

Hands-on Exercise-II

(Conditional Statements)

1. Write a Python program to input the height of the person and check if the height of the person is greater than or equal to 6 feet then print the message "The person is tall".

2. Write a Python program to input the mark of a student and check if the student mark is greater than or equal to 40, then it generates the following message.

"Congratulation! You have passed the exam."

Otherwise the output message is

"Sorry! You have failed the exam."

3. Input an integer through the keyboard. Write a Python program to find out whether it is an odd number or even number.

4. Any character is entered through the keyboard; write a Python program to determine whether the character entered is a capital letter, a small case letter, a digit or a special symbol. The following table shows the range of ASCII values for various characters.

Characters ASCII Values

A - Z 65 - 90

a - z 97 - 122

0 - 9 48 - 57

special symbols 0 - 47, 58 - 64, 91 - 96, 123 - 127

5. The two roots of a quadratic equation $ax^2 + bx + c = 0$ can be obtained using the following formula:

$$r1 = \frac{-b + \sqrt{b^2 - 4ac}}{2a} \quad \text{and} \quad r2 = \frac{-b - \sqrt{b^2 - 4ac}}{2a}$$

$b^2 - 4ac$ is called the discriminant of the quadratic equation. If it is positive, the equation has two real roots. If it is zero, the equation has one root. If it is negative, the equation has no real roots.

Write a Python program that prompts the user to enter values for a , b , and c and displays the result based on the discriminant. If the discriminant is positive, display two roots. If the discriminant is **0**, display one root. Otherwise, display “The equation has no real roots”

Here are some sample runs.

```
Enter a, b, c: 1.0 3 1
```

```
The equation has two roots -0.381966 and -2.61803
```

```
Enter a, b, c: 1 2.0 1
```

```
The equation has one root -1
```

```
Enter a, b, c: 1 2 3
```

```
The equation has no real roots
```

6. You can use Cramer’s rule to solve the following 2 X 2 system of linear equation:

$$ax + by = e$$

$$cx + dy = f$$

$$x = \frac{ed - bf}{ad - bc}$$

$$y = \frac{af - ec}{ad - bc}$$

Write a Python program that prompts the user to enter a , b , c , d , e , and f and displays the result. If $ad - bc$ is **0**, report that “The equation has no solution.”

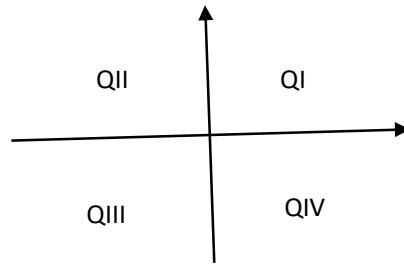
```
Enter a, b, c, d, e, f: 9.0 4.0 3.0 -5.0 -6.0 -21.0
```

```
x is -2.0 and y is 3.0
```

```
Enter a, b, c, d, e, f: 1.0 2.0 2.0 4.0 4.0 5.0
```

```
The equation has no solution
```

7. Write a Python program that takes the $x - y$ coordinates of a point in the Cartesian plane and prints a message telling either an axis on which the point lies or the quadrant in which it is found.



Sample lines of output:

```
(-1.0, -2.5) is in quadrant III  
(0.0, 4.8) is on the y-axis
```

8. If the ages of Rahul, Ayush and Ajay are input through the keyboard, write a Python program to determine the elder among them.
9. Write a Python program that randomly generates an integer between 1 and 12 and displays the English month name January, February... December for the number 1, 2... 12, accordingly.
10. Write a Python program that prompts the user to enter an integer for today's day of the week (Sunday is 0, Monday is 1... and Saturday is 6). Also prompt the user to enter the number of days after today for a future day and display the future day of the week.

Here is a sample run:

```
Enter today's day: 1  
Enter the number of days elapsed since today: 3  
Today is Monday and the future day is Thursday
```

```
Enter today's day: 0  
Enter the number of days elapsed since today: 31  
Today is Sunday and the future day is Wednesday
```

11. The body mass index (BMI) is commonly used by health and nutrition professionals to estimate human body fat in populations. It is computed by taking the individual's weight (mass) in kilograms and dividing it by the square of their height in meters. i.e.

$$\text{Metric: BMI} = \frac{\text{Weight (kg)}}{(\text{Height(m)})^2}$$

Write a Python program by using some if statements to show the category for a given BMI.

BMI	Category
less than 18.5	underweight
18.5 to 24.9	normal weight
25.0 to 29.9	overweight
30.0 or more	obese

12. Write a Python program that prompts the user to enter three integers and display the integers in non-decreasing order.

Here is a sample run:

```
Enter three integers: 2 4 3
Display the integers in non-decreasing order:
2 3 4
```

13. Write a Python program that prompts the user to enter the month and year and displays the number of days in the month. For example, if the user entered month **2** and year **2012**, the program should display that February 2012 had 29 days. If the user entered month **3** and year **2015**, the program should display that March 2015 had 31 days.

14. Write a Python program that plays the popular scissor-rock-paper game. (A scissor can cut a paper, a rock can knock a scissor, and a paper can wrap a rock.) The program randomly generates a number **0**, **1**, or **2** representing scissor, rock, and paper. The program prompts the user to enter a number **0**, **1**, or **2** and displays a message indicating whether the user or the computer wins, loses, or draws.

Here are sample runs:

```
scissor (0), rock (1), paper (2): 1
The computer is scissor. You are rock. You won

scissor (0), rock (1), paper (2): 2
The computer is paper. You are paper too. It is a draw
```

15. Write a Python program that prompts the user to enter a point (x, y) and checks whether the point is within the circle centered at (0, 0) with radius 10. For example, (4, 5) is inside the circle and (9, 9) is outside the circle,

(Hint: A point is in the circle if its distance to (0, 0) is less than or equal to 10. The formula for computing the distance is $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$. Test your program to cover all cases.)

Two sample runs are shown below.

```
Enter a point with two coordinates: 4 5
Point (4.0, 5.0) is in the circle
```

```
Enter a point with two coordinates: 9 9
Point (9.0, 9.0) is not in the circle
```

16. A University conducts a 100 mark exam for its student and grades them as follows. Assigns a grade based on the value of the marks. Write a Python program to print the grade according to the mark secured by the student.

Mark Range	Letter Grade
≥ 90	O
≥ 80 AND < 90	A
≥ 70 AND < 80	B
≥ 60 AND < 70	C
≥ 50 AND < 60	D
≥ 40 AND < 50	E
< 40	F

17. Write a Python program that prompts the user to enter an integer and determines whether it is divisible by 5 and 6, whether it is divisible by 5 or 6, and whether it is divisible by 5 or 6, but not both.

Here is a sample run of this program:

```
Enter an integer: 10
Is 10 divisible by 5 and 6? false
```

```
Is 10 divisible by 5 or 6? true
Is 10 divisible by 5 or 6, but not both? True
```

- 18.** Write a Python program which displays an appropriate name for a person, using a combination of nested ifs and compound conditions. Ask the user for a gender, first name, last name and age. If the person is female and 20 or over, ask if she is married. If so, display "Mrs." in front of her name. If not, display "Ms." in front of her name. If the female is under 20, display her first and last name. If the person is male and 20 or over, display "Mr." in front of his name. Otherwise, display his first and last name. Note that asking a person if they are married should *only* be done if they are female and 20 or older, which means you will have a single if and else nested inside one of your if statements. Also, did you know that with an if statements (or else), the curly braces are optional when there is only one statement inside?

```
What is your gender (M or F): F
First name: Gita
Last name: Pattanayak
Age: 32
Are you married, Gita (y or n)? y
Then I shall call you Mrs. Gita Pattanayak.
What is your gender (M or F): F
First name: Anjali
Last name: Mishra
Age: 48
Are you married, Anjali(y or n)? n
Then I shall call you Ms. Anjali.
```

```
What is your gender (M or F): M
First name: Ashok
Last name: Mohanty
Age: 23
Then I shall call you Mr. Ashok.
What is your gender (M or F): M
First name: Rahul
Last name: Pati
Age: 15
Then I shall call you Rahul Pati
```
