

ColumbiaX: CSMM.101x Artificial Intelligence (AI)

Help



- Artificial Intelligence Course: Getting Started
- ▶ Week 1: Introduction to ΑI
- Week 2: Intelligent Agents and Uninformed Search
- Week 3: Heuristic Search
- 3.1 Heuristics and **Greedy Search** Algorithm
- 3.2 A* Search and Optimality
- 3.3 Search **Algorithms Recap**
- 3.4 Local Search

Week 3 Quiz: **Heuristic Search**

Quiz due Apr 11, 2017 05:00 IST

Week 3 Discussion Ouestions

▶ Week 4: Adversarial Search and Games

Week 3: Heuristic Search > Week 3 Quiz: Heuristic Search > Week 3 Quiz: Heuristic Search

Week 3 Quiz: Heuristic Search

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Optimality #1

10/10 points (graded)

Consider graph search algorithms for some search space. Suppose the branching factor b is finite, the shallowest goal is at finite depth d, and step costs are finite, greater than some small positive constant, but not necessarily all equal. Check all that apply:

- Depth-First Search is optimal
- Depth-Limited Search (limit > d) is optimal
- Iterative-Deepening Search is optimal
- Breadth-First Search is optimal
- Uniform-Cost Search is optimal



Submit

You have used 4 of 4 attempts

Answers are displayed within the problem

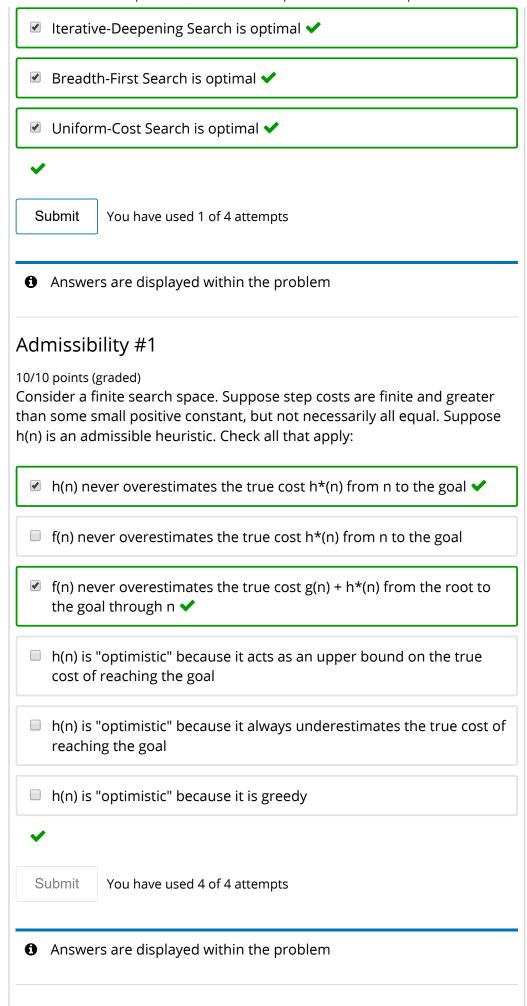
Optimality #2

10.0/10.0 points (graded)

Consider graph search algorithms for some search space. Suppose the branching factor b is finite, the shallowest goal is at finite depth d, and step costs are finite, positive, and all identical. Check all that apply:

- Depth-First Search is optimal
- Depth-Limited Search (limit > d) is optimal

- Week 5: Machine Learning 1
- ▶ Week 6: Machine Learning 2
- Week 7: Machine Learning 3
- Week 8: CSP
- ▶ Week 9: Reinforcement Learning
- Week 10: **Logical Agents**
- Week 11: Al Applications: NLP



Admissibility #2

10.0/10.0 points (graded)

In lecture, we see an example of a heuristic for the map problem; that is, the straight line distances h_SLD(n) from n to the goal. Check all that apply to this instance of the search problem (in particular, note that no edges are less than unit cost):

- h SLD(n) is admissible
- h_SLD(n)^2 is admissible
- 🗹 sqrt(h_SLD(n)) is admissible 🗸
- h SLD(n)^2 99 * h SLD(n) is admissible
- 0 is admissible



Submit

You have used 1 of 4 attempts

Answers are displayed within the problem

Completeness #1

10/10 points (graded)

Consider graph search algorithms for an infinite* search space. Suppose the branching factor b is finite, the shallowest goal is at finite depth d, step costs are finite, greater than some small positive constant, but not necessarily all equal. Check all that apply:

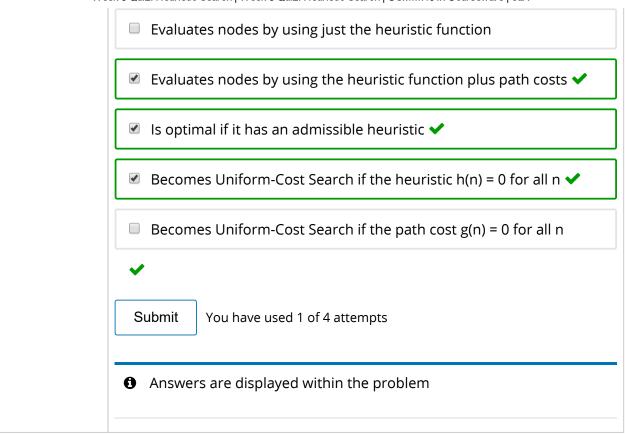
* As an example of an infinite search space, consider the 3-dimensional integer lattice Z^3; that is, the lattice in the Euclidean space R^3 whose lattice points are ordered triples of integers. A "state" may consist of a point in space (i.e. an ordered triple in Z^3), and a "transition" may consist of moving a certain number of units in the positive or negative directions parallel to one of the coordinate axes.

- Depth-First Search is complete
- Depth-Limited Search (limit > d) is complete

✓ Iterative-Deepening Search is complete ✓
☑ Breadth-First Search is complete ✓
✓ Uniform-Cost Search is complete ✓
☑ A-Star Search is complete ✓
✓
Submit You have used 2 of 4 attempts
Answers are displayed within the problem
Completeness #2 10/10 points (graded) Consider graph search algorithms for a finite search space. Suppose the branching factor b is finite, the shallowest goal is at finite depth d, step costs are finite, greater than some small positive constant, but not necessarily all equal. Check all that apply:
✓ Depth-First Search is complete ✓
✓ Depth-Limited Search (limit > d) is complete ✓
✓ Iterative-Deepening Search is complete ✓
☑ Breadth-First Search is complete ✔
☑ Uniform-Cost Search is complete ✔
✓ Greedy Best-First Search is complete ✓
Submit You have used 3 of 4 attempts

1 Answers are displayed within the problem Greedy Best-First Search #1 10.0/10.0 points (graded) In lecture, we see an example of a heuristic for the map problem; that is, the straight line distances h_SLD(n) from n to the goal. Consider Greedy Best-First Search applied to this instance of the search problem, using the straight-line distance heuristic (in particular, note that no edges are less than unit cost). Check all that apply: It always manages to reach the goal in the fewest number of steps It always manages to reach the goal through the least costly path. $ilde{\hspace{-0.1cm}\hspace{0.1cm}\hspace{0.1cm}}$ At each step it tries to get as close to the goal as possible $ilde{\hspace{-0.1cm}\hspace{0.1cm}\hspace{0.1cm}}$ At each step it always gets closer to the goal Submit You have used 2 of 4 attempts **1** Answers are displayed within the problem Greedy Best-First Search #2 10.0/10.0 points (graded) Consider Greedy Best-First Search on a search space where the branching factor b is finite, the shallowest goal is at finite depth d, step costs are finite, greater than some small positive constant, but not necessarily all equal. Check all that apply: Evaluates nodes by using just the heuristic function Evaluates nodes by using the heuristic function plus path costs Is complete if the heuristic is admissible Is complete if the search space is finite

Is optimal if the heuristic is admissible
Is optimal if the search space is finite
✓
Submit You have used 3 of 4 attempts
Answers are displayed within the problem
A-Star Search #1
10.0/10.0 points (graded) In lecture, we see an example of a heuristic for the map problem; that is, the straight line distances h_SLD(n) from n to the goal. Consider A-Star Search applied to this instance of the search problem, using the straight-line distance heuristic (in particular, note that no edges are less than unit cost). Check all that apply:
It always manages to reach the goal in the fewest number of steps
☑ It always manages to reach the goal through the least costly path ✔
At each step it tries to get as close to the goal as possible
At each step it always gets closer to the goal
Submit You have used 3 of 4 attempts
Answers are displayed within the problem
A-Star Search #2
10.0/10.0 points (graded) Consider A-Star Search on a tree of finite depth, where the branching factor b is finite, the shallowest goal is at finite depth d, step costs are finite, greater than some small positive constant, but not necessarily all equal, and the tree contains no duplicate nodes. Check all that apply. It:



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