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To solve the 3x3 slide puzzle, we must understand what is the technique to solve it efficiently under minimum moves. The main idea to solution is to reduce the dimensional of slide puzzle. For instance, a 3x3 slide puzzle can reduce its dimensional into 3x2 slide puzzle by solving the furthest row or column away from the empty tile. Below is the example figure.

1	2	3
4	5	6
7	8	Empty Tile

Note that, by solving the furthest row (red) would be more suitable than the furthest column (yellow) in number slide puzzle. After 3x2 slide puzzle is obtained, we will repeat the same technique by solving the furthest row or column.

The full solution based on the assigned starting position to goal state is generated at figure below by using the Iterative Deepening A\* Search.

Description:

(No.) = Order of search

$f(n)$  = Evaluation function / Total cost for minimum moves

$g(n)$  = Stepped cost / Cost of moving away from initial state

$h(n)$  = Weighted cost of moving distance of each slide away from their goal position

Weighted cost,  $h(n)$

$h(n) = 1$  , for tile 1, 2, 3, 4, 5

$h(n) = 2$ , for tile 6, 7, 8

For  $h(n)$ , the weighted cost for each tile is different. Let the furthest row to be 6, 7, 8, we will solve the specified row in advance with a higher weightage than other tiles.

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The following matrix will show 3x3 slide puzzle with their respective  $f(n)$  at bottom right.

$f(n)$  in red indicates rejected path,  $f(n)$  in green indicates accepted path.

