

# Rajalakshmi Engineering College

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Department: AI & ML - Section 1

Batch: 2028

Degree: B.E - AI & ML

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

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

Attempt : 1

Total Mark : 40

Marks Obtained : 30

#### Section 1 : Coding

##### 1. Problem Statement

Sampad is a high school teacher who wants to convert numeric grades into letter grades.

Write a program that accepts a numeric grade as input. The program should then convert this numeric grade into a letter grade based on specific conditions. The letter grades are A, B, C, D and F.

The conversion is determined by the following conditions:

If the numeric grade is 90 or higher, it's an "A"  
If the numeric grade is between 80 and 89 (inclusive), it's a "B"  
If the numeric grade is between 70 and 79 (inclusive), it's a "C"  
If the numeric grade is between 60 and 69 (inclusive), it's a "D"  
If the numeric grade is below 60, it's an "F"

#### *Input Format*

The input consists of an integer representing the numeric grade of the student.

### ***Output Format***

The output prints the letter grade corresponding to the input numeric grade as "Letter Grade: <grade>".

Refer to the sample output for the formatting specifications.

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

Input: 85

Output: Letter Grade: B

### ***Answer***

```
// You are using Java
import java.util.Scanner;
class GradeConverter {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        // Read numeric grade
        int grade = scanner.nextInt();
        String letterGrade;

        // Determine letter grade based on numeric grade
        if (grade >= 90) {
            letterGrade = "A";
        } else if (grade >= 80) {
            letterGrade = "B";
        } else if (grade >= 70) {
            letterGrade = "C";
        } else if (grade >= 60) {
            letterGrade = "D";
        } else {
            letterGrade = "F";
        }

        // Print output in the specified format
        System.out.println("Letter Grade: " + letterGrade);
    }
}
```

```
        scanner.close();
    }
}
```

**Status :** Correct

**Marks :** 10/10

## 2. Problem Statement

Rohit is tasked with designing a program to analyze the digits of a given integer.

Write a program to help Rohit that takes an integer as input and identifies the minimum odd digit and the maximum even digit present in the number. If no odd or even digits are present, display appropriate messages.

Implement the solution using a 'while' loop to iterate through the digits of the given number.

### ***Input Format***

The input consists of an integer n.

### ***Output Format***

The first line of output prints the message "Minimum odd digit: " followed by an integer representing the smallest odd digit found in the input number.

If no odd digit exists, it prints "There are no odd digits in the number."

The second line of output prints the message "Maximum even digit: " followed by an integer representing the largest even digit found in the input number.

If no even digit exists, it prints "There are no even digits in the number."

Refer to the sample output for formatting specifications.

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

Input: 3465

Output: Minimum odd digit: 3  
Maximum even digit: 6

### Answer

```
// You are using Java
import java.util.Scanner;
class DigitAnalyzer {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        int n = scanner.nextInt(); // Read the input number
        int num = n;

        int minOdd = 10; // Start with a value greater than max digit
        int maxEven = -1; // Start with a value smaller than any digit

        // Loop through each digit
        while (num > 0) {
            int digit = num % 10;

            if (digit % 2 == 0) {
                // Even digit
                if (digit > maxEven) {
                    maxEven = digit;
                }
            } else {
                // Odd digit
                if (digit < minOdd) {
                    minOdd = digit;
                }
            }

            num /= 10;
        }

        // Output for odd digits
        if (minOdd == 10) {
            System.out.println("There are no odd digits in the number.");
        } else {
            System.out.println("Minimum odd digit: " + minOdd);
        }

        // Output for even digits
```

```

        if (maxEven == -1) {
            System.out.println("There are no even digits in the number.");
        } else {
            System.out.println("Maximum even digit: " + maxEven);
        }

        scanner.close();
    }
}

```

**Status :** Correct

**Marks :** 10/10

### 3. Problem Statement

Ravi wants to estimate the total utility bill for a household based on the consumption of electricity, water, and gas.

Write a program to calculate the total bill using the following criteria:

The cost per unit for electricity is 0.12, for water is 0.05, and for gas is 0.08. A discount is applied to the total cost based on the following conditions: If the total cost is 100 or more, a 10% discount is applied. If the total cost is between 50 and 99.99, a 5% discount is applied. No discount is applied if the total cost is less than 50.

The program should output the total bill after applying the discount with two decimal places.

#### ***Input Format***

The input consists of three double values, representing the number of units consumed for electricity, water, and gas respectively.

#### ***Output Format***

The output prints a double value, representing the total bill after applying the discount, formatted to two decimal places.

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 1000.0

200.0

100.0

Output: 124.20

### **Answer**

```
// You are using Java
import java.util.Scanner;
class UtilityBillCalculator {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        // Read the number of units consumed
        double electricityUnits = scanner.nextDouble();
        double waterUnits = scanner.nextDouble();
        double gasUnits = scanner.nextDouble();

        // Unit costs
        double electricityCost = electricityUnits * 0.12;
        double waterCost = waterUnits * 0.05;
        double gasCost = gasUnits * 0.08;

        // Total before discount
        double totalCost = electricityCost + waterCost + gasCost;

        // Apply discount
        if (totalCost >= 100) {
            totalCost -= totalCost * 0.10; // 10% discount
        } else if (totalCost >= 50) {
            totalCost -= totalCost * 0.05; // 5% discount
        }

        // Output total bill formatted to two decimal places
        System.out.printf("%.2f\n", totalCost);

        scanner.close();
    }
}
```

**Status : Correct**

**Marks : 10/10**

#### 4. Problem Statement

You are given a number of distribution centers (rows) and are tasked with generating a zigzag shipment route pattern. Each shipment route should alternate between left-to-right and right-to-left, as described below.

The program should print the zigzag pattern with a tab (\t) separating the columns. For each row, the shipment numbers should follow a diagonal pattern where numbers are placed in a zigzag, left to right on odd rows and right to left on even rows.

#### *Input Format*

The input consists of an integer N, which represents the number of distribution centers (rows) for the zigzag pattern.

#### *Output Format*

The output prints the zigzag pattern with N rows, formatted with a tab space (\t) separating the columns.

Refer to the sample output for formatting specifications.

#### *Sample Test Case*

Input: 5

Output: 1

```
 2 6
 3 7 10
 4 8 11 13
 5 9 12 14 15
```

#### *Answer*

```
// You are using Java
import java.util.Scanner;
class ZigzagShipmentRoute {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        int N = scanner.nextInt();
```

```

int[][] matrix = new int[N][N];

int num = 1;

// Fill the matrix diagonally
for (int d = 1; d <= 2 * N - 1; d++) {
    int row, col;
    if (d <= N) {
        row = d - 1;
        col = 0;
    } else {
        row = N - 1;
        col = d - N;
    }

    while (row >= 0 && col < N) {
        matrix[row][col] = num++;
        row--;
        col++;
    }
}

// Print rows with zigzag pattern
for (int i = 0; i < N; i++) {
    if ((i + 1) % 2 == 1) {
        // Odd row: left to right
        for (int j = 0; j < N; j++) {
            if (matrix[i][j] != 0)
                System.out.print(matrix[i][j] + "\t");
        }
    } else {
        // Even row: right to left
        for (int j = N - 1; j >= 0; j--) {
            if (matrix[i][j] != 0)
                System.out.print(matrix[i][j] + "\t");
        }
    }
    System.out.println();
}

scanner.close();

```

```
    }  
}
```

**Status : Wrong**

**Marks : 0/10**