COS126 Htree.java from 2.3 Recursion

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 1 /******************************************************************************
 2  *  Compilation:  javac Htree.java
 3  *  Execution:    java Htree N
 4  *  Dependencies: StdDraw.java
 5  *
 6  *  Plot an order N Htree.
 7  *
 8  *  % java Htree 5
 9  *
10  ******************************************************************************/
11
12 public class Htree {
13
14     // plot an H, centered on (x, y) of the given side length
15     public static void drawH(double x, double y, double size) {
16
17         // compute the coordinates of the 4 tips of the H
18         double x0 = x - size/2;
19         double x1 = x + size/2;
20         double y0 = y - size/2;
21         double y1 = y + size/2;
22
23         // draw the 3 line segments of the H
24         StdDraw.line(x0, y0, x0, y1);    // left  vertical segment of the H
25         StdDraw.line(x1, y0, x1, y1);    // right vertical segment of the H
26         StdDraw.line(x0,  y, x1,  y);    // crossbar segment of the H
27     }
28
29     // plot an order n H-tree, centered on (x, y) of the given side length
30     public static void draw(int n, double x, double y, double size) {
31         if (n == 0) return;              // base case
32         drawH(x, y, size);
33
34         // compute x- and y-coordinates of the 4 half-size H-trees
35         double x0 = x - size/2;
36         double x1 = x + size/2;
37         double y0 = y - size/2;
38         double y1 = y + size/2;
39
40         // recursively draw 4 half-size H-trees of order n-1
41         draw(n-1, x0, y0, size/2);    // lower left  H-tree
42         draw(n-1, x0, y1, size/2);    // upper left  H-tree
43         draw(n-1, x1, y0, size/2);    // lower right H-tree
44         draw(n-1, x1, y1, size/2);    // upper right H-tree
45     }
46
47     // read in a command line argument N and plot an order N H-tree
48     public static void main(String[] args) {
49         int N = Integer.parseInt(args[0]);
50
51         double x = 0.5, y = 0.5;     // center of H-tree
52         double size = 0.5;           // side length of H-tree
53         draw(N, x, y, size);
54     }
55 }
```