THE UNIVERSITY OF HONG KONG
Department of Computer Science
COMP3270 Artificial Intelligence
Assignment 1

Due Date: Midnight, Sun, Oct 4, 2020 (i.e. Oct 5, 2020, 0:00)

1. Write programs to solve the 8-puzzle problem using

   (a) Iterative Deepening search up to one million nodes expanded, or when a goal node is reached.

   (b) A^* search using the two different heuristics mentioned in the book, i.e. number of misplaced tile, and sum of Manhattan distances.

   You should also report the number of *moves* used in each search method and the paths found.

   Your program should get input from keyboard (or by input redirection) a list of 9 numbers, the first number will be the first tile in the first row, the second number the second tile in the first row, the fourth number the first tile in the second row $\cdots$. Input 0 for the empty tile.

   Use the initial and goal states as in fig 28, p.24 of lecture notes of chapter 4.

   You can use either C++, Java or Python for programming. Discuss with the tutor if you want to use other programming languages.

2. The **missionary** and **cannibals** problem: Three missionaries and three cannibals are on one side of the river, along with a boat that can hold one or two people. Find a way to get everyone to the other side without ever leaving a group of missionaries in one place outnumbered by the cannibals in that place.

   Formulate the problem as a state-space search problem, and solve the problem by a suitable searching strategy, using either C++, Java or Python implementation, and report the path found.