Python

Assignment

Q1. _Explain with an example each when to use a for loop and a while loop._

Sol :-

`for` loop:

- Use a `for` loop when you know the number of iterations beforehand.
- It's particularly useful when you want to iterate over a sequence, such as a list or range.

Example: Printing numbers from 1 to 5 using a `for` loop in Python :-

for i in range(1, 6):

  print(i)

Output:-

1

2

3

4

5

2. `while` loop:

- Use a `while` loop when you don't know the number of iterations in advance, and you want to continue looping until a certain condition is met.
- It's handy for situations where the loop termination depends on dynamic conditions.

Example: Printing numbers from 1 to 5 using a `while` loop in Python.

i = 1

```python
while i <= 5:

    print(i)

    i += 1
```

1

2

3

4

5

Q2. Write a python program to print the sum and product of the first 10 natural numbers using for and while loop.

sol:-

```python
#sum of first 10 natural numbers using for loop

sum=0

for i in range(1,11):

    sum=sum+i

print(sum)
```

output:-

55

```python
#product of first 10 natural numbers using for loop

product=1
```

```python
for i in range(1,11):

    product=product*i


print(product)
```

3628800

```python
#sum of first 10 natural numbers using while loop

sum=0

i=1

while i <=10:

    sum=sum+ i

    i=i+1


print(sum)
```

55

```python
#product of first 10 natural numbers using while loop

prod=1

i=1

while i<=10:

    prod=prod*i

    i=i+1


print(prod)
```

3628800

Q3. Create a python program to compute the

electricity bill for a household. The per-unit charges in rupees are as follows: For the first 100 units, the user will be charged Rs. 4.5 per unit, for the next 100 units, the user will be charged Rs. 6 per unit, and for the next 100 units, the user will be charged Rs. 10 per unit, After 300 units and above the user will be charged Rs. 20 per unit. You are required to take the units of electricity consumed in a month from the user as input. Your program must pass this test case: when the unit of electricity consumed by the user in a month is 310, the total electricity bill should be 2250.

sol:-

```python
unit=int(input("enter unit : "))

if unit<=100:

    bill=unit*4.5

    print(bill)

elif unit>100 and unit<=200:

    bill=100*4.5+ (unit-100)*6

    print(bill)

elif unit>200 and unit<=300:

    bill= 100*4.5 + 100*6 +(unit-200)*10

    print(bill)

else:

    bill=100*4.5 + 100*6 + 100*10 + (unit-300)*20

    print(bill)
```

Test case:

enter unit : 310

Output: 2250.0

Q4. Create a list of numbers from 1 to 100. Use for loop and while loop to calculate the cube of each number and if the cube of that number is divisible by 4 or 5 then append that number in a list and print that list.

Sol:-

```python
#creating list

list=[]

for i in range(1,101):

    list.append(i)

print(list)
```

```python
# Using for loop

cubes_for = []

for num in range(1, 101):

    cube = num ** 3

    if cube % 4 == 0 or cube % 5 == 0:

        cubes_for.append(num)


print("Using for loop:", cubes_for)


# Using while loop

cubes_while = []

num = 1

while num <= 100:

    cube = num ** 3

    if cube % 4 == 0 or cube % 5 == 0:

        cubes_while.append(num)

    num += 1
```

```python
print("Using while loop:", cubes_while)
```

Output:-

```
Using for loop: [2, 4, 5, 6, 8, 10, 12, 14, 15, 16, 18, 20, 22, 24, 25, 26, 28,
30, 32, 34, 35, 36, 38, 40, 42, 44, 45, 46, 48, 50, 52, 54, 55, 56, 58, 60, 62,
64, 65, 66, 68, 70, 72, 74, 75, 76, 78, 80, 82, 84, 85, 86, 88, 90, 92, 94, 95,
96, 98, 100]

Using while loop: [2, 4, 5, 6, 8, 10, 12, 14, 15, 16, 18, 20, 22, 24, 25, 26,
28, 30, 32, 34, 35, 36, 38, 40, 42, 44, 45, 46, 48, 50, 52, 54, 55, 56, 58, 60,
62, 64, 65, 66, 68, 70, 72, 74, 75, 76, 78, 80, 82, 84, 85, 86, 88, 90, 92, 94,
95, 96, 98, 100]
```

Q5. *Write a program to filter count vowels in the below-given string.string = "I want to become a data scientist"*

```python
string = "I want to become a data scientist"


string_lower = string.lower()

vowel_count = 0


vowels = set("aeiou")


# Loop through each character in the string and check if it is a vowel

for char in string_lower:

    if char in vowels:

        vowel_count += 1


print("Number of vowels in the string:", vowel_count)
```

OUTPUT:-

```
Number of vowels in the string: 12
```