Slide 1

Exercise 1:

- Write a rule with exceptions using classical logic.
- Give an example why a rule $\frac{\alpha_1, \ldots, \alpha_m}{\varphi}$ cannot be replaced by an implication $(\alpha_1 \wedge \cdots \wedge \alpha_m) \rightarrow \varphi$.
- Prove:
  Theorem. Let $(\mathcal{D}, W)$ a default theory.
  1. If $F \subseteq \mathrm{just}(\mathcal{D})$ is $(\mathcal{D}, W)$-full, then $\mathrm{Cn}_{\mathrm{Mon}(\mathcal{D},F)}(W)$ is an extension of $(\mathcal{D}, W)$.
  2. If E is an extension of $(\mathcal{D}, W)$, then $F = \{\psi \in \mathrm{just}(\mathcal{D}) \mid \neg\psi \notin E\}$ is $(\mathcal{D}, W)$-full and $E = \mathrm{Cn}_{\mathrm{Mon}(\mathcal{D},F)}(W)$.
- Determine all the extensions of a default theory $(\mathcal{D}, W)$ where $W = \{\}$, $\mathcal{D} = \{\frac{: \neg p_1, \neg p_2}{p_0}, \frac{: \neg p_0, \neg p_2}{p_1}, \frac{: \neg p_0, \neg p_1}{p_2},\}$

Slide 2

Exercise 2:

- Write a default theory whose extensions correspond to strategic sets. For simplicity assume that each product can be produced by at most two companies and that a company can be controlled by at most three companies.
- Prove the corollary of the soundness and completeness theorem for **extensions** using the theorem.
- Give an example where sceptical consequence can be established without generating any extensions.

Slide 3

Exercise 3:

- Determine the stable models of the program

  $a \leftarrow not\ \hat{a}$ $\quad f \leftarrow \hat{a}, b, not\ f$

  $\hat{a} \leftarrow not\ a$ $\quad f \leftarrow a, b, not\ f$

  $b \leftarrow not\ \hat{b}$

  $\hat{b} \leftarrow not\ b$

- Determine the stable models of the program

  $v(X) \leftarrow d(X), not\ ov(X)$

  $ov(X) \leftarrow d(X), v(Y), not\ eq(X, Y)$

  $eq(X, X) \leftarrow d(X)$

  $d(a) \leftarrow$

  $d(b) \leftarrow$

Slide 4

Exercise 4:

- Determine using the **smodels** procedure the stable models of the program

  $p \leftarrow not\ q \wedge r$

  $q \leftarrow not\ p$

  $r \leftarrow not\ s$

  $s \leftarrow not\ p$

- Determine using the **smodels** procedure whether t is contained in every stable models of the program

  $p \leftarrow not\ q$ $\quad r \leftarrow q$

  $q \leftarrow not\ p$ $\quad s \leftarrow not\ r$

  $r \leftarrow p$ $\quad t \leftarrow not\ s$