# Sample Generator

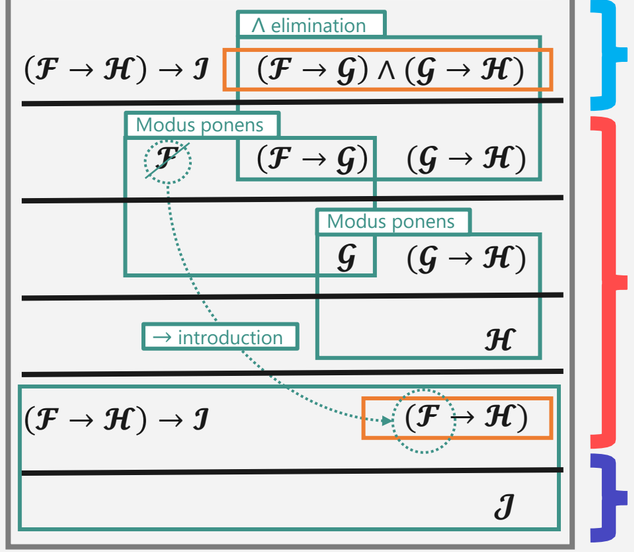
## Design Principles

1. Include unknown facts.
2. Include negative facts.
3. Include various reasoning rules.
4. Include various linguistic expressions.

## Completeness Theorem

Multistep deduction by the axioms can express any other deduction rules, such as syllogism.

## Multi-step Deductive Reasoning




# Logical Reasoning Sample

**Facts** (w/negatives = fact3, fact4):

1. If that if a Foo star exists a Haz star also exists, then a Jaz star exists. $(\mathcal{F} \to \mathcal{H}) \to \mathcal{J}$
2. If a Foo star exist a Gaz star exists, and if a Gaz star exists a Haz star also exists. $(\mathcal{F} \to \mathcal{G}) \wedge (\mathcal{G} \to \mathcal{H})$
3. If a Foo star exists and a Kax star exists, then a Jaz star exists. $(\mathcal{F} \wedge \mathcal{K}) \to \mathcal{J}$
4. If a Haz star exists, then a Gaz star exists. $\mathcal{H} \to \mathcal{G}$

**Hypothesis:**

A Jaz star exists. $\mathcal{J}$

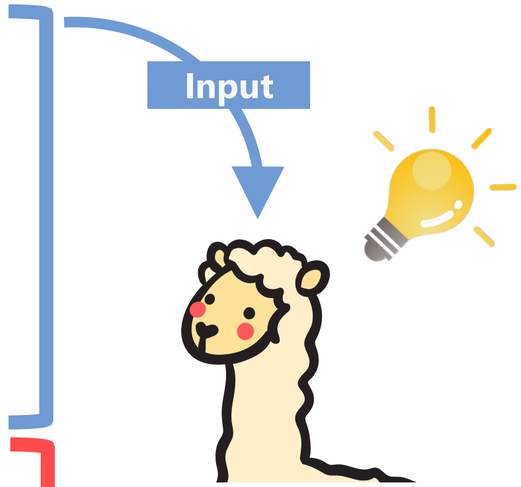
**Logical steps:**

Fact2 → If a Foo star exist a Gaz star exists. $(\mathcal{F} \to \mathcal{G})$

Assume that a Foo star exists. → A Gaz star exists. $\mathcal{G}$

add assumption $\mathcal{F}$

Fact2 → A Haz star exists. $\mathcal{H}$

(remove assumption $\mathcal{F}$) → If a Foo star exists a Haz star also exists. $(\mathcal{F} \to \mathcal{H})$

Fact1 → **A Jaz star exists.**