Session #1-2: Introduction to Reinforcement Learning

(1) Attempt to define reinforcement learning in your own words based on various perspectives given in the course. Critically inspect your definition for correctness.
(2) What are the various elements of Reinforcement learning? Review their purpose in RL?
(3) Which RL elements are vital to defining RL problem/ solution, in your opinion? Why so?
(4) Identifying a possible problem (around you/your work) that can be solved using RL. Explain how you will define various elements of RL as you have answered in question (2) and question (4).
(5) How RL is different from Supervised and Unsupervised Learning?
(6) "*A reward signal defines the goal of a reinforcement learning problem.*"; It's a statement from your textbook. How do you explain this in your own words?
(7) What do you understand about the model of an environment? In your understanding, how does the solution differ when you have a model and when you do not?
(8) What do you understand by exploration-exploitation trade-off? Why do you think this is important?
(9) What will happen to an agent that constantly explores and to the agent that constantly exploits? Can such agents be of some value?
(10) What are various ways in which ε can be chosen in the ε-greedy algorithm? How does it change the way exploration vs. exploration trade-off is handled? Can you explain each with an example/case?
(11) Refer to the Tic-Tac-Toe problem discussed in class to answer this question:
    (a) Why have we restricted updating $V(S_t)$ only to those states from where we have exploited the greedy choice? Why have we not updated the value of those states that led to the exploration?
    (b) Attempt TB Exercise 1.4
    (c) Can you rewrite the pseudo-code for ε-greedy for the tic-tac-toe problem?
    (d) Attempt TB Exercise 1.1

Happy Learning!

Readings Required: Sections 1.1-1.6 of Sutton & Barto, Ed-2

Note: The review questions are posted to help students to perform a self-assessment on the key take-aways from the sessions. These are not to be treated as sample questions / pool of questions for written exams. Certain questions will require some additional preparation beyond the class coverage.