THE UNIVERSITY OF HONG KONG
Department of Computer Science
COMP3270B Artificial Intelligence
Assignment 1

Due Date: Midnight, Sun, Feb 26, 2023 (i.e. Feb 27, 2023, 0:00)

1. Write Python 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 report the number of nodes expanded, 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 start and goal states as in fig 3.25, p.25 of lecture notes of chapter 4.

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 Python, and report the path found.