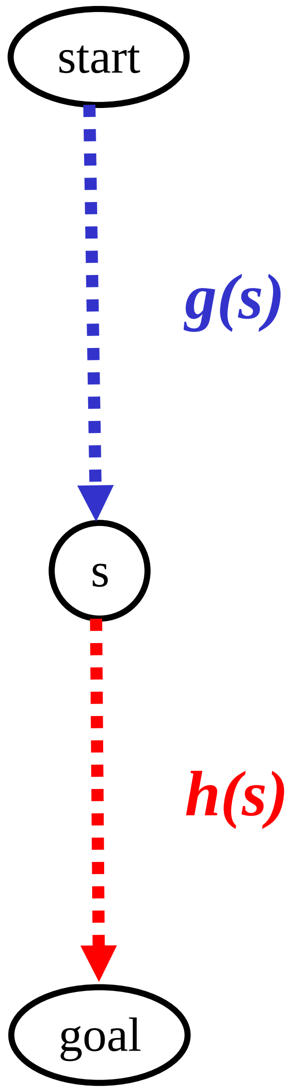
Q1-1: Your search algorithm uses a priority queue to track the state with the min score to pop next. If $h(s)$ is an <u>admissible heuristic</u>, what score should you use in the priority queue? Rank them from best to worst.

1. $g(s)$+h(s), $h(s)$, $g(s)$

2. $g(s)$+h(s), $g(s)$, $h(s)$

3. $g(s)$, $h(s)$, $g(s)$+h(s)

4. $g(s)$, $g(s)$+h(s), $h(s)$



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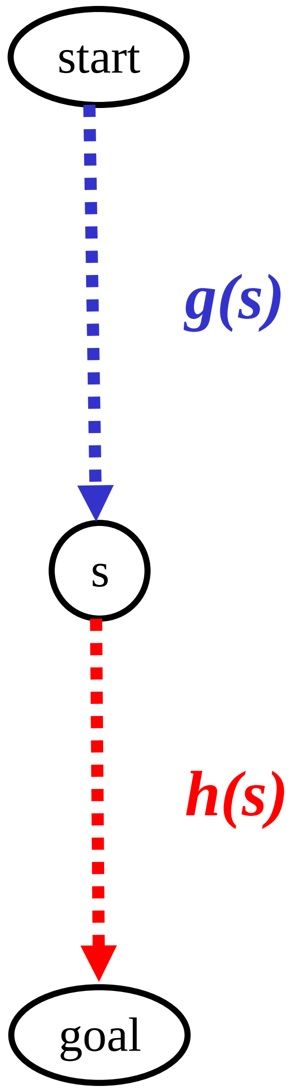

Q1-2: Your search algorithm uses a priority queue to track the state with the min score to pop next. If $h(s)$ is a heuristic (not necessarily admissible), what score should you use in the priority queue? Rank them from best to worst.

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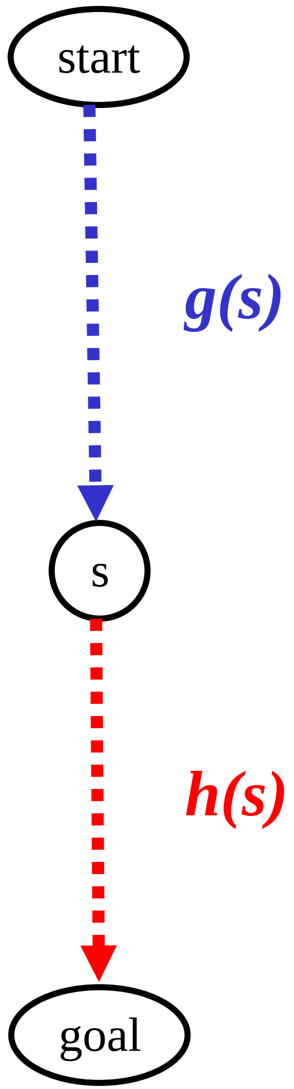

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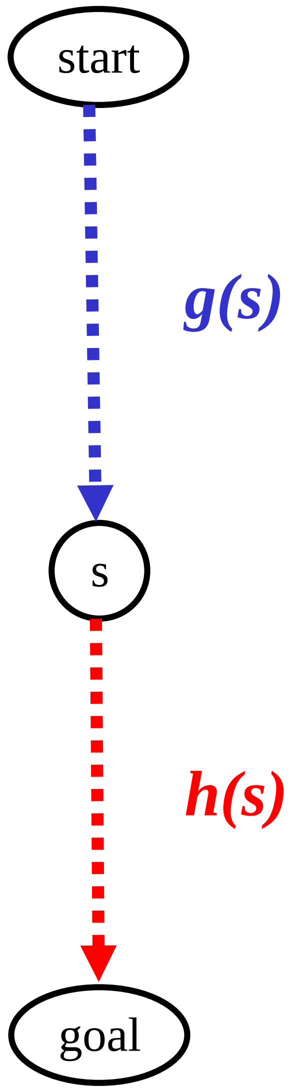

Q1-3: Consider finding the fastest driving route from one US city to another. Measure cost as the number of hours driven when driving at the speed limit. Let $h(s)$ be the number of hours needed to ride a bike from city s to your destination. $h(s)$ is

1. Not a valid heuristic

2. A valid heuristic but not admissible

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Q1-4: Consider finding the fastest driving route from one US city to another. Measure cost as the number of hours driven when driving at the speed limit. Let $h(s)$ be the current temperature in city s. $h(s)$ is

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Q1-5: Consider finding the fastest driving route from one US city to another. Measure cost as the number of hours driven when driving at the speed limit. Let $h(s)$ be the number of hours to drive from s to your destination if you ignore speed limits. $h(s)$ is

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Q2-1: Consider two heuristics for the 8 puzzle problem. *h1* is the number of tiles in wrong position. *h2* is Manhattan distance between tile and its goal location. How do *h1* and *h2* relate?

1. *h1* dominates *h2*

2. *h2* dominates *h1*

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Q2-2: Consider finding the fastest driving route from one US city to another, as before. Let $h(s)$ be the minimum number of hours to drive from s to your destination, returned from 1000s of physics simulations of driving in different weather conditions. $h(s)$ is

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Q2-3: A* search places expanded states in the CLOSED data structure. What is the space complexity of CLOSED?

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2. O(depth of optimal goal)
3. O(log number of states)
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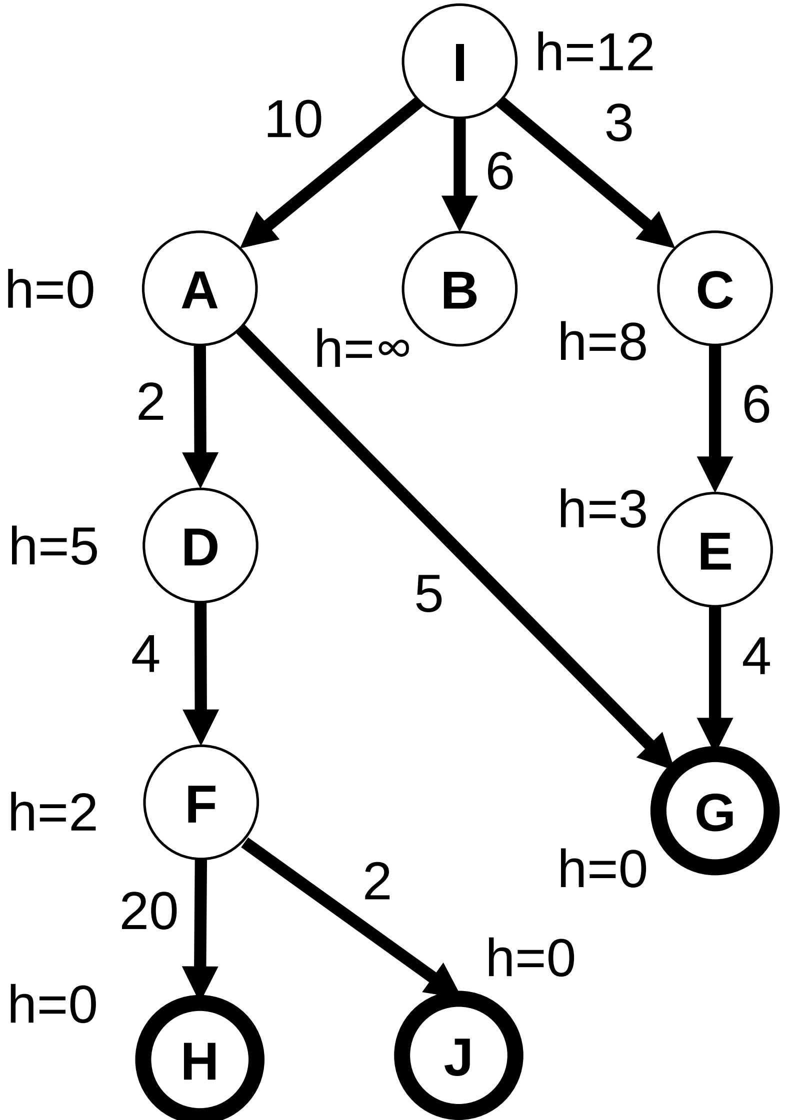
Q2-4: Consider the state space graph below. Goal states have **bold** borders. *h*(*s*) is show next to each node. What node will be expanded by A* after the initial state **I**?



1. A
2. B
3. C

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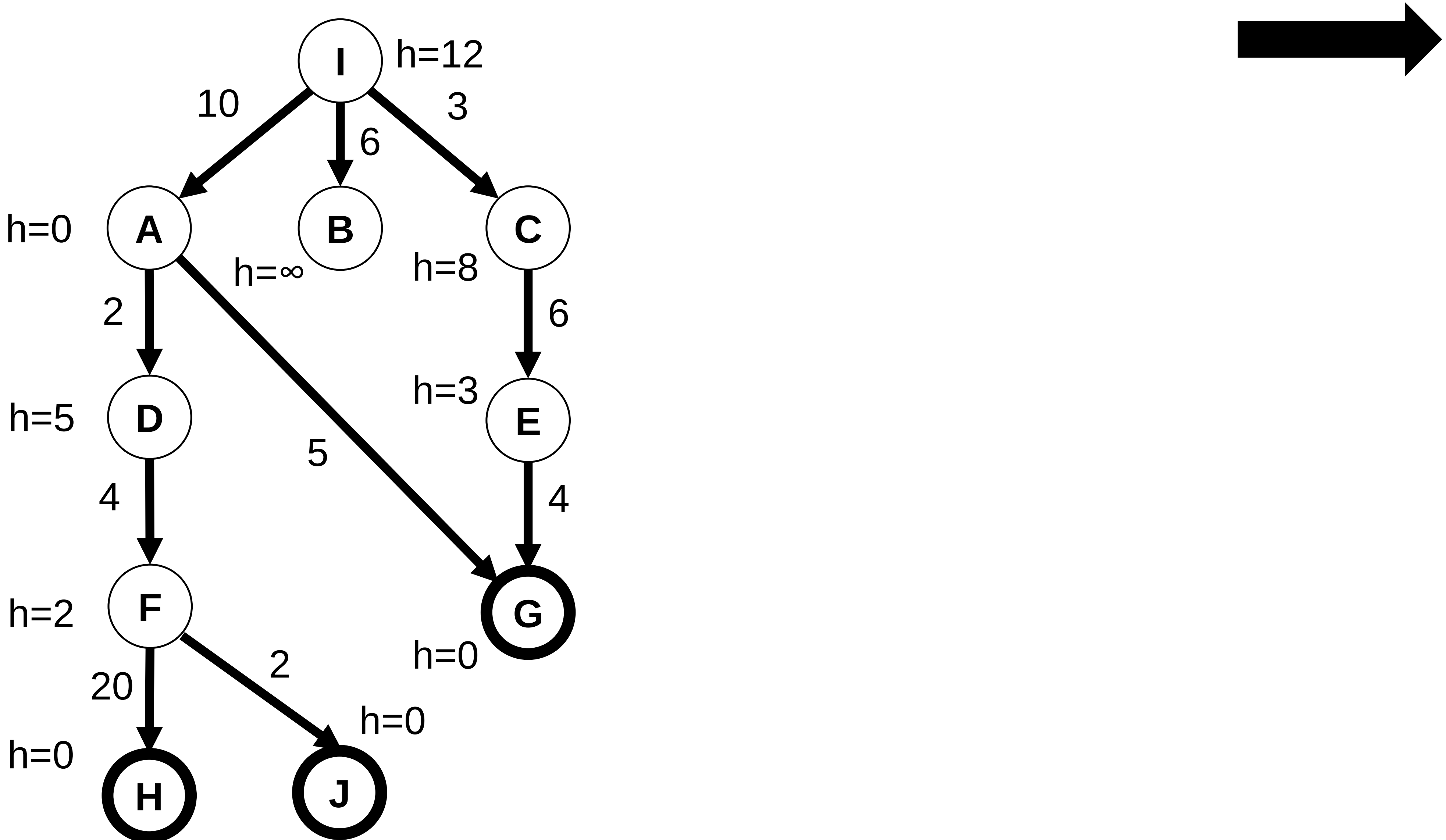

1. A
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Q3-1: How does IDA* save space compared to A*?

1. IDA* only tracks the best *k* nodes in the priority queue

2. IDA* will not get stuck exploring deep, suboptimal paths

3. IDA* uses a better heuristic and expands fewer nodes

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Q3-2: You are running IDA* in a state space graph with positive real-valued *f*(*s*) scores increasing threshold *t* as described. When *t* increases and IDA* restarts, now many new nodes are expanded?

1. 0 or 1 new nodes

2. Exactly 1 new node

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