Q 1) Write a program to print the special characters separately and print number of Special characters and spaces in the line?

Program:

```
up=""
lo=""
sp=""
sc=""
s=[" "]
ch=input("Enter the word : ")
for i in ch:
    if(i.isupper()):
    up=up+i
    elif(i.islower()):
    lo=lo+i
    elif(i in s):
    sp=sp+i
    else:
    sc=sc+i
x=len(sp)
z=len(sc)
print("Number of spaces : ",x)
print("Number of special charecters : ",z)
    print(" special charecter : ",sc)
```

Q 2) Write a program to print all the Non-Prime numbers between a and b?

Sample Input:
A = 12
B = 19
Sample Output
14, 15, 16, 18
Test cases:
1. A = 11, B = 11
2. A = 20, B = 10
3. A = 0, B = 0
4. A = -5, B = 5
5. A = 7, B = -12

Program

```
num = int(input("Enter any number : ")) if num > 1:
for i in range(2, num):
if (num % i) == 0:
print(num, "is NOT a prime number") break
else:
print(num, "is a PRIME number")
elif num == 0 or 1:
print(num, "is a neither prime NOR composite number")
else:
print(num, "is NOT a prime number it is a COMPOSITE number")
```

Q 3) Write a program to print the multiplication table or Division table of number m up to n. Get the choice from the user.(Multiplication - 1, Division – 2)

Sample Input:
M : 7
N : 4
Choice : 1
Sample Output:
1x7=7
2x7=14

3x7=21
4x7=28
Test cases:
1. M = 6, N = -3, Choice = 3
2. M = -3, N = 5, Choice = -2
3.M = 4, N = 0, Choice = 0
4.M = 0, N = 0, Choice = 1
5. M = -5, N = -5, Choice = 2

Program

```
m=int(input('enter'))
n=int(input('enter'))
choice=int(input('enter'))
if choice==1:
   for i in range(1,n+1):
      print(f'{i}*{m}={m*i}')
elif choice==2:
   for i in range(1,n+1):
       print(f'{i}/{m}={m/i}')
```

Q 4) Write a program to read the numbers until -1 is encountered. Find the average of positive numbers and negative numbers entered by user.Restrict the decimal upto 2 digits.

Sample Input:
Enter -1 to exit…
Enter the number: 7
Enter the number: -2
Enter the number: 9
Enter the number: -8
Enter the number: -6
Enter the number: -4
Enter the number: 10
Enter the number: -1
Sample Output:
The average of negative numbers is: -5.00
The average of positive numbers is : 8.67
Test cases:
1. -1,43, -87, -29, 1, -9
2. 73, 7-6,2,10,28,-1
3. -5, -9, -46,2,5,0
4. 9, 11, -5, 6, 0,-1
5. -1,-1,-1,-1,-1

Program

```
lp=list()
ln=list()
print("Enter -1 to exit...")
while(True):
        s=input("Enter the number : ")
        if((s.isnumeric())or(s.startswith("-"))):
                n=int(s)
                if(n==-1):
                        break
                else:
                        if((n>0)and(n<100)):
                                lp.append(n)
                        elif((n<0)and(n>(-100))):
                                ln.append(n)
```

```
                else:
                        pass
if(lp!=[]):
        sum_p=sum(lp)
        len_p=len(lp)
        avg_p=sum(lp)/len(lp)
else:
        avg_p=0
if(ln!=[]):
        sum_n=sum(ln)
        len_n=len(ln)
        avg_n=sum(ln)/len(ln)
else:
        avg_n=0
print("The average of negative numbers : ",avg_n)
print("The average of postive numbers : ",avg_p)
```

Q 5) Program to remove duplicates numbers entirely from the sorted array Sample Input:

Array = {15, 14, 25, 14, 32, 14, 31}

Sample Output:

Sorted Array = {15, 25, 31, 32}

Test cases:

1. {16, 16, 16 16, 16}
2. {0, 0, 0, 0}
3. {-12, -78, -35, -42}
4. {1,2,3,7,8,9,4,5,6}
5. {1-2,2-3,3-4,4-5,5-6}

Program

```
class Solution(object):
  def removeDuplicates(self, nums):
    """
    :type nums: List[int]
    :rtype: int
    """
    if len(nums) == 0:
      return 0
    length = 1
    previous = nums[0]
    index = 1
    for i in range(1,len(nums)):
      if nums[i] != previous:
        length += 1
        previous = nums[i]
        nums[index] = nums[i]
        index+=1
    return length
input_list = [1,1,2,2,2,3,3,3,3,3,4,5,5,5,6]
ob1 = Solution()
print(ob1.removeDuplicates(input_list))
```

Q 6) Write a pr-+ogram to print n non composite numbers after nth Prime number

Sample Input:

N = 5

Sample Output:

5th Prime number is 11

5 Non Composite numbers after 11 are: 13, 17, 19, 23, 29

Test cases:

1.N = P

2. N = 0
3. N = -4
4. N = 11
5. N = 7.2

Program:

```
def nprimes(a,b,cn):
        count=0
        for i in eange(a,1000):
          fact =0
          for i in range (2,1):
                if (i%j==0):
                        fact =1
                        break
            if (fact==0):
                count+=1
            if (fact==0 and count<=cn):
                 print(i)
n = int (input ('enter n value:'))
prime_c=0
c=0
while (prime_c<n):
        for i in range (2,1000):
                factor =0
                for j in range (2,i):
                        if (i%j==0):
                                factor =1
                                break
                        if (factor ==0):
                                prime_c+=1
                        if (prime_c==n):
                                c+=1
                                break
        if (c==1):
                 n primes(i+1,1000,n)
```

Q 8)Write a program to print the Inverted Full Pyramid star pattern?

Program

```
 row = int(input('Enter number of rows required: '))
for i in range(row,0,-1):
   for j in range(row-i):
      print(' ', end='')

   for j in range(2*i-1):
      print('*',end='')
   print()
```

Q 9) Write a program to read a character until a * is encountered. Also count the number of uppercase, lowercase, Special characters and numbers entered by the users.

Sample Input:
Enter * to exit…
Enter any character: W
Enter any character: d
Enter any character: A
Enter any character: G
Enter any character: ^
Enter any character: H
Enter any character: *
Sample Output:

Total count of lower case:2
Total count of upper case:4
Total count of Special Characters =0
Total count of numbers =0
Test cases:
1. 1,7.2,6,9,5
2. S, Q, l, K,7, j, M
3. M, j, L, &, @, G 4. D, K, Ice, 6.2, L, *
5. *, K, A, e, 1, 8, %, *

Program

```
def Count(str):

    upper, lower, number, special = 0, 0, 0, 0

    for i in range(len(str)):

        if str[i].isupper():

            upper += 1

        elif str[i].islower():

            lower += 1

        elif str[i].isdigit():

            number += 1

        else:

            special += 1

    print('Upper case letters:', upper)

    print('Lower case letters:', lower)

    print('Number:', number)

    print('Special characters:', special)


str = "1,7,6,9,5"

Count(str)
```

Q 10) Find the Mean, Median and Mode of the array of numbers?
Sample Input:
Array of elements = {16, 18, 27, 16, 23, 21, 19}
Sample Output:
Mean = 20
Median = 19
Mode = 16
Test cases:
1. Array of elements = {26, 28, 37, 26, 33, 31, 29}
2. Array of elements = {1.6, 1.8, 2.7, 1.6, 2.3, 2.1, .19}
3. Array of elements = {0, 160, 180, 270, 160, 230, 210, 190, 0}

4. Array of elements = {20, 18, 18, 27, 16, 27, 27, 19, 20}
5. Array of elements = {1000, 100, 1000, 100, 1000, 100, 1000, 100, 1000}

Program:

```
Mean,Median,modeklist=list(map(int, input("enter a list :").split()))
total=sum(klist)
nlen=len(klist)
mean=total/nlen
print("Mean is:",mean)

klist.sort()
if nlen%2==0:
   median1=klist[nlen//2]
   median2=klist[nlen//-1]
   median=(median1+median2) /2
else:
   median=klist[nlen//2]
print("Median is :"+str(median))
mode=klist[0]
c=0
l=0
for i in range (len(klist)-1):
   if(klist[i]==klist[i+1]):
      c=c+1
   else:
      if(c>l):
         mode=klist[i]
         l=c
c=0
print("Mode is :", mode)
```

Q 11) Find the factorial of n? Sample Input:

N = 4

Sample Output:

4 Factorial = 24

Test cases:

1. N = 0
2. N = -5
3. N = 1
4. N = 0.4
5. N = 3A

Program:

```
num=input("enter the value")
if(num.isnumeric()):
        fact=1
        for i in range(1,int(num)+1):
                fact=fact*i
        print("factorial is",fact)
else:
        print("enter the number")
```

Q 12) Python Program to create a list of all numbers in a range which are perfect squares and the sum of the digits of the number is less than 10.

Sample Input & Output:

Enter lower range: 1

Enter upper range: 40

[1, 4, 9, 16, 25, 36]

Test case:

1.Enter lower range: 50
Enter upper range: 100
2.Enter lower range: 5
Enter upper range: 8
3.Enter lower range: 10
Enter upper range: 5
4.Enter lower range: 500
Enter upper range: 500
5.Enter lower range: 0
Enter upper range: -100

Program:

```
lower_limit = int(input("Enter the lower range: "))
upper_limit = int(input("Enter the upper range: "))
my_list = []
my_list = [x for x in range(lower_limit,upper_limit+1) if (int(x*0.5))*2==x and
sum(list(map(int,str(x))))<10]
print("The result is : ")
print(my_list)
```

Q 13) Write a program to print the following pattern

Sample Input:
Enter the Character to be printed: ^
Max Number of time printed: 3
^
^ ^
^ ^ ^

Program:

```
n=int(input("enter no of rows:"))
for i in range(1,n+1):
        for j in range(1,i+1):
                print("^",end=" ")
        print()
```

Q 14) Find the year of the given Anniversary is leap year or not. If leap year then print the next Anniversary, if not leap year then print the previous Anniversary.

Sample Input:
Enter Date: 04/11/1947
Sample Output:
Given Anniversary Year: Non Leap Year.
Anniversary Date: 04/11/1946
Test cases:
1. 04/11/19.47
2. 11/15/1936
3. 31/45/1996
4. 64/09/1947
5. 00/00/2000

Program:

```
ann=input("enter anniversary date dd/mm/yyyy")
year=int(ann[-4:])
leap=0
if(year%400==0):
        leap=1
elif(year%4==0 and year%100!=0):
        leap=1
else:
        leap=0
if(leap==1):
```

```
        year=year+1
        ann=ann[0:6]+str(year)
        print("anniversary date",ann)
else:
        year=year-1
        ann=ann[0:6]+str(year)
        print("anniversary date",ann)
```

Q 15) Find the number of factors for the given number and print the 1st N factors of the given number.

Sample Input:
Given number: 100
N: 4
Sample Output:
Number of factors = 9
1st 4 factors are: 1, 2, 4, 5
Test cases:
1. 343, N = 5
2. 1080, N = 2
3. -243, N = 3
4. 101010, N = 0
5. 0, N = 2

Program

```
num=int(input("enter the number"))
nfactor=int(input("enter n value"))
total=0
count=0
factors=[]
for i in range(1,num+1):
        if(num%i==0):
                total=total+1
        if(count<nfactor):
                factors.append(i)
                count=count+1
print("total factor is ",total)
if(nfactor>total):
        print("it has only",total,"factors")
else:print("n factors are",factors)
```

Q 16) Write a program to calculate the factorial of number using recursive function.

Sample Input & Output:
Enter the value of n: 6
Sample Input & Output:
The factorial of 6 is: 720
Test cases:
1. N = 0
2. N = -5
3. N = 1
4.N = M 5. N = %

Program:

```
num=input("enter the value")
if(num.isnumeric()):
        fact=1
        for i in range(1,int(num)+1):
                fact=fact*i
        print("factorial is",fact)
else:
```

```
        print("enter the number")
```

Q 17) Python Program to Find the Nth Largest Number in a List

Sample Input:
List : {14, 67, 48, 23, 5, 62}
N = 4
Sample Output:
4th Largest number: 23

Test cases:
1. N = 0
2. N = -5
3. N = 1
4. N = M
5. N = %

Program

```
m=list(map(int,input("List : ").split(",")))[:100]
n=input("N = ")
m.sort(reverse=True)
if(n.isnumeric()):
        n=int(n)
        if(n>0):
                print(n,"   largest number is : ",m[n-1])
```

Q 18) Write a program to print the given number is Perfect number or not?

Sample Input:
Given Number: 6
Sample Output:
Its a Perfect Number
Test cases:
1. 17
2. 26!
3. 143
4. 84.1
5. -963

Program

```
def perfect_number(n):
   sum = 0
   for x in range(1, n):
      if n % x == 0:
         sum += x
   return sum == n
print(perfect_number(6))
```

Q 19) Write a program to print the number of vowels and number of consonants in the given statement and which is maximum?

Sample Input:
Saveetha School of Engineering
Sample Output:
Number of vowels = 12
Number of Consonants = 15
Test cases:
1.India is my country
2.All are my brothers and sisters

3.Why dry sky
4.Shy Try Cry
5.EDUCATION

Program:

```
str1 = input("Please Enter Your Own String : ")
vowels = 0
consonants = 0

for i in str1:
    if(i == 'a' or i == 'e' or i == 'i' or i == 'o' or i == 'u'
       or i == 'A' or i == 'E' or i == 'I' or i == 'O' or i == 'U'):
        vowels = vowels + 1
    else:
        consonants = consonants + 1

print("Total Number of Vowels in this String = ", vowels)
print("Total Number of Consonants in this String = ", consonants)
```

Python Count Vowels and Consonants

Q 20) Write a program to print number of factors and to print nth factor of the given number.

Sample Input:
Given Number: 100
N = 4
Sample Output:
Number of factors = 9
4th factor of 100 = 5
Test Cases:
1.Given Number = 512 , N = 6
2.Given Number = 343 , N = 7
3.Given Number = 1024 , N = 0
4.Given Number = -6561 , N = 3
5.Given Number = 0 , N = 2

Program:

```
def print_factors(x):
   print("The factors of",x,"are:")
   for i in range(1, x + 1):
       if x % i == 0:
           print(i)

num = 320

print_factors(num)
```

Q 21) Write a program to print symbol pattern?

Get the symbol from user and choices from the user.
Choices:
Pattern Type: Hollow or Full
Pattern Size: Square or Rectangle

Program

```
def print_rectangle(n, m) :

        for i in range(1, n+1) :
                for j in range(1, m+1) :
                        if (i == 1 or i == n or
                                j == 1 or j == m) :
```

```
                print("*", end="")
            else :
                print(" ", end="")

        print()

rows = 6
columns = 20
print_rectangle(rows, columns)
```

Q 22) Write a program to print unique permutations of a given number

Sample Input:
Given Number: 143
Sample Output:
Permutations are:
134
143
314
341
413
431
Test cases:
1. 0
2. 111
3. 505
4. -143
5. -598

Program

```
def permute(s, answer):
    if (len(s) == 0):
        print(answer, end = "  ")
        return
    for i in range(len(s)):
        ch = s[i]
        left_substr = s[0:i]
        right_substr = s[i + 1:]
        rest = left_substr + right_substr
        permute(rest, answer + ch)
answer = ""
s = input("Enter the string : ")
print("All possible strings are : ")
permute(s, answer)
```

Q 23) Write a program to print consonants and vowels separately in the given word

Sample Input:
Given Word: Engineering
Sample Output:
Consonants: n g n r n g
Vowels: e i e e i
Test cases:
1.TRY
2.MEDIAN
3.ONE
4.KNOWLEDGE
5.EDUCATION

Program

```
str=input("enter any string:")
vow='aeiouAEIOU'
print("vowels in the entered string:\n")
for i in str:
    if i in vow:
      print(i)
print("\nconsonants in the entered string:\n")
for i in str:
    if i not in vow:
      print(i)
```

Q 24) Python Program to Create a List of Tuples with the First Element as the Number and Second Element as the Square of the Number.

Sample Input:
Enter the lower range:45
Enter the upper range:49
Sample Output:
[(45, 2025), (46, 2116), (47, 2209), (48, 2304), (49, 2401)]
Test case:
1.Enter lower range: 50
Enter upper range: 100
2.Enter lower range: 5
Enter upper range: 8
3.Enter lower range: 10
Enter upper range: 5
4.Enter lower range: 500
Enter upper range: 500
5.Enter lower range: 0
Enter upper range: -100

Program

```
l1=[] n1=int(input("enter a lower number:"))
n2=int(input("enter a upper number:"))
for i in range(n1,n2):
    s=(n1,n1**2)
  l1.append(s)
n1=n1+1
 n2=n2+1
print(l1)
```

Q 25) Write a program to print the Fibonacci series.

Sample Input:
Enter the n value: 6
Sample Output:
0 1 1 2 3 5

Test Condition: Implement negative Fibonacci series

Program

```
n1=0
n2=1
n3=int(input("enter a number"))
print(n1) print(n2) for i in range (1,n3-1):
   n3=n1+n2
   print(n3)
```

```
n1=n2
n2=n3
```

Q 26) Write a program to print the below pattern

1
2 2
3 3 3
4 4 4 4

Program

```
n=int (input("enter number of rows needed:"))
for i in range (n):
        for j in range (i+1):
                print (i+1,end="  ")
                print()
```

Q 27) Write a program to find the square, cube of the given decimal number

Sample Input:

Given Number: 0.6
Sample Output:
Square Number: 0.36
Cube Number:0.216
Test cases:
1. 12
2. 0
3. -0.5
4. 14.25
5. -296

Program

```
n=float(input("enter the number "))
a=n*n
x=n*n*n
print ("square of ",n,"is",a)
print ("cube is ",n,"is",x)
```

Q 28) Write a program to convert the Binary to Decimal, Octal

Sample Input:

Given Number: 1101
Sample Output:
Decimal Number: 13 Octal:15
Test cases:
1. 211
2. 11011
3. 22122
4. 111011.011
5. 1010.0101

Program

```
dec = 1101
print("The decimal value of", dec, "is:")
print(bin(dec), "in binary.")
print(oct(dec), "in octal.")
```

Q 29) Python Program to Remove the Duplicate Items from a List Sample Input:

Enter the number of elements in list:7
Enter element1:10
Enter element2:20

Enter element3:20
Enter element4:30
Enter element5:40
Enter element6:40
Enter element7:50
Sample Output:
Non-duplicate items: [10, 20, 30, 40, 50]

Program

```
def Remove(duplicate):
    final_list = []
    for num in duplicate:
        if num not in final_list:
            final_list.append(num)
    return final_list
duplicate = [10,20,20,30,40,40]
print(Remove(duplicate))
```

Q 30) How to generate Negative Fibonacci series?

Program

```
m=int(input("Enter the no. of  terms = "))
x=(input("Enter the positive(1) or negative(0) : "))
n1=0
if(x==1):
        n2=1
else:
        n2=-1
count=0
if(m>1):
        print("fibinoci series upto %d terms= "%m)
        while(count<m):
                print(n1)
                n=n1+n2
                n1=n2
                n2=n
                count+=1
elif(m==1):
        print("fibinoci series upto %d terms = "%m)
        print(n1)
else:
        print("Enter only positive numbers")
```

Q 31) Find the maximum of three integers using looping.
Sample Input:
Given Numbers: 1101, 1011, 1001
Sample Output:
Maximum Number: 1101

Program

```
lst = []
num = int(input('How many numbers: '))
for n in range(num):
    numbers = int(input('Enter number '))
    lst.append(numbers)
print("Maximum element in the list is :", max(lst))
```

Q 32) Write a program to check if a given year is leap year or not. If it is leap year then print the next leap year, if it is non leap year then print the previous leap year.

Sample Input:
Enter Date : 1947 Sample Output:
Given year is Non Leap Year Leap Year: 1944
Test cases:
1. 19.47
2. 1936
3. 0
4. 2000
5. -1428

Program:

```
ann=input("enter anniversary date dd/mm/yyyy")
year=int(ann[-4:])
leap=0
if(year%400==0):
        leap=1
elif(year%4==0 and year%100!=0):
        leap=1
else:
        leap=0
if(leap==1):
        year=year+1
        ann=ann[0:6]+str(year)
        print("anniversary date",ann)
else:
        year=year-1
        ann=ann[0:6]+str(year)
        print("anniversary date",ann)
```

Q 33) Find the nth odd number after n odd number

Sample Input:
N : 4
Sample Output:
4th Odd number after 4 odd numbers = 15
Test cases:
1. N = 0
2. N = -6
3. N = 2021
4. N = -14.5
5. N = -196

Program

```
def nthodd(n):
   return(2*n-1)
n=int(input("enter the Nth number : "))
oddnxt=n+n
print(n,"th Odd number afte ",n," odd numbers",nthodd(oddnxt))
```

Q 34) Write a program to print the below pattern

1
2 2
3 3 3
4 444
3 3 3
2 2
1

Program

```
def printPattern(n):
    # Printing upper part
   for i in range(n+1):
       for j in range(1,i+1):
          print(i,end="")
       print("")
    # printing lower part
   for i in range(n - 1,0,-1):
       for j in range(i,0,-1):
          print(i,end="")
       print("")
# driver code
n = 8
printPattern(n)
```

Q 35) Write a program to print hollow Square Dollar pattern and full rectangle Star Pattern?

Program

```
rows = int(input("Please Enter the Total Number of Rows  : "))
columns = int(input("Please Enter the Total Number of Columns  : "))
print("Hollow Rectangle  Pattern")
for i in range(rows):
   for j in range(columns):
      if(i == 0 or i == rows - 1 or j == 0 or j == columns - 1):
         print('*', end = '  ')
      else:
         print(' ', end = '  ')
   print()
```

Q 36) Write a program to find the sum of digits of N digit number (sum should be single digit)

Sample Input:
Enter N value : 3
Enter 3 digit number: 143
Sample Output:
Sum of 3 digit number: 8
Test cases:
1. N = 2, 158
2. N = 3, 14
3. N = 4, 0148
4. N = 1, 0004
5. N = 4, 7263

Program

```
while True:
 try:
 s=int(input("Enter the size of the number:"))
 n=int(input("Enter the number:"))
 l=len(str(n))
 if(l!=s):
 print("Enter a equal number in size")
else:
 s1=0
 while(n>0):
 dig=n%10
```

```
s1=s1+dig
n=n//10
print("The sum of the digits is:",s1)
except ValueError:
print("Enter a valid input")
continue
else:
break
```

Q 37) Write a program to find the square root of a perfect square number(print both the positive and negative values)

Sample Input:
Enter the number : 6561
Sample Output:
Square Root: 81, -81
Test cases:
1. 1225
2. 9801
3. 1827
4. -100
5. 0

Program

```
while True:
 try:
 n=int(input("Enter the number:"))
 if(n<0):
 print("Enter a valid number")
 break
 else:
 sqrt=n**0.5
 print("square root:",sqrt,-sqrt)
 except ValueError:
 print("Enter only numbers")
 continue
 else:
 break
```

Q 38) Write a program for matrix multiplication?

Sample Input:

Mat1 = 1 2
5 3
Mat2 = 2 3
4 1
Sample Output:
Mat Sum = 10 5
22 18

Program

```
m=int(input("Enter the row for matrix 1:"))
n=int(input("Enter the coloumn for matrix 1:"))
p=int(input("Enter the row for matrix 2:"))
q=int(input("Enter the coloumn for matrix 2:"))
if n!=p:
 print("enter a valid order")
else:
 mat1=[]
 for i in range(0,m):
 mat1.append([])
```

```
for i in range(0,m):
for j in range(0,n):
mat1[i].append(j)
mat1[i][j]=0
print("\nenter element:",i+1,j+1)
mat1[i][j]=int(input("Enter the 1st matrix elements:"))
print(mat1)
mat2=[]
for i in range(0,p):
mat2.append([])
for i in range(0,p):
for j in range(0,q):
mat2[i].append(j)
mat2[i][j]=0
print("\nenter element:",i+1,j+1)
mat2[i][j]=int(input("Enter the 2nd matrix elements:"))
print(mat2)
res=[]
for i in range(0,m):
res.append([])
for i in range(0,m):
for j in range(0,q):
res[i].append(j)
res[i][j]=0
for p in range(len(mat1)):
for q in range(len(mat2[0])):
for r in range(len(mat2)):
res[p][q]+=mat1[p][r]*mat2[r][q]
print("product of the matrices:\n",res)
```

Q 39) Write a program to print inverted pyramid pattern.

Program

```
rows = int(input("Enter number of rows: "))
for i in range(rows, 1, -1):
    for space in range(0, rows-i):
        print("  ", end="")
    for j in range(i, 2*i-1):
        print("* ", end="")
    for j in range(1, i-1):
        print("* ", end="")
    print()
```

Q 40) Write a program to reverse an array

Sample Input;:

Array of elements = {16, 18, 27, 16, 23, 21, 19}

Sample Output:

Reverse Array elements = {19, 21 23, 16, 27, 18, 16}

Test cases:

1.Array of elements = {26, 28, 37, 26, 33, 31, 29}

2. Array of elements = {1.6, 1.8, 2.7, 1.6, 2.3, 2.1, .19}

3. Array of elements = {0, 160, 180, 270, 160, 230, 210, 190, 0}

4. Array of elements = {200, 180, 180, 270, 270, 270, 190, 200}

5. Array of elements = {100, 100, 100, 100, 100, 100, 100, 100}

Program

```
def reverseList(A, start, end):
while start < end:
 A[start], A[end] = A[end], A[start]
```

```
 start +=
end -= 1
A = [1, 2, 3, 4, 5, 6]
print(A)
reverseList(A, 0, 5)
print("Reversed list is")
print(A)
```

Q 41) Write a program to find the given number is Harshad number or not . Note: Harshad number means an integer that is divisible by the sum of its digits when written in that base

Sample Input:
Enter the number : 21 Sample Output:
Given number is Harshad number Test cases:
1. 6804
2. 378
3. 111
4. 0
5. 145.678

Program

```
num = 145.678
rem = sum = 0;
n = num;
while(num > 0):
 rem = num%10;
 sum = sum + rem;
 num = num//10;
if(n%sum == 0):
 print(str(n) + " is a harshad number");
else:
 print(str(n) + " is not a harshad number");
```

Q 42) Write a program to count all the prime and composite numbers entered by the user.

Sample Input:
Enter the numbers
4, 54, 29, 71, 7, 59, 98, 23
Sample Output:
Composite number:3 Prime number:5
Test cases:
1. 33, 41, 52, 61,73,90
2.TEN, FIFTY, SIXTY-ONE, SEVENTY-SEVEN, NINE 3. 45, 87, 09, 5.0 ,2.3, 0.4
4. -54, -76, -97, -23, -33, -98
5. 45, 73, 00, 50, 67, 44

Program

```
num = int(input("Enter any number : "))
if num > 1:
   for i in range(2, num):
      if (num % i) == 0:
         print(num, "is NOT a prime number")
         break
   else:
      print(num, "is a PRIME number")
elif num == 0 or 1:
   print(num, "is a neither prime NOR composite number")
else:
   print(num, "is NOT a prime number it is a COMPOSITE number")
```

Q 43) Write a program to find whether the person is eligible for vote or not. And if that particular person is not eligible, then print how many years are left to be eligible.

Sample Input:
Enter your age:
7
Sample output:
You are allowed to vote after 11 years

Test cases: 1. 25
2. Eighteen 3. 12
4. -18
5. 14.5

Program

```
 age=int(input("enter age:"))
if age>=18:
        print("eligible for voting")
else:
        a=18-age
        print(a,"years left to be eligible to vote")
```

Q 44) Write a program to arrange the letters of the word alphabetically in Normal order and reverse order

Sample Input:
Enter the word : MOSQUE Sample Output:
Alphabetical Order Normal: E M O Q S U Alphabetical Order Reverse: U S Q O M E Test Case:
1.SAPONIFICATION
2.MEMORANDUM
3.DISTRIBUTION
4.SATISFACTION
5.PROPAGATION

Program

```
def wordReverse(str):
    i = len(str)-1
    start = end = i+1
    result = ''
    while i >= 0:
        if str[i] == ' ':
            start = i+1
            while start != end:
                result += str[start]
                start += 1
            result += ' '
            end = i
        i -= 1
    start = 0
    while start != end:
        result += str[start]
        start += 1
    return result
str = 'I AM A GEEK'
print(wordReverse(str))
```

Q 45) Write a program to find whether the person is eligible for vote or not. And if that particular person is not eligible, then print how many years are left to be eligible.

Sample Input:
Enter your age:

7
Sample output:
You are allowed to vote after 11 years Test cases:
1. 52
2. Eighteen 3. 12
4. -18
5. 14.5

Program

```
age=int(input("enter age:"))
if age>=18:
        print("eligible for voting")
else:
        a=18-age
        print(a,"years left to be eligible to vote")
```

Q 46) Write a program to print the total amount available in the ATM machine with the conditions applied. Total denominations are 2000, 500, 200, 100, get the denomination priority from the user and the total number of notes from the user to display the total available balance to the user

Sample Input:
Enter the 1st Denomination: 500
Enter the 1st Denomination number of notes: 4 Enter the 2nd Denomination: 100
Enter the 2nd Denomination number of notes: 20 Enter the 3rd Denomination: 200
Enter the 3rd Denomination number of notes: 32 Enter the 4th Denomination: 2000
Enter the 4th Denomination number of notes: 1 Sample Output:
Total Available Balance in ATM: 12400

Test Cases:
5 Hidden Test cases (Think Accordingly based on Denominations)

Program

```
 n=int(input('enter the 1st demonstration='))
x=int(input('enter the no.of notes'))
e=n*x
z=int(input('enter the 2nd demonstration :'))
y=int(input('enter the no.of notes :'))
r=z*y
a=int(input('enter the 3rd demonstration :'))
c=int(input('enter the no.of notes ;'))
f=a*c
v=e+r+f
print('the total available balance =',v)
```

Q 47) Write a program to Print M multiples of N number

Sample Input:
M = 6
N = 3
Sample Output:
6 multiples of 3: 3, 6, 9, 12, 15, 18 Test cases:
1. M = 0, N = 5
2. M = 5, N = 0
3. M = -5, N = 4
4. M = A, N = 10
5. M = 3, N = P

Program

```
M,N multiples
def multiple(m,n):
        a=range(n,(m*n)+1,n)
        print(*a)
```

```
m=int(input("Enter M value"))
n=int(input("Enter N value"))
multiple(m,n)
```

Q 48) Write a program to print the following pattern, get the number of rows from user

```
1
+1      -1
1       -2      1
1       -3      3       -1
```

Program

```
rows = int(input("Enter number of rows: "))
coef = 1
for i in range(1, rows+1):
    for space in range(1, rows-i+1):
        print(" ",end="")
    for j in range(0, i):
        if j==0 or i==0:
            coef = 1
        else:
            coef = coef * (i - j)//j
        print(coef, end = " ")
    print()
```

Q 49) Find the LCM and GCD of n numbers?

Sample Input:

N value = 2 Number 1 = 16
Number 2 = 20 Sample Output: LCM = 80
GCD = 4
Test cases:
1. N = 3, {12, 25, 30}
2. N = 2, {52, 25, 63}
3. N = 3, {17, 19, 11}
4. N = -2, {52, 60}
5. N = 2, {30, 45}

Program

```
def compute_hcf(x, y):
    if x > y:
        smaller = y
    else:
        smaller = x
    for i in range(1, smaller+1):
        if((x % i == 0) and (y % i == 0)):
            hcf = i
    return hcf
num1 = int(input("Enter the value"))
num2 = int(input("Enter the value"))
print("The H.C.F. is", compute_hcf(num1, num2))
```

LCM

```
def compute_lcm(x, y):
   if x > y:
       greater = x
   else:
       greater = y
   while(True):
       if((greater % x == 0) and (greater % y == 0)):
           lcm = greater
```

```
            break
        greater += 1
    return lcm
num1 = int(input("Enter the value"))
num2 = int(input("Enter the value"))
print("The L.C.M. is", compute_lcm(num1, num2))
```

Q 50) Write a program to find the Non composite number in the array of numbers
Sample Input:
Array of elements = {26, 28, 47, 26, 43, 51, 29}
Sample Output:
Prime numbers in Array elements = {47, 43, 29}
Test cases:
1.Array of elements = {26, 28, 37, 26, 33, 31, 29}
2. Array of elements = {1.6, 1.8, 2.7, 1.6, 2.3, 2.1, .19}
3. Array of elements = {0, 160, 180, 270, 160, 230, 210, 190, 0}
4.Array of elements = {20, 18, 18, 27, 27, 27, 190, 20}
5. Array of elements = {100, 100, 100, 100, 100, 100, 100, 100}
Program

```
import array as arr
a = int(input("enter the array elements ")) l=[]
a.append(l)
print("Prime numbers are :", end=" ")
for i in a:
num = i
j= 2
f= 1
while j < num:
if num % j == 0: f= 0
break j= j+ 1
if f == 1:
print(num, end=" ")
```

Q 51) Write a program using function to calculate the simple interest. Suppose the customer is a senior citizen. She is being offered 15 percent rate of interest; he is being offered 12 percent rate of interest for all other customers, the ROI is 10 percent.

Sample Input:
Enter the principal amount: 200000
Enter the no of years: 3
Gender (m/f): m
Is customer senior citizen (y/n): n
Sample Output:
Interest: 60000
Test Cases:
1.Principal: 2000 , Years: 0, Gender: m, Senior: y
2.Principal: 20000 , Years: -2 , Gender: f, Senior: y
3.Principal: -2000 , Years: 2, Gender: m, Senior: n
4.Principal: 2 , Years: 2000, Gender: k, Senior: y
5.Principal: 1000 , Years: 5, Gender: f, Senior: s

Program

```
amount=float(input(" enter the principle amount :")) time=float(input(" enter the no of years :")) rate=input(" is the customer is senior citizen (y/n): ") if rate==("y"):
rate=12
```

```
elif rate==("n"):
rate=10 else:
print(" enter y or n :") SI=(amount*rate*time)/100
print("simple interst",SI) while True:
try:
choice=int(input("enter the choice :")) if (choice==1):
s=input("enter the string :") if len(s)==1:
print(" the string is not a palindrome ") elif s==s[::-1]:
print("the string is a palindrome ") else :
print(" the string is not a palindrome ") elif(choice==2):
n=input(" enter the number ") rev_num=n[::-1]
if n==rev_num:
print(" the number is a palindrome ",) else:
print("the number is not a palindrome",) else:
print("enter a valid choice ") except ValueError:
print("enter a valid input") continue
```

Q 52) Write a program to print number of factors and to print nth factor of the given number.

Sample Input:
Given Number: 100
N = 4
Sample Output:
Number of factors = 9
4th factor of 100 = 5
Test Cases:
1.Given Number = 512 , N = 6
2.Given Number = 343 , N = 7
3.Given Number = 1024 , N = 0
4.Given Number = -6561 , N = 3
5.Given Number = 0 , N = 2

Program

```
n = int(input(" enter the number :-")) l1=[]
print("factors of ",n,"are :")
for i in range (1,n+1):
if(n % i) == 0 :
l1.append(i)
print(l1)
m=int(input(" enter the mth number :-")) print(l1[m-1])
if m>len(l1):
print("entered out of range ")
```

Q 53) Write a program to print the number of Odd numbers and number of even numbers in between the limit M and N?

Sample Input:
M = 60
N = 300
Sample Output:
Number of Odd Numbers = 120
Number of Even Numbers = 119
Test cases:
1. M = 100, N = 100
2. M = 500, N = 100
3. M = -5, N = 4
4. M = A, N = 6
5. M = 12, N = -12

Program

```
while True:
 try:
    m=int(input("Enter the value of m:"))
    n=int(input("Enter the value of n:"))
    odd=0
    even=0
    for i in range(m,n):
       if i%2==0:
         even=even+1
    else:
       odd=odd+1
    print("The no.of even numbers:",even-1)
    print("The no.of odd numbers:",odd)
 except ValueError:
    print("Enter only numbers")
    continue
 else:
    break
```

Q 54) Write a program to print numbers from A to B but except the digit C?

Sample Input:
A = 60
B = 70
C = 3
Sample Output:
Numbers are = 60, 61, 62, 64, 65, 66, 67, 68, 69, 70
Test cases:
1. A = 200, B = 200, C = 5
2. A = 100, B = 200, C = 0
3. A = -100, B = 100, C = 5
4. A = 1073, B = 1075, C = 4
5. A = 444, B = 499, C = 4

Program

```
while True:
 try:
   p=int(input("Enter value of p:"))
   q=int(input("Enter value of q:"))
   n=int(input("Enter value of n:"))
   for i in range(p,q+1):
     d=i%10
     if d!=n:
        print(i)
 except ValueError:
    print("Enter only numbers")
    continue
 else:
    break
```

Q 55) Write a program to print rectangle symbol pattern with the following condition. Get the number of row and column from the user

Rectangle Pattern: Hollow or Full
Symbol: #

Program

```
r=int(input("Enter the Total Number of Rows : "))
c= int(input("Enter the Total Number of Columns : "))
for i in range(r):
 for j in range(c):
 print('*', end = ' ')
 print()
```

Q 56) Write a program to calculate tax given the following conditions:
a.If income is less than or equal to 1,50,000 then no tax
b.If taxable income is 1,50,001 – 3,00,000 then charge 10% tax for the remaining slab
c.If taxable income is 3,00,001 – 5,00,000 then charge 20% tax for the remaining slab
d.If taxable income is above 5,00,001 then charge 30% tax for the remaining slab
Sample Input:
Enter the income: 200000
Sample Output:
Tax= 5000
Test cases:
1. 400700
2. 2789239
3. 150000
4. 00000
5. -125486

Program

```
while True:
  try:
    income=float(input("Enter the income:"))
  except ValueError:
    print("String is not allowed please enter valid data")

  else :
   if income<=150000:
     tax=0
   elif income<=300000:
     tax=(income-150000)*10/100
   elif income<=500000:
     tax=150000*10/100+(income-300000)*20/100
   else:
     tax=150000*10/100+200000*20/100+(income-500000)*30/100
     print(tax)
```

Q 57) Write a program to print the all Odd numbers and even numbers in between M and N?
Sample Input:
M = 6
N = 15
Sample Output:
All Odd Numbers = 7,9,11,13
All Even Numbers = 8,10,12,14
Test cases:
1. M = 100, N = 100
2. M = 500, N = 100
3. M = -5, N = 4
4. M = 72, N = -72
5. M = 0, N = 0

Program

```
m=int(input("enter m value:"))
n=int(input("enter n value:"))
if m==0:
 if n==0:
   print("no even numbers or odd numbers")
else:
   print("even numbers:")
   for i in range(m,n):
     if i%2==0:
       print(i)
   print("odd numbers:")
   for i in range(m,n):
     if i%2!=0:
       print(i)
```

Q 58) Write a program to print vowels and consonants from the given word in alphabetical order and print which is maximum, if both vowel count and consonant count is equal then prints Equal?

Sample Input:
Enter the word: EDUCATION
Sample Output:
Vowels in alphabetical order: A, E, I, O, U
Consonants in alphabetical order: C, D, N, T
Maximum Count: Vowels
Test cases:
1.HYPOTHECATION
2.MATRICULATION
3.MANIPULATION
4.SEDIMENTATION
5.EXPERIMENTATION

Program

```
str=input("enter any string:")
vow='aeiouAEIOU'
print("vowels in the entered string:\n")
for i in str:
 if i in vow:
   print(i)
print("\nconsonants in the entered string:\n")
for i in str:
 if i not in vow:
   print(i)
def fact(n):
 if n==1:
  return n
 else:
   return n*fact(n-1)
i=int(input("enter anumber"))
print(fact(i))
```

Q 59) Write a program to print square symbol pattern with the following condition. Get the number of row and column from the user

Square Pattern: Hollow or Full
Symbol: &

Program

```
rows = int(input("Enter Number of Rows : "))
columns = int(input("Enter Number of Columns : "))
print("Rectangle Star Pattern")
for i in range(rows):
 for j in range(columns):
    print('*', end = ' ')
 print()
```

Q 60) Write a program to print all the composite numbers between a and b?
Sample Input:
A = 12
B = 19
Sample Output 14, 15, 16, 18
Test cases:
1. A = 11, B = 11
2. A = 20, B = 10
3. A = 0, B = 0
4. A = -5, B = 5
5. A = 7, B = -12

Program

```
m=int(input('Enter m: '))
n=int(input('Enter n: '))
for number in range(m,n+1):
    factor=0
    for i in range(1,number):
      if number%i==0:
        factor=i
    if factor>1:
      print (number)
```

Q 61) Write a program to arrange the digits of the number in ascending or descending, get the choice from user.{Note: A - Ascending, D - Descending , B - Both}
Sample Input:
Enter the number : 6581
Enter your choice (A/D/B): B
Sample Output:
Ascending order = 1 5 6 8
Descending order = 8 6 5 1
Test cases:
1. 12121212
2. 12345678
3. 98784565
4.ADSSDDR
5.JK78SD98

Program

```
b= [6,5,8,1]
b.sort(reverse = True)
print(b)
a=[6,5,8,1]
a.sort()
print(a)
```

Q 62) Write a program to print the number of negative numbers in the list of numbers
Sample Input:
List of elements = {16, -18, 27, -16, 23, -21, 19}
Sample Output:
Number of negative numbers in List of elements = 3
Test cases:
1. List of elements = {-26, 28, 37, -26, 33, -31, -29}
2. List of elements = {1.6, 1.8, 2.7, -1.6, 2.3, -2.1, .19}
3. List of elements = {0, 160, 180, 270, 160, 230, 210, 190, 0}
4. List of elements = {-16, 2.8, -7, -1.5, 2.8, -2.8, -.19}
5. List of elements = {-160, -160, -180, -270, -160, -230, -210, 1-90, 0}

Program

```
list1 = [16,-18,27,-16,23,-21,19]
for num in list1:
        if num < 0:
                print(num, end = " ")
```

Q 63) Write a program to print the Inverted Full Pyramid pattern?

Program

```
row = int(input('Enter number of rows required: '))
for i in range(row,0,-1):
    for j in range(row-i):
        print(' ', end='')

    for j in range(2*i-1):
        print('*',end='')
    print()
```

Q 64) Write a program to read a character until a * is encountered. Also count the number of uppercase, lowercase, and numbers entered by the users.
Sample Input:
Enter * to exit…
Enter any character: W
Enter any character: d
Enter any character: A
Enter any character: G
Enter any character: g
Enter any character: H
Enter any character: *
Sample Output:
Total count of lower case:2
Total count of upper case:4
Total count of numbers =0
Test cases:
1. 1,7,6,9,5
2. S, Q, l, K,7, j, M
3. M, j, L, &, @, G 4. D, K, I, 6, L, *
5. *, K, A, e, 1, 8, %, *

Program

```
row = int(input('Enter number of rows required: '))
for i in range(row,0,-1):
```

```
    for j in range(row-i):
        print(' ', end='')
        for j in range(2*i-1):
        print('*',end='')
    print()
```

Q 65) Write a program to reverse a word using loop? (Not to use inbuilt functions)
Sample Input:
String: TEMPLE Sample Output:
Reverse String: ELPMET Test cases:
1. SIGN UP
2. AT-LEAST 3. 1245
4. !@#$%
5. 145*999=144855

Program

```
def reverse_string(str):
    str1 = ""
    for i in str:
        str1 = i + str1
    return str1
str = "TEMPLE"
print("The original string is: ",str)
print("The reverse string is",reverse_string(str))
```

Q 66) Write a program to check the entered user name is valid or not. Get both the inputs from the user.
Sample Input:
Enter the user name: College@786 Reenter the user name: Saveetha@786
Sample Output:
User name is Invalid

Program

```
import re
password = "R@m@_f0rtu9e$"
flag = 0
while True:
    if (len(password)<8):
        flag = -1
       break
    elif not re.search("[a-z]", password):
        flag = -1
        break
    elif not re.search("[A-Z]", password):
        flag = -1
        break
   elif not re.search("[0-9]", password):
        flag = -1
        break
    elif not re.search("[_@$]", password):
        flag = -1
        break
   elif re.search("\s", password):
        flag = -1
        break
    else:
       flag = 0
        print("Valid Password")
```

```
        break
if flag ==-1:
    print("Not a Valid Password")
```

Q 67) Find the Mth maximum number and Nth minimum number in an array and then find the sum of it, difference of it and product of it.

Sample Input:
Array of elements = {14, 16, 87, 36, 25, 89, 34}
M = 1
N = 3
Sample Output:
1st Maximum Number = 89 3rd Minimum Number = 25 Sum = 114
Difference = 64
Product = 2225 Test cases:
1. {16, 16, 16 16, 16}, M = 0, N = 1
2. {0, 0, 0, 0}, M = 1, N = 2
3. {-12, -78, -35, -42, -85}, M = 3 , N = 3
4. {15, 19, 34, 56, 12}, M = 6 , N = 3
5. {85, 45, 65, 75, 95}, M = 5 , N = 7

Program

```
def getMin(arr, n):
    res = arr[0]
    for i in range(1, n):
        res = min(res, arr[i])
    return res

# Function to find maximum element
def getMax(arr, n):
    res = arr[0]
    for i in range(1, n):
        res = max(res, arr[i])
    return res

# Function to get Sum
def findSum(arr, n):
    min = getMin(arr, n)
    max = getMax(arr, n)

    return min + max

# Function to get product
def findProduct(arr, n):
    min = getMin(arr, n)
    max = getMax(arr, n)

    return min * max

# Driver Code
if _name_ == "_main_":

    arr = [ 12, 1234, 45, 67, 1 ]
    n = len(arr)

    # Sum of min and max element
    print("Sum = " , findSum(arr, n))
```

```
# Product of min and max element
print("Product = " , findProduct(arr, n))
```

Q 68) Write a program to reverse a number using loop?(Get the input from user)
Sample Input:
Number: 14567 Sample Output:
Reverse Number: 76541 Test cases:
1. -45721
2. 000
3. AD1947
4. !@#$%
5. 145*999=144855

Program

```
Number = int(input("Please Enter any Number: "))
Reverse = 0.
while(Number > 0):
Reminder = Number %10.
Reverse = (Reverse *10) + Reminder.
Number = Number //10.
print("\n Reverse of entered number is = %d" %Reverse)
```

Q 69) Write a program to find whether the person is eligible for vote or not. If that particular person is not eligible, then print how many years are left to be eligible. If that particular person is eligible then print they are Normal Citizen or Senior Citizen voter.
Sample Input:
Enter your age:
7
Sample output:
You are allowed to vote after 11 years
Test cases:
1. 25
2. Eighteen 3. 72
4. -18
5. 14.5

Program

```
age = int(input("Enter age of a user: "))
if age >= 18:
   print("User is eligible for voting: ", age)
else:
   print("User is not eligible for voting: ", age)
```

Q 70) Write a program to print the total amount available in the ATM machine with the conditions applied. Total denominations are 2000, 500, 200, 100, get the denomination priority from the user and the total number of notes from the user to display the total available balance to the user Sample Input:
Enter the 1st Denomination: 500
Enter the 1st Denomination number of notes: 4 Enter the 2nd Denomination: 100
Enter the 2nd Denomination number of notes: 20 Enter the 3rd Denomination: 200
Enter the 3rd Denomination number of notes: 32 Enter the 4th Denomination: 2000
Enter the 4th Denomination number of notes: 1 Sample Output:
Total Available Balance in ATM: 12400

Test Cases:
5 Hidden Test cases (Think Accordingly based on Denominations)

Program

```
n=int(input('enter the 1st demonstration='))
```

```
x=int(input('enter the no.of notes'))
e=n*x
z=int(input('enter the 2nd demonstration :'))
y=int(input('enter the no.of notes :'))
r=z*y
a=int(input('enter the 3rd demonstration :'))
c=int(input('enter the no.of notes ;'))
f=a*c
v=e+r+f
print('the total available balance =',v)
```

Q 71) Find the LCM and GCD of n numbers? Sample Input:
N value = 2 Number 1 = 16
Number 2 = 20 Sample Output: LCM = 80
GCD = 4
Test cases:
1. N = 3, {12, 25, 30}
2. N = 2, {52, 25, 63}
3. N = 3, {17, 19, 11}
4. N = -2, {52, 60}
5. N = 2, {30, 45}

Program

```
def compute_lcm(x, y):
   if x > y:
      greater = x
   else:
      greater = y
   while(True):
      if((greater % x == 0) and (greater % y == 0)):
         lcm = greater
         break
      greater += 1
   return lcm
num1 = int(input("Enter the value"))
num2 = int(input("Enter the value"))
print("The L.C.M. is", compute_lcm(num1, num2))
def compute_hcf(x, y):
    if x > y:
       smaller = y
    else:
       smaller = x
    for i in range(1, smaller+1):
       if((x % i == 0) and (y % i == 0)):
          hcf = i
    return hcf
num1 = int(input("Enter the value"))
num2 = int(input("Enter the value"))
print("The H.C.F. is", compute_hcf(num1, num2))
```

Q 72) Write a program to print the below pattern?

```
                1
          1     1
          1     2     1
1         3     3     1
1         4     6     4     1
```

Program

```
rows = int(input("Enter number of rows: "))
coef = 1
for i in range(1, rows+1):
    for space in range(1, rows-i+1):
        print(" ",end="")
    for j in range(0, i):
        if j==0 or i==0:
            coef = 1
        else:
            coef = coef * (i - j)//j
        print(coef, end = " ")
    print()
```

Q 73) Write a program to print the first n perfect numbers. (Hint Perfect number means a positive integer that is equal to the sum of its proper divisors)

Sample Input:
N = 3
Sample Output:
First 3 perfect numbers are: 6 , 28 , 496
Test Cases:
1. N = 0
2. N = 5
3. N = -2
4. N = -5
5. N = 0.2

Program

```
n=int(input("Enter the value of N : "))
count=0
a=1;
while count<=n:
    sum=0
    for b in range (1,(a//2)+1):
        if a%b==0:
            sum=sum+b
    if sum==a:
        print(a ,end=' ')
        count+=1
    a+=1
```

Q 74) A Pythagorean triplet is a set of three integers a, b and c such that a2+ b2= c2. Given a limit, generate all Pythagorean Triples with values smaller than given limit?
Program

```
class PythagoreanTriplets:
    def _init_(self, limit):
        self.limit = limit

    def generate(self):
        for m in range(self.limit):
            for n in range(1, m+1):
                a = m*m - n*n
                b = 2*m*n
                c = m*m + n*n
```

```
            if (c > self.limit or a > self.limit or b > self.limit):
                break
            if (a == 0 or b == 0 or c == 0):
                break
            print(a, b, c)

def main():
    limit = int(input("Enter upper limit of range for Pythagorean triplets: "))
    obj = PythagoreanTriplets(limit)
    obj.generate()
    if _name_ == "_main_":
    main()
```

Q 75) Write a program using function to calculate the simple interest. Suppose the customer is a senior citizen. He is being offered 12 percent rate of interest; for all other customers, the ROI is 10 percent.

Sample Input:
Enter the principal amount: 200000 Enter the no of years: 3
Is customer senior citizen (y/n): n Sample Output:
Interest: 60000 Test Cases:
1.Principal: 2000 , Years: 0
2.Principal: 20000 , Years: -2
3.Principal: -2000 , Years: 2
4.Principal: 2 , Years: 2000
5.Principal: 0 , Years: 5

Program

```
Simple interest
principle=float(input("Enter the principle amount:"))
time=int(input("Enter the time(years):"))
rate=float(input("Enter the rate:"))
simple_interest=(principle*time*rate)/100
print("The simple interest is:",simple_interest)
```

Q 76) Write a program to print hollow square symbol pattern? Get the symbol and Square size as input from the user

Program

```
def print_rectangle(n, m) :
    for i in range(1, n+1) :
        for j in range(1, m+1) :
            if (i == 1 or i == n or
                j == 1 or j == m) :
                print("*", end="")
            else :
                print(" ", end="")
        print()
rows = 10
columns = 20
print_rectangle(rows, columns)
```

Q 77) Write a program to print the first n perfect numbers. (Hint Perfect number means a positive integer that is equal to the sum of its proper divisors)

Sample Input:
N = 3
Sample Output:

First 3 perfect numbers are: 6 , 28 , 496
Test Cases:
6. N = 0
7. N = 5
8. N = -2
9. N = -5
10. N = 0.2

Program

```
start = int(input("Enter the starting number of the range"))
end = int(input("Enter the ending number of the range"))
 for n in range(start, end+1):
    sum = 0
    for i in range(1, n):
        if n%i == 0:
            sum += i
    #print(n, sum)
    if n == sum:
        print(n)
```

Q 78) Write a program to print square star and rectangle dollar pattern? Get the number of rows and columns from the user.

Program

```
rows = int(input("Please Enter the Total Number of Rows  : "))
columns = int(input("Please Enter the Total Number of Columns  : "))
print("Hollow Rectangle  Pattern")
for i in range(rows):
    for j in range(columns):
        if(i == 0 or i == rows - 1 or j == 0 or j == columns - 1):
            print('*', end = '  ')
        else:
            print(' ', end = '  ')
    print()
```

Q 79) Write a program to print rectangle symbol pattern.
Get the symbol and rectangle size as input from user, get the choice from the user for the pattern hollow rectangle or full rectangle.

Program

```
rows = int(input("Please Enter the Total Number of Rows  : "))
columns = int(input("Please Enter the Total Number of Columns  : "))
print("Hollow Rectangle  Pattern")
for i in range(rows):
    for j in range(columns):
        if(i == 0 or i == rows - 1 or j == 0 or j == columns - 1):
            print('*', end = '  ')
        else:
            print(' ', end = '  ')
    print()
```

Q 80) Write a program to calculate tax given the following conditions:
a.If income is less than or equal to 1,50,000 then no tax[1,50,000 – Basic Slab]
b.If taxable income is 1,50,001 – 3,00,000 then charge 5% tax for basic slab then charge 10% tax for the balance amount
c.If taxable income is 3,00,001 – 5,00,000 then charge 5% tax for basic slab then charge 20% tax for the balance amount

d.If taxable income is above 5,00,001 then charge5% tax for basic slab then charge 30% tax for the balance amount

Sample Input:
Enter the income:200000 Sample Output:
Tax= 12500
Test cases:
1. 400700
2. 2789239
3. 150000
4. 00000
5. -125486

Program

```
while True:
  try:
    income=float(input("Enter the income:"))
  except ValueError:
    print("String is not allowed please enter valid data")

  else :
   if income<=150000:
     tax=0
   elif income<=300000:
     tax=(income-150000)*10/100
   elif income<=500000:
     tax=150000*10/100+(income-300000)*20/100
   else:
     tax=150000*10/100+200000*20/100+(income-500000)*30/100
     print(tax)
```

Q 81) Write a program that would sort a list of names in alphabetical order Ascending or Descending, choice get from the user?
Sample Input:
Banana Carrot Radish Apple Jack
Order(A/D) : A
Sample Output:
Apple Banana Carrot Jack Radish
Program

```
name=[“Banana” ,”Carrot”,”Radish”,”Apple”,”Jack”]
name.sort()
Print(name)
```

Q 82) Write a program for matrix multiplication?
Sample Input:
Mat1 = 1 2
5 3
Mat2 = 2 3
4 1
Sample Output:
Mat Sum = 10 5
22 18

n=int(input("Enter the coloumn for matrix 1:")) p=int(input("Enter the row for matrix 2:")) q=int(input("Enter the coloumn for matrix 2:")) if n!=p:

```
print("enter a valid order") else:
mat1=[]
for i in range(0,m):
mat1.append([]) for i in range(0,m):
for j in range(0,n):
mat1[i].append(j)
mat1[i][j]=0
print("\nenter element:",i+1,j+1) mat1[i][j]=int(input("Enter the 1st matrix elements:"))
print(mat1) mat2=[]
for i in range(0,p):
mat2.append([]) for i in range(0,p):
for j in range(0,q): mat2[i].append(j) mat2[i][j]=0
print("\nenter element:",i+1,j+1)
mat2[i][j]=int(input("Enter the 2nd matrix elements:")) print(mat2)
res=[]
for i in range(0,m):
res.append([]) for i in range(0,m):
for j in range(0,q): res[i].append(j) res[i][j]=0
for p in range(len(mat1)):
for q in range(len(mat2[0])):
for r in range(len(mat2)): res[p][q]+=mat1[p][r]*mat2[r][q]
print("product of the matrices:\n",res)
```

Q 83) Write a program to enter the marks of a student in four subjects. Then calculate the total and aggregate, display the grade obtained by the student. If the student scores an aggregate greater than 75%, then the grade is Distinction. If aggregate is 60>= and <75, then the grade is First Division. If aggregate is 50 >= and <60, then the grade is Second Division. If aggregate is 40>= and <50, then the grade is Third Division. Else the grade is Fail.

Sample Input & Output:
Enter the marks in python: 90
Enter the marks in c programming: 91 Enter the marks in Mathematics: 92 Enter the marks in Physics: 93
Total= 366
Aggregate = 91.5 DISTINCTION
Test cases:
1. 18, 76,93,65
2. 73,78,79,75
3. 98,106,120,95
4. 96,73, -85,95
5. 78,59.8,76,79

Program

```
print("Enter Marks Obtained in 5 Subjects: ")
markOne = int(input())
markTwo = int(input())
markThree = int(input())
markFour = int(input())
markFive = int(input())
tot = markOne+markTwo+markThree+markFour+markFive
avg = tot/5
if avg>=91 and avg<=100:
   print("Your Grade is A1")
elif avg>=81 and avg<91:
   print("Your Grade is A2")
elif avg>=71 and avg<81:
   print("Your Grade is B1")
elif avg>=61 and avg<71:
   print("Your Grade is B2")
elif avg>=51 and avg<61:
```

```
    print("Your Grade is C1")
elif avg>=41 and avg<51:
    print("Your Grade is C2")
elif avg>=33 and avg<41:
    print("Your Grade is D")
elif avg>=21 and avg<33:
    print("Your Grade is E1")
elif avg>=0 and avg<21:
    print("Your Grade is E2")
else:
    print("Invalid Input!")
```

Q 84) Write a program to print the following pattern Sample Input:
Enter the number to be printed: 121 Max Number of time printed: 3 121
121
121121
121121121
121121
121
Program

```
N = int(input("Enter the number of N: "))
  for i in range(N):
    for j in range(0, i + 1):
        print("121", end=" ")
    print(  )
for i in range(1,N):
    for j in range(i,N):
        print("121", end =" ")
    print()
```

Q 85) Write a program using choice to check Case 1: Given Word is palindrome or not
Case 2: Given number is palindrome or not Sample Input:
Case = 1
String = MADAM Sample Output: Palindrome
Test cases:
1.MONEY 2. 5678765
3.MALAY12321ALAM
4.MALAYALAM 5. 1234.4321

Program

```
string= input("Enter string:")
if string == string[::-1]:
    print(string, "is a palindrome")
else:
    print(string, "is not a palindrome")
```