

Section Handout 3

Based on a handout by Eric Roberts, Mehran Sahami, and Patrick Young

Problem One: True or False?

For each of the following statements below, indicate whether it is true or false in Java:

1. The value of a *local variable* named `i` has no direct relationship with that of a variable named `i` in its caller.
2. The value of a *parameter* named `x` has no direct relationship with that of a variable named `x` in its caller.

Problem Two: Method Trace

For the program below, trace through its execution by hand to show what output is produced when it runs.

```
/*
 * File: QuestionableJava.java
 * =====
 * A program that explores some of the trickier points of parameter passing.
 */
import acm.program.*;

public class QuestionableJava extends ConsoleProgram {
    public void run() {
        int marten = 137;
        int faye = 42;

        println("marten = " + marten);
        hannelore(faye);
        println("marten = " + marten);
        println("faye = " + faye);

        marten = angus(faye, marten + faye);
        println("marten = " + marten);

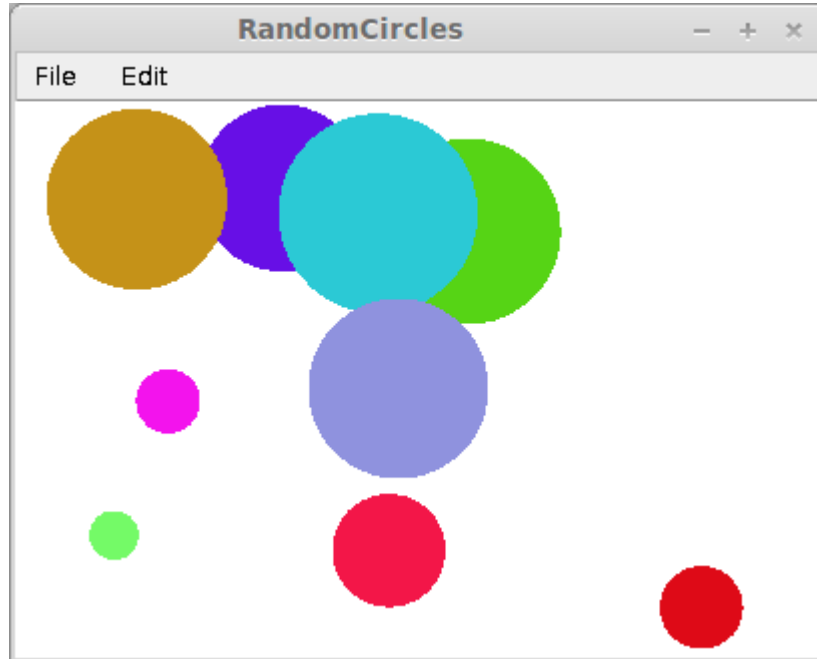
        marten = angus(marten, faye);
        println("marten = " + marten);
    }

    private void hannelore(int marten) {
        println("marten = " + marten);
        marten = 160;
    }

    private int angus(int martin, int faye) {
        int dora = faye - martin;
        println("dora = " + dora);
        return dora % 10;
    }
}
```

Problem Three: Random Circles

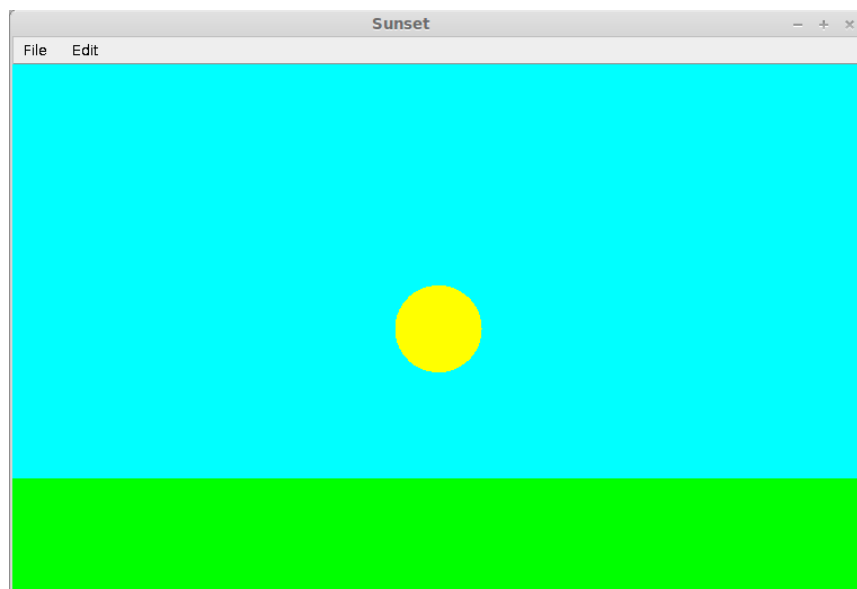
Write a `GraphicsProgram` that draws a set of ten circles with different sizes, positions, and colors. Each circle should have a randomly chosen color, a randomly chosen radius between 5 and 50 pixels, and a randomly chosen position on the canvas, subject to the condition that the entire circle must fit inside the canvas without extending past the edge. The following sample run shows one possible outcome:



On some runs of this program you might not see ten circles. Why?

Problem Four: Sunset

Write a `GraphicsProgram` that simulates a sunset. Your program should start off by drawing the sun centered in the window over a green horizon, as shown here:



Your program should then animate the sun sinking beneath the horizon. If you'd like, you might want to consider changing the color of the sun, the sky, or the horizon as the sun gets lower and lower.