Heuristic Functions

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Heuristics for 8-puzzle 8数码难题的启发式

- To find shortest solutions by using A* , need a heuristic function that are two commonly used candidates.

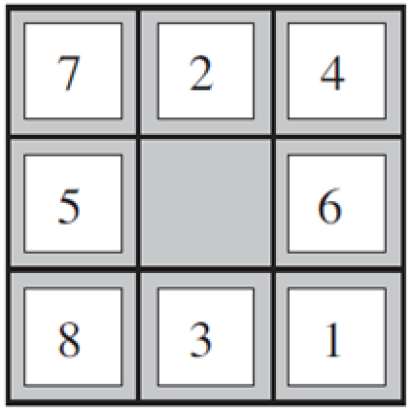
要用A*算法找到最短距离的解，需要一个启发式函数，通常有两个候选。

h_1 = *number of misplaced tiles* = 8.

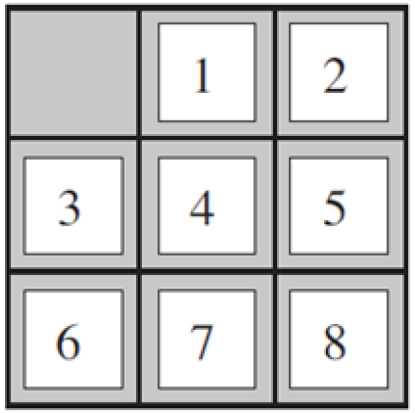
错位棋子的个数

h_2 = *total Manhattan distance* (*tiles from desired locations*) = 3+1+2+2+2+3+3+2 = 18

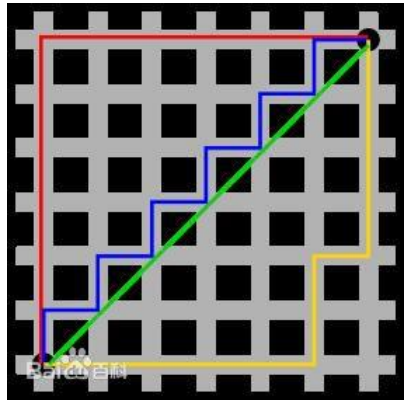
曼哈顿距离之和（每个棋子到目标位置）



Start state



Goal state



Manhattan distance

Search Cost 搜索代价

Search Cost (nodes generated)

d (depth)	Iterative Deepening Search	A*(h_1)	A*(h_2)
2	10	6	6
4	112	13	12
6	680	20	18
8	6384	39	25
10	47127	93	39
12	3644035	227	73
14	-	539	113
16	-	1301	211
18	-	3056	363
20	-	7276	676
22	-	18094	1219
24	-	39135	1641

- If $h_2(n) \geq h_1(n)$ for all n, then h_2 dominates h_1 and is better for search.

  若对于所有的n，$h_2(n) \geq h_1(n)$，则h_2 优于h_1，因而h_2更适合搜索。

Thank you for your attention!