

Foundations of Logic Programming

Prof. Michael Thielscher, Sebastian Voigt

International Master Program in Computational Logic — winter term 2008/2009

Date of Exercise: 19.01.2009

Exercise 6.1

Reconsider the program P from Exercise 5.3:

$$\begin{aligned} & num(0) \\ & num(s(x)) \leftarrow num(x) \\ & odd(s(x)) \leftarrow \neg odd(x), num(x) \end{aligned}$$

- Is P allowed? Is the query $\neg odd(s(s(0)))$ allowed? Is the query $odd(x)$ allowed?
- Give a query such that $P \cup \{Q\}$ flounders.
- Construct the dependency graph D_P of P .
- Is P strict with respect to any query Q ?
- Is P stratified?

Exercise 6.2

Compute $comp(P)$ for the following program P :

$$\begin{aligned} & member(x, [x|_]) \leftarrow \\ & member(x, [_|xs]) \leftarrow member(x, xs) \\ & is_set([]) \leftarrow \\ & is_set([x|y]) \leftarrow \neg member(x, y), is_set(y) \end{aligned}$$

Exercise 6.3

Let P be the following program. Show that p is not a semantic consequence of $comp(P)$.

$$\begin{aligned} & p \leftarrow \neg q(x) \\ & q(a) \leftarrow \end{aligned}$$

Exercise 6.4

Consider the following program P :

$$\begin{aligned} & p(x) \leftarrow q(x), \neg p(b) \\ & p(b) \leftarrow \neg q(b) \\ & q(a) \leftarrow \end{aligned}$$

- Give all Herbrand interpretations $I \subseteq HB_{\{p,q\},\{a,b\}}$ that are a model for P .
- Which of the Herbrand models from a) are supported?
- Give all standardized Herbrand interpretations $I_{=}$ that are a model for $comp(P)$.