Chapter 7 Laboratory Exercise

Prelab Assignment

1. What is “this” used for in Java programming?

2. Can you have more than one constructor in the same class?

3. How can overloaded methods be created?

4. What is a mutating method?

5. Write the definition for a Java class Rectangle that contains integer instance variables length and width, two instance methods that compute and return integer values representing the area and perimeter of the rectangle, and a constructor that initializes the length and width instance variables from values passed as arguments.

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1. Rewrite the Rectangle class definition you wrote in Prelab Exercise 5. Add instance variables to store the screen coordinates for the upper, left hand corner. Add methods to draw the rectangle in a DrawingBox. Test your program by writing a client program that draws two different sized rectangles on in the same DrawingBox in two different screen locations.

2. You need to write a class contains mutating methods that would allow the user to keep track of the gas mileage and the cost per mile of operating a car. Your class should contain instance variable that record the total miles traveled, the total gallons of gasoline purchased, and the total cost of the gasoline purchased to date. Test your class by writing a client program that prompts the user for the miles traveled, gallons purchased, and cost for each of the his or her last five fill-ups. Your program should display the average miles per gallons and cost per mile after the data for the five fill ups has been entered.

3. Rewrite your program and class definition from Exercise 2 so that non-mutating methods are used. Compare the average miles per gallon achieved by two cars after the data for three fill ups has been entered.

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Postlab Questions

1. Which implementation of the gas mileage class (mutating or non-mutating) was harder to implement? Why?

2. Did you need to make use of “this” when you implemented the classes in this lab? Is so, why?

3. If your Rectangle class from Exercise 1 were modified to store the coordinates of the four rectangle vertices (to avoid recalculating their values each time) would your client program need to be modified?

4. If your Rectangle class from Exercise 1 were modified to require a color to be specified prior to drawing itself, what changes would be necessary to your client program?