

# Rajalakshmi Engineering College

Name: Mohit Jha  
Email: 241901056@rajalakshmi.edu.in  
Roll no:  
Phone: 9445934493  
Branch: REC  
Department: CSE (CS) - Section 1  
Batch: 2028  
Degree: B.E - CSE (CS)

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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

Maya, a student in an arts and crafts class, wants to create a pattern using stars (\*) in a specific format. She plans to use a program to help her construct the pattern.

Write a program that takes an integer as input and constructs the following pattern using nested for loops.

Input: 5

Output:

\*

\* \*

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

### ***Input Format***

The input consists of a number (integer) representing the number of rows.

### ***Output Format***

The output displays the required pattern.

Refer to the sample output for the formatting specifications.

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

Input: 5

Output: \*

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

### ***Answer***

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

class wa{
    public static void main(String[] args){
```

```

Scanner in = new Scanner(System.in);
int a = in.nextInt();
for(int i=0;i<a;i++){
    for(int j=0;j<=i;j++){
        System.out.printf("* ");
    }
    System.out.printf("\n");
}
for(int i=a-2;i>=0;i--){
    for(int j=0;j<=i;j++){
        System.out.printf("* ");
    }
    System.out.printf("\n");
}
}
}

```

**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 wa{
    public static void main(String[] args){
        Scanner in = new Scanner(System.in);
        int a = in.nextInt();
        int b = in.nextInt();
        int c = in.nextInt();
        double d = (b*b) -(4.0 *a*c);
        if(d>0){
            double r1= (-b+Math.sqrt(d))/(2*a);
            double r2= (-b-Math.sqrt(d))/(2*a);
            System.out.printf("Two Real solutions:\nRoot1 = %.2f\nRoot2 =
%.2f",r1,r2);
        }
        else if(d==0){
            double r=(-b/(2.0*a));
            System.out.printf("One real solution:\nRoot = %.2f",r);
        }
    }
}
```

```
        }
    else{
        System.out.printf("There are no real solutions.");
    }
}
}
```

**Status :** Correct

**Marks :** 10/10

### 3. 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 wa{
    public static void main(String[] args){
        Scanner in = new Scanner(System.in);
        int a = in.nextInt();
        String b = String.valueOf(a);
        int c= b.length();
        int d= a%9;
        if(d==c){
            System.out.printf("The number of digits in %d matches the sum of its
digits.",a);
        }
        else{
            System.out.printf("The number of digits in %d does not match the sum of
its digits.",a);
        }
    }
}

```

**Status :** Correct

**Marks :** 10/10

#### 4. 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 = weight/(height\*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 wa{
    public static void main(String[] args){
        Scanner in = new Scanner(System.in);
        double a = in.nextDouble();
        double b = in.nextDouble();
        double c = b/(a*a);
        System.out.printf("BMI: %.2f\nClassification: ",c);
        if(c<18.5){
            System.out.printf("Underweight");
        }
        else if(c<24.9){
            System.out.printf("Normal Weight");
        }
        else if(c<29.9){
            System.out.printf("Overweight");
        }
    }
}
```

```
    else{
        System.out.printf("Obese");
    }
}
```

**Status : Correct**

**Marks : 10/10**