

Homework

Solve the 8-puzzle problem with the initial and goal state given below, draw the search tree.

(Define your heuristic function such as "How many numbers are not in its goal state position?" or "How many steps needed for the numbers to move to their correct position" ...etc.)

	•		1	
1	11	10	ctote	١
Ш	ш	tia	I state	,

3	5	7
6		4
2	1	8

Goal state

3	4	5
2		6
1	8	7



f(n)=g(n)+h(n)

*f(n):Fitness Function

*g(n):Cost Function → number of moves

*h(n):Heuristic Function \rightarrow How many numbers are not in its goal state position?

Initial State

3	5	7
6		4
2	1	8



3	4	5
2		6
1	8	7

g(n)=1 level=1	State b 3 5 7 f(b)=8 6 4 h(b)=7 2 1 8	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	State d 3 5 7 f(d)=8 6 4 h(d)=7 2 1 8	$ \frac{\text{State e}}{f(e)=8} $
g(n)=2 level=2	State f 3 5 6 4 7 2 1 8	State g 3 7 $f(g)=9$ 6 5 4 $h(g)=7$ 2 1 8	State h 3 5 7 f(h)=8 2 6 4 h(h)=6 1 8	State i 3 5 f(i)=8 6 1 h(i)=6 2 8
g(n)=3 level=3			State j 3 5 7 $f(j)=8$ 2 6 4 $h(j)=5$ 1 8	$\begin{array}{c cccc} State & & & 3 & 5 \\ \hline f(k)=9 & & 6 & 1 \\ h(k)=6 & & 2 & 8 \\ \hline \end{array}$
g(n)=4 level=4			State 1 3 5 7 f(l)=8 2 4 h(l)=4 1 6 8	



f(n)=	=g((n)	+1	h(n)
1	,	- 51	(11)		υ.	11,

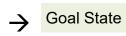
*f(n):Fitness Function

*g(n):Cost Function → number of moves

*h(n):Heuristic Function \rightarrow How many numbers are not in its goal state position?

Initial State

	3	5	7
ate	6		4
	2	1	8



3	4	5
2		6
1	8	7

g(n)=5 level=5	$ \frac{\text{State m}}{f(m)=10} = \frac{3}{2} = \frac{5}{4} $ $ h(m)=5 = \frac{1}{6} = \frac{8}{8} $
g(n)=6 level=6	$ \frac{\text{State n}}{f(n)=11} \begin{array}{c c} 3 & 5 \\ 2 & 4 & 7 \\ h(n)=5 & 1 & 6 & 8 \end{array} $
g(n)=7 level=7	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$
g(n)=8 level=8	State p $f(p)=11$ $f(p)=3$ f



f(n)=g(n)+h	(n)
---------	------	-----

*f(n):Fitness Function

*g(n):Cost Function → number of moves

h(n):Heuristic Function \rightarrow How many numbers are not in its goal state position?

Ini	tial	Sta	ate

	3	5	7
te	6		4
	2	1	8



3	4	5
2		6
1	8	7

g(n)=9 level=9	State q $\frac{3}{f(q)=12}$ $\frac{3}{h(q)=3}$ $\frac{4}{5}$ $\frac{5}{2}$ $\frac{6}{6}$ $\frac{7}{1}$ $\frac{8}{8}$
g(n)=10 level=10	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$
g(n)=11 level=11	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$
g(n)=12 level=12	$ \frac{\text{State t}}{f(t)=12} \begin{array}{c c} 3 & 4 & 5 \\ 2 & 6 \\ h(n)=0 & 1 & 8 & 7 \end{array} $