

## Homework – Week 4 (Part 1)

- Read chapter 4
- Graded assignment: Find the grounding, answer sets and corresponding reducts of:

$$\Pi = \left\{ \begin{array}{l} \textit{bird}(X) \leftarrow \textit{penguin}(X). \\ \textit{flies}(X) \leftarrow \textit{bird}(X), \textit{not } \textit{ab}(X), \textit{not } \neg \textit{flies}(X). \\ \neg \textit{flies}(X) \leftarrow \textit{penguin}(X). \\ \textit{ab}(X) \leftarrow \textit{injured}(X). \\ \textit{flies}(X) \textit{ or } \neg \textit{flies}(X) \leftarrow \textit{injured}(X). \\ \textit{penguin}(\textit{tweety}). \\ \textit{bird}(\textit{fred}). \\ \textit{injured}(\textit{fred}). \end{array} \right.$$

- Submit, in a single text file, the reducts and the answer sets. (See last page of this pdf.) Instructions:
  - In the text file, use “:-” followed by a space instead of “←”
  - In the text file, use “-” instead of “¬”
  - Name the file “week4-your\_Drexel\_username.txt”, e.g. “week4-js1232.txt”
  - Example: “ $p(a) \leftarrow \neg q(a).$ ” becomes “ $p(a) \text{ :- } -q(a).$ ”

## Homework – Week 4 (Part 2)

- Recommended, but not to be submitted: do exercises 1, 2, 7 from chapter 7. Try to run the resulting programs in CLINGO.  
Suggestion: to avoid some technical problems associated with reasoning algorithms introduce class *person*:

*person(john). person(mike). person(kathy). etc.*

and use it in rules as the range for the corresponding variables, e.g.:

*brother(X, Y) ←*  
*person(X), person(Y), person(F), person(M),*  
*gender(X, male),*  
*father(F, X), father(F, Y),*  
*mother(M, X), mother(M, Y),*  
*X ≠ Y.*

# Sample Submission File for the Graded Assignment

Grounding:

$p(a) :- q(a), \text{ not } -r(a).$

$p(b) \text{ or } p(c) :- q(b), \text{ not } r(b).$

$q(b).$

$-r(a).$

Answer set S1: {  $q(b)$ ,  $-r(a)$ ,  $p(b)$  }

Reduct w.r.t. S1:

$p(a) :- q(a).$

$q(a).$

$q(b).$

Answer set S2: ...

Reduct w.r.t. S2: ...

Answer set S3: ...

Reduct w.r.t. S3: ...

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