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Branch - ECZ

Subject - Python Programming
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Assignment - 01

Section - A

Q1 - Explain the programming cycle for Python in detail?

Ans: The programming cycle in Python refers to the ~~the~~ process of developing a Python programming which includes steps like writing the code, running it using the interpreter, testing for incorrect output and debugging the errors until the program works correctly. After successful testing, the program is executed and maintained for future improvements.

Q2 - What will be the output of the following Python code?

Ans -

```
i = 0
while i < 3:
    print(i)
    i += 1
else:
    print(0)
```

Solⁿ

```
0 1 P
0
0
0
:
```

Q3 :-

```
def cube(x):
    return x * x * x
x = cube(3)
print x
```

Solⁿ

```
0 1 P
27 A3
```

Q4 - How do we define an Interface for an ADT?

Ans: An interface for an Abstract Data Type (ADT) is defined by specifying only the operations that can be performed on the data, along with their behaviour, without describing how the data is stored or how the operations are implemented.

Q6 - How do you perform a search in Python?
A search in Python is performed by traversing a list or sequence and comparing it with the target value until a match is found. It can be done using loops or the operators.

ex: - If x is my list:
Print ("Found")

Section - B

Q6 - What do you mean by Python IDE? Explain in detail.

Ans: - A Python IDE (Integrated Development Environment) is a software application that provides a complete workspace for writing, running, and debugging Python programs. Instead of using a basic text editor and running code separately in the command prompt, an IDE brings all development tools together in a single interface, making programming easier and faster.

• Features of a Python IDE.

- 1 - Code editor: Helps write Python programs with indentation support.
- 2 - Syntax Highlighting: Colours keywords, variables and fn to improve readability.
- 3 - Auto completion: Suggests fn and variables to reduce typing and errors.
- 4 - Debugger Tool: Detects and helps fix logical and runtime errors.

Q7 - How can you randomize the items of a list in place in Python?

Ans: - In Python, the items of a list can be randomized in place using the fn shuffle() from the random module.

Syntax: -

```
import random  
random.shuffle (numbers)
```

ex: -

```
numbers = [1, 2, 3, 4, 5]  
random.shuffle (numbers)  
Print (numbers)
```

Q. Explain Tuples and Unpacking sequences in Python Data structure?

- Tuple :- A tuple in Python is an ordered, immutable collection of items. It stores multiple values in a single variable like a list, but once created, the values inside a tuple cannot be modified.

Ex: -

```
student = ("Vansh", 1965, "EC2")  
print(student)
```

Unpacking sequences: - Unpacking means assigning individual elements of a sequence to multiple variables in a single statement.

Ex: -

```
student = ("Vansh", 19, "EC2")
```

```
name, age, branch = student
```

```
print(name)
```

```
print(age)
```

```
print(branch)
```

Q. - What are file input and output operations in Python programming?

As: - File input/output operations in Python refer to the processes of reading data from file (input) and writing data to files (output). These operations allow a program to store data permanently instead of storing it temporarily in memory.

- Opening a file.

```
file = object = open("Vansh", "mode")
```

- Reading from a file (Input operation)

```
f = open("data.txt", "r")
```

```
content = f.read()
```

```
print(content)
```

```
f.close()
```

- Write a file (Output operation)

```
f = open("data.txt", "w")
```

```
f.write("Hello Students")
```

```
f.close()
```

Section - C

Q10 - Write a program in Python to execute the Selection Sort algorithm?

Ans.

```
def selection_sort(arr):  
    n = len(arr)  
    for i in range(n):  
        min_index = i  
        for j in range(i+1, n):  
            if arr[j] < arr[min_index]:  
                min_index = j  
        arr[i], arr[min_index] = arr[min_index], arr[i]  
  
numbers = [64, 25, 12, 22, 11]  
print("original list:", numbers)  
print("sorted list:", numbers)
```

~~Q11 - Write a program in Python to execute the selection sort algorithm?~~

~~Ans: - def selection_sort(arr):~~

Q12: - Write a program to construct the following pattern, using a nested for loop.

```
*  
**  
***  
****  
*****  
****  
***  
**  
*  
*
```

```
rows = 5
```

```
for i in range(1, rows+1):  
    for j in range(i):  
        print(" *", end=" ")  
    print()
```

```
for i in range(rows-1, 0, -1):  
    for j in range(i):  
        print(" *", end=" ")  
    print()
```

Q12 - Write a Program to produce Fibonacci series in Python?

```
n = int(input("Enter how many terms you want:"))  
a, b = 0, 1  
print("Fibonacci series:")  
for i in range(n):  
    print(a, end=" ")  
    c = a + b  
    a = b  
    b = c
```

Q13 - Write a Python Program to change a given string to a new string where the first and last character have been exchanged.

```
s = input("Enter a string: ")
```

```
if len(s) <= 1:
```

```
    new_string = s
```

```
else:
```

```
    new_string = s[-1] + s[1:-1] + s[0]
```

```
print("New string after exchanging first and last characters: ", new_string)
```

Q14 - write a Python program to add an item in a tuple?

Ans: - `t = (10, 20, 30, 40)`

`item = 50`

`temp = list(t)`

`temp.append(item)`

`t = tuple(temp)`

`print("tuple after adding item:", t)`

Q15:- explain the terms Merge list and Merge Sort in Python programming.

Merge list: -

`list 1 = [1, 3, 5]`

`list 2 = [2, 4, 6]`

`merged_list = list 1 + list 2`

`print(merged_list)`

Merge Sort: -

`def merge_sort(arr):`

`if len(arr) > 1:`

`mid = len(arr) // 2`

`left = arr[:mid]`

`right = arr[mid:]`

`merge_sort(left)`

`merge_sort(right)`

`i = j = k = 0`

`while i < len(left) and j < len(right):`

`if left[i] < right[j]:`

`arr[k] = left[i]`

`i += 1`

`else:`

`arr[k] = right[j]`

`j += 1`

`k += 1`

`while i < len(left):`

`arr[k] = left[i]`

`i += 1`

`k += 1`

`while j < len(right):`

`arr[k] = right[j]`

`j += 1`

`k += 1`

`return arr`