Artificial Intelligence: Assignment 4

Due date: November 7 (Thursday)

Problem 1 (4 points)
Read Chapters 4 and 5 of the textbook and answer the following questions.

(a) Explain the main differences between puzzle-solving search and game playing.

(b) Argue that game playing is inherently more difficult than solving one-player puzzles.

(c) Take the opposite position and argue that developing efficient techniques for solving puzzles is usually no easier than designing effective strategies for game playing.

Problem 2 (6 points)
The *hexagon game* involves two players, who gradually construct a six-vertex undirected graph with solid and dashed edges. Player 1 adds solid edges, whereas Player 2 uses dashes.

The players begin with a six-vertex graph that has no edges (Figure 1), and add new edges, one by one; Player 1 makes the first move. At each move, a player has to add a new edge between two vertices that are not connected by any old edge. Figure 2 is an example of a mid-game position, where Player 1 has to make the next move.

If Player 1 constructs a solid-line triangle, he loses the game; similarly, a dashed triangle means a loss of Player 2. For example, if the game ends as shown in Figure 3, then Player 2 has lost since he has constructed the dashed triangle "3-5-6."

Implement a program for playing the hexagon game. Your program should prompt the user to enter a player number (1 or 2), and then act as the specified player. For example, if the user enters "1," the program should make the first move.

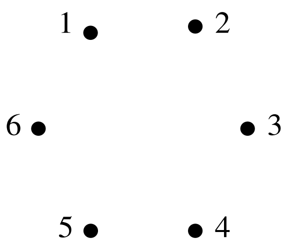

Figure 1: Initial state.

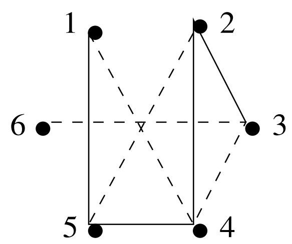

Figure 2: Mid-game position; Player 1 makes the next move.

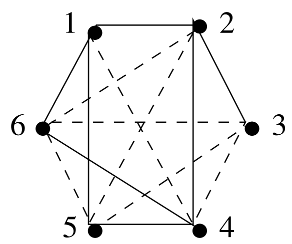

Figure 3: Player 1 has won.