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Program No : 01

Write a python program that takes in command line arguments as input and print the number of arguments.

Code:-

```
import sys

print(type(sys.argv))
print('Number of command line arguments:',len(sys.argv))
print('The command line arguments are:')
for i in sys.argv:
    print("'",i,"'")
```

Output:-

```
PS C:\D\python> python -u "c:\D\python\ITM\project file\p1.py" 8 6 5 9 0 54
<class 'list'>
Number of command line arguments: 7
The command line arguments are:
' c:\D\python\ITM\project file\p1.py '
' 8 '
' 6 '
' 5 '
' 9 '
' 0 '
' 54 '
PS C:\D\python>
```

Program No : 02

Write a python program to perform Matrix Multiplication.

Code:-

```
print("Enter the order of first Matrix:")
r1=int(input("Enter Rows of Matrix 1: "))
c1=int(input("Enter Columns of Matrix 1: "))
print(f"Order of First Matrix: ({r1}×{c1})\n\nEnter the order of Second
Matrix:")
r2=int(input("Enter Rows of Matrix 2: "))
c2=int(input("Enter Columns of Matrix 2: "))
print(f"Order of Second Matrix: ({r2}×{c2})")
if(c1==r2):
    print(f"\nOrder of Resultent Matrix: ({r1}×{c2})\n")
    print("\nEnter the first Matrix:")
    M1=[[(int(input(f"M1({y},{x}) : "))) for x in range(0,c1)] for y in
range(0,r1)]
    print("\nEnter the second Matrix:")
    M2=[[(int(input(f"M2({y},{x}) : "))) for x in range(0,c2)] for y in
range(0,r2)]
    print("Multiplication is: ")
    for i in range(0,r1):
        for j in range(0,c2):
            s=0
            for k in range(0,c1):
                s=s+(M1[i][k]*M2[k][j])
            print(s,end=" ")
        print()
else:
    print("Rows of First Matrix are not equal to Rows of second Matrix.\nSo
multiplication is not possible.")
```

Output:-

```
C:\D\python\ITM\project file>python p2.py
Enter the order of first Matrix:
Enter Rows of Matrix 1: 2
Enter Columns of Matrix 1: 2
Enter the order of Second Matrix:
Enter Rows of Matrix 2: 2
Enter Columns of Matrix 2: 2
Enter the first Matrix:
M1(0,0) : 1
M1(0,1) : 2
M1(1,0) : 3
M1(1,1) : 4
Enter the second Matrix:
M2(0,0) : 5
M2(0,1) : 6
M2(1,0) : 7
M2(1,1) : 8
Multiplication is:
19 22
43 50
C:\D\python\ITM\project file>
```

Program No : 03

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

Code:-

```
def gcd1(x,y):
    if(x<y):
        min=x
    else:
        min=y
    for i in range(1,min+1):
        if((x%i==0) and (y%i==0)):
            gcd=i
    return gcd

def gcd2(x,y):
    while(y):
        x,y=y,x%y
    return x

x=int(input("Enter first Number: "))
y=int(input("Enter second Number: "))
print(f"GCD of {x},{y} is: {gcd1(x,y)}")
# print(f"GCD of {x},{y} is: {gcd2(y,x)}")
```

Output:-

```
C:\D\python\ITM\project file>python p3.py
Enter first Number: 23
Enter second Number: 4
GCD of 23,4 is: 1

C:\D\python\ITM\project file>python p3.py
Enter first Number: 345
Enter second Number: 34
GCD of 345,34 is: 1

C:\D\python\ITM\project file>python p3.py
Enter first Number: 64
Enter second Number: 8
GCD of 64,8 is: 8

C:\D\python\ITM\project file>
```

Program No : 04

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

Code:-

```
file = open(input("Enter file location with name(C:\..\\abc.xyz)\n(You can
take 'C:\D\python\ITM\project file\data.txt')\n:-> "),"r")
word = ""
frequency = 0
words = []

for line in file:
    line_word = line.lower().replace(',','').replace('.','').split(" ")
    for w in line_word:
          words.append(w)

for i in range(0, len(words)):
    count = 1
    for j in range(i+1, len(words)):
          if(words[i] == words[j]):
                count = count + 1
    if(count > frequency):
          frequency = count
          word = words[i]

print("Most repeated word: " + word)
print("Frequency: " + str(frequency))
file.close()
```

Output:-

```
C:\D\python\ITM\project file>python p4.py
Enter file location with name(C:\..\abc.xyz)
(You can take 'C:\D\python\ITM\project file\data.txt')
:-> C:\D\python\ITM\project file\data.txt
Most repeated word: the
Frequency: 15

C:\D\python\ITM\project file>
```

“ Data.txt:-

Avul Pakir Jainulabdeen Abdul Kalam BR (15 October 1931 – 27 July 2015) was an Indian aerospace scientist and statesman who served as the 11th president of India from 2002 to 2007. He was born and raised in Rameswaram, Tamil Nadu and studied physics and aerospace engineering. He spent the next four decades as a scientist and science administrator, mainly at the Defence Research and Development Organisation (DRDO) and Indian Space Research Organisation (ISRO) and was intimately involved in India's civilian space programme and military missile development efforts. He thus came to be known as the Missile Man of India for his work on the development of ballistic missile and launch vehicle technology. He also played a pivotal organisational, technical, and political role in India's Pokhran-II nuclear tests in 1998, the first since the original nuclear test by India in 1974.

Kalam was elected as the 11th president of India in 2002 with the support of both the ruling Bharatiya Janata Party and the then-opposition Indian National Congress. Widely referred to as the "People's President", he returned to his civilian life of education, writing and public service after a single term. He was a recipient of several prestigious awards, including the Bharat Ratna, India's highest civilian honour.

While delivering a lecture at the Indian Institute of Management Shillong, Kalam collapsed and died from an apparent cardiac arrest on 27 July 2015, aged 83. Thousands, including national-level dignitaries, attended the funeral ceremony held in his hometown of Rameswaram, where he was buried with full state honours.

Program No : 05

Write a python program to find the square root of a number (Newton's method).

Code:-

```
# Newton's Formula to find Square root
# root = 0.5 * (X + (N / X)) where X is any guess which can be assumed to be
N or 1.

def sqrt(x):
    n,base=float(x),10
    for i in range(base):
        x=0.5*(x+(n/x))
    return x

print("Square root is: ",sqrt(int(input("Enter the number: "))))
```

Output:-

```
C:\D\python\ITM\project file>python p5.py
Enter the number: 45
Square root is:  6.708203932499369

C:\D\python\ITM\project file>
```

Program No : 06

Write a python program to find the exponentiation of a number (power of a number).

Code:-

```
def expo(num,pow):
    n=1
    for i in range(pow):
        n=n*num
    return n

print("Answer = ",expo(int(input("Enter the number: ")),int(input("Enter
power: "))))
```

Output:-

```
C:\D\python\ITM\project file>python p6.py
Enter the number: 25
Enter power: 5
Answer =  9765625

C:\D\python\ITM\project file>
```

Program No : 07

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

Code:-

```
# print("Maximum Number in List is: ",max([(int(input(f"Enter element {i+1}:
"))) for i in range(0,(int(input("Enter the length of list: "))))]))

def bubble_sort(lst):
    for i in range(0,(len(lst))):
        swap=False
        for j in range(0,len(lst)-1):
            if(lst[j]>lst[j+1]):
                lst[j+1],lst[j]=lst[j],lst[j+1]
                swap=True
        if(swap==False):
            break
    return lst

lst = bubble_sort([(int(input(f"Enter element {i+1}: "))) for i in
range(0,(int(input("Enter the length of list: "))))])
print("Maximum Number in List is: ",lst[len(lst)-1])
```

Output:-

```
C:\D\python\ITM\project file>python p7.py
Enter the length of list: 5
Enter element 1: 2
Enter element 2: 6
Enter element 3: 9
Enter element 4: 4
Enter element 5: 5
Maximum Number in List is:  9

C:\D\python\ITM\project file>
```

Program No : 08

Write a python program to Linear search.

Code:-

```
def ls(lst,num):
    f=0
    for i in range(0,len(lst)):
        if(lst[i]==num):
            print(f"{num} is Available at index: {i}")
            f=1
        else:
            continue
    if(f==0):
        print(f"{num} is not Available.")

ls(([(int(input(f"Enter element {i+1}: "))) for i in
range(0,(int(input("Enter the length of list: "))))]),int(input("Enter the
number to search: ")))
```

Output:-

```
C:\D\python\ITM\project file>python p8.py
Enter the length of list: 5
Enter element 1: 1
Enter element 2: 2
Enter element 3: 3
Enter element 4: 4
Enter element 5: 1
Enter the number to search: 1
1 is Available at index: 0
1 is Available at index: 4
```

Program No : 09

Write a python program to Binary search.

Code:-

```
def binary_search(lst, num):
   low, high, mid = 0, len(lst) - 1, 0
   while low <= high:
         mid = (high + low) // 2
         if lst[mid] < num:
               low = mid + 1
         elif lst[mid] > num:
               high = mid - 1
         else:
               return mid
   return -1

if ((binary_search(([(int(input(f"Enter element {i+1}: "))) for i in
range(0,(int(input("Enter the length of list: "))))]),int(input("Enter the
number to search: "))))!=-1):
   print("Given number is Available")
else:
    print("Given number is not Available in list.")
```

Output:-

```
C:\D\python\ITM\project file>python p9.py
Enter the length of list: 4
Enter element 1: 1
Enter element 2: 2
Enter element 3: 3
Enter element 4: 4
Enter the number to search: 5
Given number is not Available in list.

C:\D\python\ITM\project file>
```

Program No : 10

Write a python program to Selection sort.

Code:-

```
def selection_sort(lst):
    for i in range(len(lst)-1):
        minIndex = i
        for j in range(i+1,len(lst)):
            if lst[j]<lst[minIndex]:
                minIndex = j
        lst[i], lst[minIndex] = lst[minIndex], lst[i]
    return lst

print("The sorted lst is: ", selection_sort([(int(input(f"Enter element
{i+1}: "))) for i in range(0,(int(input("Enter the length of list: "))))]))
```

Output:-

```
C:\D\python\ITM\project file>python p10.py
Enter the length of list: 5
Enter element 1: 23
Enter element 2: 54
Enter element 3: 67
Enter element 4: 2
Enter element 5: 0
The sorted list is:  [0, 2, 23, 54, 67]

C:\D\python\ITM\project file>
```

PROGRAM NO : 11

Write a python program to Insertion sort.

Code:-

```
def insertion_sort(lst):
    for i in range(1, len(lst)):
        value, j = lst[i], i-1
        while j >= 0 and value < lst[j]:
            lst[j + 1] = lst[j]
            j -= 1
        lst[j + 1] = value
    return lst

print("The sorted lst is: ", insertion_sort([(int(input(f"Enter element
{i+1}: "))) for i in range(0,(int(input("Enter the length of list: "))))]))
```

Output:-

```
C:\D\python\ITM\project file>python p11.py
Enter the length of list: 5
Enter element 1: 3
Enter element 2: 4
Enter element 3: 6
Enter element 4: 2
Enter element 5: 0
The sorted list is:  [0, 2, 3, 4, 6]

C:\D\python\ITM\project file>
```

Program No : 12

Write a python program to Merge sort.

Code:-

```
def merge_sort(lst):
    if len(lst) > 1:
        mid = len(lst)//2
        s_lst1 = lst[:mid]
        s_lst2 = lst[mid:]
        merge_sort(s_lst1)
        merge_sort(s_lst2)
        i = j = k = 0
        while i < len(s_lst1) and j < len(s_lst2):
            if s_lst1[i] < s_lst2[j]:
                lst[k] = s_lst1[i]
                i += 1
            else:
                lst[k] = s_lst2[j]
                j += 1
            k += 1
        while i < len(s_lst1):
            lst[k] = s_lst1[i]
            i += 1
            k += 1
        while j < len(s_lst2):
            lst[k] = s_lst2[j]
            j += 1
            k += 1
    return lst

print("The sorted lst is: ", merge_sort([(int(input(f"Enter element {i+1}:
"))) for i in range(0,(int(input("Enter the length of list: "))))]))
```

Output:-

```
C:\D\python\ITM\project file>python p12.py
Enter the length of list: 5
Enter element 1: 89
Enter element 2: 46
Enter element 3: 65
Enter element 4: 34
Enter element 5: 24
The sorted list is:  [24, 34, 46, 65, 89]

C:\D\python\ITM\project file>
```

Program No : 13

Write a python program to print first N prime numbers.

Code:-

```
n=int(input("Enter the length of prime numbers: "))
if(n>0):
    count, i = 0, 0
    while(count<n):
        c=0
        for j in range(2,i//2+1):
            if(i%j==0):
                c=1
        if(c==0):
            print(i)
            count+=1
        i+=1
else:
    print("Please Enter a valid Digit. Thankyou.")
```

Output:-

```
C:\D\python\ITM\project file>python p13.py
Enter the length of prime numbers: 0
Please Enter a valid Digit. Thankyou.

C:\D\python\ITM\project file>python p13.py
Enter the length of prime numbers: 5
0
1
2
3
5

C:\D\python\ITM\project file>
```

Program No : 14

Write a python program to simulate bouncing ball in Pygame.

Code:-

```
import sys, pygame

size = width, height = 800, 400
speed = [1, 1]
background = 255, 255, 255
screen = pygame.display.set_mode(size)
pygame.display.set_caption("Bouncing ball")
ball = pygame.image.load("ball.png")
ballrect = ball.get_rect()
while 1:
    for event in pygame.event.get():
        if event.type == pygame.QUIT:
            sys.exit()
    ballrect = ballrect.move(speed)
    if ballrect.left < 0 or ballrect.right > width:
        speed[0] = -speed[0]
    if ballrect.top < 0 or ballrect.bottom > height:
        speed[1] = -speed[1]
    screen.fill(background)
    screen.blit(ball, ballrect)
    pygame.display.flip()
```

Output:-

```
C:\D\python\ITM\project file>python p14.py
pygame 2.1.2 (SDL 2.0.18, Python 3.7.6)
Hello from the pygame community. https://www.pygame.org/contribute.html

C:\D\python\ITM\project file>
```