Solving Sudoku Puzzles Using Variants of Backtracking Algorithms

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***Abstract*—(tentative) In this paper, we discuss various algorithms used to solve different types of Sudoku puzzles, including the standard 9×9, mini Sudoku, and 16×16 variants. We begin by introducing the basic structure and rules of the game, followed by a comparison between heuristic and backtracking-based approaches. The study then focuses on detailed implementations of backtracking algorithms, specifically Depth-First Search (DFS) and Dancing Links (DLX). We conclude that Dancing Links provides the most efficient and flexible solution due to the use of a linked-list data structure, which allows for rapid constraint removal and restoration during the search process.**