Assignment 5
Exception Handling

Q1. Electricity Bill Calculation with Exception Handling

Design a Java program to calculate the electricity bill for a customer, including exception handling for invalid input values. Implement a class named ElectricityBill with the following

specifications:

Class: ElectricityBill

Instance Variables

- **customerName (String): Name of the customer**

- **unitsConsumed (double): Number of electricity units consumed**

- **billAmount (double): The calculated bill amount**

Constructor

- **A parameterized constructor to initialize the customerName and unitsConsumed**

fields.

- **Throw an IllegalArgumentException if unitsConsumed is negative.**

Method

- **void calculateBillAmount(): This method calculates the electricity bill based on the**

following rules:

- **First 100 units: Rs. 5 per unit**

- **Next 200 units (101–300): Rs. 7 per unit**

- **Above 300 units: Rs. 10 per unit**

Main Program

In the main() method:

1. **Prompt the user to enter the customer's name and units consumed.**

2. **Use try-catch blocks to handle the following scenarios:**

- **Catch InputMismatchException if the user enters non-numeric data for units.**

- **Catch IllegalArgumentException if a negative value is entered for units.**

3. **If the input is valid, create an object of the ElectricityBill class, compute the bill using**

calculateBillAmount(), and print the customer's name, units consumed, and the total bill amount.

Ans:

Input:

```java
import java.util.*;

class ElectricityBill {
    String customerName;
    double unitsConsumed;
    double billAmount;

    ElectricityBill(String customerName, double unitsConsumed) {
        if (unitsConsumed < 0)
            {
            throw new IllegalArgumentException("Units Consumed cannot be negative, please enter a positive number.");
        }
        this.customerName = customerName;
        this.unitsConsumed = unitsConsumed;
    }

    double calculateBillAmount(){
        if(unitsConsumed <= 100)
            {
            billAmount = unitsConsumed * 5;
        }
            else if(unitsConsumed <= 300)
            {
```

```java
        billAmount = (100 * 5) + ((unitsConsumed - 100) * 7);

    }

            else

            {

        billAmount = (100 * 5) + (200 * 7) + ((unitsConsumed - 300) * 10);

    }

    return billAmount;

  }

}


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

        Scanner input = new Scanner(System.in);

        try {

            System.out.print("Enter Customer Name: ");

            String customerName = input.nextLine();


            System.out.print("Enter Units Consumed: ");

            double unitsConsumed = input.nextDouble();


            ElectricityBill e = new ElectricityBill(customerName, unitsConsumed);

            double bill = e.calculateBillAmount();


            System.out.println(customerName + " has consumed " + unitsConsumed + " units, so
total bill: Rs. " + bill);

        } catch (InputMismatchException e) {

            System.out.println("Error: Invalid input. Please enter a numeric value for units
consumed.");

        } catch (IllegalArgumentException e) {
```

```
        System.out.println("Error: " + e.getMessage());

    } finally {

        input.close();

    }

  }

}
```

Output:

Q2. Student Marks and Grade Calculation with Exception Handling

Design a Java program to calculate the total marks, average, and grade of a student, with

proper exception handling for invalid inputs. Implement a class named Student with the

following specifications:

Class: Student

Instance Variables

- **name (String): Name of the student**

- **rollNo (int): Roll number of the student**

- **marks (double array of size 5): Marks obtained in 5 subjects**

- **average (double): Average marks**

- **grade (char): Grade based on average**

Constructor

- **A parameterized constructor to initialize the name, rollNo, and marks.**

- **Throw an IllegalArgumentException if any mark is negative or greater than 100.**

Methods

- **void calculateAverage(): Computes the average of marks.**

- **void calculateGrade(): Assigns grade based on the average as per the following**

criteria:

- **A: average ≥ 90**

- **B: 80 ≤ average < 90**

- **C: 70 ≤ average < 80**

- **D: 60 ≤ average < 70**

- **F: average < 60**

- **void displayStudentInfo(): Displays the student's name, roll number, marks, average,**

and grade.

Main Program

In the main() method:

1. **Prompt the user to input student details and marks for 5 subjects.**

2. **Use a try-catch block to handle the following:**

- **InputMismatchException for non-numeric input**

- **IllegalArgumentException for invalid mark entries (e.g., < 0 or > 100)**

3. **Create a Student object, calculate average and grade, and display the full information.**

Ans:

Input:

import java.util.*;

class Student{

      String name;

      int rollNo;

      double marks[]=new double[5];

      double avg;

```java
        char grade;

        int total;

        Student(String name, int rollNo, double marks[]){

                this.name=name;

                this.rollNo=rollNo;

                for(int i=0;i<5;i++)

                {

                        if (marks[i]<0||marks[i]>100)

                        {

                                throw new IllegalArgumentException("plese enter valid
marks.");

                        }

                        else

                        {

                                this.marks[i]=marks[i];

                        }

                }

        }

        void calculateAverage(){

                for(int i=0;i<5;i++){

                        total+=marks[i];

                }

                avg=total/5.0;

        }

        void calculateGrade(){

                if(avg>=90)

                {

                        grade='A';
```

```java
        }
        else if(avg>=80&&avg<90)
        {
                grade='B';
        }
        else if(avg>=70&&avg<80)
        {
                grade='C';
        }
        else if(avg>=60&&avg<70)
        {
                grade='D';
        }
        else
        {
                grade='F';
        }
    }
    void displayStudentInfo(){
        System.out.println("Student name: "+name);
        System.out.println("Student roll no.: "+rollNo);
        for(int i=0;i<5;i++)
        {
                System.out.println("Student marks in Subject "+i+" : "+marks[i]);
        }
        System.out.println("Average of students marks: "+ avg);
        System.out.println("Grade of student: "+grade);
    }
```

```java
}
class StudentDemo{
    public static void main(String[] args){
        Scanner input=new Scanner(System.in);

        try{
            System.out.println("Enter the name of student: ");
            String name=input.nextLine();


            System.out.println("Enter Students roll no: ");
            int rollNo=input.nextInt();


            double marks[]= new double [5];
            for(int i=0;i<5;i++)
            {
                System.out.println("Enter marks for subject "+i+" :");
                marks[i]= input.nextDouble();
            }


            Student s=new Student(name,rollNo,marks);
            s.displayStudentInfo();
        }catch(InputMismatchException e){
            System.out.println("Plese enter the detail properly");
        }catch(IllegalArgumentException e){
            System.out.println("Error: " + e.getMessage());
        }
    }
}
```

Output:

```
C:\Windows\System32\cmd.e ×    +   ∨

D:\cdac\PG-DAC\moduls\java\assignmnet\Assignment 5>java StudentDemo
Enter the name of student:
Jhon
Enter Students roll no:
qw
Plese enter the detail properly

D:\cdac\PG-DAC\moduls\java\assignmnet\Assignment 5>java StudentDemo
Enter the name of student:
Jhon
Enter Students roll no:
12
Enter marks for subject 0 :
-12
Enter marks for subject 1 :
101
Enter marks for subject 2 :
102
Enter marks for subject 3 :
-9
Enter marks for subject 4 :
-8
Error: plese enter valid marks.
```

```
C:\Windows\System32\cmd.e ×    +   ∨

D:\cdac\PG-DAC\moduls\java\assignmnet\Assignment 5>java StudentDemo
Enter the name of student:
Jhon
Enter Students roll no:
12
Enter marks for subject 0 :
99
Enter marks for subject 1 :
98
Enter marks for subject 2 :
97
Enter marks for subject 3 :
96
Enter marks for subject 4 :
95
Student name: Jhon
Student roll no.: 12
Student marks in Subject 0 : 99.0
Student marks in Subject 1 : 98.0
Student marks in Subject 2 : 97.0
Student marks in Subject 3 : 96.0
Student marks in Subject 4 : 95.0
Average of students marks: 97.0
Grade of student: A
```