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VIRUDHUNAGAR DISTRICT COMMON EXAMINATIONS
COMMON HALF YEARLY EXAMINATION – DECEMBER 2022
STANDARD – 12
COMPUTER SCIENCE
PART – I

I. Choose the correct answer:　　　　　　　　　　**15 X 1 = 15**

1. a. Interface
2. c. Concrete
3. c.Namespace
4. b. Time, Space
5. b. Operators
6. c. X%4==0
7. c. Third
8. c. [1,4,9,16]
9. a. –init—
10. b. chen
11. c. constraint
12. d. list/Tuple
13. a. wrapping
14. a. sqlite_master
15. a. pip

PART – II

II. Answer ANY SIX questions. Qn.no.24 is compulsory:　　6 x 2 = 12

16. What is the difference between parameters and arguments?

Parameters	Arguments
Parameters are the variables in a function definition.	Arguments are the values which are passed to a function definition.

17. What is an algorithm?
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.

18. What is a literal in python? List the types of literals.
Literal:
   ➢ Literal is a raw data given in a variable or constant.
   ➢ In Python, there are various types of literals.
   ➢ They are,

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.

19. What are the differences between break and continue statements?

break	continue
The break statement terminates the loop containing it. Control of the program flows start with next iteration.	The Continue statement is used to skip the remaining part of a loop and Control of the program flows to the statement immediately after the body of the loop.
Syntax: break	Syntax: Continue

20. What is instantiation?
Instantiation:
   ➢ The process of creating object is called as "Class Instantiation".
Syntax: Object_name = class_name( )

21. What is the difference between SQL and Mysql?

SQL	MySQL
Structured Query Language is a language used for accessing databases.	MySQL is a database management system,like SQL Server, Oracle, Informix, Postgres, etc.
SQL is a DBMS	MySQL is a RDBMS.

22. Expand: (i) SWIG   (ii) MinGW

   ➢ **SWIG** - Simplified Wrapper Interface Generator - Both C and C++

   ➢ **MinGW** - Minimalist GNU for Windows

23. Define "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.

24. What will be the output for the following code?

>>>place="Tech-Park"

>>>**print(place*3)**

Output:

Tech-Park Tech-Park Tech-Park

PART – III

III. Answer ANY SIX questions. Qn. no. 32 is compulsory: 6 x 3=18

25. Write notes on Asymptotic notations.

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 algorithm.

(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.
- ➢ Example: If Big O is used to describe the upper bound (worst - case) then, 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).
- ➢ Time complexity is n log n in both best-case and worst-case.

26. Write notes on the ways of accessing elements of a 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:

> list[0]

> 10

> ist[1]

> 20

27. What are the logical operators in python? Give example for the usage of them.

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**.

Operator	Example	Result
Assume a = 97 and b = 35, Evaluate the following Logical expressions		
or	>>> a>b or a==b	True
and	>>> a>b and a==b	False
not	>>> not a>b	False i.e. Not True

28. What is composition in function?

Composition in functions:

> The value returned by a function may be used as an argument for another function in a nested manner.

> This is called composition.

> For 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.

29. Differentiae remove () , pop() and clear() functions used in lists.
remove ()

remove( ) function can also be used to delete one or more elements

if the index value is not known.

pop()

pop( ) function can also be used to delete an element using the given index value.

pop( ) function deletes and returns the last element of a list if the index is not given.

clear()

The function clear( ) is used to delete all the elements in list, it deletes only the elements and retains the list.

30. What is the role of DBA?

DBA

➤ 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.

31. Write notes on TCL commands: commit, Roll back and Save point

TRANSACTIONAL CONTROL LANGUAGE

➤ **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.

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.

32. Identify the module, operator and the definition name from the following statement.

Welcome.display()

Welcome   →   Module name

(dot) .   →   Dot operator

display()   →   Function call

33. Write any three uses of data visualization.

Uses of data visualization:

➢ Data Visualization help users to analyze 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

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PART – IV

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IV. Answer the following questions: **5 X 5 = 25**

34. a) What are the 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.

b) Explain the Bubble sort algorithm.

Bubble sort algorithm:

➢   Bubble sort is a simple sorting algorithm, it starts at the beginning of the list of values stored in an array.

➢   It compares each pair of adjacent elements and swaps them if they are in the unsorted order.

➢   This comparison and passed to be continued until no swaps are needed, which shows the values in an array is sorted.

    ➢ It is named so because, the smaller elements "bubble" to the top of the list.

    ➢ It is too slow and less efficient when compared to other sorting methods.

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.

    ➢ At the end of all the iterations we will get the sorted values in an array
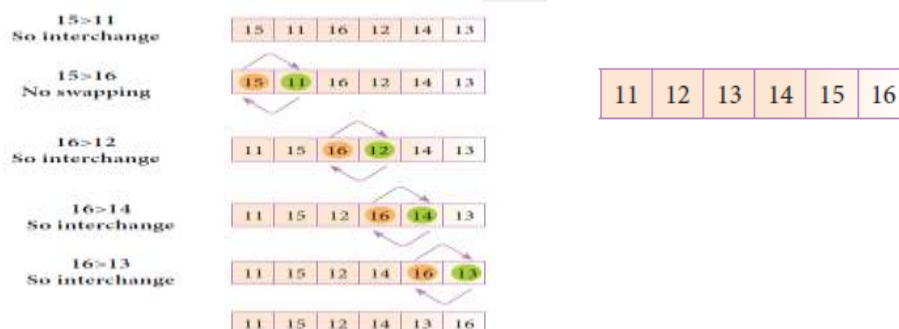
35.a) Write a python program to print the following pattern:

```
        1
        2      2
        3      3      3
        4      4      4      4
        5      5      5      5      5
```

Program Code:

rows = 6

for i in range(rows):

   for j in range(i):

      print(i, end=' ')

   print('')

b. What are the types of function arguments? Explain them with suitable examples.

➢   Arguments are used to call a function and there are primarily 4 types of functions that one can use:

1.*Required arguments*
2. *Keyword arguments*
3. *Default arguments*
4. *Variable-length arguments.*

Required Arguments

"Required Arguments" are the arguments passed to a function in correct positional order. Here, the number of arguments in the function call should match exactly with the function defi nition. You need atleast one parameter to prevent syntax errors to get the required

Example:

def printstring(str):
print ("Example - Required arguments ")
print (str)
return
printstring ("Welcome")

Keyword Arguments

Keyword arguments will invoke the function after the parameters are recognized by their parameter names. The value of the keyword argument is matched with the parameter name and so, one can also put arguments in improper order (not in order).

def printdata (name):
print ("Example-1 Keyword arguments")
print ("Name :",name)

return
printdata(name = "Gshan")

Default Arguments

In Python the default argument is an argument that takes a default value if no value is provided in the function call. The following example uses default arguments, that prints default salary when no argument is passed.

```
def printinfo( name, salary = 3500):
print ("Name: ", name)
print ("Salary: ", salary)
return
printinfo("Mani")
```

Variable-Length Arguments

In some instances you might need to pass more arguments than have already been specified. Going back to the function to redefine it can be a tedious process. Variable-Length arguments can be used instead. These are not specified in the function's definition and an asterisk (*) is used to define such arguments.

```
def printnos (*nos):
for n in nos:
print(n)
return
print ('Printing two values')
printnos (1,2)
print ('Printing three values')
printnos (10,20,30)
```

36. a) Explain the set operations with suitable example.

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.
      ➢ The **operator |** is used to union of two sets.
      ➢ The function union( ) is also used to join two sets in python.
Example:
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 **intersection( )** is also used to intersect two sets in python.

Example:

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 first 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:

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:

set_A={'A', 2, 4, 'D'}
set_B={'A', 'B', 'C', 'D'}
print(set_A ^ set_B)
Output:

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

b) What is Relational Algebra in DBMS? Explain the various groups in it.

- ➢ Relational Algebra is a procedural query language used to query the
  database tables using SQL.
- ➢ Relational Algebra is divided into various groups

Unary Relational Operations
SELECT (symbol : σ)
PROJECT (symbol : Π)
Relational Algebra Operations from Set Theory
- • UNION (∪)
- • INTERSECTION (∩)
- • DIFFERENCE (−)
- • CARTESIAN PRODUCT (X)

SELECT (symbol : σ)

General form σc (R) with a relation R and a condition C on the attributes of R. The SELECT operation is used for selecting a subset with tuples according to a given condition.

Select filters out all tuples that do not satisfy C.

STUDENT

Studno	Name	Course	Year
cs1	Kannan	Big Data	II
cs2	Gowri Shankar	R language	I
cs3	Lenin	Big Data	I
cs4	Padmaja	Python Programming	I

Table 11.1

σ_{course} = "Big Data" (**STUDENT**)

Studno	Name	Course	Year
cs1	Kannan	Big Data	II
cs3	Lenin	Big Data	I

PROJECT (symbol : Π)

 ➢ The projection eliminates all attributes of the input relation but those mentioned in the projection list.
 ➢ The projection method defines a relation that contains a vertical subset of Relation.

Π_{course} (STUDENT)

Result

Course
Big Data
R language
Python Programming

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

Table A		Table B	
Studno	**Name**	**Studno**	**Name**
cs1	Kannan	cs1	Kannan
cs3	Lenin	cs2	GowriShankarn
cs4	Padmaja	cs3	Lenin

Table 11.2

Result

Table A ∪ B	
Studno	**Name**
cs1	Kannan
cs2	GowriShankar
cs3	Lenin
cs4	Padmaja

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.

Result

Table A – B	
cs4	Padmaja

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.

A ∩ B	
cs1	Kannan
cs3	Lenin

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.
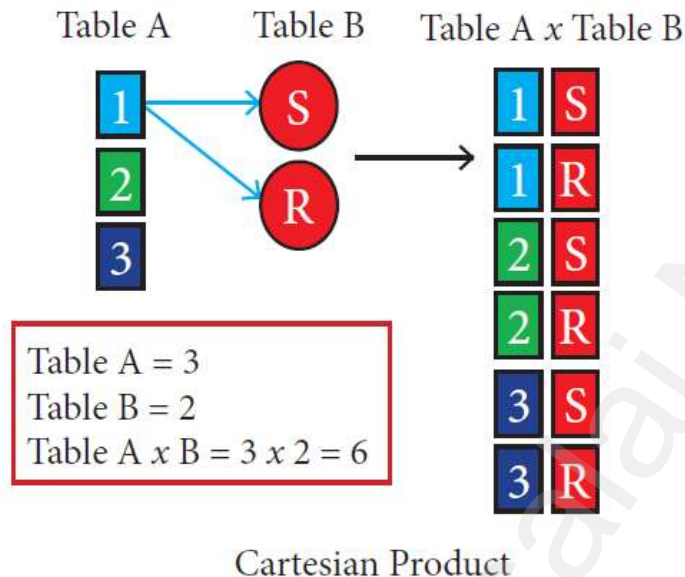 ➢ This type of operation is helpful to merge columns from two relations.

Cartesian Product

Table A		Table B	
studno	**name**	**studno**	**subject**
cs1	Kannan	cs28	Big Data
cs2	Gowri Shankar	cs62	R language
cs4	Padmaja	cs25	python programming

37. a) Explain the need of python's OS module with suitable example.
Python's OS Module
  ➢ The **OS** module in Python provides a way of using operating system dependent functionality.
  ➢ The functions that the **OS** module allows you to interface with the Windows operating system where Python is running on.

os.system(): Execute the C++ compiling commandin the shell.
For Example to compile C++ program **g++ compiler** should be invoked.
To do so the following command is used.
os.system ('g++ ' + <variable_name1> ' -<mode> ' + <variable_name2>
where each argument contains

os.system :-	function system() defined in **os** module to interact with the operating system

g++ :-	General compiler to compile C++ program under Windows Operating system.
variable_name1:-	Name of the C++ file along with its path and without extension .cpp in string format
mode :-	To specify input or output mode. Here it is o prefixed with hyphen.
variable_name2 :-	Name of the executable file without extension .exe in string format

For example the command to compile and execute C++ program is given below

os.system('g++ ' + cpp_file + ' -o ' + exe_file)	g++ compiler compiles the file cpp_file and –o send to exe_file

b) Write notes on the aggregate functions used I values of Table column.

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(*)  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.

38. a) List the rules to be followed to format the data in a CSV file.

1.

```
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)]

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

For example:

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

For example:

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

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:

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

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

b) **Explain the purpose of the following functions:**
    a. plt.xlabel , b. plt.ylabel , c. plt.title d. plt.legend() e. plt.show()

a. plt.xlabel
  ➢ plt.xlabel() specifies label for X-axis

b. plt.ylabel
  ➢ plt.ylabel() specifies label for Y-axis

c. plt.title
  ➢ plt.title() specifies title to the graph

d. plt.legend()
  ➢ Calling legend() with no arguments automatically fetches the legend handles and their associated labels.

e. plt.show()
  ➢ Display a figure. When running in Python with its Pylab mode,display all figures and return to the Python prompt.

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