Connor Musick
Miranda Hampton

Homework 3

For assignment 3, we were asked to create an A* algorithm that solved an 8-puzzle using two heuristics, number of misplaced tiles and Manhattan Distance.

The misplaced tiles algorithm counted the number of tiles that out of place in the current puzzle and the program would decide based on that number. It would check all possible directions the blank space could go in and move in the direction that had the least. However, the problem with this heuristic is that program is a recursive approach so if two directions have the same number of misplaced tiles (i.e. UP and DOWN both have 6 misplaced tiles), the algorithm will chose the first option and will explore that tree until it reaches a inconclusive result. This can lead to large number of turns to solve the puzzle if it takes the wrong path initially.

The Manhattan distance heuristic worked much better because there is much less of chance that the problem that Misplaced Tiles has. This is because Manhattan distance calculates how far each tile is from where it should go and sums it up.

Since Manhattan distance works so well, we could not come up with any more heuristics that would be more efficient.

To wrap it up, the Manhattan distance has a better search efficiency than Misplaced Tiles and barely has to backtrack.