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

Ans:- for loop : for loop is best used when you know in advance how many times you need to itrate its ideal for iterating over sequences like list , tuples or ranges

```python
In [2]: #Example suppose print the numbers  from 1 to 5
        for i in range(1,6):
            print(i)
```

```
1
2
3
4
5
```

while loop: A while loop is best used when the number of itration is not known beforehand and depends on a condition being not its ideal for situation where you need to keep looping until a certain condition changes

```python
In [3]: #Example suppose we want to keep the user for a password until they enter the co
        correct_password = "Sujen@1213"
        user_password = ""

        while user_password!=correct_password:
            user_password = input("Enter the passwoed")
            if user_password == correct_password:
                print("Access granted")
            else:
                print("Incorrect password try again letter")
```

```
Access granted
```

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

Ans : Using a "for" loop

```python
In [10]: #Sum  and product of the first 10 natural numbers using a for loop
         Sum_for = 0
         Product_for = 1

         for i in range(1,11):
             Sum_for+=i
             Product_for*=i
```

```
print(f"Sum using for loop : {Sum_for}")
print(f"product using for loop {Product_for}")
```

```
Sum using for loop : 55
product using for loop 3628800
```

Using while loop

In [13]:
```python
#Sum and product of the first 10 natural numbers using a while loop
Sum_while = 0
Product_while = 1

i = 1
while i<=10:
    Sum_while += i
    Product_while *= i

    i+=1
print(f"Sum using while loop : {Sum_while}")
print(f"product using while loop : {Product_while}")
```

```
Sum using while loop : 55
product using while loop : 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 peunit, for the next 100 units, the user will be charged Rs. 6 per unit, and for the next 100 units, the user willbe 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 is310, the total electricity bill should be 2250.

Ans :-

In [17]:
```python
#Function to calculate electric bill
def calculate_bill(units):
    if units<=100:
        bill = units * 4.5
```

```python
    elif units<=300:
        bill=(100*4.5)+((units-100)*6)

    else:
        bill = (100*4.5)+(100*6)+(100*10)+((units-300)*20)
    return bill

#Taking user input for units of electricity consumed
unit_consumed = int(input("Enter the units of electricity consumed in a month :

#Calculate the bill
total_bill = calculate_bill(unit_consumed)

#printing the total bill
print(f"The total electricity bill is Rs : {total_bill}")
```

```
The total electricity bill is Rs : 2250.0
```

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

Ans:-

In [21]:
```python
#Using a for loop
numbers = list(range(1,101))
result_for_loop = []

for number in numbers:
    cube = number **3
    if cube % 4 == 0 or cube%5==0:
        result_for_loop.append(number)
print(f"using for loop:{result_for_loop}")
```

```
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]
```

In [27]:
```python
#using while loop
numbers = list(range(1,101))
result_while_loop = []
index = 0

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

```
            index += 1
print(f"using while loop : {result_while_loop}")
```

```
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"

Ans:-

In [32]:
```python
#According to question first store in string
string = "I want to become a data scientist"
vowels = "aeiouAEIOU"

for char in string:
    if char in vowels :
        i+=1
print(f"number of vowels in the string : {i}")
```

```
number of vowels in the string : 23
```

In [ ]: