Week 3

10 試題

1 point

1。
In the 8-puzzle problem, the exact solution is defined as h^*.

(a) Consider heuristic h_1: we can exchange any two tiles on the board, and we take the exchange times as heuristic. Is this an admissible heuristic?

- Yes
- No

1 point

2。
(b) Corresponding to the above question,

consider heuristic h_2: the number of misplaced tiles. Does h_1 dominate h_2?

- No, h_2 dominates h_1
- No, no one dominates another
- Yes

1 point

3。
(c) Corresponding to the above question,

what's the relation between h_1 , h_2 , and h^*?

- h^* dominates Max(h_1, h_2)
- h_1 + h_2 dominates h^*
- h^* dominates h_1 and h_2
- h_2 dominates h_1 and h^*

1 point

4。
If the heuristic is not admissible, how will this affect to the tree search?

- We can still find a solution with no optimality guarantee
- A^* search will fall into infinite loop
- Irrelevant exploration will happen
- The completeness of A^* will not hold

1 point

5 ◦
Which is true about IDA^*?

- Guarantee to find an optimal solution even with inadmissible heuristics
- Find a better solution than A^* search
- Time complexity is the main advantage
- Space complexity is the main advantage

1 point

6 ◦
The heuristic path function (Pohl, 1977) is a best first search in which the evaluation function is $f(n)$ = (2-w)g(n) + wh(n), where w is an arbitrary number.

(a) For what values of w is this search complete?

- all integer values
- $2 < w$
- $0 \leq w < 2$
- $w < 0$

1 point

7 ◦
(b) Corresponding to the above question,

for w = 0, 1 and 2, what are the corresponding equivalent search?

- 0: the uniform-cost search; 1: A^* search; 2: the greedy best first search
- 0: DFS; 1: BFS; 2: RBFS
- 0: IDA^*; 1: A^*; 2: RBFS
- 0: A^*; 1: IDA^*; 2: RBFS

1 point

8 ◦
If we have two admissible heuristics, h_1 and h_2, is it also admissible to use linear combination to combine h_1 and h_2, e.g. a*h_1 + b*h_2, where a + b = 1, and a, b > 0?

- Yes, because ah_1 and bh_2 are both admissible, so $ah_1 + bh_2$ is also admissible, even if a + b > 1, but a + b < 2
- No, because adding two admissible heuristics does not guarantee admissibility
- Yes, because h_1 and h_2 are both smaller than h*, so this combination is also admissible
- No, because scaling a heuristic may not maintain the admissiblity

1 point

9。
What conditions makes A^* search reduce to BFS?

- $h(n)$ = 1 for all n
- $h(n)$ = c for all n and c is a constant
- Costs of all actions are equal, and $h(n)$ = c for all n and c is a constant
- $g(n)$ = c, c is a constant

1 point

10。
If a heuristic is consistent, is it also admissible?

- Sometimes yes, sometimes no
- Yes
- No

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10 試題 未回答

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