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Principles of AI Planning

Exercise Sheet 7

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Exercise 7.1 - Inaccuracy of h_{max}

Prove that the heuristic h_{max} is arbitrarily inaccurate.

Exercise 7.2 - Stability of h_{add}

Show that it is important to test for stability when computing h_{add} by giving an example where you get an unnecessarily high overestimation when not performing this test.

Exercise 7.3 - Relaxed planning graph and heuristics

Consider the relaxed planning task Π^+ with variables $A = \{a, b, c, d, e\}$, operators $O = \{o_1, o_2, o_3\}$, $o_1 = \langle d, c \wedge (c \triangleright e) \rangle$, $o_2 = \langle c, a \rangle$, $o_3 = \langle a, b \rangle$, goal $\gamma = b \wedge e$ and initial states $s = \{a \mapsto 0, b \mapsto 0, c \mapsto 0, d \mapsto 1, e \mapsto 0\}$. Solve the following by drawing the relaxed planning graph for the lowest depth k that is necessary to extract a solution

- (a) Calculate $h_{max}(s)$ for Π^+
- (b) Calculate $h_{add}(s)$ for Π^+