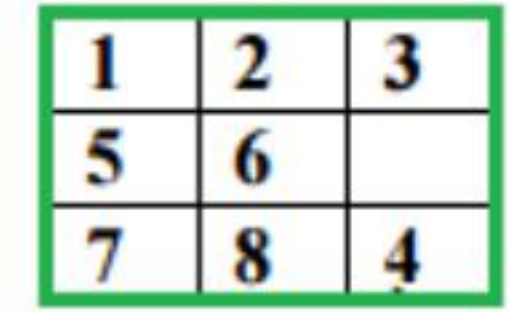
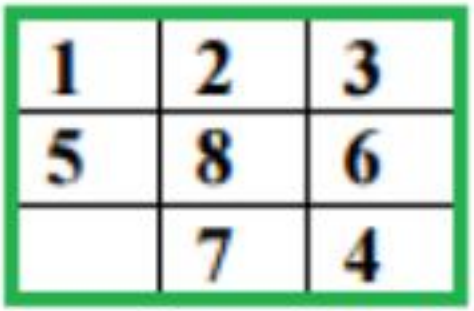
Informed Searches

8 puzzle

Initial state



Goal State



A 3 by 3 board with 8 tiles (each tile has a number from 1 to 8) and a single empty space is provided. The goal is to use the vacant space to arrange the numbers on the tiles such that they match the final arrangement.

8 Puzzle using A*
(Finding the best move)

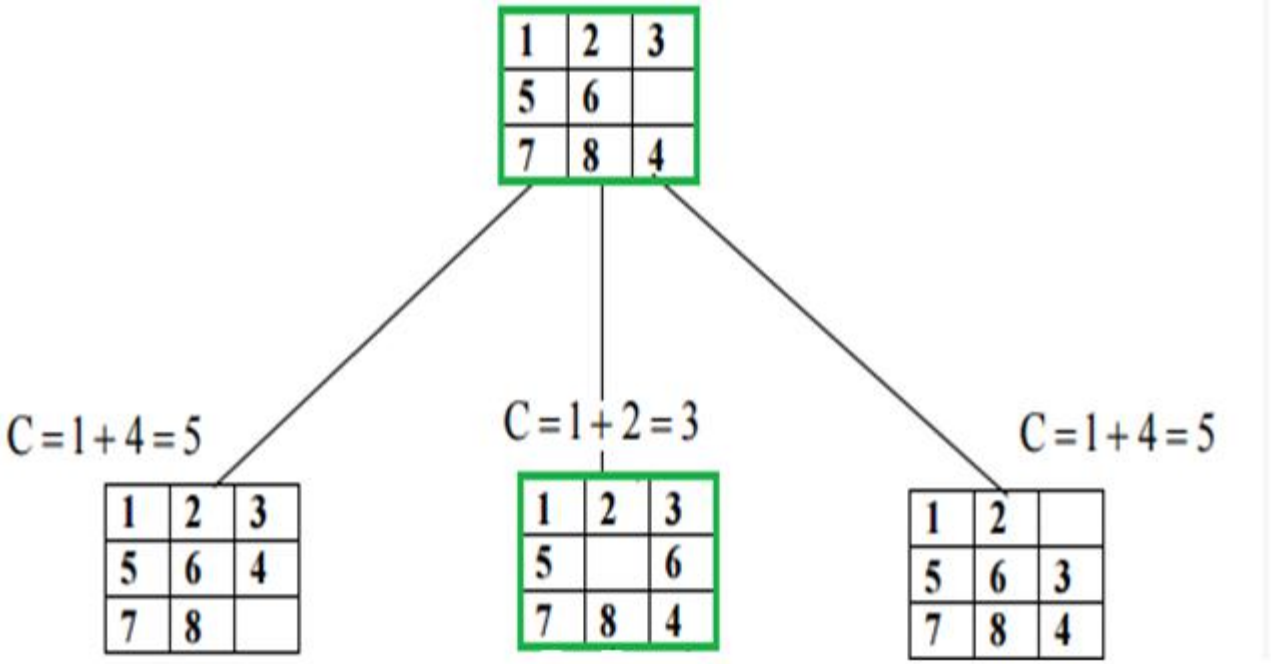
The formula to calculate cost function (f-score) is,

- cost(c) = g-score +h-score
- g-score: total nodes traversed from the start node to the current node.(the path's total length from the root).
- h-score: estimated distance from the current node to the goal node.(the amount of the non-blank tiles which are not in their final goal position (misplaced tiles)).
- In the 8-puzzle problem, the h-score is defined as the count of misplaced tiles while comparing the goal and current state **or** the summation of the Manhattan distance between the misplaced nodes.

Manhattan distance

- The distance between the tiles is measured along with the axes of the right angle. Manhattan distance is the sum of the absolute value of the difference between the current state(l,m) and goal state (I,j) coordinates, i.e. |i-l|+|j-m|.

8 puzzle



Use misplaced tile count as h-score and every level path cost is 1. In above g=1.

Only nodes with the lowest cost function value are extended.

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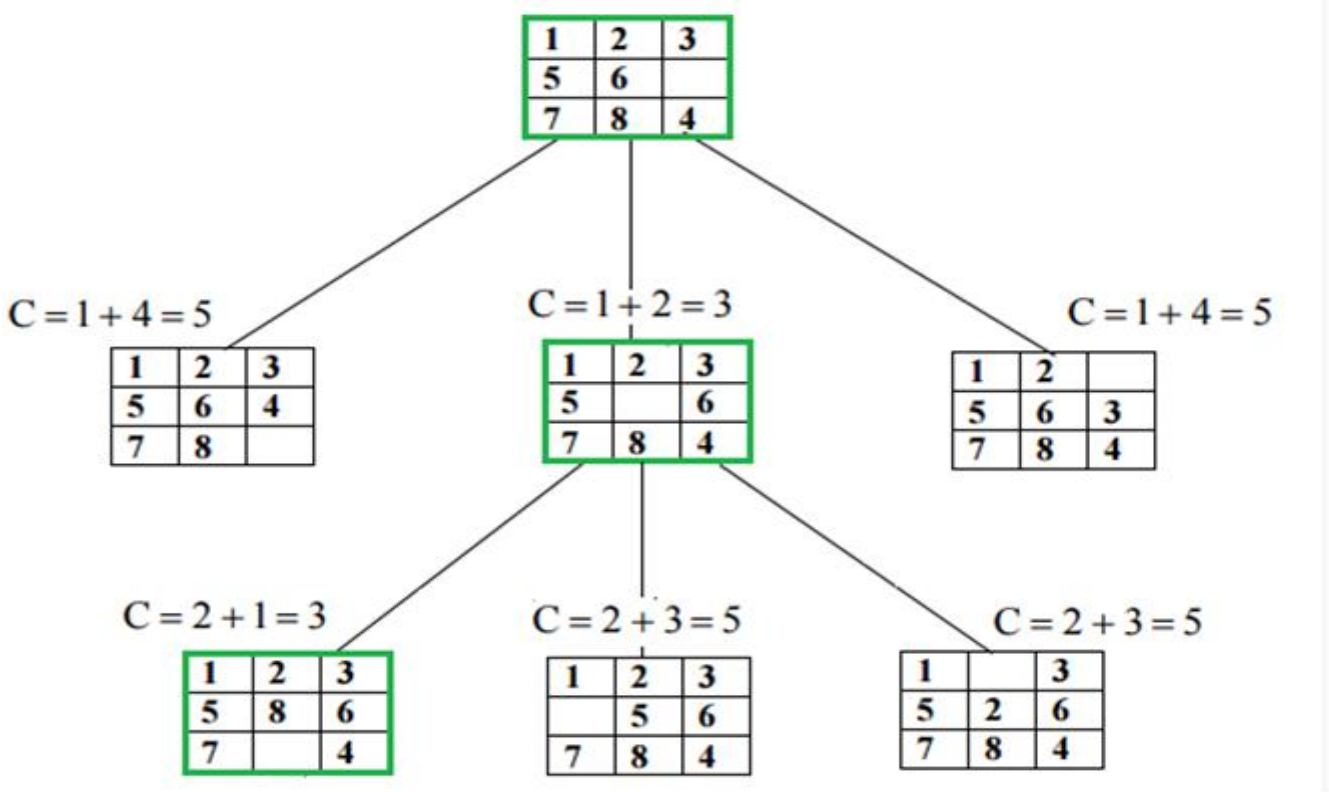
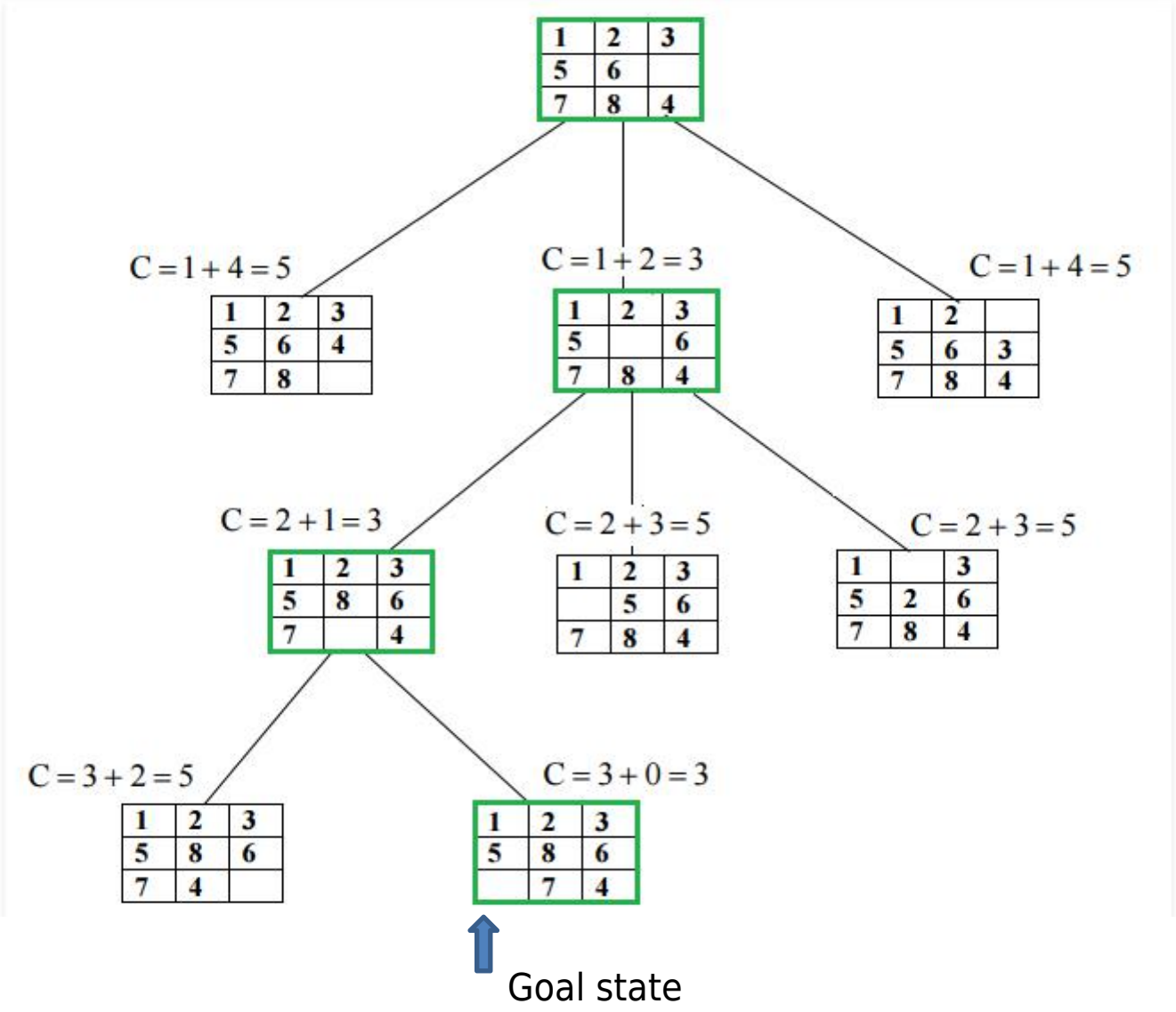


- In above g=2. Try moving 6 to the left side, so that c=2+3=5.

8 puzzle



Best moves are marked in green

TO do