STD: XII **COMPUTER SCIENCE**

VIRUDHUNAGAR DISTRICT

COMMON HALF YEARLY EXAMINATION – DECEMBER 2023

STANDARD 12

PART – I

I. ANSWER ALL THE QUESTIONS: 15 X 1 = 15

1. b. Lists

2. b. Mapping

3. d. Big O

4. a. #

5. c. else if

6. c. return

7. a. []

8. d. The extend () function is used to tuple to add elements in a list.

9. b. dot(.)

10. c. edgar Frank Codd

11. a. DROP

12. b. binary mode

13. d. BOOST

14. a. HAVING

15. d. library

PART - II

II. Answer any 6 of the following and question no. 24 is compulsory;

16. What is impure function?

- Impure functions never assure you that the function will behave the same every time it's called.
- Impure function causes side effects to effects to its output.

- The return value of the impure functions does not solely depend on its arguments passed.
- Example: random(), Date()

17. What is Abstract data type?

Abstract data type:

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

18. What is Mapping?

Mapping:

- 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.

19. What is the use of Lambda function?

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()

20. How will you create constructor in Python.

Constructor in Python:

- 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.
- Constructor function can be defined with or without arguments.

21. **List any 2 advantages of RDBMS.**

- RDBMS uses normalization to reduce redundancy
- Faster, compared to DBMS.

- used to establish relationship. Keys are used in RDBMS.
- Efficient and secure.

22. Write the SQL statements using 'BETWEEN' and 'NOT BETWEEN' keywords.

BETWEEN:

The **BETWEEN** keyword defines a range of values the record must fall into to make the condition true.

SELECT Admno, Name, Age, Gender FROM Student WHERE Age BETWEEN 18 AND 19;

Admno	Name	Age	Gender
101	Adarsh	18	M
103	Ayush	18	M
104	Abinandh	18	M
105	Revathi	19	F
106	Devika	19	F

NOT BETWEEN

- The **NOT BETWEEN** is reverse of the **BETWEEN** operator where the records not satisfying the condition are displayed.

SELECT Admno, Name, Age FROM Student WHERE Age NOT BETWEEN 18 AND 19;

Admno	Name	Age
100	Ashish	17
102	Akshith	17
107	Hema	17

23. Write the syntax of Python's OS module.

Sytax of Python's OS module.

os.system ('g++ ' + <variable_name1> +' -<mode> ' + <variable_name2>)

os.system :-	function system() defined in **os** module to interact with the operating system
g++ :-	General compiler to compile C++ program under Windows Operating system.
variable_name1:-	Name of the C++ file along with its path and with extension .cpp in string format

mode :-	To specify input or output mode. Here it is o prefixed with hyphen.
variable_name2 :-	Name of the executable file with extension .exe in string format

24. What is Data Visualization?

Data Visualization:

- ❖ Data Visualization is the graphical representation of information and data.
- ❖ The objective of Data Visualization is to communicate information visually to users using statistical graphics.

PART - III

III. Answer ANY 6 questions and and question no. 29 is compulsory;

25. Write a note on Asymptotic notation.

Asymptotic notation:

- ❖ Asymptotic Notations are languages that use meaningful statements about time and space complexity.
- ❖ The following three asymptotic notations are mostly used to represent time complexity of algorithms:

(i) Big O

- ❖ Big O is often used to describe the worst-case of an algorithm.

(ii) Big Ω

- ❖ Big Omega is the reverse Big O.

  Big Ω is used to describe the lower bound (best-case).

(iii) Big Θ

When an algorithm has a complexity with lower bound = upper bound, that algorithm has a complexity O (n log n) and Ω (n log n), it's actually has the complexity Θ (n log n).

26. Explain Ternary operator with example.

Ternary operator:

- ❖ Ternary operator is also known as conditional operator that evaluates 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

27. Write the syntax of while loop.

Syntax:

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

28. 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.

29. Write a python program to calculate area and circumference of a circle using classes and objects.

```
class Circle:
pi=3.14
def __init__(self,radius):
self.radius=radius
def area(self):
return Circle.pi*(self.radius**2)
def circumference(self):
return 2*Circle.pi*self.radius
r=int(input("Enter Radius: "))
C=Circle(r)
print("The Area =",C.area())
print("The Circumference =", C.circumference())
```

Output:

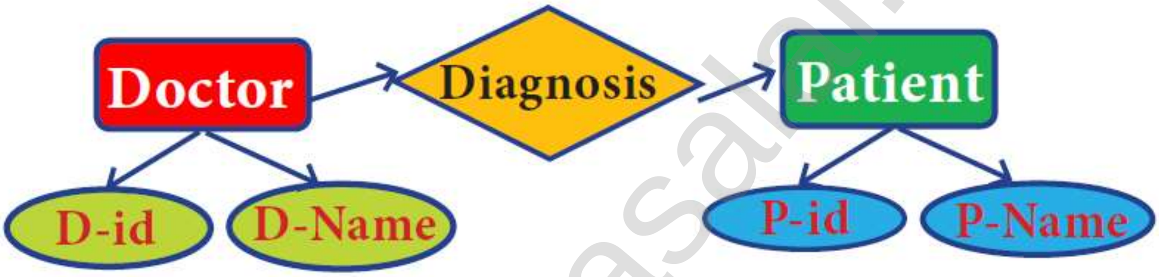
```
Enter Radius: 5
The Area = 78.5
The Circumference = 31.400000000000002
```

30. Write short note on ER model.

Entity Relationship Model. (ER model)

- ❖ In this database model, relationship are created by dividing the object into entity and its characteristics into attributes.
- ❖ It was developed by Chen in 1976.
- ❖ ER model constructed by,
- ❖ Rectangle represents the entities.
- ❖ Ellipse represents the attributes .
- ❖ Attributes describes the characteristics and each entity.
- ❖ Diamond represents the relationship in ER diagrams

Example: Doctor Diagnosis the Patient



ER model

31. Explain the syntax of UPDATE ……. SET command.

UPDATE ……. SET command:

- ❖ The **UPDATE** command updates some or all data values in a database.
- ❖ It can update one or more records in a table.
- ❖ The **UPDATE** command specifies the rows to be changed using the **WHERE** clause and the new data using the **SET** keyword.

UPDATE <table-name> SET column-name = value, column-name = value,… WHERE condition;

For example to update the following fields:

UPDATE Student SET Age = 20 WHERE Place = 'Bangalore';

- ❖ The above command will change the age to 20 for those students whose place is "Bangalore".

32. Tabulate the difference between Excel file and CSV file (any 3)

Excel file	CSV file
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 inWindows like notepad, MS Excel, OpenOffice, 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

33. Write about the special variable __ name __ python.

__name__ (A Special variable) in Python:

❖ **__name__ is one such special variable which by default stores the name of the Python file.**

❖ If the source file is executed as the main program, the interpreter sets the __name__ variable to have a value "__main__".

❖ **__name__ is a built-in variable which evaluates to the name of the current module.**

❖ Thus it can be used to check whether the current script is being run on its own.

Example:

```
if __name__ == '__main__':
main (sys.argv[1:])
```

❖ If the command line Python program itself is going to execute first, then __name__ contains the string " __main__".

❖ The condition if " __main__"==" __main__": is true then the main function is called.

PART – D

34. Explain with an example interface and implementation.

Interface :

- An interface is a set of action that an object can do.
- Interface just defines what an object can do, but won't actually do it. [The interface defines an object's visibility to the outside world.
- In Object Oriented Programming language, an Interface is a description of all functions that a class must have.
- The purpose of interfaces is to allow the computer to enforce the properties of the class which means the class of TYPE T (whatever the interface is) must have functions called X, Y, Z, etc.
- For example when you press a light switch, the light goes on, you may not have cared how it splashed the light
- In our example, anything that "ACTS LIKE" a light, should have function definitions like turn_on () and a turn_off (). [
- An object "ACTS LIKE" is an instance created from the class "LIGHT". All the objects of class "LIGHT" will uses all its functions. Characteristics of interface:
- The class template specifies the interfaces to enable an object to be created and operated properly.
- An object's attributes and behaviour is controlled by sending functions to the object. Implementation:
- Implementation carries out the instructions defined in the interface.
- How the object is processed and executed is the implementation.
- A class declaration combines the external interface (its local state) with an implementation of that interface (the code that carries out the behaviour) Example: Let's take the example of increasing a car's speed.
- The person who drives the car doesn't care about the internal working.
- To increase the speed of the car he just presses the accelerator to get the desired behaviour.
- Here the accelerator is the interface between the driver (the calling / invoking object) and the engine (the called object).
- In this case, the function call would be Speed (70): This is the interface.
- Internally, the engine of the car is doing all the things.
- It's where fuel, air, pressure, and electricity come together to create the power to move the vehicle.

- All of these actions are separated from the driver, who just wants to go faster.
- Thus we separate interface from implementation.

OR

Write any Five Characteristics of Modules.

The following are the desirable characteristics of a module.

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.

35. Explain the concept of Dynamic programming with suitable example.

Concept of Dynamic programming:

- 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.
- Results of the sub-problems 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 Memoization.
- 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 fibanocci fib ← f0 + f1 [
- step-3: Assign f0← f1, f1← fib
- step-4: Print the next consecutive value of fibanocci fib
- step-5: Goto step-2 and repeat until the specified number of terms generated
- For example if we generate fibonacci series upto 10 digits, the algorithm will generate the series as shown below:
- The Fibonacci series is : 0 1 1 2 3 5 8 13 21 34 55

(OR)

Describe in detail about the procedure of script mode programming.

SCRIPT MODE PROGRAMMING:

- A script is a text file containing the Python statements.
- Once the Python Scripts is created, they are reusable, it can be executed again and again without retyping.

The Scripts are editable.

(i) Creating Scripts in Python

1. Choose File → New File or press Ctrl + N in Python shell window.
2. An untitled blank script text editor will be displayed on screen.
3. Type the code in Script editor as given below,

(ii) Saving Python Script

(1) Choose File → Save or Press Ctrl + S

(2) Now, Save As dialog box appears on the screen.

(3) In the Save As dialog box

- Select the location to save your Python code.
- Type the file name in File Name box.
- Python files are by default saved with extension .py.
- So, while creating scripts using Python Script editor, no need to specify the file extension.

(4) Finally, click Save button to save your Python script.

(iii) Executing Python Script

(1) Choose Run → Run Module or Press F5

(2) If your code has any error, it will be shown in red color in the IDLE window, and Python describes the type of error occurred. To correct the errors, go back to Script editor, make corrections, save the file and execute it again.

(3) For all error free code, the output will appear in the IDLE window of Python

36. Write a detail note on if..else..elif statement with suitable example.

Nested if..elif...else statement:

- When we need to construct a chain of if statement(s) then „elif" clause can be used instead of „else".
- "elif" clause combines if..else-if..else statements to one if..elif…else.
- „elif" can be considered to be abbreviation of „else if".
- In an „if" statement there is no limit of „elif" clause that can be used, but an „else" clause if used should be placed at the end.

Syntax:

```
if<condition>:
        statements-block 1
elif :
        statements-block 2
else: statements-block n
```

Example:

```
m1=int (input("Enter mark in first subject : "))
m2=int (input("Enter mark in second subject : "))
avg= (m1+m2)/2
if avg>=80:
        print ("Grade : A")
elif avg>=70 and avg<80
        print ("Grade : B")
elif avg>=60 and avg<70:
        print ("Grade : C")
elif avg>=50 and avg<60:
        print ("Grade : D")
else:
        ("Grade : E")
```

Output :

```
Enter mark in first subject : 34
 Enter mark in second subject : 78
 Grade : D
```

(OR)

Explain any 5 Built-in string functions in Python.

Python supports the following built-in functions to manipulate string.

Syntax	Description	Example

len(str)	Returns the length (no of characters) of the string.	>>> A="Corporation"
		>>> print(len(A))
		11

capitalize( )	Used to capitalize the first character of the string	>>> city="chennai"
		>>> print(city.capitalize())
		Chennai

center(width, fillchar)	Returns a string with the original string centered to a total of width columns and filled with fillchar in columns that do not have characters	>>> str1="Welcome"
		>>> print(str1.center(15,'*'))
		*****Welcome*****

find(sub[, start[, end]])	The function is used to search the first occurrence of the sub string in the given string. It returns the index at which the substring starts. It returns -1 if the substring does not occur in the string.	>>>str1=’mammals’ >>>str1.find(‘ma’) 0 ***On omitting the start parameters, the function starts the search from the beginning.*** >>>str1.find(‘ma’,2) 3 >>>str1.find(‘ma’,2,4) -1 ***Displays -1 because the substring could not be found between the index 2 and 4-1.*** >>>str1.find(‘ma’,2,5) 3

37. Write a python program that prints maximum and minimum value in a Tuple.

```
def Min_Max(n):
a = max(n)
b = min(n)
return(a, b)
Num = (12, 65, 84, 1, 18, 85, 99)
(Max_Num, Min_Num) = Min_Max(Num)
print("Maximum value = ", Max_Num)
print("Minimum value = ", Min_Num)
```

Output:

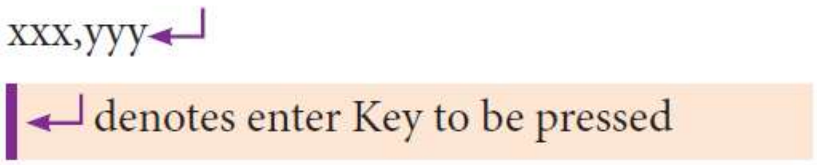
```
Maximum value = 99
Minimum value = 1
```

(OR)

Write the rules to be followed to format the data in a CSV file

1. Each record (row of data) is to be located on a separate line, delimited by a line break by pressing enter key.

For example:

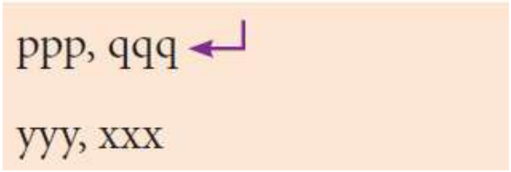


xxx,yyy↵

↵ denotes enter Key to be pressed

2. The last record in the file may or may not have an ending line break.

For example:

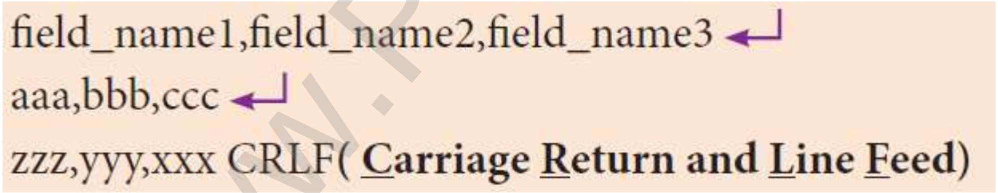


ppp, qqq ↵

yyy, xxx

3.There may be an optional header line appearing as the first line of the file with the same format as normal record lines The header will contain names corresponding to the fields in the file and should contain the same number of fields as the records in the rest of the file.

For example:



field_name1,field_name2,field_name3 ↵

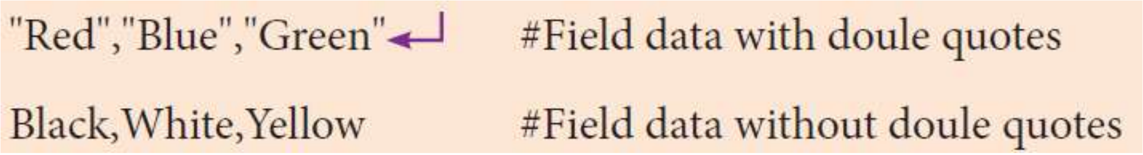
aaa,bbb,ccc ↵

zzz,yyy,xxx CRLF(**Carriage Return and Line Feed**)

4. Within the header and each record, there may be one or more fields, separated by commas. [Spaces are considered part of a field and should not be ignored. [The last field in the record must not be followed by a comma. For example: Red , Blue

5. Each field may or may not be enclosed in double quotes. [If fields are not enclosed with double quotes, then double quotes may not appear inside the fields.

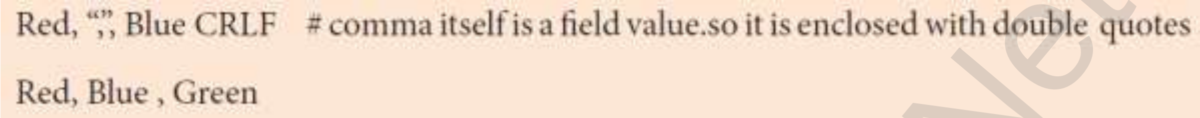
For example:



```
"Red","Blue","Green"↵      #Field data with doule quotes
Black,White,Yellow         #Field data without doule quotes
```

6.Fields containing line breaks (CRLF), double quotes, and commas should be enclosed in doublequotes.

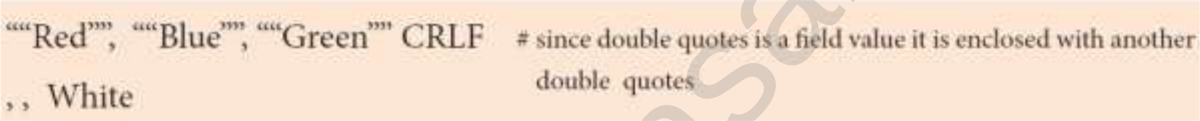
For example:



```
Red, “,”, Blue CRLF   # comma itself is a field value.so it is enclosed with double quotes
Red, Blue , Green
```

7. If double-quotes are used to enclose fields, then a double-quote appearing inside a field must be preceded with another double quote.

For example:



```
“““Red”””, “““Blue”””, “““Green””” CRLF   # since double quotes is a field value it is enclosed with another
, , White                                   double  quotes
```

38. Explain the usage of aggregate function in SQlite through python program.

Aggregate Functions:

- ❖ These functions are used to do operations from the values of the column and a single value is returned.

COUNT()	AVG()
SUM()	MAX()
MIN()	

COUNT() function

- The SQL COUNT() function returns the number of rows in a table satisfying the criteria specified in the WHERE clause. COUNT() returns 0 if there were no matching rows.

```
import sqlite3
connection = sqlite3.connect("Academy.db")
cursor = connection.cursor()
cursor.execute("SELECT COUNT(AVERAGE) FROM student ")
result = cursor.fetchall()
print(result
```

Output:

```
[(7,)]
```

AVG():

- The following SQL statement in the python program finds the average mark of all students.

```
import sqlite3
connection = sqlite3.connect("Academy.db")
cursor = connection.cursor()
cursor.execute("SELECT AVG(AVERAGE) FROM student ")
result = cursor.fetchall()
print(result)
```

OUTPUT

```
[(84.65714285714286,)]
```

SUM():

- The following SQL statement in the python program finds the sum of all average in the Average field of "Student table".

```
import sqlite3
connection = sqlite3.connect("Academy.db")
cursor = connection.cursor()
cursor.execute("SELECT SUM(AVERAGE) FROM student ")
result = cursor.fetchall()
```

```
print(result)
```

OUTPUT

```
[(592.6,)]
```

MAX() AND MIN() FUNCTIONS

- The MAX() function returns the largest value of the selected column.
- The MIN() function returns the smallest value of the selected column.

Example.

```
import sqlite3
connection = sqlite3.connect("Organization.db")
cursor = connection.cursor()
print("Displaying the name of the Highest Average")
cursor.execute("SELECT sname,max(AVERAGE) FROM student ")
result = cursor.fetchall()
print(result)
print("Displaying the name of the Least Average")
cursor.execute("SELECT sname,min(AVERAGE) FROM student ")
result = cursor.fetchall()
print(result)
```

OUTPUT

```
Displaying the name of the Highest Average
[('PRIYA', 98.6)]
Displaying the name of the Least Average
[('TARUN', 62.3)]
```

(OR)

What is a Per-Chart? How will you draw pie-chart using matplotlib.

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()
```

****

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