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Subject - Machine Learning using Python

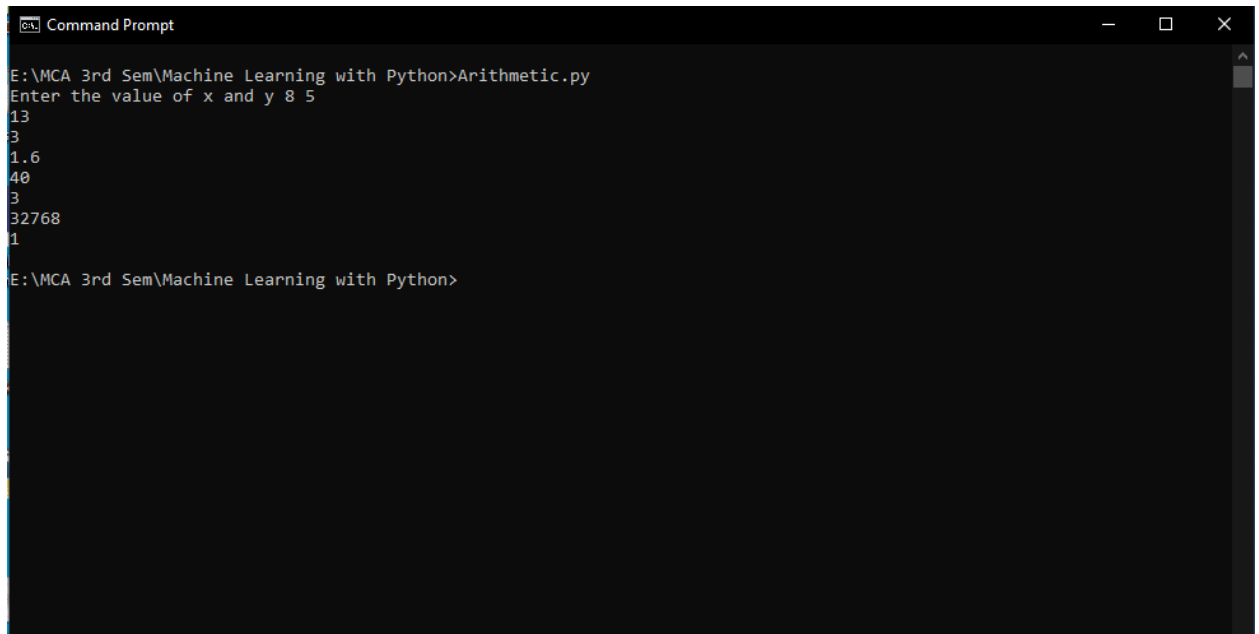
Course - MCA(3rd Sem)

Campus - Graphic Era Hill University, Haldwani

1. Write a program to use the mathematical operators.

```
# Nadeem Ansari, 20711169, Haldwani Campus
x, y=input("Enter the value of x and y").split()
print((int(x)+ int(y)))
print((int(x)- int(y)))
print((int(x)/ int(y)))
print((int(x)* int(y)))
print((int(x)% int(y)))
print((int(x)**int(y)))
print((int(x)//int(y)))
```

OUTPUT:-

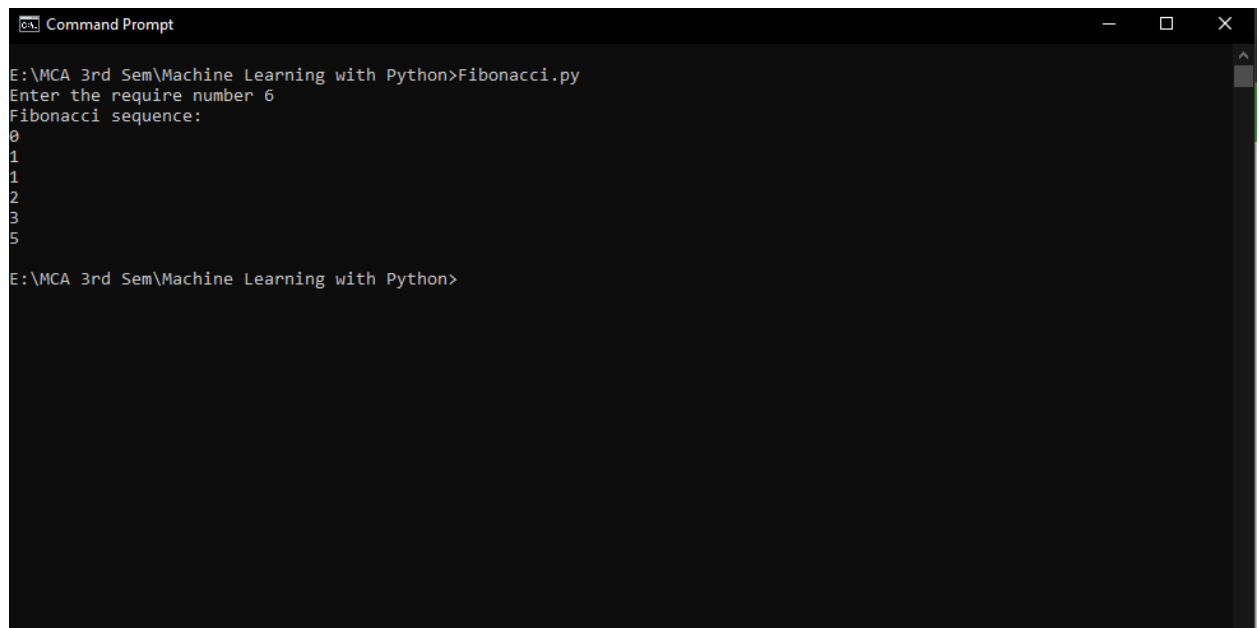


```
Command Prompt
E:\MCA 3rd Sem\Machine Learning with Python>Arithmetic.py
Enter the value of x and y 8 5
13
3
1.6
40
3
32768
1
E:\MCA 3rd Sem\Machine Learning with Python>
```

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

```
# Nadeem Ansari, 20711169, Haldwani Campus
def recur_fibo(n):
    if n <= 1:
        return n
    else:
        return(recur_fibo(n-1) + recur_fibo(n-2))
# take input from the user
nterms = int(input("Enter the require number "))
# check if the number of terms is valid
if nterms <= 0:
    print("Plese enter a positive integer")
else:
    print("Fibonacci sequence:")
    for i in range(nterms):
        print(recur_fibo(i))
```

OUTPUT:-



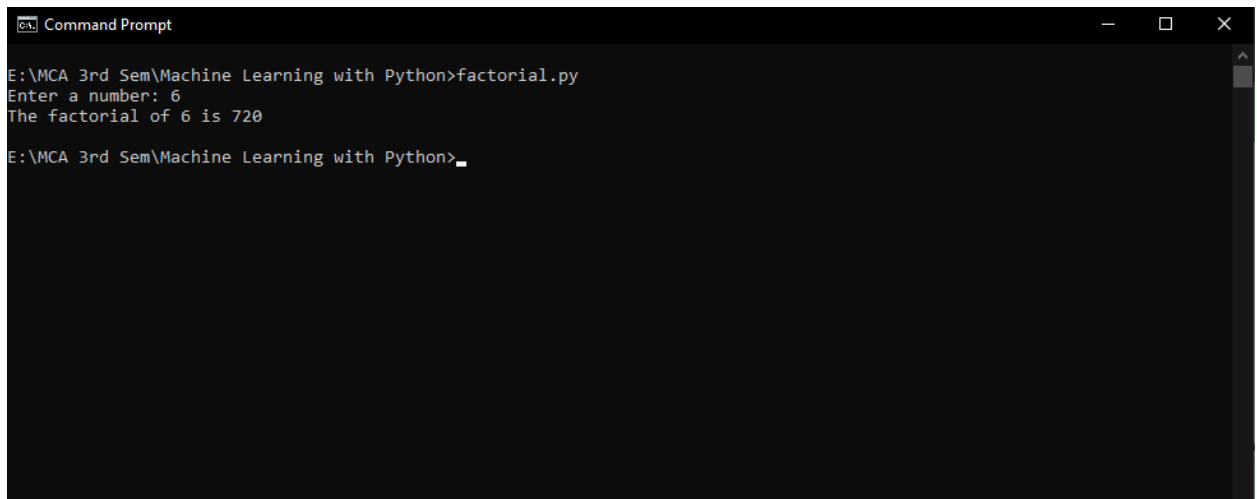
The screenshot shows a Windows Command Prompt window titled "Command Prompt". The prompt is at the directory "E:\MCA 3rd Sem\Machine Learning with Python". The user has run the command "Fibonacci.py". The program prompts the user to "Enter the require number 6". It then prints "Fibonacci sequence:" followed by the numbers 0, 1, 1, 2, 3, and 5, each on a new line. The prompt returns to "E:\MCA 3rd Sem\Machine Learning with Python>".

```
Command Prompt
E:\MCA 3rd Sem\Machine Learning with Python>Fibonacci.py
Enter the require number 6
Fibonacci sequence:
0
1
1
2
3
5
E:\MCA 3rd Sem\Machine Learning with Python>
```

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

```
# Nadeem Ansari, 20711169, Haldwani Campus
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)
```

OUTPUT:-



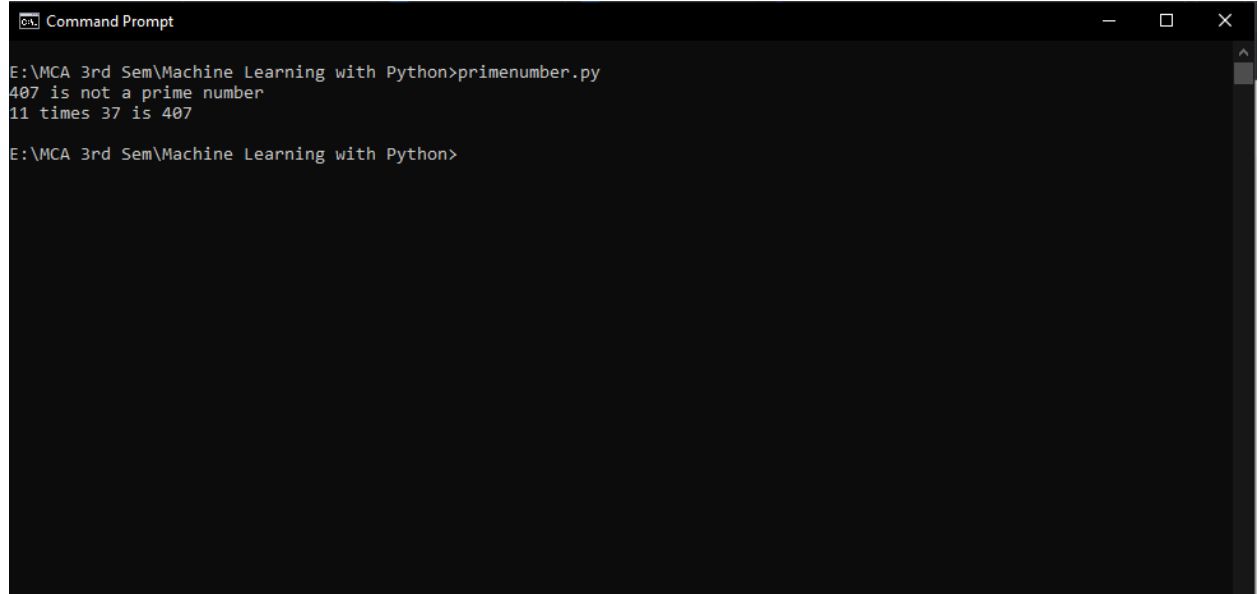
```
Command Prompt
E:\MCA 3rd Sem\Machine Learning with Python>factorial.py
Enter a number: 6
The factorial of 6 is 720
E:\MCA 3rd Sem\Machine Learning with Python>_
```

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

```
# Nadeem Ansari, 20711169, Haldwani Campus
num = 407
if num > 1:
    for i in range(2,num):
        if (num % i) == 0:
            print(num,"is not a prime number")
            print(i,"times",num//i,"is",num)
            break
    else:
```

```
        print(num,"is a prime number")
else:
    print(num,"is not a prime number")
```

OUTPUT:-

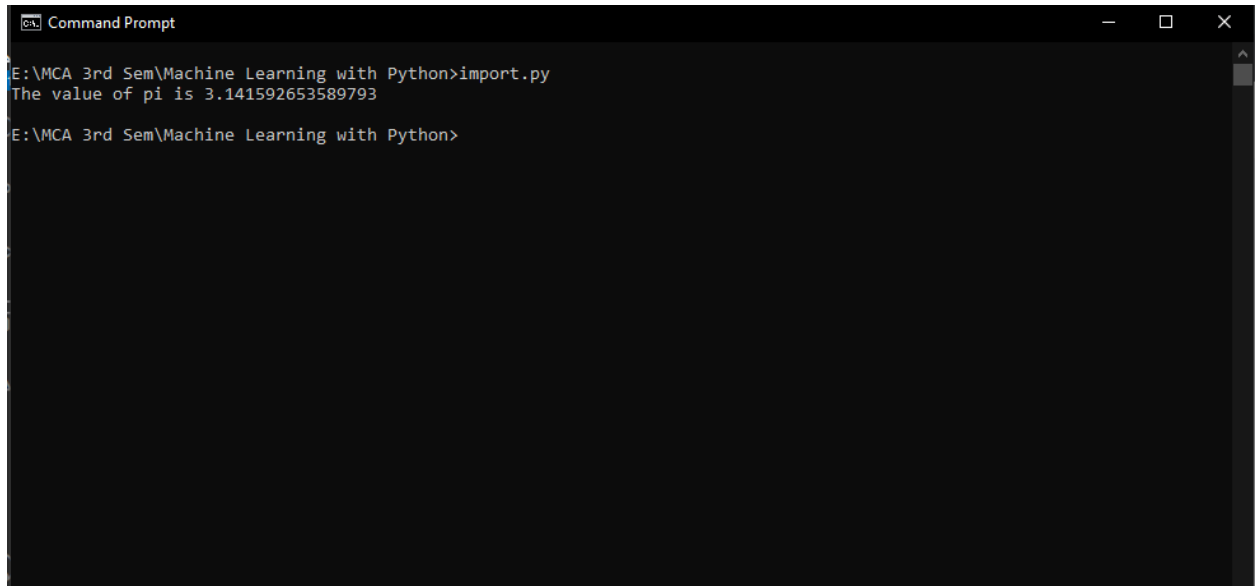


```
Command Prompt
E:\MCA 3rd Sem\Machine Learning with Python>primenumber.py
407 is not a prime number
11 times 37 is 407
E:\MCA 3rd Sem\Machine Learning with Python>
```

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

```
# Nadeem Ansari, 20711169, Haldwani Campus
from math import *
print("The value of pi is", pi)
```

OUTPUT:-

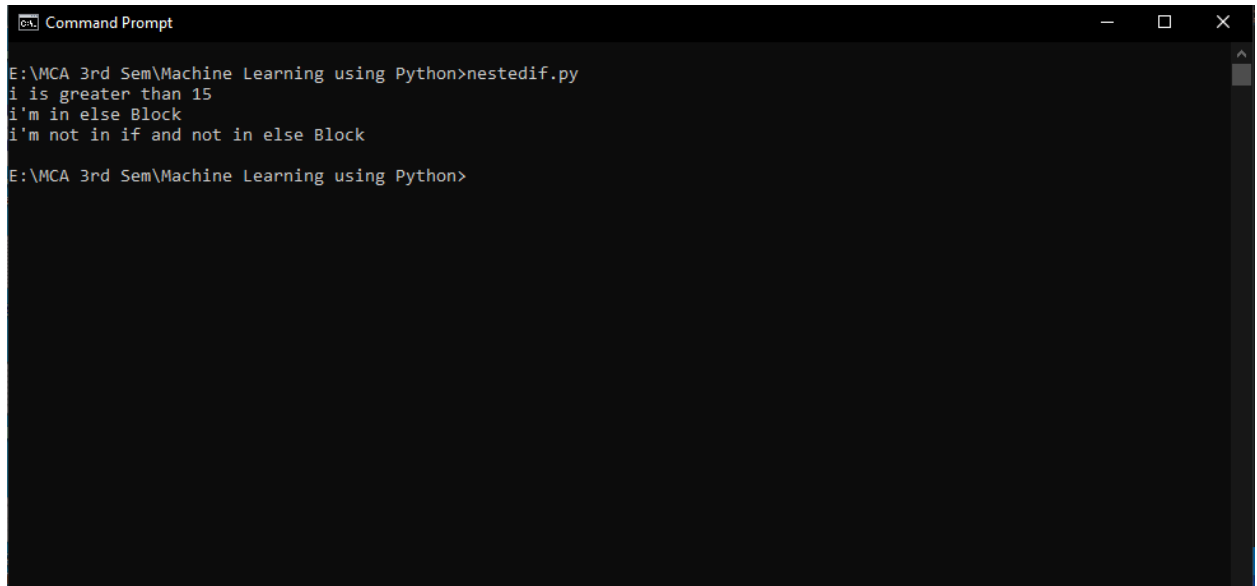


```
Command Prompt
E:\MCA 3rd Sem\Machine Learning with Python>import.py
The value of pi is 3.141592653589793
E:\MCA 3rd Sem\Machine Learning with Python>
```

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

```
# Nadeem Ansari, 20711169, Haldwani Campus
i = 20;
if (i < 15):
    print ("i is smaller than 15")
    print ("i'm in if Block")
else:
    print ("i is greater than 15")
    print ("i'm in else Block")
print ("i'm not in if and not in else Block")
```

OUTPUT:-



```
Command Prompt
E:\MCA 3rd Sem\Machine Learning using Python>nestedif.py
i is greater than 15
i'm in else Block
i'm not in if and not in else Block

E:\MCA 3rd Sem\Machine Learning using Python>
```

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

```
# Nadeem Ansari, 20711169, Haldwani Campus
a = int(input("Enter the value of a "));
b = int(input("Enter the value of b "));
c = int(input("Enter the value of c "));
if a>b and a>c:
    print("a is largest");
if b>a and b>c:
    print("b is largest");
if c>a and c>b:
    print("c is largest");
```

OUTPUT:-

```
Command Prompt
E:\MCA 3rd Sem\Machine Learning using Python>else.py
Enter the value of a 5
Enter the value of b 9
Enter the value of c 7
b is largest
E:\MCA 3rd Sem\Machine Learning using Python>
```

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

```
# Nadeem Ansari, 20711169, Haldwani Campus

my_tuple = ()
print(my_tuple)

my_tuple = (1, 2, 3)
print(my_tuple)

my_tuple = (1, "Hello", 3.4)
print(my_tuple)

my_tuple = ("mouse", [8, 4, 6], (1, 2, 3))
print(my_tuple)
```

OUTPUT:-

```
Command Prompt
E:\MCA 3rd Sem\Machine Learning using Python>tuples.py
()
(1, 2, 3)
(1, 'Hello', 3.4)
('mouse', [8, 4, 6], (1, 2, 3))
E:\MCA 3rd Sem\Machine Learning using Python>_
```

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

```
# Nadeem Ansari, 20711169, Haldwani Campus
my_list = [9,4,7,1,5,3,8]
my_list.sort()
print(my_list)
n=int(input("Enter the element to be searched:"))
print("Element found at index:-",my_list.index(n))
```

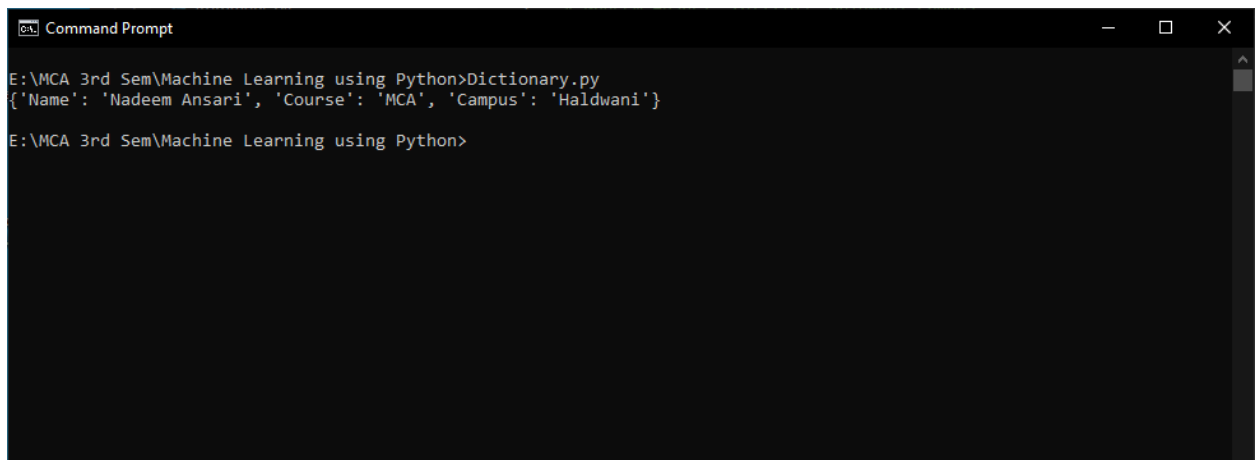
OUTPUT:-

```
Command Prompt
E:\MCA 3rd Sem\Machine Learning using Python>searching.py
[1, 3, 4, 5, 7, 8, 9]
Enter the element to be searched:5
Element found at index:- 3
E:\MCA 3rd Sem\Machine Learning using Python>
```


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

```
# Nadeem Ansari, 20711169, Haldwani Campus
thisdict = {
    "Name": "Nadeem Ansari",
    "Course": "MCA",
    "Campus": "Haldwani"
}
print(thisdict)
```

OUTPUT:-



```
Command Prompt
E:\MCA 3rd Sem\Machine Learning using Python>Dictionary.py
{'Name': 'Nadeem Ansari', 'Course': 'MCA', 'Campus': 'Haldwani'}
E:\MCA 3rd Sem\Machine Learning using Python>
```

Programs on Statistical Concepts and introduction to Linear Algebra using Python

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

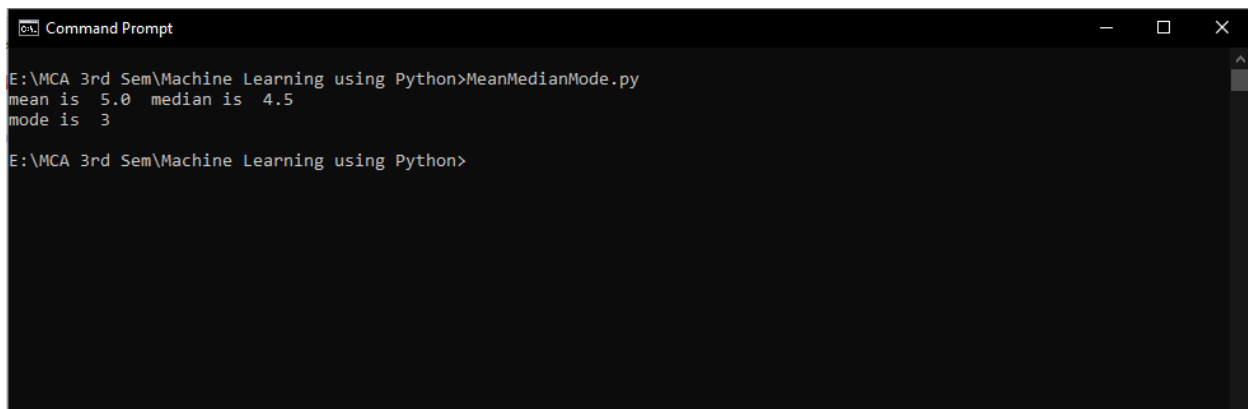
```
# Nadeem Ansari, 20711169, Haldwani Campus
list=['9','3','1','8','3','6']
n=len(list)
sum=0
for i in list:
    sum=sum+int(i)
mean=sum/n
if(n%2==0):
    median=(int(list[n//2])+int(list[(n//2)-1]))/2
```

```

else:
    median=list[n//2]
print("mean is ",mean," median is ",median)
maxValue=maxCount=0
for i in range(n):
    count=0
    for j in range(n):
        if(list[j]==list[i]):
            count+=1
    if(count>maxCount):
        maxCount=count
        maxValue=list[i]
if(maxCount==1):
    print("all element has same frequency ")
else:
    print("mode is ",maxValue)

```

OUTPUT:-



```

E:\MCA 3rd Sem\Machine Learning using Python>MeanMedianMode.py
mean is 5.0 median is 4.5
mode is 3
E:\MCA 3rd Sem\Machine Learning using Python>

```

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

```

# Nadeem Ansari, 20711169, Haldwani Campus
import math
import sys

def sd_calc(data):
    n = len(data)

    if n <= 1:

```

```

        return 0.0

    mean, sd = avg_calc(data), 0.0

    # calculate stan. dev.
    for el in data:
        sd += (float(el) - mean)**2
    sd = math.sqrt(sd / float(n-1))

    return sd

def avg_calc(ls):
    n, mean = len(ls), 0.0

    if n <= 1:
        return ls[0]

    # calculate average
    for el in ls:
        mean = mean + float(el)
    mean = mean / float(n)

    return mean

data = [4, 2, 5, 8, 6]
print("Sample Data: ",data)
print("Standard Deviation : ",sd_calc(data))

```

OUTPUT:-

```
Command Prompt
E:\MCA 3rd Sem\Machine Learning using Python>StandardDev.py
Sample Data: [4, 2, 5, 8, 6]
Standard Deviation : 2.23606797749979
E:\MCA 3rd Sem\Machine Learning using Python>
```

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

```
# Nadeem Ansari, 20711169, Haldwani Campus
X = [[1,2,3],
      [4,5,6],
      [7,8,9]]

Y = [[9,8,7],
      [6,5,4],
      [3,2,1]]

result = [[0,0,0],
          [0,0,0],
          [0,0,0]]

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

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

OUTPUT:-

```
Command Prompt
E:\MCA 3rd Sem\Machine Learning using Python>Matrix.py
[10, 10, 10]
[10, 10, 10]
[10, 10, 10]
E:\MCA 3rd Sem\Machine Learning using Python>_
```

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

```
# Nadeem Ansari, 20711169, Haldwani Campus
# 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)
```

OUTPUT : -

```
Command Prompt

E:\MCA 3rd Sem\Machine Learning using Python>MulMatrix.py
[114, 160, 60, 27]
[74, 97, 73, 14]
[119, 157, 112, 23]

E:\MCA 3rd Sem\Machine Learning using Python>
```

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

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```
import numpy as np
m = np.array([[1,2],[3,4]])
print("Original matrix:")
print(m)
result = np.linalg.inv(m)
print("Inverse of the said matrix:")
print(result)
```

OUTPUT:-

```
Command Prompt

E:\MCA 3rd Sem\Machine Learning using Python>InverseMatrix.py
Original matrix:
[[1 2]
 [3 4]]
Inverse of the said matrix:
[[-2.  1.]
 [ 1.5 -0.5]]

E:\MCA 3rd Sem\Machine Learning using Python>
```

16. Write a program to calculate the transpose of the given matrix.

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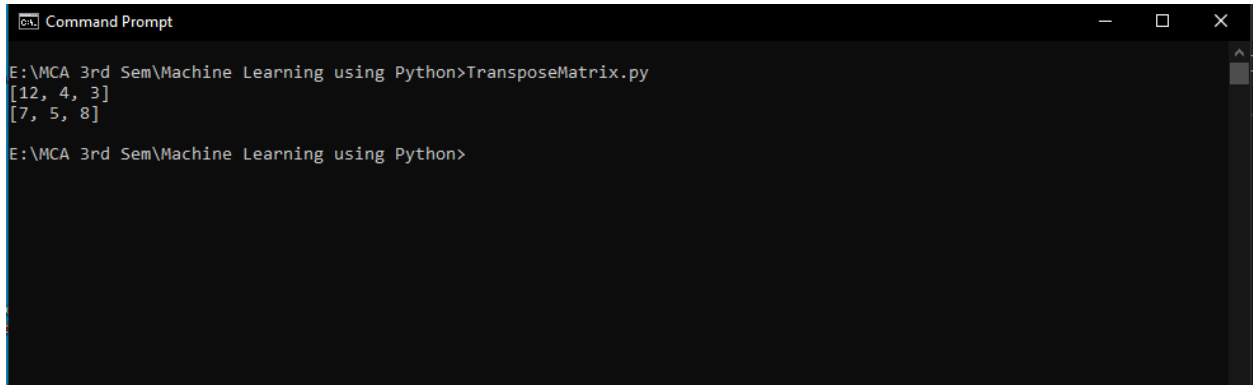
```
x = [[12,7],
     [4 ,5],
     [3 ,8]]
```

```
result = [[0,0,0],
          [0,0,0]]

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

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

OUTPUT:-



The screenshot shows a Windows Command Prompt window titled "Command Prompt". The command prompt displays the following text:

```
E:\MCA 3rd Sem\Machine Learning using Python>TransposeMatrix.py
[12, 4, 3]
[7, 5, 8]

E:\MCA 3rd Sem\Machine Learning using Python>
```

The output shows the transpose of the matrix $\begin{bmatrix} 12 & 4 & 3 \\ 7 & 5 & 8 \end{bmatrix}$, which is $\begin{bmatrix} 12 & 7 \\ 4 & 5 \\ 3 & 8 \end{bmatrix}$.