**Date: 10/11/2021**

**Tutorial-2**

**Course Outcome 1 (CO1):**

**Question 1 :**

Write a python program for display future leap years from current year to a final year entered by user.

**Program**

from datetime import date

today = date.today()

y=today.year

x=int(input("Enter the final year : "))

if y > x:

    print("Sorry! Invalid Year ")

else:

    print("Leap years between ", y," and ",x , "  are : " )

    while y <= x:

        if (y % 4) == 0:

            if (y % 100) == 0:

                if (y % 400) == 0:

                    print(y)

            else:

                print(y)

        y += 1

**Output**

Enter the final year: 2045

Leap years between 2021 and 2045 are:

2024

2028

2032

2036

2040

2044

**Question-2**

List comprehensions:

(a) Generate positive list of numbers from a given list of integers

(b) Square of N numbers

(c) Form a list of vowels selected from a given word

(d) List ordinal value of each element of a word (Hint: use ord() to get ordinal values)

**Program 2.a**

#Generate positive list of numbers from a given list of integers

l1=[]

n=int(input("Enter the limit of the list : "))

print("Enter",n," Numbers :")

for l in range(0,n):

    t=int(input())

    l1.append(t)

print("Old list : ",l1)

l2=[i for i in l1 if i>0]

print("New list : ",l2)

**Output**

Enter the limit of the list: 5

Enter 5 Numbers:

3

4

-6

-9

-1

Old list: [3, 4, -6, -9, -1]

New list: [3, 4]

**Program 2.b**

#Square of N numbers

l1=[]

n=int(input("Enter the limit of the list : "))

print("Enter",n," Numbers :")

for l in range(0,n):

    t=int(input())

    l1.append(t)

print("Old list : ",l1)

l2=[i  \*\*2 for i in l1 ]

print("New list : ",l2)

**Output**

Enter the limit of the list: 4

Enter 4 Numbers:

7

3

5

9

Old list: [7, 3, 5, 9]

New list: [49, 9, 25, 81]

**Program 2.c**

w= input("Enter the word : ")

a = ['a', 'e', 'i', 'o', 'u', 'A', 'E', 'I', 'O', 'U']

vl=[i for i in w if i in a]

print("The word is ",w, " and vowels in the word  are :",vl)

**Output**

Enter the word: sruthi

The word is sruthi and vowels in the word are: ['u', 'i']

**Program 2.d**

x = input("Enter the word : ")

b=[ord(i) for i in x]

print(b)

**Output**

Enter the word: sruthi

Word is sruthi and ordinal value of each element is: [115, 114, 117, 116, 104, 105]

**Question-3**

Count the occurrences of each word in a line of text.

**Program**

sen = input("Enter the text :")

w= sen.split(' ')

c = {}

for w in w:

    c[w] = c.get(w, 0) + 1

print("The no: of occurrences of each word in a line of text is :",c)

**Output**

Enter the text: Smallest bird in the world is Humming bird and Humming bird color is blue

The no: of occurrences of each word in a line of text is: {'Smallest': 1, 'bird': 3, 'in': 1, 'the': 1, 'world': 1, 'is': 2, 'Humming': 2, 'and': 1, 'color': 1, 'blue': 1}

**Question-4**

Prompt the user for a list of integers. For all values greater than 100, store ‘over’ instead.

**Program**

lst =  []

y = 1

while y > 0 :

    x = int(input("Enter the number = "))

    if x > 100:

        a = "Over"

    else:

        a = x

    lst.append(a)

    print(lst)

**Output**

Enter the number = 23

[23]

Enter the number = 45

[23, 45]

Enter the number = 304

[23, 45, 'Over']

Enter the number = 801

[23, 45, 'Over', 'Over']

Enter the number = 11

[23, 45, 'Over', 'Over', 11]

Enter the number = 9

[23, 45, 'Over', 'Over', 11, 9]

**Question-5**

Store a list of first names. Count the occurrences of ‘a’ within the list.

**Program**

name=["anu","sujith","sruthi","nadhana","adhidev"]

n=0

for x in name:

  n=n+x.count("a")

print("Number of 'a' in the list : ",name," is :",n)

**Output**

Number of 'a' in the list : ['anu', 'sujith', 'sruthi', 'nadhana', 'adhidev'] is : 5

**Question-6**

Enter 2 lists of integers. Check

(a) Whether list are of same length

(b) Whether list sums to same value

(c) Whether any value occurs in both.

**Program**

lst1 = ['6', '7', '2', '9','4','55','14','100']

lst2 = ['0', '2', '66', '3', '6']

sum1 = str(0)

sum2 = str(0)

if len(lst1) == len(lst2):

    print("Both list are of same length")

else:

    print("Two lists have diffrent  length")

for x in lst1:

    sum1 = sum1 + x

for x in lst2:

    sum2 = sum2 + x

if sum1 == sum2:

    a = "Equal"

else:

**a = "Not Equal"**

print(" Sum of two list are : ", a)

for x in lst1:

    for y in lst2:

        if x == y:

            print(y," Occurs in both list")

**Output**

Two lists have unequal length

Sum of two lists are not equal

2 occurs in both list

3 occurs in both list

**Question-7**

Get a string from an input string where all occurrences of first character replaced with ‘$’, except first character. [eg: onion -> oni$n]

**Program**

str1= input("Enter the string : ")

ch = str1[0]

str1 = str1.replace(ch, '$')

str1 = ch + str1[1:]

print("The new string is : ",str1)

**Output**

Enter the string : elephant

The new string is : el$phant

**Question 8**

Create a string from given string where first and last characters exchanged. [eg: python - > nythop]

**Program**

str1= input("Enter the string : ")

print("The new string is : ",str1[-1:] + str1[1:-1] + str1[:1])

**Output**

Enter the string : hello

The new string is : oellh

**Question 9**

Accept the radius from user and find area of circle.

**Program**

radius = int(input("Enter the radius of circle : "))

print( "Area of Circle :", 3.14 \* radius \* radius ,"square units")

**Output**

Enter the radius of circle: 5

Area of Circle: 78.5 square units

**Question 10**

Find biggest of 3 numbers entered.

**Program**

y = float('-inf')

for x in range (0,3):

    a = int(input("Enter the Number :  "))

    if a > y:

        y = a

print("Biggest number is : ", y)

**Output**

Enter the Number: 4

Enter the Number: 9

Enter the Number: 2

Biggest number is: 9

**Question 11**

Accept a file name from user and print extension of that

**Program**

filename = input("Enter the Filename = ")

extension = filename.split(".")

print ("The extension of the file is : " + repr(extension[-1]))

**Output**

Enter the Filename = tutorial.py

The extension of the file is : 'py'

**Question 12**

Create a list of colors from comma-separated color names entered by user. Display first and last colors.

**Program**

lst = []

for x in range(0,4):

    colour = input("Enter the colour : ")

    lst.append(colour)

print("first and last colors are : ", lst[0], lst[-1] )

**Output**

Enter the colour: red

Enter the colour: blue

Enter the colour: white

Enter the colour: yellow

first and last colors are : red yellow

**Question 13**

Accept an integer n and compute n+nn+nnn.

**Program**

n = int(input("Enter the integer = "))

print("(n + nn + nnn) =", n+n\*n+n\*n\*n)

**Output**

Enter the integer = 4

(n + nn + nnn) = 84

**Question 14**

Print out all colors from color-list1 not contained in color-list2.

**Program**

lst1 = []

lst2 = []

print("Enter the Colours in list 1 : ")

for x in range(1,5):

    a = str(input())

    lst1.append(a)

print("Enter the Colours in list 2 :  ")

for x in range(1,5):

    a = str(input())

    lst2.append(a)

print("List 1 : ",lst1)

print("List 2 : ",lst2)

s1=set(lst1)

s2=set(lst2)

print("The diffrence is : ",s1.difference(s2))

**Output**

Enter the Colours in list 1 :

red

blue

black

green

Enter the Colours in list 2 :

yellow

blue

green

white

List 1 : ['red', 'blue', 'black', 'green']

List 2 : ['yellow', 'blue', 'green', 'white']

The diffrence is : {'black', 'red'}

**Question 15**

Create a single string separated with space from two strings by swapping the character at position 1.

**Program**

s1=input("Enter the first string=")

s2=input("Enter the second string=")

print("The new string is : ",s2[0]+s1[1:]+" "+s1[0]+s2[1:])

**Output**

Enter the first string=hello

Enter the second string=world

The new string is : wello horld

**Question 16**

Sort dictionary in ascending and descending order.

**Program**

d={"jan":31,"feb":28,"march":31,"april":30,"may":31}

print("Ascending Order : ",sorted(d.items()))

print("Descending Order : ", sorted(d.items(),reverse=True))

**Output**

Ascending Order : [('april', 30), ('feb', 28), ('jan', 31), ('march', 31), ('may', 31)]

Descending Order : [('may', 31), ('march', 31), ('jan', 31), ('feb', 28), ('april', 30)]

**Question 17**

Merge two dictionaries.

**Program**

d1={"jan":31,"feb":28,"march":31}

d2={"april":30,"may":31,"jun":30,"july":31}

print("dictionaries 1 : ",d1)

print("dictionaries 2 :",d2)

d1.update(d2)

print("After merging both dictionaries",d1)

**Output**

dictionaries 1 : {'jan': 31, 'feb': 28, 'march': 31}

dictionaries 2 : {'april': 30, 'may': 31, 'jun': 30, 'july': 31}

After merging both dictionaries {'jan': 31, 'feb': 28, 'march': 31, 'april': 30, 'may': 31, 'jun': 30, 'july': 31}

**Question 18**

Find gcd of 2 numbers.

**Program**

from fractions import gcd

num1 = int(input("Enter the First number"))

num2 = int(input("Enter the second number"))

print("GCD (",num1,",",num2,") is : "+str(gcd(num1,num2)))

**Output**

Enter the First number: 60

Enter the second number: 24

GCD ( 60,24 ) is : 12

**Question 19**

From a list of integers, create a list removing even numbers.

**Program**

lst1=[]

lst2=[]

n =int(input("Enter the number of integers : "))

for x in range(0,n):

    y = int(input("Enter the integer : "))

    lst1.append(y)

    if y%2!=0:

        lst2.append(y)

print("List : ",lst1)

print("List without even numbers : ",lst2)

**Output**

Enter the number of integers: 5

Enter the integer: 23

Enter the integer: 34

Enter the integer: 11

Enter the integer: 22

Enter the integer: 23

List : [23, 34, 11, 22, 23]

List without even numbers: [23, 11, 23]

**Course Outcome 2 (CO2)**

**Question 1**

Program to find the factorial of a number

**Program**

n = int(input("Enter a number: "))

fact= 1

if n >= 0:

    if n >= 1:

        for i in range (1, n+1):

            fact = fact \* i

    print("Factorial of ",n , " is : ",fact)

**Output**

Enter a number: 7

Factorial of 7 is: 5040

**Question 2**

Generate Fibonacci series of N terms

**Program**

n=int(input("Enter The Limit:"))

f=0

s=1

if n<=0:

    print("The requested series is",f)

else:

        print(f)

        print(s)

        for x in range(2,n):

            next=f+s

            print(next)

            f=s

            s=next

**Output**

Enter The Limit:9

0

1

1

2

3

5

8

13

21

**Question 3**

Find the sum of all items in a list

**Program**

lst =[]

li = [44,30,1,71,40,91,111]

sum=0

for x in range(0,len(li)):

    sum = sum + li[x]

print("Sum of items in list = ",sum)

**Output**

Sum of items in list = 388

**Question 4**

Generate a list of four digit numbers in a given range with all their digits even and the number is a perfect square.

**Program**

u=int(input("Enter the upper limit="))

l=int(input("Enter the lower limit="))

li=[]

li1=[]

for x in range(l, u + 1):

    if x % 2 == 0:

        li.append(x)

for y in li:

    for z in range(1,y):

          if (z\*z) ==y:

             li1.append(y)

print(li1)

**Output**

Enter the upper limit=6

Enter the lower limit=4

[4]

**Question 5**

Display the given pyramid with step number accepted from user. Eg: N=4

1

2 4

3 6 9

4 8 12 16

**Program**

n = int(input("Enter the range for step pyramid : "))

for i in range(n):

    s = ""

    for j in range(i+1):

        s = s+" "+str((i+1)\*(j+1))

    print(s)

**Output**

Enter the range for step pyramid : 5

1

2 4

3 6 9

4 8 12 16

5 10 15 20 25

**Question 6**

Count the number of characters (character frequency) in a string.

**Program**

word=str(input("Enter the string: "))

freq={}

for letter in word:

    if letter in freq:

        freq[letter]+=1

    else:

        freq[letter]=1

print("The frequency of characters in",word,":",str(freq))

**Output**

Enter the string: malayalam

The frequency of characters in malayalam : {'m': 2, 'a': 4, 'l': 2, 'y': 1}

**Question 7**

Add ‘ing’ at the end of a given string. If it already ends with ‘ing’, then add ‘ly’

**Program**

def add\_str(str1):

    length=len(str1)

    if length>2:

        if str1[-3:]=='ing':

            str1+='ly'

        else:

            str1+='ing'

    return str1

print(add\_str('study'))

print(add\_str('studing'))

**Output**

studying

studingly

**Question 8**

Accept a list of words and return length of longest word.

**Program**

def long\_word(word\_list):

    word\_len=[]

    for word in word\_list:

        word\_len.append((len(word),word))

    word\_len.sort()

    return word\_len[-1][0], word\_len[-1][1]

word=long\_word(["my","name","is","sruthimol biju"])

print("\nThe longest word is: ",word[1])

print("\nand the length of '",word[1],"' is: ",word[0])

**Output**

The longest word is: sruthimol biju

and the length of ' sruthimol biju ' is: 14

**Question 9**

Construct following pattern using nested loop

\*

\* \*

\* \* \*

\* \* \* \*

\* \* \* \* \*

\* \* \* \*

\* \* \*

\* \*

\*

**Program**

rows = int(input("Enter the number of steps required: "))

for i in range(0, rows):

    for j in range(0, i + 1):

        print("\*", end=' ')

    print(" ")

for i in range(rows , 0, -1):

    for j in range(0, i - 1):

        print("\*", end=' ')

    print(" ")

**Output**

Enter the number of steps required: 9

\*

\* \*

\* \* \*

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**Question 10**

Generate all factors of a number.

**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=int(input("Enter the number: "))

print\_factors(num)

**Output**

Enter the number: 8

The factors of 8 are:

1

2

4

8

**Question 11**

Write lambda functions to find area of square, rectangle and triangle.

**Program**

square=lambda a:a\*a

length=int(input("Enter dimension of square:"))

print("Area of square=",square(length))

rectangle=lambda a,b:a\*b

length=int(input("Enter length of rectangle:"))

breadth=int(input("Enter breadth rectangle:"))

print("Area of rectangle=",rectangle(length,breadth))

triangle=lambda b,h:0.5\*b\*h

base=int(input("Enter  length of triangle:"))

height=int(input("Enter height of triangle:"))

print("Area of triangle=",triangle(base,height))

**Output**

Enter dimension of square:4

Area of square= 16

Enter length of rectangle:6

Enter breadth rectangle:3

Area of rectangle= 18

Enter length of triangle:9

Enter height of triangle:2

Area of triangle= 9.0

**Course Outcome 3(CO3):**

**Question 1**

Create a package graphics with modules rectangle, circle and sub-package 3D-graphics with modules cuboid and sphere. Include methods to find area and perimeter of respective figures in each module. Write programs that finds area and perimeter of figures by different importing statements. (Include selective import of modules and import \* statements)

**Program**

Main.py

from graphics.graphics3D import cuboid

from graphics.circle import \*

import graphics.rectangle

from graphics.graphics3D import sphere

l = int(input("Enter the length of cuboid"))

b = int(input("Enter the breath of cuboid"))

h = int(input("Enter the height of cuboid"))

x = int(input("Enter the radius of circle"))

a = int(input("Enter the length of rectangle"))

c = int(input("Enter the breath of rectangle"))

y = int(input("Enter the radius of Sphere"))

print("Area of Rectangle : "+str(graphics.rectangle.getArea(a,c)))

print("Area of Cuboid : "+str(cuboid.getArea(l,b,h)))

print("Area of Circle : "+str(getArea(x)))

print("Perimeter of Cuboid : "+str(cuboid.getPerimeter(l,b,h)))

print("Perimeter of Rectangle : "+str(graphics.rectangle.getPerimeter(a,c)))

print("Perimeter of Circle : "+str(getPerimeter(x)))

print("Area of sphere : "+str(sphere.getArea(y)))

print("Perimeter of sphere : "+str(sphere.getPerimeter(y)))

circle.py

import math

def getPerimeter(radius):

    perimeter = 2\*math.pi\*radius

    return perimeter

def getArea(radius):

    area = math.pi\*radius\*radius

    return area

rectangle.py

def getPerimeter(length,breadth):

    perimeter = 2\*(length+breadth)

    return perimeter

def getArea(length,breadth):

    area = length\*breadth

    return area

cuboid.py

def getPerimeter(length,breadth,height):

    perimeter = 4\*(length+breadth+height)

    return perimeter

def getArea(length,breadth,height):

    area = 2\*((length\*breadth)+(length\*height)+(breadth\*height))

    return area

sphere.py

import math

def getPerimeter(radius):

    perimeter = 2\*math.pi\*radius

    return perimeter

def getArea(radius):

    area = 4\*math.pi\*radius\*radius

    return area

**Output**

Enter the length of cuboid4

Enter the breath of cuboid6

Enter the height of cuboid8

Enter the radius of circle3

Enter the length of rectangle6

Enter the breath of rectangle4

Enter the radius of Sphere2

Area of Rectangle : 24

Area of Cuboid : 208

Area of Circle : 28.274333882308138

Perimeter of Cuboid : 72

Perimeter of Rectangle : 20

Perimeter of Circle : 18.84955592153876

Area of sphere : 50.26548245743669