การทดลองที่ 5

Chapter 9 Objects and Classes

Program # 1 (Exercise 9.7 p.361 The Account class)

Design a class named Account that contains:

- A private int data field named id for the account (default 0).
- A private double data field named balance for the account (default 0).
- A private double data field named annualInterestRate that stores the currentinterest rate (default 0). Assume all accounts have the same interest rate.
- A private Date data field named dateCreated that stores the date when the account was created.
- A no-arg constructor that creates a default account.
- A constructor that creates an account with the specified id and initial balance.
- The accessor and mutator methods for id, balance, and annualInterestRate.
- The accessor method for dateCreated.
- A method named getMonthlyInterestRate() that returns the monthly interest rate.
- A method named getMonthlyInterest() that returns the monthly interest.
- A method named withdraw that withdraws a specified amount from the account.
- A method named deposit that deposits a specified amount to the account.

Draw the UML diagram for the class and then implement the class. (Hint: The method getMonthlyInterest() is to return monthly interest, not the interest rate. Monthly interest is balance * monthlyInterestRate. monthlyInterestRate is annualInterestRate / 12.

Note that annualInterestRate is a percentage, e.g., like 4.5%. You need to divide it by 100.)

Write a test program that creates an Account object with an account ID of 1122, a balance of $20,000, and an annual interest rate of 4.5%. Use the withdraw method to withdraw $2,500, use the deposit method to deposit $3,000, and print the balance, the monthly interest, and the date when this account was created.

Program # 2 (Exercise 9.9 p.362 Geometry: n-sided regular polygon)

In an n-sided regular polygon, all sides have the same length and all angles have the same degree (i.e., the polygon is both equilateral and equiangular). Design a class named RegularPolygon that contains:

- A private int data field named n that defines the number of sides in the polygon with default value 3.
- A private double data field named side that stores the length of the side with default value 1.
- A private double data field named x that defines the x-coordinate of the polygon's center with default value 0.
- A private double data field named y that defines the y-coordinate of the polygon's center with default value 0.
- A no-arg constructor that creates a regular polygon with default values.
- A constructor that creates a regular polygon with the specified number of sides and length of side, centered at (0, 0).
- A constructor that creates a regular polygon with the specified number of sides,length of side, and x- and y-coordinates.
- The accessor and mutator methods for all data fields.
- The method getPerimeter() that returns the perimeter of the polygon.
- The method getArea() that returns the area of the polygon. The formula for computing the area of a regular polygon is

$$Area = \frac{n \times s^2}{4 \times \tan\left(\frac{\pi}{n}\right)}$$

Draw the UML diagram for the class and then implement the class. Write a test program that creates three RegularPolygon objects, created using the no-arg constructor, using RegularPolygon(6, 4), and using RegularPolygon(10, 4, 5.6, 7.8). For each object, display its perimeter and area.

n=number of side , ex. 10
size=length of each side, ex. 4
x-coordinate = 5.6
y-coordinate=7.8
