Java Foundations Practices - Section 9

Finding a Central Location

Tasks

Review CampusMap.mp4 from Section 9, Lesson 1, Slide 6. Your goal is to create the CampusMap program that uses your map of campus, dorm names, dorm populations, and your group of friends. You're welcome to design your own campus map (this is your background graphic). You'll have to design your own campus map if your actual campus has fewer than 3 dorms, otherwise this Problem Set wouldn't be too interesting.

CODE:

```
import javafx.application.Application;
import javafx.scene.Scene;
import javafx.scene.control.Label;
import javafx.scene.input.MouseEvent;
import javafx.scene.layout.Pane;
import javafx.scene.paint.Color;
import javafx.scene.shape.Circle;
import javafx.stage.Stage;
import java.util.ArrayList;
public class CampusMap extends Application {
   private static class Dorm {
      String name;
      Circle circle;
      Label label;
      int population;
      double x, y;
      Dorm(String name, int population, double x, double y) {
         this.name = name;
         this.population = population;
         this.x = x;
         this.y = y;
         this.circle = new Circle(x, y, 20, Color.LIGHTBLUE);
         this.label = new Label(name + "\nPop: " + population);
```

```
        this.label.setLayoutX(x - 10);
        this.label.setLayoutY(y - 40);
    }
    void updatePosition(double x, double y) {
        this.x = x;
        this.y = y;
        this.circle.setCenterX(x);
        this.circle.setCenterY(y);
        this.label.setLayoutX(x - 10);
        this.label.setLayoutY(y - 40);
    }
    void updatePopulation(int population) {
        this.population = population;
        this.label.setText(name + "\nPop: " + population);
    }
}
private ArrayList<Dorm> dorms = new ArrayList<>();
private Circle allStudentsCenter;
private Circle studyGroupCenter;
private Label allStudentsLabel;
private Label studyGroupLabel;
@Override
public void start(Stage primaryStage) {
    Pane root = new Pane();
    Scene scene = new Scene(root, 800, 600);
    dorms.add(new Dorm("Dorm 1", 100, 100, 100));
    dorms.add(new Dorm("Dorm 2", 150, 300, 100));
    dorms.add(new Dorm("Dorm 3", 200, 500, 100));
    for (Dorm dorm : dorms) {
        root.getChildren().addAll(dorm.circle, dorm.label);
        dorm.circle.setOnMouseDragged(e -> handleDrag(e, dorm));
```

```
        }
        allStudentsCenter = new Circle(10, Color.RED);
        studyGroupCenter = new Circle(10, Color.GREEN);
        allStudentsLabel = new Label();
        studyGroupLabel = new Label();
        root.getChildren().addAll(allStudentsCenter, studyGroupCenter, allStudentsLabel,
studyGroupLabel);
        calculateCenters();
        primaryStage.setTitle("Campus Map");
        primaryStage.setScene(scene);
        primaryStage.show();
    }
    private void handleDrag(MouseEvent e, Dorm dorm) {
        dorm.updatePosition(e.getX(), e.getY());
        calculateCenters();
    }

    private void calculateCenters() {
        double totalX = 0, totalY = 0, totalPop = 0;
        for (Dorm dorm : dorms) {
            totalX += dorm.x * dorm.population;
            totalY += dorm.y * dorm.population;
            totalPop += dorm.population;
        }
        double centerX = totalX / totalPop;
        double centerY = totalY / totalPop;
        allStudentsCenter.setCenterX(centerX);
        allStudentsCenter.setCenterY(centerY);
        allStudentsLabel.setText("All Students Center: (" + String.format("%.2f", centerX) + ", " +
String.format("%.2f", centerY) + ")");
        allStudentsLabel.setLayoutX(centerX + 10);
        allStudentsLabel.setLayoutY(centerY - 10);
```

```
        Dorm dorm1 = dorms.get(0);
        Dorm dorm2 = dorms.get(1);
        Dorm dorm3 = dorms.get(2);

        centerX = (dorm1.x + dorm2.x + dorm3.x) / 3;
        centerY = (dorm1.y + dorm2.y + dorm3.y) / 3;
        studyGroupCenter.setCenterX(centerX);
        studyGroupCenter.setCenterY(centerY);
        studyGroupLabel.setText("Study Group Center: (" + String.format("%.2f", centerX) + ", " +
String.format("%.2f", centerY) + ")");
        studyGroupLabel.setLayoutX(centerX + 10);
        studyGroupLabel.setLayoutY(centerY - 10);
    }
    public static void main(String[] args) {
        launch(args);
    }
}
```