Action Language $\mathcal{C}$: Problems

Problems 16–18 are about domain description (5) from the paper *An Action Language Based on Causal Explanation: Preliminary Report* by Giunchiglia and Lifschitz. The reasoning given there shows that transition $\langle \overline{P}Q, A, PQ \rangle$ is causally explained by (5), and transition $\langle \overline{P}Q, \overline{A}, PQ \rangle$ is not.

Problem 16. Check that transition $\langle PQ, A, PQ \rangle$ is causally explained by (5).

Problem 17. Show that a transition of the form $\langle s, \overline{A}, s' \rangle$ is causally explained by (5) iff $s = s'$.

Problem 18. How will the transition system represented by (5) change if we (i) drop the last line of (5)? (ii) drop the first line of (5)? (iii) drop the first four lines of (5)?

Problem 18$'$. Draw the transition system described by the propositions

$$\begin{array}{l} \textbf{default } P \\ A \textbf{ causes } \neg P. \end{array}$$

Problem 19. Give a fully adequate formalization of the domain from Problem 9 (robot with two grippers) in $\mathcal{C}$.

Problem 20. Give a fully adequate formalization of the domain from Problem 13b (two lightswitches) in $\mathcal{C}$.