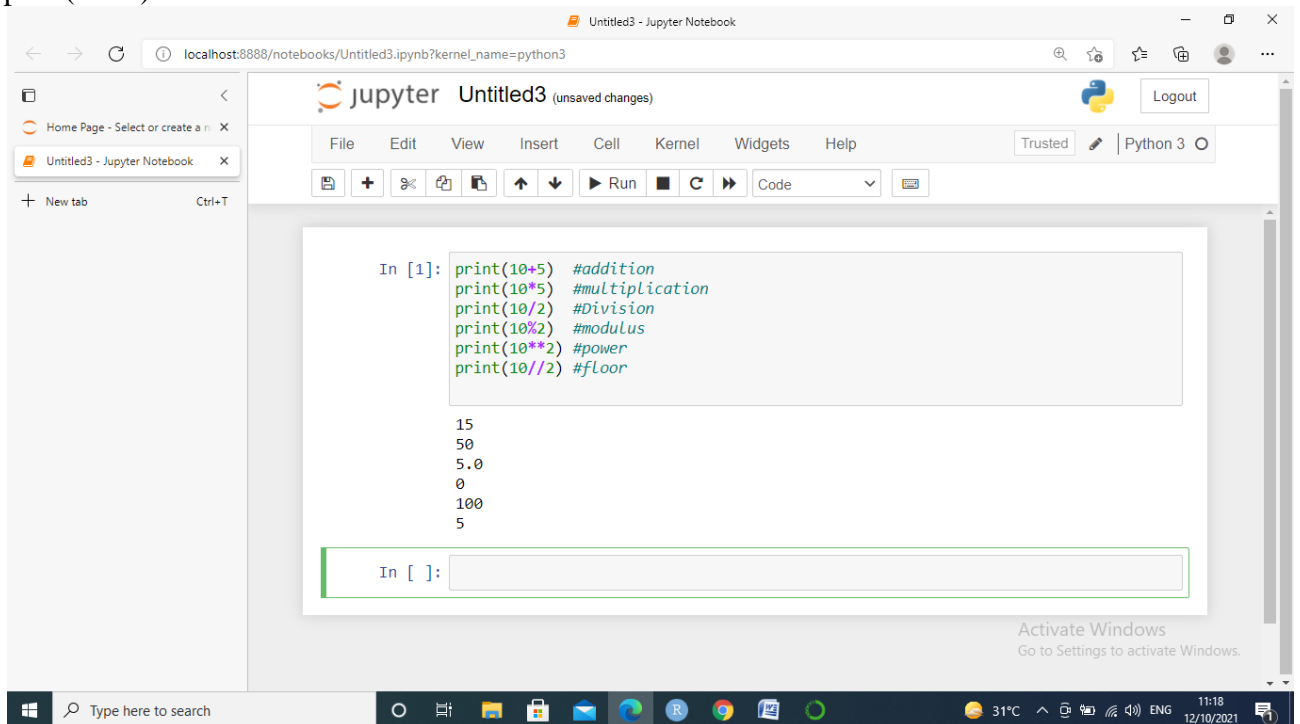


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SUBJECT-MACHINE LEARNING USING PYTHON

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)
```



- 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)

```

The screenshot shows a Jupyter Notebook titled 'Untitled3' running on a local server at localhost:8888. The notebook contains a Python function `fib(n)` that calculates the nth Fibonacci number. The function uses a loop to calculate the sequence and prints the values. The output of the function for `fib(10)` is displayed as a list of numbers: 0, 1, 1, 2, 3, 5, 8, 13, 21, 34. The interface includes a file explorer on the left, a menu bar at the top, and a toolbar with various icons for file operations and execution. The Windows taskbar is visible at the bottom, showing the time as 11:24 on 12/10/2021.

```

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

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)

```

The screenshot shows a Jupyter Notebook titled 'Untitled3' running on a local server at localhost:8888. The notebook contains a Python program that calculates the factorial of a user-input number. The program prompts the user to enter a number, and the output shows the factorial of 5, which is 120. The interface includes a file explorer on the left, a menu bar at the top, and a toolbar with various icons for file operations and execution. The Windows taskbar is visible at the bottom, showing the time as 11:24 on 12/10/2021.

```

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)

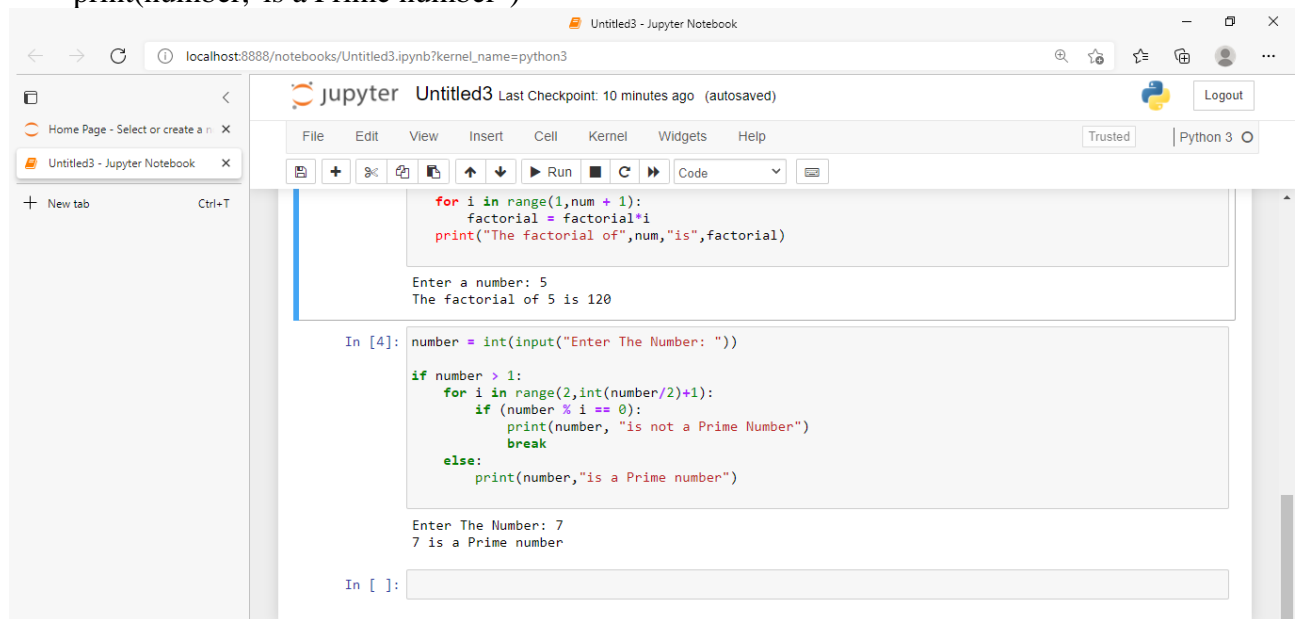
```

Enter a number: 5
The factorial of 5 is 120

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")
```



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

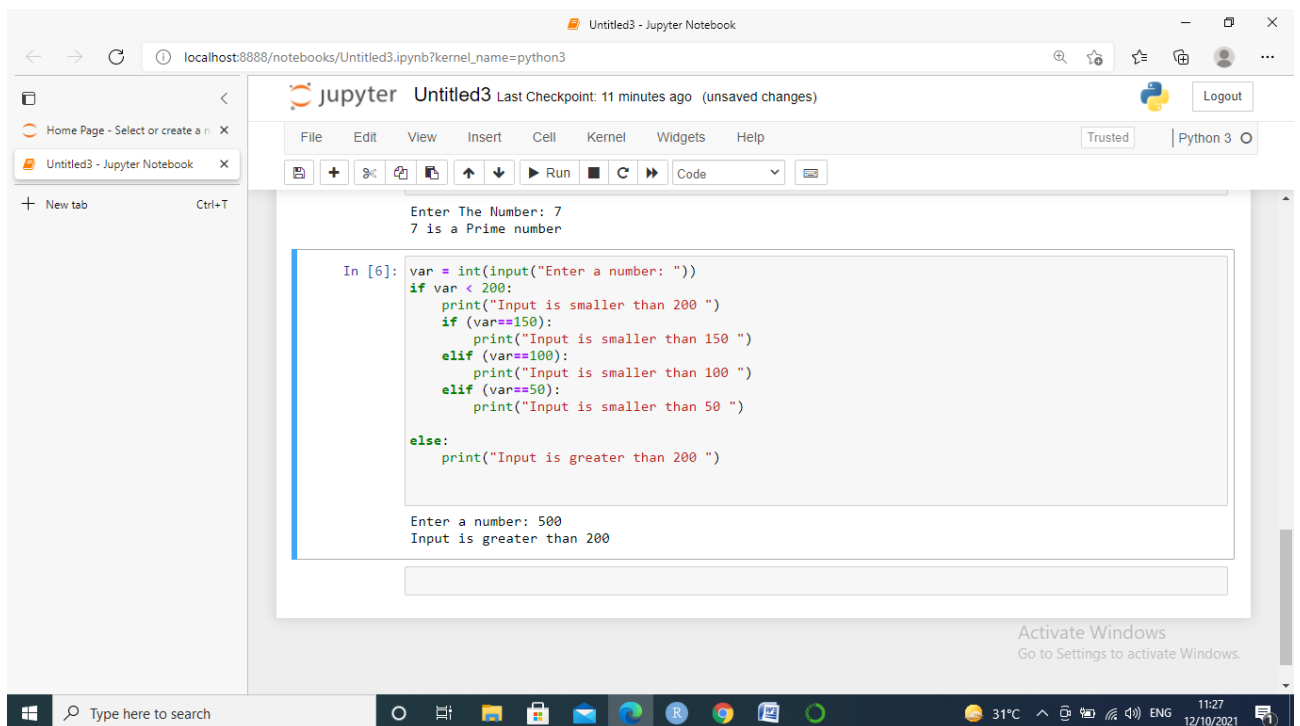
```
def display_message():
    return "HELLO EVERYONE!"
```

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



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 ")
```

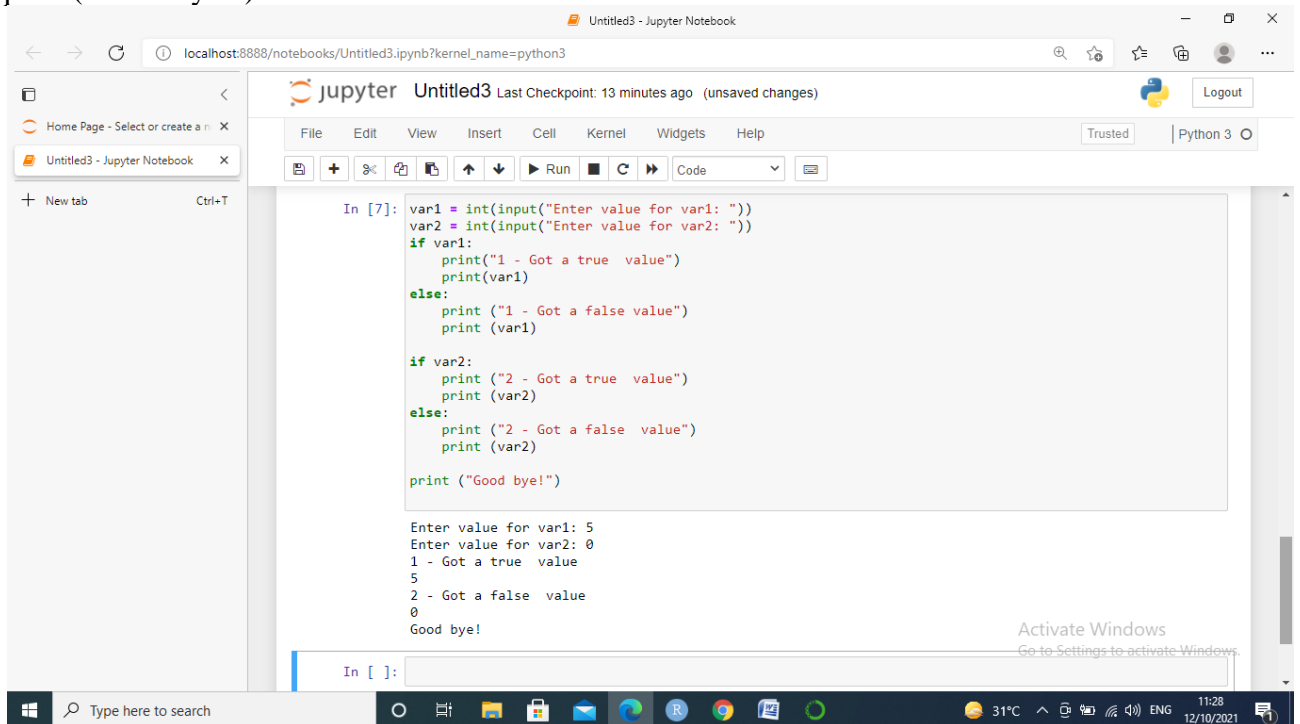


7. Write a program to demonstrate the use of the else clause.

```
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!")



The screenshot shows a Jupyter Notebook interface with a file explorer on the left and a code editor in the center. The code in the cell is as follows:

```
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!")
```

The output of the code is displayed below the cell:

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

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

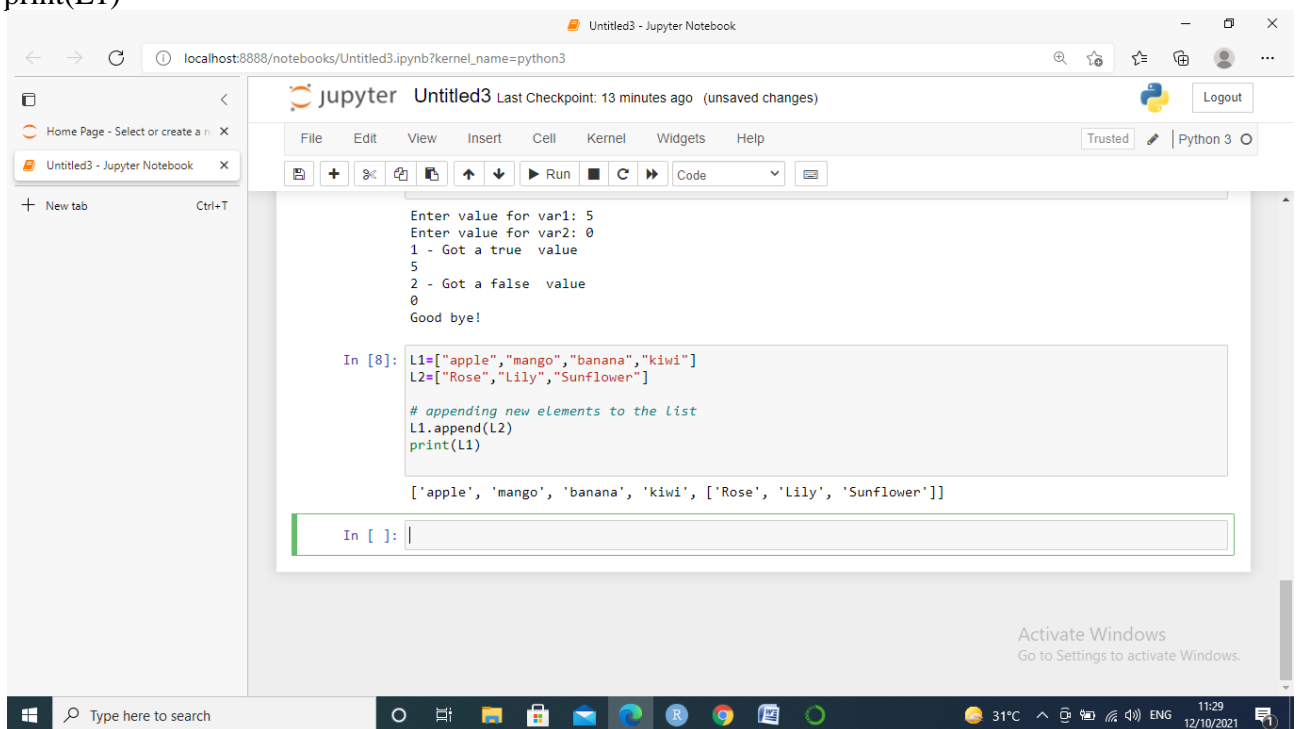
L1=["apple","mango","banana","kiwi"]

L2=["Rose","Lily","Sunflower"]

appending new elements to the list

L1.append(L2)

print(L1)



The screenshot shows a Jupyter Notebook interface with a file explorer on the left and a code editor in the center. The code in the cell is as follows:

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

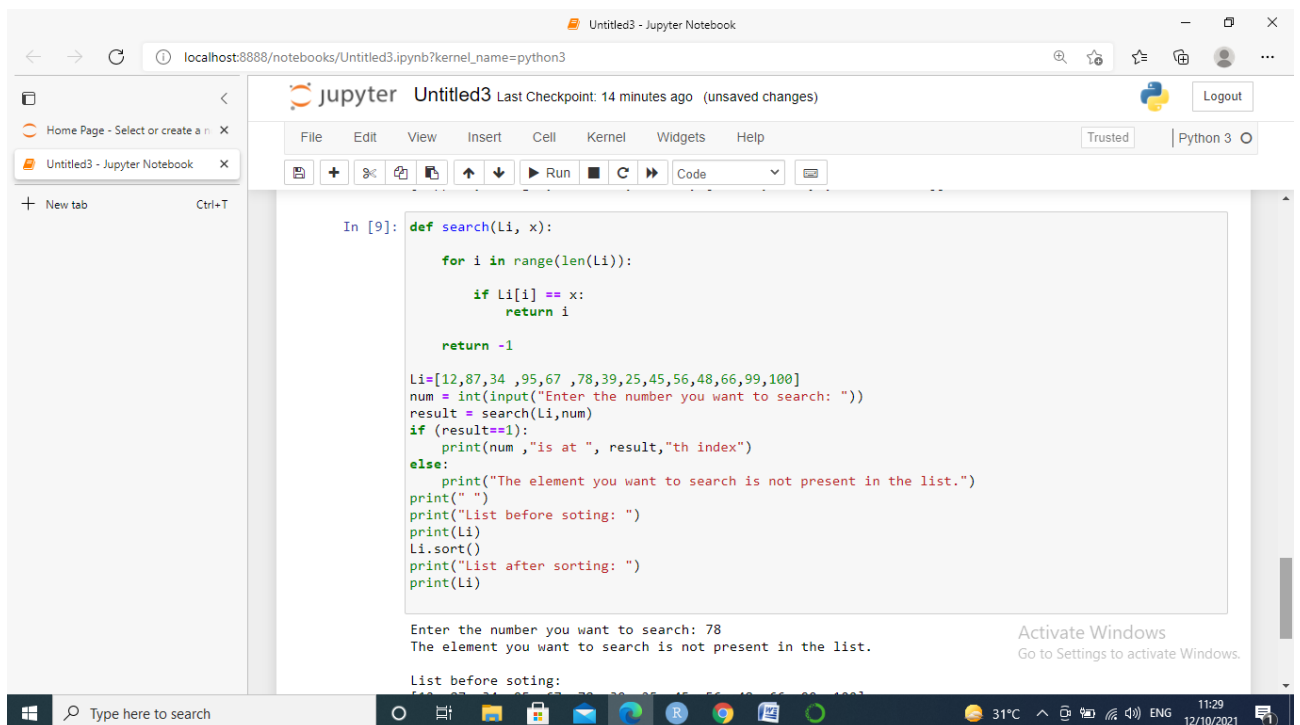
# appending new elements to the list
L1.append(L2)
print(L1)
```

The output of the code is displayed below the cell:

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

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)
```



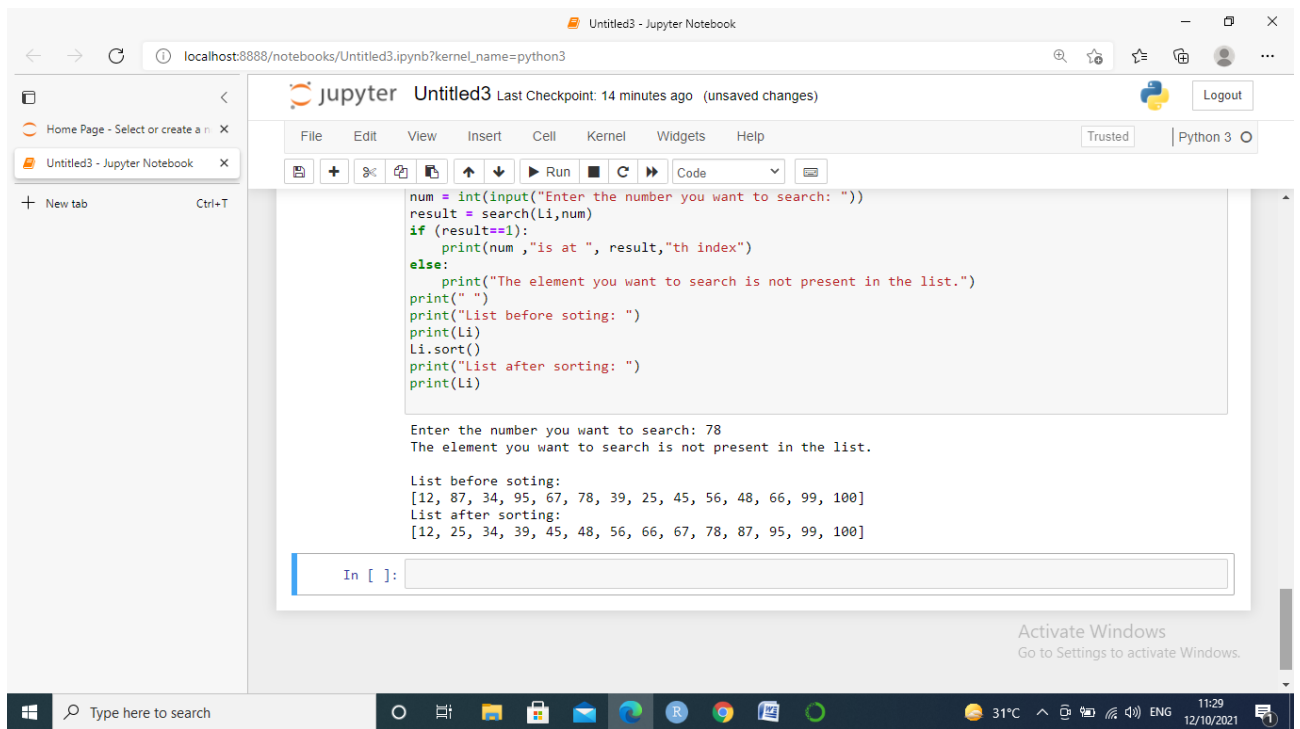
The screenshot displays a Jupyter Notebook window titled 'Untitled3 - Jupyter Notebook'. The browser address bar shows 'localhost:8888/notebooks/Untitled3.ipynb?kernel_name=python3'. The notebook interface includes a left sidebar with a file explorer and a top menu bar with options like File, Edit, View, Insert, Cell, Kernel, Widgets, and Help. The main area shows a code cell with the following Python code:

```
In [9]: 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)
```

Below the code cell, the output of the program is displayed:

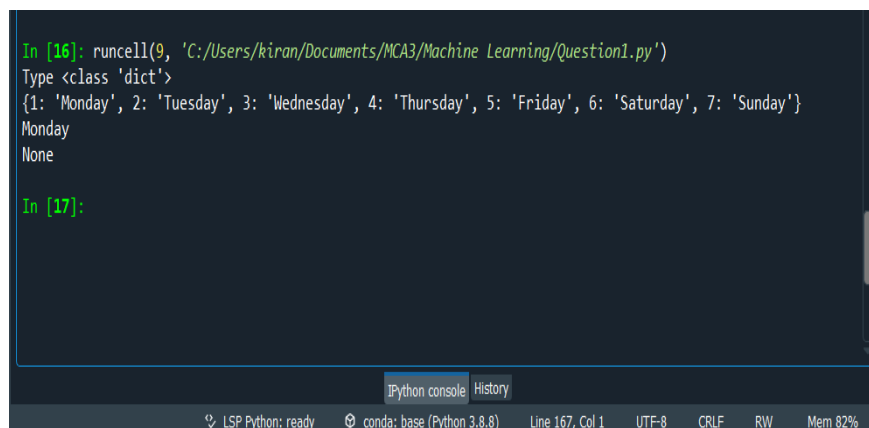
```
Enter the number you want to search: 78  
The element you want to search is not present in the list.  
  
List before soting: [12, 87, 34, 95, 67, 78, 39, 25, 45, 56, 48, 66, 99, 100]
```

The Windows taskbar at the bottom shows the system clock as 11:29 on 12/10/2021, with a temperature of 31°C and various system icons.



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

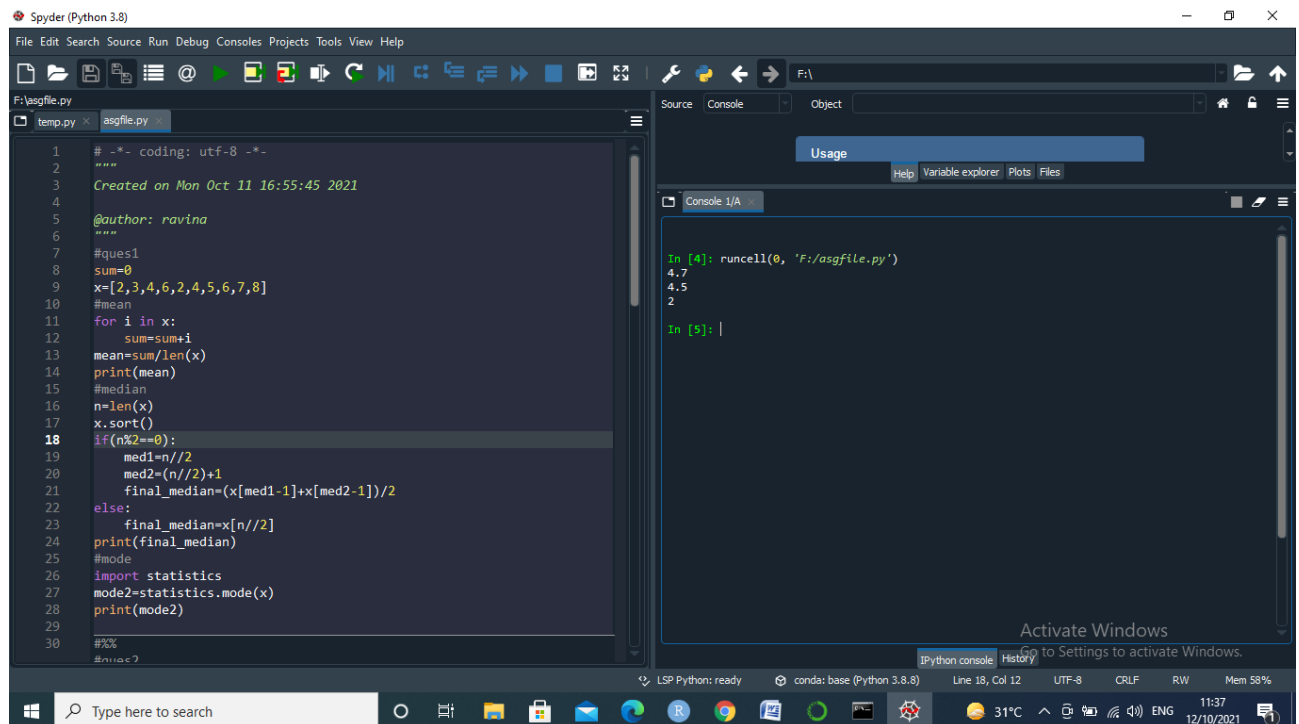
```
dict={ }
dict={1:'Monday',2:'Tuesday',3:'Wednesday',4:'Thursday',5:'Friday',6:'Saturday',7:'Sunday'}
print("Type",type(dict))
print(dict)
print(dict[1])
res=dict.get("2")
print(res)
```



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)
```



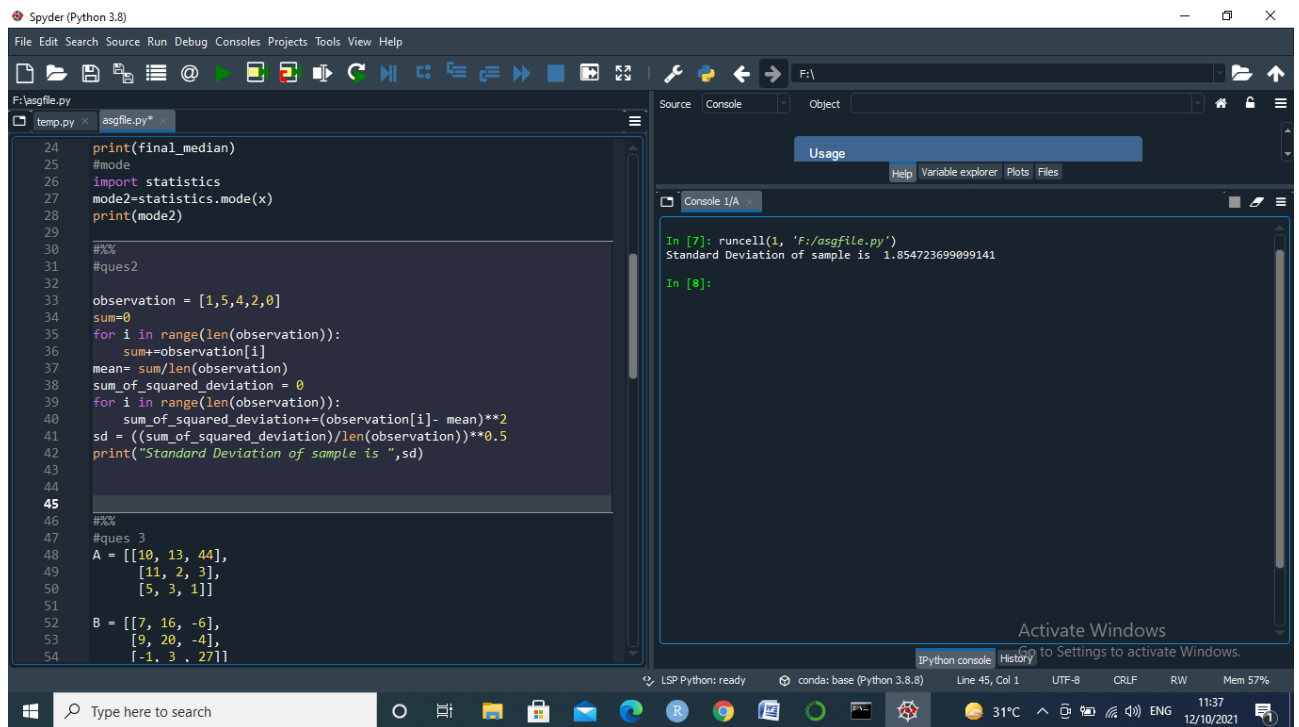
2 Write a program to calculate the standard deviation of a given set of numbers.

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)

```



- 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)
```

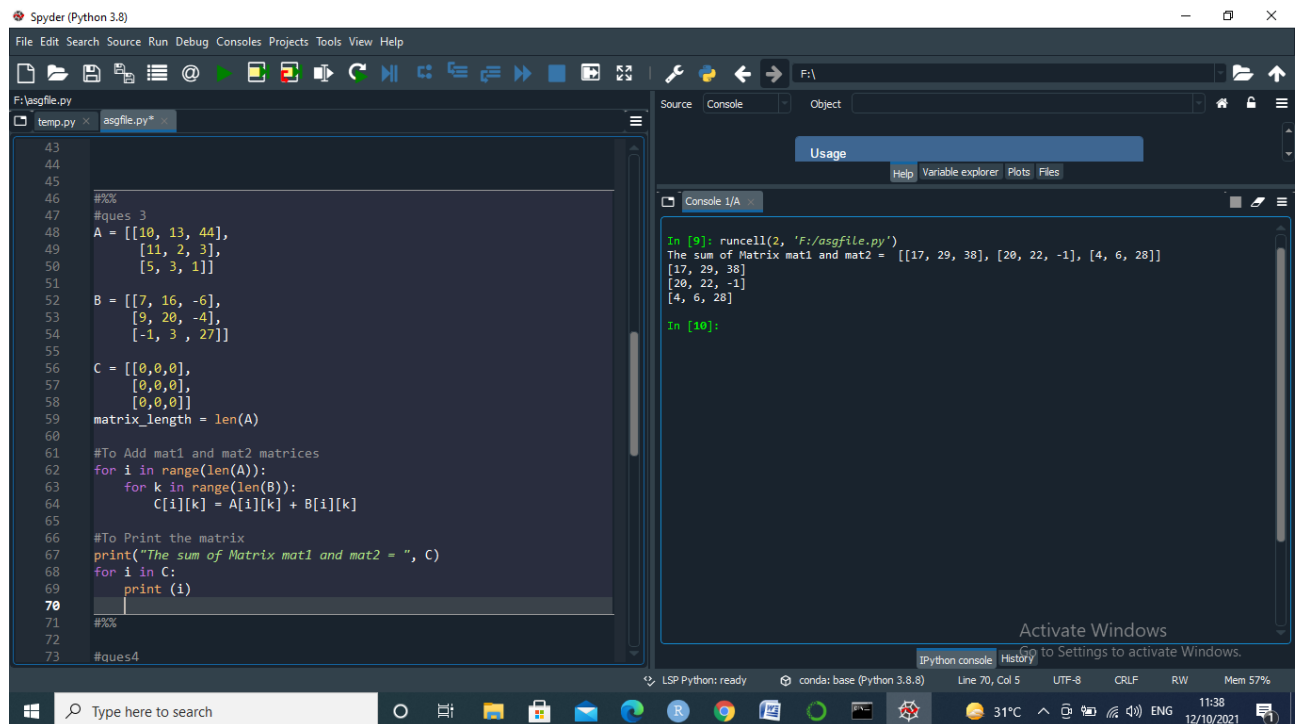
```
#To Add mat1 and mat2 matrices
```

```
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)
```



- 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])):
```

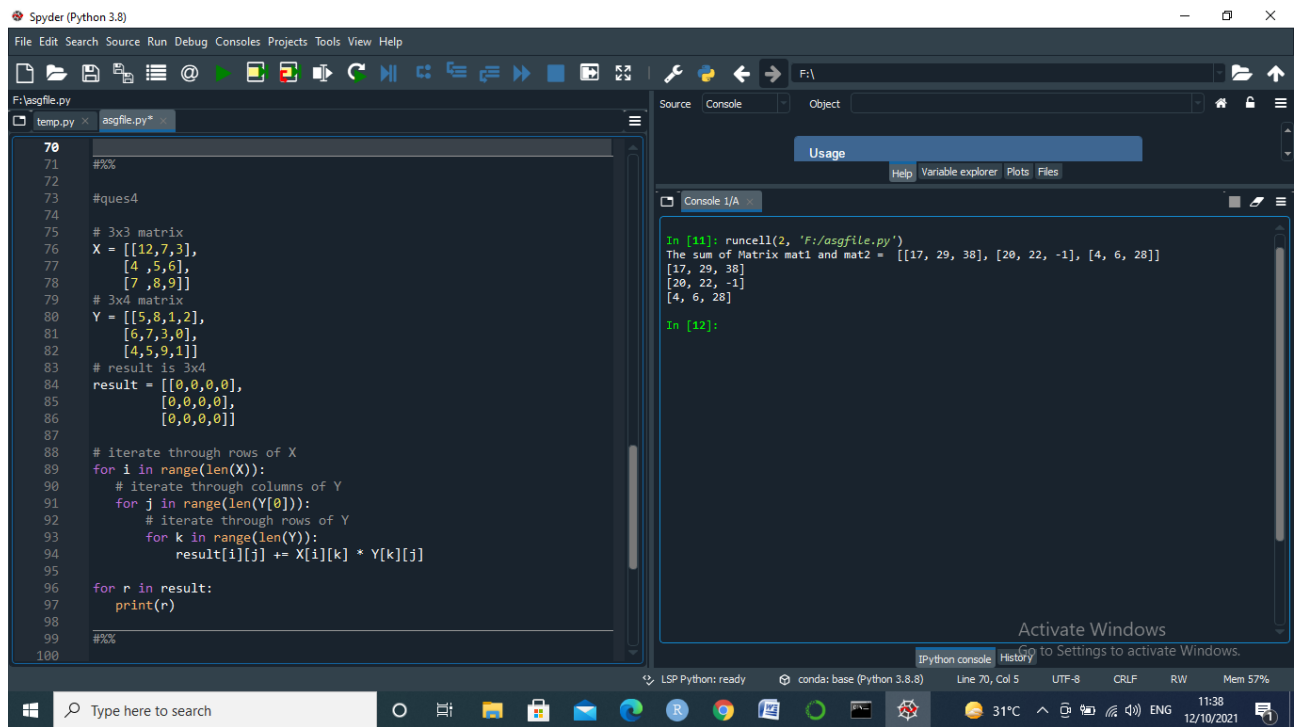
 # iterate through rows of Y

```
        for k in range(len(Y)):
```

```
            result[i][j] += X[i][k] * Y[k][j]
```

```
for r in result:
```

```
    print(r)
```



- Write a program to calculate the transpose 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)

```

