Assignment 1.1:

Submit by Day 7 of the learning week.

Instructions

1. Consider a rational agent. Suppose the performance measure is concerned with just the first T time steps of the environment and ignores everything thereafter. Use real life examples to show that a rational agent's action may depend not just on the state of the environment but also on the time step t ≤ T it has reached. [15 points]

   Hint: Consider any sequential environment in which rewards or goals may take time to arrive.

2. For each of the following, provide a description of the task environment and characteristics as described in section 2.3.2 of the book. Your answers should include descriptions in the following order. **Do not mix the order in your answers**. [20 points]

   Environment:
   - Fully observable versus partially observable
   - Deterministic versus non deterministic/stochastic
   - Episodic versus sequential
   - Static versus dynamic
   - Discrete versus continuous

   Agent:
   - Single agent versus multi agent

   Example question:

   Playing soccer

   Answer: Partially observable, stochastic, sequential, dynamic, continuous, multi agent.

   a) Exploring the subsurface oceans of Titan
   b) Shopping for used AI books on the internet
   c) Playing multiple sets (games) in a tennis match
   d) Bidding on a single item at an auction

3. Consider an agent for a vacuum cleaner environment in which the geography of the environment (extent, boundaries, and obstacles) is unknown as is the initial dirt configuration. The agent can go up and down as well as left and right. Can a simple reflex agent be perfectly rational for this environment? Explain in a few sentences using an example scenario [15 points]

Project Deliverables and Format:

Submit as a single file: Word or PDF. If you take pictures with a phone or scan into PDF, use large font (12 point and up) and high quality. Unreadable cluttered submissions with small font sizes will not be graded.