SudokuSolverX

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OVERVIEW

Welcome to the SudokuSolverX, the ultimate companion for puzzling enthusiasts! Whether you're a beginner or a seasoned solver, this app is designed to help you solve Sudoku puzzles effortlessly. With an intuitive interface, timer feature, and customizable difficulty levels, it ensures that solving Sudoku is as fun as it is satisfying. The app uses efficient backtracking algorithms to solve puzzles, offering real-time feedback and a smooth user experience.

KEY FEATURES

Backtracking

At the heart of the app's solving functionality is the backtracking algorithm. The solver uses the backtracking algorithm to solve the puzzle step-by-step, offering users insight into how the solution is built, and ensuring that the solution process is engaging and educational. The algorithm works by placing numbers in empty cells, backtracking when an invalid configuration is encountered, and ensuring the final solution adheres to Sudoku's rules.

Generation using Constraint Propagation

The puzzle generator employs constraint satisfaction techniques and randomization to create valid Sudoku puzzles with a unique solution. It uses DSA principles like depth-first search (DFS) for generating valid configurations while maintaining the constraints of Sudoku (no repeating numbers in rows, columns, or 3x3 subgrids). The generator adjusts puzzle difficulty by controlling the number of initially filled cells.

Interactive Interface

The grid is fully interactive, where users can enter numbers and easily navigate through the puzzle. Cells change color to provide visual cues when incorrect entries are made. Choose from Easy, Medium, and Hard difficulty settings. Based on your choice, the app generates a valid Sudoku puzzle with varying numbers of pre-filled cells, giving you the perfect challenge!

As users input numbers, the app highlights invalid entries, ensuring that every move is valid and helping users avoid common mistakes. Easily clear the grid or let the app solve the puzzle for you with a single click. The solver not only helps you complete the puzzle but also provides hints as you go.

CONCLUSION

The SudokuSolverX is not just a fun puzzle app; it's a showcase of powerful DSA techniques in action! With backtracking, it turns a classic game into a practical example of algorithmic problem-solving. Whether you're new to DSA or refining your skills, this project highlights how algorithms can solve real-world challenges with elegance and efficiency. Get ready to dive deep into the world of algorithms while having fun solving puzzles!