Quiz

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PUI (Planning in Artificial Intelligence)

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Heuristic *h* dominates *h'* when

- 1. h < h' for all states
- 2. h > h' for all states
- 3. $h \neq h'$ for all states



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Quiz

Heuristic *h* dominates *h'* when

- 1. $h \le h'$ for all states
- 2. h > h' for all states
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Quiz

What is the most commonly used relaxation of a STRIPS action $a = \langle pre(a), add(a), del(a) \rangle$?

- 1. $a^+ = \langle \emptyset, \operatorname{add}(a), \operatorname{del}(a) \rangle$
- 2. $a^+ = \langle \operatorname{pre}(a), \emptyset, \operatorname{del}(a) \rangle$
- 3. $a^+ = \langle \operatorname{pre}(a), \operatorname{add}(a), \emptyset \rangle$



Tutorial 3

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What is the most commonly used relaxation of a STRIPS action $a = \langle pre(a), add(a), del(a) \rangle$?

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How can a multi-valued variable $V \in \{v_1, ..., v_k\}$ be relaxed?



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How can a multi-valued variable $V \in \{v_1, ..., v_k\}$ be relaxed?

Answer: Accumulating semantics: $V \subseteq \{v_1, ..., v_k\}$.



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What is not true?

- 1. Relaxations of plans are relaxed plans.
- 2. Relaxations are no harder to solve than the original task.
- Optimal relaxed plans may be longer than optimal plans for original tasks.



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What is not true?

- 1. Relaxations of plans are relaxed plans.
- Relaxations are no harder to solve than the original task.
- Optimal relaxed plans may be longer than the optimal plans for original tasks.

Answer: Optimal relaxed plans are always shorter (or equal) than the optimal plans for original tasks.



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$$h(p) = \min_{p \in \text{add}(a)} h(a)$$

 $h(a) = \text{cost}(a) + \max_{p \in \text{pre}(a)} h(p)$

- 1. h_{max}
- 2. *h*_{add}
- 3. h_{STRIPS}
- 4. *h*_{FF}



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For h_{add} is not true:

- 1. Assumes independence of facts.
- 2. All facts are assumed to be achieved by the cheapest action.
- 3. Is admissible.



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Why?



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Why?



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- 2. *h*_{add}
- 3. h_{STRIPS}
- 4. h_{FF}



- 1. *h*_{max}
- 2. *h*_{add}
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- 4. *h*_{FF}

Why? Why not *h*_{STRIPS}? Why not *h*_{FF}?



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- 2. *h*_{add}
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Why?

Why not *h*_{STRIPS}? Why not *h*_{FF}?



- 1. *h*_{max}
- 2. *h*_{add}
- 3. h_{STRIPS}
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Why?

Why not *h*_{STRIPS}?

Why not hef?



- 1. *h*_{max}
- 2. h_{add}
- 3. h_{STRIPS}
- 4. *h*_{FF}

Why?
Why not *h*_{STRIPS}?
Why not *h*_{FF}?

