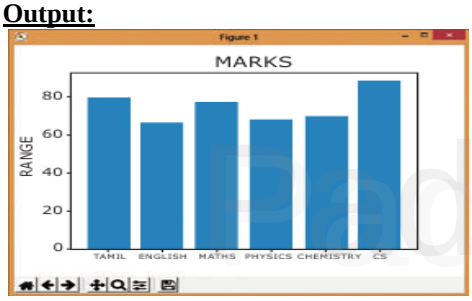
Bar Chart:

- 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:



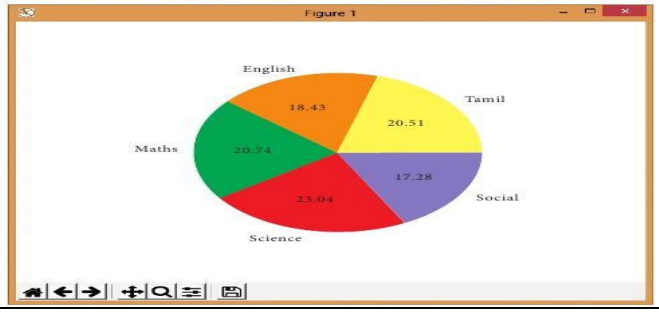
Pie Chart:

- 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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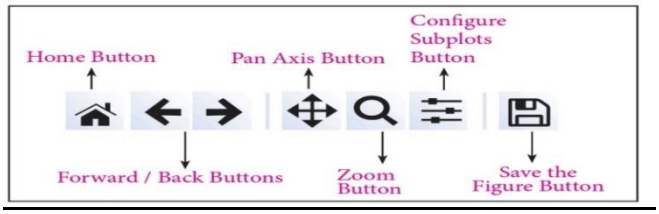
2. Explain the various buttons in a matplotlib window. (M-2024)



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.

4. 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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PUBLIC EXAMINATION 2 & 3-MARK COMPULSORY QUESTIONS WITH ANSWERS [MARCH-2020 TO JUN-2024]

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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