Knowledge Checks

Question 1

1.0/1.0 point (graded)

Which of the following is a fundamental challenge of reinforcement learning?

- Representation of the states of the system.
- Generalization from training to other possible states of the system.
- Temporal credit assignment to determine which actions are important in determining the outcome.
- Exploration of states or actions that are not optimal.
- All of the above. ✔

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Question 2

1.0/1.0 point (graded)

Why is it important for a reinforcement agent to take both exploitation and exploratory steps?

- An agent which takes only exploratory steps gains information which guarantees and optimal exploitation of the state space.
- An agent which only takes greedy steps will converge quickly using generalized information to optimize policy.
- An agent that only take greedy steps gather generalized information and converge rapidly to an optimal policy.
- ✔ An agent which takes some exploratory steps along with greedy steps will converge to optimal an policy while acquiring information to improve the policy.

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Question 3

1.0/1.0 point (graded)

Which two of the following cases are "extreme" for the epsilon-greedy?

- ☑ When e = 0 only greedy steps are taken and regret is minimized.
- ☑ When e = 1 no greedy steps are taken and regret is maximized.
- ☐ When e = 0 only greedy steps are taken and regret is maximized.
- ☐ When e = 1 no greedy steps are taken and regret is minimized.

✔

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Question 4

1.0/1.0 point (graded)

Which three reasons are why generalization is important in reinforcement learning?

- [x] An agent that generalizes will be able to provide good solutions when faced with states and action options not encountered before.
- [x] An agent that generalizes will be able to solve complex problems where the number of states is very large.
- [x] An agent that generalizes will be able to chose actions from a large number of possibilities.
- [ ] An agent which generalizes must have acquired knowledge of all possible states.

✔

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Question 5

1.0/1.0 point (graded)

Which two of the following are examples of exploration AND exploitation?

- [x] A movie recommender agent that occasionally offers a recommendation to the use in a new category.
- [x] An advertising display agent which occasionally displays an advertisement for a different class of goods to a use who has never shown interest in that class of goods.
- [ ] A chess playing agent which takes the move with the highest probability of winning at each move of each game.

- [ ] A agent which explores for oil by always choosing a drilling location in a distinctly different area from the last drilling location.

✔

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Question 6

1.0/1.0 point (graded)

Which two of the following are true about regret?

- [x] Regret is the expected value of the sum over all actions of the difference between optimal value and value of each action.
- [ ] Regret is never linear with time steps for an agent that both explores and exploits.
- [ ] Regret can be computed only from the action value function.
- [x] Regret is the expected value of the sum over actions for each time step of the opportunity lost.

✔

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Question 7

1.0/1.0 point (graded)

Which of the following statements about the UCB algorithm is correct?

- ○ The UCB algorithm uniformly samples in order to reduce uncertainty and maximize reward.

- (selected) The UCB algorithm selects the action with the largest uncertainty for the reward in order to reduce that uncertainty. ✔
- The UCB algorithm selects actions with lowest uncertainty and therefore largest expected reward to ensure rapid convergence.
- The UCB algorithm selects actions with the lowest uncertainty to minimize regret.

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Question 8

1.0/1.0 point (graded)

What do we mean by contextual learning and how is it different from reinforcement learning (RL)?

- A contextual bandit takes actions and receives rewards which may depend on state, whereas an RL agent takes actions regardless of state and receive rewards.
- A contextual bandit takes actions determined by state and receives rewards which may be determined by state, whereas an RL agent takes actions to change state and receive rewards.
- (selected) A contextual bandit takes actions and receives rewards which may depend on state, whereas an RL agent takes actions to change state and receive rewards. ✔
- A contextual bandit is a type of RL agent.

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