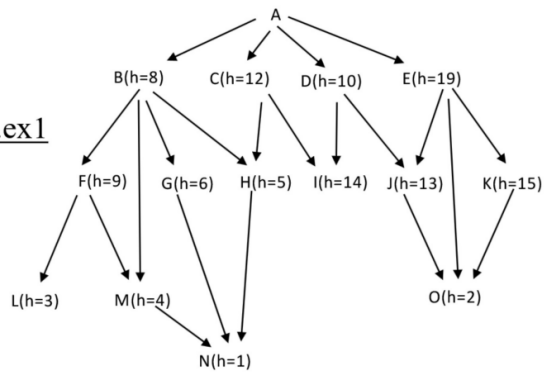
3.45J Exercise Question

Topic 3: Exercise Questions

1. "Hand run" the **greedy best-first** algorithm starting from node ***A*** in the graph of Fig.ex1, where the heuristic measure of the cost for each node is given as *h*. Write down the nodes being visited in order until it finds the target node ***O.***

Fig.ex1



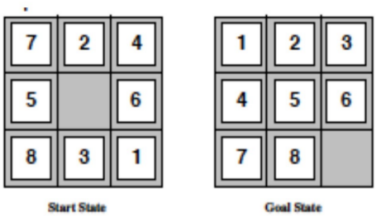


Fig.ex3

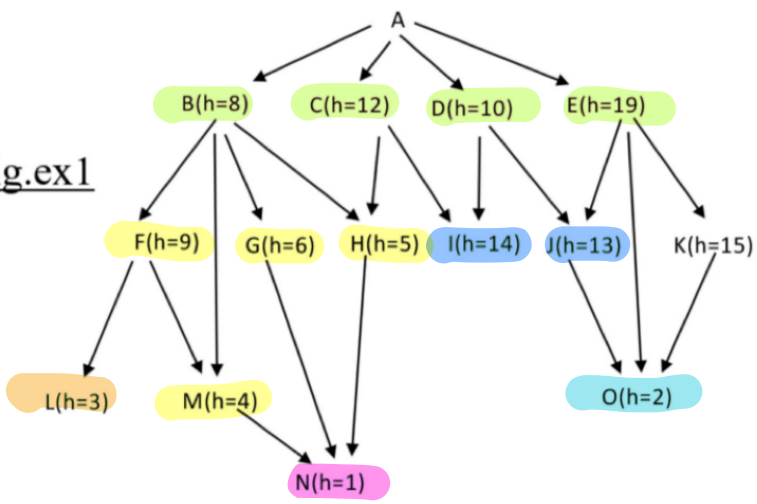
2. Sometimes there is no good evaluation function for a problem, but there is a good comparison method: a way to tell if one node is better than another, without assigning them numerical values. Is this enough to do a best-first search?

3. Work out two heuristics $h_1(n)$, and $h_2(n)$ for an 8-puzzle problem at a state n, and goal state G as shown in Fig.ex3, *where* $h_1(n)$=number of misplaced tiles, and $h_2(n)$ = total Manhattan distance, respectively.

Q1 greedy best first

Solution

Fig.ex1



	Open	Close
0	A	
1	B8 D10 C12 E19	A
2	M4 H5 G6 F9 D10 C12 E19	B8 A
3	N1 H5 G6 F9 D10 C12 E19	M4 B8 A
4	H5 G6 F9 D10 C12 E19	N1 M4 B8 A
5	G6 F9 D10 C12 E19	H5 N1 M4 B8 A
6	F9 D10 C12 E19	G6 H5 N1 M4 B8 A
7	L3 D10 C12 E19	F9 G6 H5 N1 M4 B8 A
8	D10 C12 E19	L3 F9 G6 H5 N1 M4 B8 A
9	C12 J13 I14 E19	D10 L3 F9 G6 H5 N1 M4 B8 A
10	J13 I14 E19	C12 D10 L3 F9 G6 H5 N1 M4 B8 A
11	(02) I14 E19	J13 C12 D10 L3 F9 G6 H5 N1 M4 B8 A

find the goal

Q2 don't know $f(n)$, know which node is better
can use best first search?

Solution ① As long as we can select the best state from all the states in Open
we can use BF

② Example 迷宫中
无确切地图
目标东边
即使无距离值
也可选更靠东的路

Q3. 8 puzzle

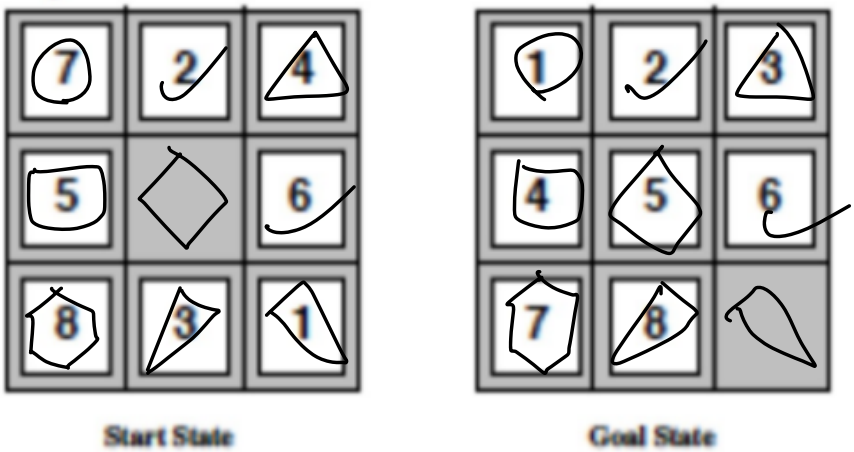


Fig.ex3 6.

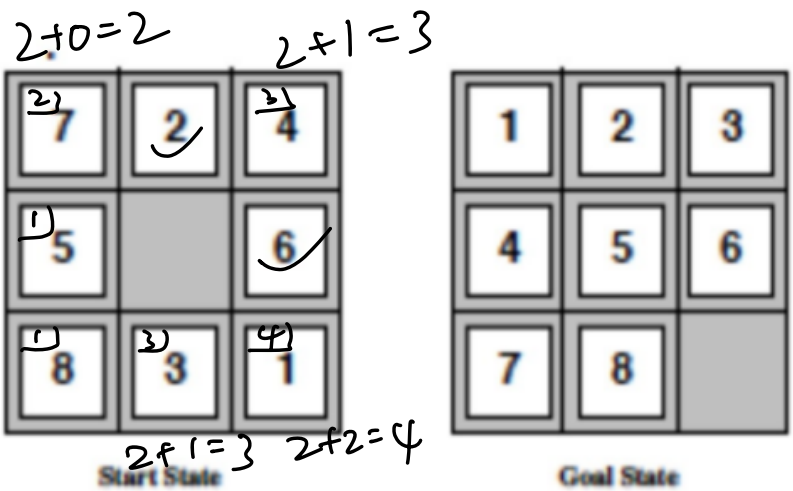


Fig.ex3

2+3+1+1+3+4 = 14

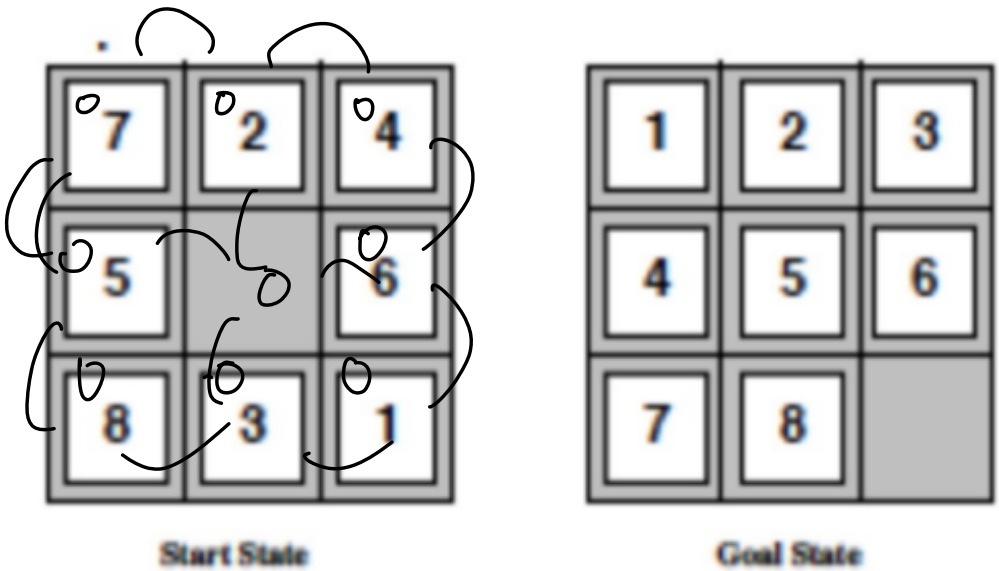


Fig.ex3

翻羽转2倍：2×0=0