**Department of Electrical & Computer Engineering (ECE)**

**Concordia University**

## APPLIED EVOLUTIONARY & LEARNING ALGORITHMS

### **COEN 432/6321: Fall 22/23**

**Assignment 1: The Puzzle (due date: 12 Oct @ 23hr55, via Moodle)**

**Goal**

Your program must attempt to solve an 8x8 square puzzle containing 64 square pieces. The puzzle pieces are provided in an input file. The input file is 64 pieces in a random arrangement, with eight 4-digit numbers per line (for a total of 8 lines).

**Representation**

The are 64 pieces in the puzzle, arranged in an 8x8 square. Each tile has 4 edges and is represented with 4 numbers. Each number represent the motif and there are a total of 7 motifs. The first number represents the top edge, the second number represents the right edge, the third number represents the bottom edge, and the fourth number represents the left edge.

**Submission**

You must submit a ZIP file that includes an output file containing your best result and a folder with your program. Name you ZIP file exactly “Assignment1”. ONLY SUBMIT ONE ZIP FILE PER TEAM.

The output file needs to be a .txt file with the names and IDs of all team members on the first line followed by your best solution (8 pieces per line, same as the input file). Make sure to not have empty spaces at the end of each line or an empty line at the end of the file. The only difference between the input file and the output file is the extra line at the beginning with your names and IDs (for a total of 9 lines). The file needs to be titled exactly “Ass1Output”. Only submit one output file. I will pass the output file through the code posted on Moodle. You need to make sure that the file can be read by the code, or your assignment will not be graded. The code simply reads the input file and counts the number of mismatching edges. The only thing you need to change in the file is the string file path. To test your solution in C++, create a new project and add the cpp to your project. Replace C:/Users/ankit/Documents/Ass1Outputs/Ass1Output.txt on line 16 by the path of your output file. To test your solution in java, create a project with a package named Ass1 and place the file under the package. Replace C:/Users/ankit/Documents/Ass1Outputs/Ass1Output.txt on line 38 by the path of your output file.

The program must be in C++ (preferable) or Java. Also place the names and IDs of all team members on the first line of each file (commented). The program must read an input file named “Ass1Input”, try to solve the 8x8 puzzle and produce an output file in the format mentioned above. If the submission is in C++, you must submit your cpp and header files. Include them in a single folder named “Ass1C++”. If the submission is in Java, include all your .java files in a folder called “Ass1Java”.

**Grading**

The submitted program will count for 70% of this assignment’s grade and the submitted output file with your best solution will count for 30%.

To grade the program, I will run a second input file and see if your program can produce an output that improves the solution. I will also look at the way you get to the solution (mutation, crossover, selection, etc.). For the output file, I will compare your results with those of your classmates.

Up to 1 day delay in submission => 20% off mark; > 1 day delay => 100% off.

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