AI - Assignment 4

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Performance of the solvers and the heuristics

Greedy Search				
Puzzle Configuration	**Heuristic**	**Visited nodes**	**Time**	**Path cost**
1	Manhattan Dist	263	0.01398388000234263s	16
2		521	0.04170002799946815s	67
3		77	0.0023860439978307113s	22
1	Misplaced Tiles	499	0.03580048900039401s	38
2		59	0.002181595002184622s	29
3		49	0.0019182040050509386s	16

A Star Search				
Puzzle Configuration	**Heuristic**	**Visited nodes**	**Time**	**Path cost**
1	Manhattan Dist	579	0.03522218899888685s	16
2		7499	1.3501651850019698s	29
3		101	0.0031376449987874366s	14
1	Misplaced Tiles	999	0.07110121399455238s	16
2		189573	1828.1700956780041s	29
3		309	0.014914504994521849s	14

When is A* complete ?

A* is complete when the heuristics are admissible and monotonic. In the given problem, the path cost increase as the node expands so it is monotonic and the path cost estimated by the heuristics at n is always less than or equal to actual path cost so it is admissible.

When does A* end the search process ?

A* ends the search process once it reaches the first solution, where h_score(goal) = 0 and its f_score will be equal to g_score (path cost). all other nodes f_score will be higher than this one. Even if we continued to search for other possible solutions, it won’t be as optimal as the first one (path cost will be higher).