DA221 : Introduction to AI

**Experimenting with Heuristic Search using 8-puzzle**

horizontal line

Having identified solvable instances by checking inversions of the 8-puzzle, the A\* - algorithm is expected to record the following vital parameters:

* The total running time in seconds
* Length of the solution (Total number of steps)
* Total number of nodes removed from frontier.

Other than the instance given as an example, we will be considering 10 instances(having a common goal state). Following are the instances:

* Instance-1 : **[1, 2, 3, 4, 5, 6, 7, 0, 8]**
* Instance-2 : **[1, 2, 3, 0, 4, 5, 7, 8, 6]**
* Instance-3 : **[1, 2, 0, 4, 5, 3, 7, 8, 6]**
* Instance-4 : **[1, 0, 3, 4, 2, 5, 7, 8, 6]**
* Instance-5 : **[1, 2, 3, 7, 0, 5, 4, 8, 6]**
* Instance-6 : **[1, 2, 3, 4, 5, 0, 7, 8, 6]**
* Instance-7 : **[1, 2, 3, 4, 5, 6, 7, 0, 8]**
* Instance-8 : **[1, 2, 3, 0, 5, 6, 4, 7, 8]**
* Instance-9 : **[1, 2, 3, 4, 5, 8, 0, 7, 6]**
* Instance-10 : **[1, 3, 0, 4, 2, 5, 7, 8, 6]**

**HEURISTICS IMPLEMENTED :**

* **Missing Tiles/ Misplaced Tiles :** The misplaced tile strategy is a very trivial heuristic that is used on the 8-puzzle problem. In this strategy, the numbers of the misplaced tiles, basically the tiles that are not in their goal positions are counted.
* **Manhattan Distance :** In this the priority is determined by summing the absolute distance or the total number of moves to be made by a tile to reach the goal state in an empty matrix of all tiles.
* **Euclidean Distance** : In this the priority is calculated by calculating for square root of sum of squares of differences of rows and columns of the present state and goal state.