

COS126 NestedCircles.java (§2.3 Recursion)

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1 /*****
2  * Draws an N-level set of nested circles in random colors.
3  * Usage:          java NestedCircles N
4  * Dependencies: StdDraw.java
5  *****/
6 public class NestedCircles {
7
8     // draw a circle with some embellishments
9     // the center is (x, y) and the radius is r
10    public static void fancyCircle(double x, double y, double r) {
11        // use one of two color pairs at random
12        double randomBit = (int)(Math.random()*2); // equally likely 0 or 1
13        // this is the colour that will fill the circle
14        if (randomBit == 0)
15            StdDraw.setPenColor(StdDraw.CYAN);
16        else
17            StdDraw.setPenColor(StdDraw.ORANGE);
18        StdDraw.filledCircle(x, y, r);
19        // this is the colour for the circle's border
20        if (randomBit == 0)
21            StdDraw.setPenColor(StdDraw.BLUE);
22        else
23            StdDraw.setPenColor(StdDraw.RED);
24        StdDraw.circle(x, y, r);
25    }
26
27    // draw an order-n nested circle, centred on (x, y) with radius r
28    public static void draw(int n, double x, double y, double r) {
29        if (n==0) return;
30        fancyCircle(x, y, r);
31
32        double halfRadius = r/2;
33        // recursively draw two nested circles of order n-1
34        draw(n-1, x - halfRadius, y, halfRadius);
35        draw(n-1, x + halfRadius, y, halfRadius);
36    }
37
38    // read in a command-line argument N and plot an order-N circle
39    public static void main(String[] args) {
40        int N = Integer.parseInt(args[0]);
41        double x = 0.5, y = 0.5; // biggest circle centred at (0.5, 0.5)
42        draw(N, x, y, 0.5); // radius fills up [0,1] x [0,1] view
43    }
44 }
```