Rajalakshmi Engineering College

Name: UMAR FAROOK
Email: 240701573@rajalakshmi.edu.in
Roll no: 240701573
Phone: 9791730398
Branch: REC
Department: CSE - Section 5
Batch: 2028
Degree: B.E - CSE

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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

```
import java.util.Scanner;
public class Main{
   public static void main(String[] args){
      Scanner sc = new Scanner(System.in);
      int n = sc.nextInt();
```

```
        for(int i=1;i<=n;i++){
            for(int j=1;j<=i;j++){
                System.out.print("* ");
            }
            System.out.println();

        }
        for(int i=n-1;i>=1;i--){
            for(int j=1;j<=i;j++){
                System.out.print("* ");
            }
            System.out.println();

        }


    }
}
```

Status : Correct **Marks : 10/10**

2. 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

```
import java.util.Scanner;
public class Main{
   public static void main(String[] args){
      Scanner sc = new Scanner(System.in);
      int n = sc.nextInt();

      int temp = n;
      int sum = 0;
      int count = 0;

      do{
         int digit = temp % 10;
         sum += digit;
         count++;
         temp /= 10;
      }while(temp > 0);

      if(sum == count){
         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***

3. 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 = b2 - 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

```
import java.util.Scanner;
public class Main{
   public static void main(String[] args){
      Scanner sc = new Scanner(System.in);
      double a = sc.nextDouble();
      double b = sc.nextDouble();
      double c = sc.nextDouble();
      double d = b*b-4*a*c;

      if(d>0){
         double r1 = (-b + Math.sqrt(d)) /  (2*a);
         double r2 = (-b - Math.sqrt(d)) /  (2*a);
         System.out.println("Two real solutions:");
         System.out.printf("Root1 = %.2f\n", r1);
         System.out.printf("Root2 = %.2f\n", r2);
      }
      else if(d == 0){
         double r = -b / (2*a);
         System.out.println("One real solution:");
         System.out.printf("Root = %.2f\n", r);
      }
      else{
         System.out.println("There are no real solutions.");
      }
   }
}
```

Status : Correct ***Marks : 10/10***

4. 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

```
import java.util.Scanner;
public class Main{
   public static void main(String[] args){
      Scanner sc = new Scanner(System.in);
      int n = sc.nextInt();
      if(n%5 == 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***