Week 2 Quiz: Uninformed Search

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Q1 - Intelligent Agent

10.0/10.0 points (graded)

Which of the following is the definition of AI agent mentioned in lecture?

- [ ] Anything that percieves its environment through actuators and acting upon its environment through sensors.
- [x] Anything that percieves its environment through sensors and acting upon its environment through actuators. ✔
- [ ] Anything that percieves its environment through sensors.
- [ ] Anything that is operated by machine learning algorithms.

Submit You have used 1 of 1 attempt

Q2 - Breadth-First Search vs. Depth-First Search

10.0/10.0 points (graded)

Compare breadth-first search with depth-first search. Please check all that apply:

- [ ] DFS and BFS use a similar amount of space.
- [x] DFS uses less space than BFS.
- [ ] BFS uses less space than DFS.
- [x] Both BFS and DFS have exponential time complexity.

✔

Submit You have used 1 of 2 attempts

Q3 - Uniform-Cost Search

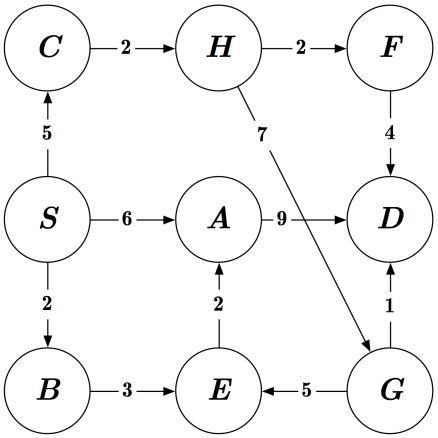
10.0/10.0 points (graded)

If there is a solution, Uniform-cost search is guaranteed to return the optimal one. True or False ?

- (•) True ✔
- ( ) False

Submit You have used 1 of 1 attempt

Consider the following graph. Edges between nodes may only be traversed in the direction indicated by the arrow. We will search the graph with the algorithms we learned, keeping a full explored set as we go. As usual, where an arbitrary choice has to be made, assume that nodes are visited in lexicographical order. The starting node is S and the goal node is G.

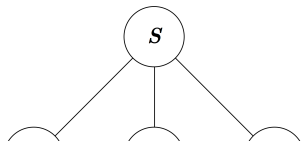


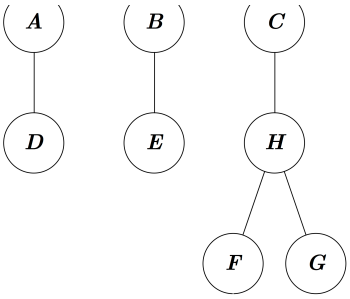
Running each algorithm produces a tree of explored nodes. For each of the following trees, indicate which search algorithm could have been generated with.

Note that each tree may correspond to zero, one, or multiple search algorithms.

Q4 - Tree 1

10/10 points (graded)





Which search algorithm has generated this tree?

- [x] Depth-First Search
- [x] Breadth-First Search
- [ ] Uniform-Cost Search
- [ ] None

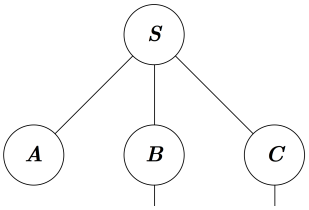
✔

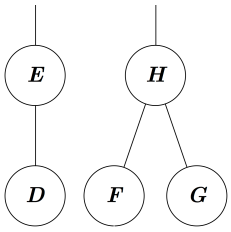
Submit You have used 1 of 2 attempts

✔ Correct (10/10 points)

Q5 - Tree 2

10/10 points (graded)





Which search algorithm has generated this tree?

- [ ] Depth-First Search
- [ ] Breadth-First Search
- [ ] Uniform-Cost Search
- [x] None

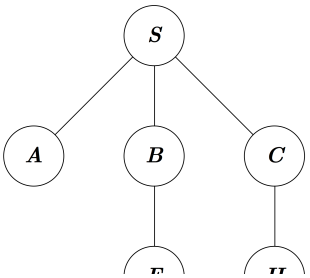
✔

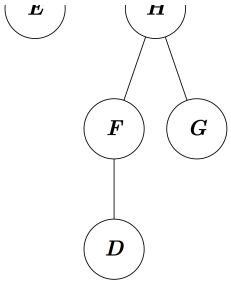
Submit You have used 1 of 2 attempts

✔ Correct (10/10 points)

Q6 - Tree 3

10/10 points (graded)





Which search algorithm has generated this tree?

- [ ] Depth-First Search
- [ ] Breadth-First Search
- [x] Uniform-Cost Search
- [ ] None

✔

Submit You have used 1 of 2 attempts

✔ Correct (10/10 points)

Q7 - Uniform-Cost Search

10.0/10.0 points (graded)

In a uniform-cost search tree, when a goal node is found, how does the depth of the goal node compare to the height of the search tree? (The depth of a node is defined as the number of edges traversed from the root to that node. The height of a tree is equal to the depth of the deepest node in the tree. The search tree includes nodes in the visited and frontier sets.)

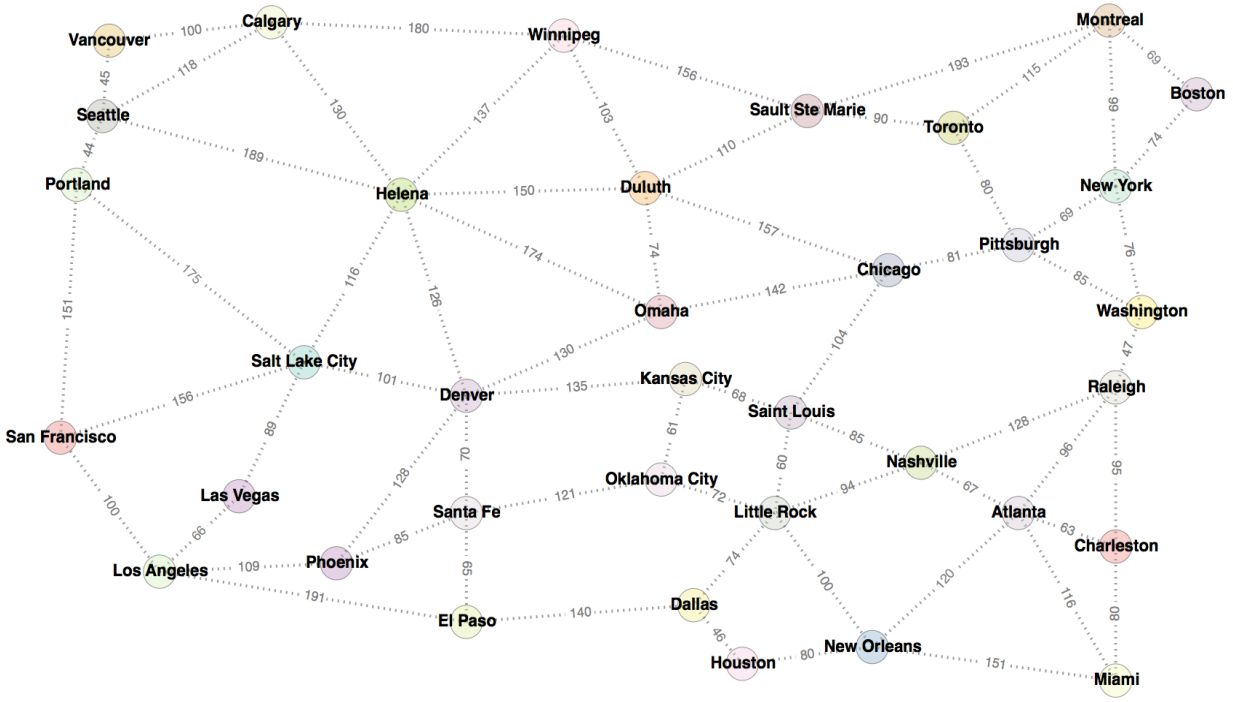
The depth of the goal node is _____ the height of the search tree:

- ○ less than
- ○ greater than
- ○ equal to
- ◉ less than or equal to ✔
- ○ greater than or equal to
- ○ greater than, less than, or equal to

greater than, less than, or equal to

Submit You have used 1 of 2 attempts

For the following questions, you are given the city that you start in (the "**start city**"), and the city that you want to find (the "**goal city**"). With each of the following search strategies, please list the cities in the exact order in which you end up visiting the cities. The following is the same map used in lecture, provided here again for reference:



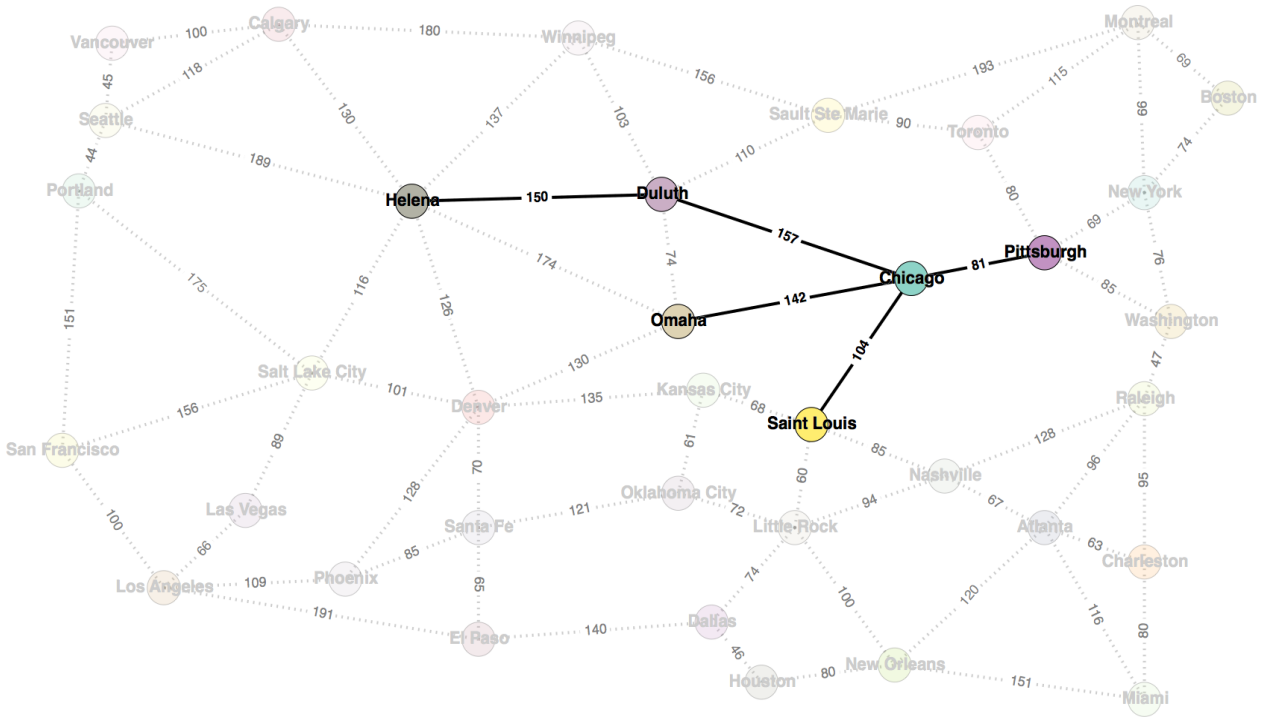
Ordering

All else equal, assume that nodes are always visited in **lexicographical** order. For example, starting at Duluth, a depth-first or breadth-first search strategy would lead to Chicago being the next node visited. In particular, for depth-first search this means that nodes are pushed onto the frontier in

reverse lexicographical order (and popped in lexicographical order). For breadth-first search, nodes are simply enqueued and dequeued in lexicographical order.

Example

For example, a breadth-first search for Helena, starting from Chicago, will have the correct answer of "*Chicago, Duluth, Omaha, Pittsburgh, Saint Louis, Helena*" (without the quotes). The graph of this example is as follows:



Important Note

- Please note that the distance between **Montreal to New York is 99, NOT 66**.
- You may have multiple attempts per question, but each attempt will involve a **randomly generated** instance of the problem. This is intended to discourage submitting by trial-and-error. If you submit an incorrect answer, please make sure to review the examples in lecture before attempting the problem again.
- List the cities in the order visited, using **commas** as separators.
- Make sure your **spelling** matches the city names exactly. For example, please write "Oklahoma City" instead of "Oklahoma" or "Okaholma City".
- Note that we ask for all the cities **visited**, not just the resulting **path** (which, in the above example, only contains Chicago, Duluth, and Helena). The start city will be the first on the list, and the goal city will be the last on the list.

Q8 - Depth-First Search

10/10 points (graded)
Start: Chicago

Goal: Vancouver

List of cities, separated by commas:

Chicago, Duluth, Helena, Calgary, Vancouver ✔

Submit You have used 1 of 3 attempts

✔ Correct (10/10 points)

Q9 - Breadth-First Search

10/10 points (graded)
Start: Houston

Goal: Los Angeles

List of cities, separated by commas:

Houston, Dallas, New Orleans, El Paso, Little Rock, Atlanta, Miami, L ✔

Submit You have used 1 of 3 attempts

✔ Correct (10/10 points)

Q10 - Uniform-Cost Search

10/10 points (graded)
Start: Pittsburgh

Goal: Saint Louis

List of cities, separated by commas:

Pittsburgh, New York, Toronto, Chicago, Washington, Raleigh, Bosto ✔

Submit You have used 1 of 3 attempts

✔ Correct (10/10 points)

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