**Break & Quiz**

**Q 1.1:** 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

- A. An admissible heuristic
- B. Not an admissible heuristic
Q 1.1: 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

- A. An admissible heuristic
- B. Not an admissible heuristic
Q 1.1: 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

- A. An admissible heuristic No: riding your bike take longer.
- B. Not an admissible heuristic
Q 1.2: Which of the following are admissible heuristics?

(i)  $h(s) = h^*(s)$

(ii) $h(s) = \max(2, h^*(s))$

(iii) $h(s) = \min(2, h^*(s))$

(iv) $h(s) = h^*(s) - 2$

(v)  $h(s) = \sqrt{h^*(s)}$

- A. All of the above
- B. (i), (iii), (iv)
- C. (i), (iii)
- D. (i), (iii), (v)
Break & Quiz

Q 1.2: Which of the following are admissible heuristics?

(i) \( h(s) = h^*(s) \)
(ii) \( h(s) = \max(2, h^*(s)) \)
(iii) \( h(s) = \min(2, h^*(s)) \)
(iv) \( h(s) = h^*(s) - 2 \)
(v) \( h(s) = \sqrt{h^*(s)} \)

• A. All of the above
• B. (i), (iii), (iv)
• C. (i), (iii)
• D. (i), (iii), (v)
Q 1.2: Which of the following are admissible heuristics?

(i) \( h(s) = h^*(s) \)
(ii) \( h(s) = \max(2, h^*(s)) \)  No: \( h(s) \) might be too big
(iii) \( h(s) = \min(2, h^*(s)) \)
(iv) \( h(s) = h^*(s) - 2 \)  No: \( h(s) \) might be negative
(v) \( h(s) = \sqrt{h^*(s)} \)  No: if \( h^*(s) < 1 \) then \( h(s) \) is bigger

• A. All of the above
• B. (i), (iii), (iv)
• C. (i), (iii)
• D. (i), (iii), (v)
Q 2.1: Consider two heuristics for the 8 puzzle problem. $h_1$ is the number of tiles in wrong position. $h_2$ is the $l_1$/Manhattan distance between the tiles and the goal location. How do $h_1$ and $h_2$ relate?

- A. $h_2$ dominates $h_1$
- B. $h_1$ dominates $h_2$
- C. Neither dominates the other
Q 2.1: Consider two heuristics for the 8 puzzle problem. $h_1$ is the number of tiles in wrong position. $h_2$ is the $l_1$/Manhattan distance between the tiles and the goal location. How do $h_1$ and $h_2$ relate?

- A. $h_2$ dominates $h_1$
- B. $h_1$ dominates $h_2$
- C. Neither dominates the other
Consider two heuristics for the 8 puzzle problem. $h_1$ is the number of tiles in wrong position. $h_2$ is the $l_1$/Manhattan distance between the tiles and the goal location. How do $h_1$ and $h_2$ relate?

- A. $h_2$ dominates $h_1$
- B. $h_1$ dominates $h_2$ (No: $h_1$ is a distance where each entry is at most 1, $h_2$ can be greater)
- C. Neither dominates the other
Q 2.2: 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?

- A. A
- B. B
- C. C
Q 2.2: Consider the state space graph below. Goal states have bold borders. $h(s)$ is shown next to each node. What node will be expanded by A* after the initial state I?

- A. A
- B. B
- C. C