Knowledge Checks

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Question 1

1/1 point (graded)

Which of the following are two characteristics of Monte Carlo (MC) and Temporal Difference (TD) learning?

- [x] MC methods provide an estimate of V(s) only once an episode terminates, whereas TD provides an estimate of after n steps.
- [ ] MC requires to know the model of the environment i.e. the transition probabilities, whereas TD requires no such model.
- [x] Both MC and TD are model free methods.
- [ ] Both MC and TD use bootstrapping.

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Correct (1/1 point)

Question 2

1/1 point (graded)

Which of the following are two advantages of the TD algorithm compared to the MC algorithms?

- [ ] No Bias in the estimate of value.
- [x] Works in continuing (non-terminating) environments.
- [ ] Sensitive to initial values.
- [ ] Model free.
- [x] Exploits the Markov Decision Process properties to gain efficiency.

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Correct (1/1 point)

Question 3

1/1 point (graded)

Which of the following statements about sampling are true for Monte Carlo (MC) and temporal difference (TD) algorithms?

- ( ) Monte Carlo algorithms randomly sample all possible state-action pairs.
- (•) TD and MC sample states, St+n, from the current state St.
- ( ) MC algorithms use deterministic sampling.
- ( ) TD use random sampling of state-action pairs one time step ahead only.

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Question 4

1/1 point (graded)

Which two of the following describe bias-variance trade-off between MC and TD?

- [ ] The MC algorithm reduces variance by sampling until the terminal state, leading to higher bias.
- [x] The MC algorithm reduces bias by sampling until the terminal state, leading to higher variance.
- [x] The TD algorithm reduces variance by sampling a small number of time steps, leading to higher bias.
- [ ] The TD algorithm reduces bias by sampling a small number of a time steps, leading to higher variance.

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Question 5

1/1 point (graded)

What is the difference between on-policy and off-policy learning?

- ( ) On-policy learning learns by evaluating the results of a behavior policy to perform policy improvement on a target policy, whereas off-policy learns from experience by evaluating a target policy and performing policy improvement on the target policy.
- (•) On-policy learning learns from experience by evaluating a target policy and performing policy improvement on the target policy, whereas off-policy learning learns by evaluating the results of a behavior policy to perform policy improvement on a target policy.
- ( ) On-policy learning learns from experience by evaluating a target policy and performing policy improvement on the target policy, whereas off-policy learning learns by evaluating the target policy to perform policy improvement on a behavior policy.
- ( ) On-policy learning learns from experience by evaluating a behavior policy and performing policy improvement on the target policy, whereas off-policy learning learns by evaluating the results of a behavior policy to perform policy improvement on the behavior policy.

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Question 6

1/1 point (graded)

Which two statements describe eligibility traces?

- [x] Eligibility traces down weight the contribution of states that are rarely visited to computing average V(s) or Q(s,a).
- [ ] Eligibility traces encourage further exploration of the state space.
- [ ] Eligibility traces assign credit to action.
- [x] Eligibility traces assign credit to both the most frequently visited and last visited states.

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Question 7

1/1 point (graded)

Which of the following characterizes Q-Learning and SARSA?

- ( ) Q-Learning uses bootstrapping and SARSA does not.
- ( ) SARSA uses bootstrapping and Q-Learning does not.
- ( ) Both SARSA and Q-Learning are control algorithms.
- ( ) Q-Learning is an on-policy algorithm, whereas SARSA is an off-policy algorithm
- (•) SARSA is an on-policy algorithm, whereas Q-Learning is an off-policy algorithm

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