

# Rules

## General Form:

If *Precondition* then *Conclusion*

## Production Rules:

If *Precondition* then *Action*

- *Precondition* can be as complex as the expressiveness of the framework allows (i.e. conjunction or general logical formulas and/or negation)

# RuleML

- Started **around 2000** as an **open community initiative**
- Goal: provide **XML-based rule markup** for:
  - Logic rules
  - Derivation rules
  - Production rules
- Evolved into a **family of rule languages** (Horn rules, Datalog, reaction rules, etc.)

# SW and Rules

- **OWL is declarative & taxonomical, but rules infer new relationships**

- hasChild (Alice,Bob)

hasChild(Bob,Tim)

Person(Alice)

$\text{Person}(X) \wedge \text{hasChild}(X,Y) \wedge \text{hasChild}(Y,Z) \rightarrow$   
 $\text{Grandparent}(X,Z)$

$\rightarrow \text{Grandparent}(\text{Alice},\text{Tim})$

# RIF — Rule Interchange Format (W3C Standard)

- Designed for exchanging rules across systems.
- Profiles:
  - **RIF-BLD** (Basic logic dialect): general reasoning
  - **RIF-PRD** (Production rules): event/action oriented
  - **RIF-Core**: Shared minimal subset

- Developed by the W3C (2005–2013)
- Goal: create a **standard rule interchange format** for the Semantic Web
- Explicitly designed to **interoperate with existing rule systems**, including:
  - RuleML
  - Prolog-like systems
  - Jess, Drools, etc.
- Design influenced by RuleML

# SWRL — Semantic Web Rule Language

- **General Form:**

*Atom1  $\wedge$  Atom2  $\wedge$  ...  $\rightarrow$  AtomResult*

- Example:

Parent(?x, ?y)  $\wedge$  Parent(?y, ?z)  $\rightarrow$   
Grandparent(?x, ?z)

- **Limitations**

- Not decidable in full generality
- No rule negation or disjunction