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Virudhunagar District Common Examinations
Common First Revision Test - January 2020
Standard 12
COMPUTER SCIENCE
PART - I

CHOOSE THE BEST ANSWER:

1. Arguments (b)
2. Tuples(b)
3. Protected(b)
4. Selection sort(c)
5. Comma (d)
6. Statements(c)
7. Def (a)
8. WELC
9. Count() (b)
10. – ©
11. Drop ©
12. MS Excel (c)
13. Get opt module (b)
14. Relational Database system (b)
15. Pip (a)

PART - II

16. Which strategy is used for program designing? Define that Strategy.
   • We are using here a powerful strategy for designing programs: ‘Wishful Thinking’.
   • Wishful Thinking is the formation of beliefs and making decisions according to what might be pleasing to imagine instead of by appealing to reality.
17. **Define Pseudo code.**

- It is an implementation of an algorithm in the form of annotations and informative text written in plain English.
- It has no syntax like any of the programming language and thus can’t be compiled or interpreted by the computer.

18. **Explain the key features of python.**

- It is a general purpose programming language which can be used for both scientific and non-scientific programming.
- It is a platform independent programming language.
- The programs written in Python are easily readable and understandable.

19. **What are the main advantages of function?**

*Ans.* Main advantages of functions are

(i) It avoids repetition and makes high degree of code reusing.

(ii) It provides better modularity for your application.

20. **Write the output for the following code.**

```python
X=[y**2 for y in range(5)]
Print(x)
```

**Output:**
1, 4, 9, 16

21. **What is instantiation?**

- Once a class is created, next to create an object or instance of that class. This process of creating object is called as “Class Instantiation”.

22. **Write the advantages of DBMS.**

**Advantages of DBMS**

- Segregation of application program
- Minimal data duplication or Data Redundancy
- Easy retrieval of data using the Query Language
- Reduced development time and maintenance

23. **Mention the difference between fetchone() and fetchmany().**

<table>
<thead>
<tr>
<th>fetchone()</th>
<th>fetchmany()</th>
</tr>
</thead>
<tbody>
<tr>
<td>The fetchone() method returns the next row of a query result set or None in case there is no row left.</td>
<td>fetchmany() method returns the next number of rows (n) of the result set.</td>
</tr>
</tbody>
</table>
24. List the types of Visualizations in Matplotlib.
There are many types of Visualizations under Matplotlib. Some of them are:
(i) Line plot
(ii) Scatter plot
(iii) Histogram
(iv) Box plot
(v) Bar chart and
(vi) Pie chart

25. Why strlen is called pure function?
(i) strlen is a pure function because the function takes one variable as a parameter, and accesses it to find its length.
(ii) This function reads external memory but does not change it, and the value returned derives from the external memory accessed.

26. Why access control is required?
(i) Access control is a security technique that regulates who or what can view or use resources in a computing environment.
(ii) It is a fundamental concept in security that minimizes risk to the object.

27. Define control structure and List its type.
A program statement that causes a jump of control from one part of the program to another is called control structure or control statement.
The types of list are
(i) Sequential
(ii) Alternative or Branching
(iii) Iterative or Looping

28. Write the basic rules for global keyword in python.
Rules of global Keyword:
The basic rules for global keyword in Python are:
(i) When we define a variable outside a function, it’s global by default. You don’t have to use global keyword.
(ii) We use global keyword to read and write a global variable inside a function.
(iii) Use of global keyword outside a function has no effect.

29. What are the advantages of Tuples over a list?
(i) 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.
(ii) The elements of a list are enclosed within square brackets. But, the elements of a tuple are enclosed by parenthesis.
(iii) Iterating tuples is faster than list.
30. How do define constructor and destructor in Python?
(i) 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.
(ii) It must begin and end with double underscore. This function will act as an ordinary function; but only difference is, it is executed automatically when the object is created.
(iii) This constructor function can be defined with or without arguments. This method is used to initialize the class variables.

General format of __init__ method (Constructor function)
def __init__(self, [args .........]):
<statements>

31. Write a note on different types of DBMS users.
Types of DBMS Users
(i) Database Administrators: 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.
(ii) Application Programmers or Software Developers: This user group is involved in developing and designing the parts of DBMS.
(iii) End User: All modern applications, web or mobile, store user data. Applications are programmed in such a way that they collect user data and store the data on DBMS systems running on their server. End users are the one who store, retrieve, update and delete data.

32. Write a note on open() function of python. What is the difference between the two methods?
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.

33. What is sys.argv? What does it contain?
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.

34. How will you facilitate data abstraction.
Explain it with suitable example.
To facilitate data abstraction, you will need to create two types of functions: constructors and selectors.

**Constructors and Selectors**:

(i) Constructors are functions that build the abstract data type. Selectors are functions that retrieve information from the data type.

(ii) 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 = makecity(name, lat, lon)
   ```

(iii) To extract the information of a city object, you would use functions like:

   ```
   getname(city)
   getlat(city)
   getlon(city)
   ```

(iv) The following pseudo code will compute the distance between two city objects:

   ```
   distance(city1, city2):
   lt1, lg1 := getlat(city1), getlon(city1)
   lt2, lg2 := getlat(city2), getlon(city2)
   return ((lt1 - lt2)**2 + (lg1 - lg2)**2)).
   ```

(v) In the above code read distance(), getlat() and getlon() as functions and read lt as latitude and lg longitude. Read := as “assigned as” or “becomes”

(vi) lt1, lg1 := getlat(city1), getlon(city1) is read as lt1 becomes the value of getlat(city1) and lg1 becomes the value of getlon(city1).

(vii) Notice that you don't need to know how these functions were implemented. You are assuming that someone else has defined them for us.

(viii) It's okay if the end user doesn't know how functions were implemented. However, the functions still have to be defined by someone.

(ix) Let us identify the constructors and selectors in the above code. As you already know that Constructors are functions that build the abstract data type. In the above pseudo code the function which creates the object of the city is the constructor.

   ```
   city = makecity(name, lat, lon)
   ```

(x) Here makecity (name, lat, lon) is the constructor which creates the object city.

   ```
   make city ( )
   ```

   ```
   city
   ```

   ```
   lat lon
   ```

   ```
   value passed as parameter
   Constructor
   ```
Selectors are nothing but the functions that retrieve information from the data type. Therefore in the above code:
getname(city)
getlat(city)
getlon(city)
(xi) are the selectors because these functions extract the information of the city object.

B. What is Binary search? Discuss with example.

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:
Start with the middle element:
(i) If the search element is equal to the middle element of the array i.e., the middle value = number of elements in array / 2, then return the index of the middle element.
(ii) If not, then compare the middle element with the search value,
(iii) If the search element is greater than the number in the middle index, then select the elements to the right side of the middle index, and go to Step-1.
(iv) If the search element is less than the number in the middle index, then select the elements to the left side of the middle index, and start with Step-1.
(v) When a match is found, display success message with the index of the element matched.
(vi) If no match is found for all comparisons, then display unsuccessful message.

Binary Search Working principles:
(i) List of elements in an array must be sorted first for Binary search. The following example describes the step by step operation of binary search.
(ii) Consider the following array of elements, the array is being sorted so it enables 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.

10 20 30 40 50 60 70 80 90 99
0 1 2 3 4 5 6 7 8 9

(iii) First, we find index of middle element of the array by using this formula:
\[ \text{mid} = \frac{(\text{low} + \text{high})}{2} \]
(iv) Here it is, \[ 0 + (9 - 0) / 2 = 4 \] (fractional part ignored). So, 4 is the mid value of the array.

10 20 30 40 50 60 70 80 90 99
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.

10 20 30 40 50 60 70 80 90 99
0 1 2 3 4 5 6 7 8 9

Now we change our low to mid + 1 and find the new mid value again using the formula. low to 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 31.

10 20 30 40 50 60 70 80 90 99
0 1 2 3 4 5 6 7 8 9

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

10 20 30 40 50 60 70 80 90 99
0 1 2 3 4 5 6 7 8 9

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.

10 20 30 40 50 60 70 80 90 99
0 1 2 3 4 5 6 7 8 9

Now we compare the value stored at location 5 with our search element. We found that it is a match.

10 20 30 40 50 60 70 80 90 99
0 1 2 3 4 5 6 7 8 9

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.

35. **Discuss in detail about Tokens in Python.**

Python breaks each logical line into a sequence of elementary lexical components known as **Tokens**. The normal token types are

(i) Identifiers,
(ii) Keywords,
(iii) Operators,
(iv) Delimiters and
(v) Literals.
(i) 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.

(ii) 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.

(iii) 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.

(iv) Delimiters: Python uses the symbols and symbol combinations as delimiters in expressions, lists, dictionaries and strings. Following are the delimiters.

( ) [ ] { }
, : . ' = ;
+= -= *= /= //= %=
&= |= >>= <<= **=

(v) Literals: Literal is a raw data given in available or constant. In Python, there are various types of literals.
- Numeric
- String
- Boolean

B. Explain the following function with example.
(i) swapcase()
   It will change case of every character to its opposite case vice-versa.
   ```python
   str1="tAmIL NaDu"
   ```
print(str1.swapcase())

TaMl nAdU

(ii) count()
Returns the number of substrings occurs within the given range. Remember that substring may be a single character. Range (beg and end) arguments are optional. If it is not given, python searched in whole string. Search is case sensitive.

```python
>>> str1="Raja Raja Chozhan"
>>> print(str1.count('Raja'))
2
>>> print(str1.count('r'))
0
>>> print(str1.count('R'))
2
>>> print(str1.count('a'))
5
>>> print(str1.count('a',0,5))
2
>>> print(str1.count('a',11))
1
```

(iii) capitalize()
Used to capitalize the first character of the string.

```python
>>> city="chennai"
>>>print(city.capitalize())
Chennai
```

36. Explain the different set operations supported by python with suitable example.
The python supports the set operations such as Union, Intersection, difference and Symmetric difference.

**Union:** It includes all elements from two or more sets

![Set Operations Diagram]

(i) In python, the operator | is used to union of two sets. The function union() is also used to join two sets in python.

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

```python
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'}
(iii) Example: Program to Join (Union) two sets using union function
set_A={2,4,6,8}
set_B={'A', 'B', 'C', 'D'}
set_U=set_A.union(set_B)
print=set_U)
Output: {'D', 2, 4, 6, 8, 'B', 'C', 'A'}
Intersection:
(i) It includes the common elements in two Sets

(ii) The operator & is used to intersect two sets in python. The function intersection() is also used to intersect two sets in python.
(iii) 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'}
(iv) Example: Program to insect two sets using intersection function
set_A={'A', 2, 4, 'D'}
set_B={'A', 'B', 'C', 'D'}
print(set_A.intersection(set_B))
Output:
{'A', 'D'}
Difference:
(i) 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** : Program to difference of two sets using minus operator

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

**Output** : {2, 4}

**Example** : Program to difference of two sets using difference function

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

**Output** : {2, 4}

**Symmetric difference** :

(i) 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.

(ii) 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

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

**Output** :

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

**Example** : Program to difference of two sets using symmetric difference function

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

**Output** :

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

b. Explain the different types of data model.

The different types of a Data Model:
Hierarchical Model, Relational Model, Network Database Model, Entity Relationship Model, Object Model.

**Hierarchical Model:**
(i) Hierarchical model was developed by IBM as Information Management System. In Hierarchical model, data is represented as a simple tree-like structure form.
(ii) This model represents a one-to-many relationship i.e., parent-child relationship. One child can have only one parent but one parent can have many children.
(iii) This model is mainly used in IBM Main Frame computers.

**Relational Model:**
(i) The Relational Database model was first proposed by E.F. Codd in 1970. Nowadays, it is the most widespread data model used for database applications around the world.
(ii) The basic structure of data in relational model is tables (relations). All the information's related to a particular type is stored in rows of that table.
(iii) Hence tables are also known as relations in a relational model. A relation key is an attribute which uniquely identifies a particular tuple (row in a relation (table)).

**Network Model:** Network database model is an extended form of hierarchical data model. The difference between hierarchical and Network data model is:
(i) In hierarchical model, a child record has only one parent node,
(ii) In a Network model, a child may have many parent nodes. It represents the data in many-to-many relationships.
(iii) This model is easier and faster to access the Data
(iv) School represents the parent node
(v) Library, Office and Staff room is a child to school (parent node)
(vi) Student is a child to library, office and staff room (one to many relationship)

**Entity Relationship Model. (ER model):**
(i) In this database model, relationship are created by dividing the object into entity and its characteristics into attributes.
(ii) It was developed by Chen in 1976. This model is useful in developing a conceptual design for the database. It is very simple and easy to design logical view of data. The developer can easily understand the system by looking at ER model constructed.
(iii) Rectangle represents the entities. E.g. Doctor and Patient.
(iv) Ellipse represents the attributes E.g. D-id, D-name, P-id, P-name. Attributes describes the characteristics and each entity becomes a major part of the data stored in the database. Diamond represents the relationship in ER diagrams E.g. Doctor diagnosis the Patient

**Object Model:**
(i) Object model stores the data in the form of objects, attributes and methods, classes and Inheritance.
(ii) This model handles more complex applications, such as Geographic information System (GIS), scientific experiments, engineering design and manufacturing.
(iii) It is used in file Management System. It represents real world objects, attributes and behaviors. It provides a clear modular structure. It is easy to maintain and modify the existing code.
(iv) An example of the Object model is **Shape, Circle, Rectangle** and **Triangle** are all objects in this model.
  - **Circle** has the attribute radius.
  - Rectangle has the attributes length and breadth.
  - Triangle has the attributes base and height.
  - The objects Circle, Rectangle and Triangle inherit from the object Shape.

37. Write a SQL statement to create a table for employee having any five fields and create a table constraint for the employee table.

```
CREATE TABLE employee
(
  empcode integer NOTNULL,
  efirstname char(20),
  elastname char(20),
  Designation char(20),
  Pay integer,
  PRIMARY KEY (efirstname, elastname)
);
```

B. Write the different methods to read a File in Python.

**Ans. Read a CSV File Using Python:**
There are two ways to read a CSV file.
(i) Use the csv module’s reader function
(ii) Use the DictReader class.
Two ways of Reading CSV File reader () function Dict Reader class

**CSV Module’s Reader Function:**
(i) You 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.
(ii) Then, you just choose the column you want the variable data for. 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)

(iii) file object : passes the path and the mode of the file

(iv) delimiter: an optional parameter containing the standard delimiters like , | etc can be omitted.

(v) fmtparams : optional parameter which help to override the default values of the dialects like skipinitialspace, quoting etc. can be omitted.

- CSV file - data with default delimiter comma (,)
- CSV file - data with Space at the beginning
- CSV file - data with quotes
- CSV file - data with custom Delimiters

CSV file with default delimiter comma (,): The following program read a file called "sample1.csv" with default delimiter comma (,)

Program:

```python
# importing csv
import csv

# opening the csv file which is in different location with read mode
with open('c:\pyprg\sample1.csv', 'r') as F:
    # other way to open the file is f= ('c:\pyprg\sample1.csv', 'r')
    reader = csv.reader(F)
    # printing each line of the Data row by row
    print(row)
F.close()
```

Output:

```
['SNO', 'NAME', 'CITY']
['12101', 'RAM', 'CHENNAI']
['12102', 'LAVANYA', 'TIRUCHY']
['12103', 'LAKSHMAN', 'MADURAI']
```

Reading CSV File Into A Dictionary:

(i) To read a CSV file into a dictionary can be done by using DictReader class of csv module which works similar to the reader() class but creates an object which maps data to a dictionary.

(ii) 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.
(iii) The columns in each subsequent row then behave like dictionary values and can be accessed with the appropriate key (i.e. fieldname).

(iv) If the first row of your CSV does not contain your column names, you can pass a fieldnames parameter into the DictReader's constructor to assign the dictionary keys manually.

(v) 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.

(vi) For Example Reading “sample8.csv” file into a dictionary

Program :
```python
import csv
filename = 'c:\pyprg\sample8.csv'
input_file = csv.DictReader(open(filename,'r'))
for row in input_file:
    print(dict(row))  # dict() to print data
```

Output :
```
{'ItemName ': 'Keyboard ', 'Quantity': '48'}
{'ItemName ': 'Monitor', 'Quantity': '52'}
{'ItemName ': 'Mouse ', 'Quantity': '20'}
```

In the above program, DictReader() is used to read “sample8.csv” file and map into a dictionary. Then, the function dict() is used to print the data in dictionary format without order.

Remove the dict() function from the above program and use print(row). Check you are getting the following output

```python
OrderedDict([('ItemName ', 'Keyboard '), ('Quantity', '48')])
OrderedDict([('ItemName ', 'Monitor'), ('Quantity', '52')])
OrderedDict([('ItemName ', 'Mouse '), ('Quantity', '20')])
```

38. Write any 5 features of Python.

Features of Python:

(i) Python uses Automatic Garbage Collection whereas C++ does not.

(ii) C++ is a statically typed language, while Python is a dynamically typed language.

(iii) Python runs through an interpreter, while C++ is pre-compiled.

(iv) Python code tends to be 5 to 10 times shorter than that written in C++.

(v) In Python, there is no need to declare types explicitly where as it should be done in C++

(vi) In Python, a function may accept an argument of any type, and return multiple values without any kind of declaration beforehand. Whereas in C++ return statement can return only one value.
B. Write in brief about SQLite and the steps used to use it.

(i) SQLite is a simple relational database system, which saves its data in regular data files or even in the internal memory of the computer.
(ii) It is designed to be embedded in applications, instead of using a separate database server program such as MySQL or Oracle.
(iii) SQLite is fast, rigorously tested, and flexible, making it easier to work. Python has a native library for SQLite. To use SQLite,

Step 1 : import sqlite3
Step 2 : create a connection using connect () method and pass the name of the database file
Step 3 : Set the cursor object cursor = connection. cursor ()
(iv) Connecting to a database in step2 means passing the name of the database to be accessed. If the database already exists the connection will open the same. Otherwise, Python will open a new database file with the specified name.
(v) Cursor in step 3 is a control structure used to traverse and fetch the records of the database.
(vi) Cursor has a major role in working with Python. All the commands will be executed using cursor object only.
(vii) To create a table in the database, create an object and write the SQL command in it.
Example : sql_comm = "SQL statement"
(viii) 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.
(ix) Any changes made in the values of the record should be saved by the commend

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