

This library probabilistically generates crossword puzzles (Across words only for the moment, with Down words to be added in a later release).

Basic usage:

Given dimensions $M \times N$, and a positive integer **density**, the function

genSqBoard($M, N, density$)

yields the template for an $M \times N$ crossword puzzle. This template is a three element list

[Puzzle, Words, collisionInfo]

comprising, respectively,

- an $M \times N$ matrix containing zeros but at the cells corresponding to words of a solved crossword puzzle, which contain the letters in those words;
- the words in the crossword puzzle, stored as 3-element lists in the format
 - [list of letters, initial position, isAcrossBooleanValue]; and
- a 2-element list containing the values
 - [noCollisions, **density**],
 - where **density** is the greatest total number of collisions allowed.

The function **addAW** adds a random Across word to the puzzle. It does so by choosing a random starting position and legal word length, then checking for *collisions* with the function **collisionAW**.

Loosely speaking, a collision occurs when a new word

- intersects another in an unintended or undesirable way, or
- contains letters adjacent to those of another existing word.

If a collision occurs, then noCollisions is increased and another attempt is made to add a word. Otherwise, the word is added letter-wise to the board and in the appropriate form to Words. When noCollisions \geq density, no more words may be added and Down word addition begins (the higher the value of **density**, the more words are likely to be added, hence the etymology).

Rather than being added strictly probabilistically, Down words would be added “greedily.” Their positions and length would be selected similarly as for those of Down words, but addition would require not only a collision check but (1) the reduction of the number of “connected components” of the crossword puzzle and (2) a suitable word in the corpus given the intersections of the proposed Down word with the corresponding across words. Once all words formed a single connected puzzle, no more could be added.