CptS 440 / 540: AI

Fall 2016

Homework #1

Due date: Tuesday, Sept. 20 (by the end of the class)

1. **Problem 1.14 in [AIMA], parts (a – e), g, h, k** (so, eight parts in total). Keep each answer to no more than two crisp, to-the-point sentences.
   (Note: the answers need not always simply be "Yes, because…" or "No, because…". They could be, for example, along the lines of "It depends on…", or "As of year 2016, the existing AI systems can do task X to this extent: …", or similar.)

2. Which of the following properties best describe the Wumpus World environment? Explain your choices briefly. (Make the following assumptions: i) the game progresses in discrete time steps, where a single turn-and-go or a single shoot-the-arrow or other single agent action takes a unit time; ii) upon shooting the arrow, the agent will know whether it was hit-or-miss within the same unit time; iii) when the game is reset, the positions of the gold, the Wumpus and the pits are 'scrambled', i.e., in general the starting configuration may change.)
   a. Fully observable or partially observable.
   b. Single agent or multi-agent.
   c. Deterministic or stochastic.
   d. Episodic or sequential.
   e. Static or dynamic.
   f. Discrete or continuous.
   g. Known or unknown.

3. The Wumpus World game is described on pages 236-240 in the textbook and on the slides for Ch. 2.
   a. Define what it means for an agent to act rationally in the Wumpus World.
   b. How many different 4x4 Wumpus Worlds are there? (Assume that the gold, the monster and the pits can be in any of the squares, other than (1, 1). Assume also, a square can contain either nothing, or exactly one of the gold, the Wumpus or a pit. Assume there are exactly 3 pits, and that the pits are indistinguishable from each other.) Show your work and justify your answer.

4. Consider the task of designing an intelligent software agent to play (= invest in) the stock market for you. Describe the "PEAS": performance measure, environment, actuators and sensors of your agent. For each of the seven environment properties we discussed in class (see lecture notes for Ch. 2, as well as Problem 2. above), indicate how this environment would be described along these seven dimensions and briefly explanation as to why. Finally, of the four types of agents (simple reflex, model-based reflex, goal-based, utility-based), briefly explain which you think would be best for your stock market agent and why.

5. **Problem 2.3 in [AIMA], parts a), d), e), f) and i)** (so, five parts total).
    Justify each answer with 1-2 crisp, to-the-point sentences.

Email me if any questions or concerns!
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