Answer Set Programming

(3) Handling of variables in ASP

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COMP4418

Overview of the Lecture

- Semantics of ASP programs

- Extensions of ASP programs

- **Handling of variables in ASP**

- ASP as modelling language

Programs with Variables

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  - U contains all $f(t_1, \ldots, t_k)$ if f is a k-ary function in P and U contains $t_1, \ldots, t_k$

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- ASP **grounds** variables with Herbrand universe
  - ▶ Unlike Prolog: instantiation instead of unification
  - ▶ ⚠ the ground program may grow exponentially (or worse)
  - ▶ ⚠ function symbols make grounding Turing-complete
  - ▶ If P is finite and mentions only constants, grounding is finite

Programs with Variables

- $f(X) \leftarrow b(X), \text{not } a(X).$
  $a(X) \leftarrow p(X).$
  $b(\text{sam}).$
  $b(\text{tweety}).$
  $p(\text{tweety}).$

- $f(\text{sam}) \leftarrow b(\text{sam}), \text{not } a(\text{sam}).$
  $f(\text{tweety}) \leftarrow b(\text{tweety}), \text{not } a(\text{tweety}).$
  $a(\text{sam}) \leftarrow p(\text{sam}).$
  $a(\text{tweety}) \leftarrow p(\text{tweety}).$
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