

## Programming Project 1

Solving the 8-puzzle using A\* algorithm

Note: You can work alone or in a team of TWO max

---

You are to implement A\* search algorithm and apply it to 8-puzzle problem, using any language of your preference.

In addition to coding of A\* algorithm, provide state space representation, operators, g (cost) and two heuristic functions of the 8-puzzle problem. Your program should accept initial and goal states from user and will compute the best path as output.

You will turn in the following as **hard copy directly to me in the class**:

- A report describing 8-puzzle problem formulation, program structure, global variables, functions and procedures, etc.
- Sample input/output of at least four cases
  - For each input/output sample, for each heuristic report the following: (1) The solution path from initial state to goal state (2) the number of nodes generated, and (3) the number of nodes expanded.
  - Also summarize the results in a table
- Source code (with necessary inline documentation).

Sample input:

Initial state:	Goal State:
1 2 3	1 2 3
7 4 5	8 6 4
6 8 0	7 5 0
Initial state:	Goal State:
2 8 1	3 2 1
3 4 6	8 0 4
7 5 0	7 5 6

In addition, each student should **upload** everything (e.g. report, code, etc.) to **Canvas**.

**Warning:** Any form of cheating will subject you to severe disciplinary act.