Artificial Intelligence: Assignment 2

Due date: February 5 (Wednesday)

Problem 1 (4 points)
(a) 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.

(b) Give an example of search space in which depth-first search is likely to take much more time than iterative deepening; again, you may use an artificial example.

Problem 2 (6 points)
Implement a program that solves the 24-puzzle, which is a 5×5 sliding-block puzzle analogous to the 8-puzzle. The program should read a start state from a file, and print out a sequence of moves that leads to the following goal state:

```
01 02 03 04 05
06 07 08 09 10
11 12 13 14 15
16 17 18 19 20
21 22 23 24
```

Your program may return a non-optimal solution; however, if you implement a program that always finds a shortest solution, you will get a bonus. If the puzzle has no solution for a given start state, your program should output an appropriate message. The format for encoding start states is as follows:

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

Each `<tile>` is a two-digit number from 00 to 24, where 00 marks the blank space, and the other numbers are real tiles. For example, the puzzle with the following start state has a ten-move solution:

```
00 07 02 03 05
01 06 08 04 10
11 12 13 09 15
16 17 18 14 19
21 22 23 24 20
```