PUBLIC EXAM ANSWER KEY – MARCH 2023

12th COMPUTER SCIENCE

1 Marks:

1. B) Public members
2. C) Operator
3. B) Subroutines
4. B) 3
5. D) .
6. A) Hierarchical
7. B) +
8. B) Wrapping
9. B) DROP TABLE
10. B) MAX()
11. A) Concrete Data Type
12. D) Recursion
13. D) Binary mode
14. A) Memoization
15. C) {1,3,6,9}

2 Marks:

16. What is a Tuple? Give an example.

A tuple is a comma-separated sequence of values surrounded with parentheses.
Mytuple=(1,2,3,4)

17. What is a scope?

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

18. How will you delete a string in Python?

Python will not allow deleting a particular character in a string. Whereas you can remove entire string variable using **del** command.

```
>>> str="WELCOME"
>>> print (str)
        WELCOME
>>> del str
        NameError: name 'str' is not defined
```

19. Write note on range() in loop.

range() generates a list of values starting from **start** till **stop-1.**

Syntax:

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:

range(1,10,1) – will start the range of values from 1 and end at 9

20. What is class?

Class is the main building block in Python. Object is a collection of data and function that act on those data. Class is a template for the object.

21. What is Data Manipulation Language?

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.

22. Mention the default modes of the File.

Default modes of the File are 1. Text mode 2. Binary Mode.

23. List the general types of data visualization

• Charts • Tables • Graphs • Maps • Infographics • Dashboards

24. What will be output of the following Python code?

```
Squares=[x**2 for x in range(1,11)]
print (squares)
```

[1,4,9,16,25,36,49,64,81,100]

3 Marks:

25. Mention the characteristics of Interface.

i) The class template specifies the interfaces to enable an object to be created and operated properly.

ii) An object's attributes and behaviour is controlled by sending functions to the object.

26. What do you understand by Dynamic Programming?

Dynamic programming is an algorithmic design method that can be used when the solution to a problem can be viewed as the result of a sequence of decisions.

Dynamic programming approach is similar to divide and conquer.

The given problem is divided into smaller and yet smaller possible sub-problems.

27. Explain Ternary Operator with an example.

Ternary operator is also known as conditional operator that evaluate something based on a condition being true or false. It simply allows testing a condition in a single line replacing the multiline if-else making the code compact.

Syntax: Variable Name = [on_true] if [Test expression] else [on_false]

Example: min= 50 if 49<50 else 70

Output: min = 50

28. Write the syntax of the while loop.

```
while <condition>:
        statements block 1
[else:
        statements block2]
```

29. Differentiate – ceil() and floor() function.

ceil ( )	Returns the smallest integer greater than or equal to x	math.ceil (x)	x= 26.7 print (math.ceil (x)) **Output:** 27
floor()	Returns the largest integer less than or equal to x	math.floor (x)	x=26.7 print (math.floor (x)) **Output:** 26

30. What is the difference between csv.reader() method and DictReader() class?

The main difference between the csv.reader() and DictReader() is in simple terms csv. reader and csv.writer work with **list/tuple,** while csv.DictReader and csv.DictWriter work with dictionary. csv.DictReader and csv.DictWriter take additional argument fieldnames that are used as dictionary keys.

31. Differentiate fetchone() and fetchmany()

fetchone()

fetchone () method returns the next row of a query result set or None in case there is no row left.

Example: fetchone()

fetchmany()

fetchmany() method that returns the next number of rows (n) of the result set

Example: fetchmany(3)

32. Write a Python program to display the given pattern.

COMPUTER
COMPUTE
COMPUT
COMPU
COMP
COM
CO
C

```
str="COMPUTER"
index=len(str)
for i in str:
    print (str[0:index])
    index-=1
```

33. Write about the steps of Python program executing C++ program using control statement.

Step1: Type the C++ program in notepad and save it as **"ABC.cpp".**
Step2: Type the Python program and save it as PQR.py
Step3: Click the Run Terminal and open the command window
Step4: Type the command Python PQR.py –I ABC

5 Marks:

34. A) What is a List? Why List, can be called as pairs? Explain with suitable example.

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

Example for List is [10, 20].

The elements of a list can be accessed in two ways. The first way is via our familiar method of multiple assignment, which unpacks a list into its elements and binds each element to a different name.

lst := [10, 20]

x, y := lst

In the above example ***x*** will become10 and ***y*** will become 20.

A second method for accessing the elements in a list is by the element selection operator, also 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.

lst[0]
10
lst[1]
20

In both the example mentioned above mathematically we can represent list similar to a set. lst[(0, 10), (1, 20)] - where

(1, 20)	(0, 10)
Index position, value	**Index position, value**

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.

34 b) Discuss about linear search algorithm

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

Traverse the array using for loop

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. If no match is found, display the search element not found.

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

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
Output: -1 (not found)

35. A) Discuss in details about Tokens in Python

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 and

5) Literals.

1. Identifiers

An Identifier is a name used to identify a variable, function, class, module or object.

Valid: Sum, total_marks, regno, num1

Invalid : 2Name, 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: if , for, while, false , true

3 . Operators:

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 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. Most computer languages contain a set of such operators that can be used within equations to perform different types of sequential calculations.

Arithmetic Operators are: +,-,*,/,%,//,**.

Example: 10+20 =30

(ii) 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.

(iii) Assignment operators

In Python, = is a simple assignment operator to assign values to variable. Let a = 5 and b = 10 assigns the value 5 to a and 10 to b these two assignment statement can also be given as a,b=5,10 that assigns the value 5 and 10 on the right to the variables a and b respectively. There are various compound operators in Python like +=, -=, *=, /=, %=, **= and //= are also available.

(v) Conditional operator

Ternary operator is also known as conditional operator that evaluate something based on a condition being true or false. It simply allows testing a condition in a single line replacing the multiline if-else making the code compact.

Example:

min= 50 if 49<50 else 70 # min = 50

min= 50 if 49>50 else 70 # min = 70

4. Delimiters

Python uses the symbols and symbol combinations as delimiters in expressions, lists, dictionaries and strings. (,) , { , }, [,], , ,= and so on.

5. **Literals**

Literal is a raw data given in a variable or constant. In Python, there are various types of literals.

1) Numeric 2) String 3) Boolean

35 b) Explain the following built-in function.

i)id ii) chr() iii) round() iv) type() v) pow()

Function	Description	Syntax	Example
id()	id( ) Return the "identity" of an object. i.e. the address of the object in memory	id (object)	x=15 y='a' print ('address of x is :',id (x)) Output: address of x is : 1357486752

chr()	Returns the ASCII value for the given Unicode character. This function is inverse of chr() function	chr (i)	c=65 d=43 print (chr (c)) prin t(chr (d)) Output: A +
round()	Returns the nearest integer to its input. 1. First argument (number) is used to specify the value to be rounded.	round (number [,ndigits])	x= 17.9 print ('x value is rounded to', round (x)) Output: x value is rounded to 18 18.0
type()	Returns the type of object for the given single object.	type (object)	x= 15.2 print (type (x)) Output: <class 'float'>

36. A) What is Nested Tuple? Explain with an example.

In Python, a tuple can be defined inside another tuple; called Nested tuple. In a nested tuple, each tuple is considered as an element. The for loop will be useful to access all the elements in a nested tuple.

Example:

```
Toppers = (("Vinodini", "XII-F", 98.7), ("Soundarya", "XII-H", 97.5),
("Tharani", "XII-F", 95.3), ("Saisri", "XII-G", 93.8))
for i in Toppers:
    print(i)
```

Output:

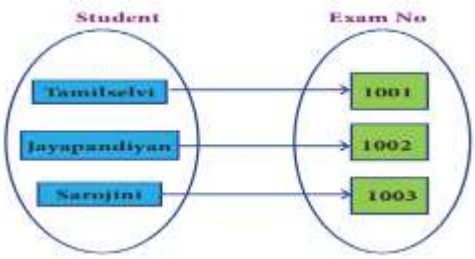
```
('Vinodini', 'XII-F', 98.7)
('Soundarya', 'XII-H', 97.5)
('Tharani', 'XII-F', 95.3)
('Saisri', 'XII-G', 93.8)
```

36 b) Explain the different types of relationship mapping.

1. One-to-One Relationship:

In One-to-One Relationship, one entity is related with only one other entity. One row in a table is linked with only one row in another table and vice versa.

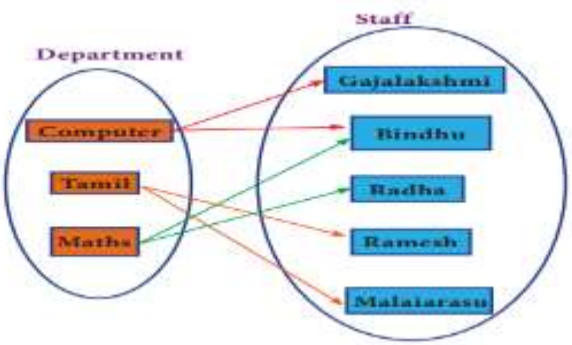
For example: A student can have only one exam number

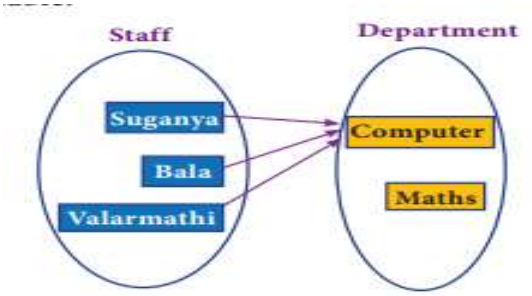


2. One-to-Many Relationship

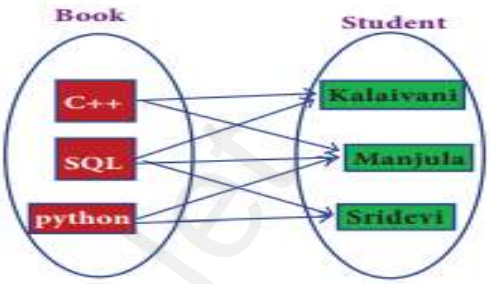
In One-to-Many relationship, one entity is related to many other entities. One row in a table A is linked to many rows in a table B, but one row in a table B is linked to only one row in table A.

For example: One Department has many staff members.





3. Many-to-One Relationship
In Many-to-One Relationship, many entities can be related with only one in the other entity.
For example: A number of staff members working in one Department. Multiple rows in staff members table is related with only one row in Department table.



4. Many-to-Many Relationship
A many-to-many relationship occurs when multiple records in a table are associated with multiple records in another table.
Example: Customers and Product Customers can purchase various products and Products can be purchased by many customers

37 A) Write the syntax for getopt() and explain its arguments and return values.

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.
getopt.getopt method

This method parses command-line options and parameter list. Following is the syntax for this method − ,

<opts>,<args>=getopt.getopt(argv, options, [long_options])

Here is the detail of the parameters
argv − This is the argument list of values to be parsed (splited). In our program the complete command will be passed as a list.
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.
long_options −This parameter is passed with a list of strings. Argument of Long options should be followed by an equal sign ('='). In our program the C++ file name will be passed as string and ‘i’ also will be passed along with to indicate it as the input file.
getopt() method returns value consisting of two elements. Each of these values are stored separately in two different list (arrays) opts and args .Opts contains list of splitted strings like mode, path and args contains any string if at all not splitted because of wrong path or mode. args will be an empty array if there is no error in splitting strings by getopt().

For example The Python code which is going to execute the C++ file p4 in command line will have the getopt() method like the following one.
opts, args = getopt.getopt (argv, "i:",['ifile='])

where opts contains [('-i', 'c:\\pyprg\\p4')]
-i :- option nothing but mode should be followed by :
'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)
[]

37 b) Differentiate DBMS and RDBMS

Basis of Comparison	DBMS	RDBMS
Expansion	Database Management System	Relational DataBase Management System
Data storage	Navigational model ie data by linked records	Relational model (in tables). 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, mysql,

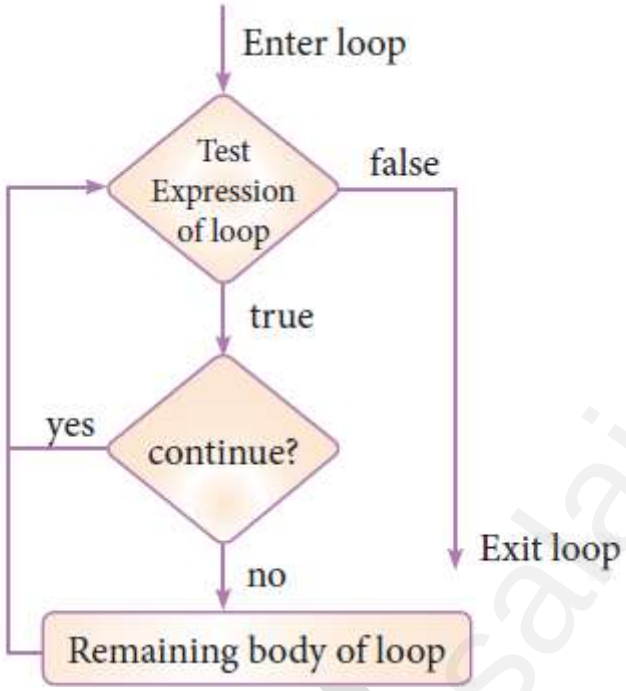
38 A) Explain about differences between Histogram and Bar Graph.

1. 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.
2. A histogram represents the frequency distribution of continuous variables. Conversely, a bar graph is a diagrammatic comparison of discrete variables.
3. Histogram presents numerical data whereas bar graph shows categorical data.
4. The histogram is drawn in such a way that there is no gap between the bars. On the ot her hand, there is proper spacing between bars in a bar graph that indicates discontinuity.
5. 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.
6. In the case of a bar graph, it is quite common to rearrange the blocks, from highest to lowest. But with histogram, this cannot be done, as they are shown in the sequence of classes.
7. The width of rectangular blocks in a histogram may or may not be same while the width of the bars in a bar graph is always same.

38 B) Explain 'continue' statement with an example.

Continue statement unlike the break statement is used to skip the remaining part of a loop and start with next iteration.

Syntax: continue



Example:

```
for word in "Jump Statement":
if word = = "e":
continue
print (word, end=")
print ("\n End of the program")
```

Output:

Jump Statement
End of the program

The above program is same as the program we had written for 'break' statement except that we have replaced it with 'continue'. As you can see in the output except the letter 'e' all the other letters get printed.

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