AI Lab 1

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Program-1 8-Puzzle using A*

```
def astar(src, target)
    state = [src]
    g = 0
    visited_states = set()
    while len(states):
        print(f"level: {g}")
        moves = []
        for state in states:
            visited = states.add(tuple(state))
            print_grid(state)
            if (state == target):
                print("Success")
                return
        moves += [move for move in feasible_moves(state, visited_states)]
    costs = [g+h(move, target) for move in moves]
    states = [moves[i] for i in range(len(moves)) if costs[i] == min(costs)]
    g += 1
print("Fail")
```

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#(Manhattan distance)

~~def fn~~

```
def h(state, target)
    dist = 0
    for i in state:
        d1, d2 = state.index(i), target.index(i)
        x1, y1 = d1%3, d1//3
        x2, y2 = d2%3, d2//3
        dist += abs(x1-x2) + abs(y1-y2)
    return dist
```