

```
1import java.awt.Color;
2import java.awt.Dimension;
3import java.awt.Graphics;
4import java.util.Random;
5
6import javax.swing.JPanel;
7import javax.swing.JFrame;
8
9public class DartDropping extends JPanel {
10
11    // Unique version ID for this class to ensure saved objects
    can be loaded safely
12    private static final long serialVersionUID = 1L;
13
14    // main method to launch the program as a standalone
    application – no need to modify
15    public static void main(String[] args) {
16        DartDropping panel = new DartDropping();
17        panel.setPreferredSize(new Dimension(1000, 1000)); // content
        size window dimensions
18
19        JFrame frame = new JFrame("DartDropping"); // Title of
        frame
20        frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
21        frame.add(panel);
22        frame.pack();
23        frame.setVisible(true);
24    }
25
26    public void calculate(Graphics g) {
27        int count = 0;
28        double darts = 10000000.0; //Note that with graphics, the
        code is slower. It will take a much longer time for 100 million or
        1 billion although it is possible. Currently will take 10–20
        Seconds for 10 million
29        int i = 1;
30        Random rand = new Random();
31        System.out.println("Calculating. Please wait.");
32        while (i<=darts) {
33            double randx = rand.nextDouble()-1;
34            double randy = rand.nextDouble()-1;
35            double distance = Math.sqrt((randx-0)*(randx-0)+
        (randy-0)*(randy-0));
36            if (distance <=1) {
37                count++;
38                g.setColor(Color.GREEN);
39            }
40            else
41                g.setColor(Color.BLUE);
```

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42         g.fillOval((int)((randx+1)*500), (int)((randy+1)*500),
43         1, 1);
44         i+=1;
45     }
46     double pi = count / darts*4.0;
47     System.out.println("Pi according to " + (int)darts + "
48     darts: " + pi + "\n");
49 }
50 @Override
51 protected void paintComponent(Graphics g) {
52     super.paintComponent(g); // Clears the panel before drawing
53     calculate(g);
54 }
55
56 }
57
```