

Solutions for Section #3

Based on handouts by Mehran Sahami, Marty Stepp, Keith Schwarz, and others

1. Random Circles

```
import acm.program.*;
import acm.graphics.*;
import java.awt.*;
import acm.util.*;

public class RandomCircles extends GraphicsProgram {

    private static final int NUM_CIRCLES = 20;
    private static final int MIN_RADIUS = 5;
    private static final int MAX_RADIUS = 50;

    public void run() {
        RandomGenerator rgen = RandomGenerator.getInstance();
        for (int i = 0; i < NUM_CIRCLES; i++) {
            double radius = rgen.nextInt(MIN_RADIUS, MAX_RADIUS);
            double x = rgen.nextDouble(0, getWidth() - radius*2);
            double y = rgen.nextDouble(0, getHeight() - radius*2);
            GOval circle = new GOval(x, y, radius * 2, radius * 2);
            circle.setColor(rgen.nextColor());
            circle.setFilled(true);
            add(circle);
            pause(200);
        }
    }
}
```

2. Drawing Rectangles

```
import acm.program.*;
import acm.graphics.*;
import java.awt.*;
import java.awt.event.*;
import acm.util.*;

public class DrawingRectangles extends GraphicsProgram {

    private GRect rect;
    private RandomGenerator rgen;

    public void run() {
        rgen = RandomGenerator.getInstance();
        addMouseListeners();
    }

    public void mousePressed(MouseEvent e) {
        GObject obj = getElementAt(e.getX(), e.getY());
        if (obj != null) {
            remove(obj);
        } else {
            rect = new GRect(e.getX(), e.getY(), 0, 0);
            rect.setFilled(true);
            rect.setColor(rgen.nextColor());
            add(rect);
        }
    }

    public void mouseDragged(MouseEvent e) {
        if (rect != null) {
            double width = e.getX() - rect.getX();
            double height = e.getY() - rect.getY();
            rect.setSize(width, height);
        }
    }

    public void mouseReleased(MouseEvent e) {
        rect = null;
    }
}
```

Note: this solution only works when the user drags down and to the right to create a rectangle. That's totally fine for this problem. For an extra challenge, feel free to try extending the solution to work for any direction!

3. Method Trace – Parameters and Returns

```
a = 137  
a = 42  
a = 137  
b = 42  
d = 137  
a = 7  
d = 35  
a = 5
```