

# Science of Computational Logic

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## Problem 7.1

Give a logic program  $\mathcal{P}$  and its completion  $C_C(\mathcal{P})$  such that the following holds:

$$\{\neg A \mid \neg A \in C(\mathcal{P})\} \neq \{\neg A \mid \neg A \in C_C(\mathcal{P})\}$$

(Justify your answer.)

## Problem 7.2

Find non-stratifiable programs  $K_1$  and  $K_2$  such that

- $C_C(K_1)$  is satisfiable, and
- $C_C(K_2)$  is unsatisfiable.

## Problem 7.3

Consider the language  $\mathcal{L}(\mathcal{R}, \mathcal{F}, \mathcal{V})$  with  $\mathcal{R} = \{p/1\}$  and  $\mathcal{F} = \{a/0, b/0, c/0\}$ .

Let  $G$  be the formula  $p(a) \wedge (p(b) \vee p(c))$ .

- Determine  $\text{Circ}(G, p)$ .
- Find two instantiations  $G_1$  and  $G_2$  of  $\text{Circ}(G, p)$  such that

$$\{G, G_1, G_2\} \models (\forall X)(p(X) \rightarrow X \approx a \vee X \approx b) \vee (\forall X)(p(X) \rightarrow X \approx a \vee X \approx c).$$

Hint: Combine the ideas from Exercise 1 (slides 23-24) and Exercise 2 (slides 26-27) from the lecture.