SE 1108 PROGRAMMING AND PROBLEM SOLVING II

Lab Assignment 1

You are tasked with designing a system for a utility company that provides electricity services to both residential and commercial customers, each with a different billing structure.

Define a class called Customer. Each Customer should have the following attributes:

- ID (integer)
- Name (string)
- RatePerUnit (double)
- Constructor that takes the attributes as parameters
- Getter and Setter for ratePerUnit and name.
- An abstract method called calculateBill that takes an usageUnits.

Define a subclass of Customer called ResidentialCustomer. Each ResidentialCustomer should have the following attributes:

- BaseCharge (double)
- Constructor that takes the attributes as parameters
- A calculateBill method that returns the total amount the customer pays by adding the baseCharge to product of ratePerUnit and usageUnits.
- A toString method that uses all attributes.

Define a subclass of Customer called CommercialCustomer. Each CommercialCustomer should have the following attributes:

- AdditionalRatePerUnit (double)
- Constructor that takes the attributes as parameters
- A calculateBill method that returns the total amount the customer pays by multiplying the sum of ratePerUnit and additionalRatePerUnit with the usageUnits.
- A toString method that uses all attributes.

Define a class called UtilityCompany. The UtilityCompany should have the following attributes:

- A list of Customer objects to represent the customers.
- A method to add a new customer to the company.
- A method to remove a customer from the company.
- A method to calculate and return the total revenue from all customers.
- A method that increases each customer's rate per unit by a specified amount.
- A toString method.

Create a Main class that demonstrates the functionality of the UtilityCompany class. In Main, create two instances of ResidentialCustomer and CommercialCustomer, add them to a UtilityCompany object, and then call the UtilityCompany object's methods at least once.