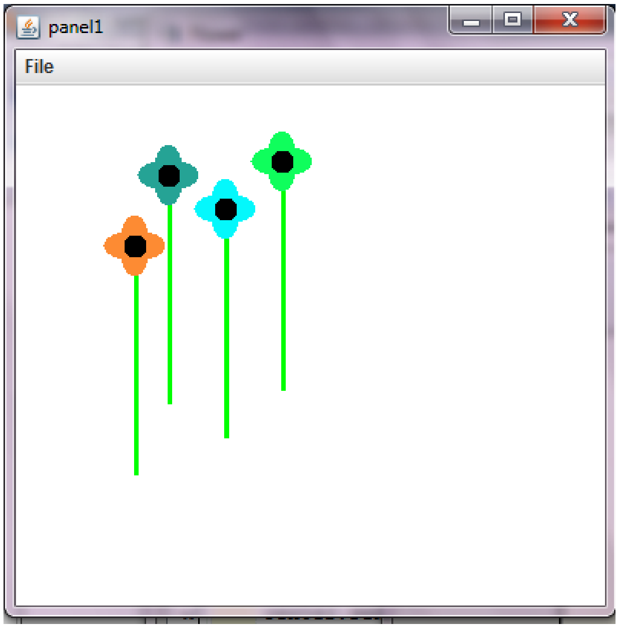
Lab 6 Spring Flowers

PART 1

You will write a class that draws a picture of a flower at a location specified by a mouse button press. The flower will be *draggable*. To do this, you will implement methods *contains* and *move* on the flower class.



The picture at the left shows 4 flowers. A flower has 4 petals drawn as two overlapping FilledOvals of dimension 20 x 40. The center of the flower is a circle of width 15. The stem width is a FilledRect of width 3 and height 150. The color of the stem is green. The color of the petals is a random color generated by your class.

You are given a window controller class named Spring. This class handles window and mouse events and calls methods on your Flower class as needed. You do not have to make any changes to Spring.

The requirements for Flower are

1. The name of the class is Flower. The Flower class is **NOT** a window controller class, so it should not have `extends WindowController` in its class header; it should not have any methods named `onMouseXXX`.
2. A constructor that takes a mouse Location and a drawing canvas as arguments. The constructor uses these arguments to draw the flower. The method header for the constructor should look like

   ```
   public Flower (Location point, DrawingCanvas canvas){
   ```

3. Methods move and contains are used by Spring controller class to drag the Flower. The contains method will return true if the point is inside any of the petals.

   ```
   public boolean contains(Location point){
   ```

   ```
   public void move(double dx, double dy){
   ```

You will test your program by executing the `Spring` program (not Flower). When you click on the canvas a flower appears. You can select the flower by clicking inside a petal and dragging it around. You can select and drag only the last flower that was drawn. You can draw several flowers by clicking on clear areas of the canvas. If the mouse exits and re-enters the canvas, the canvas is cleared.

PART 2 (Extra Credit)

You will write a class named `GrowingFlower`. GrowingFlower is similar to Flower but on a mouse press, only a small part of the stem appears which is a sprout. The sprout will be 3 pixels wide and 2 pixels in height. The user holds the button down and drags the mouse the flower stem will grow and when it reaches full height of 150 pixels the petals and center will appear. When the user clicks on a petal, the petal will change color. The user can continue to click on the petals to get a desired color.

The requirements for `GrowingFlower` are

1. The name of the class is `GrowingFlower`. It is NOT a window controller so it should not have `extends WindowController` in the class header and should not have any `onMouseXXX` methods.
2. The constructor draws the sprout. The sprout should appear at the mouse location.

   ```
   public GrowingFlower (Location point, DrawingCanvas canvas){
   ```

3. The `contains` method returns true if the point is inside any of the petals. What if the flower has not finished growing and there are no petals?

   ```
   public boolean contains(Location point){
   ```

4. A `changeColor` method that changes color of the petals. What if the flower has not finished growing?

   ```
   public void changeColor( ){
   ```

5. The `grow` method. The stem will grow by 2 pixels until it reachs a height of 150 pixels. The stem should grow up and not down. To do this you will change the height of the FilledRect but you will have also have to shift it up using the `move` method on the rectangle object.

   ```
   public boolean grow( ){
   ```

Test your class by executing Spring2. When you press and hold the mouse button a small stem should appear at the mouse location; and as you drag the mouse the sprout will grow upward and then the flower will bloom. If you click on a petal, the color will change. Spring2 does not do dragging of the flower. But if you have time, you can modify Spring2 to do dragging. For dragging, you will need to copy and paste the `move` method from your Flower class.

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This is a template for the Flower class. You need to complete the Flower constructor, contains, and move methods.

```
import objectdraw.*;
import java.awt.*;

//    Lab6   Your name goes here
public class Flower  {

 private static final int PETAL_WIDTH = 20,
                          PETAL_HEIGHT = 40,
                          CENTER_WIDTH = 15,
                          STEM_WIDTH = 3,
                          STEM_HEIGHT = 150;

 private FilledOval petal1;
 private FilledOval petal2;
 private FilledOval center;
 private FilledRect stem;
 private RandomIntGenerator random = new RandomIntGenerator(0,255);

  public Flower (Location point, DrawingCanvas canvas){
     //  code to draw a Flower goes here






  }

  public boolean contains(Location point){
     // return true if the input argument is inside the petals


  }

  public void move(double dx, double dy){
     // move the flower by the distance dx, dy by moving each of the
     // parts of the flower




  }
}
```