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.)

Initial 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 →How many numbers are not in its goal state position?

Initial State

3	5	7
6		4
2	1	8

→ Goal State

3	4	5
2		6
1	8	7

g(n)=1, level=1

State b
f(b)=8
h(b)=7

3	5	7
6	4	
2	1	8

State c
f(c)=8
h(c)=7

3		7
6	5	4
2	1	8

State d
f(d)=8
h(d)=7

3	5	7
	6	4
2	1	8

State e
f(e)=8
h(e)=7

3	5	7
6	1	4
2		8

g(n)=2, level=2

State f
f(f)=9
h(f)=7

3	5	
6	4	7
2	1	8

State g
f(g)=9
h(g)=7

3	7	
6	5	4
2	1	8

State h
f(h)=8
h(h)=6

3	5	7
2	6	4
	1	8

State i
f(i)=8
h(i)=6

3	5	7
6	1	4
2	8	

g(n)=3, level=3

State j
f(j)=8
h(j)=5

3	5	7
2	6	4
1		8

State k
f(k)=9
h(k)=6

3	5	7
6	1	
2	8	4

g(n)=4, level=4

State l
f(l)=8
h(l)=4

3	5	7
2		4
1	6	8

f(n)=g(n)+h(n)
*f(n):Fitness Function
*g(n):Cost Function →number of moves
*h(n):Heuristic Function →How many numbers are not in its goal state position?

Initial State

3	5	7
6		4
2	1	8

→ Goal State

3	4	5
2		6
1	8	7

g(n)=5
level=5

State m
f(m)=10
h(m)=5

3	5	7
2	4	
1	6	8

g(n)=6
level=6

State n
f(n)=11
h(n)=5

3	5	
2	4	7
1	6	8

g(n)=7
level=7

State o
f(o)=11
h(o)=4

3		5
2	4	7
1	6	8

g(n)=8
level=8

State p
f(p)=11
h(p)=3

3	4	5
2		7
1	6	8

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

*f(n):Fitness Function

*g(n):Cost Function →number of moves

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

Initial State

3	5	7
6		4
2	1	8

→ Goal State

3	4	5
2		6
1	8	7

g(n)=9
level=9

State q
f(q)=12
h(q)=3

3	4	5
2	6	7
1		8

g(n)=10
level=10

State r
f(r)=12
h(r)=2

3	4	5
2	6	7
1	8	

g(n)=11
level=11

State s
f(s)=12
h(s)=1

3	4	5
2	6	
1	8	7

g(n)=12
level=12

State t
f(t)=12
h(n)=0

3	4	5
2		6
1	8	7