

# Unit 12 - Week 9: Planning and Decision Making

## Course outline

### How to access the portal

### Week 0: Prerequisites

### Week 1: AI and AI Problem Solving

### Week 2: Problem Solving by Search - I

### Week 3: Problem Solving by Search - II

### Week 4: Knowledge Representation and Reasoning - I

### Week 5: Knowledge Representation and Reasoning - II

### Live Session-1

### Week 6: Knowledge Representation and Reasoning - III

### Week 7: Reasoning under Uncertainty

### Week 8: Planning

### Week 9: Planning and Decision Making

 Lec 1: Practical Planning and Acting

 Lec 2: Sequential Decision Problems

 Lec 3: Making Complex Decisions

 Quiz : Assignment 9

 Feedback Form

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### Week 10: Machine Learning -I

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## Assignment 9

The due date for submitting this assignment has passed.  
As per our records you have not submitted this assignment.

**Due on 2019-10-02, 23:59 IST.**

- 1) Hierarchical decomposition allows non-primitive operators to be included in plans. Which of the following statements are false? **1 point**
- A. Hierarchical planning allows very complex plans to be built up.
  - B. Primitive operators represent actions that cannot appear in the final plan.
  - C. It is possible to replace a non-primitive operator with its decomposition.
  - D. Primitive operators represent actions that appear in the final plan.

No, the answer is incorrect.  
Score: 0

Accepted Answers:

B. Primitive operators represent actions that cannot appear in the final plan.

- 2) Sensor model describes how the environment generates the sensor data; in a Belief Network, it is the \_\_\_\_\_ associated with the percept node; and show how reliable they are as sensors. **1 point**

- A. conditional probability table
- B. maximum expected utility
- C. weighted sum of the utilities
- D. state evolution model

No, the answer is incorrect.  
Score: 0

Accepted Answers:

A. conditional probability table

- 3) In finding an abstract solution, and in rejecting other abstract plans as inconsistent, the downward solution property states that \_\_\_\_\_ **1 point**

- A. If  $p$  is an abstract solution, then there is a primitive solution of which  $p$  is an abstraction.
- B. If  $p$  is an abstract solution, then there is a plan that contains abstract operators.
- C. If an abstract plan is inconsistent, then there is no primitive solution of which it is an abstraction.
- D. If  $p$  is an abstract solution, then abstract pieces can be combined hierarchically to create large plans.

No, the answer is incorrect.  
Score: 0

Accepted Answers:

A. If  $p$  is an abstract solution, then there is a primitive solution of which  $p$  is an abstraction.

- 4) STRIPS is an alternative representation to the pure situation calculus for planning. **1 point**

- I. Hierarchical Plans cannot be expressed in STRIPS.
- II. STRIPS operators are essentially propositional.
- III. Real world projects need a better model of time than that in STRIPS.

Which of the above statements are correct?

- A. Only Statements I and II
- B. Statements I, II and III
- C. Only Statements II and III
- D. None

No, the answer is incorrect.  
Score: 0

Accepted Answers:

B. Statements I, II and III

- 5) Hierarchical Task Network (HTN) planning, uses \_\_\_\_\_ to incrementally decompose a planning problem. **1 point**

- A. Primitive operators
- B. Abstract operators
- C. Conditional operators
- D. Hierarchical planner

No, the answer is incorrect.  
Score: 0

Accepted Answers:

B. Abstract operators

- 6) A Markov Decision Process is a four tuple  $\langle S, A, T, R \rangle$ , where  $S$  is the finite set of states,  $A$  is the finite set of actions and  $R$  is the cost or reward being in state  $s$ .  $T$  is the transition model. **1 point**

- A. Probability of executing action  $a$  in state  $s$  at time  $t$
- B. Probability of  $s'$  at time  $t+1$ , given action  $a$  in state  $s$  at time  $t$ .
- C. Probability of  $s$  at time  $t$ , given actions in states upto time  $t-1$
- D. Probability of executing action  $a$  in state  $s'$  at time  $t+1$

No, the answer is incorrect.  
Score: 0

Accepted Answers:

B. Probability of  $s'$  at time  $t+1$ , given action  $a$  in state  $s$  at time  $t$ .

- 7) Value Iteration is an algorithm for computing \_\_\_\_\_. **1 point**

- A. utility of each state.
- B. an optimal policy
- C. maximum expected utility
- D. shortest path to goal

No, the answer is incorrect.  
Score: 0

Accepted Answers:

B. an optimal policy

- 8) For a sequential decision problem, a policy refers to \_\_\_\_\_. **1 point**

- A. complete mapping from states to actions
- B. progressively discounted rewards of states
- C. an optimal action sequence
- D. shortest path to goal

No, the answer is incorrect.  
Score: 0

Accepted Answers:

A. complete mapping from states to actions

- 9) The value of a policy is the expected sum of \_\_\_\_\_ obtained, where the expectation is taken over all possible state sequences that could occur, given that the policy is executed. **1 point**

- A. expected utilities.
- B. additive rewards.
- C. discounted rewards.
- D. maximal rewards

No, the answer is incorrect.  
Score: 0

Accepted Answers:

C. discounted rewards.

- 10) \_\_\_\_\_ provide a general, concise representation for large POMDP, so they can be used as inputs for any POMDP algorithm including value and policy iteration methods. **1 point**

- A. Bayesian Networks
- B. Decision Networks
- C. Dynamic Decision Networks
- D. Dynamic Belief Networks

No, the answer is incorrect.  
Score: 0

Accepted Answers:

C. Dynamic Decision Networks