Backtracking

General Method

Backtracking is an algorithmic strategy that is used to solve optimization problems and decision-making problems. It is a general algorithmic technique that explores all possible solutions by incrementally building candidates to the solutions and backtracks as soon as it determines that a particular candidate cannot possibly be a solution.

The basic idea behind backtracking is to start with an empty solution and to recursively build up a solution, one component at a time, while maintaining a list of candidate components. At each stage, the algorithm chooses a candidate component, adds it to the solution, and recursively explores the remaining candidates. If the algorithm finds that the current candidate cannot be part of a solution, it backtracks, removes the candidate from the solution, and tries the next candidate. The algorithm continues to backtrack until it has explored all possible solutions.

Backtracking can be visualized as a tree structure where the root node represents an empty solution, and each child node represents a possible extension to the current solution. Each path from the root node to a leaf node represents a complete solution.