

# Rajalakshmi Engineering College

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Batch: 2028

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## 2024\_28\_III\_OOPS Using Java Lab

### 2028\_REC\_OOPS using Java\_Week 2\_CY

Attempt : 1

Total Mark : 40

Marks Obtained : 40

### Section 1 : Coding

#### 1. Problem Statement

John is a fitness trainer, and he wants to use the BMI calculator to assess the body mass index of his clients. He has a list of clients based on their height and weight.

John plans to write a program to quickly determine the BMI and provide a classification for each client.

If BMI is less than 18.5, the program will classify it as "Underweight" If BMI is between 18.6 and 24.9, the program will classify it as "Normal Weight" If BMI is between 25.0 and 29.9, the program will classify it as "Overweight" If BMI is 30.0 or higher, the program will classify it as "Obese"

Note: Formula to calculate BMI =  $\text{weight}/(\text{height}*\text{height})$

***Input Format***

The first line of input consists of a double value, representing the height of the person in meters.

The second line consists of a double value, representing the weight of the person in kilograms.

### **Output Format**

The first line of output prints "BMI: " followed by a double (rounded to two decimal places) representing the calculated BMI.

The second line prints "Classification: " followed by a string indicating the BMI category (Underweight, Normal Weight, Overweight, or Obese).

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 1.2

45.2

Output: BMI: 31.39

Classification: Obese

### **Answer**

```
// You are using Java
import java.util.*;
```

```
class BMICal{
    public static void main(String[] args){
        Scanner ip=new Scanner(System.in);
        double h=ip.nextDouble();
        double w=ip.nextDouble();

        double BMI=w/(h*h);

        System.out.printf("BMI: %.2f\n",BMI);

        if(BMI<=18.5){
            System.out.println("Classification: Underweight");
        }else if(18.6<=BMI && BMI<=24.9){
            System.out.println("Classification:Normal Weight");
        }
    }
}
```

```
}else if(25.0<=BMI && BMI<=29.9){
    System.out.println("Classification: Overwiegth");
}else{
    System.out.println("Classification: Obese");
}
}
}
```

**Status :** Correct

**Marks :** 10/10

## 2. Problem Statement

Raj is solving a physics problem involving projectile motion, where he needs to calculate the time a ball hits the ground using a quadratic equation of the form  $ax^2 + bx + c = 0$ . Depending on the coefficients, the ball may hit the ground once, twice, or not at all in real time.

Help Raj find all real roots of the equation, if any.

Note: discriminant =  $b^2 - 4ac$

### **Input Format**

The input consists of three space-separated doubles a, b, and c, representing the coefficients of the quadratic equation.

### **Output Format**

If there are two real roots, print:

- "Two real solutions:"
- "Root1 = <value>"
- "Root2 = <value>"

If there is one real root, print:

- "One real solution:"
- "Root = <value>"

If there are no real roots, print:

- "There are no real solutions."

Note: values are rounded to two decimal places.

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 1 6 9

Output: One real solution:

Root = -3.00

### **Answer**

```
// You are using Java
import java.util.*;
```

```
class QuadraticSolver {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        double a = scanner.nextDouble();
        double b = scanner.nextDouble();
        double c = scanner.nextDouble();

        double D = b * b - 4 * a * c;

        if (D > 0) {
            double x1 = (-b + Math.sqrt(D)) / (2 * a);
            double x2 = (-b - Math.sqrt(D)) / (2 * a);
            System.out.println("Two real solutions:");
            System.out.printf("Root1 = %.2f\n", x1);
            System.out.printf("Root2 = %.2f\n", x2);
        } else if (D == 0) {
            double x = -b / (2 * a);
            System.out.println("One real solution:");
            System.out.printf("Root = %.2f\n", x);
        } else {
            System.out.println("There are no real solutions.");
        }
    }
}
```

Status : Correct

Marks : 10/10

### 3. Problem Statement

Samantha is a diligent math student who is exploring the world of programming. She is learning Java and has recently studied conditional statements. One day, her teacher gives her an interesting problem to solve, which takes a number as input and checks whether it is a multiple of 5 or 7.

Help her complete the task.

#### **Input Format**

The input consists of a single integer N, representing the number to be checked.

#### **Output Format**

If the number is a multiple of 5 but not 7, the output prints "N is a multiple of 5".

If the number is a multiple of 7, the output prints "N is a multiple of 7".

Otherwise the output prints "N is neither multiple of 5 nor 7" where N is an entered integer.

Refer to the sample output for formatting specifications.

#### **Sample Test Case**

Input: 10

Output: 10 is a multiple of 5

#### **Answer**

```
// You are using Java
import java.util.*;
```

```
class MultipleChecker {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
```

```

int N = scanner.nextInt();

if (N % 5 == 0 && N % 7 != 0) {
    System.out.print(N + " is a multiple of 5");
} else if (N % 7 == 0) {
    System.out.print(N + " is a multiple of 7");
} else {
    System.out.print(N + " is neither multiple of 5 nor 7");
}
}
}

```

**Status :** Correct

**Marks :** 10/10

#### 4. Problem Statement

Ted, the computer science enthusiast, has accepted the challenge of writing a program that checks if the number of digits in an integer matches the sum of its digits.

Guide Ted in designing and writing the code to solve this problem using a 'do-while' loop.

##### **Input Format**

The input consists of an integer N, representing the number to be checked.

##### **Output Format**

If the sum is equal to the number of digits, print "The number of digits in N matches the sum of its digits."

Else, print "The number of digits in N does not match the sum of its digits."

Refer to the sample output for formatting specifications.

##### **Sample Test Case**

Input: 20

Output: The number of digits in 20 matches the sum of its digits.

**Answer**

```
// You are using Java
import java.util.*;
```

```
class Check{
    public static void main(String[]args){
        Scanner ip=new Scanner(System.in);
        int n=ip.nextInt();
        int digitCount=0;
        int temp=n;
        int digitSum=0;
        do {
            int digit = temp % 10;
            digitSum += digit;
            digitCount++;
            temp /= 10;
        } while (temp > 0);

        if(digitSum==digitCount){
            System.out.println("The number of digits in "+n+" matches the sum of its
digits.");
        }else{
            System.out.println("The number of digits in "+n+" does not match the sum
of its digits.");
        }
    }
}
```

**Status :** Correct

**Marks :** 10/10