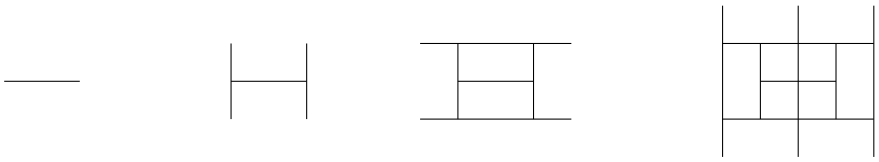
Toothpicks

Take a toothpick and lie it flat on the table. At its ends, place two more toothpicks – each perpendicular to the original, and touching its ends at their midpoints. Do it again, and again, and ...



Perhaps each new toothpick should be a little shorter than the original one, or maybe longer?

Task

Write a program that produces a representation of an n^{th} generation toothpick diagram on the screen (generation 0 is the first of the pictures above, generation 1 the next etc.) or as a graphics file in a common format. In either case it should be suitably scaled – meaning the diagram should basically fill a decent sized window, or a single sheet of paper. The program should also take an optional second parameter r which is the ratio of the length of the toothpicks in each succeeding generation (so that $r = 1$ is the situation above, with $r = 2$ each toothpick would be twice as long as the preceding set, and with $r = 0.8$ each would be 80% as long as the preceding set.)

For example, in a Java environment the command line invocation could be:
`>java Toothpick 3`
to produce the last of the diagrams above, or
`>java Toothpick 6 0.7`
to produce a sixth generation diagram where each generation of toothpicks is 70% of the length of the preceding generation, or
`>java Toothpick 5 10`
to produce a fifth generation diagram where each generation of toothpicks is ten times the length of the preceding generation.

Relates to Objectives

1.1, 1.4, 2.2, 2.3, 3.1, 3.2, 3.3, 3.4.

(Individual)