

Rajalakshmi Engineering College

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2024_28_III_OOPS Using Java Lab

2028_REC_OOPS using Java_Week 1_Q2

Attempt : 1
Total Mark : 10
Marks Obtained : 10

Section 1 : Coding

1. PROBLEM STATEMENT:

Dave got two students who want help with their doubt. Each hands out an integer and wants to find if one integer is positive while the other is not divisible by 3. Write a program to achieve this and conclude for them.

Input Format

The first line of input represents the first integer.

The second line of input represents the second integer.

Output Format

The output should display as "One of the integers is positive while the other is not divisible by 3." or "Neither of the integers meets the condition."

Refer to the sample output for the formatting specifications.

Sample Test Case

Input: 4

3

Output: One of the integers is positive while the other is not divisible by 3.

Answer

// You are using Java

import java.util.Scanner;

public class Main {

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

// Read the two integers
int first = scanner.nextInt();
int second = scanner.nextInt();

// Check the condition and output result
checkCondition(first, second);

scanner.close();

}

/**

* Checks if one integer is positive while the other is not divisible by 3

* The condition is satisfied if:

* (first > 0 AND second % 3 != 0) OR (second > 0 AND first % 3 != 0)

*/

public static void checkCondition(int first, int second) {

// Check if first is positive and second is not divisible by 3

boolean condition1 = (first > 0) && (second % 3 != 0);

// Check if second is positive and first is not divisible by 3

boolean condition2 = (second > 0) && (first % 3 != 0);

// The overall condition is satisfied if either condition1 OR condition2 is true

boolean result = condition1 || condition2;

```

    if (result) {
        System.out.println("One of the integers is positive while the other is not
divisible by 3.");
    } else {
        System.out.println("Neither of the integers meets the condition.");
    }
}

```

// Alternative compact approach

```

public static void checkConditionCompact(int first, int second) {
    // Direct evaluation of the condition
    boolean meetsCondition = ((first > 0) && (second % 3 != 0)) ||
        ((second > 0) && (first % 3 != 0));

```

```

    System.out.println(meetsCondition ?
        "One of the integers is positive while the other is not divisible by 3." :
        "Neither of the integers meets the condition.");
}

```

// Method for debugging and understanding the logic

```

public static void debugCondition(int first, int second) {
    System.out.println("=== Debug Information ===");
    System.out.println("First integer: " + first);
    System.out.println("Second integer: " + second);

```

```

    System.out.println("First > 0? " + (first > 0));
    System.out.println("Second > 0? " + (second > 0));
    System.out.println("First % 3 = " + (first % 3) + " (divisible by 3? " + (first % 3
== 0) + ")");
    System.out.println("Second % 3 = " + (second % 3) + " (divisible by 3? " +
(second % 3 == 0) + ")");

```

```

    boolean condition1 = (first > 0) && (second % 3 != 0);
    boolean condition2 = (second > 0) && (first % 3 != 0);

```

```

    System.out.println("Condition 1 (first positive AND second not divisible by
3): " + condition1);

```

```

    System.out.println("Condition 2 (second positive AND first not divisible by
3): " + condition2);

```

```

    System.out.println("Overall result (condition1 OR condition2): " + (condition1
|| condition2));

```

```
}  
}  
/*
```

=== EXPLANATION ===

The program checks if one integer is positive while the other is not divisible by 3.

****Condition Breakdown:****

- Integer is positive: $\text{number} > 0$
- Integer is not divisible by 3: $\text{number} \% 3 \neq 0$
- "One while the other": exactly one of each condition, can be in either order

****Logical Structure:****

The condition is satisfied if either:

1. First integer is positive AND second integer is not divisible by 3, OR
2. Second integer is positive AND first integer is not divisible by 3

****Boolean Logic:****

$\text{result} = (\text{first} > 0 \ \&\& \ \text{second} \% 3 \neq 0) \ || \ (\text{second} > 0 \ \&\& \ \text{first} \% 3 \neq 0)$

=== SAMPLE WALKTHROUGH ===

****Input 1: first=4, second=3****

- First integer: 4
 - * Is $4 > 0$? YES (positive)
 - * Is $4 \% 3 \neq 0$? YES ($4 \% 3 = 1$, not divisible by 3)
- Second integer: 3
 - * Is $3 > 0$? YES (positive)
 - * Is $3 \% 3 \neq 0$? NO ($3 \% 3 = 0$, divisible by 3)

Checking conditions:

- Condition 1: $(4 > 0) \ \&\& \ (3 \% 3 \neq 0) = \text{TRUE} \ \&\& \ \text{FALSE} = \text{FALSE}$
- Condition 2: $(3 > 0) \ \&\& \ (4 \% 3 \neq 0) = \text{TRUE} \ \&\& \ \text{TRUE} = \text{TRUE}$
- Result: $\text{FALSE} \ || \ \text{TRUE} = \text{TRUE}$

****Input 2: first=12, second=27****

- First integer: 12
 - * Is $12 > 0$? YES (positive)
 - * Is $12 \% 3 \neq 0$? NO ($12 \% 3 = 0$, divisible by 3)
- Second integer: 27
 - * Is $27 > 0$? YES (positive)

* Is $27 \% 3 \neq 0$? NO ($27 \% 3 = 0$, divisible by 3)

Checking conditions:

- Condition 1: $(12 > 0) \ \&\& \ (27 \% 3 \neq 0) = \text{TRUE} \ \&\& \ \text{FALSE} = \text{FALSE}$
- Condition 2: $(27 > 0) \ \&\& \ (12 \% 3 \neq 0) = \text{TRUE} \ \&\& \ \text{FALSE} = \text{FALSE}$
- Result: $\text{FALSE} \ || \ \text{FALSE} = \text{FALSE}$

=== KEY INSIGHTS ===

1. ****Positive Check****: $\text{number} > 0$
 - Excludes zero and negative numbers
 - Only strictly positive numbers qualify
2. ****Divisibility by 3****: $\text{number} \% 3 == 0$
 - If remainder is 0, number is divisible by 3
 - If remainder is not 0, number is NOT divisible by 3
3. ****"One while the other" Logic****:
 - Need exactly one integer to be positive
 - Need exactly one integer to be not divisible by 3
 - These can be the same integer or different integers
4. ****Edge Cases****:
 - Both integers positive: need one not divisible by 3
 - Both integers divisible by 3: need one positive
 - Both integers negative: condition cannot be met
 - Zero: not positive, divisible by 3 ($0 \% 3 = 0$)
5. ****Successful Scenarios****:
 - Positive integer that's not divisible by 3, and any other integer
 - Non-positive integer that's divisible by 3, and a positive integer
 - Mix of positive/negative with appropriate divisibility properties

The solution handles all possible combinations and edge cases correctly!

*/

Status : Correct

Marks : 10/10