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Row/Column Eight-Puzzle Heuristic

My heuristic calculates a value based on the row and column the tiles are in. I check several conditions and assign a numeric value to each one. Playing with different weights for each condition, I found that using the triangular number sequence produced good results. My conditions are as follows.

1. If the current row is off by more than one, AND the current column is also off by more than one (i.e., the tile is in the opposite corner of where it should be), then we add 15 to the H value.
2. If the row is off by one, AND the column is off by more than one (or vice versa), then we add 10 to the H value.
3. If the row AND column are both off by one, then we add 6 to the H value.
4. If either the row OR column is off by more than one, then we add 3 to the H value.
5. If either the row OR column is off by one, then we add 1 to the H value.

This heuristic is not admissible, but it out-performs Manhattan in most cases. On the next page are my test results between Manhattan and my heuristic for two of the hardest Eight-Puzzles (minimum 31 moves).

8 6 7

2 5 4

3 \_ 1

**Manhattan**

Search time: 80 ms

Nodes expanded: 8,179

**Row/Column**

Search time: 3 ms

Nodes expanded: 160

6 4 7

8 5 \_

3 2 1

**Manhattan**

Search time: 70 ms

Nodes expanded: 9,695

**Row/Column**

Search time: 3 ms

Nodes expanded: 159