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## Week 9 Quiz

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### Q1

10/10 points (graded)

What are the five essential parameters that define an MDP? Check all that apply:

☒ state space ✓

☐ state model

☒ action space ✓

☒ transition model ✓

☒ starting state ✓

☐ action state

☒ reward distribution ✓



Submit

You have used 1 of 2 attempts

**i** Answers are displayed within the problem

### Q2

10/10 points (graded)

In an MDP with finite state space consisting of  $n$  states and finite action space consisting of  $m$  actions, what is the dimension of the transition probability matrix?

☐  $n^3 m$

## Learning

### Week 9: Reinforcement Learning Introduction

#### 9.1 Reinforcement Learning Overview

#### 9.2 Markov Decision Process (MDP)

#### 9.3 MDP - Finding Optimal Policy

#### 9.4 Example of an MDP and Bellman Equations

#### 9.5 Value Function - Matrix Notation


#### 9.6 Finding Optimal Policy in MDPs - Iterative Methods

#### 9.7 Policy Iteration Method Example


#### 9.8 Value Iteration Method

#### 9.9 Reinforcement Learning - Algorithms

### Week 9 Quiz: Reinforcement Learning

Quiz due Apr 11, 2017  
05:00 IST 

### Week 9 Project: Constraint Satisfaction Problems

Project due Apr 11,  
2017 05:00 IST 

### Week 9 Optional Project: Reinforcement Learning (not graded)

### Week 9 Discussion Questions

☒  $n^2 m$  ✓

☐  $m^2 n$

☐  $m^2 n$

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 Answers are displayed within the problem

## Q3

10/10 points (graded)

In an MDP, the transition probability distribution of next state for a given state and action can vary depending on the past history of actions and rewards.

☐ True

☒ False ✓

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You have used 1 of 1 attempt

 Answers are displayed within the problem

## Q4

10/10 points (graded)

If you are interested in maximizing long-term rewards, what kind of discount factor should you use?

☐ close to 0

☒ close to 1 ✓

☐ does not matter

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You have used 1 of 1 attempt

**i** Answers are displayed within the problem

## Q5

10/10 points (graded)

In any MDP, given a discount factor smaller than 1, the optimal discounted reward is same for all starting states.

☐ True☒ False ✓

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You have used 1 of 1 attempt

**i** Answers are displayed within the problem

## Q6

10/10 points (graded)

A deterministic stationary policy takes the same action (Check all that apply):

☐ At all time steps.☒ In any given state, for all time steps. ✓☒ In any given state and history of actions taken, for all time steps. ✓

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You have used 1 of 2 attempts

**i** Answers are displayed within the problem

## Q7

10/10 points (graded)

For every MDP, there exists a stationary policy whose expected discounted

reward for every starting state is at least as good as that of any other policy.

☒ True ✓

☐ False

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You have used 1 of 1 attempt

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**i** Answers are displayed within the problem

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## Q8

10/10 points (graded)

Bellman optimality equations suggest that in every state, the optimal action to take is the one that maximizes immediate expected reward.

☐ True

☒ False ✓

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You have used 1 of 1 attempt

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**i** Answers are displayed within the problem

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## Q9

10/10 points (graded)

If the discount factor is 0, then Bellman optimality equations suggest that in every state, the optimal action to take is the one that maximizes immediate expected reward.

☒ True ✓

☐ False

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You have used 1 of 1 attempt

**i** Answers are displayed within the problem

## Q10

10/10 points (graded)

Consider the three state MDP discussed in the lecture, modeling a robot learning to walk (the three states were 'Fallen', 'Standing' and 'Moving'). Suppose now that once the robot has Fallen, no action (fast or slow) can take the robot out of the Fallen state. What will be the transition probability vector for state "Fallen" and action "slow"?

☐ [1 1 0]

☒ [1 0 0] ✓

☐ [1 0 1]

☐ [0 0 1]

☐ [0 1 0]

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**i** Answers are displayed within the problem

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