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My given code implements an evolutionary algorithm for generating crosswords.
Initialization: File with the words from which crossword must be generated from
Then I make initial population and start Evaluation loop
Evaluation loop: I make crossover with all words in the population then make mutation with children we obtain. Make new generation with size of population according to fitness function
Fitness function: I give penalties if something is wrong with a crossword. Best crossword has fitness 0. Print crosswords in file
FItness:
1. The code starts with a nested loop that checks for overlapping vertical words in the crossword grid. If two vertical words overlap, a fitness penalty of 500 is added.
2. Next, there is a loop that checks if each word intersects with at least one other word in the crossword. If a word does not intersect with any other word, a fitness penalty of 125 is added.
3. Another loop checks for the connectivity of the crossword grid using a depth-first search (DFS) algorithm. The number of disconnected components is counted, and a fitness penalty of 1000 times the number of components minus one is added.
4. The fitness number is returned as the sum of all fitness penalties.
5. There is a DFS function defined to traverse the crossword grid and mark visited cells.

Crossover:
Takes randomly word from parent1 or parent2 make new crossword

Mutation:
Can change x or y or oriental of word in crossword

Statistic about fitness function in 100 tests: