CSE 402: Offline Assignment 1

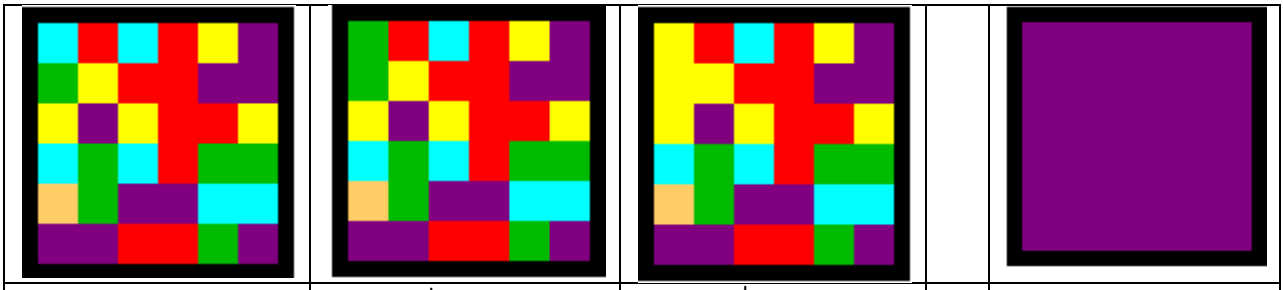
SOLVING "FLOOD-IT" USING A* SEARCH

In this assignment you will have to solve the game "Flood-It" using A* search.

The Problem

Flood-It is a computer game played by millions the world over. The object is to turn a board full of colored squares into one single color in minimum number of 'flood-filling' moves. Each move changes the color of the top-left square and all of the same colored squares, connected to it. It is easy to play, yet challenging, great fun and addictive. Solving Flood-It is an NP-Hard problem. The game can be played online:

1. http://www.lemoda.net/javascript/flood-it/game.html
2. http://unixpapa.com/floodit/?sz=14&nc=6



Initial State	1st move	2nd move	…	Goal State

A* Search

Refer to the slide provided in class.

The tasks

1. You have to design **at least** two different heuristics for the problem. One of them should be admissible. Your heuristics should not take more than 10, 17, and 25 steps for 6*6, 10*10, and, 14*14 boards, respectively. The number of colors is fixed to six.

2. You will have to implement A* search to solve the problem, and implement both of the heuristics. Bonus will be given if GUI is implemented. Refer to the template files given for implementation details.

3. You have to write a short report (Max 1-1.5 page, hard copy), discussing the admissibility and the comparative performance (optimality and runtime) of your proposed heuristics.

Input File Format

The input file contains a series of inputs. First line contains the board size *n*. Next *n* line contains *n* integer each, i.e., the *n***n* board. The colors are represented by integers *1* to *n*. The file ends with a zero as board size. Refer to *input.txt* for sample inputs.

Output Format

Output will be shown in console in the following format:

Number of moves: x
Next there will be x integers showing the chosen color in each move.
Next Print the (x+1) Boards sequentially, starting from initial state to goal state.
Bonus will be given for implementing GUI.

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