Universidade Federal de Ouro Preto
Lecture Notes
Backtracking

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1 Backtracking

Algorithm 1 Backtracking Algorithm

1: **function** BACKTRACKING(problem)
2:     **if** ISSOLUTION(problem) **then**
3:         **return** problem   ▷ Found a solution
4:     **for all** option **in** GENERATEOPTIONS(problem) **do**
5:         **if** ISVALID(option) **then**
6:             APPLYOPTION(option)
7:             result ← BACKTRACKING(problem)
8:             **if** result ≠ **None then**
9:                 **return** result   ▷ Found a solution
10:            UNDOOPTION(option)   ▷ Backtrack
11:    **return None**   ▷ No solution found

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2 Sudoku

Algorithm 2 Sudoku Backtracking Algorithm

1: **function** SOLVESUDOKU(board)
2:     **if** ISBOARDCOMPLETE(board) **then**
3:         **return** board   ▷ Found a solution
4:     row, col ← FINDEMPTYCELL(board)
5:     **for** *num* **in** [1, 2, 3, 4, 5, 6, 7, 8, 9] **do**
6:         **if** ISVALIDMOVE(board, row, col, num) **then**
7:             board[row][col] ← num
8:             result ← SOLVESUDOKU(board)
9:             **if** result ≠ **None then**
10:                **return** result   ▷ Found a solution
11:            board[row][col] ← 0   ▷ Backtrack
12:    **return None**   ▷ No solution found