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Lab3. Python Functions and Modules

Question 1: create a function prime() that receives an integer and returns whether n is prime or not. Print all prime numbers from 1 to 100 by calling prime() function.

In [34]:

```
def prime(num):
    for i in range(2,num):
        if num%i == 0:
            return 0
    else:
        return num

while True:
    n=int(input("Enter the number: "))
    if n==0:
        print("\nLoop ends here... \n\n\nHere we are printing all prime numbers fr
        break
    a=prime(n)
    if a!= 0:
        print(n,"is prime number\n")
    else:
        print(n,"is not prime number\n")

def prime(n):
    status = True
    if n < 2:
        status = False
    else:
        for i in range(2,n):
            if n % i == 0:
                status = False
    return status

for n in range(1,100):
    if prime(n):
        if n==100:
            print ('Prime',n)
        else:
            print ('Prime',n)
```

Enter the number: 1
1 is prime number

Enter the number: 2
2 is prime number

Enter the number: 3
3 is prime number

Enter the number: 4
4 is not prime number

Enter the number: 5
5 is prime number

Enter the number: 6
6 is not prime number

Enter the number: 0

Loop ends here...

Here we are printing all prime numbers from 1 to 100 using prime function:

```
Prime 2
Prime 3
Prime 5
Prime 7
Prime 11
Prime 13
Prime 17
Prime 19
Prime 23
Prime 29
Prime 31
Prime 37
Prime 41
Prime 43
Prime 47
Prime 53
Prime 59
Prime 61
Prime 67
Prime 71
Prime 73
Prime 79
Prime 83
Prime 89
Prime 97
```

Explanation 1: Here we need to print the integer from the user wheather the entered number is prime number or not to do that we are creating a function using (def) and giving certian conditions in (while, if, else) which to validate specific condition in each block. Then we call prime function to print prime numbers from 1 to 100...

Question 2: Develop a simple arithmetic calculator for 4 operations. The program should continue calculation until user types 'q' to quit. A sample user interaction can be:

Enter operator(q to quit): + Enter value 1: 10 Enter value 2: 20 Result = 30

Create 4 functions add(), subtract(), multiply(), and divide() that receives two values and returns the result of the operation. Now, perform the following operations by calling the corresponding functions. Validate your outputs.

1. 10+20
2. 20-5
3. 8*5
4. 50/3

In [35]:

```
def add(a,b):
    return a+b
def sub(a,b):
    return a-b
def mul(a,b):
    return a*b
def div(a,b):
    if b==0:
        print("division is not possible ")
```

```

else:
    return a/b

while True:
    print("Enter the operator: ")
    operator=input()
    if (operator=='q'):
        break
    a=int(input("\nEnter the value of 1: "))
    b=int(input("Enter the value of 2: "))

    if (operator=='+'):
        r=add(a,b)
    elif (operator=='-'):
        r=sub(a,b)
    elif (operator == '*'):
        r=mul(a,b)
    elif (operator=='/'):
        r=div(a,b)
    print("Result is ",r,'\n')
    print("Quit")

```

Enter the operator:

+

Enter the value of 1: 10

Enter the value of 2: 20

Result is 30

Enter the operator:

-

Enter the value of 1: 20

Enter the value of 2: 5

Result is 15

Enter the operator:

*

Enter the value of 1: 8

Enter the value of 2: 5

Result is 40

Enter the operator:

/

Enter the value of 1: 50

Enter the value of 2: 3

Result is 16.666666666666668

Enter the operator:

q

Quit

Explanation 2: Here we are creating 4 separate functions using 1.add 2.sub 3.mul 4.div I need to get input from the user to 'enter the operator', 'Enter the value 1:', 'Enter the value 2:' then using if and else operation it performs a validate add, sub, mul, div while performing division if the input is 0 then it prints division is not possible else it performs next step. Then finally when the user enters q the program is to quit.

Question3. Create a function factorial() that takes an integer and returns its factorial value.

- You can create a non-recursive version of factorial.
- Also, check factorial of negative number does not exist.

- Factorial of 0 is 1.
- Save this Python file as factorial_definition.py.

Now, open another file and can import factorial_definition.py as follows:

- import factorial_definition
- You can call function function as factorial_definition.factorial().

Now, print the following factorial values:

- 1. factorial_definition.factorial(3)
- 1. factorial_definition.factorial(5)
- 1. factorial_definition.factorial(10)

```
In [1]: def factorial(n):
        result = 1;
        if(n < 0):
            print("The factorial does not exist for negative numbers")
        elif(n==0):
            print("The factorial of 0 is 1")
        elif(n==1):
            return 1
        else:
            for i in range(2, n + 1):
                result = result * i;
            return result;
```

Create a non recursive function factorial() that takes an integer and returns its factorial value. Save the python file as .py and import the module and use the functions.

```
In [2]: import factorial_definition

        factorial_definition.factorial(3)
```

Out[2]: 6

```
In [3]: factorial_definition.factorial(5)
```

Out[3]: 120

```
In [4]: factorial_definition.factorial(10)
```

Out[4]: 3628800