Ex. 3   **EXPLORING CONDITIONAL STATEMENTS**
Date: 5 – Feb - 2024

Aim:

To explore the use of conditional statements in Python by writing programs for the following and executing them:

a. Create a simple calculator that accepts two numbers and an arithmetic operator as inputs and performs the appropriate operation on the given numbers and displays the result.

b. Get a year from the user and check if it is a leap year and display the result.

c. Find the maximum of three numbers, obtained from the user, using conditional statements.

d. Obtain the marks secured by a student in Maths, Physics, Chemistry, Computer Science, and English, out of 100, and calculate their average. Check the range within which the average mark falls and display the appropriate grade. (A+ grade - 90 to 100, A grade - 80 to 90, B+ grade - 70 to 80, B grade - 60 to 70, C grade - 50 to 60, D grade - 40 to 50, F grade - less than 40)

e. identify if a point (x,y) lies inside, outside, or on the circumference of a circle of radius "r", centered at the origin. Obtain the values of x, y, and r from the user.

f. Obtain the lengths of the 4 sides of a quadrilateral and the angles at each corner of the quadrilateral. Verify if the dimensions represent a valid quadrilateral and if so, check whether the dimensions represent a square, a rectangle, or neither.

Algorithm:

(a)

Step 1: Get Inputs for the arithmetic Operands and the Operation
Step 2: Using Conditional Statements Operate the Operands
Step 3: Print the result To the user

(b)

Step 1: Get the year from the user
Step 2: Using Conditional Statements check if the year is a leap year
Step 3: Print the result to the user

(c)

Step 1: Get the 3 numbers from the user
Step 2: Figure out which number is larger
Step 3: Print that the number is larger than the others

(d)

Step 1: Get the marks of 5 subjects from the user
Step 2: Find the average and the corresponding category Grade
Step 3: Display the grade of the user

(e)

Step 1: Get the radius and euclidean points from the user
Step 2: Check the euclidean distance of the point from the centre and compare it with
the radius of the circle
Step 3: Display the relative position to the user

(f)

Step 1: Take inputs of the side length and angles of the shape form the user
Step 2: - validate if the shape is a quadrilateral
- Square if number of unique lengths of sides is 1 and all angles = 90
- Rectagle if number of unique length of sides is 2 and all angles = 90
Step 3: Display the shape to the user

Program:

(a)

```
opt = 1
while True:
    a = input("Enter Operand a : ")
    b = input("Enter Operand b : ")
    c = input("Arithmetic Operation (+ , - , * , /) : ")
    if(c=="+"):
        print(a,c,b , " = " ,a+b)
    elif(c=="-"):
        print(a,c,b , " = " ,a-b)
    elif(c=="*"):
        print(a,c,b , " = " ,a*b)
    else:
        print(a,c,b," = ",a/b)

    opt= int(input("Enter (1)  if you want to continue : "))
    if opt!=1:
        break
```

(b)

```python
year = int(input("Enter the year : "))
print("Leap Year : ",end="")
if((year%4 ==0 or year%400==0) and not year%100==0):
    print("True")
else:
    print("false")
```

(c)

```python
a,b,c = int(input("Enter the first Number : ")),int(input("Enter the second Number : ")),int(input("Enter the third Number : "))
if(a>b and a>c) : print("First Number ({}) is greater".format(a))
if(b>a and b>c) : print("Second Number ({}) is greater".format(b))
if(c>a and c>b) : print("Third Number ({}) is greater".format(c))
```

(d)

```python
marks = [int(input("Enter Mark for Maths :")),int(input("Enter Mark for Physics :")),int(input("Enter Mark for Chemistry :")),int(input("Enter Mark for Computer Science :")),int(input("Enter Mark for English :"))]
averagemarks = 0
for i in marks:
    averagemarks+=i
averagemarks/=5
if(averagemarks >90):
    print("Grade : A+")
elif(averagemarks >80):
    print("Grade : A")
elif(averagemarks >70):
    print("Grade : B+")
elif(averagemarks >60):
    print("Grade : B")
elif(averagemarks >50):
    print("Grade : C")
elif(averagemarks >40):
    print("Grade : D")
else:
    print("Grade : F")
```
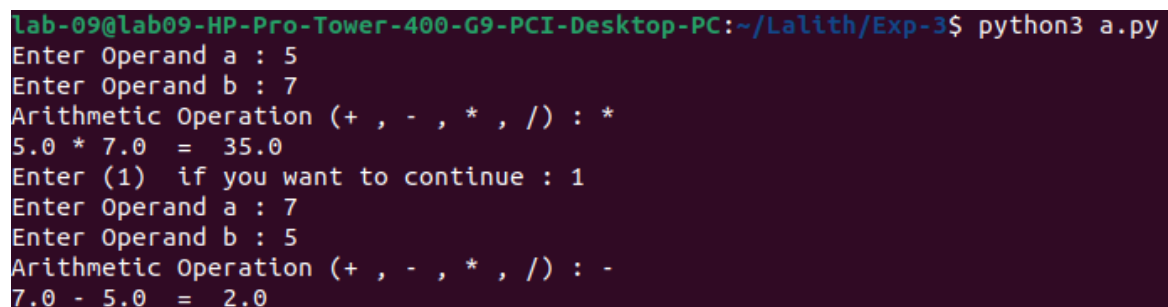
(e)

```
r = float(input("Enter the Radius of the circle : "))
x,y = eval("[" + input("Enter the x and y coordinates seperated by comman
( x,y ) : ")+ "]")
if((x**2 + y**2)**(1/2) > r):
    print("Outside the circle")
elif((x**2 + y**2)**(1/2) < r):
    print("Inside the circle")
else:
    print("On the Circumference of the circle")
```

(f)

```
SideLengths = [float(input("Enter the length of side - {} : ".format(i))) for i in
range(1,5)]
Angles = [float(input("Enter the degree of angle - {} : ".format(i))) for i in
range(1,5)]
var = 0
for i in Angles:
    var+=i
if var== 360:
    if len(set(Angles))==1:
        if set(SideLengths)==1: print("The given Quadrilateral is a Square")
        if set(SideLengths)==2: print("The given Quadrilateral is a Rectangle")
    else:
        print("The Given Dimensions is for a Quadrilateral\nBut does not reperesent
a Square or a Rectangle")
else:
    print("The Given Dimensions is not valud for a Quadrilateral")
```

Screenshot of Output:

(a)


```
lab-09@lab09-HP-Pro-Tower-400-G9-PCI-Desktop-PC:~/Lalith/Exp-3$ python3 a.py
Enter Operand a : 5
Enter Operand b : 7
Arithmetic Operation (+ , - , * , /) : *
5.0 * 7.0  =  35.0
Enter (1)  if you want to continue : 1
Enter Operand a : 7
Enter Operand b : 5
Arithmetic Operation (+ , - , * , /) : -
7.0 - 5.0  =  2.0
```

(b)

```
lab-09@lab09-HP-Pro-Tower-400-G9-PCI-Desktop-PC:~/Lalith/Exp-3$ python3 b.py
Enter the year : 2024
Leap Year : True
lab-09@lab09-HP-Pro-Tower-400-G9-PCI-Desktop-PC:~/Lalith/Exp-3$ python3 b.py
Enter the year : 2023
Leap Year : false
lab-09@lab09-HP-Pro-Tower-400-G9-PCI-Desktop-PC:~/Lalith/Exp-3$
```

(c)

```
lab-09@lab09-HP-Pro-Tower-400-G9-PCI-Desktop-PC:~/Lalith/Exp-3$ python3 c.py
Enter the first Number : 4
Enter the second Number : 7
Enter the third Number : 3
Second Number (7) is greater
lab-09@lab09-HP-Pro-Tower-400-G9-PCI-Desktop-PC:~/Lalith/Exp-3$ python3 c.py
Enter the first Number : 9
Enter the second Number : 2
Enter the third Number : 1
First Number (9) is greater
lab-09@lab09-HP-Pro-Tower-400-G9-PCI-Desktop-PC:~/Lalith/Exp-3$
```

(d)

```
lab-09@lab09-HP-Pro-Tower-400-G9-PCI-Desktop-PC:~/Lalith/Exp-3$ python3 d.py
Enter Mark for Maths :70
Enter Mark for Physics :40
Enter Mark for Chemistry :65
Enter Mark for Computer Science :40
Enter Mark for English :78
Grade : C
lab-09@lab09-HP-Pro-Tower-400-G9-PCI-Desktop-PC:~/Lalith/Exp-3$ python3 d.py
Enter Mark for Maths :99
Enter Mark for Physics :87
Enter Mark for Chemistry :100
Enter Mark for Computer Science :100
Enter Mark for English :99
Grade : A+
lab-09@lab09-HP-Pro-Tower-400-G9-PCI-Desktop-PC:~/Lalith/Exp-3$
```

(e)

```
lab-09@lab09-HP-Pro-Tower-400-G9-PCI-Desktop-PC:~/Lalith/Exp-3$ python3 e.py
Enter the Radius of the circle : 5
Enter the x and y coordinates seperated by comman ( x,y ) : 1,1
Inside the circle
lab-09@lab09-HP-Pro-Tower-400-G9-PCI-Desktop-PC:~/Lalith/Exp-3$ python3 e.py
Enter the Radius of the circle : 5
Enter the x and y coordinates seperated by comman ( x,y ) : 5,5
Outside the circle
lab-09@lab09-HP-Pro-Tower-400-G9-PCI-Desktop-PC:~/Lalith/Exp-3$ python3 e.py
Enter the Radius of the circle : 5
Enter the x and y coordinates seperated by comman ( x,y ) : 5,0
On the Circumference of the circle
lab-09@lab09-HP-Pro-Tower-400-G9-PCI-Desktop-PC:~/Lalith/Exp-3$
```

(f)

```
lab-09@lab09-HP-Pro-Tower-400-G9-PCI-Desktop-PC:~/Lalith/Exp-3$ python3 f.py
Enter the length of side - 1 : 10
Enter the length of side - 2 : 10
Enter the length of side - 3 : 10
Enter the length of side - 4 : 10
Enter the degree of angle - 1 : 90
Enter the degree of angle - 2 : 90
Enter the degree of angle - 3 : 90
Enter the degree of angle - 4 : 90
lab-09@lab09-HP-Pro-Tower-400-G9-PCI-Desktop-PC:~/Lalith/Exp-3$ python3 f.py
Enter the length of side - 1 : 10
Enter the length of side - 2 : 10
Enter the length of side - 3 : 10
Enter the length of side - 4 : 10
Enter the degree of angle - 1 : 90
Enter the degree of angle - 2 : 90
Enter the degree of angle - 3 : 90
Enter the degree of angle - 4 : 90
The given Quadrilateral is a Square
lab-09@lab09-HP-Pro-Tower-400-G9-PCI-Desktop-PC:~/Lalith/Exp-3$ python3 f.py
Enter the length of side - 1 : 10
Enter the length of side - 2 : 20
Enter the length of side - 3 : 20
Enter the length of side - 4 : 10
Enter the degree of angle - 1 : 90
Enter the degree of angle - 2 : 90
Enter the degree of angle - 3 : 90
Enter the degree of angle - 4 : 90
The given Quadrilateral is a Rectangle
lab-09@lab09-HP-Pro-Tower-400-G9-PCI-Desktop-PC:~/Lalith/Exp-3$ python3 f.py
Enter the length of side - 1 : 10
Enter the length of side - 2 : 20
Enter the length of side - 3 : 10
Enter the length of side - 4 : 20
Enter the degree of angle - 1 : 90
Enter the degree of angle - 2 : 90
Enter the degree of angle - 3 : 90
Enter the degree of angle - 4 : 90
The given Quadrilateral is a Rectangle
lab-09@lab09-HP-Pro-Tower-400-G9-PCI-Desktop-PC:~/Lalith/Exp-3$
```

Result:

Thus, programs have been written and executed to explore the use of conditional statements in Python.