

## Topic: 8-Puzzle Games

### Description

In this assignment, you are required to develop a software application or website (a localhost implementation is acceptable) that allows users to upload an image. Your program should process the uploaded image and convert it into a playable 8-puzzle game format. Additionally, you must provide an option to shuffle the puzzle as well as an option to directly display the optimal solution step-by-step. You are expected to test your program from a user's perspective, addressing and resolving any issues to ensure smooth and logical interaction. The image below shows a common 8-puzzle game. You need to transform the given scrambled configuration into the correct placement.



For ease of implementation on a computer, we have simplified the above puzzles into numbers and saved them as the matrix below. Specifically, you may choose to represent the blank space as either 0 or 9.

	2	4	1	2	3	
6	1	3	4	5	6	
7	8	5	7	8		

### Requirement

1. Core algorithm: A\* algorithm is required (60 points). You may choose any rational heuristic (need to explain in a report) by yourself. You can deploy multiple algorithms, such as BFS & DFS, to help user understand their differences.
2. A user-friendly interface. (40 points)
3. Extra points (20 at most). You may freely add additional, reasonable features to your software or website. The grader will evaluate your implementation and assign extra points based on its performance.

### Deliverable

1. A short report/README to explain your assignment. (PDF format)
2. An executable source code.
3. Put all files into one folder and compress this folder to submit.