18CSC207J- Advanced Programming Practices

Record Work

Register Number	**:**
Name of the Student	**:**
Semester / Year	**: 4th Semester/2nd Year**
Department	**: CSE**

SRMI INSTITUTE OF SCIENCE AND TECHNOLOGY
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BONAFIDE CERTIFICATE

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Date: **Lab Incharge:**

Submitted for University Examination held in_______________SRM Institute of Science and Technology, Kattankulathur.

Examiner-1 **Examiner-2**

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EX. NO.-1 **Structured Programming Paradigm**
DATE:

Aim: To implement Structured Programming Paradigm

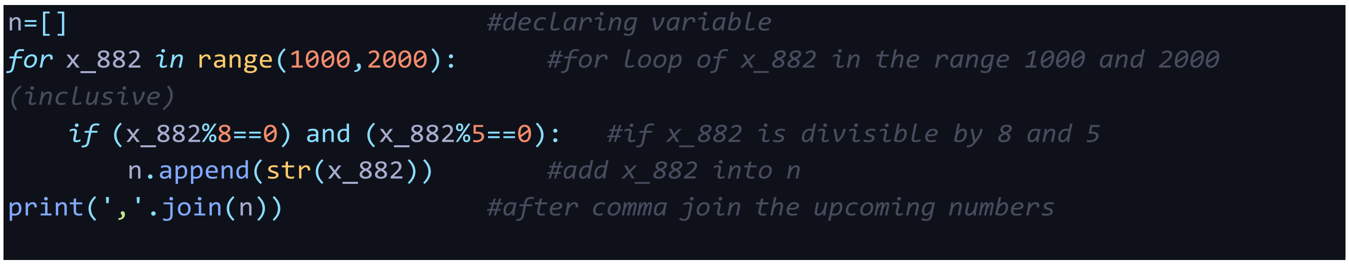
Problem:

Write a Python program to find those numbers which are divisible by 8 and multiple of 5, between 1000 and 2000 (both included)

Algorithm:

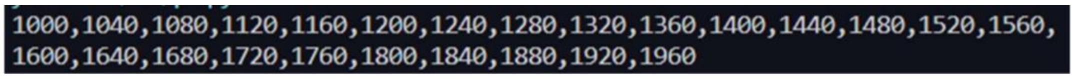
Step 1: Iterate in range from 1000 to 2000
Step 2: For each iteration check if the number is divisible by 5 and 8
Step 3: Print the numbers if the above condition is true.

Program:



```
n=[]                                #declaring variable
for x_882 in range(1000,2000):          #for loop of x_882 in the range 1000 and 2000
(inclusive)
    if (x_882%8==0) and (x_882%5==0):    #if x_882 is divisible by 8 and 5
        n.append(str(x_882))            #add x_882 into n
print(','.join(n))                  #after comma join the upcoming numbers
```

Input/Output



```
1000,1040,1080,1120,1160,1200,1240,1280,1320,1360,1400,1440,1480,1520,1560,
1600,1640,1680,1720,1760,1800,1840,1880,1920,1960
```

Problem:

Write a Python program to guess a number between 1 to 9. Note : User is prompted to enter a guess. If the user guesses wrong then the prompt appears again until the guess is correct, on successful guess, user will get a "Well guessed!" message, and the program will exit.

Algorithm:

Step 1: Import random as header file
Step 2: Input a number
Step 3: Guess a number between 1 and 10 randomly using inbuilt function
Step 4: Check if input number and random is matched
Step 5: Print well guessed if condition is true

Step 6: Repeat the above process of 2.

Program:

```
import random                         #imprting function to generate random numbers
n_882 , guess_882 = random.randint(1,10),0       # declaring variable and generating
random int
while n_882!=guess_882:                         # while loop till n not equal to guess
    guess_882=int(input("guess a number between 1 to 10 until u get it right:")) #convert
the input into an integer data type

print("guessed  well!!")              #prints this when the guess is right
```

Problem:

Write a Python program to construct the following pattern, using a nested for loop.

```
*
* *
* * *
* * * *
* * * * *
* * * *
* * *
* *
*
```

Algorithm:

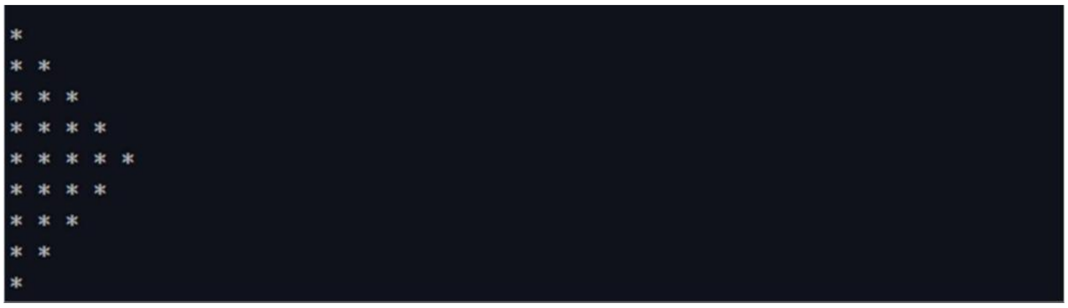
Step 1: Break the pattern into 2 parts.
Step 2: Iterate for the above part for 5 times using i
Step 3: Iterate for in range 0 to I and print *
Step 4: Iterate for second half for 4 times.
Step 5: Iterate in reverse manner from I to 0
Step 6: print *

Program:

```
n_882=5
for i in range(n_882):                  #for loop, i from 0 to n
    for j in range(i):                #j from 0 to i
        print('* ',end="")            #print '*' one after the other
    print('')                         #change line

for i in range(n_882,0,-1):             #i from 5 to 0, decreement
```

Input/Output

Problem:



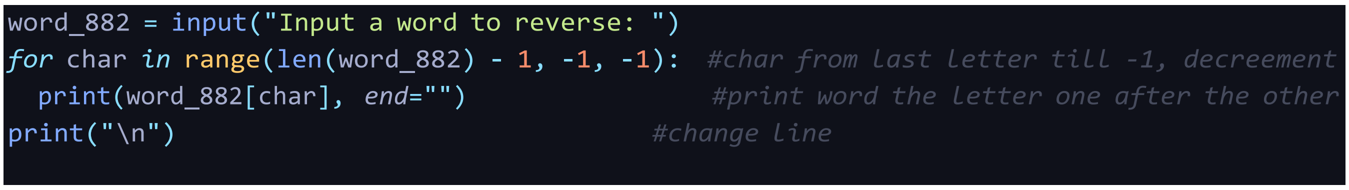
```
*
* *
* * *
* * * *
* * * * *
* * * *
* * *
* *
*
```

Write a Python program that accepts a word from the user and reverse it. (should not use any functions)

Algorithm:

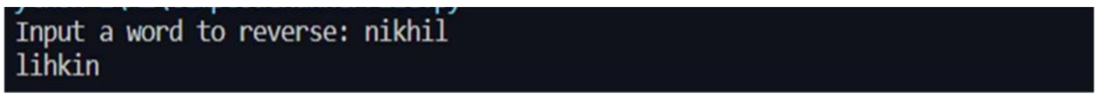
Step 1: Input a word
Step 2: Reverse the word iterating each character and use the syntax in for loop.
Step 3: Print the word

Program:



```python
word_882 = input("Input a word to reverse: ")
for char in range(len(word_882) - 1, -1, -1):  #char from last letter till -1, decreement
  print(word_882[char], end="")                #print word the letter one after the other
print("\n")                                  #change line
```

Input/Output



```
Input a word to reverse: nikhil
lihkin
```

Problem:

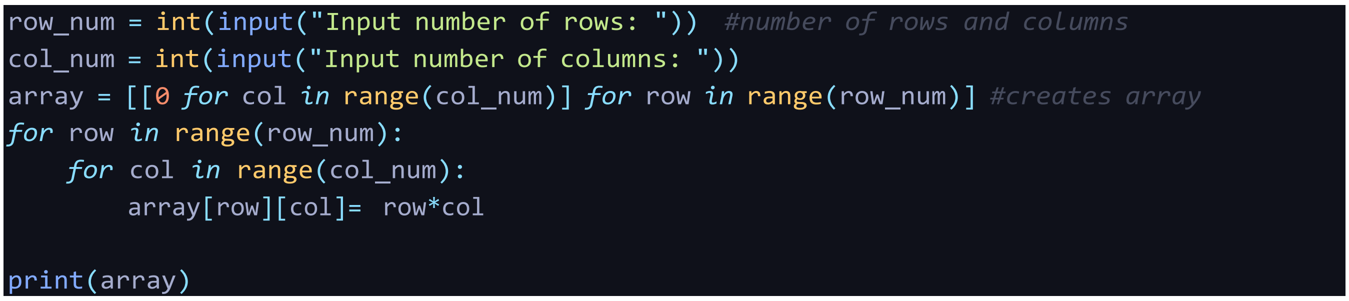
Write a Python program which takes two digits m (row) and n (column) as input and generates a two-dimensional array. The element value in the i-th row and j-th column of the array should be i*j. Note :
i = 0,1.., m-1
j = 0,1, n-1.

Test Data : Rows = 3, Columns = 4
Expected Result : [[0, 0, 0, 0], [0, 1, 2, 3], [0, 2, 4, 6]]

Algorithm:

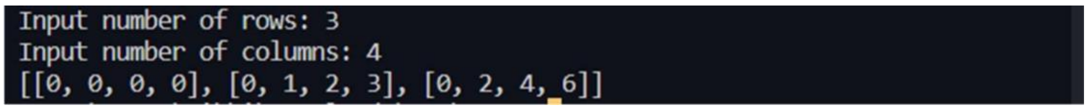
Step 1: Input rows(m) and column (n)
Step 2: Initialize a result array
Step 3: Iterate in rows(m) and for each row iterate in column (n)
Step 4: Calculating i*j
Step 5: print the resultant array

Program:



```python
row_num = int(input("Input number of rows: "))  #number of rows and columns
col_num = int(input("Input number of columns: "))
array = [[0 for col in range(col_num)] for row in range(row_num)] #creates array
for row in range(row_num):
    for col in range(col_num):
        array[row][col]= row*col

print(array)
```

Input/Output:



```
Input number of rows: 3
Input number of columns: 4
[[0, 0, 0, 0], [0, 1, 2, 3], [0, 2, 4, 6]]
```

Problem:

Write a Python program that accepts a string and calculate the number of digits and letters.

Algorithm:

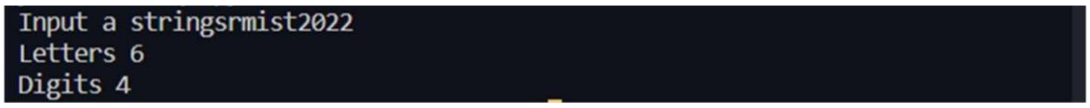
Step 1: Input a string
Step 2: Intialize d and l as 0
Step 3: Traverse as character in string
Step 4: Check if the current character in digit
Step 5: If it in digit increment d else d

Step 6: Print d and l

Program:

```
s = input("Input a string")      #takes an input
d=l=0
for c in s:                      #for a letter/character in string
    if c.isdigit():              #using the function to check is c is a digit
        d=d+1                    #adding the value
    elif c.isalpha():            #using the function to check is c is a alpha
        l=l+1
    else:
        pass
print("Letters", l) print("Digits", d)
```

Input/Output:



```
Input a stringsrmist2022
Letters 6
Digits 4
```

Problem:

Write a Python program to check the validity of password input by users.
Validation :

- At least 1 letter between [a-z] and 1 letter between [A-Z].
- At least 1 number between [0-9].
- At least 1 character from [$#@].
- Minimum length 6 characters.
- Maximum length 16 characters.

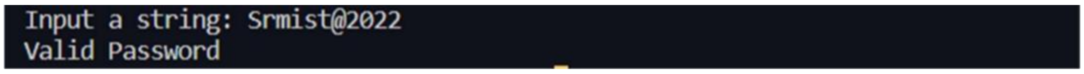
Algorithm:

Step 1: Input a password as string
Step 2: Iterate in range 0 to string length
Step 3: Check for validation and conditions one by one
Step 4: If all are true print “Valid Password” else “Not Valid Password”

Program:

```
l, u, p, d = 0, 0, 0, 0
s = input("Input a string: ")
if (len(s) >= 8) and (len(s) <= 16):
    for i in s:
        if (i.islower()):
            l+=1

        if (i.isupper()):
            u+=1

        if (i.isdigit()):
            d+=1

        if(i=='@'or i=='$' or i=='_' or i=='!'):
            p+=1

if (l>=1 and u>=1 and p>=1 and d>=1 and l+p+u+d==len(s)):
    print("Valid Password")
else:
    print("Invalid Password")
```

Input/Output:



```
Input a string: Srmist@2022
Valid Password
```

Problem:

Write a Python program to find numbers between 100 and 400 (both included) where each digit of a number is an even number. The numbers obtained should be printed in a comma-separated sequence.

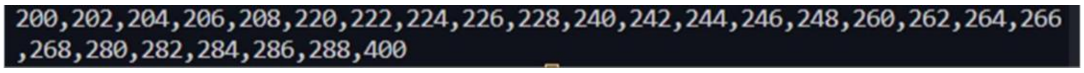
Algorithm:

Step 1: Iterate from 100 to 400
Step 2: Extract each digit and check for even
**Step 3: If yes, the print the digits of numbers **
Step 4: Continue with step 1 again till upon time.

Program

```
items = []
for i in range(100, 401):
    s = str(i)
    if (int(s[0])%2==0) and (int(s[1])%2==0) and (int(s[2])%2==0):    #convert into int
and check if each digit is divisible by 2
        items.append(s)
print( ",".join(items))
```

Input/Output:



```
200,202,204,206,208,220,222,224,226,228,240,242,244,246,248,260,262,264,266
,268,280,282,284,286,288,400
```

Problem:

Write a Python program to convert month name to a number of days.

Algorithm:

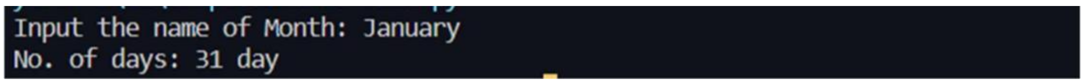
Step 1: Input the name of month
Step 2: Check if the month is feb, print 28/29 days

Step 3: Check if the month is Jan, March, May, August, print (31 days)
Step 4: Check if month in April ,June ,September ,November print 30 days.

Program:

```python
month_name = input("Input the name of Month: ")

if month_name == "February":
    print("No. of days: 28/29 days")
elif month_name in ("April", "June", "September", "November"):
    print("No. of days: 30 days")
elif month_name in ("January", "March", "May", "July", "August", "October", "December"):
    print("No. of days: 31 day")
else:
    print("Wrong month name")
```

Input/Output:



```
Input the name of Month: January
No. of days: 31 day
```

Problem:

Write a Python program to sum of two given integers. However, if the sum is between 105 to 200 it will return 200.

Algorithm:

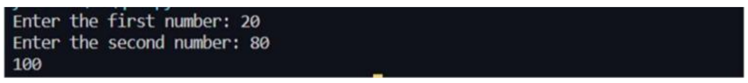
Step 1: Take 2 Integer as input

Step 2: Sum them up in sum 1
Step 3: If sum ties in range of 105 and 200
Step 4: else print sum1

Program:

```
a = int(input("Enter the first number: "))
b = int(input("Enter the second number: "))
sum = a + b
if sum in range(105, 200):
    print(200)
else:
    print(sum)
```

Input/Output:



```
Enter the first number: 20
Enter the second number: 80
100
```

Problem:

Write a Python program to construct the following pattern, using a nested loop number.
Expected Input/Output:
999999999
88888888
7777777
666666
55555
4444
333
22
1

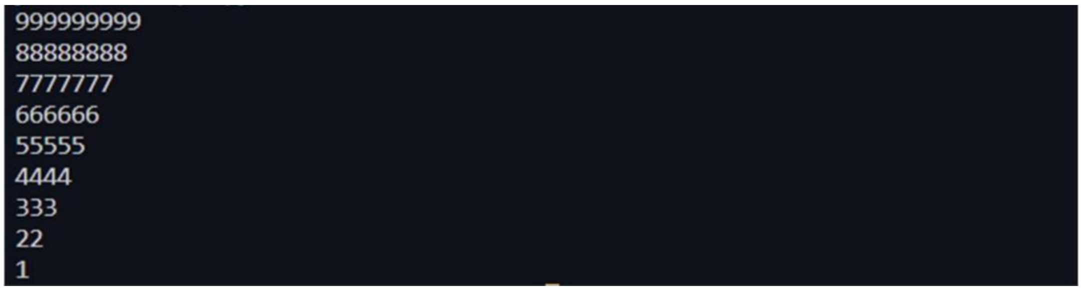
Algorithm:

Step 1: Take for loop and iterate for number of lives
Step 2: Iterating for 10 to i-1 in reverse direction
Step 3: Print values of 9-i

Program:

```
for i in range(9,0,-1):
    print(str(i) * i)
```

Input/Output:



```
999999999
88888888
7777777
666666
55555
4444
333
22
1
```

Problem:
Write a Python program to create a histogram from a given list of integers

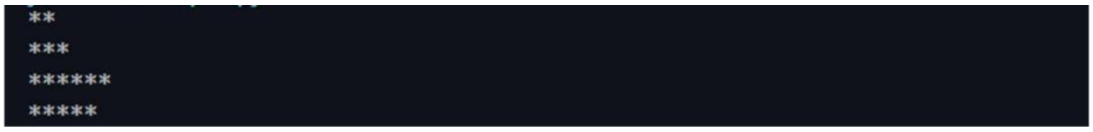
Algorithm:

Step 1: Define a function histogram and iterate with n on items
Step 2: Take variable time and iterate for times and print *
Step 3: Reduce times by 1
Step 4: Print Output
Step 5: Call the functions with histogram [2,3,6,5]

Program:

```
def histogram( items ):
    for n in items:
        Input/Output = ''
        times = n
        while( times > 0 ):
          Input/Output += '*'
          times = times - 1
        print(Input/Output)

histogram([2, 3, 6, 5])
```

Input/Output:



```
**
***
******
*****
```

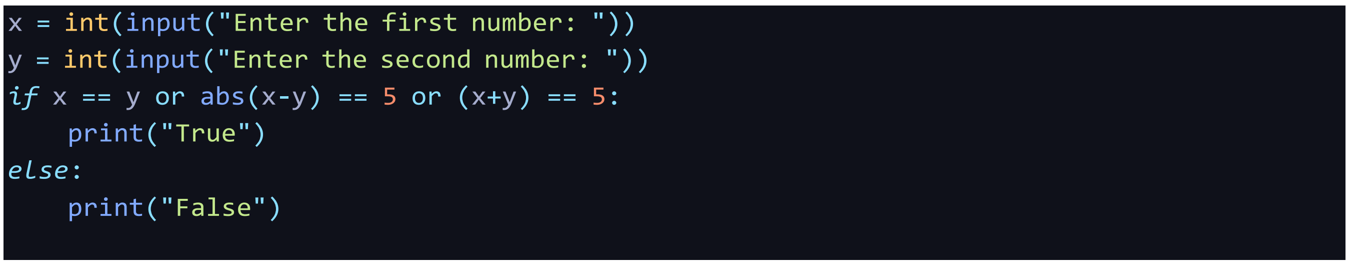
Problem:

Write a Python program that will return true if the two given integer values are equal or their sum or difference is 5.

Algorithm:

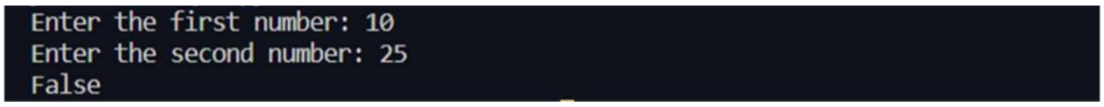
Step 1: Create a function taking two inputs
Step 2: Check if condition if x==y or if absolute difference is 5 or if their sum is 5.
Step 3: If the condition is fulfilled, print true
Step 4: else print false

Program:



```python
x = int(input("Enter the first number: "))
y = int(input("Enter the second number: "))
if x == y or abs(x-y) == 5 or (x+y) == 5:
    print("True")
else:
    print("False")
```

Input/Output:



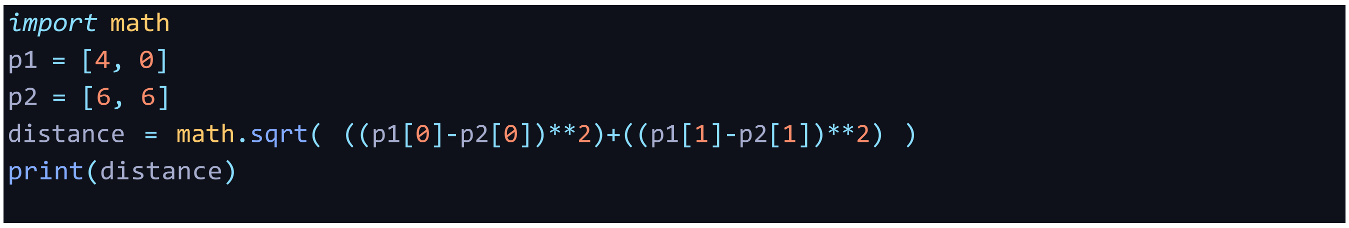
```
Enter the first number: 10
Enter the second number: 25
False
```

Problem:

Write a Python program to compute the distance between the points (x1, y1) and (x2, y2).
Algorithm:

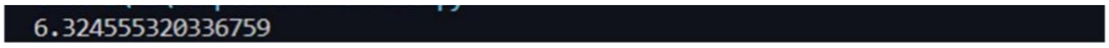
Step 1:Input 4 integer in pairs of 2 separated by ,
Step 2: Using square root function, sum of (x1,x2) square and sum of (y1-y2) square.
Step 3: Print the distance

Program:



```python
import math
p1 = [4, 0]
p2 = [6, 6]
distance = math.sqrt( ((p1[0]-p2[0])**2)+((p1[1]-p2[1])**2) )
print(distance)
```

Input/Output:



```
6.324555320336759
```

Problem:

Function that takes a sequence of numbers and determines whether all are different from each other

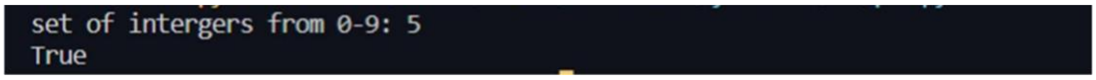
Algorithm:

Step 1: Create function test_distinct
Step 2: Create a set of the data provide.
Step 3: Set data Structure doesn't take any duplicate numbers
Step 4: If the length of set and data in same print true.

Program:

```
data=input("set of intergers from 0-9: ")
if len(data) == len(set(data)):
    print("True")
else:
    print("False")
```

Input/Output:



```
set of intergers from 0-9: 5
True
```

Problem:

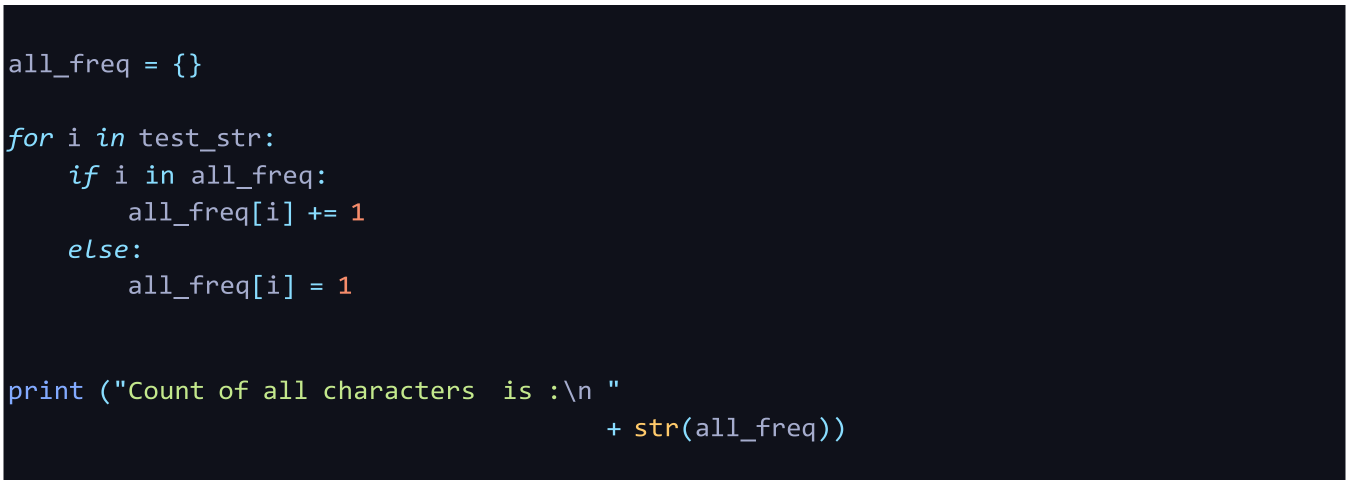
Write a Python program to count the number of each character of a given text

Algorithm:

Step 1: Enter a string
Step 2: Iterate with n in string
Step 3: Using keys, calculate dict[n] not increase it if the key is prexting
Step 4: Else create a new key with value 1
Step 5: Dictionary library of python is used to keep track of character.

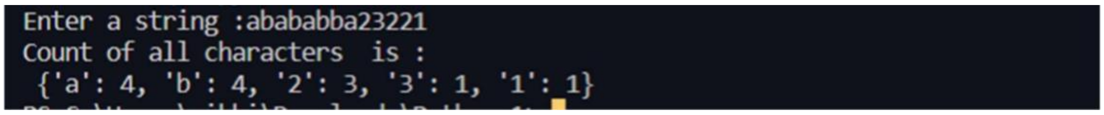
Program:

```
test_str = input("Enter a string :")
```



```python
all_freq = {}

for i in test_str:
    if i in all_freq:
        all_freq[i] += 1
    else:
        all_freq[i] = 1


print ("Count of all characters  is :\n "
                                        + str(all_freq))
```

Input/Output:



```
Enter a string :abababba23221
Count of all characters  is :
 {'a': 4, 'b': 4, '2': 3, '3': 1, '1': 1}
```

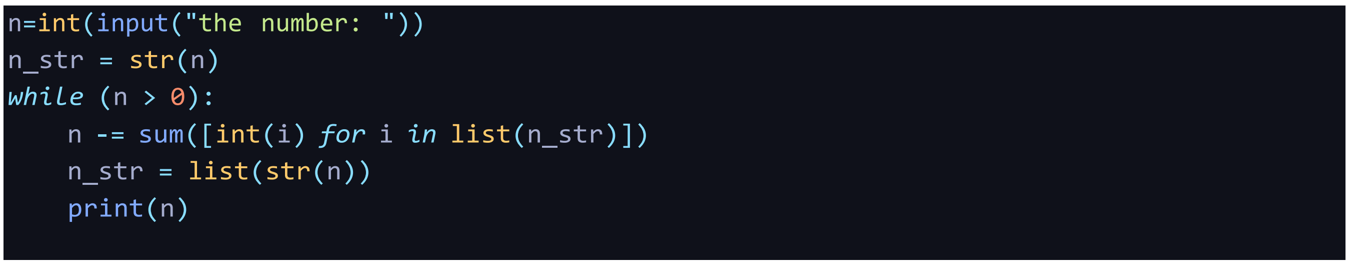
Problem:

Write a Python program that accept a positive number and subtract from this number the sum of its digits and so on. Continues this operation until the number is positive.

Algorithm:

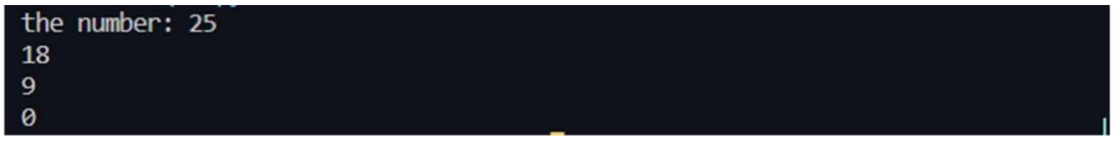
Step 1: Change the number to string
Step 2: Iterate while number in positive
Step 3: Decrement n by its sum of digits
Step 4: Update the string number by list of string number

Program:



```python
n=int(input("the number: "))
n_str = str(n)
while (n > 0):
    n -= sum([int(i) for i in list(n_str)])
    n_str = list(str(n))
    print(n)
```

Input/Output:


```
the number: 25
18
9
0
```

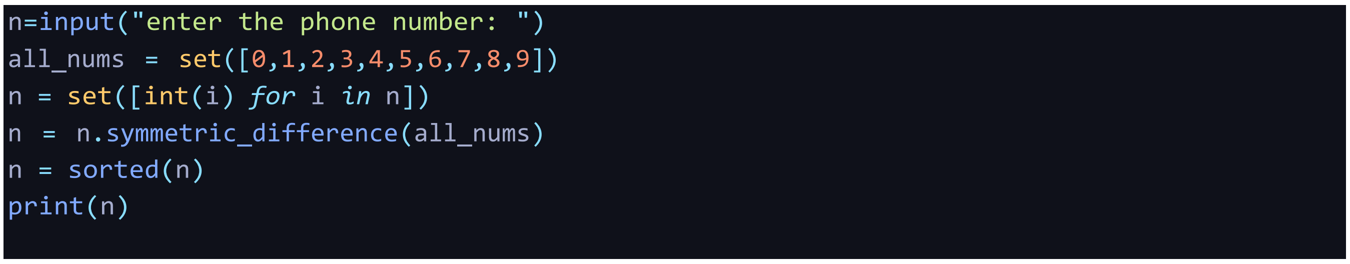
Problem:

Write a Python program to find the digits which are absent in a given mobile number.

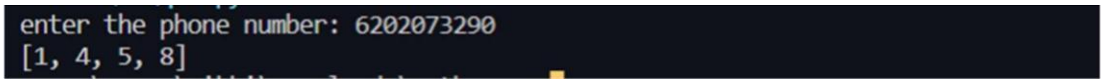
Algorithm:

Step 1: Input numbers in list
Step 2: Sort the set in range from start to end -1
Step 3: Here negative indexes are used
Step 4: Start in 1st[0], end in 1st[-1]

Program:


```
n=input("enter the phone number: ")
all_nums = set([0,1,2,3,4,5,6,7,8,9])
n = set([int(i) for i in n])
n = n.symmetric_difference(all_nums)
n = sorted(n)
print(n)
```

Input/Output:


```
enter the phone number: 6202073290
[1, 4, 5, 8]
```

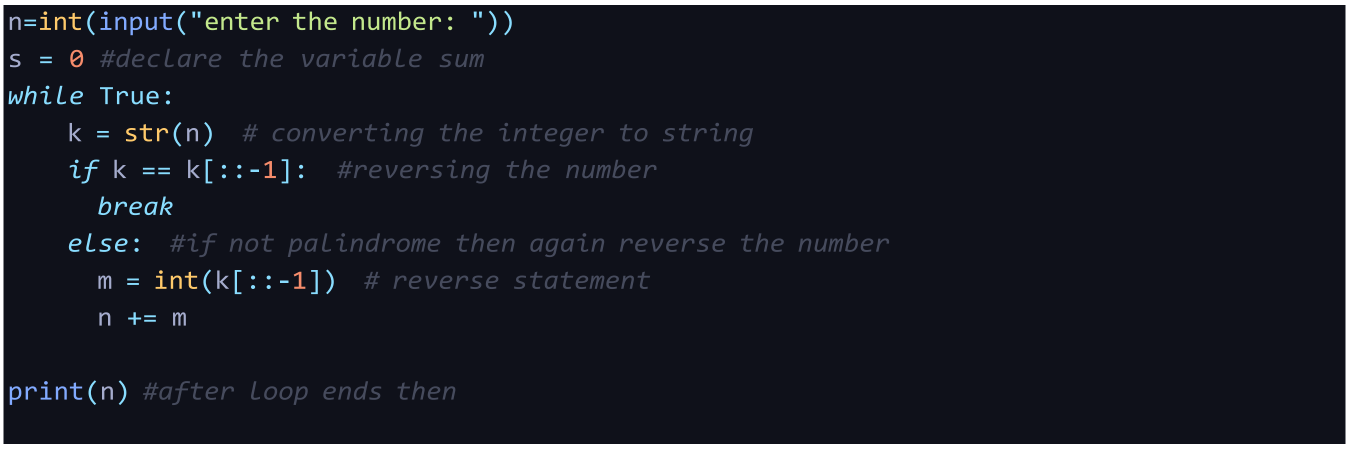
Problem:

Write a Python program to reverse the digits of a given number and add it to the original, If the sum is not a palindrome repeat this procedure

Algorithm:

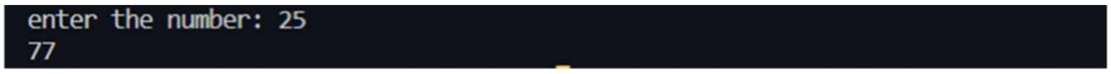
Step 1: Enter the number
Step 2: Take a infinte loop of while
Step 3: Take k and assign seeing value of n in it
Step 4: Check if it's a palindrome , if yes break
Step 5: Else reverse the number and add it to a number and update the sum.
Step 6: Return the value of n

Program:



```
n=int(input("enter the number: "))
s = 0 #declare the variable sum
while True:
    k = str(n)  # converting the integer to string
    if k == k[::-1]:  #reversing the number
      break
    else:  #if not palindrome then again reverse the number
      m = int(k[::-1])  # reverse statement
      n += m

print(n) #after loop ends then
```

Input/Output:



```
enter the number: 25
77
```

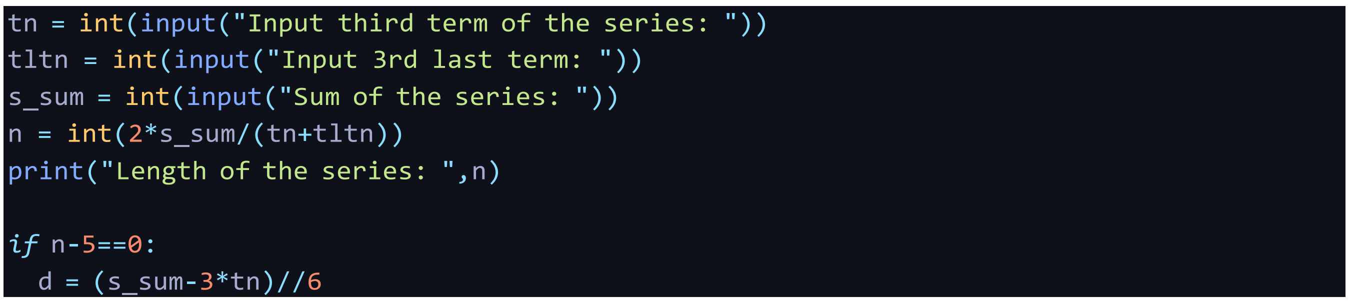
Problem:

Write a Python program to print the length of the series and the series from the given 3rd term, 3rd last term and the sum of a series.

Algorithm:

Step 1: Input third term,third last term and sum of series.
Step 2: Calculate the integral part of the formula
Step 3: Print total number of terms
Step 4: In order to calculate the common difference, use the formula used in arithemetic progression.
Step 5: Calculating the first term
Step 6: Iterating in range of n-1, print integral part of a
Step 7: Increament a by d after every iteration

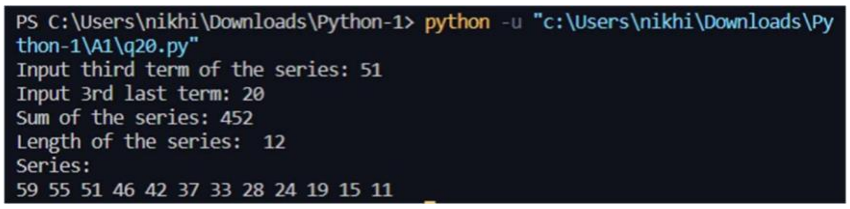
Program:



```
tn = int(input("Input third term of the series: "))
tltn = int(input("Input 3rd last term: "))
s_sum = int(input("Sum of the series: "))
n = int(2*s_sum/(tn+tltn))
print("Length of the series: ",n)

if n-5==0:
  d = (s_sum-3*tn)//6
```

```
else:
  d = (tltn-tn)/(n-5)

a = tn-2*d
j = 0
print("Series:")
for j in range(n-1):
  print(int(a),end="  ")
  a+=d
print(int(a),end="  ")
```

Input/Output:



```
PS C:\Users\nikhi\Downloads\Python-1> python -u "c:\Users\nikhi\Downloads\Py
thon-1\A1\q20.py"
Input third term of the series: 51
Input 3rd last term: 20
Sum of the series: 452
Length of the series:  12
Series:
59 55 51 46 42 37 33 28 24 19 15 11
```

Result: Hence the Structured Programming has been successfully executed and compiled successfully.

EX. NO.-2
DATE:

Procedural Programming Paradigm

Aim: To implement Procedural Programming Paradigm

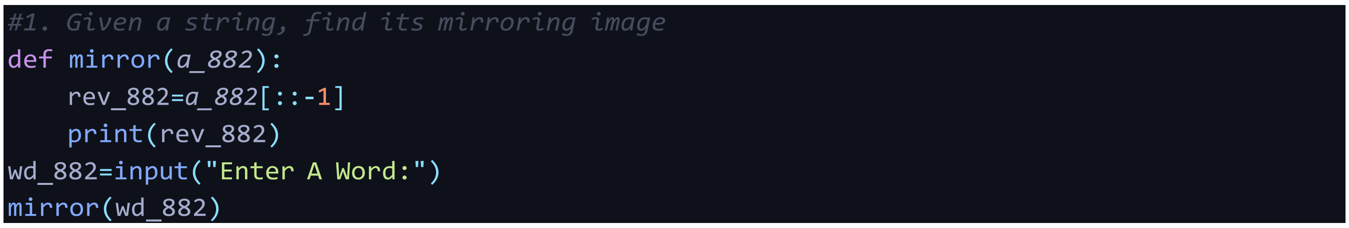
Problem:

Given a string, find its mirroring image

Algorithm:

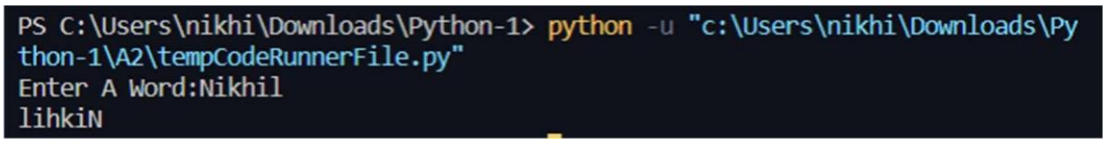
Step 1: Input string from user
Step 2: Lookup dictionary for all valid mirrorable English character
Step 3: find string 2 in string 1
Step 4: If string 2 in rotation of string 1 return true
Step 5: else return false
Step 6: Exit

Program:



```
#1. Given a string, find its mirroring image
def mirror(a_882):
    rev_882=a_882[::-1]
    print(rev_882)
wd_882=input("Enter A Word:")
mirror(wd_882)
```

Input/Output:



```
PS C:\Users\nikhi\Downloads\Python-1> python -u "c:\Users\nikhi\Downloads\Py
thon-1\A2\tempCodeRunnerFile.py"
Enter A Word:Nikhil
lihkiN
```

Problem:

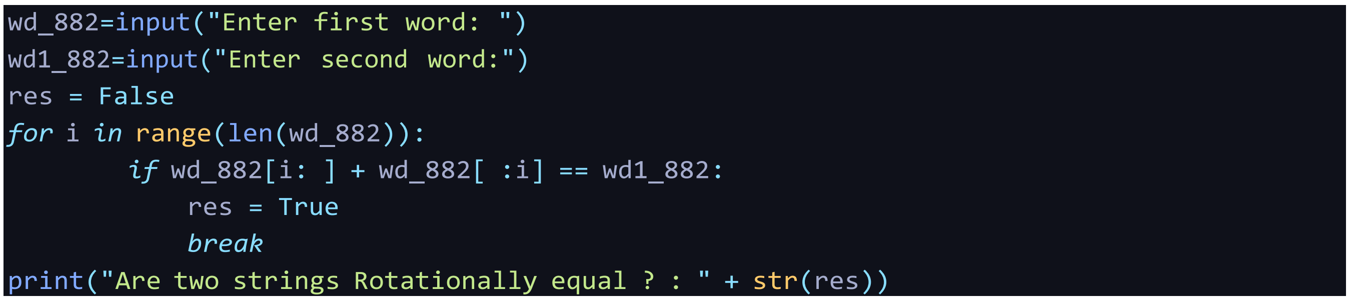
Check if two strings are Rotationally Equivalent
Sample Input/Output
string 1 is : srmist
string 2 is : tsrmis
Are two strings Rotationally equal ? : True

Algorithm:

Step 1:Input 2 strings
Step 2: Concentrate
Step 3: If the string 2 is present is concentrate string, string 2 is rotation of string 1.
Step 4: return true

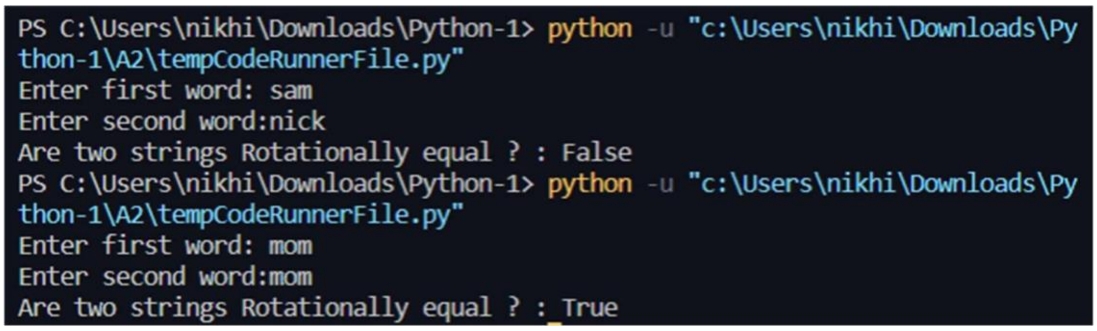
Step 5: else return false
Step 6: Exit

Program:



```
wd_882=input("Enter first word: ")
wd1_882=input("Enter  second  word:")
res = False
for i in range(len(wd_882)):
        if wd_882[i: ] + wd_882[ :i] == wd1_882:
            res = True
            break
print("Are two strings Rotationally equal ? : " + str(res))
```

Input/Output:



```
PS C:\Users\nikhi\Downloads\Python-1> python -u "c:\Users\nikhi\Downloads\Py
thon-1\A2\tempCodeRunnerFile.py"
Enter first word: sam
Enter second word:nick
Are two strings Rotationally equal ? : False
PS C:\Users\nikhi\Downloads\Python-1> python -u "c:\Users\nikhi\Downloads\Py
thon-1\A2\tempCodeRunnerFile.py"
Enter first word: mom
Enter second word:mom
Are two strings Rotationally equal ? : True
```

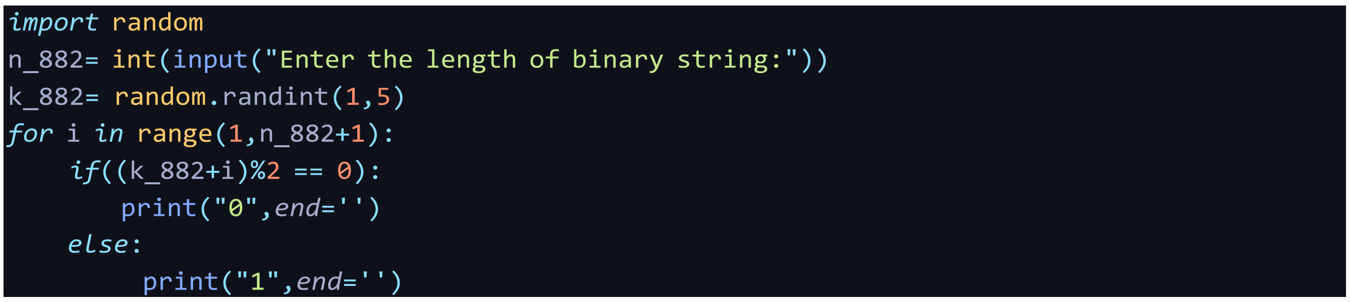
Problem:

Given a number n, the task is to generate a random binary string of length n.

Algorithm:

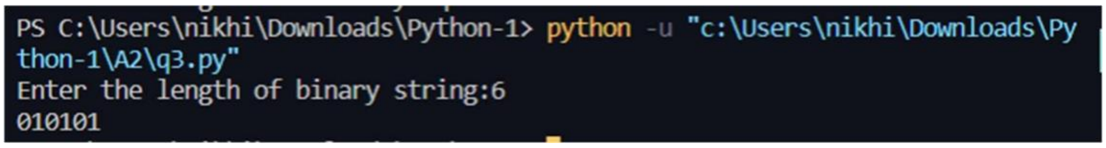
Step 1: Input n
Step 2: Input string and key
Step 3: Randint function used to create random “0” or “1”
Step 4: Append the randomly generated “0” and “1” to string, key.
Step 5: return string,key
Step 6: Exit

Program:



```
import random
n_882= int(input("Enter the length of binary string:"))
k_882= random.randint(1,5)
for i in range(1,n_882+1):
    if((k_882+i)%2 == 0):
        print("0",end='')
    else:
        print("1",end='')
```

Input/Output:



```
PS C:\Users\nikhi\Downloads\Python-1> python -u "c:\Users\nikhi\Downloads\Py
thon-1\A2\q3.py"
Enter the length of binary string:6
010101
```

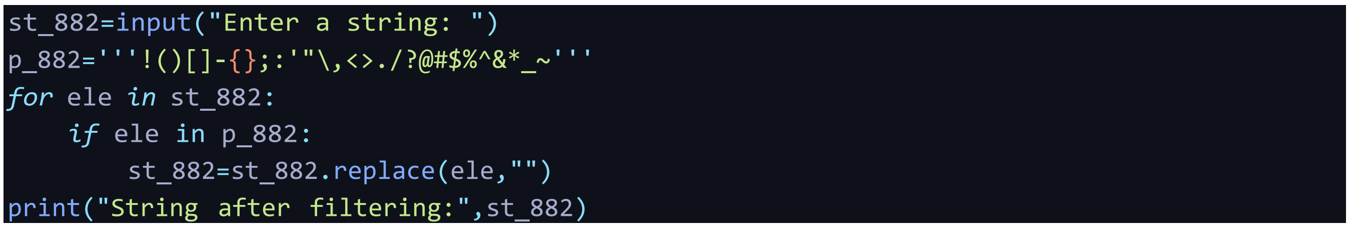
Problem:

Given a string, remove punctuation and any special characters

Algorithm:

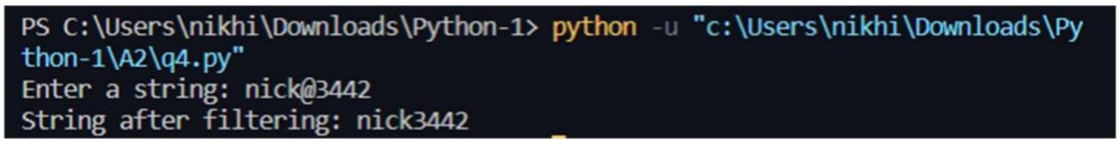
Step 1: Input string from user
Step 2: Look up dictionary created for all valid punctuation
Step 3: Remove any invalid parameters as your move along the string
Step 4: Print the obtained string
Step 5: Exit

Program:



```python
st_882=input("Enter a string: ")
p_882='''!()[]-{};:'"\,<>./?@#$%^&*_~'''
for ele in st_882:
    if ele in p_882:
        st_882=st_882.replace(ele,"")
print("String after filtering:",st_882)
```

Input/Output:



```
PS C:\Users\nikhi\Downloads\Python-1> python -u "c:\Users\nikhi\Downloads\Py
thon-1\A2\q4.py"
Enter a string: nick@3442
String after filtering: nick3442
```

Problem:

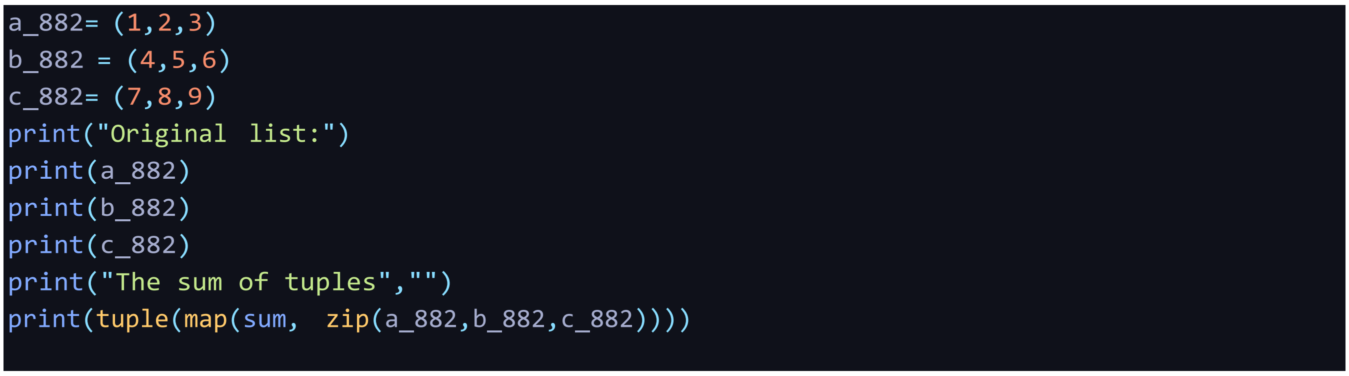
Write a Python program to compute element-wise sum of given tuples.

Input
(11, 2, 3, 14)
(13, 5, 22, 10)
(12, 2, 3, 10)
Input/Output
(36, 9, 28, 34)

<u>Algorithm:</u>

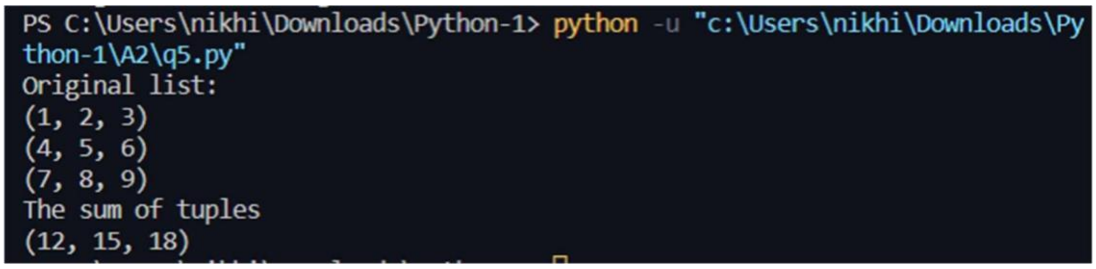
Step 1: Input the tuple from user
Step 2: Store the sum in results
Step 3: result =tuple(mag(sum,zip(x,y,z))
Step 4: print the result
Step 5: Exit

<u>Program:</u>



```
a_882= (1,2,3)
b_882 = (4,5,6)
c_882= (7,8,9)
print("Original  list:")
print(a_882)
print(b_882)
print(c_882)
print("The sum of tuples","")
print(tuple(map(sum,  zip(a_882,b_882,c_882))))
```

<u>Input/Output:</u>



```
PS C:\Users\nikhi\Downloads\Python-1> python -u "c:\Users\nikhi\Downloads\Py
thon-1\A2\q5.py"
Original list:
(1, 2, 3)
(4, 5, 6)
(7, 8, 9)
The sum of tuples
(12, 15, 18)
```

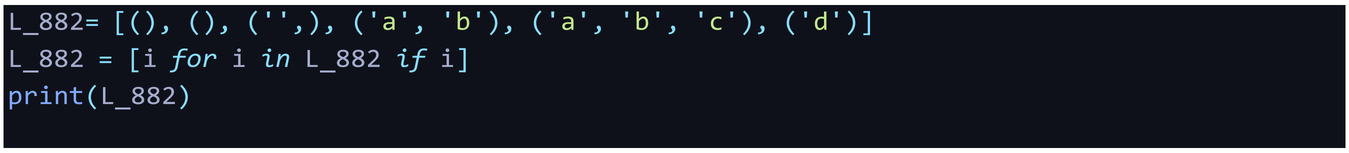
<u>Problem:</u>

Write a Python program to remove an empty tuple(s) from a list of tuples.

<u>Algorithm:</u>

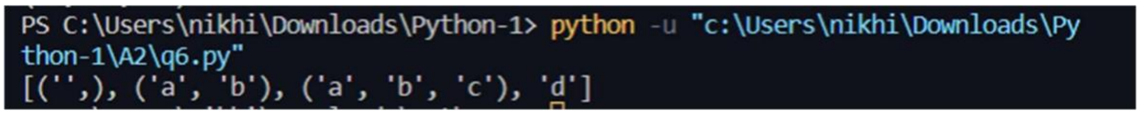
Step 1: Input the tuple from user
Step 2: filter method is used to remove empty one.
Step 3: tuples=filter(move,tuples)
Step 4: print tuples
Step 5: Exit

Program:



```
L_882= [(), (), ('',), ('a', 'b'), ('a', 'b', 'c'), ('d')]
L_882 = [i for i in L_882 if i]
print(L_882)
```

Input/Output:



```
PS C:\Users\nikhi\Downloads\Python-1> python -u "c:\Users\nikhi\Downloads\Py
thon-1\A2\q6.py"
[('',), ('a', 'b'), ('a', 'b', 'c'), 'd']
```

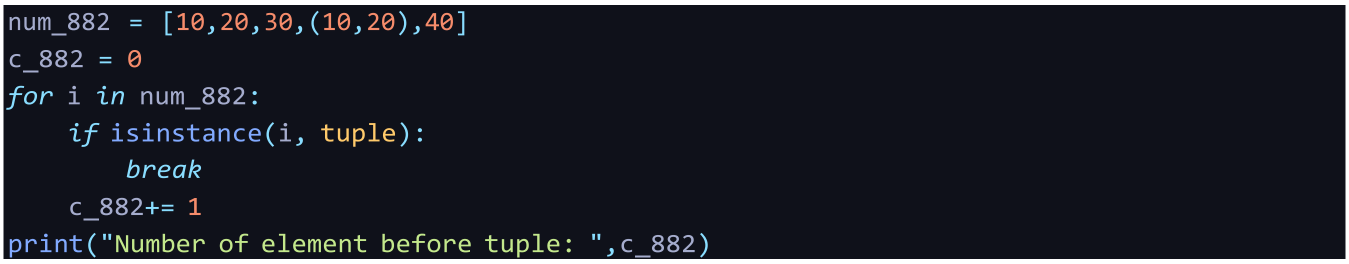
Problem:

Write a Python program to count the elements in a list until an element is a tuple

Algorithm:

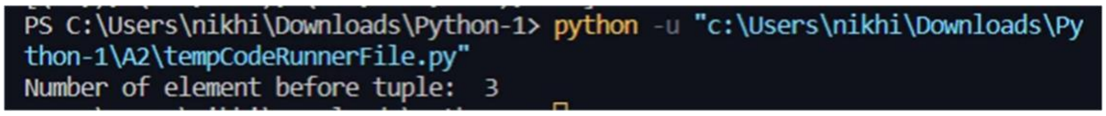
Step 1: Input the list from user
Step 2: Use instance() to verify whether we are encountering a tuple
Step 3: If instance (num,tuple) in true then break
Step 4: else counter ++
Step 5: print counter
Step 6: Exit

Program:



```
num_882  = [10,20,30,(10,20),40]
c_882 = 0
for i in num_882:
    if isinstance(i, tuple):
        break
    c_882+= 1
print("Number of element before tuple: ",c_882)
```

Input/Output:



```
PS C:\Users\nikhi\Downloads\Python-1> python -u "c:\Users\nikhi\Downloads\Py
thon-1\A2\tempCodeRunnerFile.py"
Number of element before tuple:  3
```

Problem:

Write a Python program to Convert Tuple Matrix to Tuple List
Sample Input : [[(9, 51), (7, 9)], [(11, 1), (22, 19)]]
Input/Output : [(9, 7, 11, 22), (51, 9, 1, 19)]

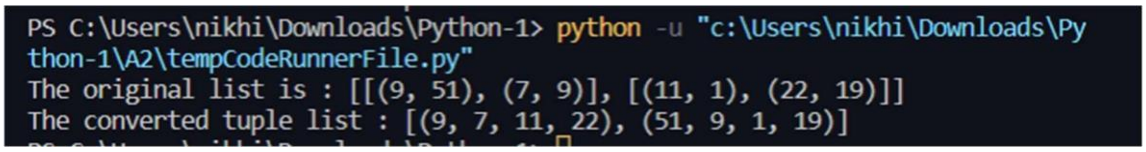
Algorithm:

Step 1: Input a list from user
Step 2: We perform list comprehension and zip() is used to perform column pairing to render as tuple pairs.
Step 3: res=list(zip(*tup))
Step 4: print the list
Step 5: Exit

Program:

```
list_882= [[(9, 51), (7, 9)], [(11, 1), (22, 19)]]

print("The original list is : " + str(list_882))

temp_882= [ele for sub in list_882 for ele in sub]

res = list(zip(*temp_882))

print("The converted tuple list : " + str(res))
```

Input/Output:



```
PS C:\Users\nikhi\Downloads\Python-1> python -u "c:\Users\nikhi\Downloads\Py
thon-1\A2\tempCodeRunnerFile.py"
The original list is : [[(9, 51), (7, 9)], [(11, 1), (22, 19)]]
The converted tuple list : [(9, 7, 11, 22), (51, 9, 1, 19)]
```

Problem:

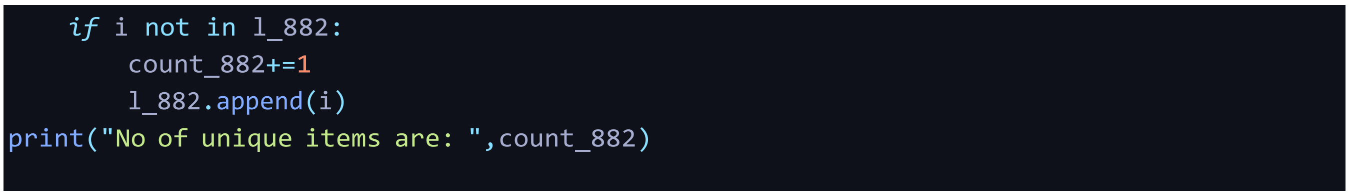
Write a Python program to count unique values in the list.

Algorithm:

Step 1: Input list from user
Step 2: Using counter function we will create a dictionary
Step 3: The keys of dictionary will be unique items and values will be the numbers of that key present in list
Step 4: Print unique number
Step 5: Exit

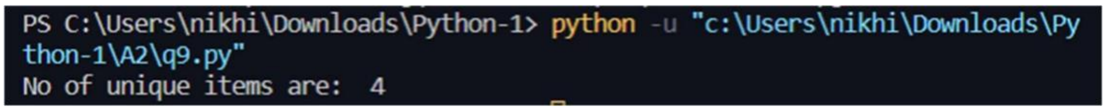
Program:

```
list_882=[1,3,3,2,4,4]
l_882=[]
count_882=0
for i in list_882:
```



```
    if i not in l_882:
        count_882+=1
        l_882.append(i)
print("No of unique items are: ",count_882)
```

Input/Output:



```
PS C:\Users\nikhi\Downloads\Python-1> python -u "c:\Users\nikhi\Downloads\Py
thon-1\A2\q9.py"
No of unique items are:  4
```

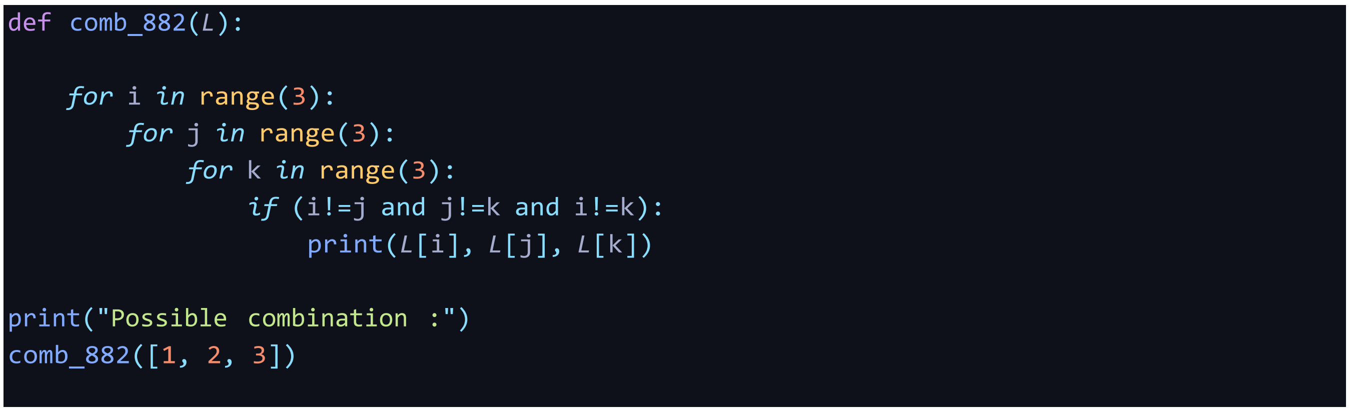
Problem:

Python Program to print all Possible Combinations from the three Digits

Algorithm:

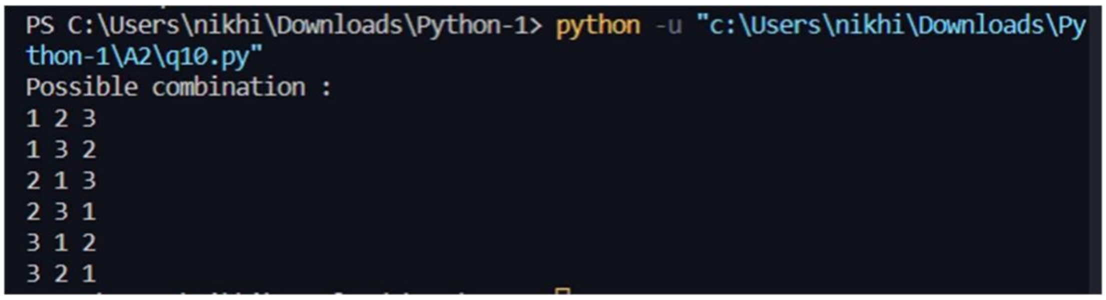
Step 1: Input 3 digits
Step 2: Using internal permuatation U print all the combination
Step 3: This method takes a list as an input and returning an object list of tuples that contain all permuation in a list from
Step 4: print all the combination
Step 5: Exit

Program:



```
def comb_882(L):

    for i in range(3):
        for j in range(3):
            for k in range(3):
                if (i!=j and j!=k and i!=k):
                    print(L[i], L[j], L[k])

print("Possible combination :")
comb_882([1, 2, 3])
```

Input/Output:



```
PS C:\Users\nikhi\Downloads\Python-1> python -u "c:\Users\nikhi\Downloads\Py
thon-1\A2\q10.py"
Possible combination :
1 2 3
1 3 2
2 1 3
2 3 1
3 1 2
3 2 1
```

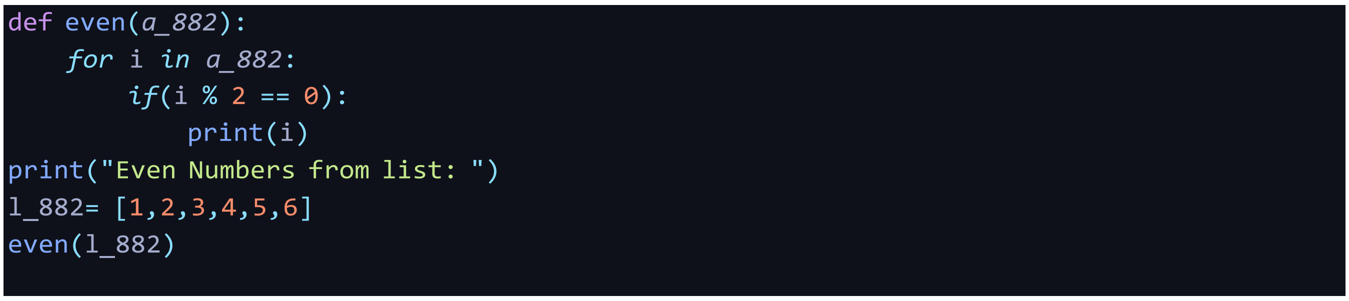
Problem:

Write a Python program (using function) to print the even numbers from a given list.

Algorithm:

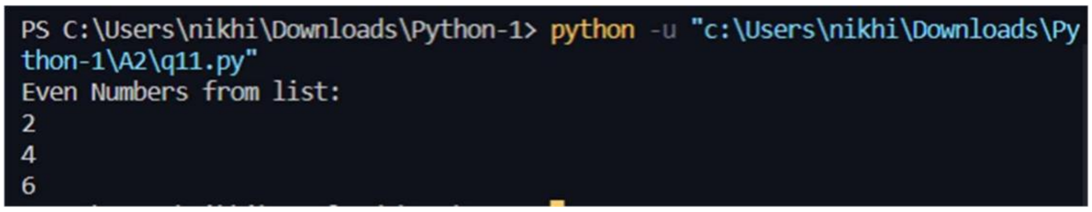
Step 1: Input list from user
Step 2: Iterate along the array
Step 3: Check divisible by 2
Step 4: Print the number
Step 5 : Exit

Program:



```python
def even(a_882):
    for i in a_882:
        if(i % 2 == 0):
            print(i)
print("Even Numbers from list: ")
l_882= [1,2,3,4,5,6]
even(l_882)
```

Input/Output:



```
PS C:\Users\nikhi\Downloads\Python-1> python -u "c:\Users\nikhi\Downloads\Py
thon-1\A2\q11.py"
Even Numbers from list:
2
4
6
```

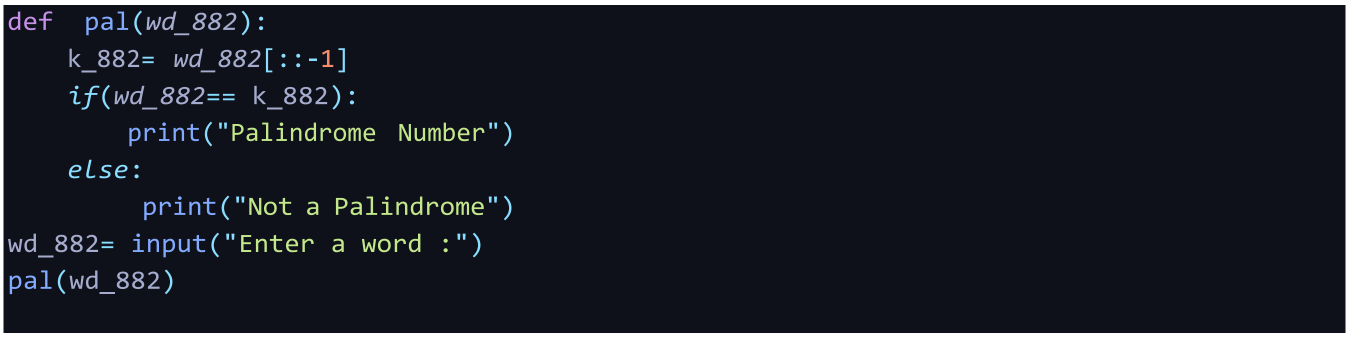
Problem:

Write a Python function (using function) that checks whether a passed string is palindrome or not.

Algorithm:

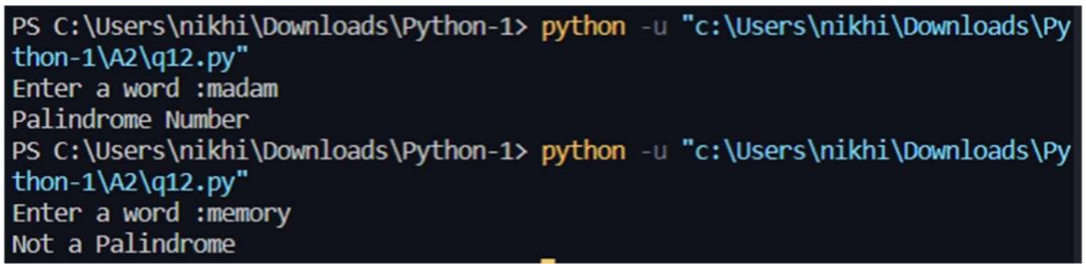
Step 1: Take string from user
Step 2: Iterate string as argument
Step 3: If last letter is equal to first character recursively call the function with argument as the sliced list with the first character and last character removed.
Step 4: Exit

Program:



```
def  pal(wd_882):
    k_882= wd_882[::-1]
    if(wd_882== k_882):
        print("Palindrome  Number")
    else:
         print("Not a Palindrome")
wd_882= input("Enter a word :")
pal(wd_882)
```

Input/Output:



```
PS C:\Users\nikhi\Downloads\Python-1> python -u "c:\Users\nikhi\Downloads\Py
thon-1\A2\q12.py"
Enter a word :madam
Palindrome Number
PS C:\Users\nikhi\Downloads\Python-1> python -u "c:\Users\nikhi\Downloads\Py
thon-1\A2\q12.py"
Enter a word :memory
Not a Palindrome
```

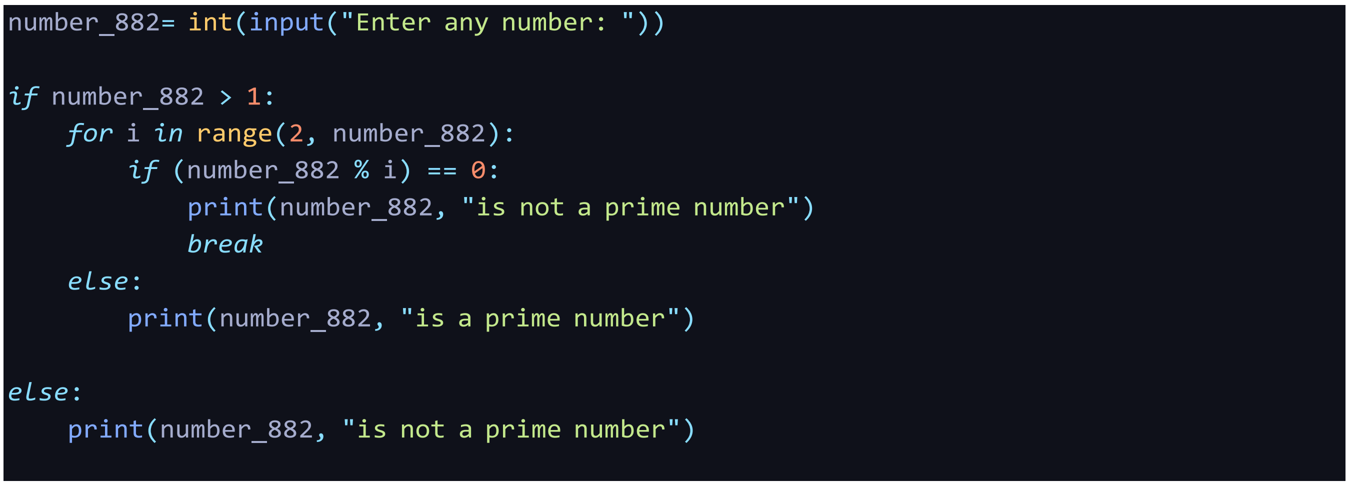
Problem:

Write a Python function (using function) that checks whether a given number is prime or not

Algorithm:

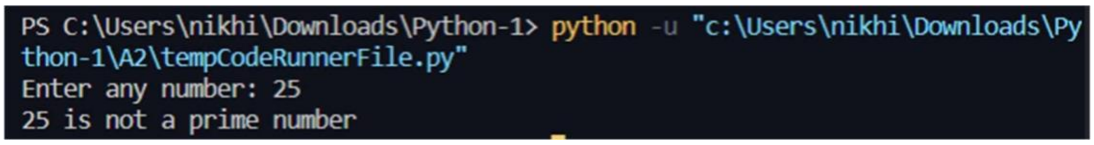
Step 1: Input the number from user
Step 2: Iterate from 2 to sqrt of (number)
Step 3: If we found any fact then we can print as not a prime number
Step 4: Initialize a flag that maintain states whether it is prime or not.

Program:



```
number_882= int(input("Enter any number: "))

if number_882 > 1:
    for i in range(2, number_882):
        if (number_882 % i) == 0:
            print(number_882, "is not a prime number")
            break
    else:
        print(number_882, "is a prime number")

else:
    print(number_882, "is not a prime number")
```

Input/Output:



```
PS C:\Users\nikhi\Downloads\Python-1> python -u "c:\Users\nikhi\Downloads\Py
thon-1\A2\tempCodeRunnerFile.py"
Enter any number: 25
25 is not a prime number
```

Result: Hence the Procedural Programming has been successfully implemented and compiled successfully.

EX. NO. : 3 **DATE:**

Object Oriented Programming Paradigm

Aim: To implement Object Oriented Programming Paradigm

Problem:

Write a Python class named SRMIST with six attributes school, dept1, dept2, dept2 and dept3. Add a new attribute specialization and display the entire attribute and their values of the said class. Now remove the dept1 and dept2 attribute and display the entire attribute with values.

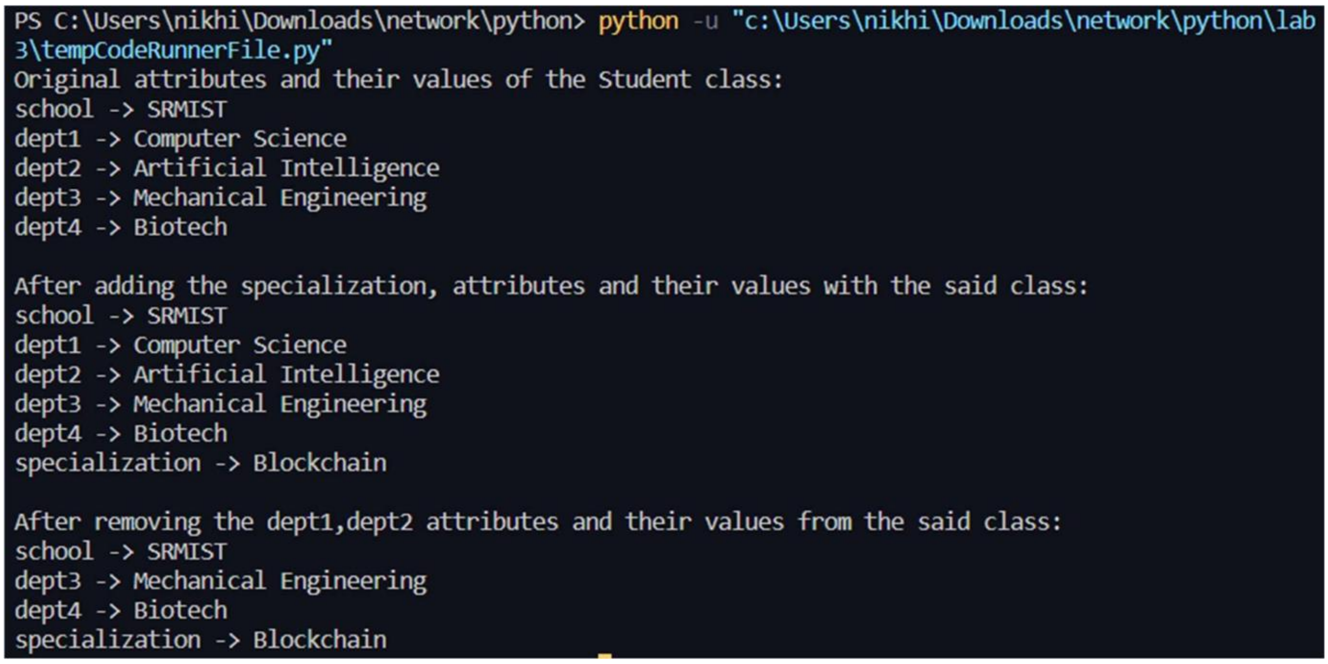
Algorithm:

Step 1: Create class ‘SRMIST’
Step 2: school=’SRMIST’ ,dep1=’Computer Science’, dept2=”Artificial Intelligence”,dep3=”Mech Engineering”,dep4=”Biotech”
Step 3: SRMIST. Specialization= ‘Blockchain’
Step 4: Print attributes with value
Step 5: Exit

Program:

```
class SRMIST:
    school = 'SRMIST'
    dept1 = 'Computer Science'
    dept2 = 'Artificial Intelligence'
    dept3 = 'Mechanical Engineering'
    dept4 = 'Biotech'
print("Original attributes and their values of the Student class:")
for attr, value in SRMIST.__dict__.items():
    if not attr.startswith('_'):
        print(f'{attr} -> {value}')
print("\nAfter adding the specialization, attributes and their values with the said
class:")
SRMIST.specialization  = 'Blockchain'
for attr, value in SRMIST.__dict__.items():
    if not attr.startswith('_'):
        print(f'{attr} -> {value}')
print("\nAfter removing the dept1,dept2 attributes and their values from the said
class:")
del  SRMIST.dept1
del  SRMIST.dept2
#delattr(Student,  'student_name')
for attr, value in SRMIST.__dict__.items():
    if not attr.startswith('_'):
        print(f'{attr} -> {value}')
```

Input/Output:



```
PS C:\Users\nikhi\Downloads\network\python> python -u "c:\Users\nikhi\Downloads\network\python\lab
3\tempCodeRunnerFile.py"
Original attributes and their values of the Student class:
school -> SRMIST
dept1 -> Computer Science
dept2 -> Artificial Intelligence
dept3 -> Mechanical Engineering
dept4 -> Biotech

After adding the specialization, attributes and their values with the said class:
school -> SRMIST
dept1 -> Computer Science
dept2 -> Artificial Intelligence
dept3 -> Mechanical Engineering
dept4 -> Biotech
specialization -> Blockchain

After removing the dept1,dept2 attributes and their values from the said class:
school -> SRMIST
dept3 -> Mechanical Engineering
dept4 -> Biotech
specialization -> Blockchain
```

Problem:

Write a Python program to crate four empty classes, CTECH, CINTEL, NWC and DSBS. Now create some instances and check whether they are instances of the said classes or not. Also, check whether the said classes are subclasses of the built-in object class or not.

Algorithm:

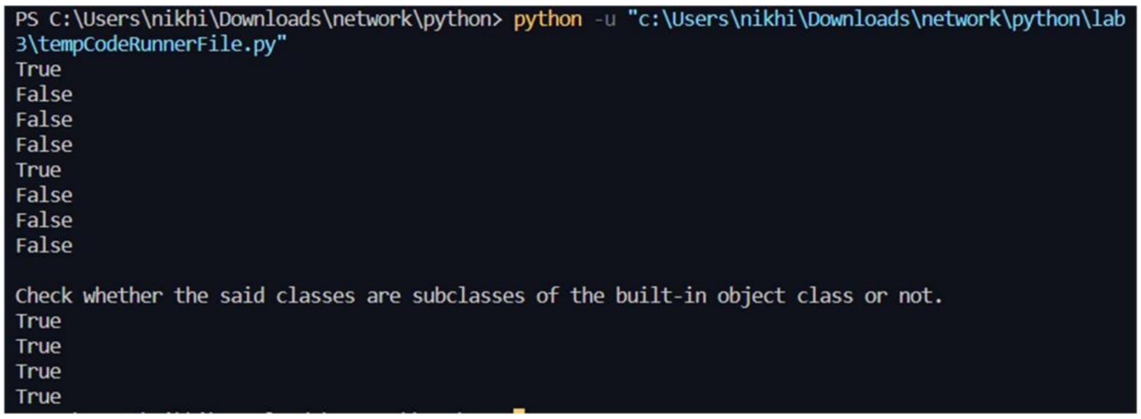
```
Step 1: class Ctech ;pass
        class Cintel; pass
        class NWC; pass
        class DSBS;pass
Step 2: student1=Ctech()
         Marks1=Cintel()
        Str=NWC()
        Ma=DSBS()
Step 3: print(isinstance(marks1,CINTEL)
Step 4: print(isinstance(Ctech,object)
Step 5: Exit
```

Program:

```
class CTECH:
    pass
class CINTEL:
    pass
class NWC:
    pass

class DSBS:
    pass

student1 = CTECH()
marks1 = CINTEL()
stu=NWC()
ma=DSBS()

print(isinstance(student1,  CTECH))
print(isinstance(marks1, CTECH))
print(isinstance(stu, CTECH))
print(isinstance(ma, CTECH))

print(isinstance(marks1, CINTEL))
print(isinstance(student1,  CINTEL))
print(isinstance(stu, CINTEL))
```

```
print(isinstance(ma,  CINTEL))

print("\nCheck whether the said classes are subclasses of the built-in object class or 
not.")
print(issubclass(CTECH,  object))
print(issubclass(CINTEL,  object))
print(issubclass(NWC, object))
print(issubclass(DSBS,  object))
```

Input/Output:



```
PS C:\Users\nikhi\Downloads\network\python> python -u "c:\Users\nikhi\Downloads\network\python\lab
3\tempCodeRunnerFile.py"
True
False
False
False
True
False
False
False

Check whether the said classes are subclasses of the built-in object class or not.
True
True
True
True
```

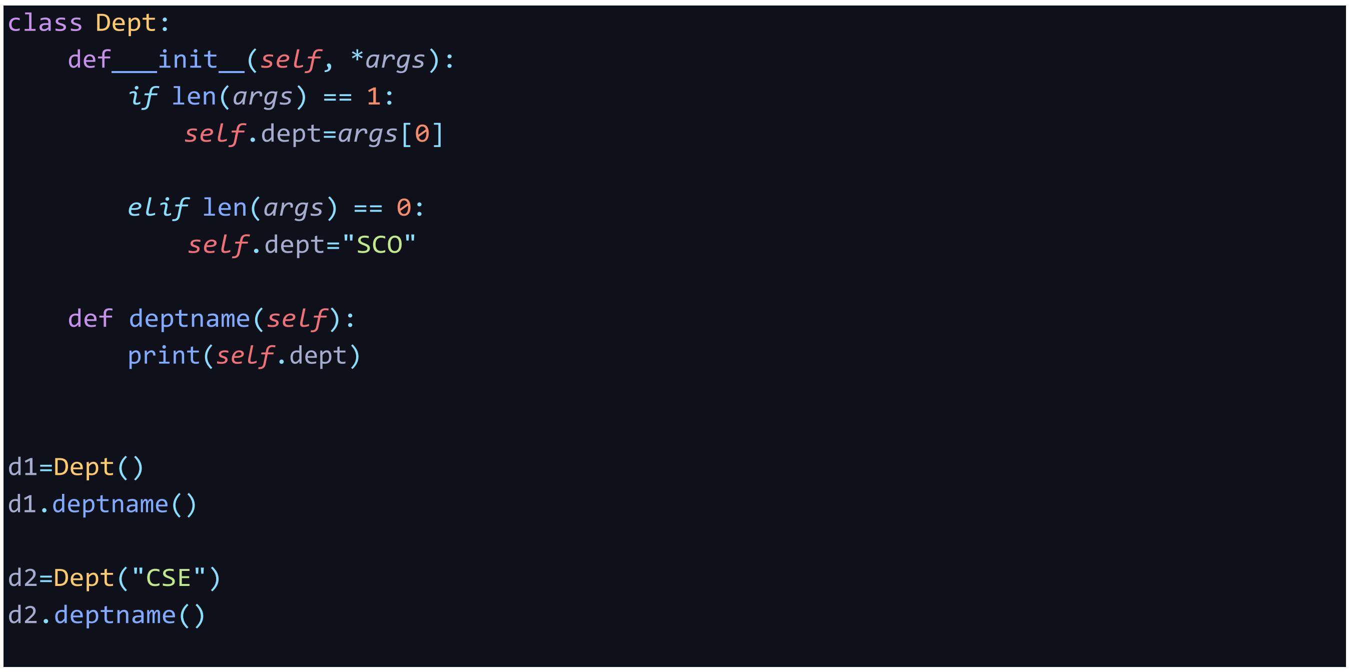
Problem:

Write a program to print the names of the departments students by creating a Dept class. If no name is passed while creating an object of the Dept class, then the name should be "SCO", otherwise the name should be equal to the String value passed while creating the object of the Dept class.

Algorithm:

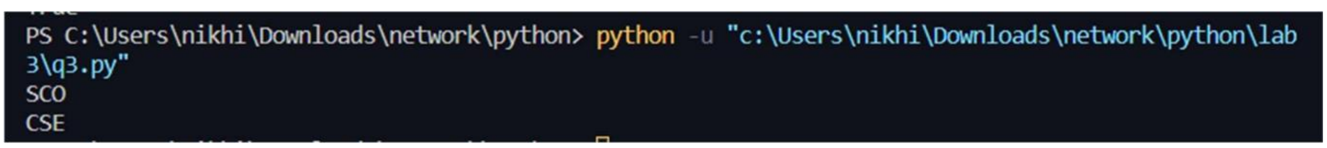
```
Step 1: def __init_(self,*args)
Step 2: if(len args)=1
Step 3: self.dept=args[0]
Step 4: elif(len(args))==0
Step 5: self.dept=’SLO’
Step 6: print self.dept
Step 7: Exit
```

Program:



```python
class Dept:
    def___init__(self, *args):
        if len(args) == 1:
            self.dept=args[0]

        elif len(args) == 0:
            self.dept="SCO"

    def deptname(self):
        print(self.dept)


d1=Dept()
d1.deptname()

d2=Dept("CSE")
d2.deptname()
```

Input/Output:



```
PS C:\Users\nikhi\Downloads\network\python> python -u "c:\Users\nikhi\Downloads\network\python\lab
3\q3.py"
SCO
CSE
```

Problem:

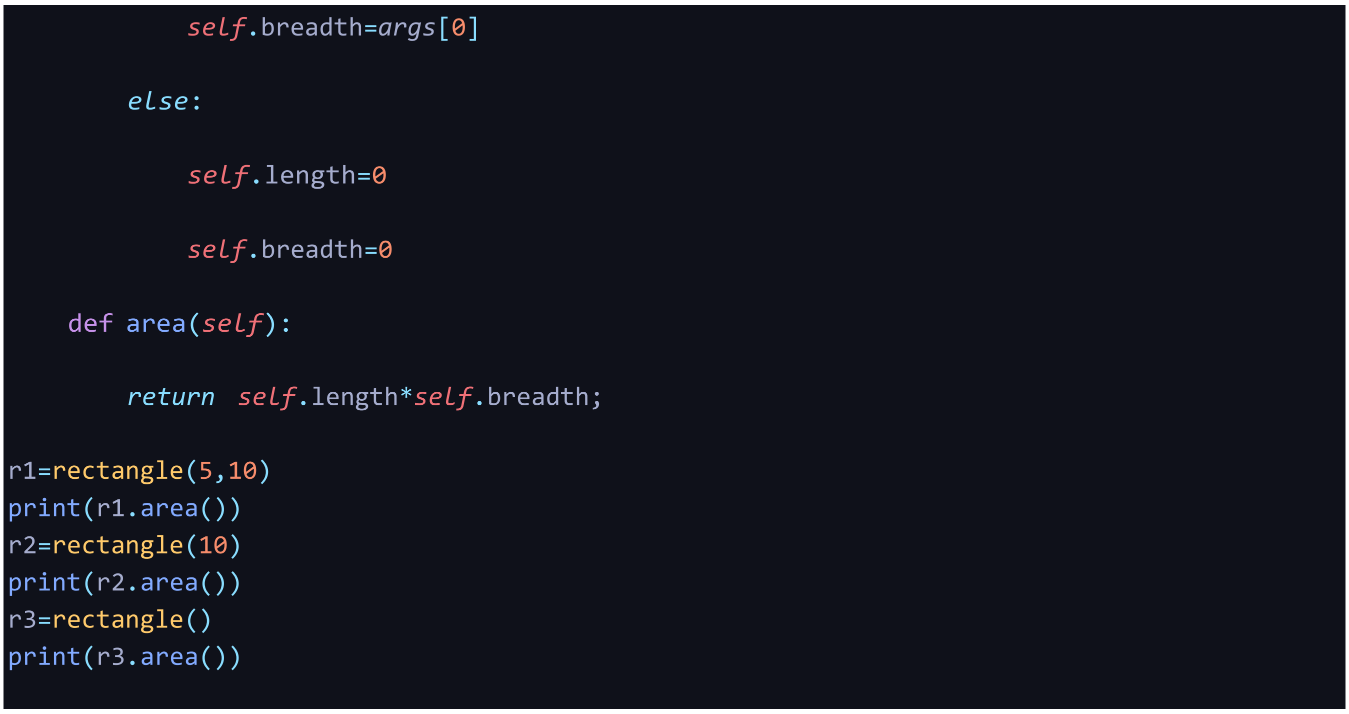
Create a class named 'Rectangle' with two data members- length and breadth and a function to calculate the area which is 'length*breadth'. The class has three constructors which are : having no parameter - values of both length and breadth are assigned zero.
having two numbers as parameters - the two numbers are assigned as length and breadth respectively.
having one number as parameter - both length and breadth are assigned that number.
Now, create objects of the 'Rectangle' class having none, one and two parameters and print their areas.

Algorithm:

```
Step 1: class Rectangle
Step 2: l=0,b=0
Step 3: def  __init_(self,*args)
Step 4: if(len (args))==2
          Selfl=args[0]
          Selfb=args[1]
Step 5: else
Step 6: self.l=0
          Self.b=0
Step 7: area=self.l*self.b
```

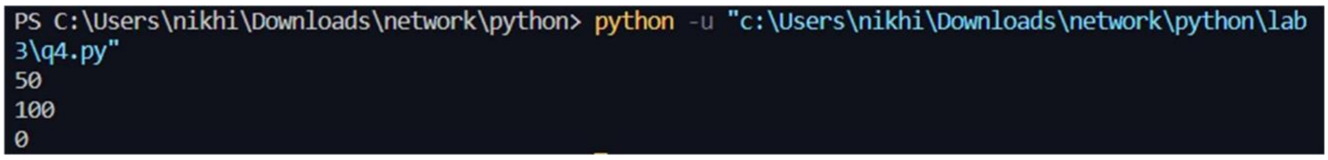
Program:

```
class rectangle:

    length=0

    breadth=0

    def___init__(self, *args):

        if len(args) == 2:

            self.length=args[0];

            self.breadth=args[1]

        elif len(args) == 1:

            self.length=args[0]
```



```
            self.breadth=args[0]

        else:

            self.length=0

            self.breadth=0

    def area(self):

        return  self.length*self.breadth;

r1=rectangle(5,10)
print(r1.area())
r2=rectangle(10)
print(r2.area())
r3=rectangle()
print(r3.area())
```

Input/Output:



```
PS C:\Users\nikhi\Downloads\network\python> python -u "c:\Users\nikhi\Downloads\network\python\lab
3\q4.py"
50
100
0
```

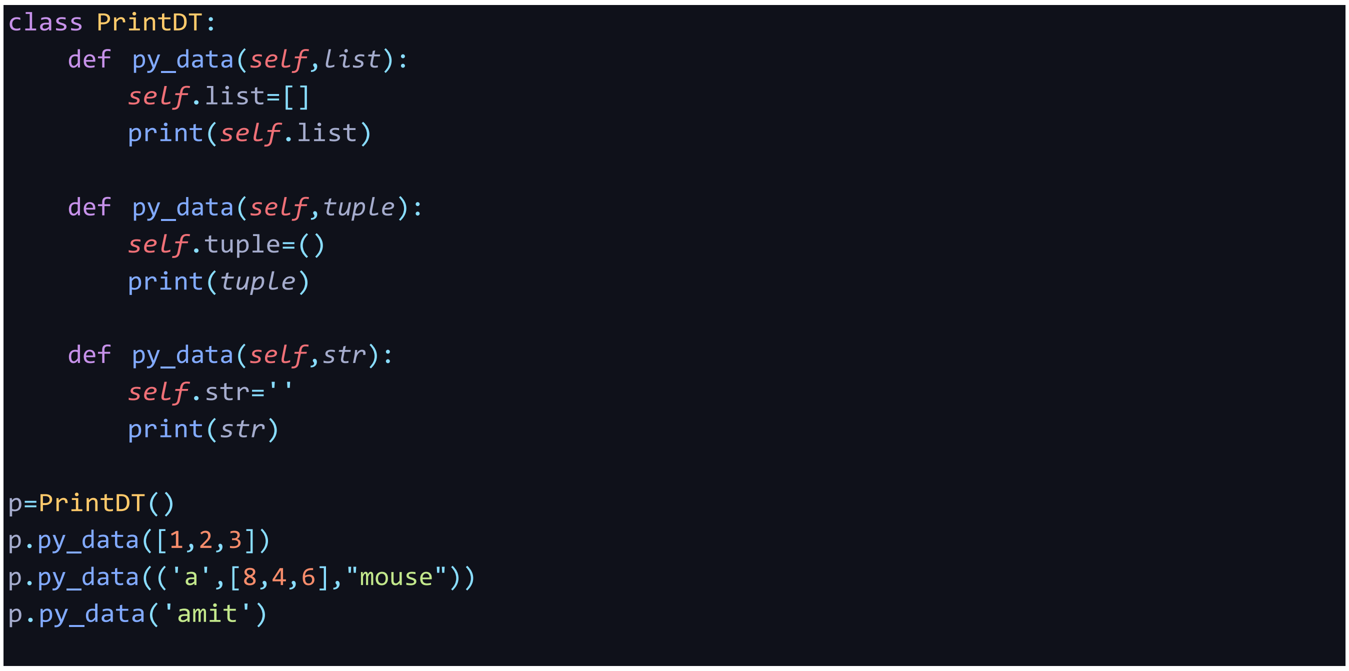
Problem:

Create a class named 'PrintDT' to print various numbers of different datatypes by creating different functions with the same name 'python_data' having a parameter for each datatype. (example : tuple, list, string)

Algorithm:

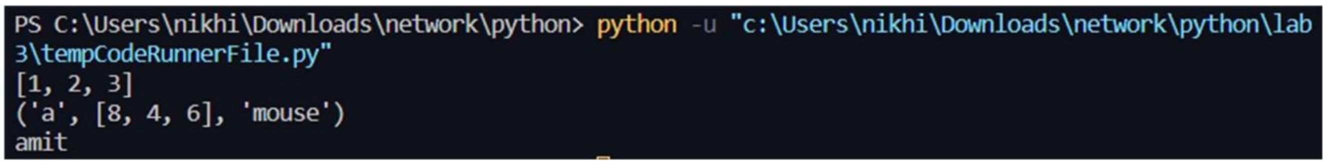
```
Step 1: def pyd(self,list)
Step 2: print self.list
Step 3: def pyd(self,tuple)
Step 4: print(tuple)
Step 5: def pyd(self,str)
Step 6: print(str)
Step 7: p=PrintDT()
Step 8: Exit
```

Program:



```
class PrintDT:
    def  py_data(self,list):
        self.list=[]
        print(self.list)

    def  py_data(self,tuple):
        self.tuple=()
        print(tuple)

    def  py_data(self,str):
        self.str=''
        print(str)

p=PrintDT()
p.py_data([1,2,3])
p.py_data(('a',[8,4,6],"mouse"))
p.py_data('amit')
```

Input/Output:



```
PS C:\Users\nikhi\Downloads\network\python> python -u "c:\Users\nikhi\Downloads\network\python\lab
3\tempCodeRunnerFile.py"
[1, 2, 3]
('a', [8, 4, 6], 'mouse')
amit
```

Problem:

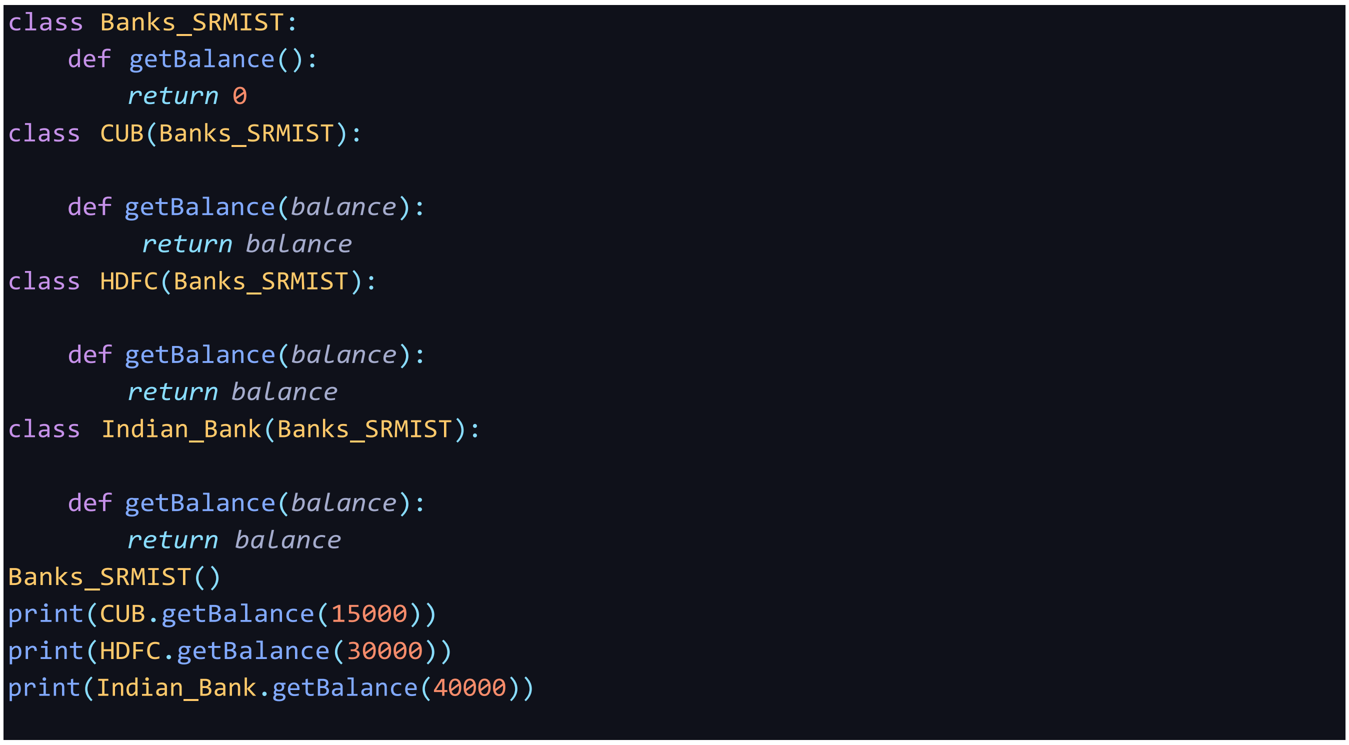
A student from SRMIST has his/her money deposited Rs.15000, Rs.30000 and Rs. 40,000 in banks-CUB, HDFC and Indian Bank respectively. We have to print the money deposited by him/her in a particular bank.
Create a class named 'Banks_SRMIST' with a function 'getBalance' which returns 0. Make its three subclasses named 'CUB', 'HDFC' and 'Indian_Bank' with a function with the same name 'getBalance' which returns the amount deposited in that particular bank. Call the function 'getBalance' by the object of each of the three banks.

Algorithm:

```
Step 1: class Bank_Srmist
Step 2: def getBalance()
Step 3: class WB(Banks_Srmist)
Step 4: def getBalance (balance)
Step 5: return balance
Step 6: class HDFC(Bank_Srmist)
Step 7: def getBalance(balance)
```

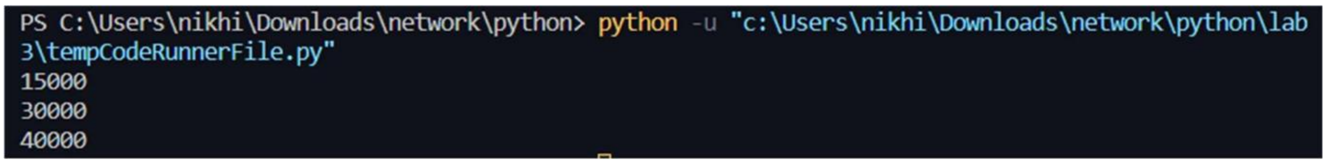
```
        Return balance
Step 8: print
Step 9: Exit
```

Program:



```python
class Banks_SRMIST:
    def getBalance():
        return 0
class CUB(Banks_SRMIST):

    def getBalance(balance):
         return balance
class HDFC(Banks_SRMIST):

    def getBalance(balance):
        return balance
class Indian_Bank(Banks_SRMIST):

    def getBalance(balance):
        return balance
Banks_SRMIST()
print(CUB.getBalance(15000))
print(HDFC.getBalance(30000))
print(Indian_Bank.getBalance(40000))
```

Input/Output:



```
PS C:\Users\nikhi\Downloads\network\python> python -u "c:\Users\nikhi\Downloads\network\python\lab
3\tempCodeRunnerFile.py"
15000
30000
40000
```

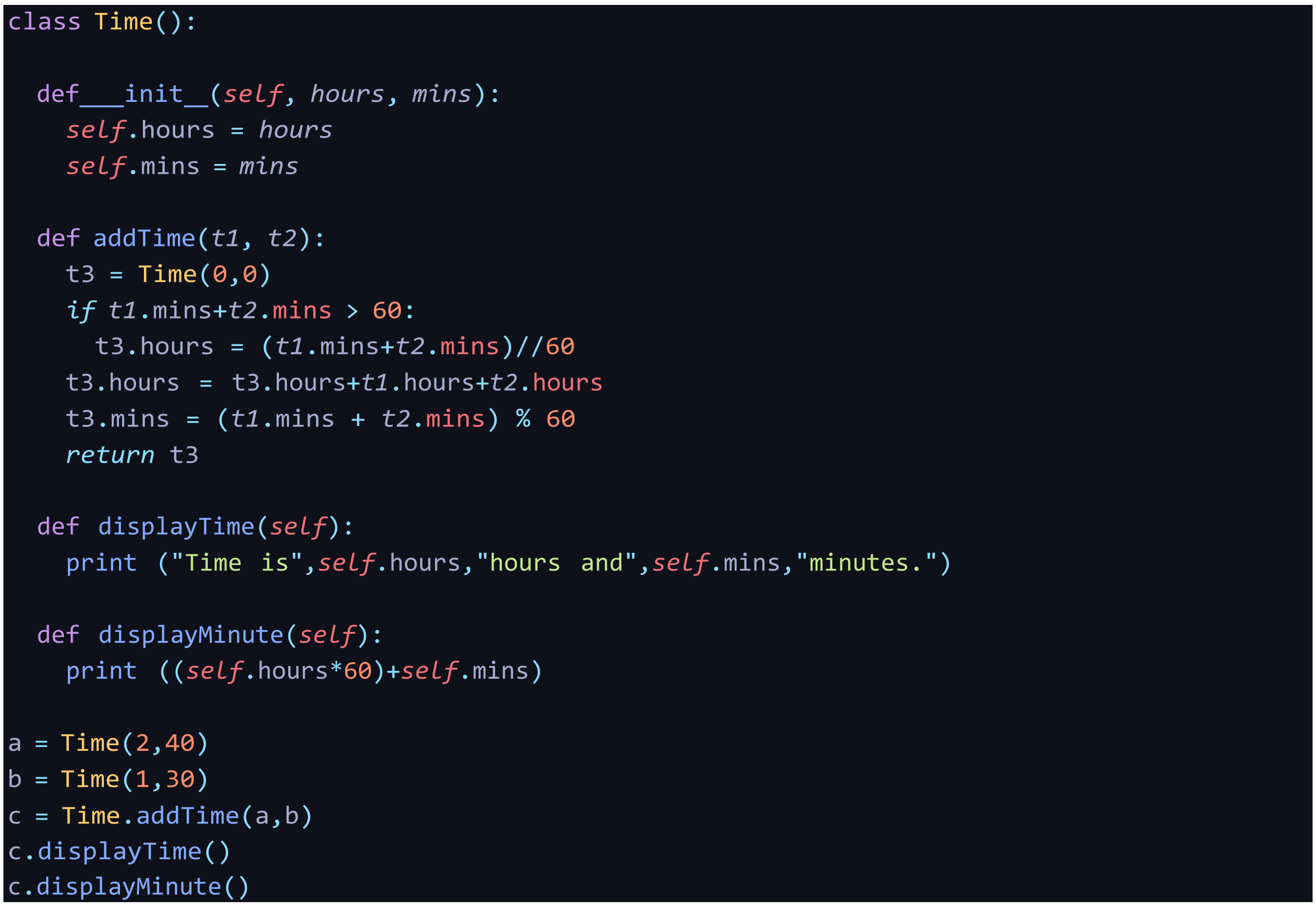
Problem:

Create a Time class and initialize it with hours and minutes.
 Make a method addTime which should take two time object and add them. E.g.- (2 hour and 50 min)+(1 hr and 20 min) is (4 hr and 10 min)
 Make a method displayTime which should print the time.
 Make a method DisplayMinute which should display the total minutes in the Time. E.g.- (1 hr 2 min) should display 62 minute.

Algorithm:

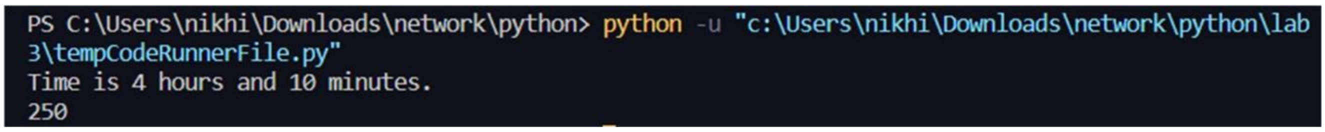
Step 1: create class Time
Step 2: def __init__(self,hours,min)
Step 3: self.hours=hours
Step 4: self.mins=mins
Step 5: def additive(t1,t2)
Step 6: t3.hours=t1.mins+t2.mins
Step 7: print
Step 8: Exit

Program:



```
class Time():

  def___init__(self, hours, mins):
    self.hours = hours
    self.mins = mins

  def addTime(t1, t2):
    t3 = Time(0,0)
    if t1.mins+t2.mins > 60:
      t3.hours = (t1.mins+t2.mins)//60
    t3.hours  = t3.hours+t1.hours+t2.hours
    t3.mins = (t1.mins + t2.mins) % 60
    return t3

  def displayTime(self):
    print ("Time is",self.hours,"hours and",self.mins,"minutes.")

  def displayMinute(self):
    print ((self.hours*60)+self.mins)

a = Time(2,40)
b = Time(1,30)
c = Time.addTime(a,b)
c.displayTime()
c.displayMinute()
```

Input/Output:



```
PS C:\Users\nikhi\Downloads\network\python> python -u "c:\Users\nikhi\Downloads\network\python\lab
3\tempCodeRunnerFile.py"
Time is 4 hours and 10 minutes.
250
```

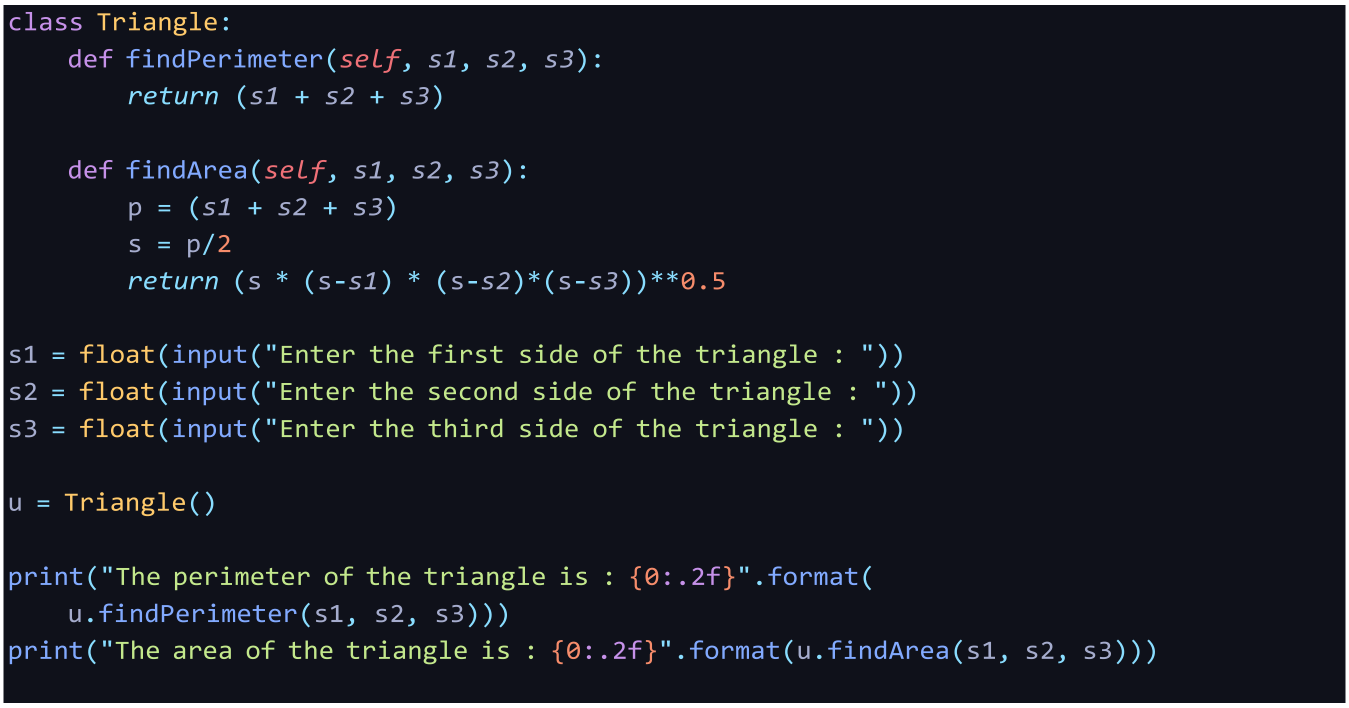
Problem:

Write a program to print the area and perimeter of a triangle having sides of 3, 4 and 5 units by creating a class named 'Triangle' with a function to print the area and perimeter.

Algorithm:

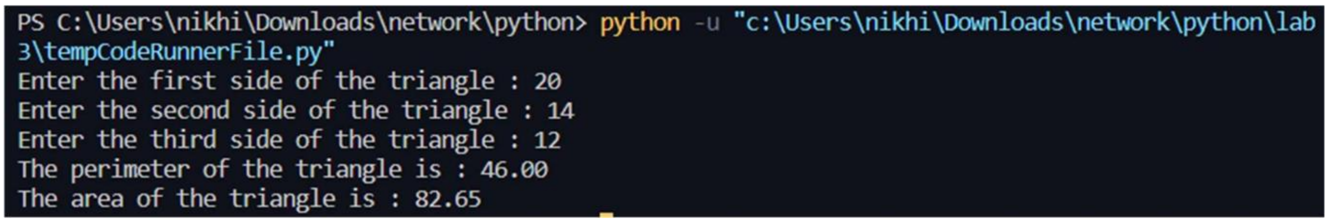
Step 1: Create class Traingle
Step 2: def findPerimeter(self,s1,s2,s3)
Step 3: findArea(self,s1,s2,s3)
Step 4: p=s1+s2+s3
Step 5: s=p/2
Step 6: area=(0.5(s*(s-s1)*(s-s2)*(s-s3))**
Step 7: print
Step 8: Exit

Program:



```
class Triangle:
    def findPerimeter(self, s1, s2, s3):
        return (s1 + s2 + s3)

    def findArea(self, s1, s2, s3):
        p = (s1 + s2 + s3)
        s = p/2
        return (s * (s-s1) * (s-s2)*(s-s3))**0.5

s1 = float(input("Enter the first side of the triangle : "))
s2 = float(input("Enter the second side of the triangle : "))
s3 = float(input("Enter the third side of the triangle : "))

u = Triangle()

print("The perimeter of the triangle is : {0:.2f}".format(
    u.findPerimeter(s1, s2, s3)))
print("The area of the triangle is : {0:.2f}".format(u.findArea(s1, s2, s3)))
```

Input/Output:



```
PS C:\Users\nikhi\Downloads\network\python> python -u "c:\Users\nikhi\Downloads\network\python\lab
3\tempCodeRunnerFile.py"
Enter the first side of the triangle : 20
Enter the second side of the triangle : 14
Enter the third side of the triangle : 12
The perimeter of the triangle is : 46.00
The area of the triangle is : 82.65
```

Result: Hence the Object Oriented Programming has been implemented and compiled successfully.

EX. NO.-4
DATE:

Event Driven Programming Paradigm

Aim: To implement Event Driven Programming Paradigm

Algorithm:

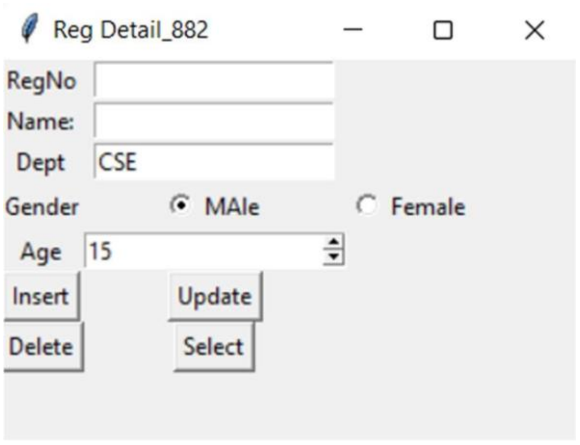
Step 1: import tkinter package
Step 2: define functions that works on button actions
Step 3: Create multiple labels and Text fields according to the requirement
Step 4: Call the defined functions in the command methods of button.
Step 5: Call the mainloop
Step 6: Exit

Program:

```python
import tkinter as tk
from tkinter import *
from tkinter import messagebox

def hello1():
    msg = messagebox.show_882info( "Confirmation","Inserted Sucessfully")
def hello2():
    msg = messagebox.show_882info( "Confirmation","Updated Sucessfully")
def hello3():
    msg = messagebox.show_882info( "Confirmation","Deleted Sucessfully")
def hello4():
    msg = messagebox.show_882info( "Confirmation","Select Button")
root_882=tk.Tk()
root_882.title('Reg Detail_882')
root_882.geometry('300x200')
l1_882=tk.Label(root_882,text="RegNo")
l1_882.grid(row=0)
t1_882=tk.Entry(root_882)
t1_882.grid(row=0,column=1)
l2_882=tk.Label(root_882,text="Name:")
l2_882.grid(row=1)
t2_882=tk.Entry(root_882)
t2_882.grid(row=1,column=1)
v = StringVar(root_882, value='CSE')
l3_882=tk.Label(root_882,text="Dept")
l3_882.grid(row=2)
t3_882=tk.Entry(root_882,textvariable=v)
t3_882.grid(row=2,column=1)
l4_882=tk.Label(root_882,text="Gender")
l4_882.grid(row=3)
radio1_882=IntVar()
```

```
radio2_882=IntVar()
rb1_882=Radiobutton(root_882,text='MAle',variable=radio1_882,value=0)
rb1_882.grid(row=3,column=1)
rb2_882=Radiobutton(root_882,text='Female',variable=radio1_882,value=1)
rb2_882.grid(row=3,column=2)
l5_882=tk.Label(root_882,text="Age")
l5_882.grid(row=4)
spin_882 = Spinbox(root_882,from_=15,to=20)
spin_882.grid(row=4,column=1)
b1_882=tk.Button(root_882, text='Insert',command=hello1)
b1_882.grid(row=5,column=0)
b2_882=tk.Button(root_882, text='Update',command=hello2)
b2_882.grid(row=5,column=1)
b3_882=tk.Button(root_882, text='Delete',command=hello3)
b3_882.grid(row=6,column=0)
b4_882=tk.Button(root_882, text='Select',command=hello4)
b4_882.grid(row=6,column=1)
root_882.mainloop()
```

Input/Output:


Reg Detail_882

RegNo

Name:

Dept CSE

Gender (●) MAle ( ) Female

Age 15

Algorithm:

Step 1: import tkinter package
Step 2: define functions that works on button actions
Step 3: Create multiple labels and Text fields according to the requirement
Step 4: Call the defined functions in the command methods of button.
Step 5: Call the mainloop
Step 6: Exit

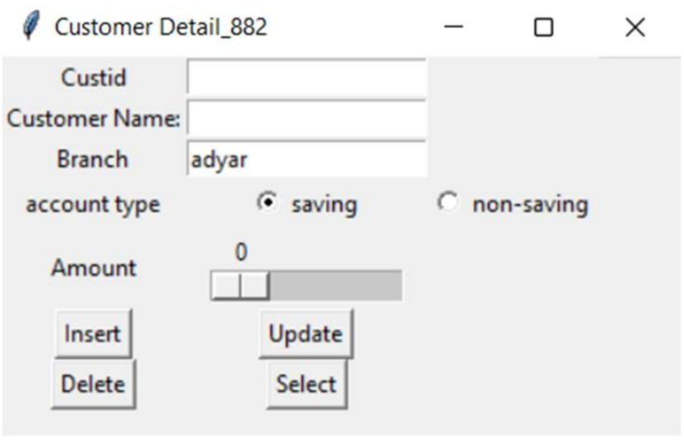
Program:

```
import tkinter as tk
from tkinter import *
```

```python
from tkinter import messagebox

def  hello1():
    msg  =  messagebox.show_882info(  "Confirmation","Inserted  Sucessfully")
def hello2():
    msg  =  messagebox.show_882info(  "Confirmation","Updated  Sucessfully")
def hello3():
    msg  =  messagebox.show_882info(  "Confirmation","Deleted  Sucessfully")
def hello4():
    msg  =  messagebox.show_882info(  "Confirmation","Select  Button")
root_882=tk.Tk()
root_882.title('tk')
root_882.geometry('300x200')
l1_882=tk.Label(root_882,text="Custid")
l1_882.grid(row=0)
t1_882=tk.Entry(root_882)
t1_882.grid(row=0,column=1)
l2_882=tk.Label(root_882,text="Customer Name:")
l2_882.grid(row=1)
t2_882=tk.Entry(root_882)
t2_882.grid(row=1,column=1)
```

```python
v = StringVar(root_882, value='adyar')
l3_882=tk.Label(root_882,text="Branch")
l3_882.grid(row=2)
t3_882=tk.Entry(root_882,textvariable=v)
t3_882.grid(row=2,column=1)
l4_882=tk.Label(root_882,text="account type")
l4_882.grid(row=3)
radio1_882=IntVar()
radio2_882=IntVar()
rb1_882=Radiobutton(root_882,text='saving',variable=radio1_882,value=0)
rb1_882.grid(row=3,column=1)
rb2_882=Radiobutton(root_882,text='non-saving',variable=radio1_882,value=1)
rb2_882.grid(row=3,column=2)
l5_882=tk.Label(root_882,text="Amount")
l5_882.grid(row=4)
w_882  =  Scale(root_882,  from_=0,  to=200,  orient=HORIZONTAL)
w_882.grid(row=4,column=1)
b1_882=tk.Button(root_882, text='Insert',command=hello1)
b1_882.grid(row=5,column=0)
b2_882=tk.Button(root_882, text='Update',command=hello2)
b2_882.grid(row=5,column=1)
b3_882=tk.Button(root_882, text='Delete',command=hello3)
b3_882.grid(row=6,column=0)
b4_882=tk.Button(root_882, text='Select',command=hello4)
b4_882.grid(row=6,column=1)
root_882.mainloop()
```

Input/Output:



Algorithm:

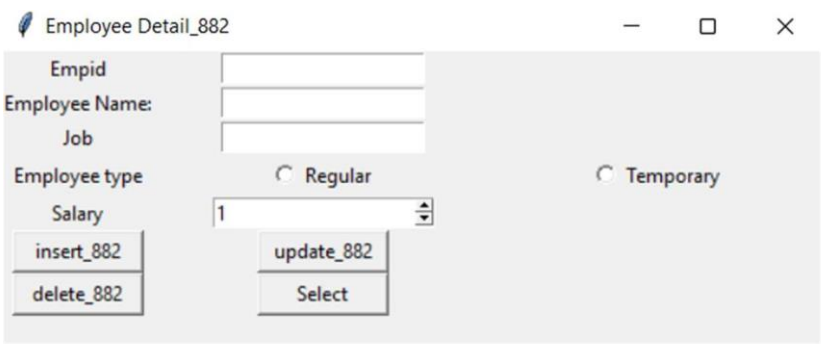
Step 1: import tkinter package
Step 2: define functions that works on button actions
Step 3: Create multiple labels and Text fields according to the requirement
Step 4: Call the defined functions in the command methods of button.
Step 5: Call the mainloop
Step 6: Exit

Program:

```
import tkinter as tk
from tkinter import *

root_882=tk.Tk()
root_882.title('Employee Detail_882')
l1_882=tk.Label(root_882,text="Empid")
l1_882.grid(row=0)
t1=tk.Entry(root_882)
t1.grid(row=0,column=1)
l2=tk.Label(root_882,text="Employee  Name:")
l2.grid(row=1)
t2_882=tk.Entry(root_882)
t2_882.grid(row=1,column=1)
l3_882=tk.Label(root_882,text="Job")
l3_882.grid(row=2)
t3_882=tk.Entry(root_882)
t3_882.grid(row=2,column=1)
emty=IntVar()
def emtype():
    print(emty.get())
g=tk.Label(root_882,text="Employee  type")
g.grid(row=3,column=0)
```

```
g1=Radiobutton(root_882,text="Regular",variable=emty,width=25,value=1,command=emtype)
g1.grid(row=3,column=1)
g2=Radiobutton(root_882,text="Temporary",variable=emty,width=25,value=2,command=emtype)
g2.grid(row=3,column=2)
age=tk.Label(root_882,text="Salary")
age.grid(row=4,column=0)
age=Spinbox(root_882,from_=1, to = 30)
age.grid(row=4,column=1)
insert_882=tk.Button(root_882,text="insert_882",width=10,command=root_882.destroy)
insert_882.grid(row=5,column=0)
update_882=tk.Button(root_882,text="update_882",width=10,command=root_882.destroy)
update_882.grid(row=5,column=1)
delete_882=tk.Button(root_882,text="delete_882",width=10,command=root_882.destroy)
delete_882.grid(row=6,column=0)
select=tk.Button(root_882,text="Select",width=10,command=root_882.destroy)
select.grid(row=6,column=1)

root_882.mainloop()
```

Input/Output:



Algorithm:

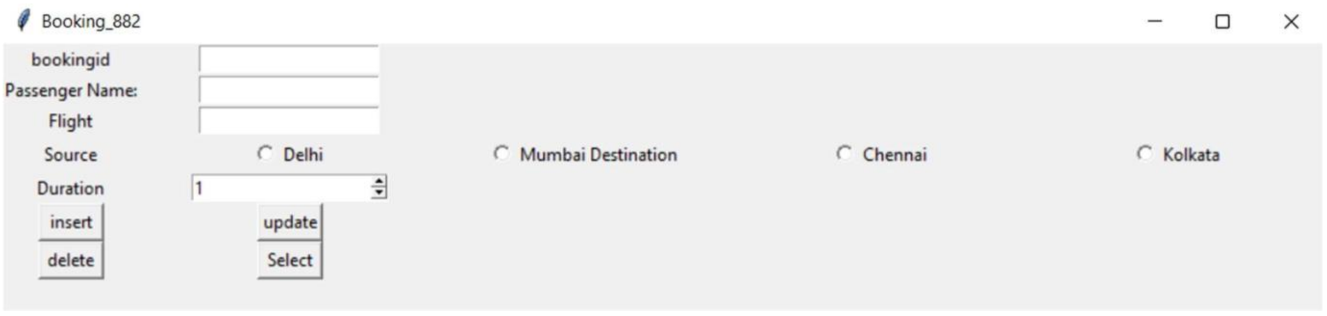
Step 1: import tkinter package
Step 2: define functions that works on button actions
Step 3: Create multiple labels and Text fields according to the requirement
Step 4: Call the defined functions in the command methods of button.
Step 5: Call the mainloop
Step 6: Exit

Program:

```
import tkinter as tk
from tkinter import *

root_882=tk.Tk()
root_882.title('Booking_882')
l1_882=tk.Label(root_882,text="bookingid")
```

```
l1_882.grid(row=0)
t1_882=tk.Entry(root_882)
t1_882.grid(row=0,column=1)
l2_882=tk.Label(root_882,text="Passenger Name:")
l2_882.grid(row=1)
t2_882=tk.Entry(root_882)
t2_882.grid(row=1,column=1)
l3_882=tk.Label(root_882,text="Flight")
l3_882.grid(row=2)
t3_882=tk.Entry(root_882)
t3_882.grid(row=2,column=1)
fli=IntVar()
def flidis():
    print(fli.get())
g=tk.Label(root_882,text="Source")
g.grid(row=3,column=0)
g1=Radiobutton(root_882,text="Delhi",variable=fli,width=25,value=1,command=flidis)
g1.grid(row=3,column=1)
g2=Radiobutton(root_882,text="Mumbai
Destination",variable=fli,width=25,value=2,command=flidis)
g2.grid(row=3,column=2)
g2=Radiobutton(root_882,text="Chennai",variable=fli,width=25,value=3,command=flidis)
g2.grid(row=3,column=3)
g2=Radiobutton(root_882,text="Kolkata",variable=fli,width=25,value=4,command=flidis)
g2.grid(row=3,column=4)
age=tk.Label(root_882,text="Duration")
age.grid(row=4,column=0)
age=Spinbox(root_882,from_=1, to = 30)
age.grid(row=4,column=1)
insert_882=tk.Button(root_882,text="insert",width=5,command=root_882.destroy)
insert_882.grid(row=5,column=0)
update_882=tk.Button(root_882,text="update",width=5,command=root_882.destroy)
update_882.grid(row=5,column=1)
delete_882=tk.Button(root_882,text="delete",width=5,command=root_882.destroy)
delete_882.grid(row=6,column=0)
select=tk.Button(root_882,text="Select",width=5,command=root_882.destroy)
select.grid(row=6,column=1)

root_882.mainloop()
```

Input/Output:



Algorithm:

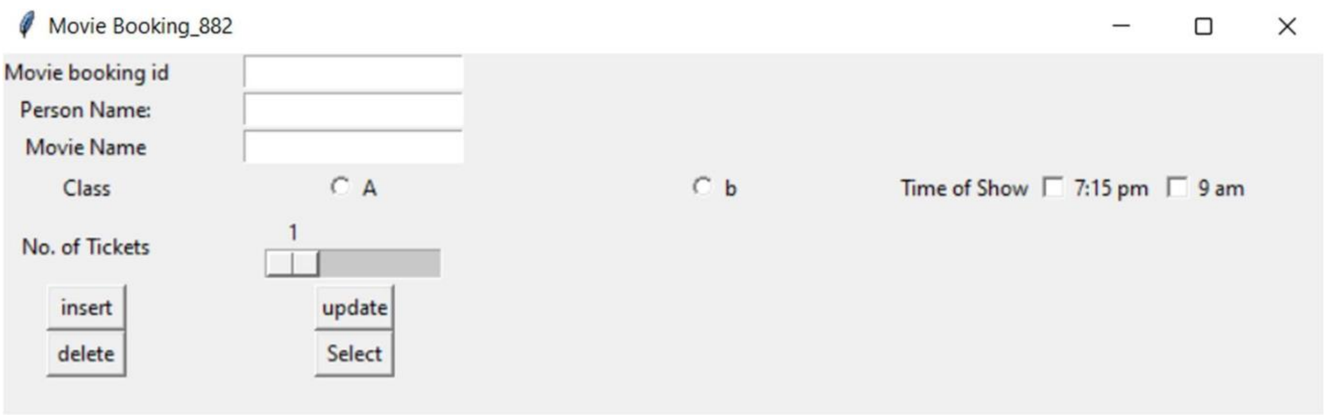
Step 1: import tkinter package
Step 2: define functions that works on button actions
Step 3: Create multiple labels and Text fields according to the requirement
Step 4: Call the defined functions in the command methods of button.
Step 5: Call the mainloop
Step 6: Exit

Program:

```
import tkinter as tk
from tkinter import *

root_882=tk.Tk()
root_882.geometry("750x250")
root_882.title('Movie  Booking_882')
l1_882=tk.Label(root_882,text="Movie  booking  id")
l1_882.grid(row=0)
t1_882=tk.Entry(root_882)
t1_882.grid(row=0,column=1)
l2_882=tk.Label(root_882,text="Person  Name:")
l2_882.grid(row=1)
t2_882=tk.Entry(root_882)
t2_882.grid(row=1,column=1)
l3_882=tk.Label(root_882,text="Movie  Name")
l3_882.grid(row=2)
t3_882=tk.Entry(root_882)
t3_882.grid(row=2,column=1)
boo=IntVar()
def tick():
    print(boo.get())
g=tk.Label(root_882,text="Class")
g.grid(row=3,column=0)
g1=Radiobutton(root_882,text="A",variable=boo,width=25,value=1,command=tick)
g1.grid(row=3,column=1)
g2=Radiobutton(root_882,text="b",variable=boo,width=25,value=2,command=tick)
```

```
g2.grid(row=3,column=2)
g=tk.Label(root_882,text="Time of Show")
g.grid(row=3,column=3)
g1=Checkbutton(root_882, text='7:15 pm')
g1.grid(row=3,column=4)
g2=Checkbutton(root_882, text='9 am')
g2.grid(row=3,column=5)
age=tk.Label(root_882,text="No.  of  Tickets")
age.grid(row=4,column=0)
age=Scale(root_882, from_=1, to= 20, orient=HORIZONTAL)
age.grid(row=4,column=1)
insert_882=tk.Button(root_882,text="insert",width=5,command=root_882.destroy)
insert_882.grid(row=5,column=0)
update_882=tk.Button(root_882,text="update",width=5,command=root_882.destroy)
update_882.grid(row=5,column=1)
delete_882=tk.Button(root_882,text="delete",width=5,command=root_882.destroy)
delete_882.grid(row=6,column=0)
select=tk.Button(root_882,text="Select",width=5,command=root_882.destroy)
select.grid(row=6,column=1)

root_882.mainloop()
```

Input/Output:



Algorithm:

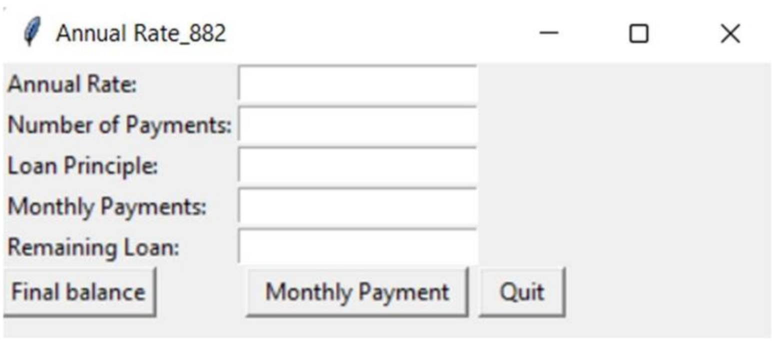
Step 1: import tkinter package
Step 2: define functions that works on button actions
Step 3: Create multiple labels and Text fields according to the requirement
Step 4: Call the defined functions in the command methods of button.
Step 5: Call the mainloop
Step 6: Exit

Program:

```
import tkinter as tk
from tkinter import *

root_882=tk.Tk()
root_882.geometry("400x200")
root_882.title('Annual Rate_882')
l1_882=tk.Label(root_882,text="Annual Rate:")
l1_882.grid(row=0,sticky='w')
t1_882=tk.Entry(root_882)
t1_882.grid(row=0,column=1,sticky='w')
l2_882=tk.Label(root_882,text="Number of Payments:")
l2_882.grid(row=1,sticky='w')
t2_882=tk.Entry(root_882)
t2_882.grid(row=1,column=1,sticky='w')
l3_882=tk.Label(root_882,text="Loan Principle:")
l3_882.grid(row=2,sticky='w')
```

```
t3_882=tk.Entry(root_882)
t3_882.grid(row=2,column=1,sticky='w')
l2_882=tk.Label(root_882,text="Monthly Payments:")
l2_882.grid(row=3,sticky='w')
t2_882=tk.Entry(root_882)
t2_882.grid(row=3,column=1,sticky='w')
l2_882=tk.Label(root_882,text="Remaining Loan:")
l2_882.grid(row=4,sticky='w')
t2_882=tk.Entry(root_882)
t2_882.grid(row=4,column=1,sticky='w')
final=tk.Button(root_882,text="Final balance",width=10,command=root_882.destroy)
final.grid(row=5,column=0,sticky='w')
monthly=tk.Button(root_882,text="Monthly Payment",width=15,command=root_882.destroy)
monthly.grid(row=5,column=1)
qui=tk.Button(root_882,text="Quit",width=5,command=root_882.destroy)
qui.grid(row=5,column=2,sticky=tk.N)
root_882.mainloop()
```

Input/Output:



Annual Rate:
Number of Payments:
Loan Principle:
Monthly Payments:
Remaining Loan:

Algorithm:

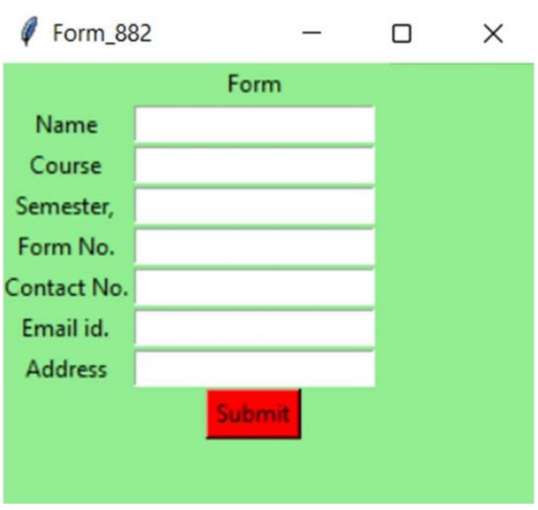
Step 1: import tkinter package
Step 2: define functions that works on button actions
Step 3: Create multiple labels and Text fields according to the requirement
Step 4: Call the defined functions in the command methods of button.
Step 5: Call the mainloop
Step 6: Exit

Program:

```
from tkinter import *

master = Tk()
myText=StringVar()
master.title('Form_882')
Label(master,  text="Form",bg='light  green').grid(row=0,column=1)
Label(master, text="Name",bg='light green').grid(row=1)
Label(master, text="Course",bg='light green').grid(row=2)
Label(master, text="Semester,",bg='light green').grid(row=3)
Label(master, text="Form No.",bg='light green').grid(row=4)
Label(master, text="Contact No.",bg='light green').grid(row=5)
Label(master, text="Email id.",bg='light green').grid(row=6)
Label(master, text="Address",bg='light green').grid(row=7)
master.configure(bg='light green')

e1_882 = Entry(master)
e2_882 = Entry(master)
e3_882 = Entry(master)
e4_882 = Entry(master)
e5_882 = Entry(master)
e6_882 = Entry(master)
e7_882 = Entry(master)

e1_882.grid(row=1,  column=1)
e2_882.grid(row=2,  column=1)
```

```
e3_882.grid(row=3,  column=1)
e4_882.grid(row=4,  column=1)
e5_882.grid(row=5,  column=1)
e6_882.grid(row=6,  column=1)
e7_882.grid(row=7,  column=1)
b = Button(master, text="Submit",bg='RED')
b.grid(row=8,column=1)
mainloop()
```

Input/Output:



Algorithm:

Step 1: import tkinter package
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Step 6: Exit

Program:

```
from tkinter import *

expression = ""


def press(num):
    global expression
    expression = expression + str(num)
    equation.set(expression)
```

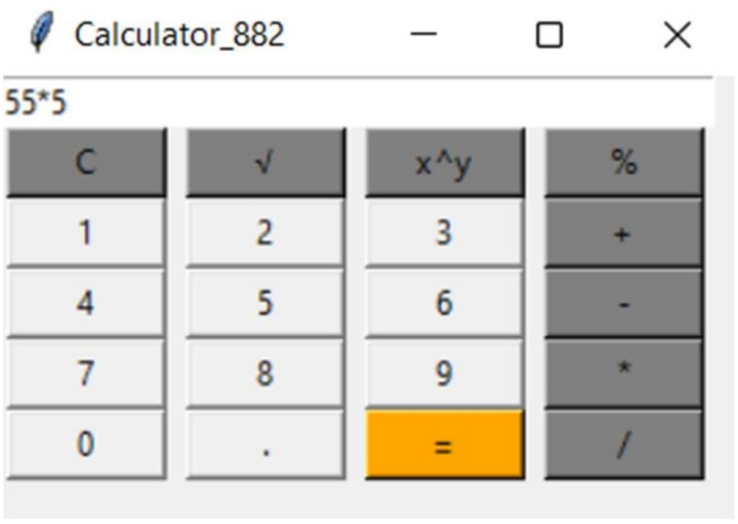
```
def equalpress():
    try:
        global expression
        total = str(eval(expression))
        equation.set(total)
        expression = ""
    except:
        equation.set(" error ")
        expression = ""


def clear():
    global expression
    expression = ""
    equation.set("0")


if___name___== "_main_":
    gui = Tk()
    gui.title("Calculator_882")
    gui.geometry("270x150")
    equation = StringVar()
    expression_field  = Entry(gui, textvariable=equation)
    expression_field.grid(columnspan=4, ipadx=70)
    clrscr = Button(gui, text=' C ', fg='black', bg='grey',
                    command=clear, height=1, width=7)
    clrscr.grid(row=2, column=0)

    squareRoot = Button(gui, text=' √ ', fg='black', bg='grey',
                        command=lambda: press('√'), height=1, width=7)
    squareRoot.grid(row=2, column=1)

    exponent  = Button(gui, text='  x^y  ', fg='black', bg='grey',
                       command=lambda: press('^'), height=1, width=7)
    exponent.grid(row=2, column=2)

    percent = Button(gui, text=' % ', fg='black', bg='grey',
                     command=lambda: press('%'), height=1, width=7)
```

```
    percent.grid(row=2, column=3)

    num1 = Button(gui, text=' 1 ', fg='black',
                  command=lambda: press(1), height=1, width=7)
    num1.grid(row=3, column=0)

    num2 = Button(gui, text=' 2 ', fg='black',
                  command=lambda: press(2), height=1, width=7)
    num2.grid(row=3, column=1)
```

```
num3 = Button(gui, text=' 3 ', fg='black',
  command=lambda: press(3), height=1, width=7)
num3.grid(row=3, column=2)

plus = Button(gui, text=' + ', fg='black', bg='grey',
              command=lambda: press('+'), height=1, width=7)
plus.grid(row=3, column=3)

num4 = Button(gui, text=' 4 ', fg='black',
              command=lambda: press(4), height=1, width=7)
num4.grid(row=4, column=0)

num5 = Button(gui, text=' 5 ', fg='black',
              command=lambda: press(5), height=1, width=7)
num5.grid(row=4, column=1)

num6 = Button(gui, text=' 6 ', fg='black',
              command=lambda: press(6), height=1, width=7)
num6.grid(row=4, column=2)

minus = Button(gui, text=' - ', fg='black', bg='grey',
               command=lambda: press("-"), height=1, width=7)
minus.grid(row=4, column=3)

num7 = Button(gui, text=' 7 ', fg='black',
              command=lambda: press(7), height=1, width=7)
num7.grid(row=5, column=0)

num8 = Button(gui, text=' 8 ', fg='black',
              command=lambda: press(8), height=1, width=7)
num8.grid(row=5, column=1)

num9 = Button(gui, text=' 9 ', fg='black',
              command=lambda: press(9), height=1, width=7)
num9.grid(row=5, column=2)

multiply = Button(gui, text=' * ', fg='black', bg='grey',
                  command=lambda: press('*'), height=1, width=7)
multiply.grid(row=5, column=3)

num0 = Button(gui, text=' 0 ', fg='black',
              command=lambda: press(0), height=1, width=7)
num0.grid(row=6, column=0)

decimal = Button(gui, text=' . ', fg='black',
                 command=lambda: press('.'), height=1, width=7)
decimal.grid(row=6, column=1)
```

```
    equals = Button(gui, text=' = ', fg='black', bg='orange',
                    command=equalpress, height=1, width=7)
  equals.grid(row=6, column=2)

    divide = Button(gui, text=' / ', fg='black', bg='grey',
                    command=lambda: press('/'), height=1, width=7)
    divide.grid(row=6, column=3)

    # start the GUI
    gui.mainloop()
```

Input/Output:



55*5

Algorithm:

Step 1: import tkinter package
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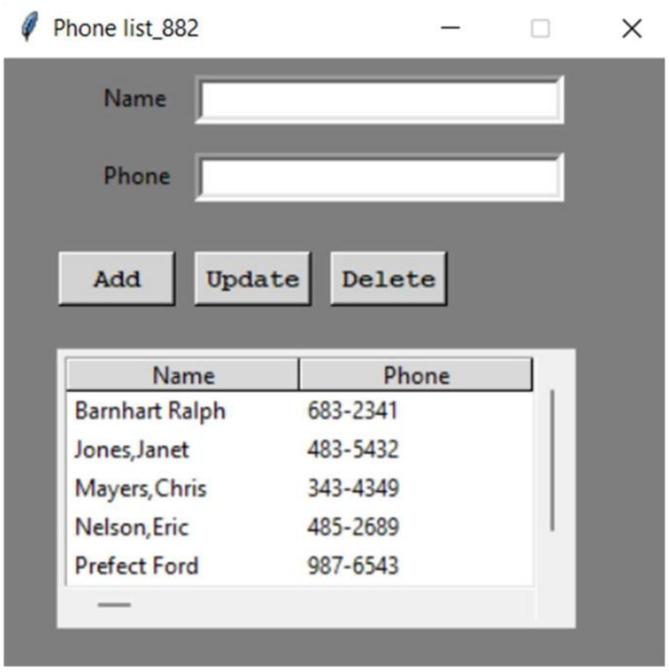
Step 6: Exit

Program:

```
from tkinter import *
from tkinter import ttk
root = Tk()
root.title("Phone  list_882")
root.geometry("350x320")
root.resizable(0, 0)
root.configure(background="#7F7F7F")
```

```
name  = Label(root, text="Name",background="#7F7F7F").place(x=51, y=10)
nameEntry = Entry(root, width=30,bd=4).place(x=101, y=9)
phone  = Label(root, text="Phone", background="#7F7F7F").place(x=51, y=50)
phoneEntry = Entry(root, width=30,bd=4).place(x=101, y=49)
add = Button(root, text="Add", bg="light grey",padx=13,font=("Courier
New",10,'bold')).place(x=31, y=100)
update  = Button(root, text="Update",bg="light grey",font=("Courier
New",10,'bold')).place(x=101, y=100)
delete  = Button(root, text="Delete", bg="light grey",font=("Courier
New",10,'bold')).place(x=171, y=100)
f1=Frame(root,bd=4)
f1.pack()
sb=Scrollbar(f1)
sb.pack(side=RIGHT,fill=Y)
sb2= Scrollbar(f1, orient="horizontal")
sb2.pack(side=BOTTOM, fill=X)
f1.place(x=30, y=150)
tree  = ttk.Treeview(f1,height=5,columns=(1,2),show='headings')
sb.configure(command=tree.yview)
tree.configure(yscrollcommand=sb.set)
tree.column(1,width=120)
tree.column(2,width=120)
tree.heading(1, text="Name")
tree.heading(2, text="Phone")
tree.insert(parent="", index=0, values=("Barnhart Ralph", "683-2341"))
tree.insert(parent="", index=1, values=("Jones,Janet", "483-5432"))
tree.insert(parent="", index=2, values=("Mayers,Chris", "343-4349"))
tree.insert(parent="", index=3, values=("Nelson,Eric", "485-2689"))
tree.insert(parent="", index=4, values=("Prefect Ford", "987-6543"))
tree.insert(parent="", index=5, values=("Smith,Bob", "689-1234"))
tree.insert(parent="", index=6, values=("Smith,Robert", "689-1234"))
tree.pack(side=LEFT)
s = ttk.Style()
s.theme_use("default")
s.map("Treeview")
root.mainloop()
```

Input/Output:



Name	Phone
Barnhart Ralph	683-2341
Jones,Janet	483-5432
Mayers,Chris	343-4349
Nelson,Eric	485-2689
Prefect Ford	987-6543

Algorithm:

Step 1: import tkinter package
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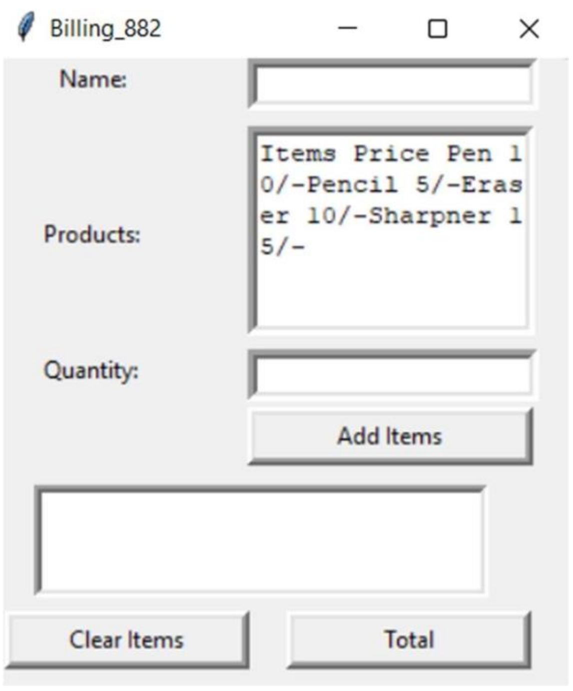
Step 6: Exit

Program:

```
from tkinter import *
r=Tk()
r.title("Billing_882")
r.geometry("285x325")
label1=Label(r,text="Name:")
label1.place(x=30,y=0)
entry1=Entry(r,bd=5,width=23)
entry1.place(x=130,y=0)
text1=Text(r,height=6,width=17,bd=5)
text1.place(x=130,y=35)
s1 = """Items Price"""
s2 = """ """
s3 = """Pen 10/-"""
s4 = """Pencil 5/-"""
s5 = """Eraser 10/-"""
s6 = """Sharpner 15/-"""
```

```
text1.insert(END,s1)
text1.insert(END,s2)
text1.insert(END,s3)
text1.insert(END,s4)
text1.insert(END,s5)
text1.insert(END,s6)
entry2=Entry(r,bd=5,width=23)
entry2.place(x=130,y=150)
label2=Label(r,text="Products:")
label2.place(x=22,y=80)
label3=Label(r,text="Quantity:")
label3.place(x=22,y=150)
button1=Button(r,text="Add Items",width=19,bd=4)
button1.place(x=130,y=180)
text2=Text(r,height=3,width=28,bd=4)
text2.place(x=20,y=220)
button2=Button(r,text="Clear Items",bd=4,width=16)
button2.place(x=5,y=285)
button3=Button(r,text="Total",bd=4,width=16)
button3.place(x=150,y=285)
r.mainloop()
```

Input/Output:



```
Items Price Pen 1
0/-Pencil 5/-Eras
er 10/-Sharpner 1
5/-
```

Algorithm:

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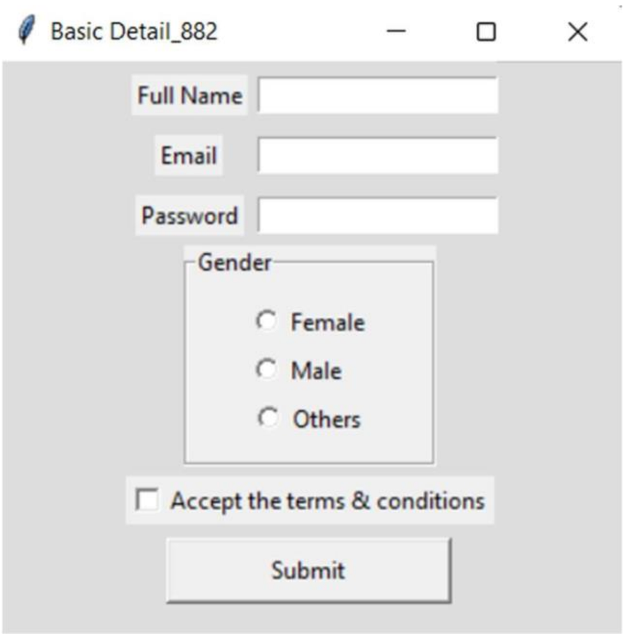
Step 6: Exit

Program:

```
from tkinter import *
ws_882 =Tk()
ws_882.title('Basic Detail_882')
ws_882.geometry('250x300')
ws_882.configure(bg='#dddddd')
frame1_882 = Label(ws_882, bg='#dddddd')
frame1_882.pack()
frame2_882  =  LabelFrame(frame1_882, text='Gender', padx=30, pady=10)
var =IntVar()
cb = IntVar()
Label(frame1_882, text='Full Name').grid(row=0, column=0, padx=5, pady=5)
Label(frame1_882, text='Email').grid(row=1, column=0, padx=5, pady=5)
Label(frame1_882, text='Password').grid(row=2, column=0, padx=5, pady=5)
Radiobutton(frame2_882, text='Female', variable=var, value=1).pack()
Radiobutton(frame2_882,  text='Male',  variable=var,  value=2).pack(anchor=W)
Radiobutton(frame2_882, text='Others', variable=var, value=3).pack()
name_Tf = Entry(frame1_882)
name_Tf.grid(row=0, column=2)
Entry(frame1_882).grid(row=1, column=2)
Entry(frame1_882,  show="*").grid(row=2,  column=2)
frame2_882.grid(row=3, columnspan=3,padx=30)
Checkbutton(frame1_882, text='Accept  the  terms  &  conditions', variable=cb, onvalue=1,
offvalue=0).grid(row=4, columnspan=4, pady=5)
submit_btn = Button(frame1_882, text="Submit", padx=50, pady=5)
submit_btn.grid(row=5, columnspan=4, pady=2)
ws_882.mainloop()
```

Input/Output:


Basic Detail_882

Full Name

Email

Password

Gender

Female

Male

Others

Accept the terms & conditions

Submit

Algorithm:

Step 1: import tkinter package
Step 2: define functions that works on button actions
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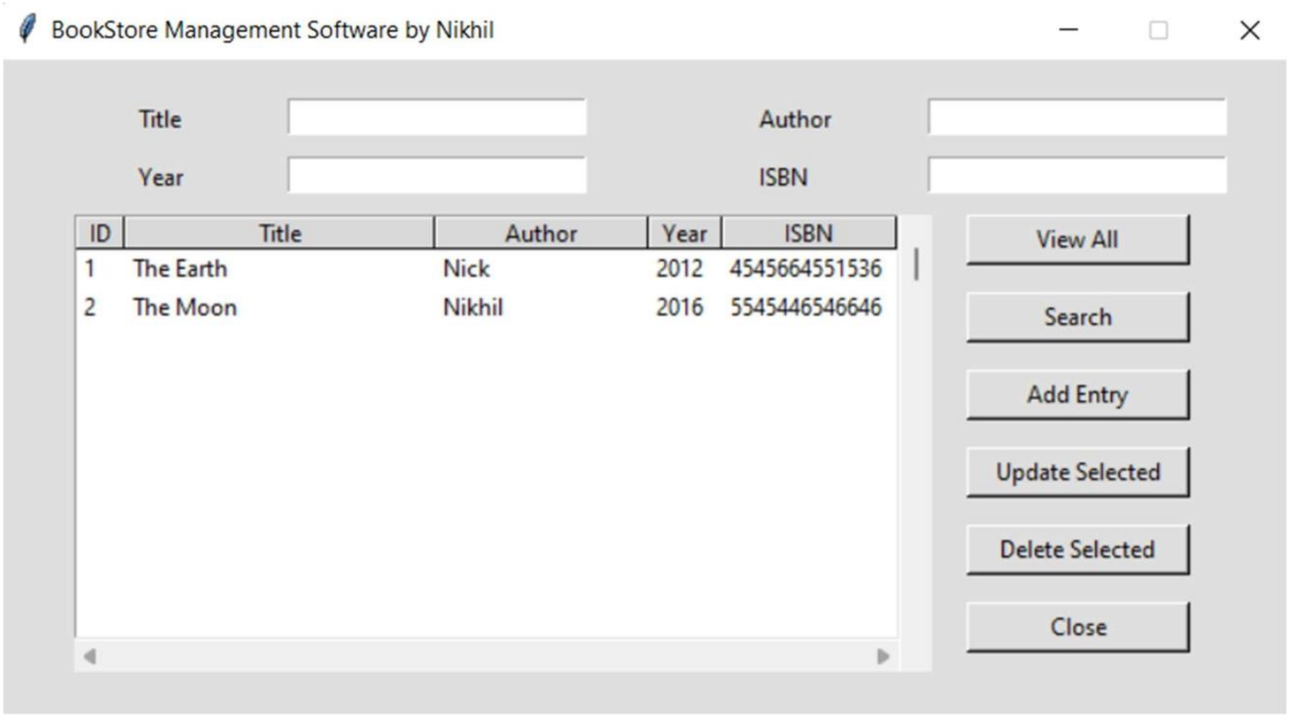
Step 6: Exit

Program:

```
from tkinter import *
from tkinter import ttk
from tkinter import font
root = Tk()
root.geometry("670x340")
root.title("BookStore Management Software by Nikhil")
root.resizable(0, 0)
root.configure(bg="#DFDFDE")
f = "Helvetica 13 bold"
title  = Label(root, text="Title",bg="#DFDFDE").place(x=70, y=20)
titleEntry = Entry(root,width=25).place(x=150, y=20)
year  = Label(root, text="Year",bg="#DFDFDE").place(x=70, y=50)
yearEntry = Entry(root,width=25).place(x=150, y=50)
author  = Label(root, text="Author",bg="#DFDFDE").place(x=390, y=20)
authorEntry = Entry(root,width=25).place(x=480, y=20)
isbn  = Label(root, text="ISBN",bg="#DFDFDE").place(x=390, y=50)
isbnEntry = Entry(root,width=25).place(x=480, y=50)
viewAll = Button(root, text="View All", width=15,bg="#DFDFDE").place(x=500, y=80)
```

```
search = Button(root, text="Search", width=15,bg="#DFDFDE").place(x=500, y=120)
addEntry = Button(root, text="Add Entry", width=15,bg="#DFDFDE").place(x=500, y=160)
updateSelected = Button(root, text="Update Selected", width=15,bg="#DFDFDE").place(x=500,
y=200)
deleteSelected = Button(root, text="Delete Selected", width=15,bg="#DFDFDE").place(x=500,
y=240)
close = Button(root, text="Close", width=15,bg="#DFDFDE").place(x=500, y=280)
data_frame = Frame(root)
data_frame.pack()
# scrollbar
data_scroll = Scrollbar(data_frame)
data_scroll.pack(side=RIGHT, fill=Y)
data_scroll = Scrollbar(data_frame, orient="horizontal")
data_scroll.pack(side=BOTTOM, fill=X)
frame = ttk.Treeview(
data_frame, yscrollcommand=data_scroll.set, xscrollcommand=data_scroll.set
)
style = ttk.Style()
style.configure("Treeview.Heading", font="Ariel 10 bold")
frame.pack()
data_frame.place(x=40, y=80)
data_scroll.config(command=frame.yview)
data_scroll.config(command=frame.xview)
# define our column
frame["columns"] = ("ID", "Title", "Author", "Year", "ISBN")
frame.column("#0", width=0, stretch=NO)
frame.column("ID", width=25)
frame.column("Title", width=160)
frame.column("Author", width=110)
frame.column("Year", width=38)
frame.column("ISBN", width=90)
frame.heading("#0", text="")
frame.heading("ID", text="ID")
frame.heading("Title", text="Title")
frame.heading("Author", text="Author")
frame.heading("Year", text="Year")
frame.heading("ISBN", text="ISBN")
frame.insert(
parent="", index=0, values=("1", "The Earth", "Nick", "2012", "4545664551536")
)
frame.insert(
parent="", index=1, values=("2", "The Moon", "Nikhil", "2016", "5545446546646")
)
s = ttk.Style()
s.theme_use("default")
s.map("Treeview")
root.mainloop()
```

Input/Output:



ID	Title	Author	Year	ISBN
1	The Earth	Nick	2012	4545664551536
2	The Moon	Nikhil	2016	5545446546646

Algorithm:

Step 1: import tkinter package
Step 2: define functions that works on button actions
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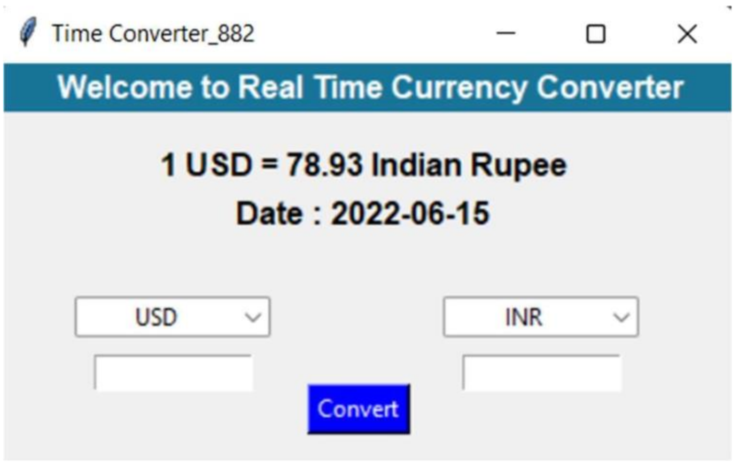
Step 6: Exit

Program:

```
import tkinter as tk
from tkinter import ttk
r_882= tk.Tk()
r_882.title('Time  Converter_882')
r_882.geometry("380x210")
label1_882=tk.Label(r_882,fg="#fff",text="Welcome to Real Time Currency
Converter",bg="#187498",font='Helvetica  12  bold',justify='center',width=38)
label1_882.place(x=0,y=0)
label2_882=tk.Label(r_882,text="1 USD = 78.93 Indian Rupee",font='Helvetica 12
bold',justify='center')
label2_882.place(x=81,y=40)
label3_882=tk.Label(r_882,text="Date  :  2022-06-15",font='Helvetica  12
bold',justify='center')
label3_882.place(x=120,y=65)
n_882=  tk.StringVar()
```

```
c1_882= ttk.Combobox(r_882, width = 13,justify='center', textvariable = n_882)
c1_882['values'] = (' USD ')
c1_882.place(x = 40, y = 120)
c1_882.current(0)
n2_882=  tk.StringVar()
c2_882= ttk.Combobox(r_882, width = 13,justify='center', textvariable = n2_882)
c2_882['values'] = (' INR')
c2_882.place(x = 230, y = 120)
c2_882.current(0)
e1_882=tk.Entry(r_882,justify='center',width=13)
e1_882.place(x=50,y=150)
e2_882=tk.Entry(r_882,justify='center',width=13)
e2_882.place(x=240,y=150)
b1_882=tk.Button(r_882,text="Convert",bg='blue',fg="#fff")
b1_882.place(x=160,y=165)
r_882.mainloop()
```

Input/Output:


Time Converter_882
Welcome to Real Time Currency Converter
1 USD = 78.93 Indian Rupee
Date : 2022-06-15
USD
INR
Convert

Algorithm:

Step 1: import tkinter package
Step 2: define functions that works on button actions
Step 3: Create multiple labels and Text fields according to the requirement
Step 4: Call the defined functions in the command methods of button.
Step 5: Call the mainloop
Step 6: Exit

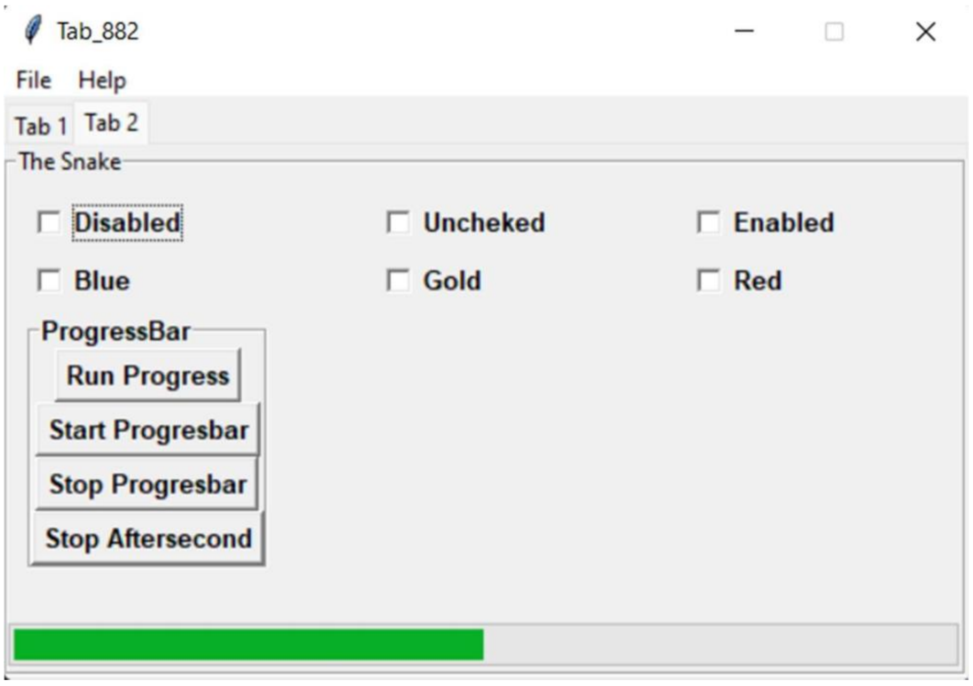
Program:

```
from tkinter import *
from tkinter import ttk
def donothing():
    filewin = Toplevel(root)
```

```python
    button = Button(filewin, text="Do nothing button")
    button.pack()
f = "Helvetica 13 bold"
root = Tk()
root.geometry("500x300")
```

```python
root.title("Tab_882")
root.resizable(0,0)
menubar = Menu(root)
filemenu = Menu(menubar, tearoff=0)
filemenu.add_command(label="New", command=donothing)
filemenu.add_command(label="Open", command=donothing)
filemenu.add_command(label="Save", command=donothing)
filemenu.add_command(label="Save  as...", command=donothing)
filemenu.add_command(label="Close", command=donothing)
filemenu.add_separator()
filemenu.add_command(label="Exit", command=root.quit)
menubar.add_cascade(label="File", menu=filemenu)
helpmenu = Menu(menubar, tearoff=0)
helpmenu.add_command(label="Help  Index", command=donothing)
helpmenu.add_command(label="About...", command=donothing)
menubar.add_cascade(label="Help", menu=helpmenu)
tabControl = ttk.Notebook(root)
tab1  = ttk.Frame(tabControl)
tab2  = ttk.Frame(tabControl)
tabControl.add(tab1, text="Tab 1")
tabControl.add(tab2, text="Tab 2")
tabControl.pack(expand=1, fill="both")
label_frame = LabelFrame(tab2, text="The Snake")
label_frame.pack(expand=YES, fil=BOTH)
disabledCheckBox  =  Checkbutton(label_frame,  text="Disabled",  font="Ariel  10
bold").place(x=10, y=10)
unCheckedCheckBox  =  Checkbutton(label_frame,  text="Uncheked",  font="Ariel  10
bold").place(x=190, y=10)
enabledCheckBox  =  Checkbutton(label_frame,  text="Enabled",  font="Ariel  10
bold").place(x=350, y=10)
blueCheckBox = Checkbutton(label_frame, text="Blue", font="Ariel 10 bold").place(x=10,
y=40)
goldCheckBox  =  Checkbutton(label_frame,  text="Gold",  font="Ariel  10  bold").place(x=190,
y=40)
redCheckBox  =  Checkbutton(label_frame,  text="Red",  font="Ariel  10  bold").place(x=350,
y=40)
progressBarLabelFrame  =  LabelFrame(label_frame,  text="ProgressBar",  font="Ariel  10  bold")
progressBarLabelFrame.place(x=10, y=70)
runProgressButton  =  Button(progressBarLabelFrame,  text="Run  Progress",  font="Ariel  10
bold").grid(
row=0, column=0
)
startProgressBar = Button(progressBarLabelFrame, text="Start Progresbar", font="Ariel 10
bold").grid(
row=1, column=0
)
stopProgressBar = Button(progressBarLabelFrame, text="Stop Progresbar", font="Ariel 10
bold").grid(
row=2, column=0
)
stopAfterSecond = Button(progressBarLabelFrame, text="Stop Aftersecond", font="Ariel 10
bold").grid(row=3, column=0)
progress = ttk.Progressbar(
label_frame, orient=HORIZONTAL,style="green.Horizontal.TProgressbar", length=490,
mode="determinate",maximum=4, value=2
)
progress.pack(ipady=20)
progress.place(x=0, y=230)
root.config(menu=menubar)
root.mainloop()
```

Input/Output:



Result: Hence the Event Driven Programming has been implemented and compiled successfully.

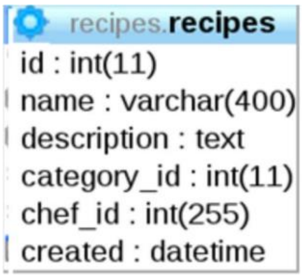
EX. NO.-5
DATE:

Declarative Programming Paradigm

Aim: To implement Declarative Programming Paradigm

Problem:

Create the below table and execute the insert, update and the below select statements.



recipes.**recipes**
id : int(11)
name : varchar(400)
description : text
category_id : int(11)
chef_id : int(255)
created : datetime

i) Write a query to display the total number of recipes available with the description “Chinese”
ii) Write a query to display the id, name of the recipes with chef_id 'BL000002'.
iii) Write a query to display the description of the recipes whose name begins with 'P'.

Algorithm:

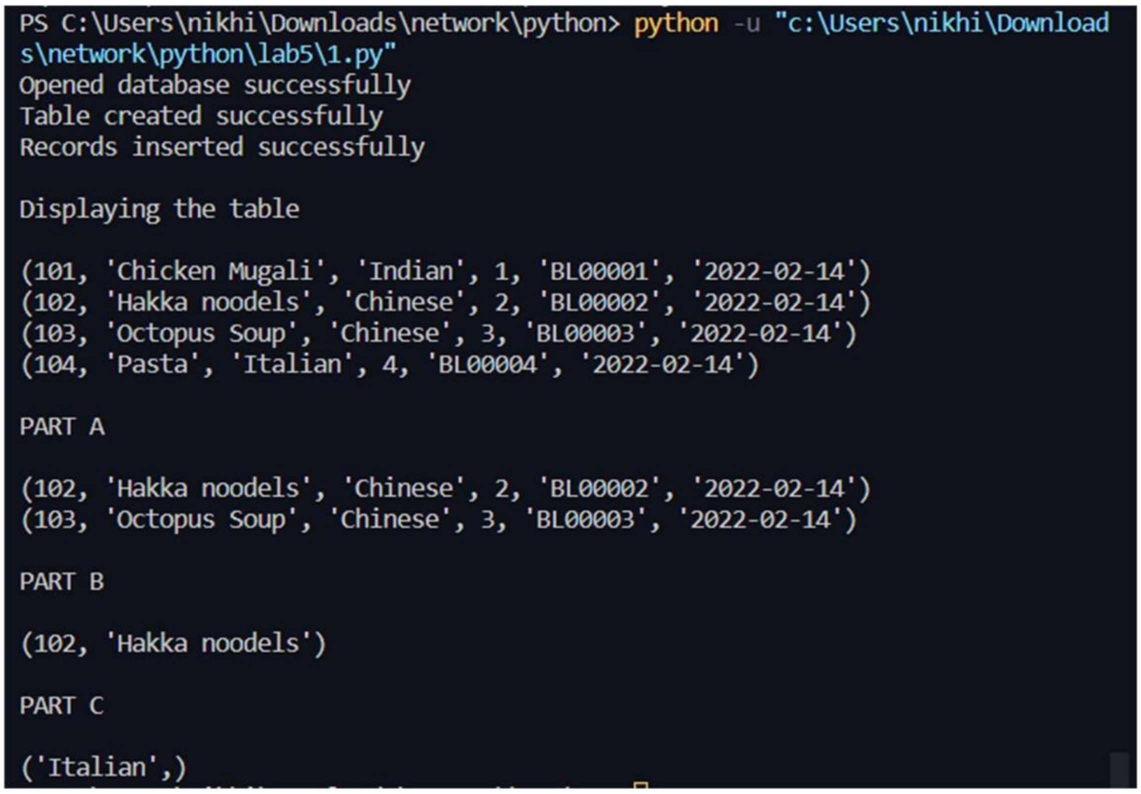
Step 1: import sqlite3 package
Step 2: connect the database to store,retrieve table & records
Step 3: Create a table using CREATE TABLE command
Step 4: Insert records in the table using INSERT command
Step 5: commit/save the record into the Table
Step 6: Execute the sql query one by one and print the result accordingly

Program:

```
import sqlite3
conn_882=sqlite3.connect('week4.db')
print("Opened database successfully")
conn_882.execute("CREATE TABLE recipes(id INT PRIMARY KEY NOT NULL,name
VARCHAR,description TEXT,category_id INT,chef_id text,created DATETIME);")
print("Table created successfully")
conn_882.execute("INSERT INTO recipes VALUES(101,'Chicken
Mugali','Indian',01,'BL00001','2022-02-14');")
conn_882.execute("INSERT INTO recipes VALUES(102,'Hakka
noodels','Chinese',02,'BL00002','2022-02-14');")
conn_882.execute("INSERT INTO recipes VALUES(103,'Octopus
Soup','Chinese',03,'BL00003','2022-02-14');")
conn_882.execute("INSERT INTO recipes VALUES(104,'Pasta','Italian',04,'BL00004','2022-02-
14');")
conn_882.commit()
print("Records inserted successfully");
print("\nDisplaying the table \n")
for rows in conn_882.execute("SELECT * from recipes;"):
```

```python
    print(rows)
print("\nPART  A\n")
for rows in conn_882.execute("SELECT * from recipes WHERE description='Chinese';"):
    print(rows)
print("\nPART B\n")
for rows in conn_882.execute("SELECT id,name from recipes WHERE chef_id='BL00002';"):
    print(rows)
print("\nPART C\n")
for rows in conn_882.execute("SELECT description from recipes WHERE name LIKE 'P%';"):
    print(rows)
conn_882.close()
```

Input/Output:



```
PS C:\Users\nikhi\Downloads\network\python> python -u "c:\Users\nikhi\Download
s\network\python\lab5\1.py"
Opened database successfully
Table created successfully
Records inserted successfully

Displaying the table

(101, 'Chicken Mugali', 'Indian', 1, 'BL00001', '2022-02-14')
(102, 'Hakka noodels', 'Chinese', 2, 'BL00002', '2022-02-14')
(103, 'Octopus Soup', 'Chinese', 3, 'BL00003', '2022-02-14')
(104, 'Pasta', 'Italian', 4, 'BL00004', '2022-02-14')

PART A

(102, 'Hakka noodels', 'Chinese', 2, 'BL00002', '2022-02-14')
(103, 'Octopus Soup', 'Chinese', 3, 'BL00003', '2022-02-14')

PART B

(102, 'Hakka noodels')

PART C

('Italian',)
```

Problem:

Create a table movie of the below structure and assume data types.Movie_ID, Movie_Name, Genre, Language, Rating ,Do the following queries

a. Update the movies rating by 10% and display it

b. Delete the movies with movie_id 102

c. Select movies whose rating is more than 3.

Algorithm:

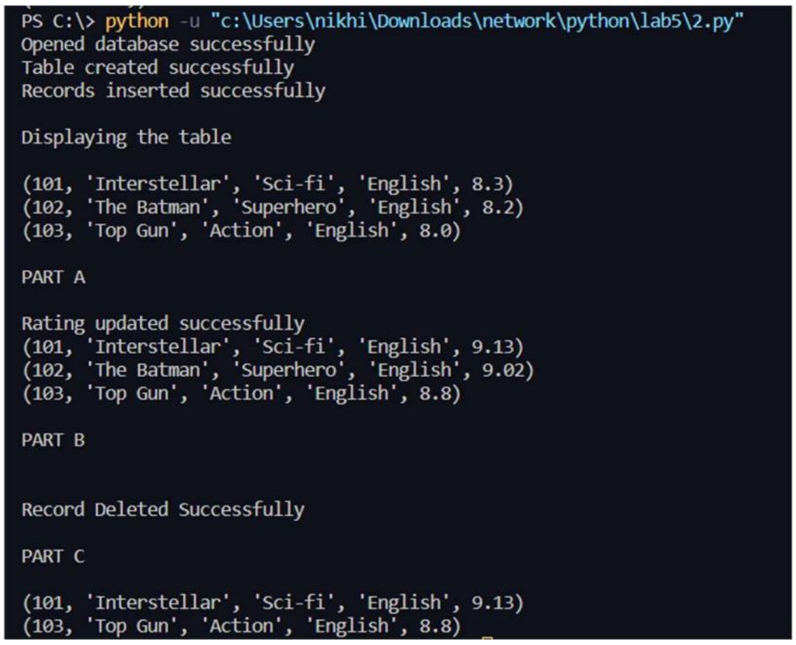
Step 1: import sqlite3 package
Step 2: connect the database to store,retrieve table & records
Step 3: Create a table using CREATE TABLE command

Step 4: Insert records in the table using INSERT command
Step 5: commit/save the record into the Table
Step 6: Execute the sql query one by one and print the result accordingly

<u>**Program:**</u>

```python
import sqlite3
conn_882=sqlite3.connect('week4.db')
print("Opened database successfully")
conn_882.execute("CREATE TABLE movie(Movie_ID INT PRIMARY KEY NOT NULL,Movie_Name
VARCHAR,Genre TEXT,Language text,Rating FLOAT);")
print("Table created successfully")
conn_882.execute("INSERT INTO movie VALUES(101,'Interstellar','Sci-fi','English',8.3);")
conn_882.commit()
conn_882.execute("INSERT INTO movie VALUES(102,'The Batman','Superhero','English',8.2);")
conn_882.commit()
conn_882.execute("INSERT INTO movie VALUES(103,'Top Gun','Action','English',8.0);")
conn_882.commit()
print("Records inserted successfully");
print("\nDisplaying the table \n")
for rows in conn_882.execute("SELECT * from movie;"):
    print(rows)
print("\nPART A\n")
conn_882.execute("UPDATE movie SET rating=rating+0.1*rating;")
print("Rating updated successfully")
for rows in conn_882.execute("SELECT * from movie;"):
    print(rows)
print("\nPART B\n")
conn_882.execute("DELETE from movie WHERE Movie_Id=102;")
print("\nRecord Deleted Successfully")
print("\nPART C\n")
for rows in conn_882.execute("SELECT * from movie WHERE rating>3;"):
    print(rows)
conn_882.close()
```

Input/Output:



```
PS C:\> python -u "c:\Users\nikhi\Downloads\network\python\lab5\2.py"
Opened database successfully
Table created successfully
Records inserted successfully

Displaying the table

(101, 'Interstellar', 'Sci-fi', 'English', 8.3)
(102, 'The Batman', 'Superhero', 'English', 8.2)
(103, 'Top Gun', 'Action', 'English', 8.0)

PART A

Rating updated successfully
(101, 'Interstellar', 'Sci-fi', 'English', 9.13)
(102, 'The Batman', 'Superhero', 'English', 9.02)
(103, 'Top Gun', 'Action', 'English', 8.8)

PART B


Record Deleted Successfully

PART C

(101, 'Interstellar', 'Sci-fi', 'English', 9.13)
(103, 'Top Gun', 'Action', 'English', 8.8)
```

Problem:

Create a course database with the following fields Product(ID, Prod_name, Supplier_id,Unit_price,Package,OrderID),OrderItem(ID,Order_id,Product_id,Unit_price,Quantity) using Foreign key

d. Display the total quantity of every product in the stock

e. Sort the Unit_price based on the supplier_id

f. Display the Product_name along with order_id and supplier_id

Algorithm:

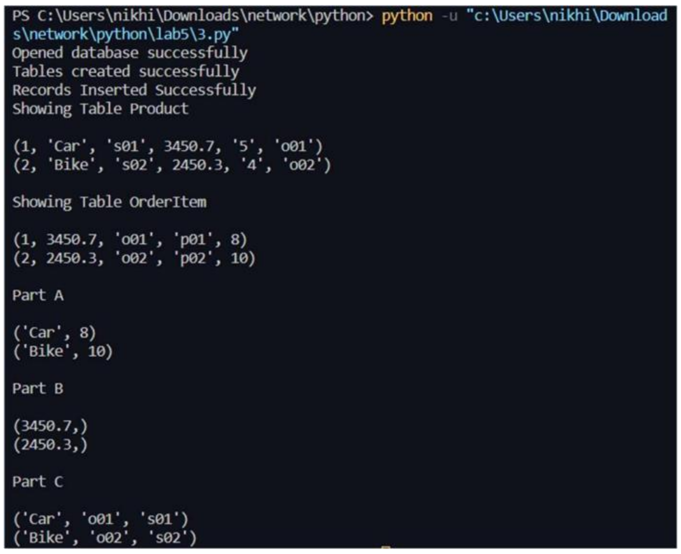
Step 1: import sqlite3 package
Step 2: connect the database to store,retrieve table & records
Step 3: Create a table using CREATE TABLE command
Step 4: Insert records in the table using INSERT command
Step 5: commit/save the record into the Table
Step 6: Execute the sql query one by one and print the result accordingly

Program:

```
import sqlite3
conn_882=sqlite3.connect('course.db')
print("Opened database successfully")
conn_882.execute("CREATE TABLE Product(ID INT PRIMARY KEY NOT NULL,Prod_name
VARCHAR,Supplier_id text,Unit_price FLOAT,Package TEXT,order_ID text);")
conn_882.execute("CREATE TABLE OrderItem(ID INT PRIMARY KEY NOT NULL,Unit_price
FLOAT,order_ID text,Product_ID TEXT,quantity INT, FOREIGN KEY(order_ID) REFERENCES
Product(order_ID));")
print("Tables created successfully")
conn_882.execute("INSERT INTO Product VALUES(1,'Car','s01',3450.7,5,'o01');")
```

```python
conn_882.execute("INSERT  INTO  Product  VALUES(2,'Bike','s02',2450.3,4,'o02');")
conn_882.execute("INSERT INTO OrderItem VALUES(1,3450.7,'o01','p01',8);")
conn_882.execute("INSERT INTO OrderItem VALUES(2,2450.3,'o02','p02',10);")
conn_882.commit()
print("Records  Inserted  Successfully")
print("Showing Table Product\n")
for rows in conn_882.execute("SELECT * from Product"):
    print(rows)
print("\nShowing  Table  OrderItem\n")
for rows in conn_882.execute("SELECT * from OrderItem"):
    print(rows)
print("\nPart A\n")
for  rows  in  conn_882.execute("SELECT  Product.Prod_name,OrderItem.quantity  FROM
Product,OrderItem where Product.order_ID=OrderItem.order_ID;"):
    print(rows)
print("\nPart  B\n")
for rows in conn_882.execute("SELECT Unit_Price FROM Product ORDER BY Supplier_id"):
    print(rows)
print("\nPart C\n")
for  rows  in  conn_882.execute("SELECT  Prod_name,order_ID,Supplier_id  FROM  PRODUCT"):
    print(rows)
conn_882.close()
```

Input/Output:



```
PS C:\Users\nikhi\Downloads\network\python> python -u "c:\Users\nikhi\Download
s\network\python\lab5\3.py"
Opened database successfully
Tables created successfully
Records Inserted Successfully
Showing Table Product

(1, 'Car', 's01', 3450.7, '5', 'o01')
(2, 'Bike', 's02', 2450.3, '4', 'o02')

Showing Table OrderItem

(1, 3450.7, 'o01', 'p01', 8)
(2, 2450.3, 'o02', 'p02', 10)

Part A

('Car', 8)
('Bike', 10)

Part B

(3450.7,)
(2450.3,)

Part C

('Car', 'o01', 's01')
('Bike', 'o02', 's02')
```

Problem:

Write a SQL lite3 statement to create a table named as job including columns job_id,job_title,Min-salary,Max_salary.job_id column does not contain any duplicate value at the time of insertion

Algorithm:

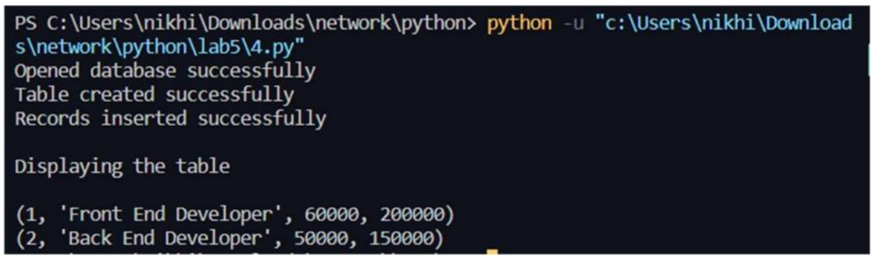
Step 1: import sqlite3 package

Step 2: connect the database to store,retrieve table & records
Step 3: Create a table using CREATE TABLE command
Step 4: Insert records in the table using INSERT command
Step 5: commit/save the record into the Table
Step 6: Execute the sql query one by one and print the result accordingly

Program:

```
import sqlite3
conn_882=sqlite3.connect('week4.db')
print("Opened database successfully")
conn_882.execute("CREATE TABLE job(job_id INT PRIMARY KEY NOT NULL,job_title
text,Min_salary INT,Max_salary INT);")
print("Table created successfully")
conn_882.execute("INSERT INTO job VALUES(01,'Front End Developer',60000,200000);")
conn_882.execute("INSERT INTO job VALUES(02,'Back End Developer',50000,150000);")
conn_882.commit()
print("Records inserted successfully");
print("\nDisplaying the table\n")
for rows in conn_882.execute("SELECT * from job;"):
    print(rows)
conn_882.close()
```

Input/Output:



```
PS C:\Users\nikhi\Downloads\network\python> python -u "c:\Users\nikhi\Download
s\network\python\lab5\4.py"
Opened database successfully
Table created successfully
Records inserted successfully

Displaying the table

(1, 'Front End Developer', 60000, 200000)
(2, 'Back End Developer', 50000, 150000)
```

Problem:

Write a SQL lite3 statement to create a table names as job_history including columns employee_id, start_date, end_date, job_id and department_id and make sure that, the employee_id column does not contain any duplicate value at the time of insertion and the foreign key column job_id contain only those values which are exists in the jobs table.

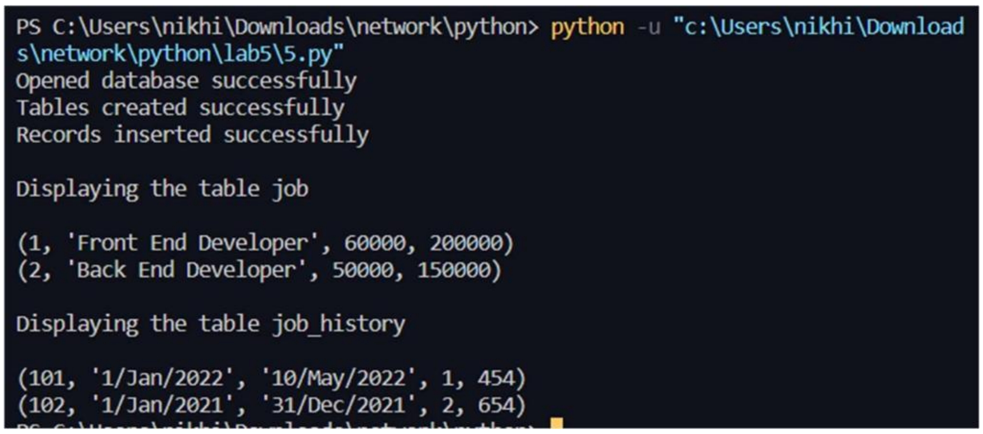
Algorithm:

Step 1: import sqlite3 package
Step 2: connect the database to store,retrieve table & records
Step 3: Create a table using CREATE TABLE command
Step 4: Insert records in the table using INSERT command
Step 5: commit/save the record into the Table
Step 6: Execute the sql query one by one and print the result accordingly

Program:

```
import sqlite3
conn_882=sqlite3.connect('week4.db')
print("Opened database successfully")
conn_882.execute("CREATE TABLE job(job_id INT PRIMARY KEY NOT NULL,job_title
text,Min_salary INT,Max_salary INT);")
conn_882.execute("CREATE TABLE job_history(employee_id INT PRIMARY KEY NOT
NULL,start_date text,end_date text,job_id INT,depatment_id INT, FOREIGN KEY(job_id)
REFERENCES job(job_id));")
print("Tables created successfully")
conn_882.execute("INSERT INTO job VALUES(01,'Front End Developer',60000,200000);")
conn_882.execute("INSERT INTO job VALUES(02,'Back End Developer',50000,150000);")
conn_882.execute("INSERT INTO job_history
VALUES(101,'1/Jan/2022','10/May/2022',01,454);")
conn_882.execute("INSERT INTO job_history
VALUES(102,'1/Jan/2021','31/Dec/2021',02,654);")
conn_882.commit()
print("Records inserted successfully");
print("\nDisplaying the table job\n")
for rows in conn_882.execute("SELECT * from job;"):
    print(rows)
print("\nDisplaying the table job_history\n")
for rows in conn_882.execute("SELECT * from job_history;"):
    print(rows)
conn_882.close()
```

Input/Output:



```
PS C:\Users\nikhi\Downloads\network\python> python -u "c:\Users\nikhi\Download
s\network\python\lab5\5.py"
Opened database successfully
Tables created successfully
Records inserted successfully

Displaying the table job

(1, 'Front End Developer', 60000, 200000)
(2, 'Back End Developer', 50000, 150000)

Displaying the table job_history

(101, '1/Jan/2022', '10/May/2022', 1, 454)
(102, '1/Jan/2021', '31/Dec/2021', 2, 654)
```

Result: Hence the Declarative Programming has been implemented and compiled successfully.

EX. NO.-6 **Parallel Programming**
DATE:

Aim : To implement Parallel Programming

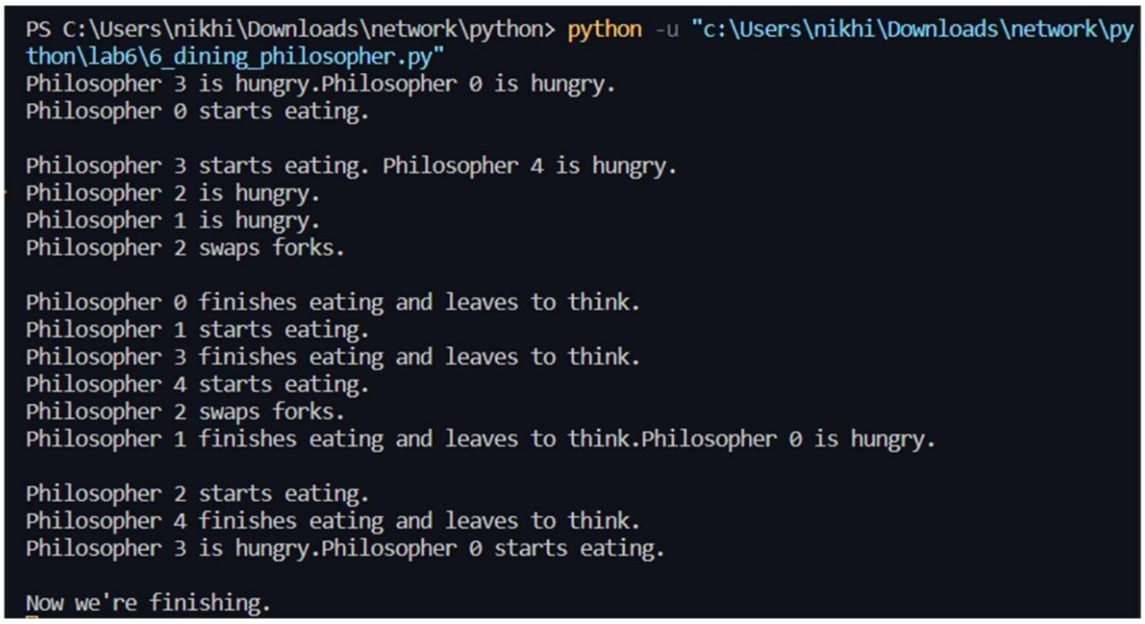
Problem:

The Dining Philosopher Problem – The Dining Philosopher Problem states that K philosophers seated around a circular table with one chopstick between each pair of philosophers. There is one chopstick between each philosopher.

Program:

```python
import threading
import time


# inheriting threading class in Thread module
class  Philosopher(threading.Thread):
    running = True  # used to check if everyone is finished eating

    # Since the subclass overrides the constructor, it must make sure to invoke the base
class constructor (
    # Thread.__init__()) before doing anything else to the thread.
    def___init_(self, index, forkOnLeft, forkOnRight):
        threading.Thread.__init__(self)
        self.index = index
        self.forkOnLeft = forkOnLeft
        self.forkOnRight  = forkOnRight

    def run(self):
        while (self.running):
            # Philosopher is thinking (but really is sleeping).
            time.sleep(30)
            print('Philosopher %s is hungry.' % self.index)
            self.dine()

    def dine(self):
        # if both the semaphores(forks) are free, then philosopher will eat
        fork1, fork2 = self.forkOnLeft, self.forkOnRight
        while self.running:
            fork1.acquire()  # wait operation on left fork
            locked = fork2.acquire(False)
            if locked: break  # if right fork is not available leave left fork
            fork1.release()
            print('Philosopher %s swaps forks.' % self.index)
            fork1, fork2 = fork2, fork1
        else:
            return
        self.dining()
        # release both the fork after dining
        fork2.release()
        fork1.release()

    def dining(self):
        print('Philosopher %s starts eating. ' % self.index)
        time.sleep(30)
        print('Philosopher %s finishes eating and leaves to think.' % self.index)


def main():
    forks = [threading.Semaphore() for n in range(5)]  # initialising array of semaphore
i.e forks

    # here (i+1)%5 is used to get right and left forks circularly between 1-5
    philosophers = [Philosopher(i, forks[i % 5], forks[(i + 1) % 5])
                    for i in range(5)]

    Philosopher.running = True
    for p in philosophers: p.start()
    time.sleep(100)
    Philosopher.running = False
    print("Now we're finishing.")


if___name__== "_main_":
    main()
```

Input/Output:



```
PS C:\Users\nikhi\Downloads\network\python> python -u "c:\Users\nikhi\Downloads\network\py
thon\lab6\6_dining_philosopher.py"
Philosopher 3 is hungry.Philosopher 0 is hungry.
Philosopher 0 starts eating.

Philosopher 3 starts eating. Philosopher 4 is hungry.
Philosopher 2 is hungry.
Philosopher 1 is hungry.
Philosopher 2 swaps forks.

Philosopher 0 finishes eating and leaves to think.
Philosopher 1 starts eating.
Philosopher 3 finishes eating and leaves to think.
Philosopher 4 starts eating.
Philosopher 2 swaps forks.
Philosopher 1 finishes eating and leaves to think.Philosopher 0 is hungry.

Philosopher 2 starts eating.
Philosopher 4 finishes eating and leaves to think.
Philosopher 3 is hungry.Philosopher 0 starts eating.

Now we're finishing.
```

Problem:

Consider a situation where we have a file shared between many people.

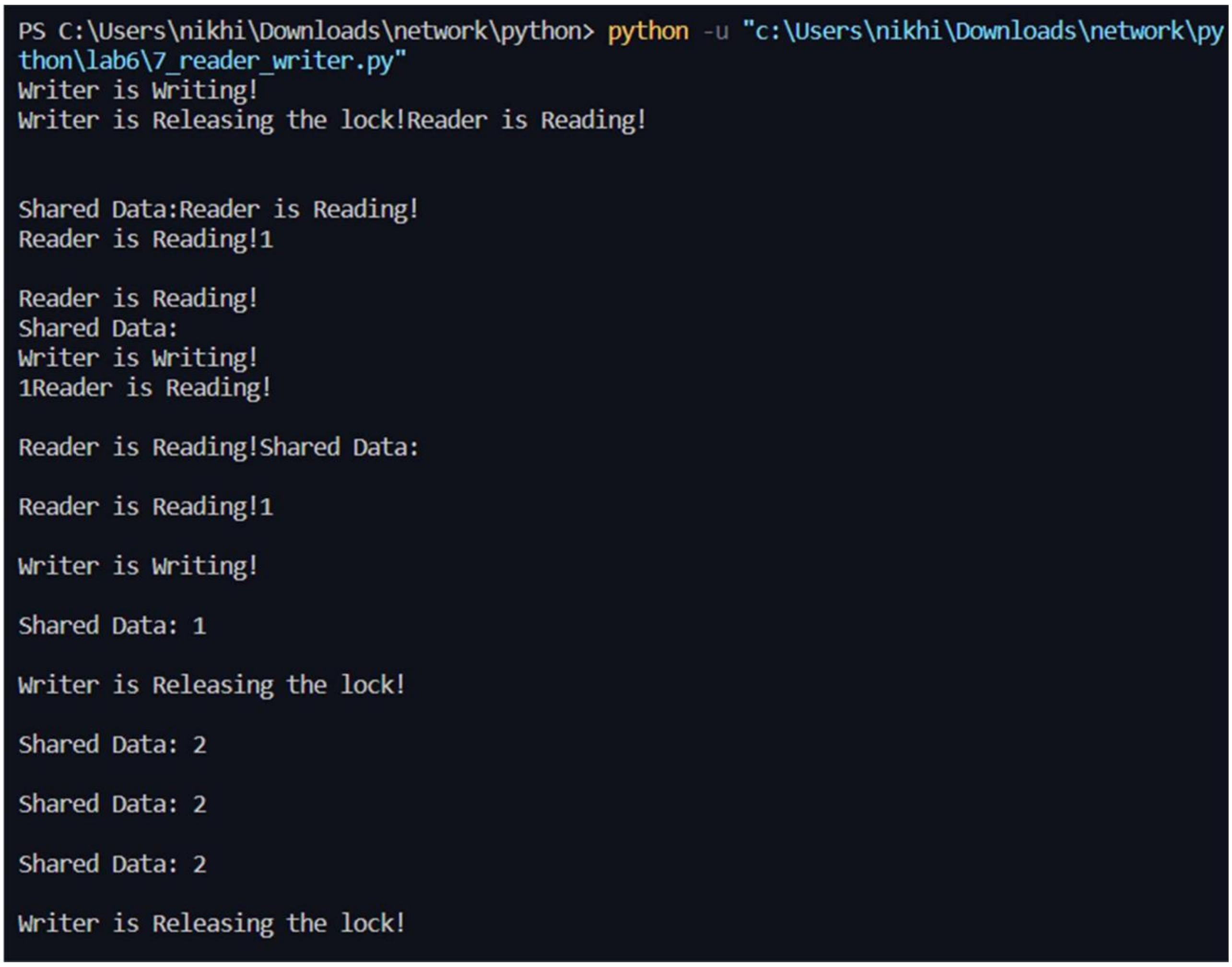
- If one of the people tries editing the file, no other person should be reading or writing at the same time, otherwise changes will not be visible to him/her.
- However if some person is reading the file, then others may read it at the same time.

Program:

```
import threading as thread
import random

global x  # Shared Data
x = 0
lock = thread.Lock()  # Lock for synchronising access


def Reader():
    global x
    print('Reader is Reading!')
    lock.acquire()  # Acquire the lock before Reading (mutex approach)
    print('Shared Data:', x)
    lock.release()  # Release the lock after Reading
    print()


def Writer():
    global x
    print('Writer is Writing!')
    lock.acquire()  # Acquire the lock before Writing
    x += 1 # Write on the shared memory
    print('Writer is Releasing the lock!')
    lock.release() # Release the lock after Writing
    print()


 if___name__== '__main__':
    for i in range(0, 10):
        randomNumber = random.randint(0, 100)  # Generate a Random number between 0 and
100
        if randomNumber > 50:
            Thread1  =  thread.Thread(target=Reader)
            Thread1.start()
        else:
            Thread2  =  thread.Thread(target=Writer)
            Thread2.start()

Thread1.join()
```

```
Thread2.join()
```

Input/Output:



```
PS C:\Users\nikhi\Downloads\network\python> python -u "c:\Users\nikhi\Downloads\network\py
thon\lab6\7_reader_writer.py"
Writer is Writing!
Writer is Releasing the lock!Reader is Reading!


Shared Data:Reader is Reading!
Reader is Reading!1

Reader is Reading!
Shared Data:
Writer is Writing!
1Reader is Reading!

Reader is Reading!Shared Data:

Reader is Reading!1

Writer is Writing!

Shared Data: 1

Writer is Releasing the lock!

Shared Data: 2

Shared Data: 2

Shared Data: 2

Writer is Releasing the lock!
```

Result: Hence the Parallel and Concurrent Programming has been implemented and compiled successfully

EX. NO.-7

DATE:

Concurrent programming

Aim : To implement concurrent programming

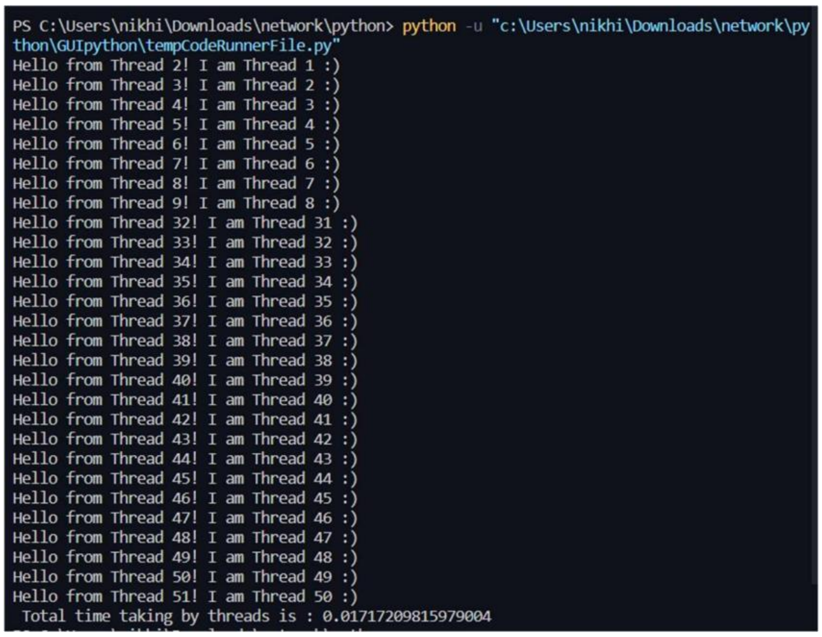
Problem:

Modify the provided ReverseHelloMultithreaded file so that it creates a thread (let's call it Thread 1). Thread 1 creates another thread (Thread 2); Thread 2 creates Thread 3; and so on, up to Thread 50. Each thread should print "Hello from Thread <num>!", but you should structure your program such that the threads print their greetings in reverse order. When complete, ReverseHelloTest should run successfully.

Program:

```python
import time # import time module
import threading
from threading import *

ThreadCount = 0
def req_thread(num): # define a square calculating function
    if num<=0:
        return 0
    req_thread(num-1)
    print(f'Hello from Thread {num+1}! I am Thread {num} :)')
t = time.time()
th1 = threading.Thread(target=req_thread, args=(50, ))
th1.start()
th1.join()
print(" Total time taking by threads is :", time.time() - t) # print the total time
```

Input/Output:



```
PS C:\Users\nikhi\Downloads\network\python> python -u "c:\Users\nikhi\Downloads\network\py
thon\GUIpython\tempCodeRunnerFile.py"
Hello from Thread 2! I am Thread 1 :)
Hello from Thread 3! I am Thread 2 :)
Hello from Thread 4! I am Thread 3 :)
Hello from Thread 5! I am Thread 4 :)
Hello from Thread 6! I am Thread 5 :)
Hello from Thread 7! I am Thread 6 :)
Hello from Thread 8! I am Thread 7 :)
Hello from Thread 9! I am Thread 8 :)
Hello from Thread 32! I am Thread 31 :)
Hello from Thread 33! I am Thread 32 :)
Hello from Thread 34! I am Thread 33 :)
Hello from Thread 35! I am Thread 34 :)
Hello from Thread 36! I am Thread 35 :)
Hello from Thread 37! I am Thread 36 :)
Hello from Thread 38! I am Thread 37 :)
Hello from Thread 39! I am Thread 38 :)
Hello from Thread 40! I am Thread 39 :)
Hello from Thread 41! I am Thread 40 :)
Hello from Thread 42! I am Thread 41 :)
Hello from Thread 43! I am Thread 42 :)
Hello from Thread 44! I am Thread 43 :)
Hello from Thread 45! I am Thread 44 :)
Hello from Thread 46! I am Thread 45 :)
Hello from Thread 47! I am Thread 46 :)
Hello from Thread 48! I am Thread 47 :)
Hello from Thread 49! I am Thread 48 :)
Hello from Thread 50! I am Thread 49 :)
Hello from Thread 51! I am Thread 50 :)
 Total time taking by threads is : 0.01717209815979004
```

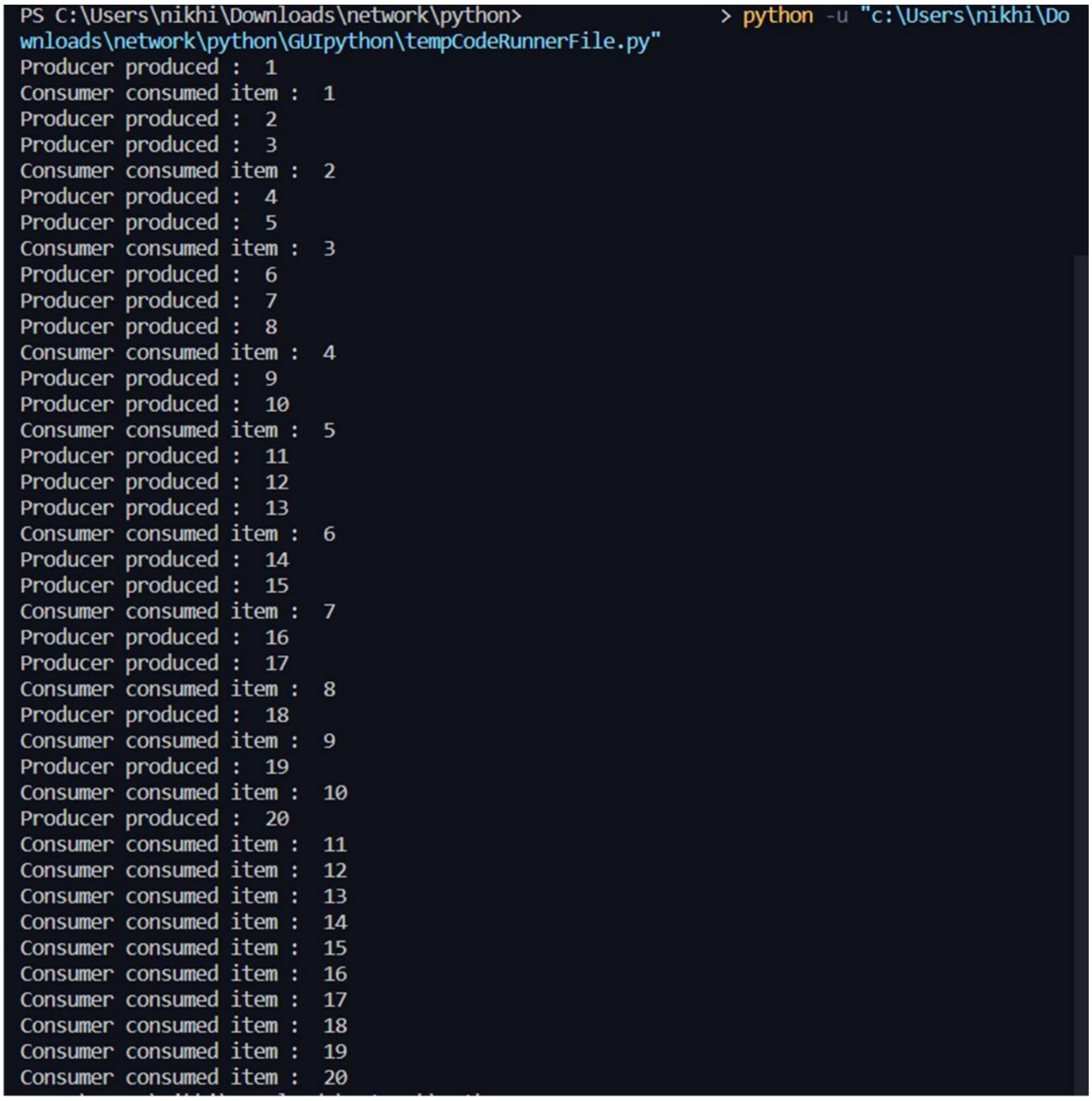
Problem:

To make sure that the producer won’t try to add data into the buffer if it’s full and that the consumer won’t try to remove data from an empty buffer.

Program:

```python
import threading
import time

# Shared Memory variables
CAPACITY = 10
buffer = [-1 for i in range(CAPACITY)]
in_index = 0
out_index = 0

# Declaring Semaphores
mutex  =  threading.Semaphore()
empty  =  threading.Semaphore(CAPACITY)
full = threading.Semaphore(0)

# Producer Thread Class
class  Producer(threading.Thread):
    def run(self):

        global CAPACITY, buffer, in_index, out_index
        global mutex, empty, full

        items_produced = 0
        counter = 0

        while items_produced < 20:
            empty.acquire()
            mutex.acquire()

            counter += 1
            buffer[in_index]  =  counter
            in_index = (in_index + 1)%CAPACITY
            print("Producer produced : ", counter)

            mutex.release()
            full.release()

            time.sleep(1)
            items_produced += 1
# Consumer Thread Class
class  Consumer(threading.Thread):
    def run(self):
        global CAPACITY, buffer, in_index, out_index, counter
        global mutex, empty, full

        items_consumed = 0

        while items_consumed < 20:
            full.acquire()
            mutex.acquire()

            item = buffer[out_index]
            out_index = (out_index + 1)%CAPACITY
            print("Consumer consumed item : ", item)

            mutex.release()
            empty.release()

            time.sleep(2.5)
            items_consumed += 1
# Creating Threads
producer = Producer()
consumer = Consumer()

# Starting Threads
consumer.start()
producer.start()

# Waiting for threads to complete
producer.join()
consumer.join()
```

Input/Output:



```
PS C:\Users\nikhi\Downloads\network\python>          > python -u "c:\Users\nikhi\Do
wnloads\network\python\GUIpython\tempCodeRunnerFile.py"
Producer produced :  1
Consumer consumed item :  1
Producer produced :  2
Producer produced :  3
Consumer consumed item :  2
Producer produced :  4
Producer produced :  5
Consumer consumed item :  3
Producer produced :  6
Producer produced :  7
Producer produced :  8
Consumer consumed item :  4
Producer produced :  9
Producer produced :  10
Consumer consumed item :  5
Producer produced :  11
Producer produced :  12
Producer produced :  13
Consumer consumed item :  6
Producer produced :  14
Producer produced :  15
Consumer consumed item :  7
Producer produced :  16
Producer produced :  17
Consumer consumed item :  8
Producer produced :  18
Consumer consumed item :  9
Producer produced :  19
Consumer consumed item :  10
Producer produced :  20
Consumer consumed item :  11
Consumer consumed item :  12
Consumer consumed item :  13
Consumer consumed item :  14
Consumer consumed item :  15
Consumer consumed item :  16
Consumer consumed item :  17
Consumer consumed item :  18
Consumer consumed item :  19
Consumer consumed item :  20
```

Result: Hence the Concurrent Programming has been implemented and compiled successfully

EX. NO.-8 **Functional Programming Paradigm**
DATE:

Aim: To implement Functional Programming Paradigm

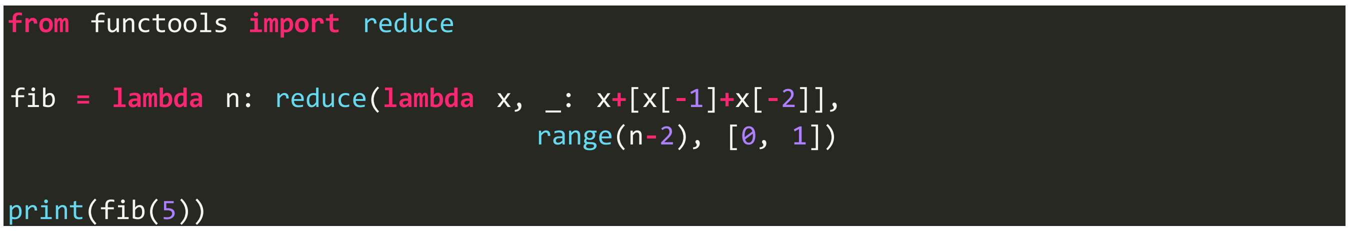
Problem:

Write a Python program to create Fibonacci series upto n using Lambda.

Algorithm:

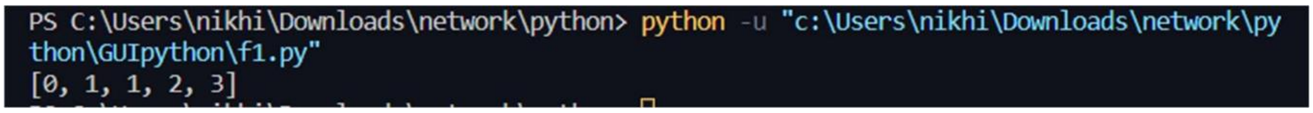
Step 1:Create a list of 0,1
Step 2: Using map ,giving function as append in list
Step 3: Range in given as 2
Step 4: print fibonacci

Program:



```
from functools import reduce

fib = lambda n: reduce(lambda x, _: x+[x[-1]+x[-2]],
                                   range(n-2), [0, 1])


print(fib(5))
```

Input/Output:



```
PS C:\Users\nikhi\Downloads\network\python> python -u "c:\Users\nikhi\Downloads\network\py
thon\GUIpython\f1.py"
[0, 1, 1, 2, 3]
```

Problem:

Write a Python program to find the numbers of a given string and store them in a list, display the numbers which are bigger than the length of the list in sorted form. Use lambda function to solve the problem.

Input :
Original string: SOC 23 CTech 5 DSBS8 NWC 56 CINtel 20 5
Input/Output
Numbers in sorted form:
20 23 56

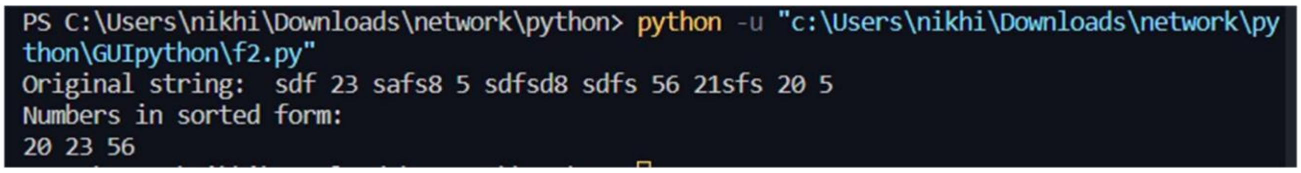
Algorithm:

Step 1: Input the string
Step 2: Length of string calculated
Step 3: Sort the list
Step 4: if x>length ,print the numbers

Program:

```python
str1 = "sdf 23 safs8 5 sdfsd8 sdfs 56 21sfs 20 5"
print("Original string: ",str1)
str_num=[i for i in str1.split(' ')]
lenght=len(str_num)
numbers=sorted([int(x) for x in str_num if x.isdigit()])
print('Numbers in sorted form:')
for i in ((filter(lambda x:x>lenght,numbers))):
    print(i,end=' ')
```

Input/Output:



```
PS C:\Users\nikhi\Downloads\network\python> python -u "c:\Users\nikhi\Downloads\network\py
thon\GUIpython\f2.py"
Original string:  sdf 23 safs8 5 sdfsd8 sdfs 56 21sfs 20 5
Numbers in sorted form:
20 23 56
```

Problem:

Write a Python program to sort a given list of strings(numbers) numerically using lambda.

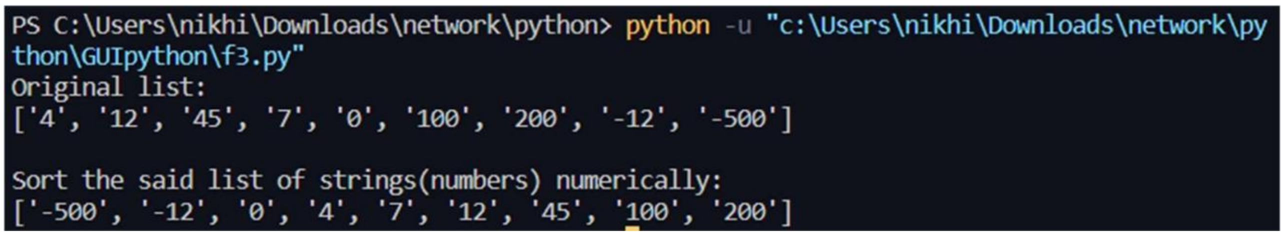
Algorithm:

Step 1:Enter the list
Step 2: Create a sort function
Step 3: Pass the sort function and list in map function
Step 4: print the list

Program:

```python
def  sort_numeric_strings(nums_str):
    result = sorted(nums_str, key=lambda el: int(el))
    return result
nums_str  =  ['4','12','45','7','0','100','200','-12','-500']
print("Original  list:")
print(nums_str)
print("\nSort the said list of strings(numbers) numerically:")
print(sort_numeric_strings(nums_str))
```

Input/Output:



```
PS C:\Users\nikhi\Downloads\network\python> python -u "c:\Users\nikhi\Downloads\network\py
thon\GUIpython\f3.py"
Original list:
['4', '12', '45', '7', '0', '100', '200', '-12', '-500']

Sort the said list of strings(numbers) numerically:
['-500', '-12', '0', '4', '7', '12', '45', '100', '200']
```

Problem:

Write a Python program to calculate the average value of the numbers in a given tuple of tuples using lambda.

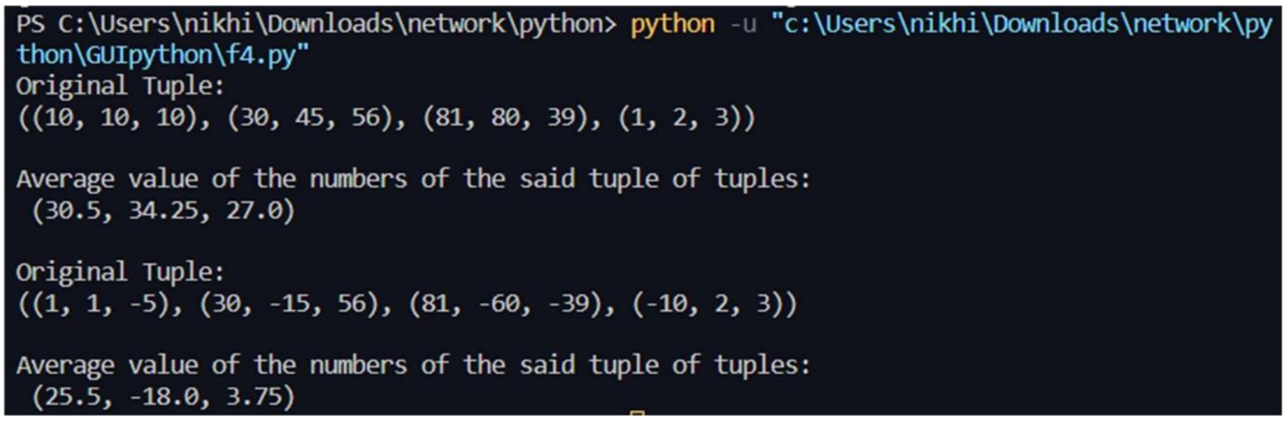
Algorithm:

Step 1: Enter the numbers
Step 2: Use reduce function
Step 3: create function of (x+y)/2
Step 4: Press the function and list in reduce

Program:

```python
def average_tuple(nums):
    result = tuple(map(lambda x: sum(x) / float(len(x)), zip(*nums)))
    return result

nums = ((10, 10, 10), (30, 45, 56), (81, 80, 39), (1, 2, 3))
print ("Original Tuple: ")
print(nums)
print("\nAverage value of the numbers of the said tuple of
tuples:\n",average_tuple(nums))
nums = ((1, 1, -5), (30, -15, 56), (81, -60, -39), (-10, 2, 3))
print ("\nOriginal Tuple: ")
print(nums)
print("\nAverage value of the numbers of the said tuple of
tuples:\n",average_tuple(nums))
```

Input/Output:



```
PS C:\Users\nikhi\Downloads\network\python> python -u "c:\Users\nikhi\Downloads\network\py
thon\GUIpython\f4.py"
Original Tuple:
((10, 10, 10), (30, 45, 56), (81, 80, 39), (1, 2, 3))

Average value of the numbers of the said tuple of tuples:
 (30.5, 34.25, 27.0)

Original Tuple:
((1, 1, -5), (30, -15, 56), (81, -60, -39), (-10, 2, 3))

Average value of the numbers of the said tuple of tuples:
 (25.5, -18.0, 3.75)
```

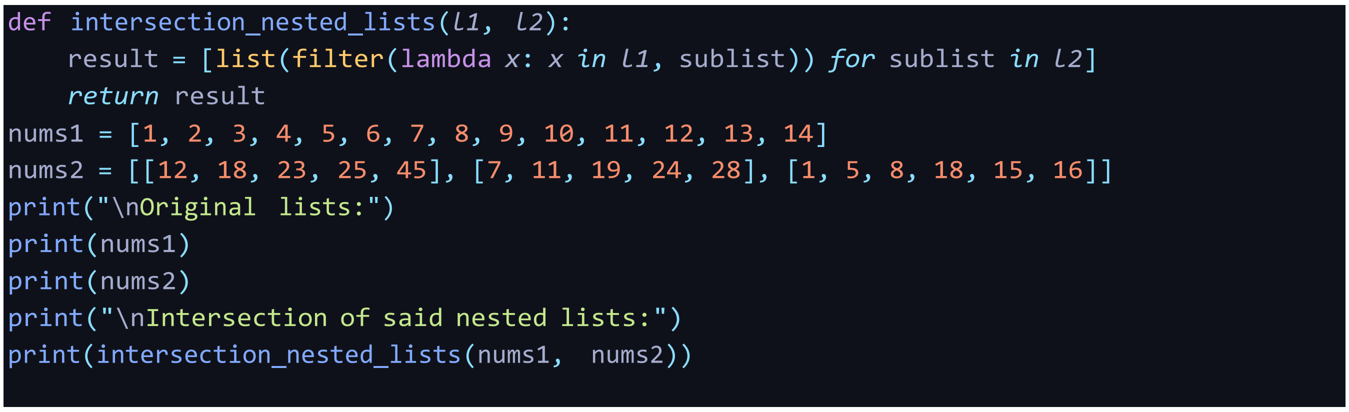
Problem:

Write a Python program to find the nested lists elements, which are present in another list using lambda.

Algorithm:

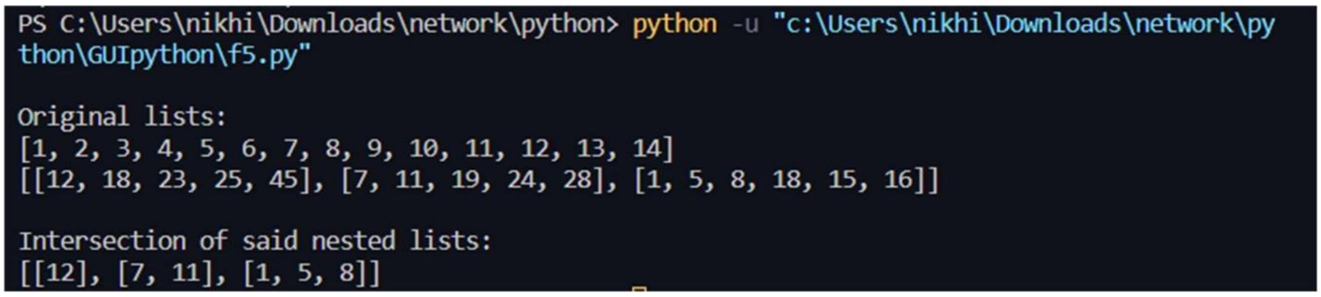
Step 1: Enter both element in list
Step 2: Enter function expression as x=y
Step 3: Pass the list1 and list2 as parameters
Step 4: Print the values

Program:



```python
def intersection_nested_lists(l1, l2):
    result = [list(filter(lambda x: x in l1, sublist)) for sublist in l2]
    return result
nums1 = [1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14]
nums2 = [[12, 18, 23, 25, 45], [7, 11, 19, 24, 28], [1, 5, 8, 18, 15, 16]]
print("\nOriginal  lists:")
print(nums1)
print(nums2)
print("\nIntersection of said nested lists:")
print(intersection_nested_lists(nums1,  nums2))
```

Input/Output:



```
PS C:\Users\nikhi\Downloads\network\python> python -u "c:\Users\nikhi\Downloads\network\py
thon\GUIpython\f5.py"

Original lists:
[1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14]
[[12, 18, 23, 25, 45], [7, 11, 19, 24, 28], [1, 5, 8, 18, 15, 16]]

Intersection of said nested lists:
[[12], [7, 11], [1, 5, 8]]
```

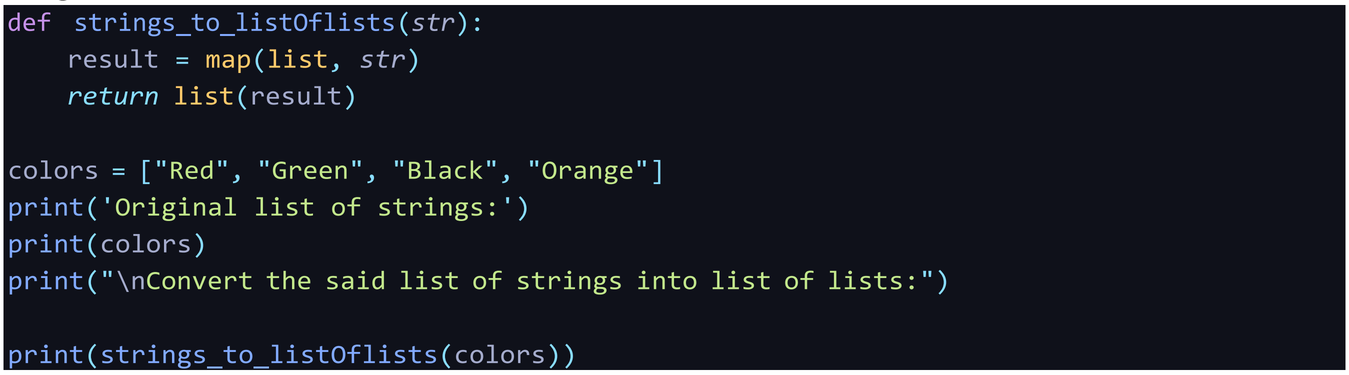
Problem:

Write a Python program to convert a given list of strings into list of lists using map function.

Algorithm:

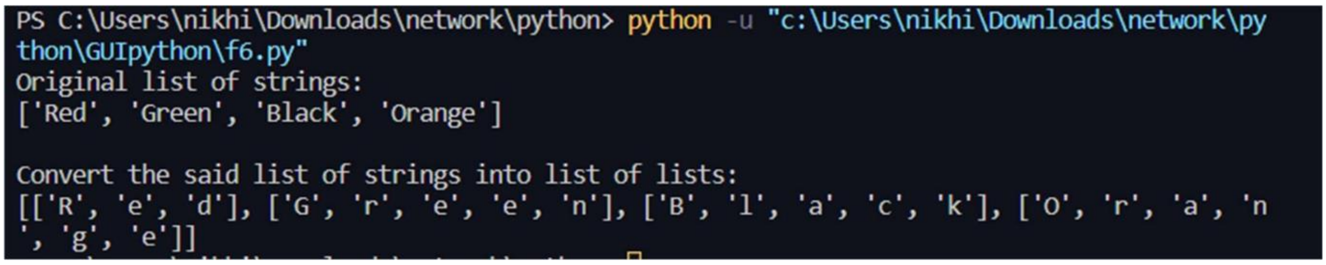
Step 1: Create a function taking map function passing (list,string)
Step 2: Sort the result in separate list
Step 3: The list has each letter of every word

Program:



```python
def  strings_to_listOflists(str):
    result = map(list, str)
    return list(result)

colors = ["Red", "Green", "Black", "Orange"]
print('Original list of strings:')
print(colors)
print("\nConvert the said list of strings into list of lists:")

print(strings_to_listOflists(colors))
```

Input/Output:



```
PS C:\Users\nikhi\Downloads\network\python> python -u "c:\Users\nikhi\Downloads\network\py
thon\GUIpython\f6.py"
Original list of strings:
['Red', 'Green', 'Black', 'Orange']

Convert the said list of strings into list of lists:
[['R', 'e', 'd'], ['G', 'r', 'e', 'e', 'n'], ['B', 'l', 'a', 'c', 'k'], ['O', 'r', 'a', 'n
', 'g', 'e']]
```

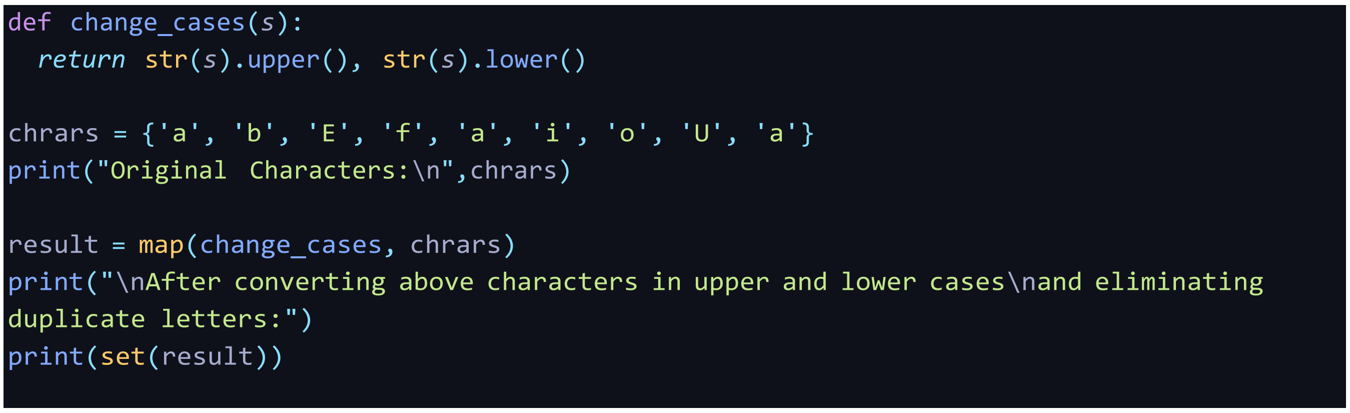
Problem:

Write a Python program to convert all the characters in uppercase and lowercase and eliminate duplicate letters from a given sequence. Use map() function.

Algorithm:

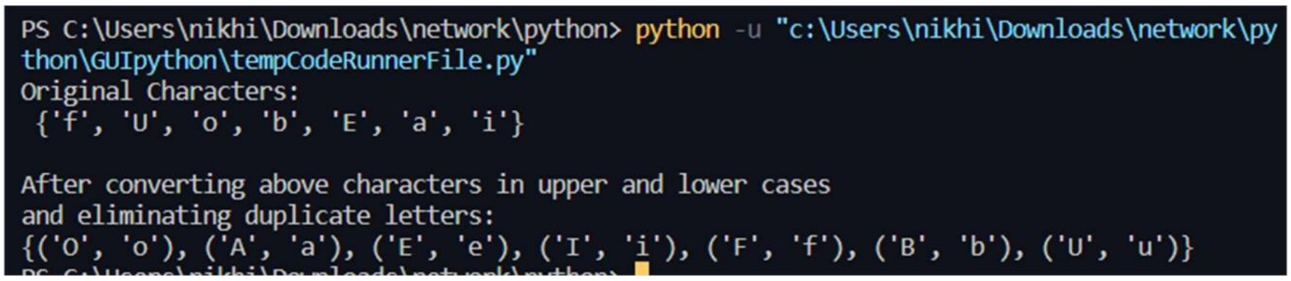
Step 1: Enter the chaarcters in list
Step 2: Enter function as x!=y
Step 3: Pass the function and list in map
Step 4: Print it as a list

Program:



```python
def change_cases(s):
  return str(s).upper(), str(s).lower()

chrars = {'a', 'b', 'E', 'f', 'a', 'i', 'o', 'U', 'a'}
print("Original  Characters:\n",chrars)

result = map(change_cases, chrars)
print("\nAfter converting above characters in upper and lower cases\nand eliminating 
duplicate letters:")
print(set(result))
```

Input/Output:



```
PS C:\Users\nikhi\Downloads\network\python> python -u "c:\Users\nikhi\Downloads\network\py
thon\GUIpython\tempCodeRunnerFile.py"
Original Characters:
 {'f', 'U', 'o', 'b', 'E', 'a', 'i'}

After converting above characters in upper and lower cases
and eliminating duplicate letters:
{('O', 'o'), ('A', 'a'), ('E', 'e'), ('I', 'i'), ('F', 'f'), ('B', 'b'), ('U', 'u')}
```

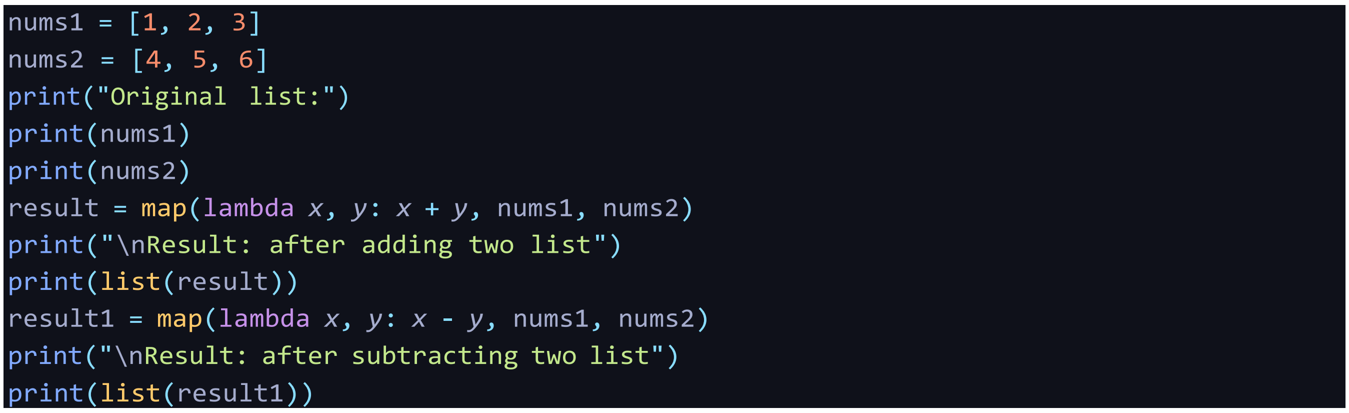
Problem:

Write a Python program to add two given lists and find the difference between lists. Use map() function.

Algorithm:

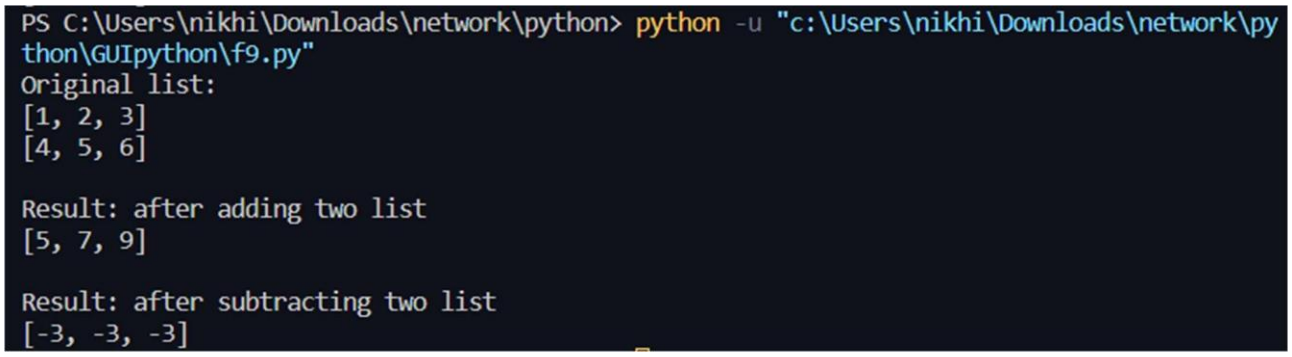
Step 1: Enter two list
Step 2: Using map define lambda function
Step 3: Give parameters as 2 list 1
Step 4: print the list

Program:



```
nums1 = [1, 2, 3]
nums2 = [4, 5, 6]
print("Original  list:")
print(nums1)
print(nums2)
result = map(lambda x, y: x + y, nums1, nums2)
print("\nResult: after adding two list")
print(list(result))
result1 = map(lambda x, y: x - y, nums1, nums2)
print("\nResult: after subtracting two list")
print(list(result1))
```

Input/Output:



```
PS C:\Users\nikhi\Downloads\network\python> python -u "c:\Users\nikhi\Downloads\network\py
thon\GUIpython\f9.py"
Original list:
[1, 2, 3]
[4, 5, 6]

Result: after adding two list
[5, 7, 9]

Result: after subtracting two list
[-3, -3, -3]
```

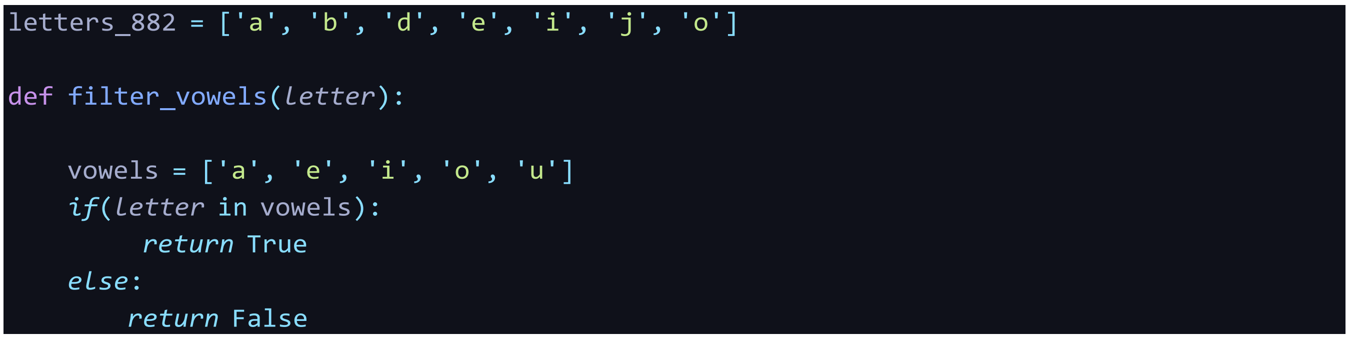
Problem:

Write a Python program to filter only vowels from given sequence.

Algorithm:

Step 1: Pass the list as parameter
Step 2: Specify the function as x='a' || x='e' || x='o' || x='i' ||x='e'
Step 3: If the elements match the above conditions print them in list

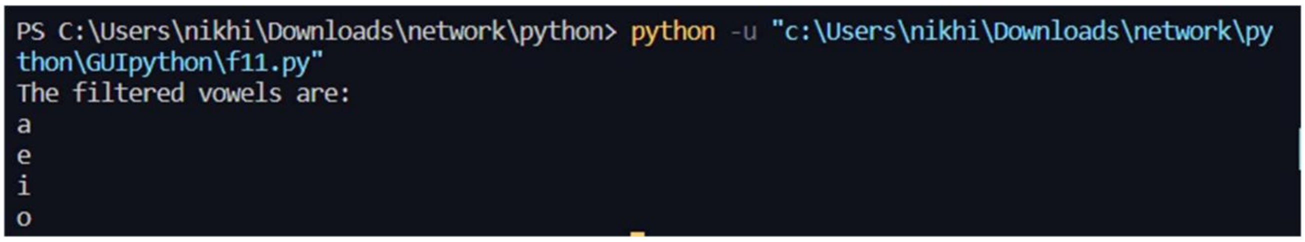
Program:



```
letters_882 = ['a', 'b', 'd', 'e', 'i', 'j', 'o']

def filter_vowels(letter):

    vowels = ['a', 'e', 'i', 'o', 'u']
    if(letter in vowels):
         return True
    else:
        return False
```

```python
filtered_vowels = filter(filter_vowels, letters_882)
print('The filtered vowels are:')
for vowel in filtered_vowels:
    print(vowel)
```

<u>Input/Output:</u>



```
PS C:\Users\nikhi\Downloads\network\python> python -u "c:\Users\nikhi\Downloads\network\py
thon\GUIpython\f11.py"
The filtered vowels are:
a
e
i
o
```

<u>Problem:</u>

Write a python program to calculate factorial of given number (use reduce function)

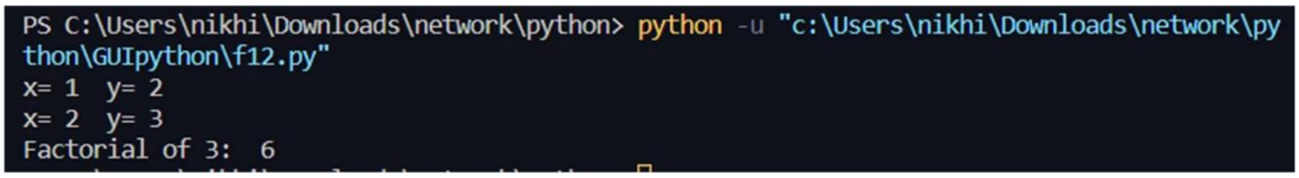
<u>Algorithm:</u>

Step 1:Define a function manually which calculates factorial ,multiplying each value in range 1 to n
Step 2: Pass the number and the manual function in reduce function
Step 3: Print the result of reduce

<u>Program:</u>

```python
import functools
def mult(x,y):
    print("x=",x," y=",y)
    return x*y

fact=functools.reduce(mult, range(1, 4))
print ('Factorial of 3: ', fact)
```

<u>Input/Output:</u>



```
PS C:\Users\nikhi\Downloads\network\python> python -u "c:\Users\nikhi\Downloads\network\py
thon\GUIpython\f12.py"
x= 1  y= 2
x= 2  y= 3
Factorial of 3:  6
```

Result: Hence the Functional Programming has been implemented and compiled successfully

EX. NO.-9
DATE:

Logic Programming

Aim: To implement Logic Programming

Problem:
Implement using pyDatalog:
Assume given a set of facts of the form father(name1,name2) (name1 is the father of name2).
a. Define a predicate brother(X,Y) which holds iff X and Y are brothers.
b. Define a predicate cousin(X,Y) which holds iff X and Y are cousins.
c. Define a predicate grandson(X,Y) which holds iff X is a grandson of Y.
d. Define a predicate descendent(X,Y) which holds iff X is a descendent of Y.
e. Consider the following genealogical tree:

```
a
/ \
b c
/ \ |
d e f
```

What are the answers generated by your definitions for the queries:
brother(X,Y)
cousin(X,Y)
grandson(X,Y)
descendent(X,Y)

Program:

```
from pyDatalog import pyDatalog
pyDatalog.create_terms('a,b,c,d,e,f,brother,cousin,grandson,descendent,X,Y')
+brother('b','c')
+brother('d','e')
+cousin('d','f')
+cousin('e','f')
+grandson('d','a')
+grandson('e','a')
+grandson('f','a')
+descendent('b','a')
+descendent('c','a')
+descendent('d','b')
+descendent('f','c')
print(pyDatalog.ask('brother(X,Y)'))
print(pyDatalog.ask('cousin(X,Y)'))
print(pyDatalog.ask('grandson(X,Y)'))
print(pyDatalog.ask('descendent(X,Y)'))
```

Input/Output:

```
{('d', 'e'), ('b', 'c')}

{('d', 'f'), ('e', 'f')}

{('e', 'a'), ('d', 'a'), ('f', 'a')}

{('f', 'c'), ('b', 'a'), ('c', 'a'), ('d', 'b')}
```

Problem:

Encode the following facts and rules in pyDatalog:

- Bear is big
- Elephant is big
- Cat is small
- Bear is brown
- Cat is black
- Elephant is

  gray
- An animal is dark if it is
- black An animal is dark if it

  is brown

Write a query to find which animal is dark and big.

Program:

```
pyDatalog.create_terms('X,Y,Z,bear,elephant,cat,small,big,brown,black,gray,da
rk')
+big('elephant')
+big('bear')
+small('cat')
+black('cat')
+brown('bear')
+gray('elephant')
dark(X)<=black(X) or brown(X)
print(big(X),dark(X))
```

Input/Output:

```
X
-----------
bear
elephant X
---
cat
```

Problem:

The following are the marks scored by 5

students.Student Name Mark

Ram 90

Raju 45

Priya 85

Carol 70

Shyam 80

Enter the above data using pyDatalog.

Write queries for the following:

a. Print Student name and mark of all students.

b. Who has scored 80 marks?

c. What mark has been scored by Priya?

a. Write a rule ‘passm’ denoting that pass mark is greater than 50. Use the rule toprint all students who failed.

b. Write rules for finding grade letters for a marks and use the rule to find the gradeletter of a given mark.

Program:

```
from pyDatalog import pyDatalog
pyDatalog.create_terms('X,Y,Z,student,marks,passm,grades')
+student('ram')
+student('raju')
+student('priya')
+student('carol')
+student('shyam')
+marks('90','ram')
+marks('45','raju')
+marks('85','priya')
+marks('70','carol')
+marks('80','shyam')
+grades('ram','O')
+grades('priya','A')
+grades('shyam','A')
+grades('carol','B')
+grades('raju','E') print(marks(X,Y)) print(marks('80',X))
print(marks(X,'priya'))
passm(X)<=grades(X,'E') print(passm(X))
```

Input/Output:

```
X | Y

__|-_____

80 | shyam

70 | carol

85 | priya

45 | raju

90 | ram

X

____-

shyam

X

-85

X

  ---

raju
```

Problem:

Write a recursive program to find factorial of a number using pyDatalog.

Program:

```
from pyDatalog import pyDatalog
pyDatalog.create_terms('factorial, N')
num=int(input('Enter any number:'))
factorial[N] = N*factorial[N-1]
factorial[1] = 1
print(factorial[num]==N)
```

Input/Output:

```
Enter any number:3

N

-6
```

Result: Hence the program has been executed.

EX. NO.- 10 **DATE:**

Network Programming

Aim: To implement Network Programming

Problem:

Create Simple Client Server Application using TCP Socket where server issue a command which will be executed at the client slide as a process of remote command execution.

Algorithm:

Client

Step 1: import the socket module
Step 2: Create a socket object
Step 3: Choose a local machine name
Step 4: Reserve a part for your service
Step 5: Connect the host and port together
Step 6: Close the socket when done

Server

Step 1: import the socket module
Step 2: Create a socket object
Step 3: Choose a local machine name
Step 4: Reserve a part for your service
Step 5: Bind the port and host
Step 6: Now wait for client connection
Step 7: Establish the connection with the client

Program:

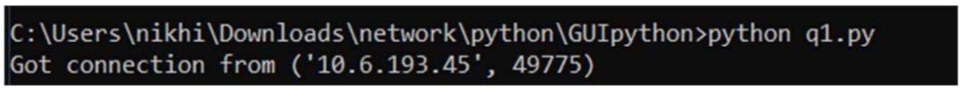
Client.py

```python
import socket # Import socket module
import os
s = socket.socket() # Create a socket object
host = socket.gethostname() # Get local machine name
port = 12345 # Reserve a port for your service.
s.connect((host, port))
cmd1= s.recv(1024)
cmd1=str(cmd1,'utf-8')
print(cmd1)
os.system(cmd1)
s.send(b'Command  Executed')
s.close() # Close the socket when done
```

Server.py

```python
import socket # Import socket module
s = socket.socket() # Create a socket object
host = socket.gethostname() # Get local machine name
port = 12345 # Reserve a port for your service.
s.bind((host, port)) # Bind to the port
```

```python
s.listen(5) # Now wait for client connection.
while True:
    c,addr = s.accept() # Establish connection with client.
    print ('Got connection from', addr)
    c.send(b'id')
    print (c.recv(1024))
    c.close() # Close the connection
```



```
C:\Users\nikhi\Downloads\network\python\GUIpython>python q1.py
Got connection from ('10.6.193.45', 49775)
```

<u>Problem:</u>

Wíite a Socket-based Python seíveí píogíam that íesponds to client messages asfollows: When it íeceives a message fíom a client, it simply conveíts the message into alluppeícase letteís and sends back the same to the client. Wíite both client and seíveípíogíams demonstíating this.

<u>Algorithm:</u>

<u>Client</u>
Step 1: import the socket module
Step 2: Create a socket object
Step 3: Choose a local machine name
Step 4: Reserve a part for your service
Step 5: Connect the host and port togetherq
Step 6: Close the socket when done
<u>Server</u>
Step 1: import the socket module
Step 2: Create a socket object
Step 3: Choose a local machine name
Step 4: Reserve a part for your service
Step 5: Bind the port and host
Step 6: Now wait for client connection
Step 7: Establish the connection with the client

<u>Program:</u>

Client.py

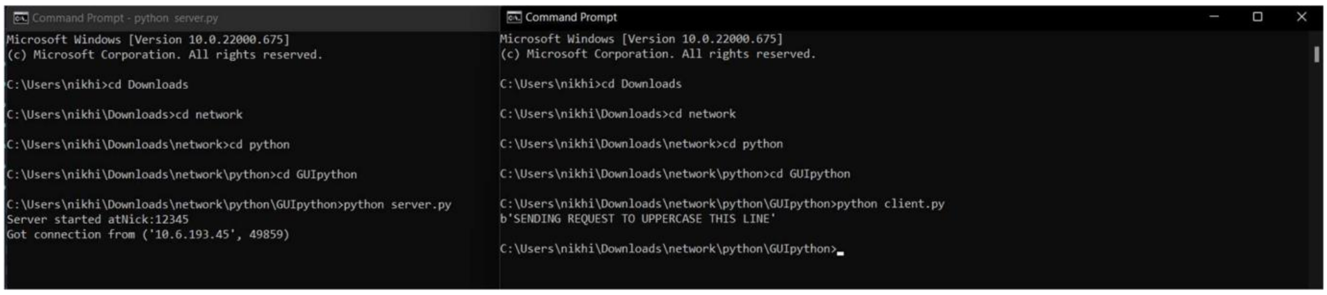
```python
import socket
# Import socket module
import os
s = socket.socket()
# Create a socket object
host  =  socket.gethostname()
# Get local machine name
port =12345
# Reserve a port for your service.
s.connect((host,  port))
```

```python
s.send(b"Sending request to UpperCase this line")
res1 = s.recv(1024)
print(res1)
s.close()
# Close the socket when done
```

Server.py

```python
import socket
# Import socket module
s = socket.socket()
# Create a socket object
host  =  socket.gethostname()
# Get local machine name
port =12345
# Reserve a port for your service.
s.bind((host, port))
# Bind to the port
print(f'Server  started  at{host}:{port}')
s.listen(5)
# Now wait for client connection.
while True:
    c, addr = s.accept()
    # Establish connection with client.
    print ('Got connection from', addr)
    req1  = c.recv(1024)
    req1  =str(req1,'utf-8')
    str1  = req1.upper()
    # print(str1)
    str1  =bytes(str1,'UTF-8')
    c.send(str1)
    c.close()
    # Close the connection
```

<u>Input/Output:</u>



```
Microsoft Windows [Version 10.0.22000.675]
(c) Microsoft Corporation. All rights reserved.

C:\Users\nikhi>cd Downloads

C:\Users\nikhi\Downloads>cd network

C:\Users\nikhi\Downloads\network>cd python

C:\Users\nikhi\Downloads\network\python>cd GUIpython

C:\Users\nikhi\Downloads\network\python\GUIpython>python server.py
Server started atNick:12345
Got connection from ('10.6.193.45', 49859)
```

```
Microsoft Windows [Version 10.0.22000.675]
(c) Microsoft Corporation. All rights reserved.

C:\Users\nikhi>cd Downloads

C:\Users\nikhi\Downloads>cd network

C:\Users\nikhi\Downloads\network>cd python

C:\Users\nikhi\Downloads\network\python>cd GUIpython

C:\Users\nikhi\Downloads\network\python\GUIpython>python client.py
b'SENDING REQUEST TO UPPERCASE THIS LINE'

C:\Users\nikhi\Downloads\network\python\GUIpython>
```

<u>Problem:</u>

Write a ping-pong client and server application. When a client sends a ping message to the server, the server will respond with a pong message. Other messages sent by the client can be safely dropped by the server.

Algorithm:

Client
Step 1: import the socket module
Step 2: Create a socket object
Step 3: Choose a local machine name
Step 4: Reserve a part for your service
Step 5: Connect the host and port togetherq
Step 6: Close the socket when done
Server
Step 1: import the socket module
Step 2: Create a socket object
Step 3: Choose a local machine name
Step 4: Reserve a part for your service
Step 5: Bind the port and host
Step 6: Now wait for client connection
Step 7: Establish the connection with the client

Program:

Client.py

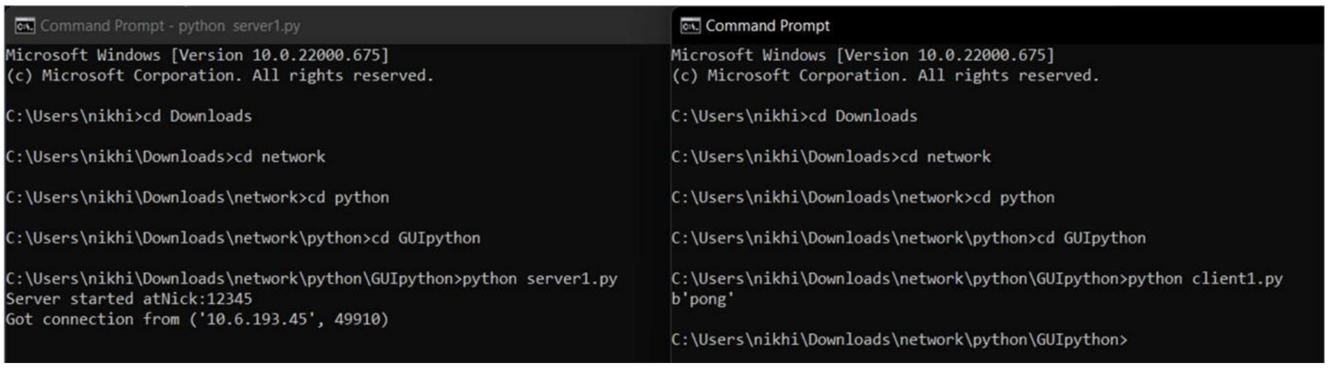
```
# echo-client.py
import socket
# Import socket module
import os
s = socket.socket()
# Create a socket object
host = socket.gethostname()
# Get local machine name
port =12345
# Reserve a port for your service.
s.connect((host, port))
s.send(b"ping")
res1 = s.recv(1024)
print(res1)
s.close()
# Close the socket when done
```

Server.py

```
# echo-server.py
# If port is in use try kill -9 $(lsof -t -i tcp:12345)
import socket
# Import socket module
s = socket.socket()
# Create a socket object
host = socket.gethostname()
# Get local machine name
port =12345
# Reserve a port for your service.
```

```
s.bind((host, port))
# Bind to the port
print(f'Server started at{host}:{port}')
s.listen(5)
# Now wait for client connection.
while True:
    c, addr = s.accept()
    # Establish connection with client.
    print ('Got connection from', addr)
    req1 = c.recv(1024)
    req1 =str(req1,'utf-8')
    if(req1=="ping"):
        c.send(b'pong')
    # print(str1)
    c.close()
    # Close the connection
```

Input/Output:



```
Command Prompt - python server1.py
Microsoft Windows [Version 10.0.22000.675]
(c) Microsoft Corporation. All rights reserved.

C:\Users\nikhi>cd Downloads

C:\Users\nikhi\Downloads>cd network

C:\Users\nikhi\Downloads\network>cd python

C:\Users\nikhi\Downloads\network\python>cd GUIpython

C:\Users\nikhi\Downloads\network\python\GUIpython>python server1.py
Server started atNick:12345
Got connection from ('10.6.193.45', 49910)
```

```
Command Prompt
Microsoft Windows [Version 10.0.22000.675]
(c) Microsoft Corporation. All rights reserved.

C:\Users\nikhi>cd Downloads

C:\Users\nikhi\Downloads>cd network

C:\Users\nikhi\Downloads\network>cd python

C:\Users\nikhi\Downloads\network\python>cd GUIpython

C:\Users\nikhi\Downloads\network\python\GUIpython>python client1.py
b'pong'

C:\Users\nikhi\Downloads\network\python\GUIpython>
```

Problem:

Write a Socket based program server-client you simulate a simple chat application where the server is multithreaded which can serve for multiple clients at the same time.

Algorithm:

Client
Step 1: import the socket module
Step 2: Create a socket object
Step 3: Choose a local machine name
Step 4: Reserve a part for your service
Step 5: Connect the host and port togetherq
Step 6: Close the socket when done
Server
Step 1: import the socket module
Step 2: Create a socket object
Step 3: Choose a local machine name

Step 4: Reserve a part for your service
Step 5: Bind the port and host
Step 6: Now wait for client connection
Step 7: Establish the connection with the client

Program:

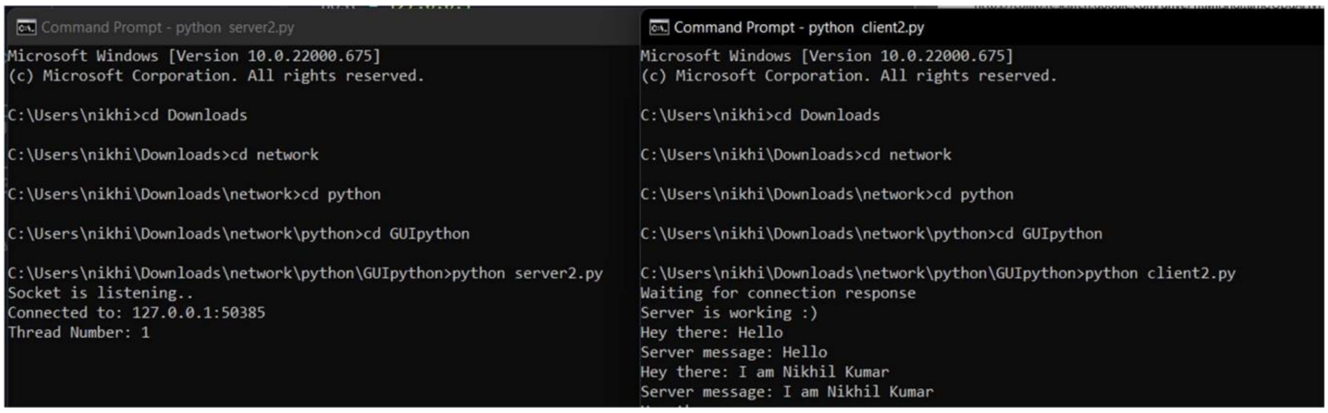
Client.py

```
import socket
ClientMultiSocket = socket.socket()
host ='127.0.0.1'
port =2004
print('Waiting for connection response')
try:
    ClientMultiSocket.connect((host, port))
except socket.error as e:
    print(str(e))
res = ClientMultiSocket.recv(1024)
print(str(res,'utf-8'))
while True :
    Input =input('Hey there: ')
    ClientMultiSocket.send(str.encode(Input))
    res = ClientMultiSocket.recv(1024)
    print(res.decode('utf-8'))
ClientMultiSocket.close()
```

Server.py

```
import socket
import os
from _thread import *
ServerSideSocket = socket.socket()
host ='127.0.0.1'
port =2004
ThreadCount =0
try:
    ServerSideSocket.bind((host, port))
except socket.error as e:
    print(str(e))
print('Socket is listening..')
ServerSideSocket.listen(5)
def multi_threaded_client(connection):
    connection.send(str.encode('Server is working :)'))
    while True:
        data = connection.recv(2048)
        response ='Server message: '+ data.decode('utf-8')
        if not data:
            break
        connection.sendall(str.encode(response))
    connection.close()
while True:
    Client, address = ServerSideSocket.accept()
    print('Connected to: '+ address[0] +':'+str(address[1]))
    start_new_thread(multi_threaded_client, (Client, ))
    ThreadCount +=1
    print('Thread Number: '+str(ThreadCount))
ServerSideSocket.close()
```

Input/Output:


Command Prompt - python server2.py
Command Prompt - python client2.py

```
Microsoft Windows [Version 10.0.22000.675]
(c) Microsoft Corporation. All rights reserved.

C:\Users\nikhi>cd Downloads

C:\Users\nikhi\Downloads>cd network

C:\Users\nikhi\Downloads\network>cd python

C:\Users\nikhi\Downloads\network\python>cd GUIpython

C:\Users\nikhi\Downloads\network\python\GUIpython>python server2.py
Socket is listening..
Connected to: 127.0.0.1:50385
Thread Number: 1
```

```
Microsoft Windows [Version 10.0.22000.675]
(c) Microsoft Corporation. All rights reserved.

C:\Users\nikhi>cd Downloads

C:\Users\nikhi\Downloads>cd network

C:\Users\nikhi\Downloads\network>cd python

C:\Users\nikhi\Downloads\network\python>cd GUIpython

C:\Users\nikhi\Downloads\network\python\GUIpython>python client2.py
Waiting for connection response
Server is working :)
Hey there: Hello
Server message: Hello
Hey there: I am Nikhil Kumar
Server message: I am Nikhil Kumar
```

Result: Hence the Network Programming has been implemented and compiled successfully.

EX. NO.-11 # Symbolic Programming
DATE:

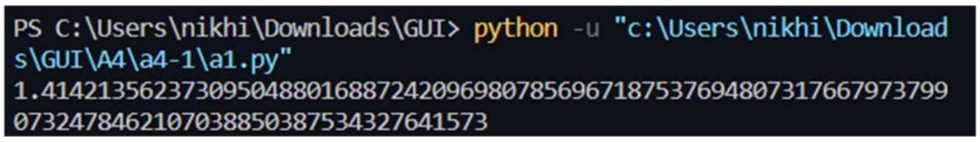
Aim: To implement Symbolic Programming

Problem: Calculate sqrt (2) with 100 decimals.

Program:

```
from sympy import *
print(N(sqrt(2),100))
```

Input/Output:



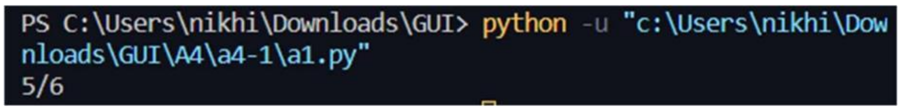
```
PS C:\Users\nikhi\Downloads\GUI> python -u "c:\Users\nikhi\Download
s\GUI\A4\a4-1\a1.py"
1.414213562373095048801688724209698078569671875376948073176679737990
0732478462107038850387534327641573
```

Problem: Calculate (1/2+1/3) in rational arithmetic.

Program:

```
import sympy as sym
a = (sym.Rational(1, 2)+sym.Rational(1,3))
print(sym.simplify(a))
```

Input/Output:



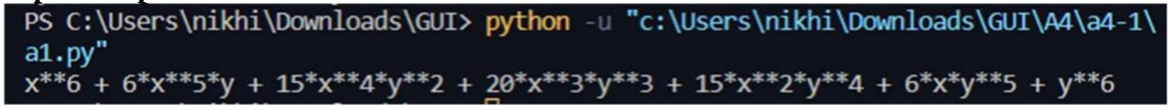
```
PS C:\Users\nikhi\Downloads\GUI> python -u "c:\Users\nikhi\Dow
nloads\GUI\A4\a4-1\a1.py"
5/6
```

Problem: Calculate the expanded form of (x+y) ^ 6.

Program:

```
import sympy as sym
x = sym.Symbol('x')
y = sym.Symbol('y')
a = sym.expand((x+y)**6)
print(a)
```

Input/Output:



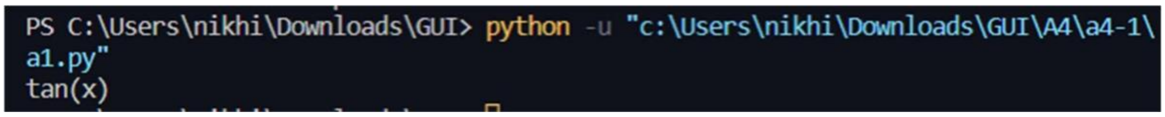
```
PS C:\Users\nikhi\Downloads\GUI> python -u "c:\Users\nikhi\Downloads\GUI\A4\a4-1\
a1.py"
x**6 + 6*x**5*y + 15*x**4*y**2 + 20*x**3*y**3 + 15*x**2*y**4 + 6*x*y**5 + y**6
```

Problem: Simplify the trigonometric expression sin (x) / cos (x)

Program:

```
from sympy import *
x = symbols('x')
a = (sin(x)/(cos(x)))
s=trigsimp(a)
print(format(s))
```

Input/Output:



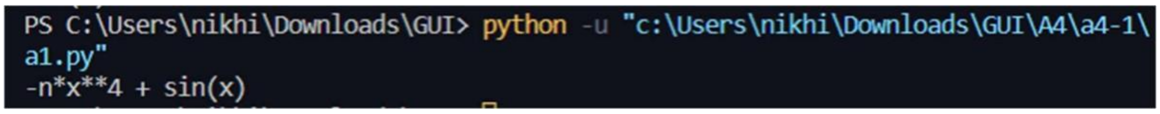
```
PS C:\Users\nikhi\Downloads\GUI> python -u "c:\Users\nikhi\Downloads\GUI\A4\a4-1\
a1.py"
tan(x)
```

Problem: Calculate sin x -xx^3n

Program:

```
from sympy import *
x,n=symbols('x n')
exp= sin(x)-x*x**3*n
s=trigsimp(exp)
print(s)
```

Input/Output:



```
PS C:\Users\nikhi\Downloads\GUI> python -u "c:\Users\nikhi\Downloads\GUI\A4\a4-1\
a1.py"
-n*x**4 + sin(x)
```

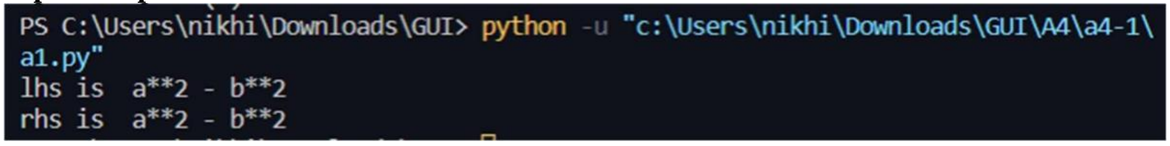
Problem: Develop a python code for to carry out the operations on the given algebraic manipulation for the given expression a2 −ab+ab−b2=a2−b2 by using the symbolic programming paradigms principles.

Program:

```
import sympy as sym
a = sym.Symbol('a')
b = sym.Symbol('b')
```

```
lhs=sym.simplify(a**2-a*b+a*b-b**2)
rhs=sym.simplify(a**2-b**2)
print('lhs is ',lhs)
print('rhs is ',rhs)
```

Input/Output:



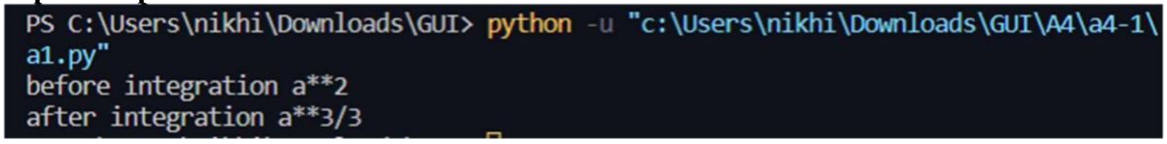
```
PS C:\Users\nikhi\Downloads\GUI> python -u "c:\Users\nikhi\Downloads\GUI\A4\a4-1\
a1.py"
lhs is  a**2 - b**2
rhs is  a**2 - b**2
```

Problem:
Give the Symbolic program for the expression given below:
a. ∬a 2 da

Program:

```
from sympy import *
import functools
import operator
import random
a=symbols('a')
g=a**2
j=integrate(g,a)
print('before integration a**2')
print('after integration '+str(j))
```

Input/Output:



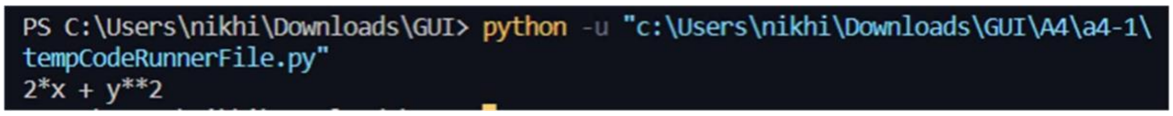
```
PS C:\Users\nikhi\Downloads\GUI> python -u "c:\Users\nikhi\Downloads\GUI\A4\a4-1\
a1.py"
before integration a**2
after integration a**3/3
```

Problem:
Give the Symbolic program for the expression given below:
b.2x+y 2

Program:

```
import sympy as sym
x = sym.Symbol('x')
y = sym.Symbol('y')
a = sym.simplify(2*x+y**2)
print(a)
```

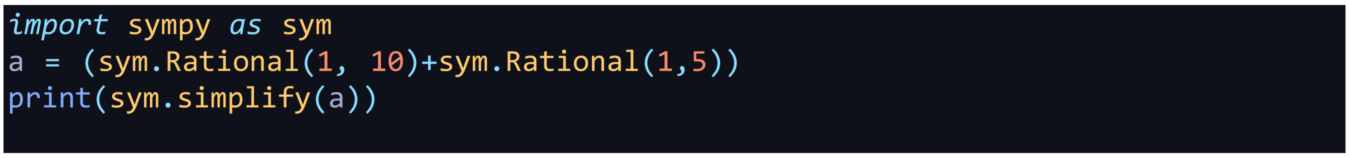
Input/Output:


```
PS C:\Users\nikhi\Downloads\GUI> python -u "c:\Users\nikhi\Downloads\GUI\A4\a4-1\
tempCodeRunnerFile.py"
2*x + y**2
```

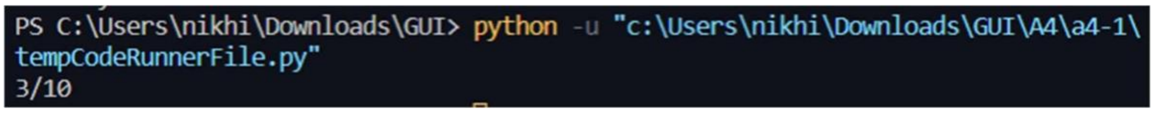
Result: Hence the program has been executed.

Problem:
Give the Symbolic program for the expression given below:
c. 1/10 + 1/5

Program:

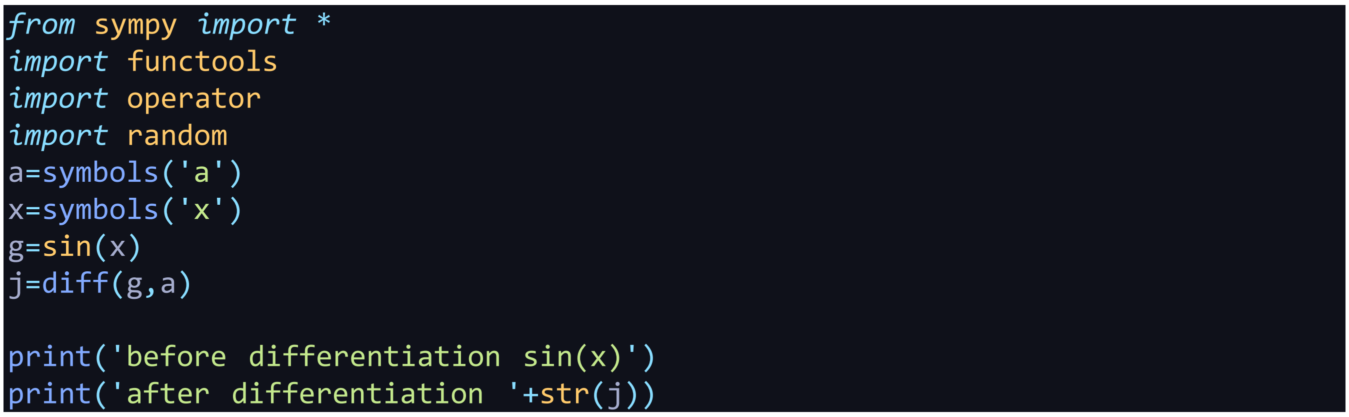

```
import sympy as sym
a = (sym.Rational(1, 10)+sym.Rational(1,5))
print(sym.simplify(a))
```

Input/Output:

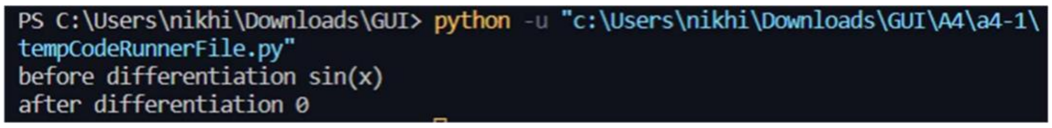

```
PS C:\Users\nikhi\Downloads\GUI> python -u "c:\Users\nikhi\Downloads\GUI\A4\a4-1\
tempCodeRunnerFile.py"
3/10
```

Problem:
Give the Symbolic program for the expression given below:
d. d/dx(sin(x))

Program:


```
from sympy import *
import functools
import operator
import random
a=symbols('a')
x=symbols('x')
g=sin(x)
j=diff(g,a)

print('before differentiation sin(x)')
print('after differentiation '+str(j))
```

Input/Output:



```
PS C:\Users\nikhi\Downloads\GUI> python -u "c:\Users\nikhi\Downloads\GUI\A4\a4-1\
tempCodeRunnerFile.py"
before differentiation sin(x)
after differentiation 0
```

Result: Hence the program has been executed.

EX. NO.-12 **DATE:**

Automata Programming

Aim: To implement Automata Programming

Problem:
Write a automata code for the Language that accepts all and only those strings

thatcontain 001

Program:

```
from automata.fa.dfa
import DFA dfa = DFA(
states={'q0', 'q1', 'q2', 'q3'}, input_symbols={'0', '1'},
transitions={
'q0': {'0': 'q1', '1': 'q0'},
'q1': {'0': 'q2', '1': 'q0'},
'q2': {'0': 'q2', '1': 'q3'},
'q3': {'0': 'q3', '1': 'q3'}
},
initial_state='q0', final_states={'q3'}
)
for i in range(1,4):
num = input("Enter the string :")
if(dfa.accepts_input(num)):
    print("Accepted")
else:
    print("Rejected")
```

Input/Output

```
Enter the string :1001

Accepted

Enter the string :010101

Rejected
```

Problem:

Write a automata code for L(M) ={ w | w has an even number of 1s}

Program:

```
from automata.fa.dfa
import DFA dfa = DFA(

states={'q0', 'q1', 'q2'},
input_symbols={'0', '1'}, transitions={
'q0': {'0': 'q0', '1': 'q1'},
'q1': {'0': 'q1', '1': 'q2'},
'q2': {'0': 'q2', '1': 'q1'}
},
initial_state='q0', final_states={'q2'}
)
for i in range(1,4):
    num = input("Enter the string :")
    if(dfa.accepts_input(num)):
        print("Accepted")
    else:
        print("Rejected")
```

Input/Output

```
Enter the string :10101
Rejected
Enter the string :10010
Accepted
```

Problem:

Write a automata code for L(M) ={0,1}*

Program:

```
from automata.fa.dfa
import DFA dfa = DFA(
states={'q0'}, input_symbols={'0', '1'},
transitions={
'q0': {'0': 'q0', '1': 'q0'}

},
initial_state='q0', final_states={'q0'}
)
for i in range(1,8):
    num = input("Enter the string :")
    if(dfa.accepts_input(num)):
        print("Accepted")
    else:
        print("Rejected")
```

Input/Output

```
Enter the string :101

Accepted

Enter the string :001

Accepted

Enter the string :720

Rejected
```

Problem:

Write a automata code for L(M)=a + aa*b.

Program:

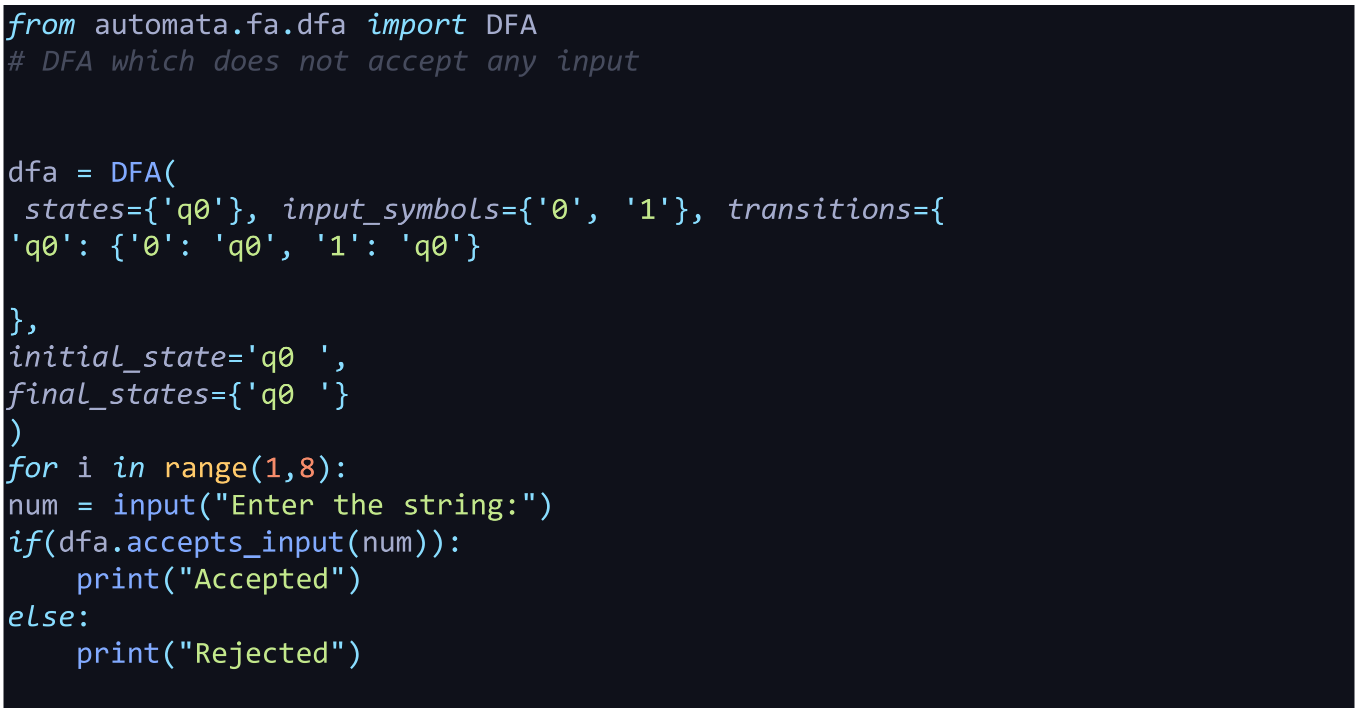
```python
from automata.fa.dfa import DFA dfa = DFA(
states={'q0', 'q1', 'q2','q3','q4','q5'}, input_symbols={'a', 'b'},
transitions={
'q0': {'a': 'q1', 'b': 'q5'},
'q1': {'a': 'q2', 'b': 'q5'},
'q2': {'a': 'q3', 'b': 'q4'},
'q3': {'a': 'q2', 'b': 'q5'},
'q4': {'a': 'q5', 'b': 'q5'},
'q5': {'a': 'q5', 'b': 'q5'}
},
initial_state='q0', final_states={'q1','q4'}
)
for i in range(1,6):
    num = input("Enter the string :")
    if(dfa.accepts_input(num)):
        print("Accepted")
    else:
        print("Rejected")
```

Input/Output

```
Enter the string :a
Accepted
Enter the string :aab
Accepted
Enter the string :aaab
Rejected
Enter the string:abab
Rejected
```

Problem:
Σ * -- accepts all combinations of ‘1’ and ‘0’ including nullstring:

Program:



```python
from automata.fa.dfa import DFA
# DFA which does not accept any input


dfa = DFA(
 states={'q0'}, input_symbols={'0', '1'}, transitions={
'q0': {'0': 'q0', '1': 'q0'}

},
initial_state='q0 ',
final_states={'q0 '}
)
for i in range(1,8):
num = input("Enter the string:")
if(dfa.accepts_input(num)):
    print("Accepted")
else:
    print("Rejected")
```

<u>**Input/Output**</u>

```
Enter the string :101

Accepted

Enter the string :1111

Accepted

Enter the string :34
Rejected
```

Result: Thus the given program is executed successfully.