

```
1 def h(state):
2     res = 0
3     for i in range(1, 9):
4         if state.index(i) != target.index(i):
5             res += 1
6     return res
7
8
9 def gen(state, m, b):
10    temp=state[:]
11    if m == "l":
12        temp[b], temp[b - 1] = temp[b - 1], temp[b]
13    if m == "r":
14        temp[b], temp[b + 1] = temp[b + 1], temp[b]
15    if m == "u":
16        temp[b], temp[b - 3] = temp[b - 3], temp[b]
17    if m == "d":
18        temp[b], temp[b + 3] = temp[b + 3], temp[b]
19    return temp
20
21
22 def possible_moves(state, visited_states):
23     b = state.index(-1)
24     d = []
25     pos_moves = []
26     if b <= 5:
27         d.append("d")
28     if b >= 3:
29         d.append("u")
30     if b % 3 > 0:
31         d.append("l")
32     if b % 3 < 2:
33         d.append("r")
34     for i in d:
35         temp = gen(state, i, b)
36         if not temp in visited_states:
37             pos_moves.append(temp)
38     return pos_moves
39
40
41 def search(src, target, visited_states, g):
42     if src == target:
43         return visited_states
44     visited_states.append(src),
45     adj = possible_moves(src, visited_states)
46     scores = []
47     selected_moves = []
48     for move in adj:
49         scores.append(h(move) + g)
50     min_score = min(scores)
51     for i in range(len(adj)):
52         if scores[i] == min_score:
53             selected_moves.append(adj[i])
54     for move in selected_moves:
55         if search(move, target, visited_states, g + 1):
56             return visited_states
57     return 0
58
59
60 def solve(src, target):
61     visited_states = []
62     res = search(src, target, visited_states, 0)
63
64     if type(res) != type(int()):
65         i = 0
66         for state in res:
67             display(state)
68             i += 1
69         display(target)
70         print("Total moves made: ", i + 1)
71
72
73 def display(state):
74     for i in range(9):
75         if i % 3 == 0:
76             print()
77         if state[i] == -1:
78             print(state[i], end=" ")
79         else:
80             print(state[i], end=" ")
81     print(end="\n")
82
83
84 # define source and target states
85 src = [1, 2, 3, -1, 4, 5, 6, 7, 8]
86 target = [1, 2, 3, 4, 5, -1, 6, 7, 8]
87
88 print("A* method to solve 8 Puzzle")
89
90 print("Source State: ")
91 display(src)
92 print("Target State: ")
93 display(target)
94 print("Solving using A*: ")
95
96 solve(src, target)
```

× Terminal

A* method to solve 8 Puzzle

Source State:

1	2	3
-1	4	5
6	7	8

Target State:

1	2	3
4	5	-1
6	7	8

Solving using A*:

1	2	3
-1	4	5
6	7	8

1	2	3
4	-1	5
6	7	8

1	2	3
4	5	-1
6	7	8

Total moves made: 3

Process finished.