

Title: Crossword Puzzle Generator Using Backtracking

Description: The Crossword Puzzle Generator project aims to create a program that generates crossword puzzles given a pattern structure and a list of possible words using backtracking algorithm. Crossword puzzles are a popular form of word puzzle that involves filling a grid with words based on given patterns and constraints. The program will allow users to input a pattern structure, such as a grid with '_' characters representing blank spaces, and a list of words that can fit within the pattern. The program will then generate a crossword puzzle by placing the words in the grid while ensuring that they intersect correctly and adhere to the specified pattern.

Key Features:

1. **Pattern Input:** Users can input a pattern structure for the crossword puzzle, where '_' characters represent blank spaces and '#' characters represent blocked spaces.
2. **Word Input:** Users can provide a list of words that can fit within the crossword puzzle grid.
3. **Backtracking Algorithm:** The program will use a backtracking algorithm to recursively explore possible word placements in the crossword puzzle grid, ensuring that they satisfy the pattern structure and intersect correctly.
4. **Word Placement:** Words will be placed horizontally or vertically in the grid, based on the pattern structure and the available space.
5. **Intersections:** The program will ensure that words intersect correctly, with overlapping letters forming valid words.
6. **Solution Generation:** Once a valid crossword puzzle is generated, the program will provide the option to display the solution to the puzzle.

