Q1.Write a Java program to calculate electricity bill using inheritance. The program should get the inputs of watts per hour and unit rate.

Check your program for the following case:

Assume a consumer consumes 5000 watts per hour daily for one month. Calculate the total energy bill of that consumer if per unit rate is 7 [1 unit = 1k Wh].

PROGRAM:

```
import java.util.Scanner;

// Parent class: ElectricityBilL
class ElectricityBill {
    protected double wattsPerHour;
    protected double unitRate;

    public ElectricityBill(double wattsPerHour, double unitRate) {
        this.wattsPerHour = wattsPerHour;
        this.unitRate = unitRate;
    }

    public double calculateEnergyConsumed(int days) {

        // 1 unit = 1 kWh (1000 watts per hour)
        return (wattsPerHour * days) / 1000;
    }
}

// Child class: ConsumerBill extends ElectricityBill

class ConsumerBill extends ElectricityBill {
    private int days;

    public ConsumerBill(double wattsPerHour, double unitRate, int days) {
        super(wattsPerHour, unitRate);
        this.days = days;
    }

    public double calculateTotalBill() {
        double energyConsumed = calculateEnergyConsumed(days);
        return energyConsumed * unitRate;
    }

    public void displayBill() {
        System.out.printf("Total Energy Consumed: %.2f units\n", calculateEnergyConsumed(days));
        System.out.printf("Total Bill: Rs.%.2f\n", calculateTotalBill());
    }
}
public class Main {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        System.out.print("Enter watts per hour: ");
        double wattsPerHour = scanner.nextDouble();

        System.out.print("Enter unit rate (Rs./unit): ");
        double unitRate = scanner.nextDouble();

        System.out.print("Enter number of days: ");
        int days = scanner.nextInt();

        // Input validation

        if (wattsPerHour <= 0 || unitRate <= 0 || days <= 0) {
            System.out.println("Invalid input. Please enter positive values.");
            return;
        }

        ConsumerBill consumer = new ConsumerBill(wattsPerHour, unitRate, days);
```

```
        consumer.displayBill();

        scanner.close();
    }
}
```

OUTPUT:

```
D:\>javac Main.java
D:\>java Main

Enter watts per hour: 5000
Enter unit rate (Rs./unit): 7
Enter number of days: 30
Total Energy Consumed: 150.00 units
Total Bill: Rs.1050.00
```

EXPLANATION ABOUT THE PROGRAM:

Program Purpose:
Calculate electricity bills using inheritance.

Program Structure:
1. Parent class: ElectricityBill
2. Child class: ConsumerBill (extends ElectricityBill)
3. Main class: Main (contains main method)

Key Components:

ElectricityBill (Parent Class)
- Attributes: wattsPerHour, unitRate
- Method: calculateEnergyConsumed(int days)

ConsumerBill (Child Class)

- Attributes: days (in addition to parent's attributes)
- **Methods:**
  - calculateTotalBill()
  - displayBill() (prints total energy consumed and total bill)

Main Class

- Creates ConsumerBill object with user-input values
- Calls displayBill() to show calculated bill

Program Flow:

1. User inputs watts per hour, unit rate, and number of days.
2. ConsumerBill object is created with user inputs.
3. calculateEnergyConsumed() calculates total energy consumed.
4. calculateTotalBill() calculates total bill.
5. displayBill() prints total energy consumed and total bill.

Inheritance Benefit:
The child class (ConsumerBill) inherits attributes and methods from the parent class (ElectricityBill), promoting code reuse and modularity.

Output:
Total energy consumed and total electricity bill (in Indian Rupees).

THANK YOU.....