CSC 339

Fall 2016

Programming Assignment 1

# Model the Puzzle

Consider the Back2Back Puzzle described in the syllabus. You will, in the next assignment, be asked to program a particular style of solver for it. For this assignment, you have some programming and some problem solving.

# Programming

Design and implement a data structure for the program itself, produce a (possibly crude) GUI or command line interface for sanity checks, write methods or procedures that place pieces on the board, and return an error condition or raise an exception if the user attempts to place a piece in an invalid position.

The GUI or text interface could be very simple—perhaps just a character or numeral to distinguish the colors and whether the piece is entering from the front or back. The interface should provide views from the front (obverse) and back (reverse) sides.

The interface should include methods or functions that model:

* Clearing the board
* Placing a piece on the board
  + From either side
  + In any of the 4 possible rotations
* As noted above, report an error if the user attempts to place the piece in an invalid position—for example,
  + Off the edge
  + Overlap in a way that the puzzle does not allow
* The puzzle does allow overlaps in some cases (see instructions), and your code should allow this

# Problem Solving

Come up with at least one *heuristic* for the puzzle, and explain both the heuristic and why you believe that that heuristic is *admissible*. A heuristic, in this context, is NOT an algorithm. It is an approximation of the number of steps to the solved state. Read the book, about and before the discussion of the A\* algorithm.

# To hand in:

* A description in English of your data structure [20 points];
* code for the data structures (upload to Moodle) [40 points];
* at least two examples of the GUI or command-line output [20 points];
* your heuristic, clearly described and justified, including an argument that it is admissible [10 points];
* and a statement of what you learned from this assignment [10 points].

Note: You may be asked to demonstrate your code to the instructor at a later date. (If so, I will contact you by email within one week of the submission to arrange for this.)