Artificial Intelligence: Assignment 2

Due date: February 9 (Wednesday)

Problem 1 (2 points)
Read Chapter 3 of the textbook and identify two important concepts that have not been presented in class. Give a brief description of these concepts and discuss their significance.

Problem 2 (2 points)
Give an example of search space in which iterative deepening performs much worse than depth-first search. You may use an *artificial example,* that is, your space may not correspond to any real problem.

Problem 3 (3 points)
Implement a program that finds an *optimal* solution to the 8-puzzle. It should read an initial state from a given file, and print out a sequence of moves that leads to the goal state, given in Figure 3.4 of the textbook. In addition, it should output the number of nodes in the resulting search tree. You may assume that the puzzle always has a solution, that is, the program does not have to deal with unsolvable states. The format for encoding initial states is as follows:

```
<tile> <tile> <tile>
<tile> <tile> <tile>
<tile> <tile> <tile>
```

Each `<tile>` is a digit from 0 to 8, where 0 marks the blank space, and the other digits are real tiles. For example, the following file encodes the start state from Figure 3.4:

```
5 4 0
6 1 8
7 3 2
```

Problem 4 (3 points)
Suppose that we need a fast algorithm for 8-puzzle, and solution quality is *not* important. Implement a program that quickly finds some solution; the input and output should be the same as in Problem 3.