

Foundations of Logic Programming

Tutorial 4 (on December 20th)

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Exercise 5.1:

Consider the following program \mathcal{P} :

$$\begin{aligned} & p(X, X, c). \\ & p(f(X), Y, f(Z)) \text{ :- } p(X, Y, Z). \end{aligned}$$

- Indicate the Herbrand universe HU_F and the Herbrand base $HB_{\Pi, F}$ determined by \mathcal{P} .
- Give the least Herbrand model \mathcal{I}_1 of \mathcal{P} .
- Give a Herbrand model \mathcal{I}_2 of \mathcal{P} , different from \mathcal{I}_1 .
- Give a classical model model \mathcal{I}_3 of \mathcal{P} , different from \mathcal{I}_1 and \mathcal{I}_2 .

Exercise 5.2:

Take the following program P :

$$\begin{aligned} & p \leftarrow . \\ & p \leftarrow p. \\ & q \leftarrow r. \\ & q \leftarrow \neg r, p. \\ & r \leftarrow \neg p. \\ & t \leftarrow q. \\ & t \leftarrow r, \neg q. \end{aligned}$$

- Construct the dependency graph D_P of P .
- Is P stratified and/or hierarchical?
- Give a stratification of P .
- Using your stratification to show how to compute the standard model M_P of P .

Exercise 5.3

Consider the following program:

```
p(a). (1)
p(b). (2)
r(b). (3)
p(c). (4)
p(d). (5)
r(d). (6)
naf(X) ← X,!,fail. (7)
naf(X). (8)
q(X) ← p(X), naf(r(X)). (9)
```

- a) Provide the full Prolog tree for the query `?- q(X)`.
- b) Indicate explicitly if branches are eliminated from the tree.
- c) Give the output in the order of the computation.