Python Programming Lab

Name: Deeraj R Ramchandani

Class: V BCA

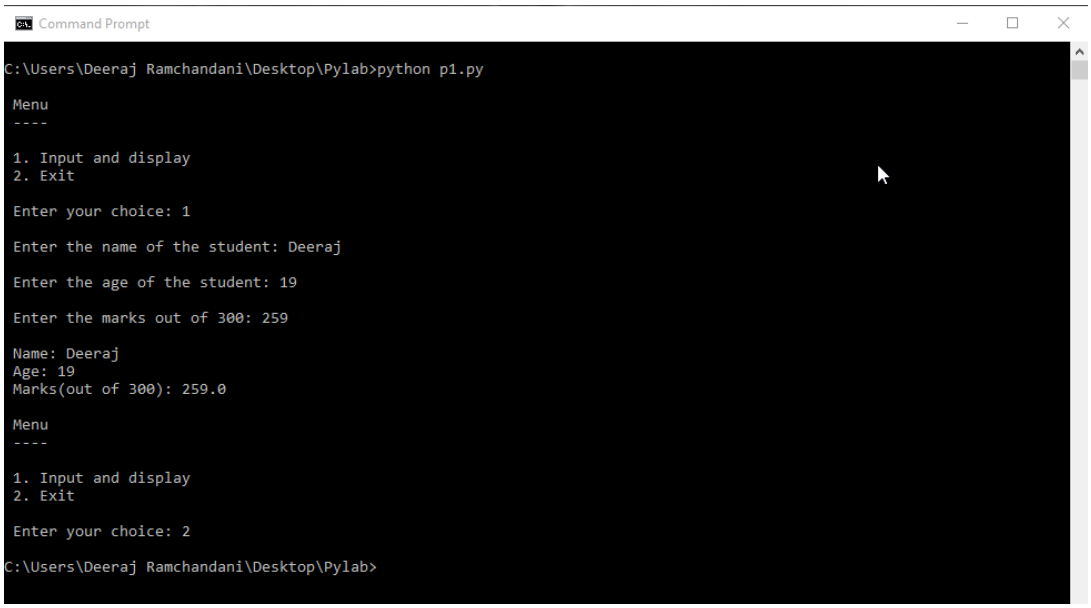
Roll Number: 1541019

Program 1: Demonstrate the use of input and type conversion functions by accepting name (string), age(integer) and marks(float) from user and displaying the same.

Program

```
def input1():
    name=input("\n Enter the name of the student: ")
    age=int(input("\n Enter the age of the student: "))
    marks=float(input("\n Enter the marks out of 300: "))
    while(marks>300 or marks<0):
        marks=float(input("\n Invalid. Please re-nter the marks out of 300: "))
    print("\n Name: "+name+"\n Age: "+str(age)+"\n Marks(out of 300): "+str(marks))

a=1
while(a==1):
    print("\n Menu\n ----\n\n 1. Input and display\n 2. Exit")
    ch=int(input("\n Enter your choice: "))
    if(ch==1):
        input1()
    elif(ch==2):
        a=0
```

Output



Program 2: Demonstrate the use of arithmetic operators (+, -, /, =, %) and conditional statement with a basic calculator program by reading the operands and operator from the user. Also check for divide by zero.

Program

```
def read_input():
    x = int(input("\n Enter the value of x: "))
    y = int(input("\n Enter the value of y: "))
    main_program(x,y)

def main_program(x,y):
    a = 1
    while a == 1:
        print("\n\n Menu\n ----\n\n (+) - Addition\n (-) - Subtraction\n (*) - Multiplication\n (/) - Division\n (%) - Remainder\n (!) - Exit")
        ch = input("\n\n Enter your choice: ")
        if ch == '+':
            b = x+y
            print("\n The result is: "+str(b))
        elif ch == '-':
            b = x-y
            print("\n The result is: "+str(b))
        elif ch == '*':
            b = x*y
            print("\n The result is: "+str(b))
        elif ch == '/':
            if y == 0:
                print("\n Invalid divsion")
            else:
                b = x/y
                print("\n The result is: "+str(b))
        elif ch  =='%':
            if y == 0:
                print("\n Invalid divsion")
```

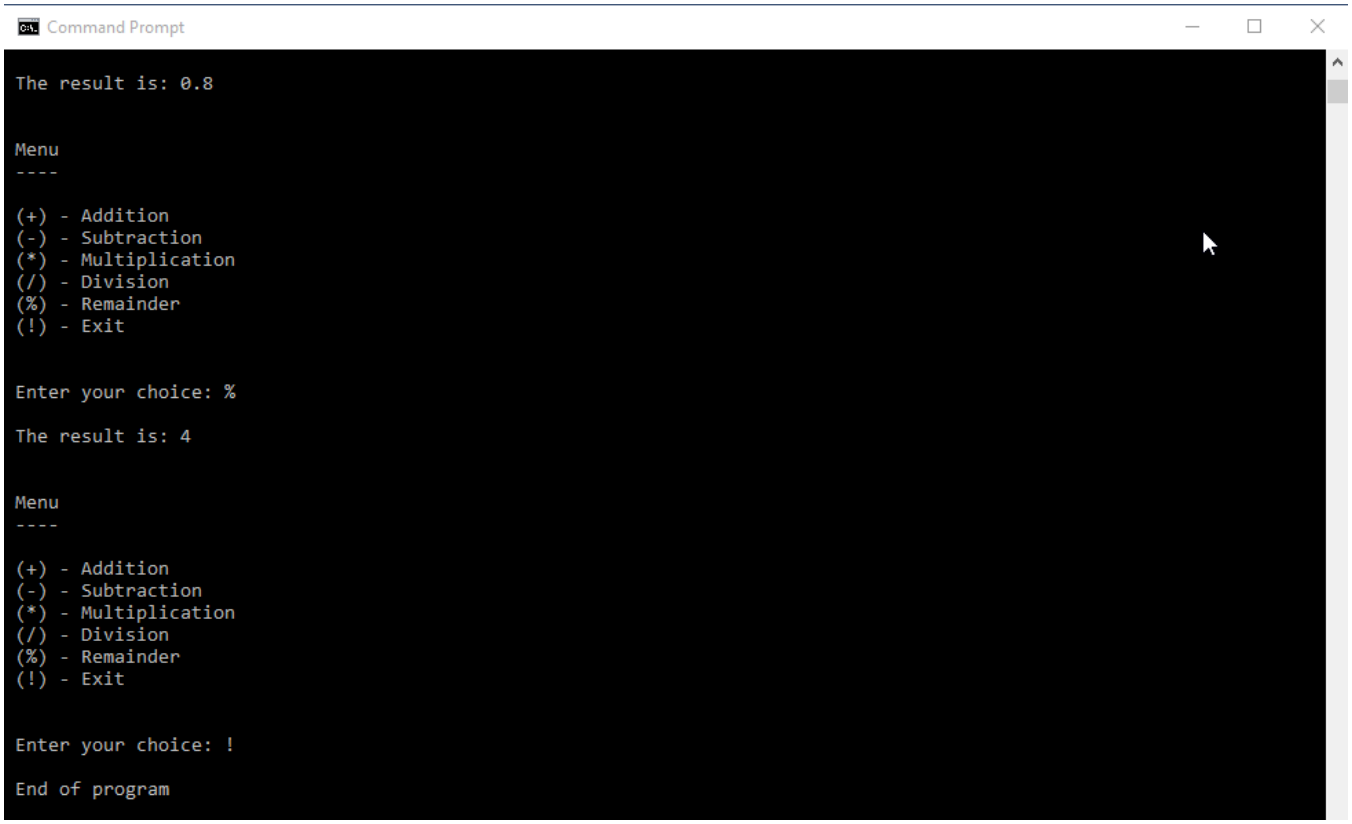
```
                else:
                        b = x%y
                        print("\n The result is: "+str(b))
        elif ch == '!':
                a = -1
        else:
                print("\n Invalid input")
    print("\n End of program")
read_input()
```

Output


Command Prompt - python p2.py
Menu

(+) - Addition
(-) - Subtraction
(*) - Multiplication
(/) - Division
(%) - Remainder
(!) - Exit
Enter your choice: *
The result is: 20
Menu

(+) - Addition
(-) - Subtraction
(*) - Multiplication
(/) - Division
(%) - Remainder
(!) - Exit
Enter your choice: /
The result is: 0.8


Command Prompt
The result is: 0.8
Menu

(+) - Addition
(-) - Subtraction
(*) - Multiplication
(/) - Division
(%) - Remainder
(!) - Exit
Enter your choice: %
The result is: 4
Menu

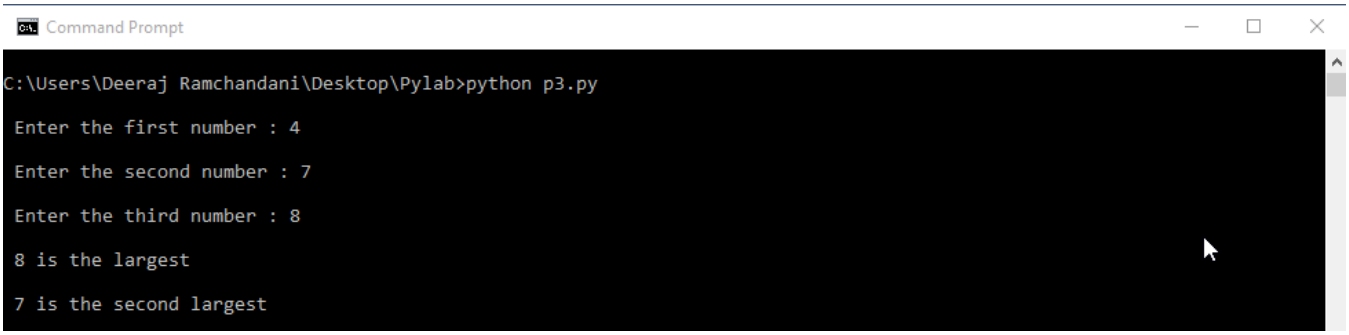
(+) - Addition
(-) - Subtraction
(*) - Multiplication
(/) - Division
(%) - Remainder
(!) - Exit
Enter your choice: !
End of program

Program 3: Demonstrate the use of relational, logical and concatenation operators by accepting three integers from the user and displaying the smallest and greatest of the three.

Program

```
x = input("\n Enter the first number : ")
y = input("\n Enter the second number : ")
z = input("\n Enter the third number : ")
if(x>y and x>z):
        l=x
        if(y>z):
                sl=y
        else:
                sl=z
elif(y>x and y>z):
        l=y
        if(x>z):
                sl=x
        else:
                sl=z
elif(z>x and z>y):
        l=z
        if(y>x):
                sl=y
        else:
                sl=x
print("\n "+str(l)+" is the largest")
print("\n "+str(sl)+" is the second largest")
```

Output



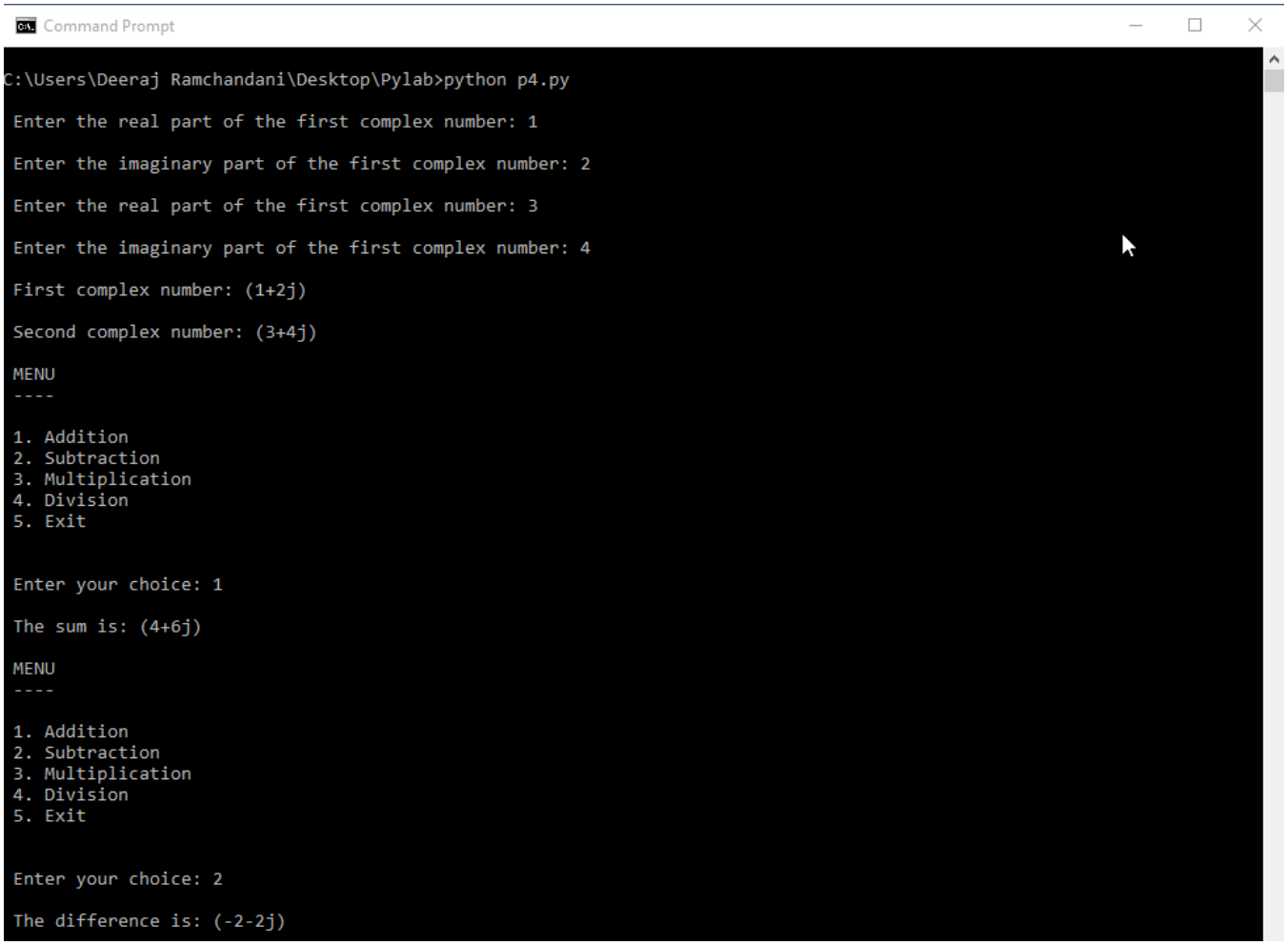
Program 4: Demonstrate the use of complex data types by performing complex number operations by reading the real and imaginary values from user.

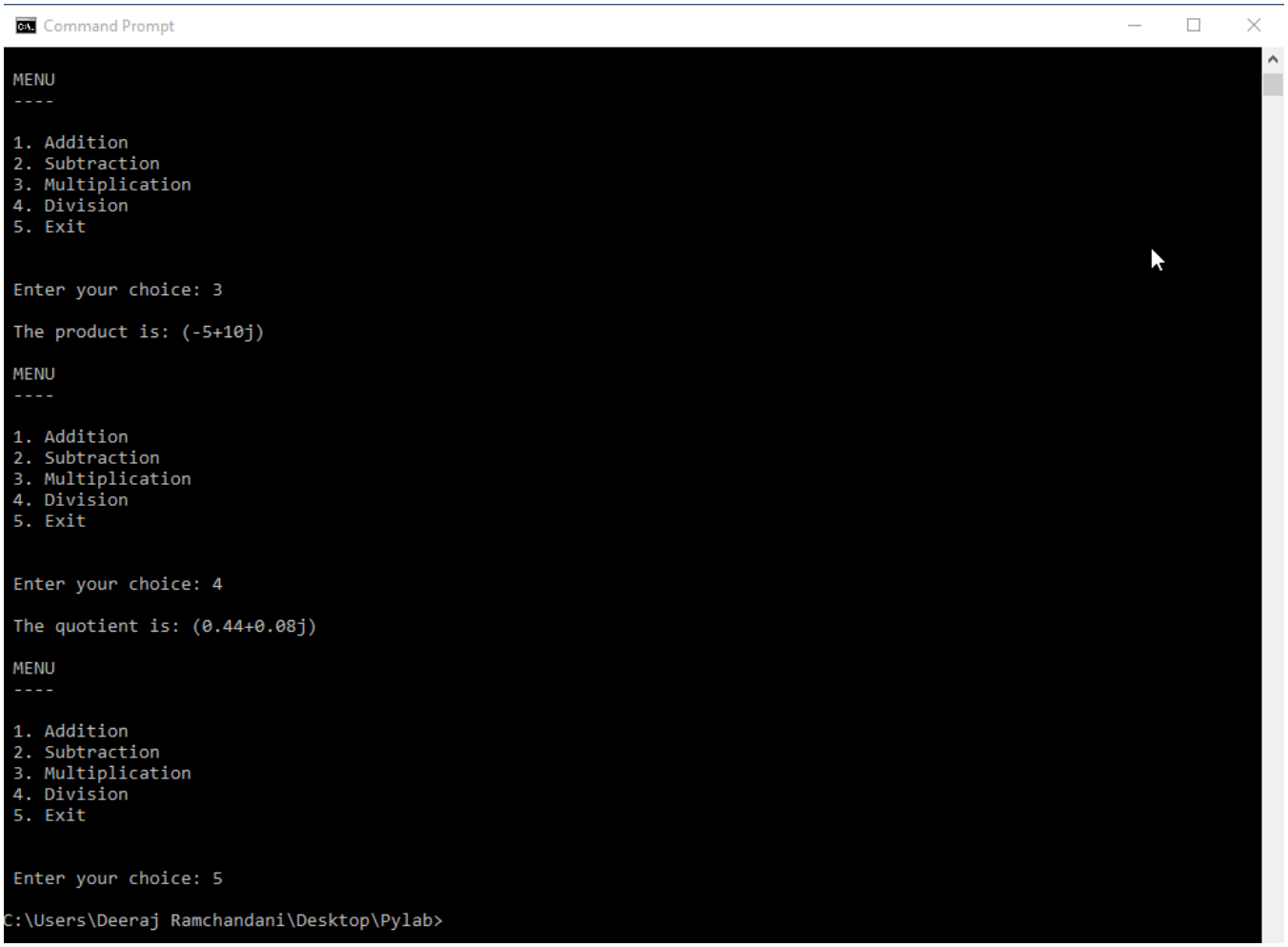
Program

```
real=int(input("\n Enter the real part of the first complex number: "))
imag=int(input("\n Enter the imaginary part of the first complex number: "))
x=complex(real,imag)

real=int(input("\n Enter the real part of the first complex number: "))
imag=int(input("\n Enter the imaginary part of the first complex number: "))
y=complex(real,imag)

print("\n First complex number: "+str(x))
print("\n Second complex number: "+str(y))

a=1
while a==1:
    print("\n MENU\n ----\n\n 1. Addition\n 2. Subtraction\n 3. Multiplication\n 4. Division\n 5. Exit\n")
    ch=int(input("\n Enter your choice: "))
    if(ch==1):
        real=x.real+y.real
        imag=x.imag+y.imag
        z = complex(real,imag)
        print("\n The sum is: "+str(z))
    elif(ch==2):
        real=x.real-y.real
        imag=x.imag-y.imag
        z = complex(real,imag)
        print("\n The difference is: "+str(z))
    elif(ch==3):
        z= x*y
        print("\n The product is: "+str(z))
```

```
    elif(ch==4):
        z=x/y
        print("\n The quotient is: "+str(z))
    elif(ch==5):
        a=0
```

Output



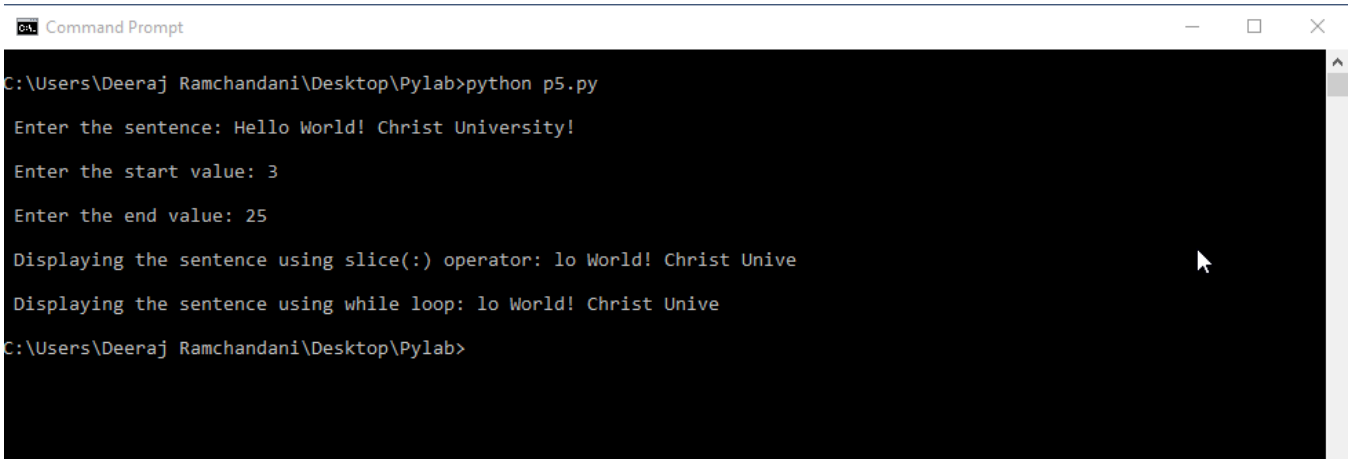

Command Prompt
MENU
----
1. Addition
2. Subtraction
3. Multiplication
4. Division
5. Exit
Enter your choice: 3
The product is: (-5+10j)
MENU
----
1. Addition
2. Subtraction
3. Multiplication
4. Division
5. Exit
Enter your choice: 4
The quotient is: (0.44+0.08j)
MENU
----
1. Addition
2. Subtraction
3. Multiplication
4. Division
5. Exit
Enter your choice: 5
C:\Users\Deeraj Ramchandani\Desktop\Pylab>

Program 5: Write a program that accepts a sentence, the start position and end position from the user and passes in to a function. The function should display the string from the start position to end position using (i) slice (:) operator and (ii) while loop on the string

Program

```
def display(s,start,end):
    print("\n Displaying the sentence using slice(:) operator: "+s[start:end])
    s1=""
    while(start<end):
        s1+=s[start]
        start+=1

    print("\n Displaying the sentence using while loop: "+s1)

s=input("\n Enter the sentence: ")
start=int(input("\n Enter the start value: "))
end=int(input("\n Enter the end value: "))
display(s,start,end)
```

Output

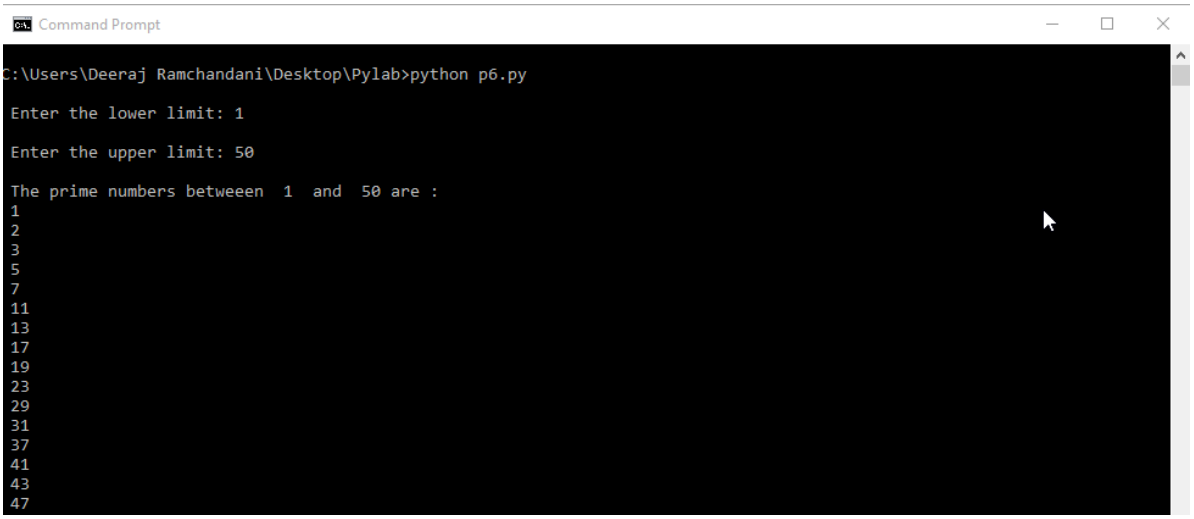


Program 6: Demonstrate the use of for loop by accepting a lower limit and upper limit from the user and displaying the prime numbers between the limits.

Program

```
lower=int(input("\n Enter the lower limit: "))
upper=int(input("\n Enter the upper limit: "))
while lower>=upper:
        lower=int(input("\n Invalid. Re-nter the lower limit: "))
        upper=int(input("\n Invalid. Re-enter the upper limit: "))

print("\n The prime numbers betweeen ",lower," and ",upper,"are : ")
for i in range(lower,upper+1):
        flag=1
        for j in range(2,int(i/2+1)):
                if i==1:
                        flag=0
                        break
                if i%j==0:
                        flag=0
                        break
        if(flag==1):
                print(" "+str(i))
```

Output

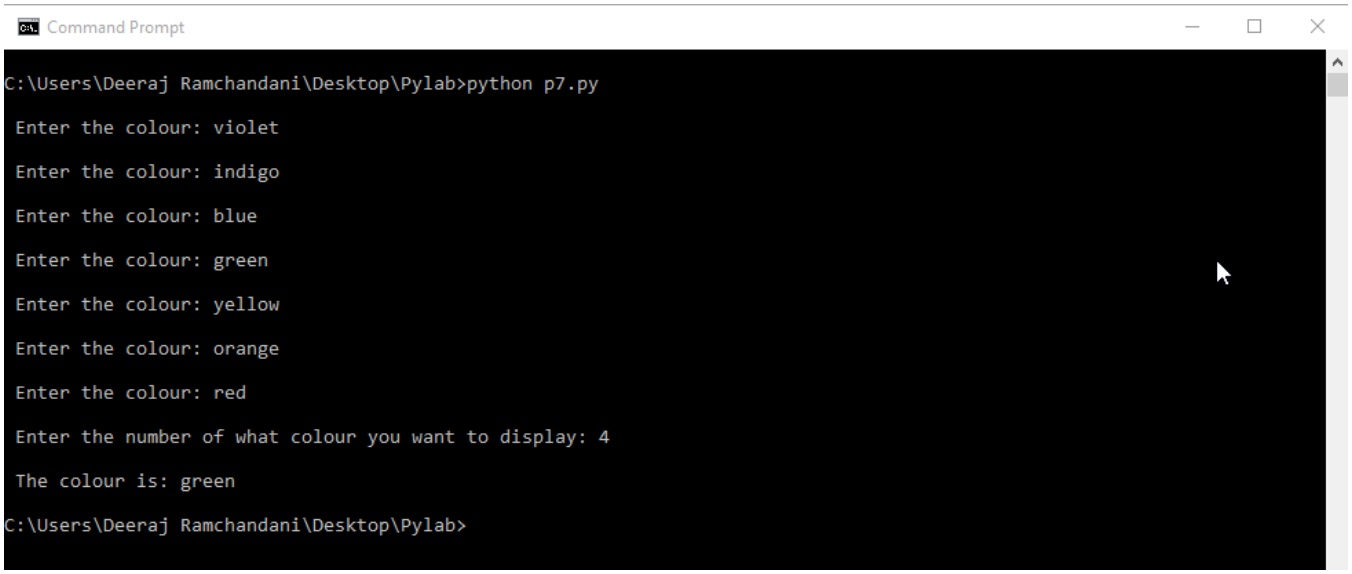


Program 7: Demonstrate the use of dictionary by declaring a dictionary called ‘rainbow’ and appending it with the seven colors of the rainbow by accepting the colors from the user. Read a number from the user and pass it to a function that display the corresponding color in the rainbow.

Program

```
rainbow={}
def display(ch):
        print("\n The colour is: "+rainbow[ch])

i=1
while i<=7:
        color = input("\n Enter the colour: ")
        rainbow[i]=color
        i+=1
ch=int(input("\n Enter the number of what colour you want to display: "))
display(ch)
```

Output



Program 8: Create a python module that contains the function definitions with two formal variables for addition, multiplication, subtraction and division (with divide by zero check). Demonstrate the use of the module by a python menu-driven calculator program that inputs values from the user.

Module

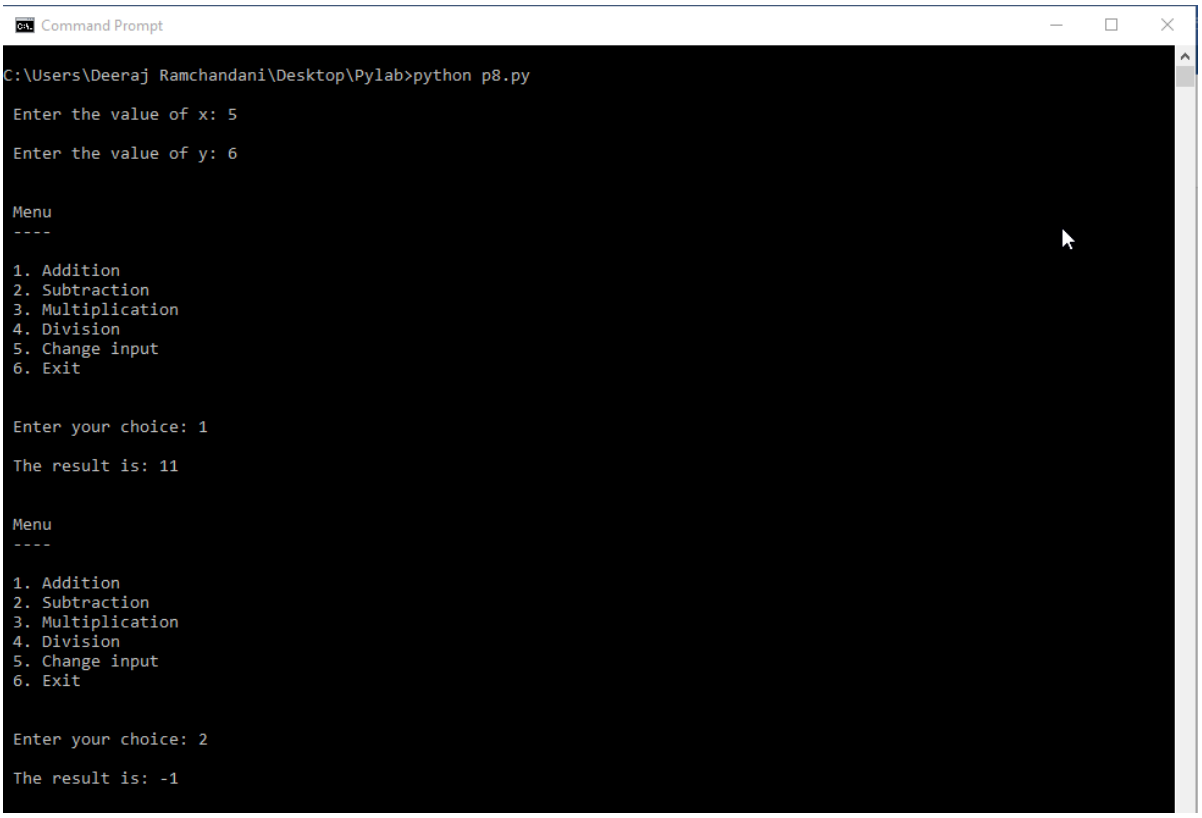
```
def addition(x,y):
    return x+y

def subtraction(x,y):
    return x-y

def multiplication(x,y):
    return x*y

def division(x,y):
    if y == 0:
        return 0
    else:
        return x/y
```

Program

```
import maths
def read_input():
    x = int(input("\n Enter the value of x: "))
    y = int(input("\n Enter the value of y: "))
    main_program(x,y)

def main_program(x,y):
    a = 1
    while a == 1:
        print("\n\n Menu\n ----\n\n 1. Addition\n 2. Subtraction\n 3. Multiplication\n 4.
Division\n 5. Change input\n 6. Exit")
        ch = int(input("\n\n Enter your choice: "))
```

```
            if ch == 1:
                b = maths.addition(x,y)
                print("\n The result is: "+str(b))
            elif ch == 2:
                b = maths.subtraction(x,y)
                print("\n The result is: "+str(b))
            elif ch == 3:
                b = maths.multiplication(x,y)
                print("\n The result is: "+str(b))
            elif ch == 4:
                b = maths.division(x,y)
                if b == 0:
                    print("\n Invalid divsion")
                else:
                    print("\n The result is: "+str(b))
            elif ch == 5:
                read_input()
            elif ch == 6:
                a = -1
            else:
                print("\n Invalid input")
        print("\n End of program")
read_input()
```

Output


Command Prompt
C:\Users\Deeraj Ramchandani\Desktop\Pylab>python p8.py
Enter the value of x: 5
Enter the value of y: 6
Menu
----
1. Addition
2. Subtraction
3. Multiplication
4. Division
5. Change input
6. Exit
Enter your choice: 1
The result is: 11
Menu
----
1. Addition
2. Subtraction
3. Multiplication
4. Division
5. Change input
6. Exit
Enter your choice: 2
The result is: -1


Menu
----
1. Addition
2. Subtraction
3. Multiplication
4. Division
5. Change input
6. Exit
Enter your choice: 3
The result is: 30
Menu
----
1. Addition
2. Subtraction
3. Multiplication
4. Division
5. Change input
6. Exit
Enter your choice: 4
The result is: 0.8333333333333334

Program 9: Create a python package called 'arithmetic' that contains four modules for addition, multiplication, subtraction and division with each module having function definitions for 2, 3 and 4 formal variables respectively. Demonstrate the use of the package by a python program that passes user-input values to the corresponding functions in the package and displays the result.

Package name: 'athematic'

Modules in package 'arithmetic'

1. *addition.py*

```
def addition1(a,b):
    return a+b

def addition2(a,b,c):
    return a+b+c

def addition3(a,b,c,d):
    return a+b+c+d
```

2. *subtraction.py*

```
def subtraction1(a,b):
    return a-b

def subtraction2(a,b,c):
    return a-b-c

def subtraction3(a,b,c,d):
    return a-b-c-d
```

3. *multiplication.py*

```
def multiplication1(a,b):
        return a*b

def multiplication2(a,b,c):
        return a*b*c

def multiplication3(a,b,c,d):
        return a*b*c*d
```

4. *division.py*

```
def division1(a,b):
        return a/b

def division2(a,b,c):
        return (a/b)/c

def division3(a,b,c,d):
        return (((a/b)/c)/d)
```

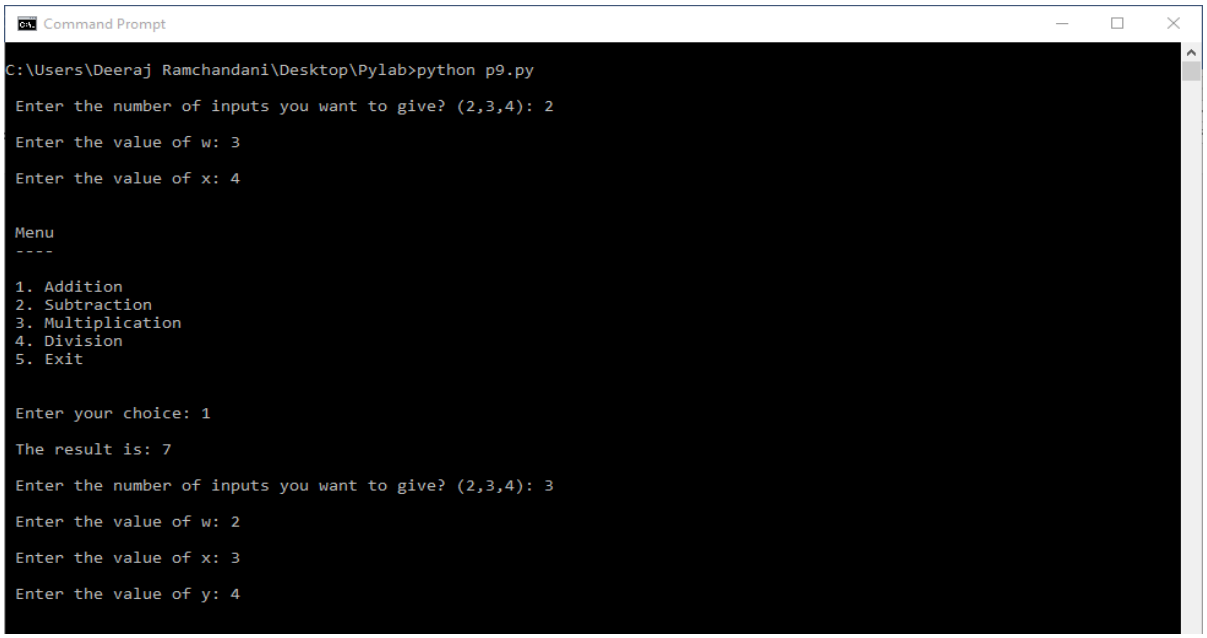
Program

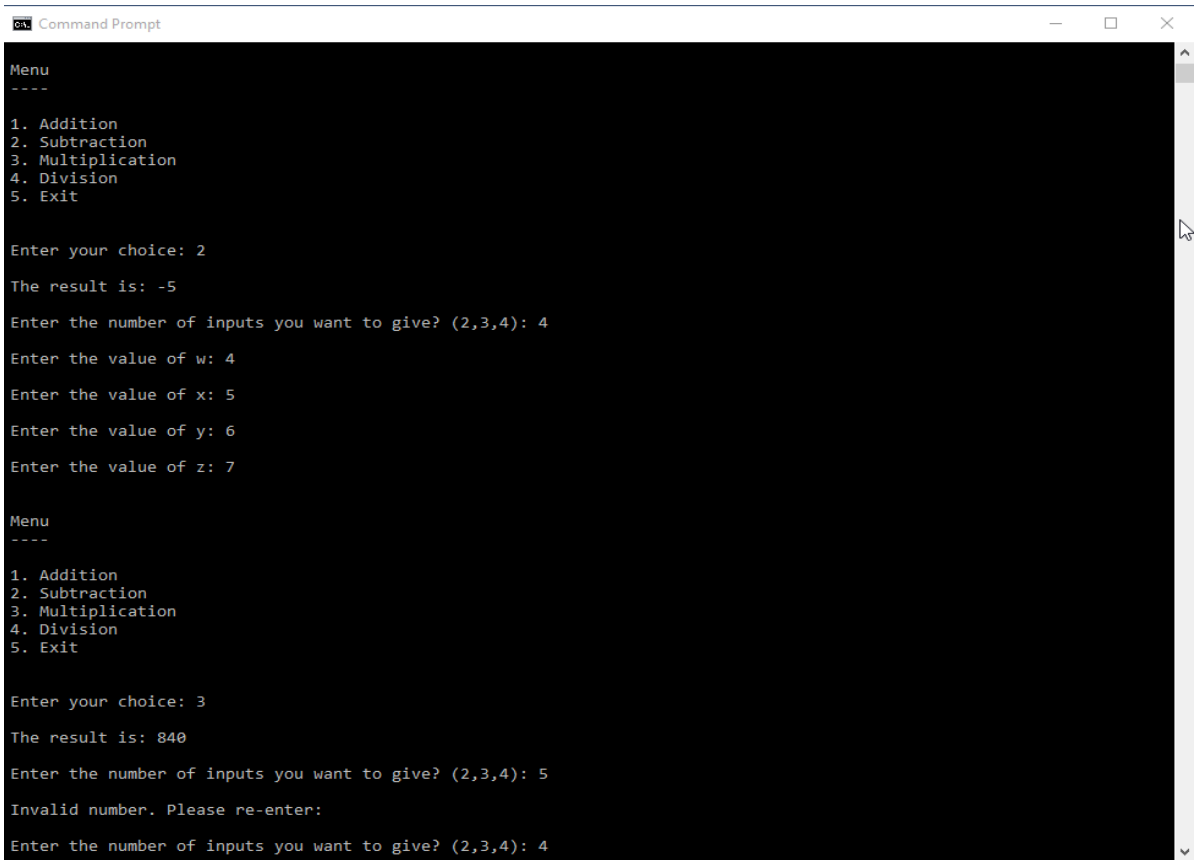
```
from arthematics.addition import *
from arthematics.subtraction import *
from arthematics.multiplication import *
from arthematics.division import *

def main_program():
        a = 1
        while a == 1:
                no=int(input("\n Enter the number of inputs you want to give? (2,3,4): "))
                if(no==2):
                        w = int(input("\n Enter the value of w: "))
                        x = int(input("\n Enter the value of x: "))
```

```
        elif(no==3):
                w = int(input("\n Enter the value of w: "))
                x = int(input("\n Enter the value of x: "))
                y = int(input("\n Enter the value of y: "))
        elif(no==4):
                w = int(input("\n Enter the value of w: "))
                x = int(input("\n Enter the value of x: "))
                y = int(input("\n Enter the value of y: "))
                z = int(input("\n Enter the value of z: "))
        else:
                print("\n Invalid number. Please re-enter: ")
                main_program()
        print("\n\n Menu\n ----\n\n 1. Addition\n 2. Subtraction\n 3. Multiplication\n 4.
Division\n 5. Exit")
        ch = int(input("\n\n Enter your choice: "))
        if ch == 1:
                if no==2:
                        b = addition1(w,x)
                elif no==3:
                        b = addition2(w,x,y)
                elif no==4:
                        b = addition3(w,x,y,z)
                print("\n The result is: "+str(b))
        elif ch == 2:
                if no==2:
                        b = subtraction1(w,x)
                elif no==3:
                        b = subtraction2(w,x,y)
                elif no==4:
                        b = subtraction3(w,x,y,z)
                print("\n The result is: "+str(b))
        elif ch == 3:
                if no==2:
                        b = multiplication1(w,x)
```

```
                elif no==3:
                        b = multiplication2(w,x,y)
                elif no==4:
                        b = multiplication3(w,x,y,z)
                print("\n The result is: "+str(b))
        elif ch == 4:
                if no==2:
                        if x==0:
                                print("\n Invalid division.")
                        else:
                                b = division1(w,x)
                elif no==3:
                        if x==0 or y==0:
                                print("\n Invalid division.")
                        else:
                                b = division2(w,x,y)
                elif no==4:
                        if x==0 or y==0 or z==0:
                                print("\n Invalid division.")
                        else:
                                b = division1(w,x,y,z)
        elif ch == 5:
                a = -1
        else:
                print("\n Invalid input")

    print("\n End of program")

main_program()
```

Output


Command Prompt
C:\Users\Deeraj Ramchandani\Desktop\Pylab>python p9.py
Enter the number of inputs you want to give? (2,3,4): 2
Enter the value of w: 3
Enter the value of x: 4
Menu
----
1. Addition
2. Subtraction
3. Multiplication
4. Division
5. Exit
Enter your choice: 1
The result is: 7
Enter the number of inputs you want to give? (2,3,4): 3
Enter the value of w: 2
Enter the value of x: 3
Enter the value of y: 4


Command Prompt
Menu
----
1. Addition
2. Subtraction
3. Multiplication
4. Division
5. Exit
Enter your choice: 2
The result is: -5
Enter the number of inputs you want to give? (2,3,4): 4
Enter the value of w: 4
Enter the value of x: 5
Enter the value of y: 6
Enter the value of z: 7
Menu
----
1. Addition
2. Subtraction
3. Multiplication
4. Division
5. Exit
Enter your choice: 3
The result is: 840
Enter the number of inputs you want to give? (2,3,4): 5
Invalid number. Please re-enter:
Enter the number of inputs you want to give? (2,3,4): 4

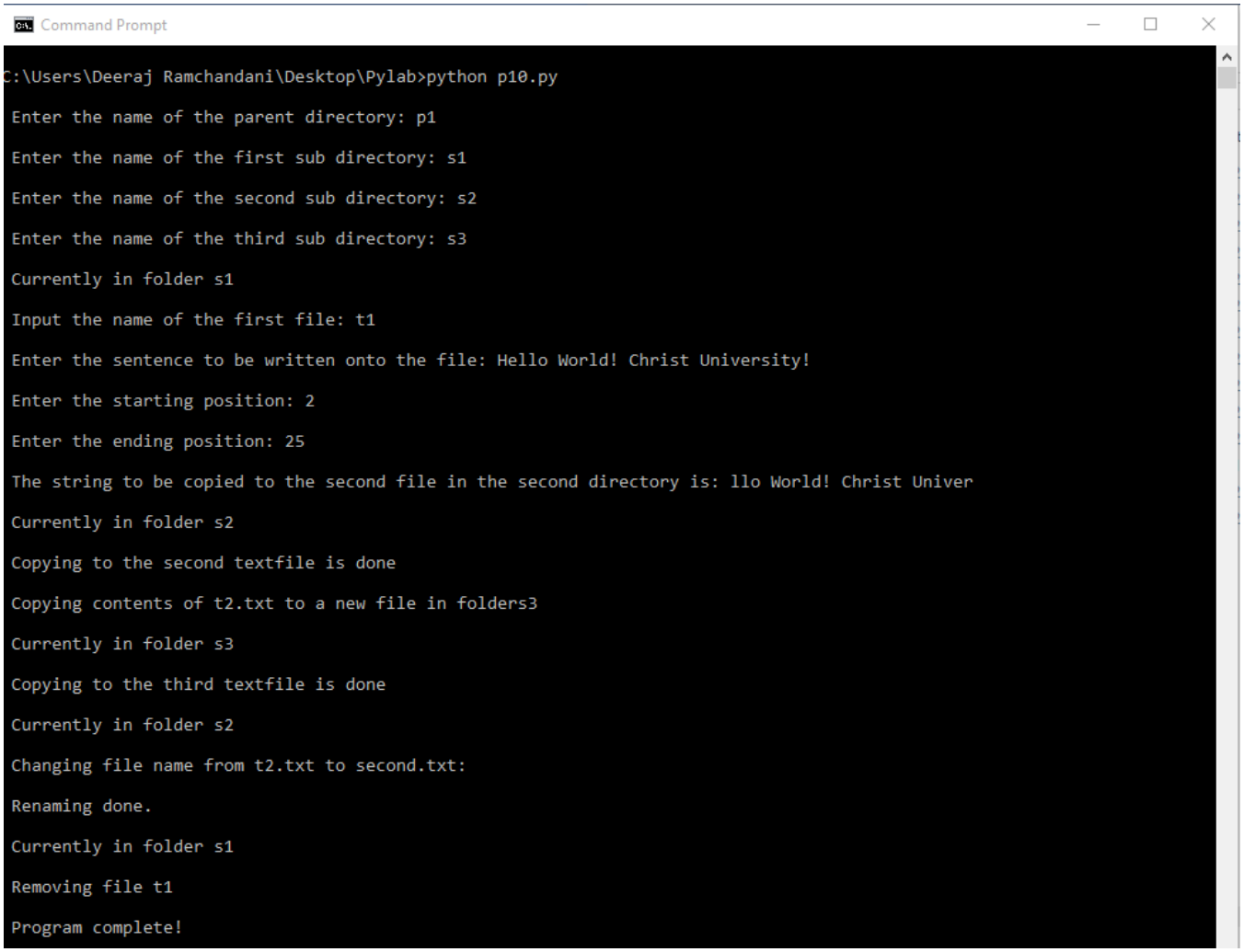
Program 10: Demonstrate the use of file-handling functions by creating three folders within a parent folder by accepting the names of the folders from the user. Create a file in the first folder with a user-input filename. Write a user input sentence into this file. Read a starting and ending position from the user and read the sub-string from the first file and write it into a new file in the second folder. Copy the contents of the second file into a new file in the third folder. Rename the file in the second folder as 'second.txt'. Delete the file in the first folder.

Program

```
import os

pdir=input("\n Enter the name of the parent directory: ")
os.mkdir(pdir)
os.chdir(pdir)
s1=input("\n Enter the name of the first sub directory: ")
os.mkdir(s1)
s2=input("\n Enter the name of the second sub directory: ")
os.mkdir(s2)
s3=input("\n Enter the name of the third sub directory: ")
os.mkdir(s3)
os.chdir(s1)
print("\n Currently in folder "+s1)
name=input("\n Input the name of the first file: ")
f=open(name,"a+")
string=input("\n Enter the sentence to be written onto the file: ")
f.write(string)
start=int(input("\n Enter the starting position: "))
end=int(input("\n Enter the ending position: "))
f.seek(start)
s=""
while start<=end:
        s+=f.read(1)
        start+=1
print("\n The string to be copied to the second file in the second directory is: "+s)
```

```
f.close()
os.chdir("..")
os.chdir(s2)
print("\n Currently in folder "+s2)
name2="t2.txt"
f=open(name2,"a+")
f.write(s)
print("\n Copying to the second textfile is done")
f.seek(0)
print("\n Copying contents of "+name2+" to a new file in folder"+s3)
s=f.read()
f.close()
os.chdir("..")
os.chdir(s3)
print("\n Currently in folder "+s3)
f=open("t3.txt","a+")
f.write(s)
print("\n Copying to the third textfile is done")
f.close()
os.chdir("..")
os.chdir(s2)
print("\n Currently in folder "+s2)
name3="second.txt"
print("\n Changing file name from "+name2+" to "+name3+": ")
os.rename(name2,name3)
print("\n Renaming done.")
os.chdir("..")
os.chdir(s1)
print("\n Currently in folder "+s1)
print("\n Removing file "+name)
os.remove(name)
print("\n Program complete!")
```

Output


Command Prompt
C:\Users\Deeraj Ramchandani\Desktop\Pylab>python p10.py
Enter the name of the parent directory: p1
Enter the name of the first sub directory: s1
Enter the name of the second sub directory: s2
Enter the name of the third sub directory: s3
Currently in folder s1
Input the name of the first file: t1
Enter the sentence to be written onto the file: Hello World! Christ University!
Enter the starting position: 2
Enter the ending position: 25
The string to be copied to the second file in the second directory is: llo World! Christ Univer
Currently in folder s2
Copying to the second textfile is done
Copying contents of t2.txt to a new file in folders3
Currently in folder s3
Copying to the third textfile is done
Currently in folder s2
Changing file name from t2.txt to second.txt:
Renaming done.
Currently in folder s1
Removing file t1
Program complete!