Rajalakshmi Engineering College

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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

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.

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

```java
import java.util.Scanner;

public class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int N = sc.nextInt();

        int[][] matrix = new int[N][N];
        int num = 1;

        for (int col = 0; col < N; col++) {
            if (col % 2 == 0) {
                for (int row = 0; row <= col; row++) {
                    matrix[row][col - row] = num++;
                }
            } else {
                for (int row = col; row >= 0; row--) {
                    matrix[col - row][row] = num++;
                }
            }
        }

        for (int col = 1; col < N; col++) {
```

```java
        if ((col + N - 1) % 2 == 0) {
            for (int row = col; row < N; row++) {
                matrix[row][N - 1 - (row - col)] = num++;
            }
        } else {
            for (int row = N - 1; row >= col; row--) {
                matrix[N - 1 - (row - col)][row] = num++;
            }
        }
    }
}

for (int i = 0; i < N; i++) {
    for (int j = 0; j < N; j++) {
        if (matrix[i][j] != 0) {
            System.out.print(matrix[i][j] + "\t");
        } else {
            System.out.print("\t");
        }
    }
    System.out.println();
}
    }
}
```

Status : Wrong   *Marks : 0/10*

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

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

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

        int minOdd = 10;
        int maxEven = -1;

        int num = n;

        while (num > 0) {
            int digit = num % 10;

            if (digit % 2 == 0) {
                if (digit > maxEven) {
                    maxEven = digit;
```

```
        }
      } else {
         if (digit < minOdd) {
            minOdd = digit;
         }
      }

      num /= 10;
   }

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

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

Status : Correct   *Marks : 10/10*

3. 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

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

public class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int grade = sc.nextInt();
        String letter;

        if (grade >= 90) {
            letter = "A";
        } else if (grade >= 80) {
            letter = "B";
        } else if (grade >= 70) {
            letter = "C";
        } else if (grade >= 60) {
            letter = "D";
        } else {
            letter = "F";
        }
```

```
    System.out.println("Letter Grade: " + letter);
  }
}
```

Status : Correct   *Marks : 10/10*

4. 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

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

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

        double electricityUnits = sc.nextDouble();
        double waterUnits = sc.nextDouble();
        double gasUnits = sc.nextDouble();

        double electricityRate = 0.12;
        double waterRate = 0.05;
        double gasRate = 0.08;

        double totalCost = (electricityUnits * electricityRate) +
                    (waterUnits * waterRate) +
                    (gasUnits * gasRate);

        if (totalCost >= 100) {
            totalCost *= 0.90;
        } else if (totalCost >= 50) {
            totalCost *= 0.95;
        }

        System.out.printf("%.2f", totalCost);
    }
}
```

Status : Correct   *Marks : 10/10*