

Q1. Explain with an example each when to use a for loop and a while loop. Ans- Use a for loop when you know the number of iterations you want to perform, such as when iterating over elements in a list or executing a block of code a specific number of times. Example

```
In [2]: # Printing numbers from 1 to 5 using a for loop
for i in range(1, 6):
    print(i)
```

```
1
2
3
4
5
```

Use a while loop when you need to repeat a block of code until a certain condition is met. The loop will continue as long as the condition is True.

```
In [3]: # Printing numbers from 1 to 5 using a while loop
i = 1
while i <= 5:
    print(i)
    i += 1
```

```
1
2
3
4
5
```

Q2. Python program to print the sum and product of the first 10 natural numbers using for and while loop?

```
In [4]: # Using for loop
sum_for = 0
product_for = 1

for num in range(1, 11):
    sum_for += num
    product_for *= num

print("Sum using for loop:", sum_for)
print("Product using for loop:", product_for)

# Using while loop
sum_while = 0
product_while = 1
num = 1

while num <= 10:
    sum_while += num
    product_while *= num
    num += 1

print("Sum using while loop:", sum_while)
print("Product using while loop:", product_while)
```

```
Sum using for loop: 55
Product using for loop: 3628800
Sum using while loop: 55
Product using while loop: 3628800
```

Q3. Python program to compute the electricity bill for a household:

```
In [37]: def calculate_electricity_bill(units):
    per_unit_charges = 0
```

```

if units <= 100:
    per_unit_charges = 4.5
elif units <= 200:
    per_unit_charges = 6
elif units <= 300:
    per_unit_charges = 10
else:
    per_unit_charges = 20

total_bill = units * per_unit_charges
return total_bill

# Taking input from the user
units_consumed = float(input("Enter the units of electricity consumed in a month: "))
total_bill_amount = calculate_electricity_bill(units_consumed)
print("Total electricity bill:", total_bill_amount)

```

```

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TypeError                                Traceback (most recent call last)
Cell In [37], line 17
     14     return total_bill
     16 # Taking input from the user
--> 17 units_consumed = float(input("Enter the units of electricity consumed in a
month: "))
     18 total_bill_amount = calculate_electricity_bill(units_consumed)
     19 print("Total electricity bill:", total_bill_amount)

TypeError: 'str' object is not callable

```

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.

```

In [38]: # Using for loop
numbers = list(range(1, 101))
cube_divisible_list = []

for num in numbers:
    cube = num ** 3
    if cube % 4 == 0 or cube % 5 == 0:
        cube_divisible_list.append(num)

print("Numbers whose cube is divisible by 4 or 5 (using for loop):", cube_divisible_list)

# Using while loop
numbers = list(range(1, 101))
cube_divisible_list = []
index = 0

while index < len(numbers):
    cube = numbers[index] ** 3
    if cube % 4 == 0 or cube % 5 == 0:
        cube_divisible_list.append(numbers[index])
    index += 1

print("Numbers whose cube is divisible by 4 or 5 (using while loop):", cube_divisible_list)

```

Numbers whose cube is divisible by 4 or 5 (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]

Numbers whose cube is divisible by 4 or 5 (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.

```
In [39]: string = "I want to become a data scientist"

# Using for loop
vowels = 'aeiou'
vowel_count = 0

for char in string:
    if char.lower() in vowels:
        vowel_count += 1

print("Vowel count using for loop:", vowel_count)

# Using List comprehension and sum
vowel_count = sum(1 for char in string if char.lower() in vowels)

print("Vowel count using list comprehension:", vowel_count)

Vowel count using for loop: 12
Vowel count using list comprehension: 12
```

In []: