

Backtracking



- **backtracking:** Finding solution(s) by trying partial solutions and then abandoning them if they are not suitable.
 - a "brute force" algorithmic technique (tries all paths)
 - often implemented recursively

Applications:

- producing all permutations of a set of values
- parsing languages
- games: anagrams, crosswords, word jumbles, 8 queens
- combinatorics and logic programming
- escaping from a maze

Backtracking



A general pseudo-code algorithm for backtracking:

function **Search** (*decisions*):

- If there are decisions left to make:
 - // Let's handle one decision ourselves, and the rest by recursion.
 - For each available choice *C* for this decision:
 - Choose *C*.
 - Search the remaining decisions that could follow *C*.
 - Un-choose *C*. (*backtrack!*)
 - Otherwise, if there are no more decisions to make: Stop.
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- Key tasks:
 - Figure out appropriate smallest unit of work (decision).
 - Figure out how to enumerate all possible choices/options for it.