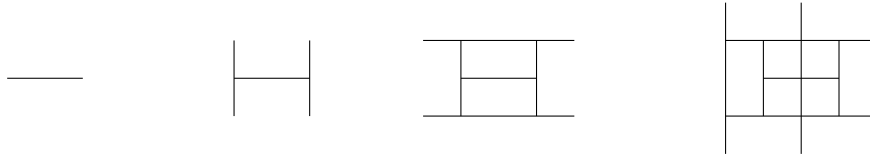


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### Toothpicks

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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).

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### Task

Write a program that produces a representation of an  $n^{\text{th}}$  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)