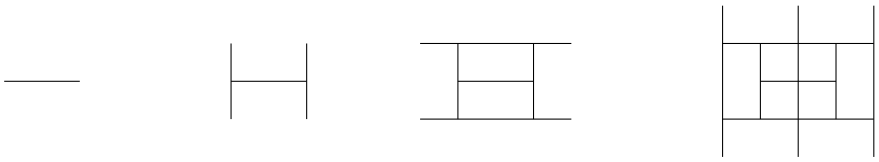
Toothpicks

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, or maybe new toothpicks should only be placed where there really is a free end (in which case the last picture above would be missing the pair of vertical toothpicks in the middle).

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.)

Optionally, add a flag that requires new toothpicks to be placed only where there is actually a free end.

(1 point, Individual)