Knowledge Checks

Question 1

1/1 point (graded)

Which of the following is a correct definition of a policy, for a Markov Decision Process (MDP)?

- ○ The probability of taking an action given a state and the time of being in that state.
- ◉ The probability of taking an action given a state, independent of the time of being in that state. ✔
- ○ The probability of transitioning to a state from the current state, independent of the time of being in that state.
- ○ The probability that a state transition with trigger an action, independent of the time of that action.

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Question 2

1/1 point (graded)

How can you best describe the Bellman Equations for a Markov Reward Process (MRP)?

- ○ The value of a state is the reward from that state plus the sum over the product of transition probabilities for the next n states.
- ◉ The value of a state is the sum over all actions, a, given the state, s of the policy, times the sum over the product of transition probabilities from the state to the next state, s' and the reward from the state plus the discounted value of the next state. ✔
- ○ The value of a state is the discounted sum over next the product of transition probabilities for next states.
- ○ The value of a state is the sum over all transition probabilities from the state, s, to the next state, s', times the sum over the product of the policy, and the reward from the state plus the discounted value of the next state.

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Question 3

1/1 point (graded)

Which two of the following statements are correct about the use of the Bellman Optimality Equation in Dynamic programming?

- ☑ The transition probabilities p(s', r| s, a) must be completely known.
- ☐ The transition probabilities p(s', r| s, a) are computed iteratively.
- ☐ The Bellman equation is solved directly for all state values.
- ☑ The Bellman equation is solved iteratively, as a series of overlapping subproblems on the value function, to find the optimal policy, pi(a|s).

✔

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Question 4

1/1 point (graded)

Which two of the following are correct statements about the bootstrapping process?

- ☐ Bootstrapping uses values from states at future time steps (t + n) to compute the value, v(s), or action value q(a, s).
- ☑ Bootstrapping approximates the current state-value estimate based on previously learned estimates.
- ☐ Bootstrapping uses a decay factor at each time step to ensure convergence.
- ☑ Bootstrapping approximates the current state-action value estimate based on previously learned estimates.

✔

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Question 5

1/1 point (graded)

Which of the following is a correct statement about the policy improvement theorem?

- ◉ If greedy policy improvement does not improve the policy, then the policy is optimal. ✔
- ○ If iterative policy evaluation does not improve the policy, then the policy is optimal.

- ○ If greedy policy improvement does not improve the evaluation of v(s), then the policy in optimal.
- ○ If greedy policy improvement does not improve the probability of an action, then the policy is optimal.

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Question 6

1/1 point (graded)

Which of the following is a correct statement about the difference between policy iteration and value iteration?

- ○ Value iteration requires convergence of the policy evaluation before policy improvement can be performed, whereas, policy iteration performs policy improvement after each sweep of evaluation.
- ◉ Policy iteration requires convergence of the policy evaluation before policy improvement can be performed, whereas, value iteration performs policy improvement after each sweep of evaluation. ✔
- ○ Policy iteration requires convergence of the policy improvement before policy evaluation can be performed, whereas, value iteration performs policy evaluation after each sweep of policy improvement.
- ○ Policy iteration requires an approximation of policy evaluatiion before policy improvement can be performed, whereas, value iteration performs policy improvement after each sweep of policy evaluation.

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Question 7

1/1 point (graded)

Which of the following are differences between synchronous and asynchronous (in-place) Dynamic Programming (DP)?

- ○ At each iteration of synchronous DP, v(S) is updated, or backed up, in parallel for all states in one step, whereas in asynchronous DP, only states with high probability are backed-up.
- ○ At each iteration of asynchronous DP, v(S) is updated, or backed up, one at a time in a sweep, whereas in synchronous DP, states are backed up in parallel for all stats in one step.
- ◉ At each iteration of synchronous DP, v(S) is updated ,or backed up, in parallel for all states in one step, whereas in asynchronous DP, states are updated individually in a sweep. ✔
- ○ At each iteration of synchronous DP, v(S) is updated, or backed up, in a priority sequence, whereas in asynchronous DP, states are updated individually in a sweep.

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