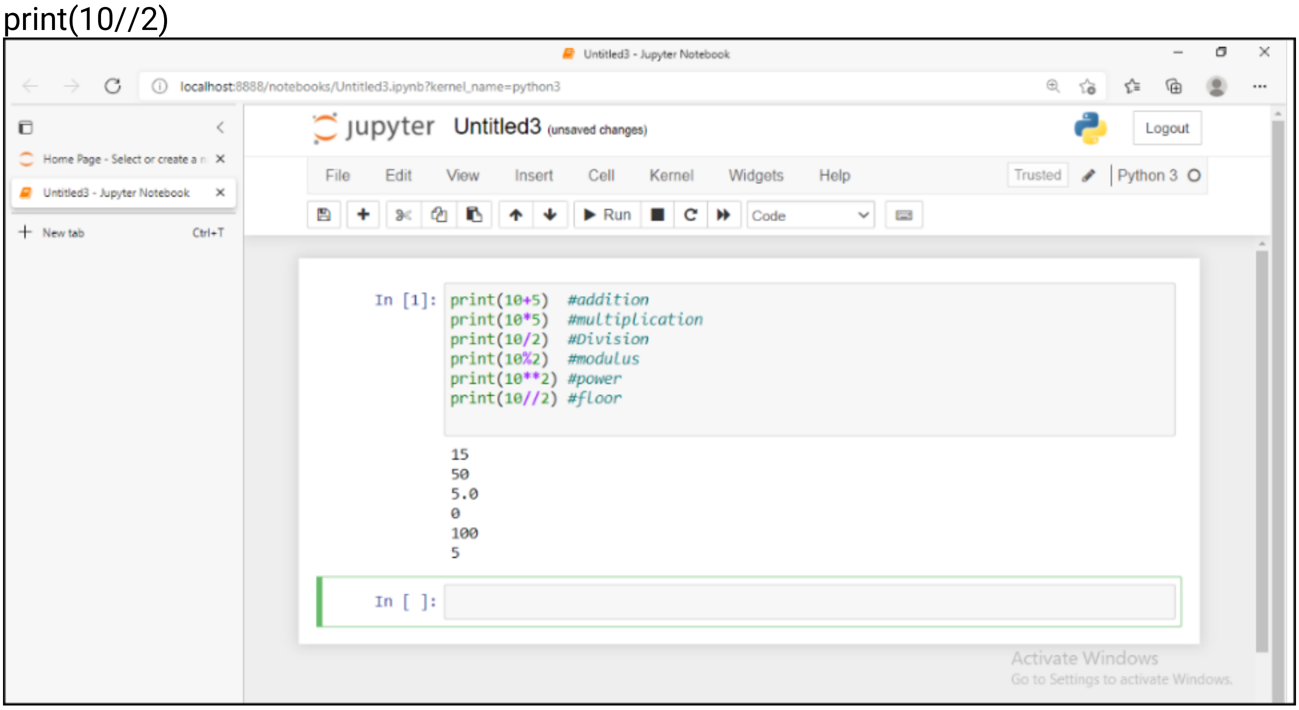
NAME - AMRIT GURUNG
COURSE - MCA
SEC - A
ROLL NO - 2001025
SUBJECT - MACHINE LEARNING USING PYTHON

Lab assignment

1. Programs on Basics of Python

   1. Write a program to use the mathematical operators.

```
print(10+5)
print(10*5)
print(10/2)
print(10%2)
print(10**2)
print(10//2)
```



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Code
Activate Windows
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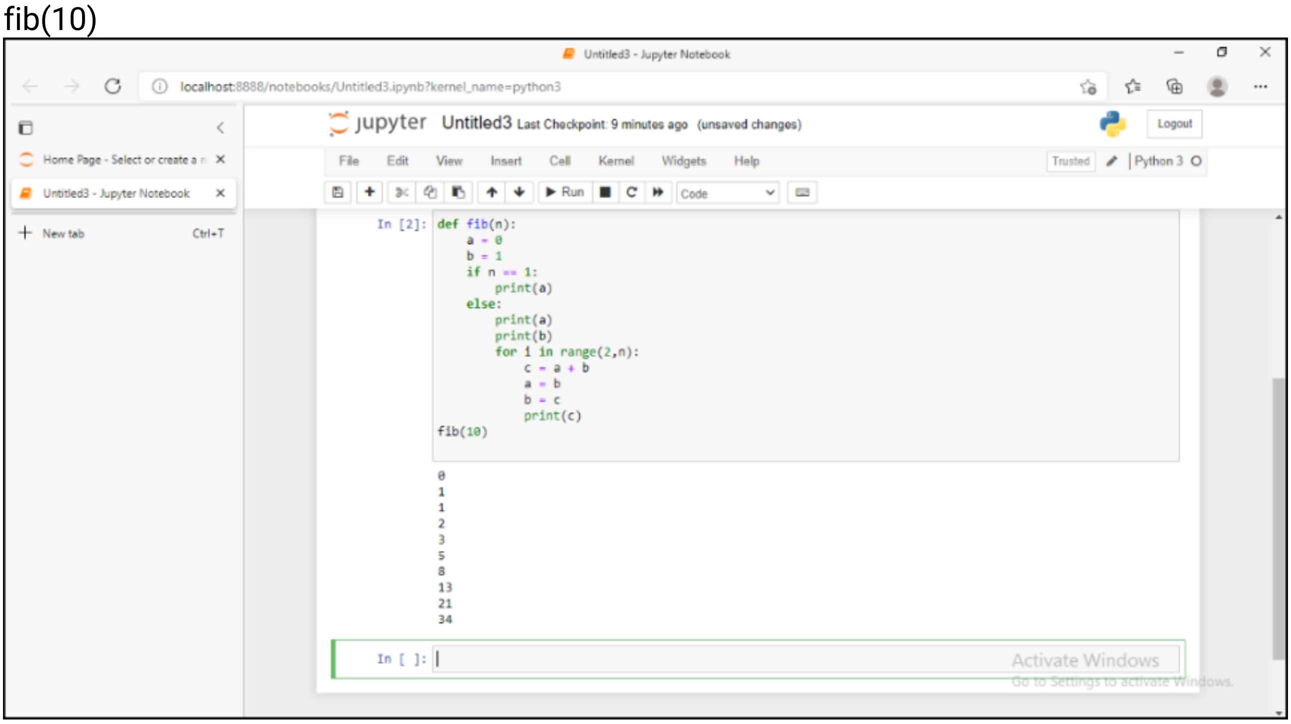
```
In [1]: print(10+5)  #addition
        print(10*5)  #multiplication
        print(10/2)  #Division
        print(10%2)  #modulus
        print(10**2) #power
        print(10//2) #floor

        15
        50
        5.0
        0
        100
        5

In [ ]:
```

2.write a program to take an input of numbers from the user and print the Fibonacci series to the terminal number.

```
def fib(n):
    a = 0
    b = 1
    if n == 1:
        print(a)
    else:
        print(a)
        print(b)
        for i in range(2,n):
            c = a + b
        a = b
        b = c
        print(c)
fib(10)
```



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Activate Windows
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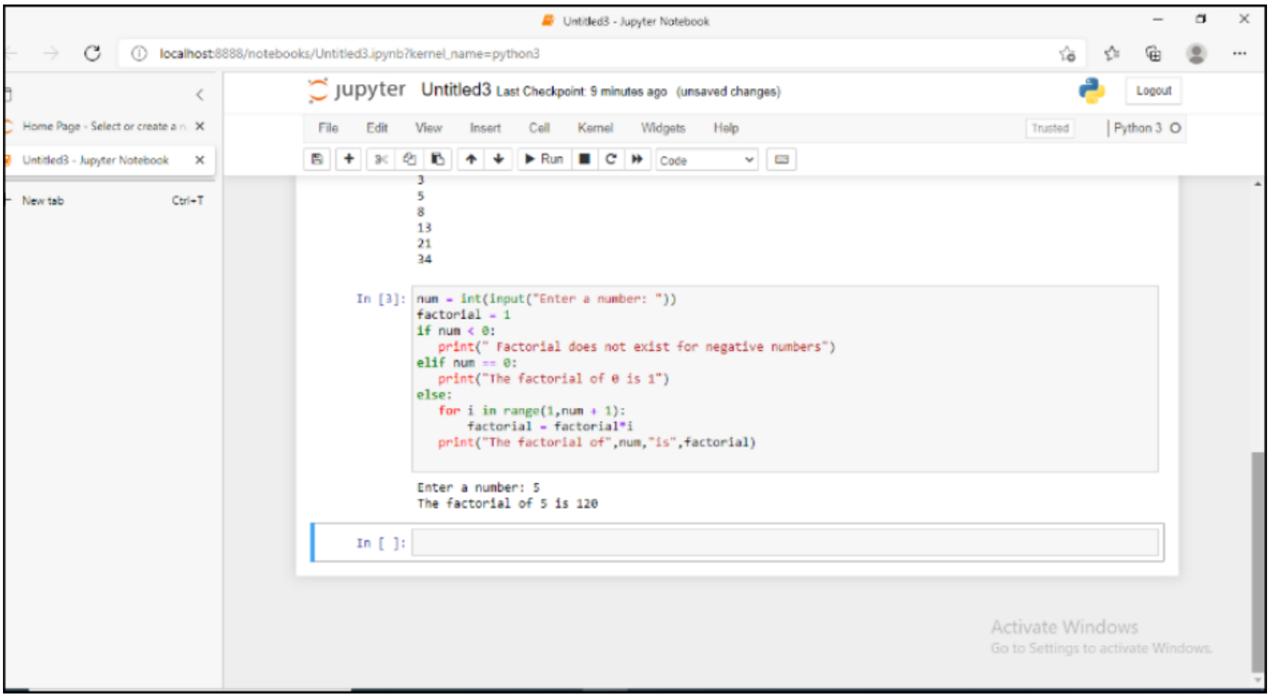
```
In [2]: def fib(n):
            a = 0
            b = 1
            if n == 1:
                print(a)
            else:
                print(a)
                print(b)
                for i in range(2,n):
                    c = a + b
                    a = b
                    b = c
                    print(c)
        fib(10)

        0
        1
        1
        2
        3
        5
        8
        13
        21
        34

In [ ]:
```

3.Write a program to print the factorial of the number input by the user.

```
num = int(input("Enter a number: "))
factorial = 1
if num < 0:
  print(" Factorial does not exist for negative numbers")
elif num == 0:
  print("The factorial of 0 is 1")
else:
  for i in range(1,num + 1):
     factorial = factorial*i
  print("The factorial of",num,"is",factorial)
```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Code
Activate Windows
Go to Settings to activate Windows.

```
3
5
8
13
21
34
```

```
In [3]: num = int(input("Enter a number: "))
        factorial = 1
        if num < 0:
           print(" Factorial does not exist for negative numbers")
        elif num == 0:
           print("The factorial of 0 is 1")
        else:
           for i in range(1,num + 1):
               factorial = factorial*i
           print("The factorial of",num,"is",factorial)
```

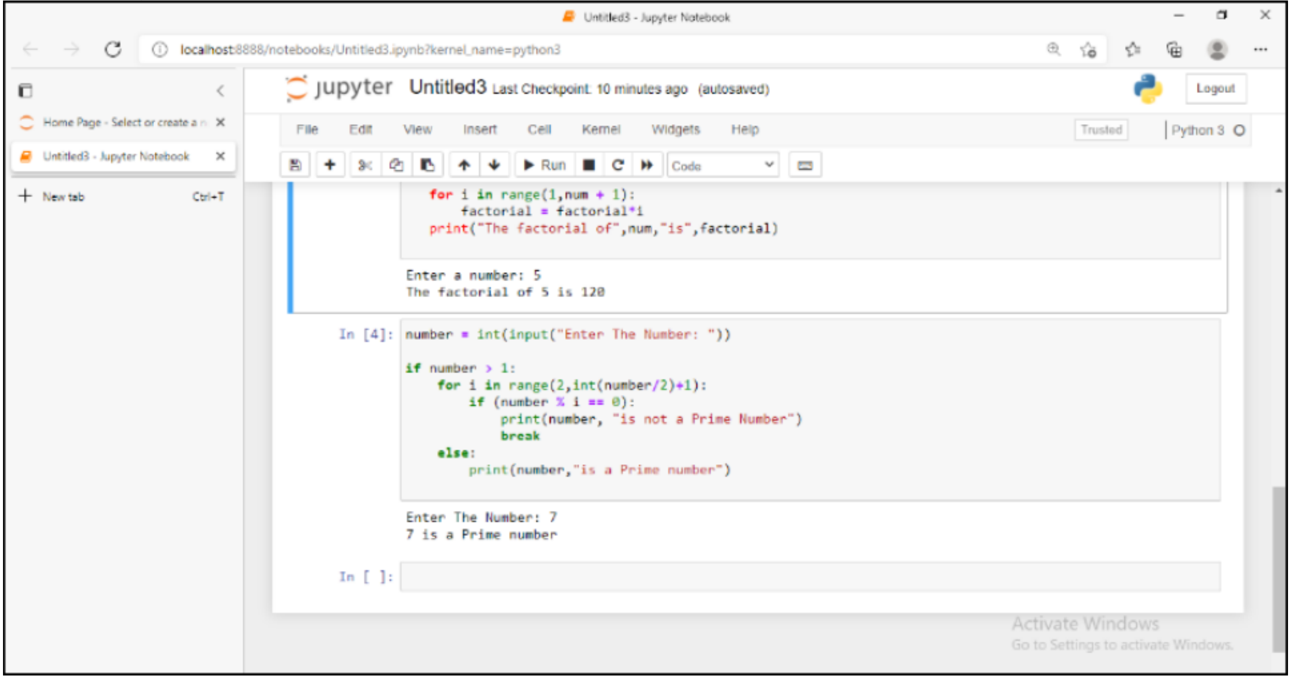
```
Enter a number: 5
The factorial of 5 is 120
```

```
In [ ]:
```

4.Write a program to check whether a given number is a prime number or not using loops.

```
number = int(input("Enter The Number: "))

if number > 1:
    for i in range(2,int(number/2)+1):
        if (number % i == 0):
            print(number, "is not a Prime Number")
            break
    else:
        print(number,"is a Prime number")
```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```
   for i in range(1,num + 1):
       factorial = factorial*i
   print("The factorial of",num,"is",factorial)
```

```
Enter a number: 5
The factorial of 5 is 120
```

```
In [4]: number = int(input("Enter The Number: "))

        if number > 1:
          for i in range(2,int(number/2)+1):
              if (number % i == 0):
                  print(number, "is not a Prime Number")
                  break
          else:
              print(number,"is a Prime number")
```

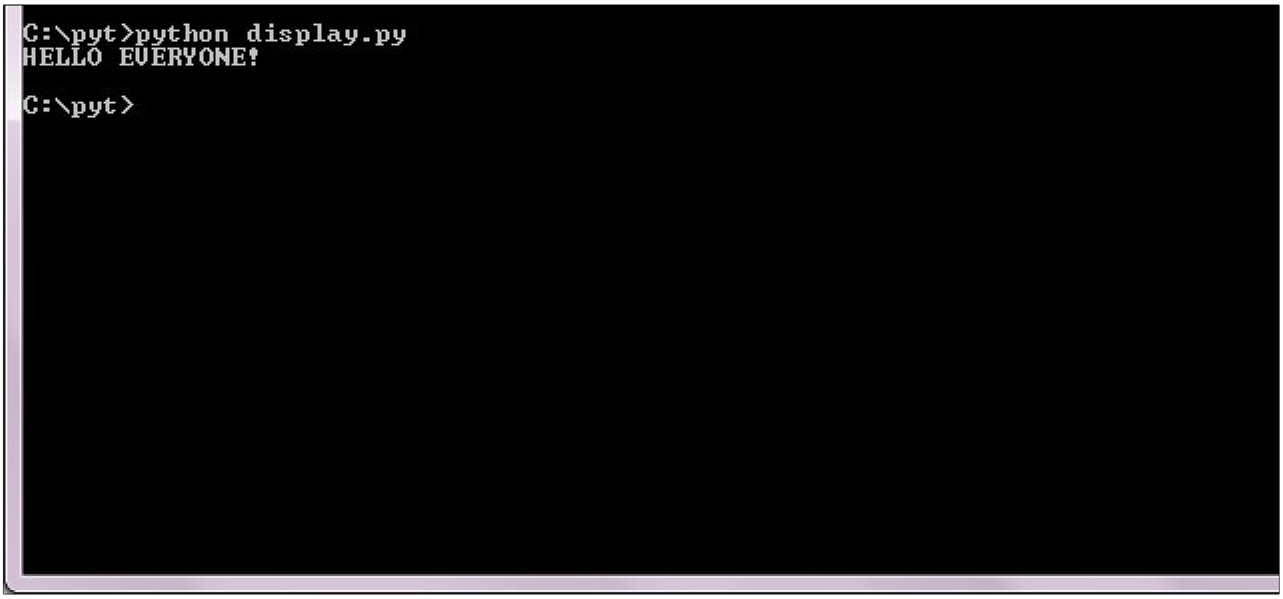
```
Enter The Number: 7
7 is a Prime number
```

```
In [ ]:
```

5. Write a program to demonstrate the importing of modules of python.

```
def display_message():
   return "HELLO EVERYONE!"

import test
print(test.display_message())
```



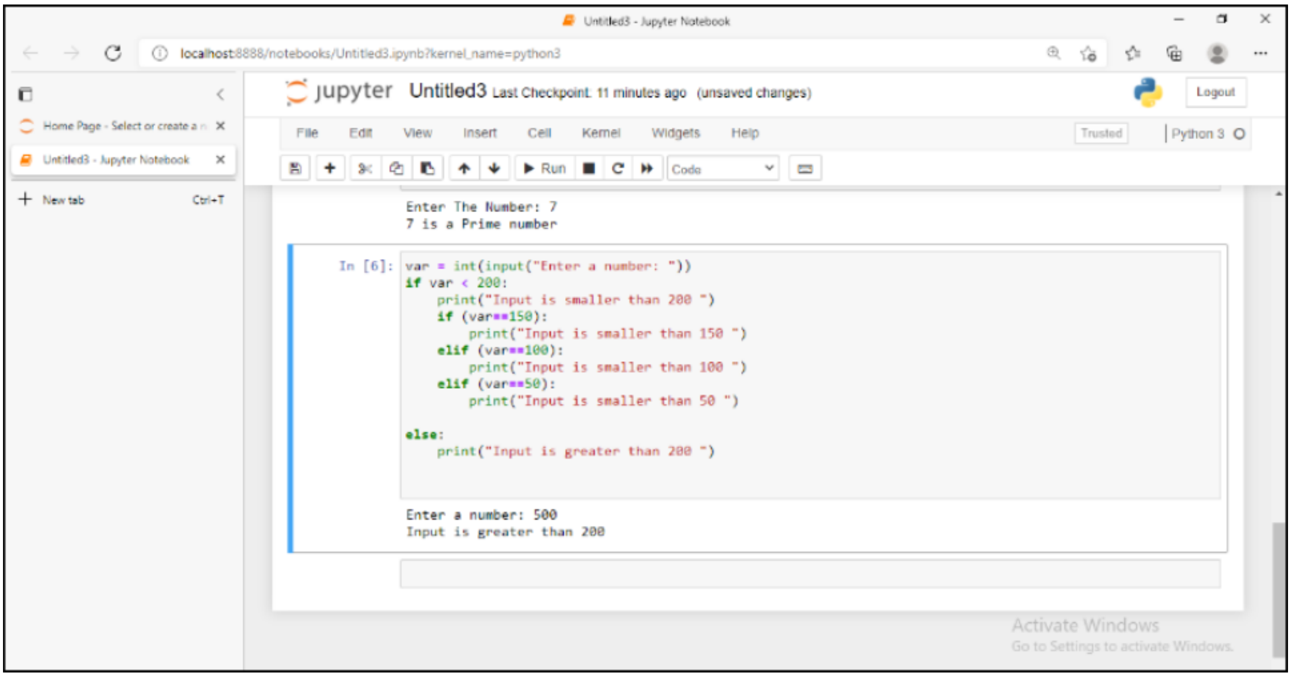
```
C:\pyt>python display.py
HELLO EVERYONE!

C:\pyt>
```

6. Write a program to demonstrate the use of nested if statements.

```
var = int(input("Enter a number: "))
if var < 200:
   print("Input is smaller than 200 ")
   if (var==150):
      print("Input is smaller than 150 ")
   elif (var==100):
      print("Input is smaller than 100 ")
   elif (var==50):
      print("Input is smaller than 50 ")

else:
   print("Input is greater than 200 ")
```



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Activate Windows
Go to Settings to activate Windows.

```
Enter The Number: 7
7 is a Prime number
```

```
In [6]: var = int(input("Enter a number: "))
        if var < 200:
            print("Input is smaller than 200 ")
            if (var==150):
                print("Input is smaller than 150 ")
            elif (var==100):
                print("Input is smaller than 100 ")
            elif (var==50):
                print("Input is smaller than 50 ")

        else:
            print("Input is greater than 200 ")
```

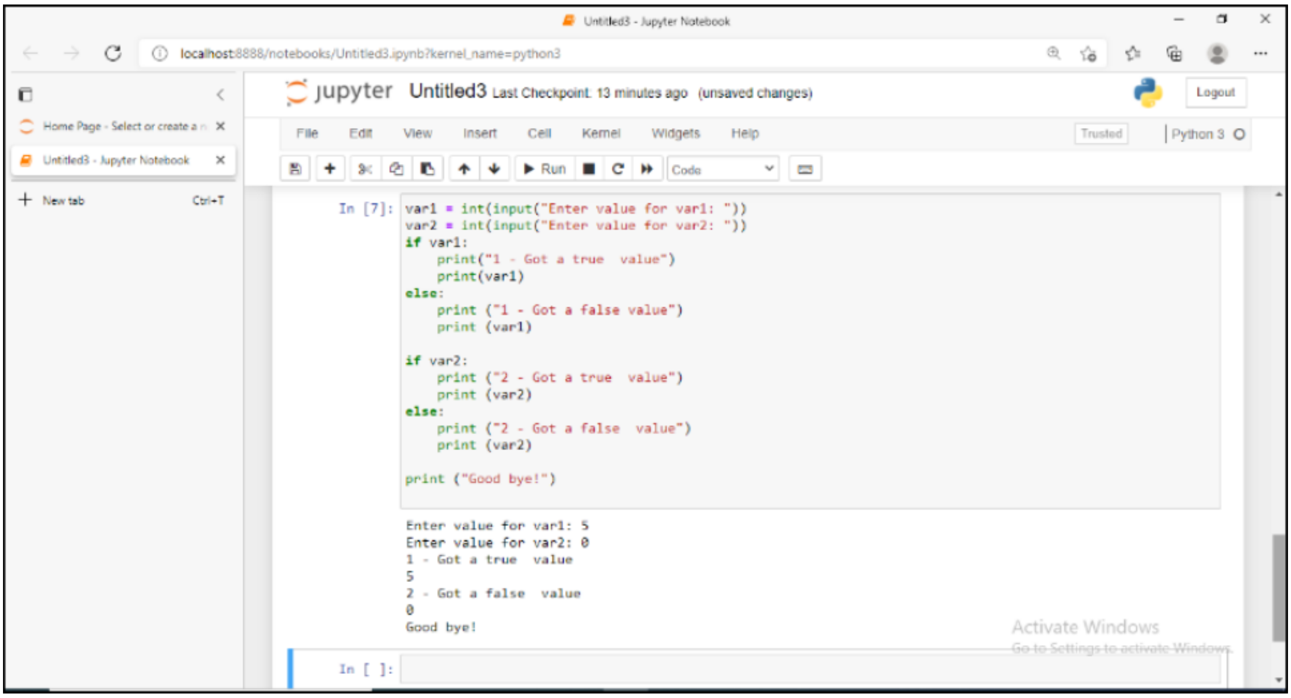
```
Enter a number: 500
Input is greater than 200
```

7. Write a program to demonstrate the use of the else clause.

```
var1 = int(input("Enter value for var1: "))
var2 = int(input("Enter value for var2: "))
if var1:
    print("1 - Got a true  value")
    print(var1)
else:
    print ("1 - Got a false value")
    print (var1)

if var2:
    print ("2 - Got a true  value")
    print (var2)
else:
    print ("2 - Got a false  value")
    print (var2)

print ("Good bye!")
```



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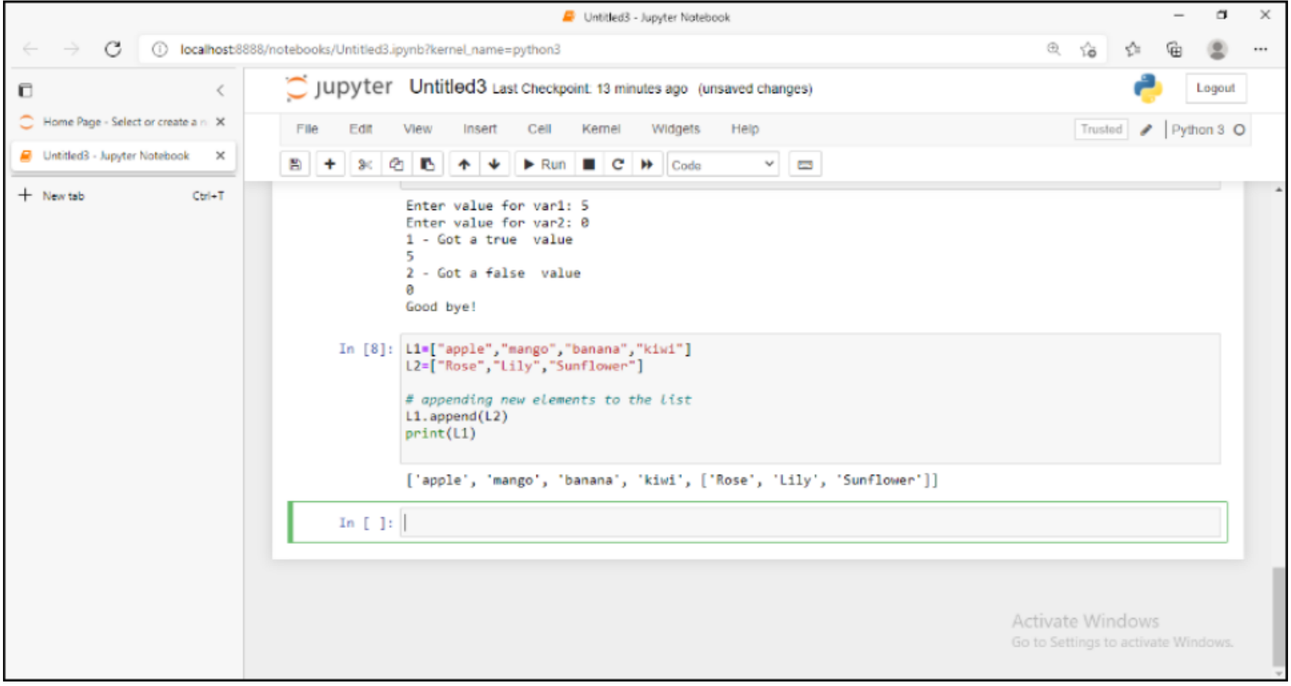
Go to Settings to activate Windows.

```
In [7]: var1 = int(input("Enter value for var1: "))
        var2 = int(input("Enter value for var2: "))
        if var1:
            print("1 - Got a true  value")
            print(var1)
        else:
            print ("1 - Got a false value")
            print (var1)

        if var2:
            print ("2 - Got a true  value")
            print (var2)
        else:
            print ("2 - Got a false  value")
            print (var2)

        print ("Good bye!")

        Enter value for var1: 5
        Enter value for var2: 0
        1 - Got a true  value
        5
        2 - Got a false  value
        0
        Good bye!

In [ ]:
```

8. Write a program to illustrate the usage of Tuples.

L1=["apple","mango","banana","kiwi"]
L2=["Rose","Lily","Sunflower"]

appending new elements to the list
L1.append(L2)
print(L1)



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Python 3
Run
Code
Activate Windows
Go to Settings to activate Windows.

```
        Enter value for var1: 5
        Enter value for var2: 0
        1 - Got a true  value
        5
        2 - Got a false  value
        0
        Good bye!

In [8]: L1=["apple","mango","banana","kiwi"]
        L2=["Rose","Lily","Sunflower"]

        # appending new elements to the list
        L1.append(L2)
        print(L1)

        ['apple', 'mango', 'banana', 'kiwi', ['Rose', 'Lily', 'Sunflower']]

In [ ]:
```

9. Write a program for searching an element and sorting a List.

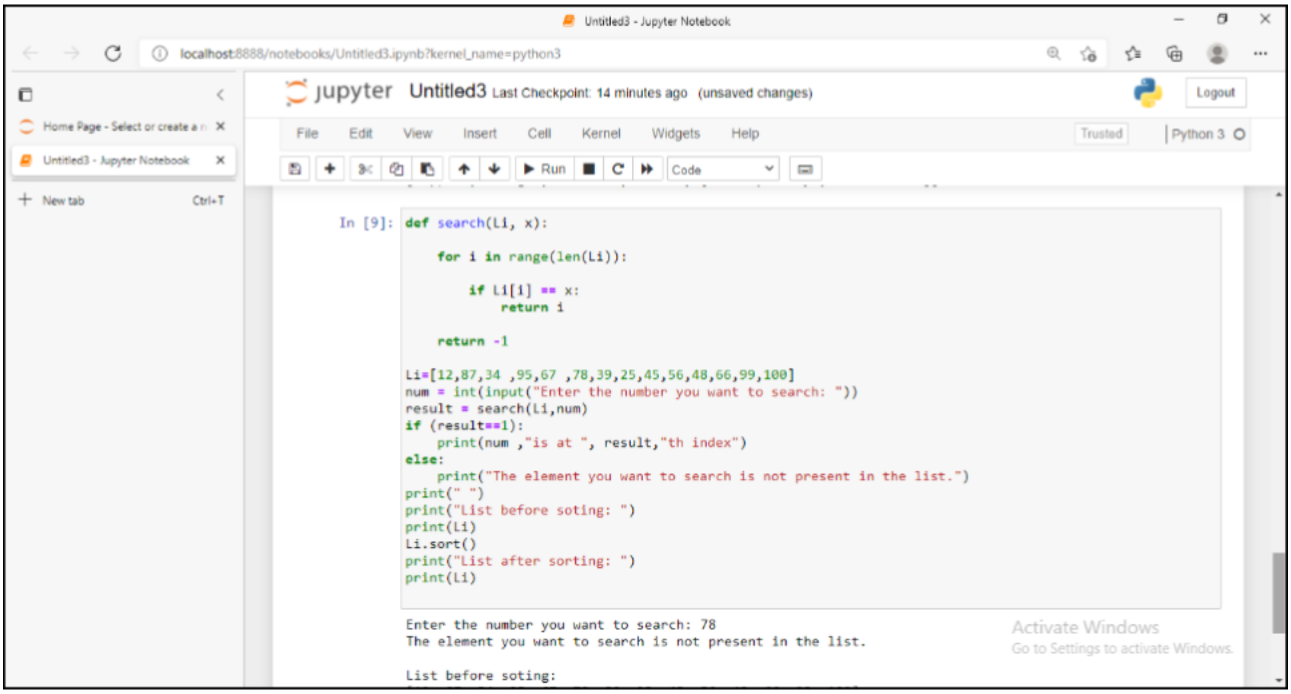
def search(Li, x):

  for i in range(len(Li)):

```
        if Li[i] == x:
            return i

    return -1

Li=[12,87,34 ,95,67 ,78,39,25,45,56,48,66,99,100]
num = int(input("Enter the number you want to search: "))
result = search(Li,num)
if (result==1):
    print(num ,"is at ", result,"th index")
else:
    print("The element you want to search is not present in the list.")
print(" ")
print("List before soting: ")
print(Li)
Li.sort()
print("List after sorting: ")
print(Li)
```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In [9]:
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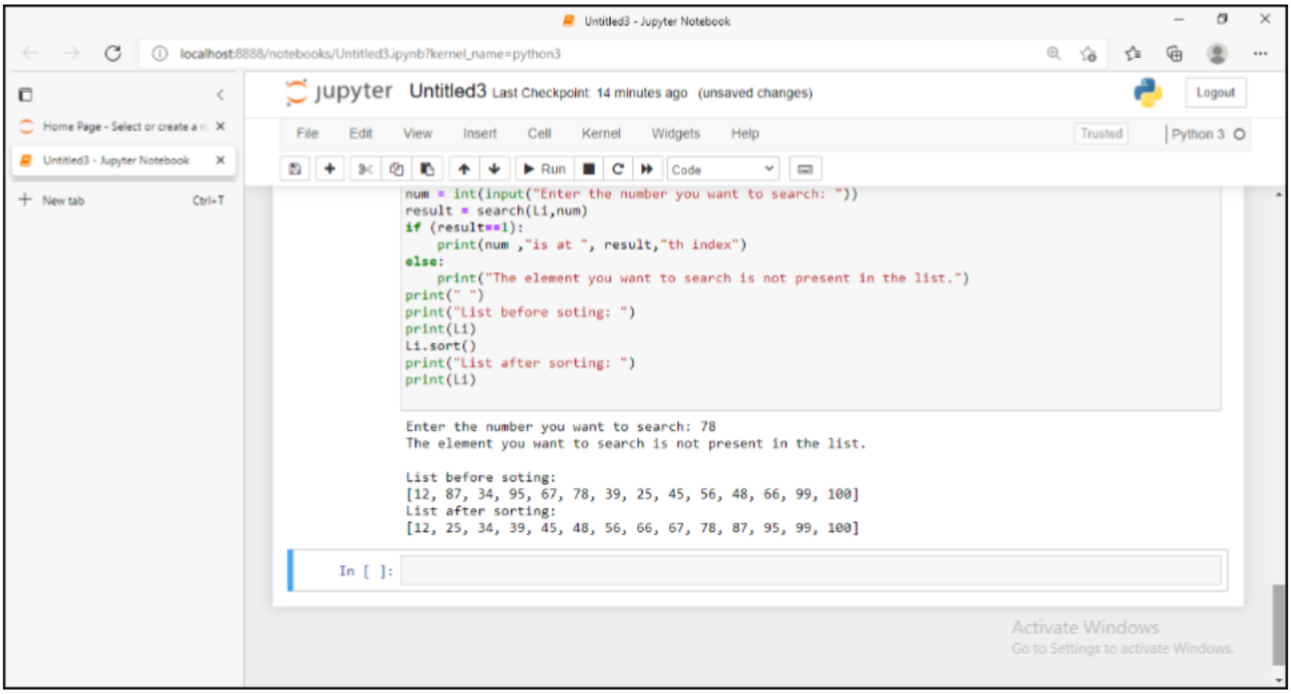
```
def search(Li, x):

    for i in range(len(Li)):

        if Li[i] == x:
            return i

    return -1

Li=[12,87,34 ,95,67 ,78,39,25,45,56,48,66,99,100]
num = int(input("Enter the number you want to search: "))
result = search(Li,num)
if (result==1):
    print(num ,"is at ", result,"th index")
else:
    print("The element you want to search is not present in the list.")
print(" ")
print("List before soting: ")
print(Li)
Li.sort()
print("List after sorting: ")
print(Li)
```

```
Enter the number you want to search: 78
The element you want to search is not present in the list.

List before soting:
```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```
num = int(input("Enter the number you want to search: "))
result = search(L1,num)
if (result==1):
    print(num ,"is at ", result,"th index")
else:
    print("The element you want to search is not present in the list.")
print(" ")
print("List before soting: ")
print(L1)
L1.sort()
print("List after sorting: ")
print(L1)
```

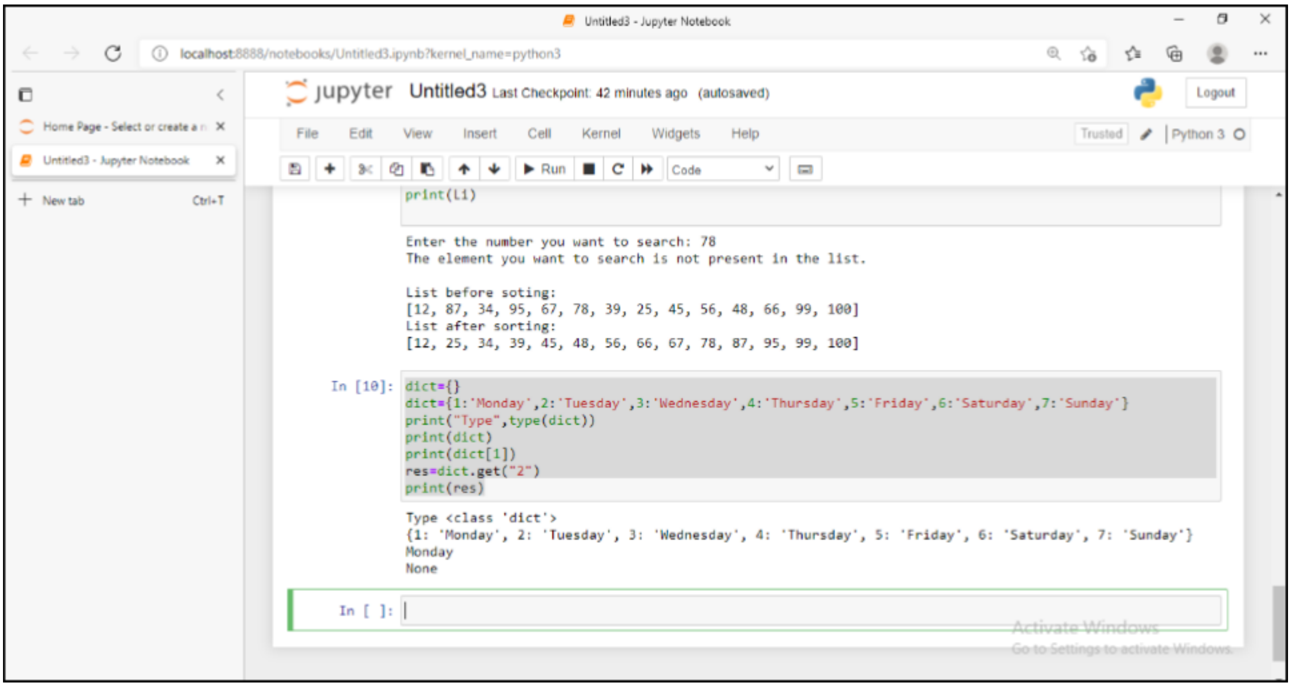
```
Enter the number you want to search: 78
The element you want to search is not present in the list.

List before soting:
[12, 87, 34, 95, 67, 78, 39, 25, 45, 56, 48, 66, 99, 100]
List after sorting:
[12, 25, 34, 39, 45, 48, 56, 66, 67, 78, 87, 95, 99, 100]
```

```
In [ ]:
```

10. Write a program to illustrate the usage of Dictionaries.

```
dict={}
dict={1:'Monday',2:'Tuesday',3:'Wednesday',4:'Thursday',5:'Friday',6:'Saturday',7:'Sunday'}
print("Type",type(dict))
print(dict)
print(dict[1])
res=dict.get("2")
print(res)
```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```
print(L1)
```

```
Enter the number you want to search: 78
The element you want to search is not present in the list.

List before soting:
[12, 87, 34, 95, 67, 78, 39, 25, 45, 56, 48, 66, 99, 100]
List after sorting:
[12, 25, 34, 39, 45, 48, 56, 66, 67, 78, 87, 95, 99, 100]
```

```
In [10]: dict={}
dict={1:'Monday',2:'Tuesday',3:'Wednesday',4:'Thursday',5:'Friday',6:'Saturday',7:'Sunday'}
print("Type",type(dict))
print(dict)
print(dict[1])
res=dict.get("2")
print(res)
```

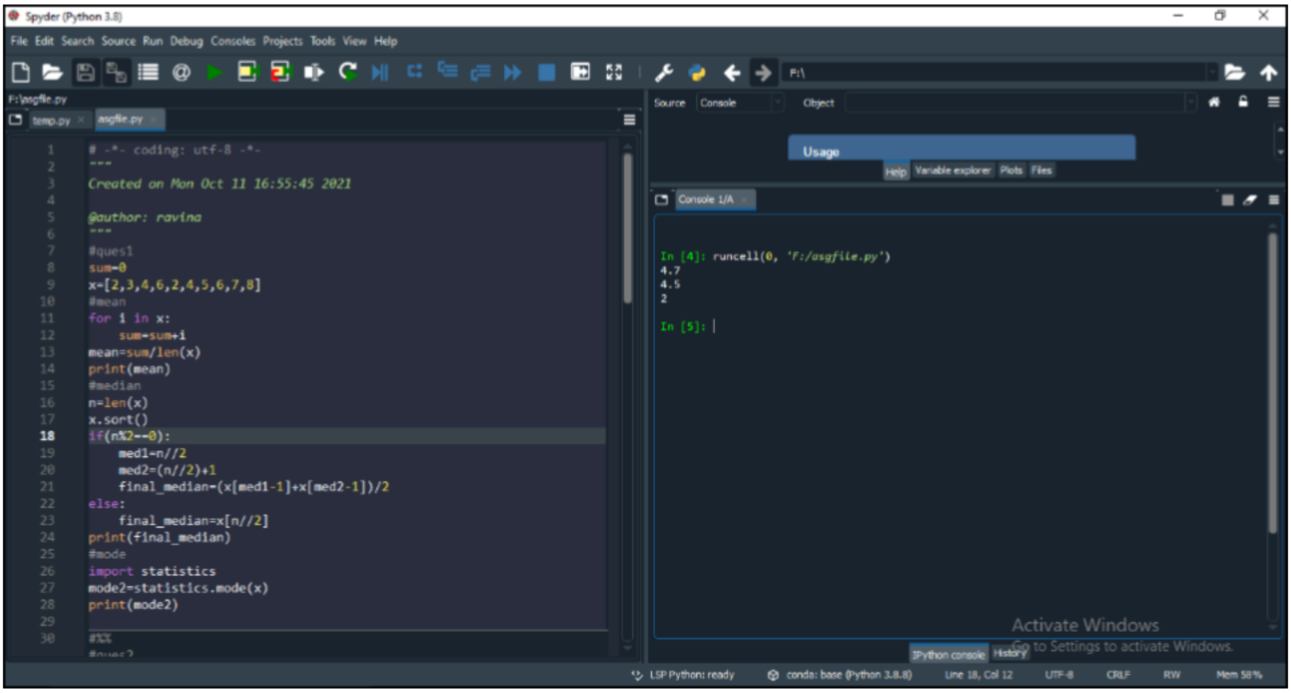
```
Type <class 'dict'>
{1: 'Monday', 2: 'Tuesday', 3: 'Wednesday', 4: 'Thursday', 5: 'Friday', 6: 'Saturday', 7: 'Sunday'}
Monday
None
```

```
In [ ]:
```

2. Programs on Statistical Concepts and introduction to Linear Algebra using Python

1.Write a program to find the mean. mode and median of the given range of numbers.

```
#ques1
sum=0
x=[2,3,4,6,2,4,5,6,7,8]
#mean
for i in x:
   sum=sum+i
mean=sum/len(x)
print(mean)
#median
n=len(x)
x.sort()
if(n%2==0):
   med1=n//2
   med2=(n//2)+1
   final_median=(x[med1-1]+x[med2-1])/2
else:
   final_median=x[n//2]
print(final_median)
#mode
import statistics
mode2=statistics.mode(x)
print(mode2)
```



```
# -*- coding: utf-8 -*-
"""
Created on Mon Oct 11 16:55:45 2021

@author: ravina
"""
#ques1
sum=0
x=[2,3,4,6,2,4,5,6,7,8]
#mean
for i in x:
    sum=sum+i
mean=sum/len(x)
print(mean)
#median
n=len(x)
x.sort()
if(n%2==0):
    med1=n//2
    med2=(n//2)+1
    final_median=(x[med1-1]+x[med2-1])/2
else:
    final_median=x[n//2]
print(final_median)
#mode
import statistics
mode2=statistics.mode(x)
print(mode2)

#%%
#ques2
```

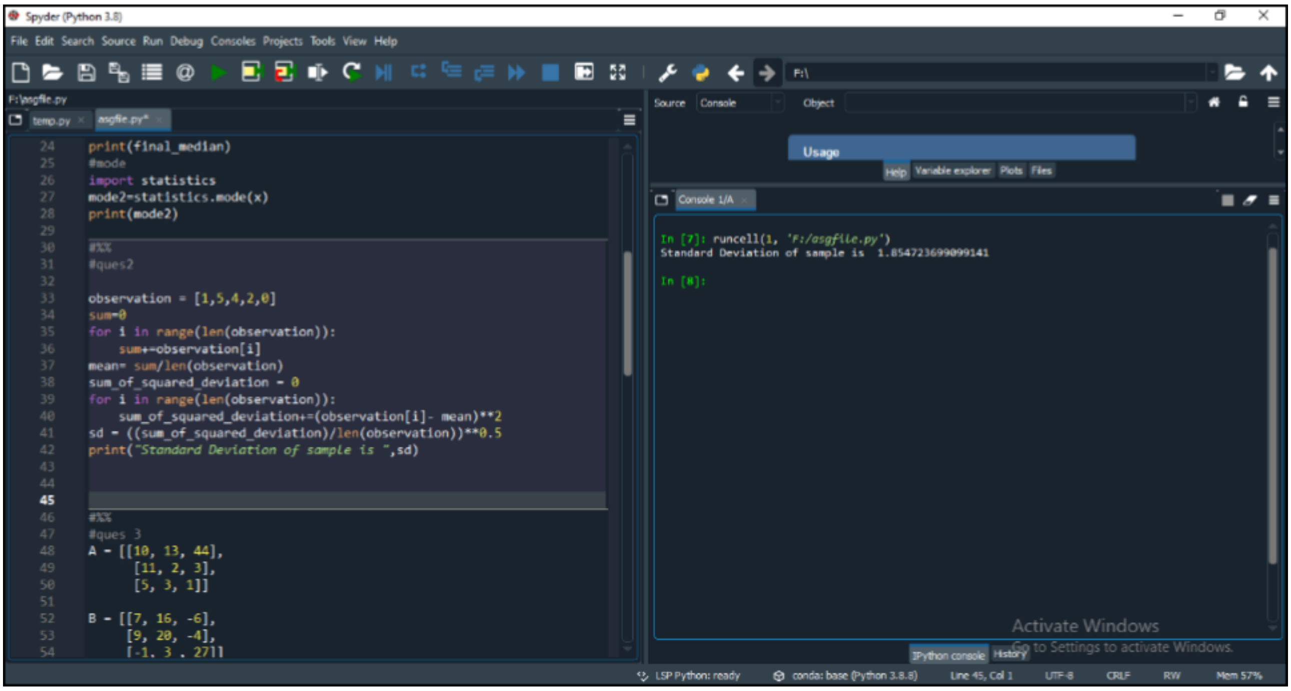
```
In [4]: runcell(0, 'F:/asgfile.py')
4.7
4.5
2

In [5]: |
```

2 Write a program to calculate the standard deviation of a given set of numbers.

```
observation = [1,5,4,2,0]
sum=0
for i in range(len(observation)):
   sum+=observation[i]
mean= sum/len(observation)
sum_of_squared_deviation = 0
for i in range(len(observation)):
   sum_of_squared_deviation+=(observation[i]- mean)**2
```

```
sd = ((sum_of_squared_deviation)/len(observation))**0.5
print("Standard Deviation of sample is ",sd)
```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```
print(final_median)
#mode
import statistics
mode2=statistics.mode(x)
print(mode2)

#%%
#ques2

observation = [1,5,4,2,0]
sum=0
for i in range(len(observation)):
    sum+=observation[i]
mean= sum/len(observation)
sum_of_squared_deviation = 0
for i in range(len(observation)):
    sum_of_squared_deviation+=(observation[i]- mean)**2
sd = ((sum_of_squared_deviation)/len(observation))**0.5
print("Standard Deviation of sample is ",sd)



#%%
#ques 3
A = [[10, 13, 44],
      [11, 2, 3],
      [5, 3, 1]]

B = [[7, 16, -6],
     [9, 20, -4],
     [-1, 3 , 27]]
```

```
In [7]: runcell(1, 'F:/asgfile.py')
Standard Deviation of sample is  1.854723699099141

In [8]:
```

3. Write a program to calculate the addition of two 3x 3 matrices.

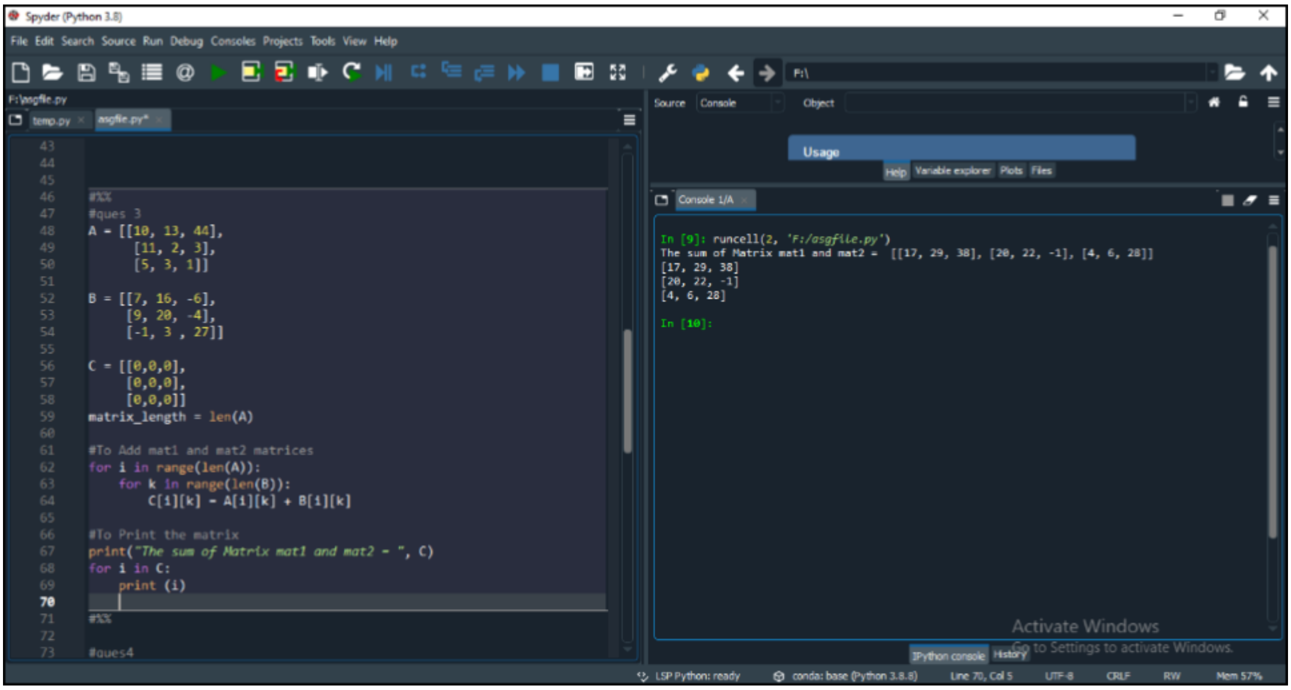
```
#ques 3
A = [[10, 13, 44],
      [11, 2, 3],
      [5, 3, 1]]

B = [[7, 16, -6],
     [9, 20, -4],
     [-1, 3 , 27]]

C = [[0,0,0],
     [0,0,0],
     [0,0,0]]
matrix_length = len(A)

#To Add mat1 and mat2 matrices
for i in range(len(A)):
    for k in range(len(B)):
        C[i][k] = A[i][k] + B[i][k]

#To Print the matrix
print("The sum of Matrix mat1 and mat2 = ", C)
for i in C:
    print (i)
```



Spyder (Python 3.8)
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```
#%%
#ques 3
A = [[10, 13, 44],
      [11, 2, 3],
      [5, 3, 1]]

B = [[7, 16, -6],
     [9, 20, -4],
     [-1, 3 , 27]]

C = [[0,0,0],
     [0,0,0],
     [0,0,0]]
matrix_length = len(A)

#To Add mat1 and mat2 matrices
for i in range(len(A)):
    for k in range(len(B)):
        C[i][k] = A[i][k] + B[i][k]

#To Print the matrix
print("The sum of Matrix mat1 and mat2 = ", C)
for i in C:
    print (i)

#%%

#ques4
```

```
In [9]: runcell(2, 'F:/asgfile.py')
The sum of Matrix mat1 and mat2 =  [[17, 29, 38], [20, 22, -1], [4, 6, 28]]
[17, 29, 38]
[20, 22, -1]
[4, 6, 28]

In [10]:
```

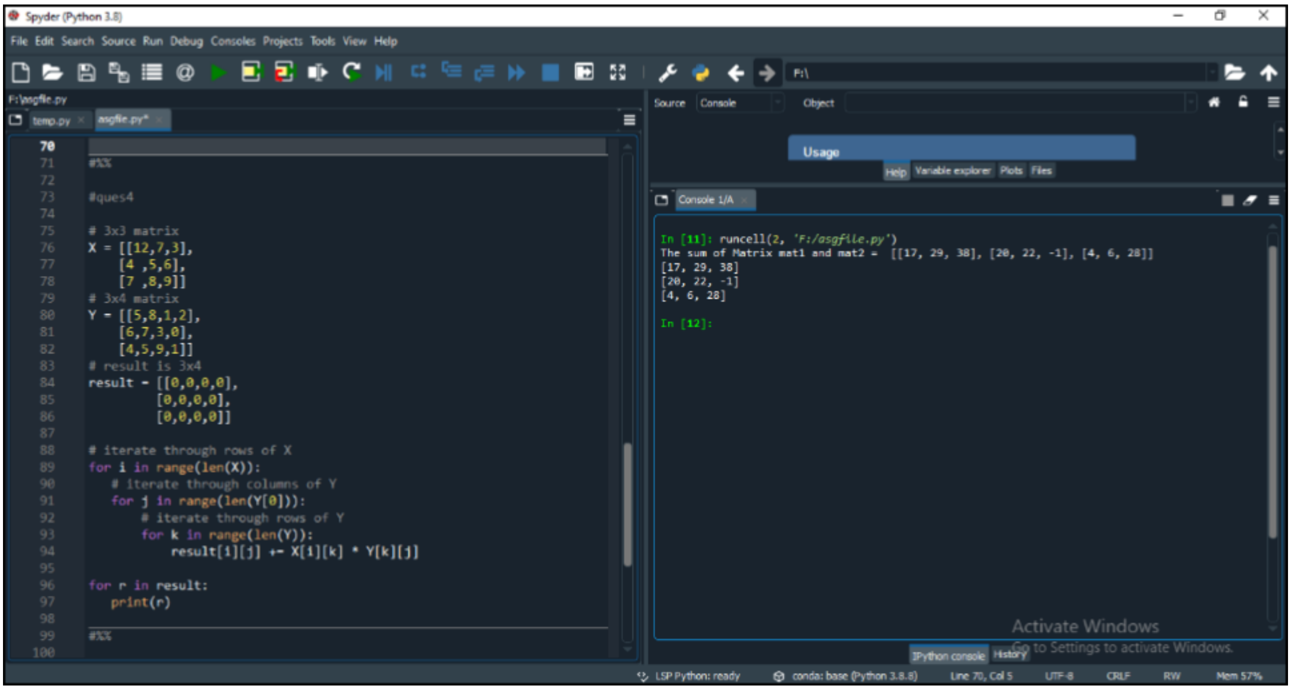
4. Write a program to calculate the multiplication of two 3x 3 matrices.

```
#ques4

# 3x3 matrix
X = [[12,7,3],
    [4 ,5,6],
    [7 ,8,9]]
# 3x4 matrix
Y = [[5,8,1,2],
    [6,7,3,0],
    [4,5,9,1]]
# result is 3x4
result = [[0,0,0,0],
         [0,0,0,0],
         [0,0,0,0]]

# iterate through rows of X
for i in range(len(X)):
   # iterate through columns of Y
   for j in range(len(Y[0])):
       # iterate through rows of Y
       for k in range(len(Y)):
           result[i][j] += X[i][k] * Y[k][j]

for r in result:
   print(r)
```



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```python
#%%

#ques4

# 3x3 matrix
X = [[12,7,3],
    [4 ,5,6],
    [7 ,8,9]]
# 3x4 matrix
Y = [[5,8,1,2],
    [6,7,3,0],
    [4,5,9,1]]
# result is 3x4
result = [[0,0,0,0],
         [0,0,0,0],
         [0,0,0,0]]

# iterate through rows of X
for i in range(len(X)):
   # iterate through columns of Y
   for j in range(len(Y[0])):
       # iterate through rows of Y
       for k in range(len(Y)):
           result[i][j] += X[i][k] * Y[k][j]

for r in result:
   print(r)

#%%
```

```
In [11]: runcell(2, 'F:/asgfile.py')
The sum of Matrix mat1 and mat2 =  [[17, 29, 38], [20, 22, -1], [4, 6, 28]]
[17, 29, 38]
[20, 22, -1]
[4, 6, 28]

In [12]:
```

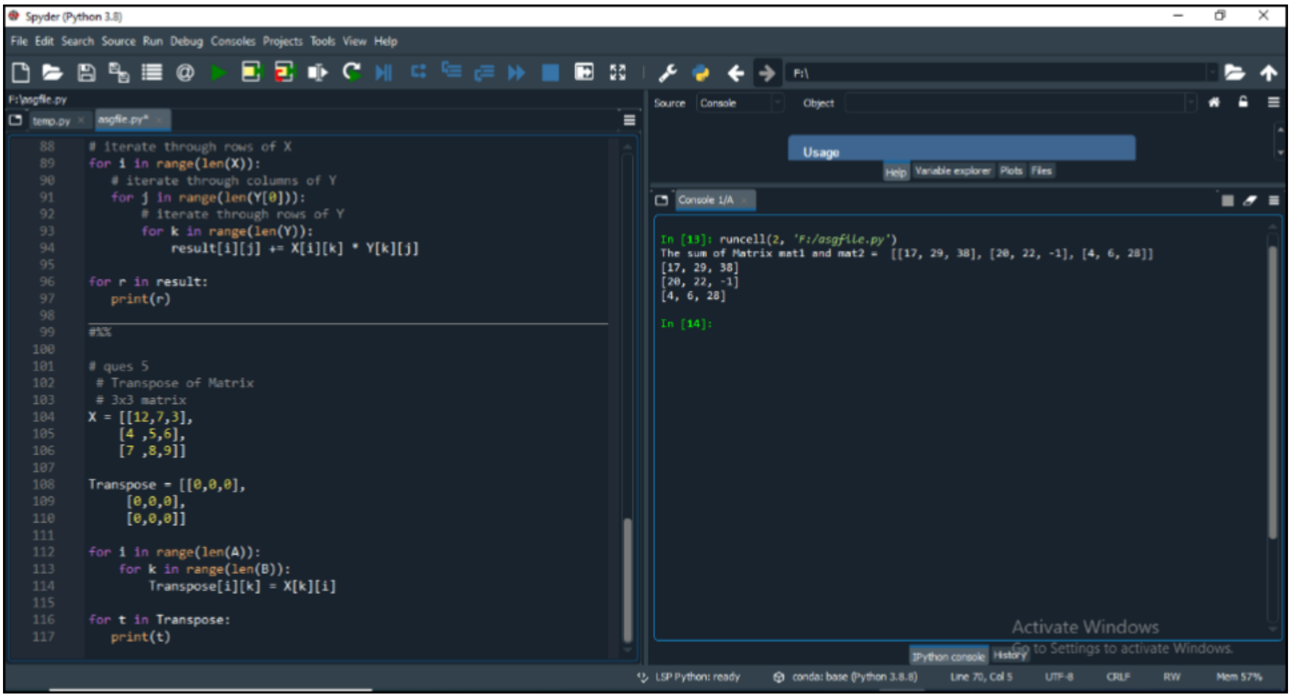
5. Write a program to calculate the inverse of the given matrix.

```
# ques 5
 # Transpose of Matrix
 # 3x3 matrix
X = [[12,7,3],
    [4 ,5,6],
    [7 ,8,9]]

Transpose = [[0,0,0],
     [0,0,0],
     [0,0,0]]

for i in range(len(A)):
    for k in range(len(B)):
        Transpose[i][k] = X[k][i]

for t in Transpose:
  print(t)
```


Spyder (Python 3.8)
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```python
# iterate through rows of X
for i in range(len(X)):
   # iterate through columns of Y
   for j in range(len(Y[0])):
       # iterate through rows of Y
       for k in range(len(Y)):
           result[i][j] += X[i][k] * Y[k][j]

for r in result:
   print(r)

#%%

# ques 5
 # Transpose of Matrix
 # 3x3 matrix
X = [[12,7,3],
    [4 ,5,6],
    [7 ,8,9]]

Transpose = [[0,0,0],
     [0,0,0],
     [0,0,0]]

for i in range(len(A)):
    for k in range(len(B)):
        Transpose[i][k] = X[k][i]

for t in Transpose:
   print(t)
```

```
In [13]: runcell(2, 'F:/asgfile.py')
The sum of Matrix mat1 and mat2 =  [[17, 29, 38], [20, 22, -1], [4, 6, 28]]
[17, 29, 38]
[20, 22, -1]
[4, 6, 28]

In [14]:
```