MORADABAD INSTITUTE OF TECHNOLOGY MORADABAD

Department Of Computer Science and Engineering

COURSE: B. TECH **YEAR: 2ND** **SEMESTER: 4TH**

PYTHON PROGRAMMING LAB FILE

(KCS 453)

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SECTION: C

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PROGRAM - 01

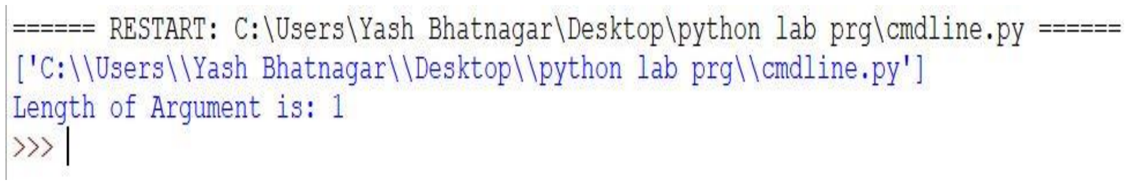
OBJECTIVE:- Write a python program that takes in command line arguments asinput and print the number of arguments.

SOURCE CODE:-

```
import sys
print(sys.argv)
n=len(sys.argv)
print("Length of Argument is:",n)
```

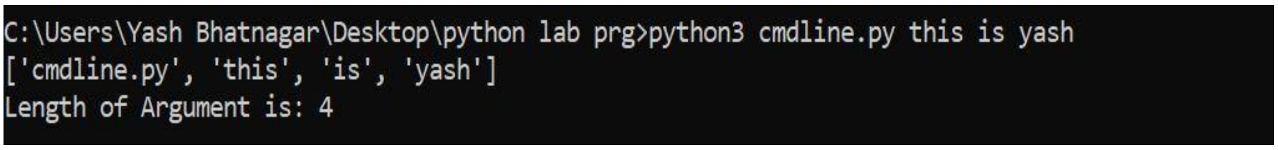
OUTPUT:-

USING IDLE:-



```
====== RESTART: C:\Users\Yash Bhatnagar\Desktop\python lab prg\cmdline.py ======
['C:\\Users\\Yash Bhatnagar\\Desktop\\python lab prg\\cmdline.py']
Length of Argument is: 1
>>> |
```

USING CMD:-



```
C:\Users\Yash Bhatnagar\Desktop\python lab prg>python3 cmdline.py this is yash
['cmdline.py', 'this', 'is', 'yash']
Length of Argument is: 4
```

PROGRAM - 02

OBJECTIVE:- Write a python program to perform Matrix Multiplication.

SOURCE CODE:-

METHOD 1:-

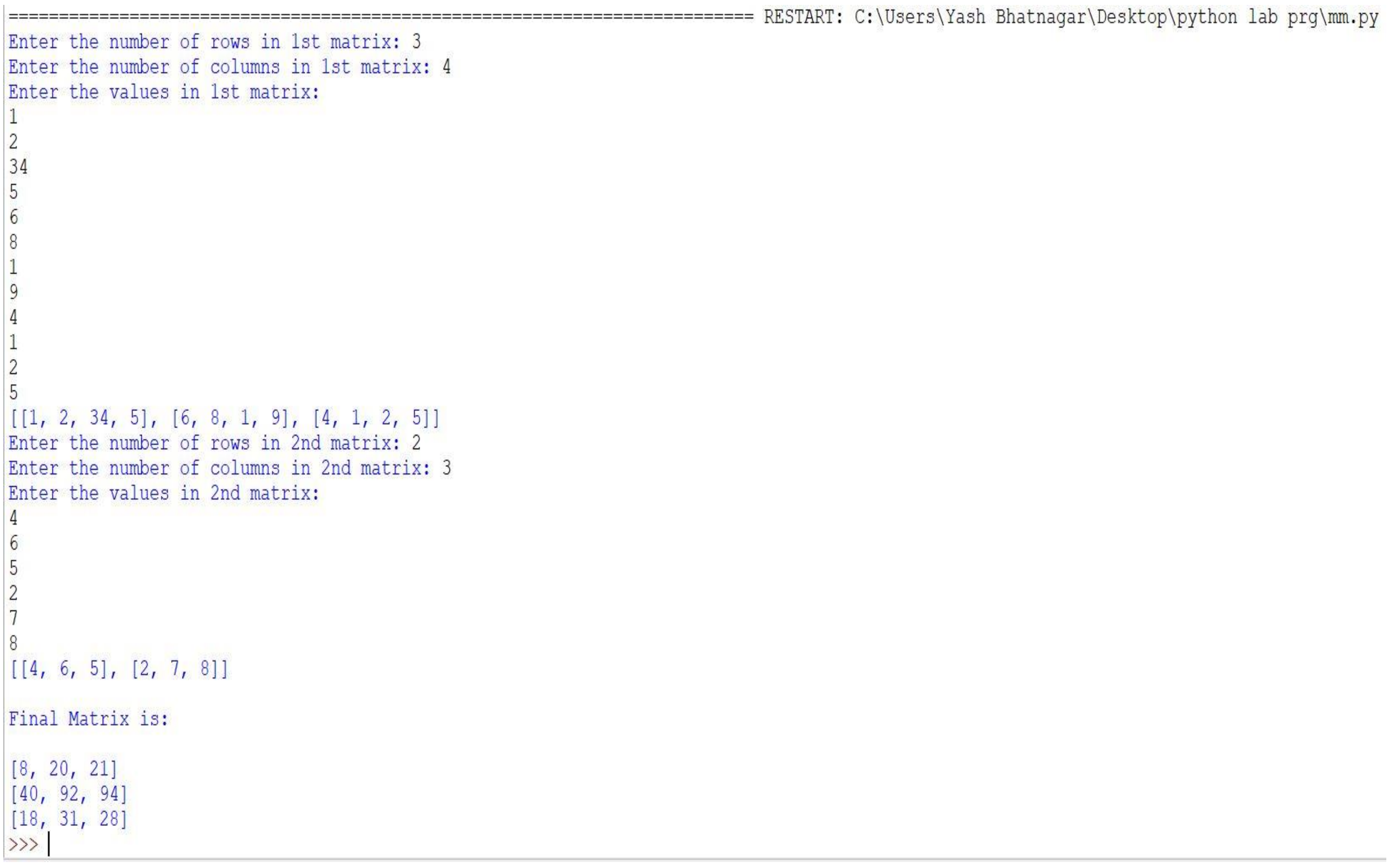
```
R1 = int(input("Enter the number of rows in 1st matrix: "))
C1 = int(input("Enter the number of columns in 1st matrix: "))

A = []
print("Enter the values in 1st matrix:")

for i in range(R1):
    a = []
    for j in range(C1):
        a.append(int(input()))
    A.append(a)
print(A)

R2 = int(input("Enter the number of rows in 2nd matrix: "))
C2 = int(input("Enter the number of columns in 2nd matrix: "))

B = []
print("Enter the values in 2nd matrix:")

for i in range(R2):
    b = []
    for j in range(C2):
        b.append(int(input()))
    B.append(b)
print(B)

result = []

for i in range(R1):
    res = []
    for j in range(C2):
        res.append(0)
    result.append(res)

for i in range(len(A)):
    for j in range(len(B[0])):
        for k in range(len(B)):
            result[i][j] += A[i][k] * B[k][j]

print("\nFinal Matrix is:\n")
for r in result:
    print(r)
```

METHOD 2:- By NumPy Library

```
import numpy as np
A=np.array([[5,8],[6,3]])
B=np.array([[3,8],[4,5]])
prod=np.dot(A,B)print(prod)
```

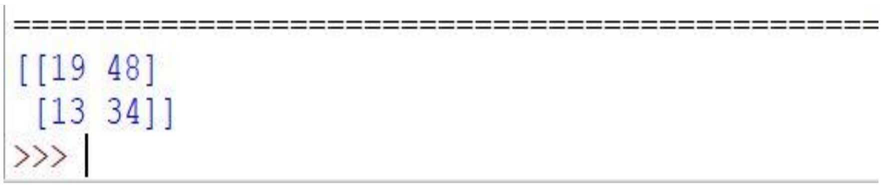
OUTPUT:-

METHOD 1:-



```
========================================================================== RESTART: C:\Users\Yash Bhatnagar\Desktop\python lab prg\mm.py
Enter the number of rows in 1st matrix: 3
Enter the number of columns in 1st matrix: 4
Enter the values in 1st matrix:
1
2
34
5
6
8
1
9
4
1
2
5
[[1, 2, 34, 5], [6, 8, 1, 9], [4, 1, 2, 5]]
Enter the number of rows in 2nd matrix: 2
Enter the number of columns in 2nd matrix: 3
Enter the values in 2nd matrix:
4
6
5
2
7
8
[[4, 6, 5], [2, 7, 8]]

Final Matrix is:

[8, 20, 21]
[40, 92, 94]
[18, 31, 28]
>>> 
```

METHOD 2:- By NumPy Library



```
==================================================
[[19 48]
 [13 34]]
>>> 
```

PROGRAM - 03

OBJECTIVE:- Write a python program to compute the GCD of two numbers.

SOURCE CODE:-

METHOD 1:- By Function

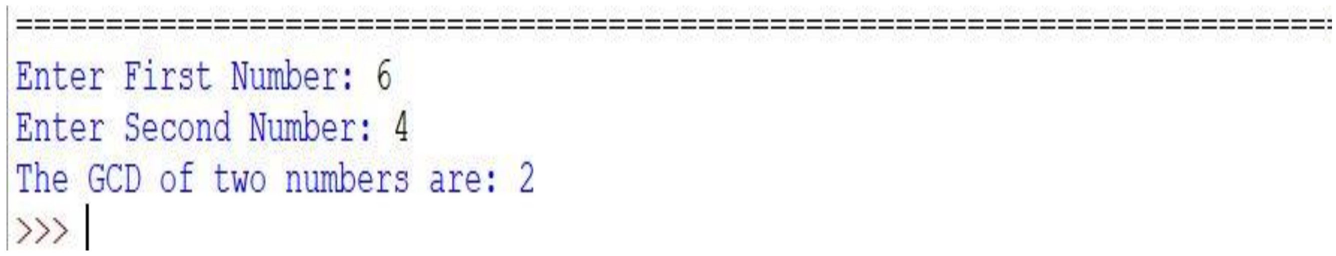
```
def fun_gcd(a,b):
   if(b==0):
      return a
   else:
      return fun_gcd(b,a%b)
a=int(input("Enter First Number: "))
b=int(input("Enter Second Number: "))
print("The GCD of two numbers are:",fun_gcd(a,b))
```

METHOD 2:- By Math Module

```
import math
m = int(input("Enter First Number: "))
n = int(input("Enter Second Number: "))
print("The GCD of",m,"and",n,"is:",math.gcd(m,n))
```

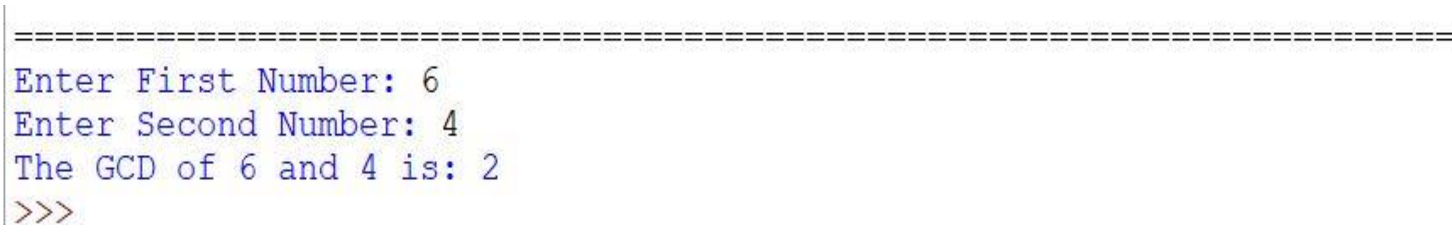
OUTPUT:-

METHOD 1:- By Function



```
========================================================================
Enter First Number: 6
Enter Second Number: 4
The GCD of two numbers are: 2
>>>
```

METHOD 2:- By Math Module



```
========================================================================
Enter First Number: 6
Enter Second Number: 4
The GCD of 6 and 4 is: 2
>>>
```

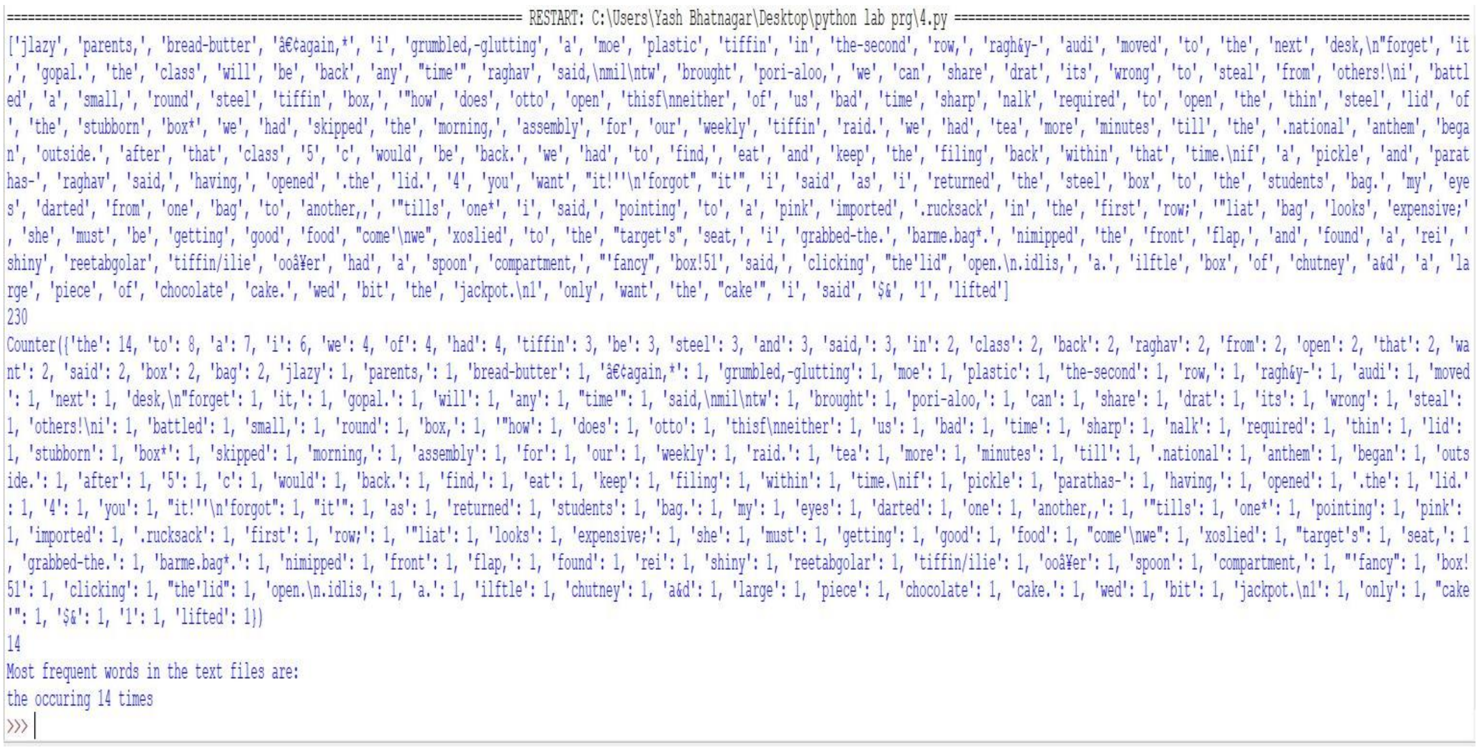
PROGRAM - 04

OBJECTIVE:- Write a python program to find the most frequent words in a text file.

SOURCE CODE:-

```
from collections import Counter
f = open("D:/ Yash.txt","r")
a=list((f.read().lower()).split(" "))
print(a)
length=len(a)
print(length)
mydict= Counter(a)
print(mydict)
max_value =  max(mydict.values())
print(max_value)
print("Most frequent words in the text files are:")
for i in mydict:
    if mydict[i] == max_value:
        print(i,"occuring",mydict[i],"times")
f.close()
```

OUTPUT:-



```
========================================================================= RESTART: C:\Users\Yash Bhatnagar\Desktop\python lab prg\4.py ========================================================================
['jlazy', 'parents,', 'bread-butter', 'â€¢again,*', 'i', 'grumbled,-glutting', 'a', 'moe', 'plastic', 'tiffin', 'in', 'the-second', 'row,', 'ragh&y-', 'audi', 'moved', 'to', 'the', 'next', 'desk,\n"forget', 'it
,', 'gopal.', 'the', 'class', 'will', 'be', 'back', 'any', "time'", 'raghav', 'said,\nmil\ntw', 'brought', 'pori-aloo,', 'we', 'can', 'share', 'drat', 'its', 'wrong', 'to', 'steal', 'from', 'others!\ni', 'battl
ed', 'a', 'small,', 'round', 'steel', 'tiffin', 'box,', '"how', 'does', 'otto', 'open', 'thisf\nneither', 'of', 'us', 'bad', 'time', 'sharp', 'nalk', 'required', 'to', 'open', 'the', 'thin', 'steel', 'lid', 'of
', 'the', 'stubborn', 'box*', 'we', 'had', 'skipped', 'the', 'morning,', 'assembly', 'for', 'our', 'weekly', 'tiffin', 'raid.', 'we', 'had', 'tea', 'more', 'minutes', 'till', 'the', '.national', 'anthem', 'bega
n', 'outside.', 'after', 'that', 'class', '5', 'c', 'would', 'be', 'back.', 'we', 'had', 'to', 'find,', 'eat', 'and', 'keep', 'the', 'filing', 'back', 'within', 'that', 'time.\nif', 'a', 'pickle', 'and', 'parat
has-', 'raghav', 'said,', 'having,', 'opened', '.the', 'lid.', '4', 'you', 'want', "it!''\n'forgot", "it'", 'i', 'said', 'as', 'i', 'returned', 'the', 'steel', 'box', 'to', 'the', 'students', 'bag.', 'my', 'eye
s', 'darted', 'from', 'one', 'bag', 'to', 'another,,', '"tills', 'one*', 'i', 'said,', 'pointing', 'to', 'a', 'pink', 'imported', '.rucksack', 'in', 'the', 'first', 'row;', '"liat', 'bag', 'looks', 'expensive;'
, 'she', 'must', 'be', 'getting', 'good', 'food', "come'\nwe", 'xoslied', 'to', 'the', "target's", 'seat,', 'i', 'grabbed-the.', 'barme.bag*.', 'nimipped', 'the', 'front', 'flap,', 'and', 'found', 'a', 'rei', '
shiny', 'reetabgolar', 'tiffin/ilie', 'ooâ¥er', 'had', 'a', 'spoon', 'compartment,', "'fancy", 'box!51', 'said,', 'clicking', "the'lid", 'open.\n.idlis,', 'a.', 'ilftle', 'box', 'of', 'chutney', 'a&d', 'a', 'la
rge', 'piece', 'of', 'chocolate', 'cake.', 'wed', 'bit', 'the', 'jackpot.\nl', 'only', 'want', 'the', "cake'", 'i', 'said', '$&', '1', 'lifted']
230
Counter({'the': 14, 'to': 8, 'a': 7, 'i': 6, 'we': 4, 'of': 4, 'had': 4, 'tiffin': 3, 'be': 3, 'steel': 3, 'and': 3, 'said,': 3, 'in': 2, 'class': 2, 'back': 2, 'raghav': 2, 'from': 2, 'open': 2, 'that': 2, 'wa
nt': 2, 'said': 2, 'box': 2, 'bag': 2, 'jlazy': 1, 'parents,': 1, 'bread-butter': 1, 'â€¢again,*': 1, 'grumbled,-glutting': 1, 'moe': 1, 'plastic': 1, 'the-second': 1, 'row,': 1, 'ragh&y-': 1, 'audi': 1, 'moved
': 1, 'next': 1, 'desk,\n"forget': 1, 'it,': 1, 'gopal.': 1, 'will': 1, 'any': 1, "time'": 1, 'said,\nmil\ntw': 1, 'brought': 1, 'pori-aloo,': 1, 'can': 1, 'share': 1, 'drat': 1, 'its': 1, 'wrong': 1, 'steal':
1, 'others!\ni': 1, 'battled': 1, 'small,': 1, 'round': 1, 'box,': 1, '"how': 1, 'does': 1, 'otto': 1, 'thisf\nneither': 1, 'us': 1, 'bad': 1, 'time': 1, 'sharp': 1, 'nalk': 1, 'required': 1, 'thin': 1, 'lid':
1, 'stubborn': 1, 'box*': 1, 'skipped': 1, 'morning,': 1, 'assembly': 1, 'for': 1, 'our': 1, 'weekly': 1, 'raid.': 1, 'tea': 1, 'more': 1, 'minutes': 1, 'till': 1, '.national': 1, 'anthem': 1, 'began': 1, 'outs
ide.': 1, 'after': 1, '5': 1, 'c': 1, 'would': 1, 'back.': 1, 'find,': 1, 'eat': 1, 'keep': 1, 'filing': 1, 'within': 1, 'time.\nif': 1, 'pickle': 1, 'parathas-': 1, 'having,': 1, 'opened': 1, '.the': 1, 'lid.'
: 1, '4': 1, 'you': 1, "it!''\n'forgot": 1, "it'": 1, 'as': 1, 'returned': 1, 'students': 1, 'bag.': 1, 'my': 1, 'eyes': 1, 'darted': 1, 'one': 1, 'another,,': 1, '"tills': 1, 'one*': 1, 'pointing': 1, 'pink':
1, 'imported': 1, '.rucksack': 1, 'first': 1, 'row;': 1, '"liat': 1, 'looks': 1, 'expensive;': 1, 'she': 1, 'must': 1, 'getting': 1, 'good': 1, 'food': 1, "come'\nwe": 1, 'xoslied': 1, "target's": 1, 'seat,': 1
, 'grabbed-the.': 1, 'barme.bag*.': 1, 'nimipped': 1, 'front': 1, 'flap,': 1, 'found': 1, 'rei': 1, 'shiny': 1, 'reetabgolar': 1, 'tiffin/ilie': 1, 'ooâ¥er': 1, 'spoon': 1, 'compartment,': 1, "'fancy": 1, 'box!
51': 1, 'clicking': 1, "the'lid": 1, 'open.\n.idlis,': 1, 'a.': 1, 'ilftle': 1, 'chutney': 1, 'a&d': 1, 'large': 1, 'piece': 1, 'chocolate': 1, 'cake.': 1, 'wed': 1, 'bit': 1, 'jackpot.\nl': 1, 'only': 1, "cake
'": 1, '$&': 1, '1': 1, 'lifted': 1})
14
Most frequent words in the text files are:
the occuring 14 times
>>> 
```

PROGRAM - 05

OBJECTIVE:- Write a python program to find the square root of a number (Newton’smethod).

SOURCE CODE:-

METHOD 1:- BY NEWTON’S METHOD:-

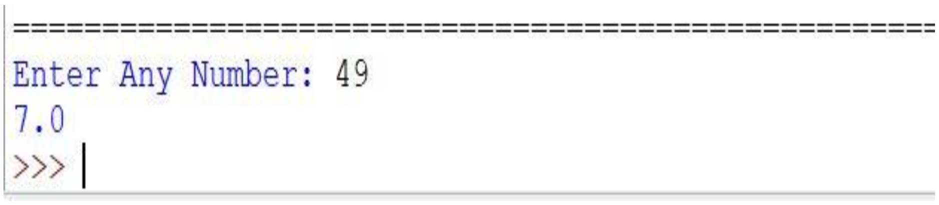
```
x=1
n=int(input("Enter Any Number: "))
for i in range(25):
x=x-(x*x-n)/(2*x)print(round(x,4))
```

METHOD 2:- BY MATH.SQRT METHOD:-

```
import math
n=int(input("Enter Any Number: "))
print(“The Square root of”,n,”is: ”,round(math.sqrt(n),4))
```

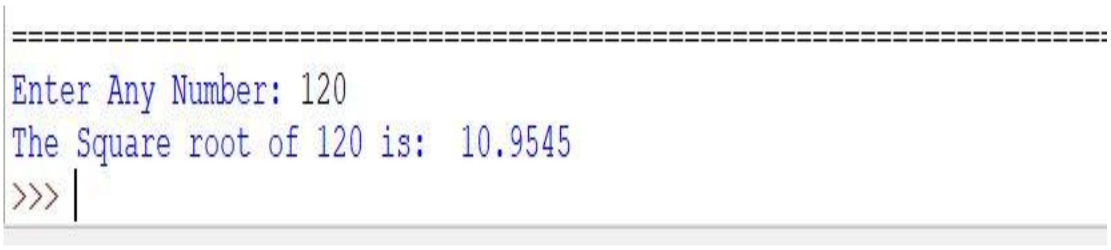
OUTPUT:-

METHOD 1:- BY NEWTON’S METHOD:-



```
==========================================================
Enter Any Number: 49
7.0
>>> |
```

METHOD 2:- BY MATH.SQRT METHOD:-



```
======================================================================
Enter Any Number: 120
The Square root of 120 is:  10.9545
>>> |
```

PROGRAM - 06

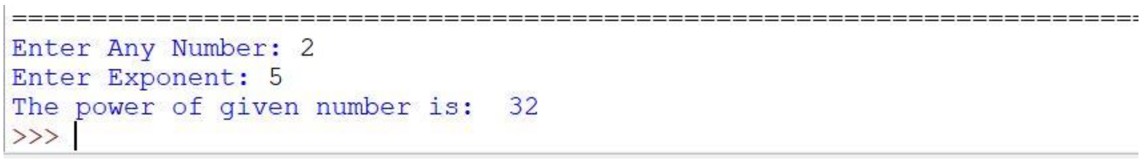
OBJECTIVE:- Write a python program exponentiation (power of a number).

SOURCE CODE:-

```
n=int(input("Enter Any Number: "))
p=int(input("Enter Exponent: "))
pow=1
for i in range(1,p+1):
        pow=pow*n
print("The power of given number is: ",pow)
```

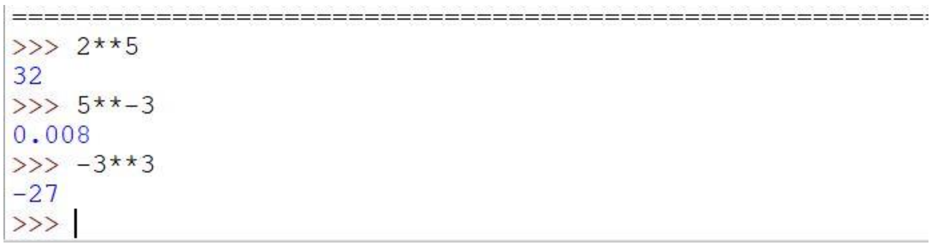
OUTPUT:-

BY USING ABOVE SOURCE CODE:-



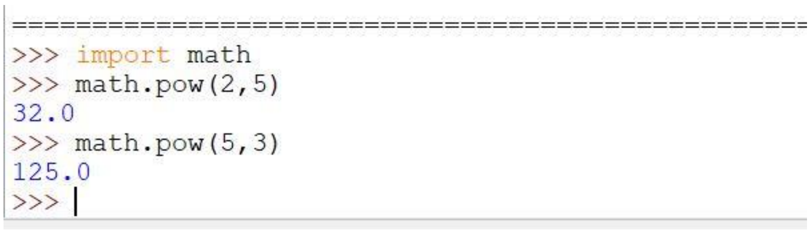
```
==========================================================================
Enter Any Number: 2
Enter Exponent: 5
The power of given number is:  32
>>> |
```

BY USING ARITHMETIC OPERATOR:-



```
============================================================
>>> 2**5
32
>>> 5**-3
0.008
>>> -3**3
-27
>>> |
```

BY USING MATH MODULE:-



```
====================================================
>>> import math
>>> math.pow(2,5)
32.0
>>> math.pow(5,3)
125.0
>>> |
```

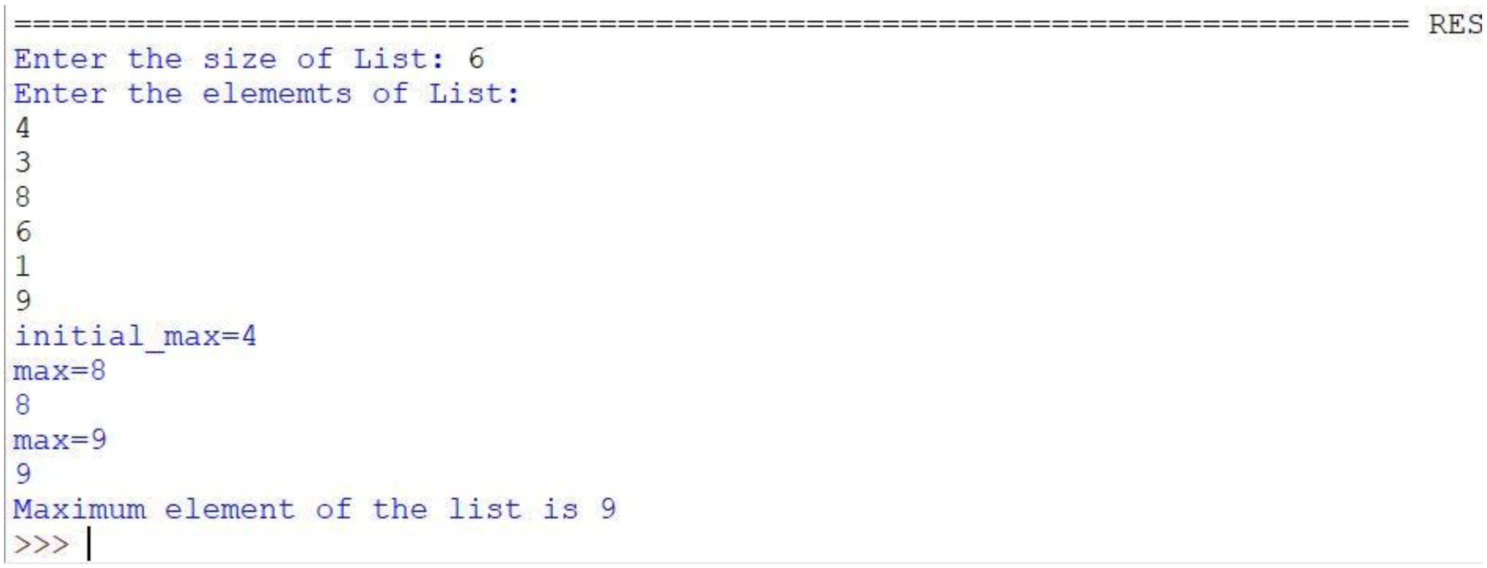
PROGRAM - 07

OBJECTIVE:- Write a python program to find the maximum of a list of numbers.

SOURCE CODE:-

```
list=[]
n=int(input("Enter the size of List: "))
print("Enter the elememts of List: ")

for i in range(0,n):
    list.append(int(input()))
max=list[0]
print(f"initial_max={max}")
for i in range(1,n):
    if list[i]>max:
        max=list[i]
        print(f"max={max}")
        print(list[i])
print(f"Maximum element of the list is {max}")
```

OUTPUT:-



```
========================================================================== RES
Enter the size of List: 6
Enter the elememts of List:
4
3
8
6
1
9
initial_max=4
max=8
8
max=9
9
Maximum element of the list is 9
>>> |
```

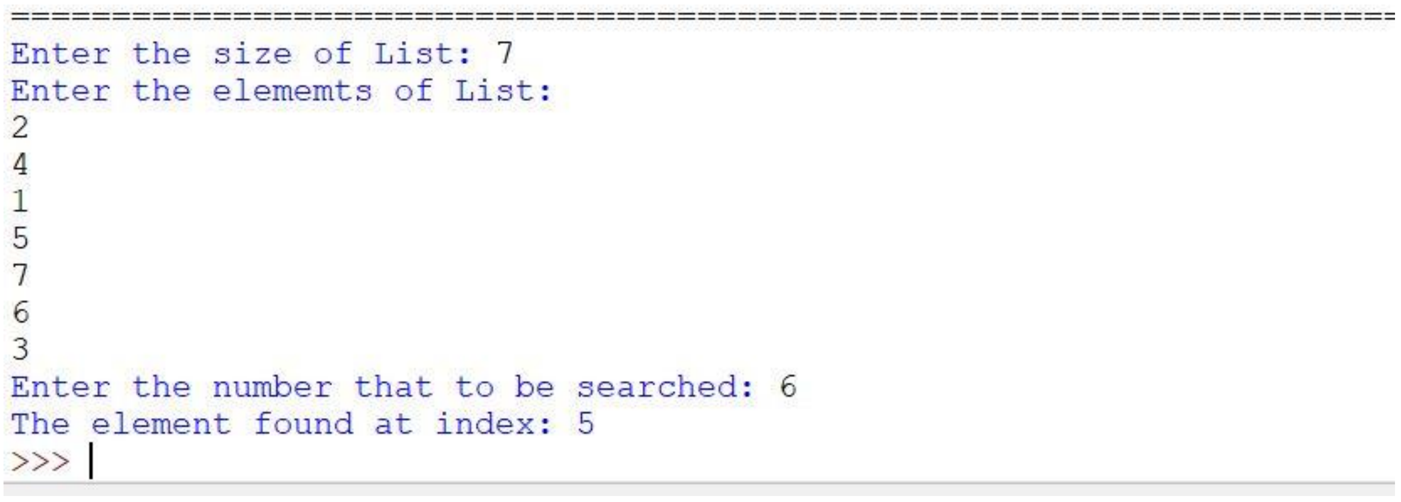
PROGRAM - 08

OBJECTIVE:- Write a python program Linear search.

SOURCE CODE:-

```
list=[]
n=int(input("Enter the size of List: "))
print("Enter the elememts of List: ")

for i in range(0,n):
    list.append(int(input()))

key=int(input("Enter the number that to be searched: "))

for i in range(0,n):
    if list[i]==key:
        print(f"The element found at index: {i}")
        break
else:
    print("Element does not exist")
```

OUTPUT:-



```
=============================================================================
Enter the size of List: 7
Enter the elememts of List:
2
4
1
5
7
6
3
Enter the number that to be searched: 6
The element found at index: 5
>>> |
```

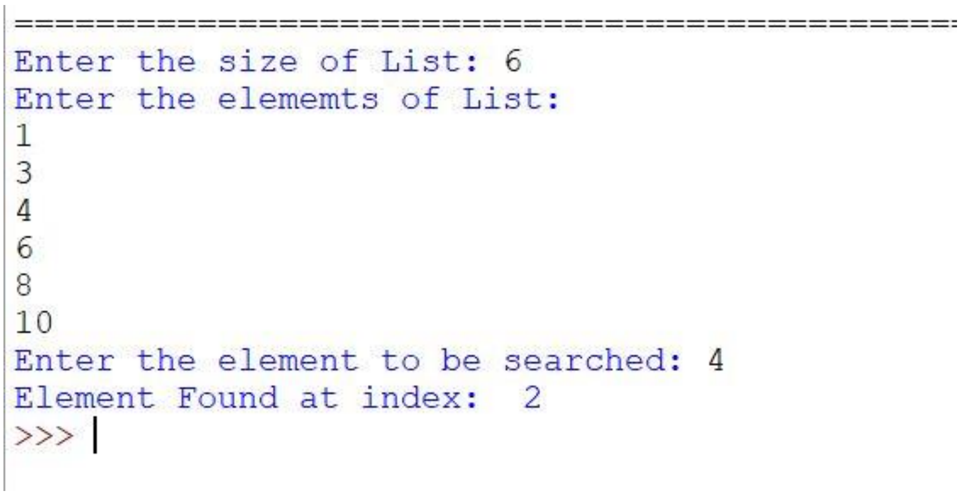
PROGRAM - 09

OBJECTIVE:- Write a python program Binary search.

SOURCE CODE:-

```
list=[]
n=int(input("Enter the size of List: "))
print("Enter the elememts of List: ")

for i in range(0,n):
    list.append(int(input()))

x = int(input("Enter the element to be searched: "))
lower_bound = 0
upper_bound = len(list)-1
mid = (lower_bound + upper_bound)//2

while lower_bound <= upper_bound:
    if x == list[mid]:
        print("Element Found at index:\t",mid)
        break
    else:
        if x > list[mid]:
            lower_bound = mid+1
            mid = (lower_bound+upper_bound)//2
        elif x < list[mid]:
            upper_bound = mid-1
            mid = (lower_bound+upper_bound)//2

if(lower_bound>upper_bound):
    print("Element Not Found")
```

OUTPUT:-



```
==============================================
Enter the size of List: 6
Enter the elememts of List:
1
3
4
6
8
10
Enter the element to be searched: 4
Element Found at index:   2
>>> |
```

PROGRAM - 10

OBJECTIVE:- Write a python program Selection Sort.

SOURCE CODE:-

OUTPUT:-

PROGRAM - 11

OBJECTIVE:- Write a python program Insertion Sort.

SOURCE CODE:-

OUTPUT:-

PROGRAM - 12

OBJECTIVE:- Write a python program Merge Sort.

SOURCE CODE:-

OUTPUT:-

PROGRAM - 13

OBJECTIVE:- Write a python program first n prime numbers.

SOURCE CODE:-

OUTPUT:-

PROGRAM - 14

OBJECTIVE:- Write a python program simulate bouncing ball in pygame.

SOURCE CODE:-

OUTPUT:-

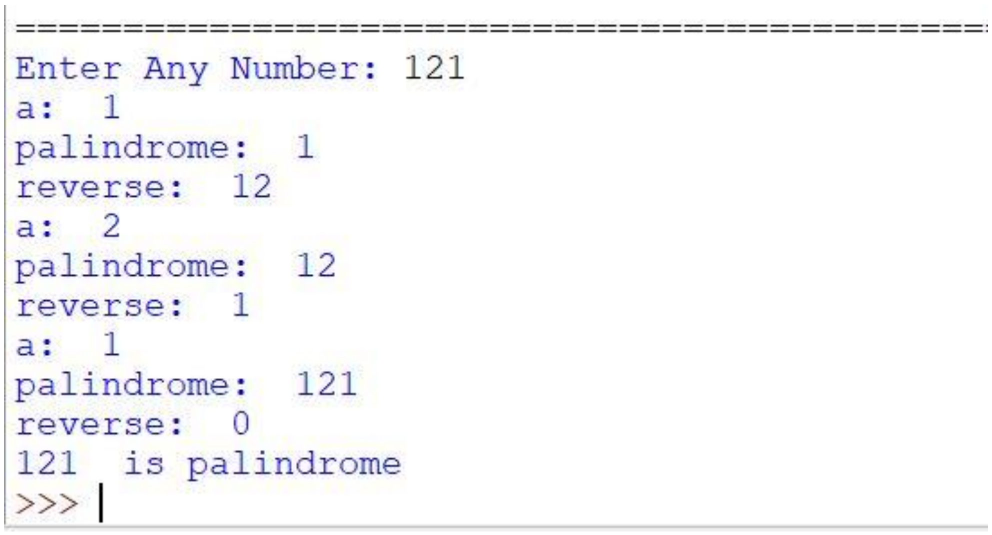
PROGRAM - 15

OBJECTIVE:- Write a python program to check a number is Palindrome.

SOURCE CODE:-

```
n=int(input("Enter Any Number: "))
rev=n
palindrome=0
while rev>0:
    a=rev%10
    print("a: ",a)
    palindrome=palindrome*10+a
    print("palindrome: ",palindrome)
    rev=rev//10
    print("reverse: ",rev)
if n==palindrome:
    print(n, " is palindrome")
else:
    print(n, " is not palindrome")
```

OUTPUT:-



```
=============================================
Enter Any Number: 121
a:  1
palindrome:  1
reverse:  12
a:  2
palindrome:  12
reverse:  1
a:  1
palindrome:  121
reverse:  0
121  is palindrome
>>> 
```

PROGRAM - 16

OBJECTIVE:- Write a python program to implement Scipy library demonstration.

SOURCE CODE:-

METHOD 1:- METHOD OF INTERPOLATION

```
import matplotlib.pyplot as plt
from scipy import interpolate
import numpy as np
x = np.arange(7,35)
print(x)
y = np.exp(x/3.0)
print(y)
f = interpolate.interp1d(x, y)
x1 = np.arange(8, 15)
print(x1)
y1 = f(x1)
print(y1)
plt.plot(x, y, 'o', x1, y1, '--')
plt.show()
```

METHOD 2:- SPECIAL MODULE METHOD

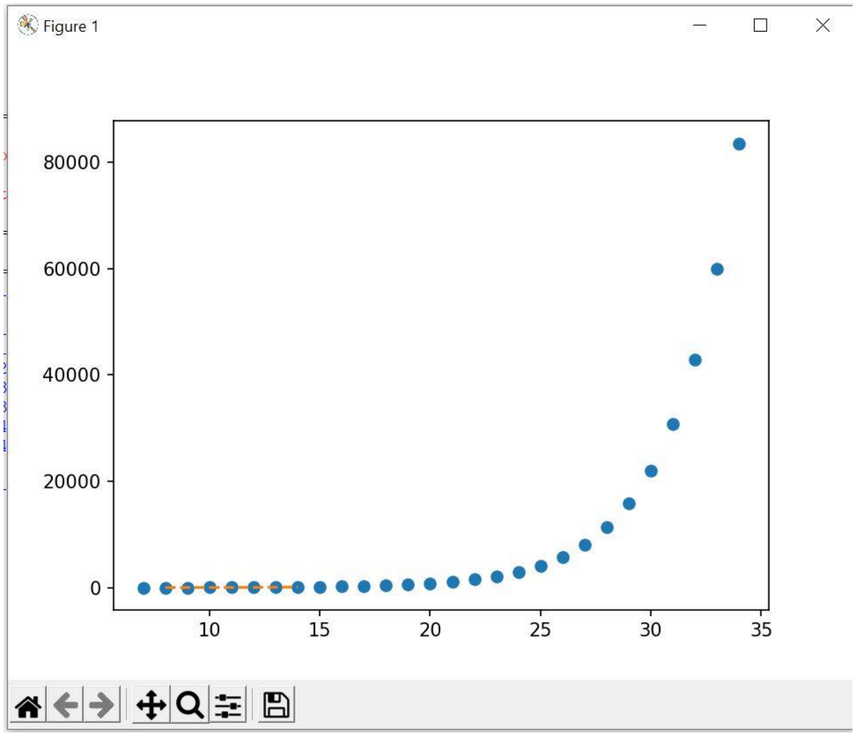
```
from scipy import special
c = special.sindg(45)
print(c)
d = round(special.tandg(10),4)
print(d)
```

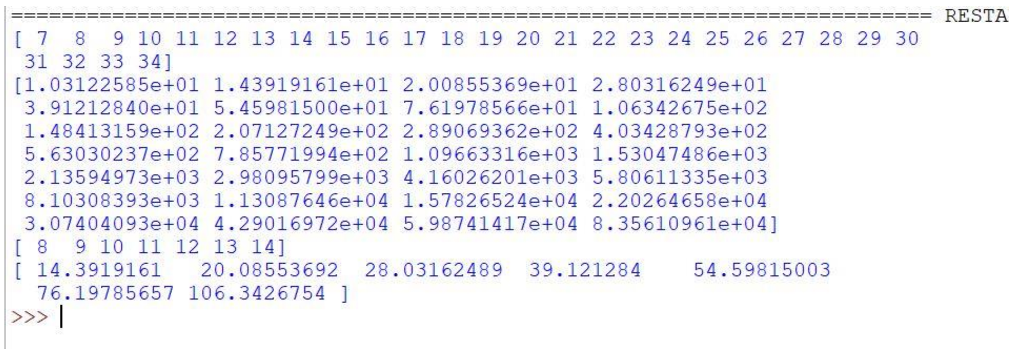
METHOD 3:- LINEAR ALGEBRA PROGRAM

```
# Program on linear algebra
import numpy as np
from scipy import linalg
from scipy.linalg import eigh
A = np.array([[6,3], [5,2]])
B = linalg.inv(A)
print(B)
c = linalg.det(A)
print(c)
D = np.array([[1, 3, 2, 4], [1, 5, 6, 3], [6, 3, 4, 1], [4, 3, 2, 5]])
a, b = eigh(D)

print("Selected eigenvalues:", a)
print("Complex ndarray:", b)
```

OUTPUT:-

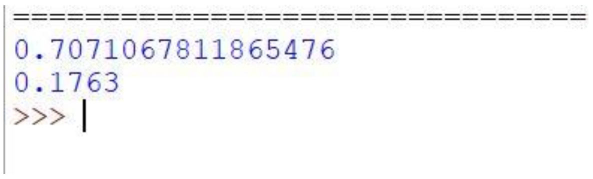
METHOD 1:- METHOD OF INTERPOLATION





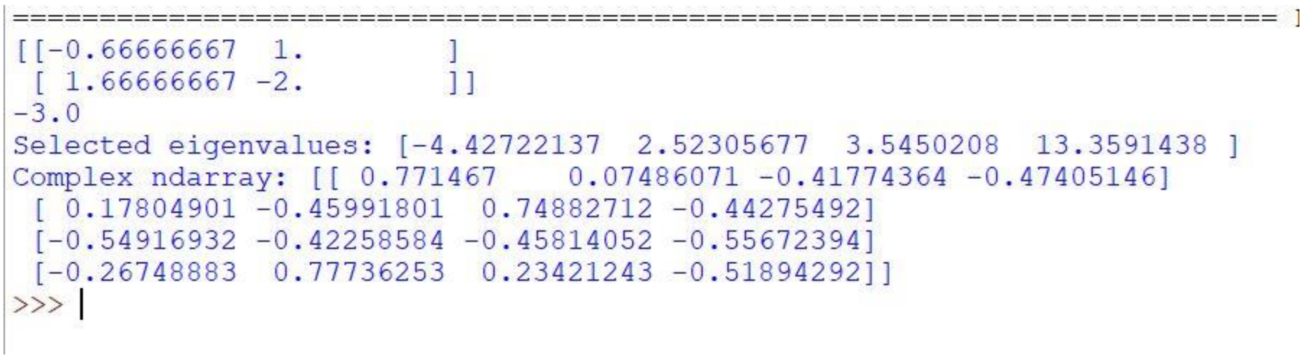
```
========================================================================= RESTA
[ 7  8  9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
 31 32 33 34]
[1.03122585e+01 1.43919161e+01 2.00855369e+01 2.80316249e+01
 3.91212840e+01 5.45981500e+01 7.61978566e+01 1.06342675e+02
 1.48413159e+02 2.07127249e+02 2.89069362e+02 4.03428793e+02
 5.63030237e+02 7.85771994e+02 1.09663316e+03 1.53047486e+03
 2.13594973e+03 2.98095799e+03 4.16026201e+03 5.80611335e+03
 8.10308393e+03 1.13087646e+04 1.57826524e+04 2.20264658e+04
 3.07404093e+04 4.29016972e+04 5.98741417e+04 8.35610961e+04]
[ 8  9 10 11 12 13 14]
[ 14.3919161   20.08553692  28.03162489  39.121284    54.59815003
  76.19785657 106.3426754 ]
>>> |
```

METHOD 2:- SPECIAL MODULE METHOD



```
=================================
0.7071067811865476
0.1763
>>> |
```

METHOD 3:- LINEAR ALGEBRA PROGRAM



```
========================================================================= ]
[[-0.66666667  1.        ]
 [ 1.66666667 -2.        ]]
-3.0
Selected eigenvalues: [-4.42722137  2.52305677  3.5450208  13.3591438 ]
Complex ndarray: [[ 0.771467    0.07486071 -0.41774364 -0.47405146]
 [ 0.17804901 -0.45991801  0.74882712 -0.44275492]
 [-0.54916932 -0.42258584 -0.45814052 -0.55672394]
 [-0.26748883  0.77736253  0.23421243 -0.51894292]]
>>> |
```