

SPRING 2002: **COP 3530** DATA STRUCTURES
[PROGRAMMING ASSIGNMENT 3; DUE MARCH 7 IN MY OFFICE.]
RECURSION

Problem Description

Your task is to write a recursive program to draw “fractal images” such as `Tree.ps`, which is shown on the course web page. Your program should have at least one recursive method and a main program that calls this recursive method. The output of the program is a **postscript** file that you can view and print using `ghostview` on Linux or on Windows. Ghostview, can be installed free of charge and is available through a link from your course homepage. The recursive method is parameterized by a depth number `Depth`. When `Depth` equals 1, it must draw the figure shown in `H.ps` (it has 5 H-like figures and is shown on the course web page).

When `Depth` equals 1, your program must output the following code in **postscript language**:

```
%!
50 50 translate 2 setlinewidth
128 256 moveto 256 0 rlineto stroke
128 128 moveto 0 256 rlineto stroke
384 128 moveto 0 256 rlineto stroke
 64 384 moveto 128 0 rlineto stroke
 64 320 moveto 0 128 rlineto stroke
192 320 moveto 0 128 rlineto stroke
320 384 moveto 128 0 rlineto stroke
320 320 moveto 0 128 rlineto stroke
448 320 moveto 0 128 rlineto stroke
 64 128 moveto 128 0 rlineto stroke
 64 64 moveto 0 128 rlineto stroke
192 64 moveto 0 128 rlineto stroke
320 128 moveto 128 0 rlineto stroke
320 64 moveto 0 128 rlineto stroke
448 64 moveto 0 128 rlineto stroke
showpage
```

What to submit: As usual, submit the source code for your program and the output of Javadoc. Your floppy diskette should contain all the requisite `.java`, `.class`, `.html`, `.dat`, `.out` files that are relevant for the grader to check the program. Make sure that the hard copy you submit is the same as the copy on the floppy, and is compilable from the floppy. You should test the program for several different values of `Depth`, but submit only the result for `Depth` equal to 3 (this should have 25 H-like figures).

Extensions for the bored Your program should have appropriate comments describing whatever modifications, additions, and/or improvements you make.

- This is a problem where you can let your imagination run wild. Try generating other fractal images. Variants can be obtained by replacing the initial H figure by a figure as shown in `Y.ps` or `Weed.ps` on your web page. Any other imaginative or “cool” images will earn you extra credit.