**CS 480 Homework 1**

**Assigned: 30 January 2023   Due: 10 February 2023**

Problems use ideas from the *Russell & Norvig* textbook. These homework problems are to be done individually, not in pairs or other groups. Upload your solution using the Blackboard course page. Please typeset your solutions, except that your Tic-Tac-Toe state graph can be hand drawn.

1. For each of the following activities, give a PEAS description of the task environment (as shown, for example, in Figure 2.4):
   * making an omelet
   * exploring the surface of the moon
2. Give a problem formulation (of the form shown in Section 3.2.1 of your textbook) for the following problems. (Note that you are giving a detailed problem formulation, you are **NOT** finding a solution to the problem.)
   * The Mouse Maze problem: A mouse is at the entrance to a maze. The mouse is hungry. The mouse has reason to believe there is cheese hidden in various parts of the maze. The mouse can move north, south, east or west from any point, except when walls get in the way. The goal is for the mouse to find and eat enough cheese to satisfy its hunger (not necessarily all of the cheese). Be clear about any assumptions you are making.
   * The water pitcher puzzle: Suppose that you are given a 3 quart pitcher and a 4 quart pitcher. Either pitcher can be filled from a faucet. The contents of either pitcher can be poured down a drain. Water may be poured from one pitcher to the other. When pouring, as soon as the pitcher being poured into is full, the pouring stops. There is no additional measuring device and and the pitchers have no markings to show partial quantities. Your goal is to have 2 quarts of water in the 4 quart pitcher.
3. Show a *state space graph* (as shown in Figure 3.2 in your textbook) for the levels 0, 1 and 2 of the game Tic Tac Toe (meaning the levels with 0, 1 and 2 positions on the board filled). Tic Tac Toe boards are symmetrical, so you can reduce the size of your solution by, for example, only showing one state with X in a corner square. Assume that X moves first.