# Semantics Networks

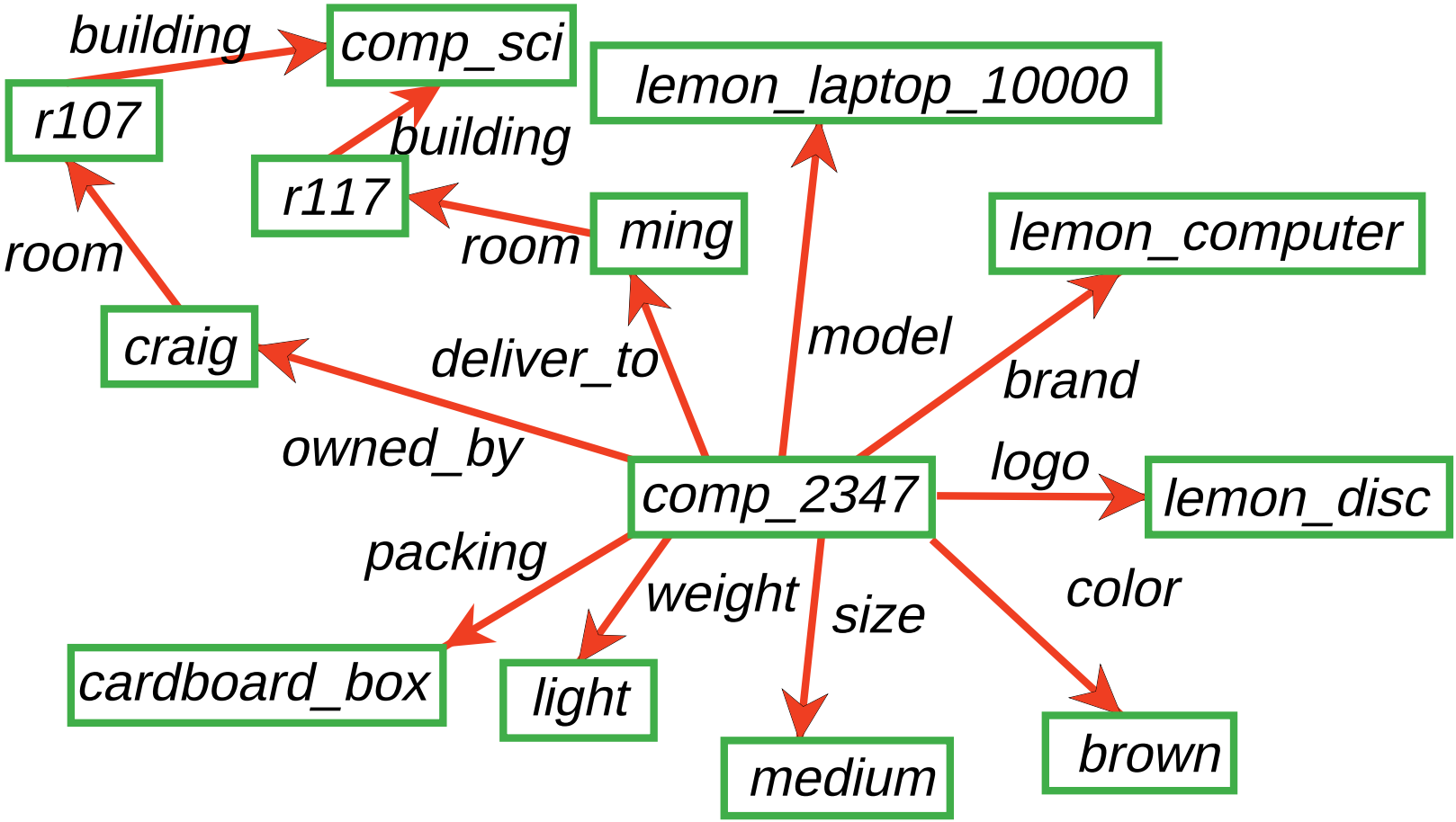
When you only have one relation, *prop*, it can be omitted without loss of information.

Write

$$prop(Obj, Att, Value)$$

as

# An Example Semantic Network



# Equivalent Logic Program

*prop*(*comp_*2347, *owned_by*, *craig*).

*prop*(*comp_*2347, *deliver_to*, *ming*).

*prop*(*comp_*2347, *model*, *lemon_laptop_*10000).

*prop*(*comp_*2347, *brand*, *lemon_computer*).

*prop*(*comp_*2347, *logo*, *lemon_disc*).

*prop*(*comp_*2347, *color*, *brown*).

*prop*(*craig*, *room*, *r*107).

*prop*(*r*107, *building*, *comp_sci*).

⋮

# Frames

The properties and values for a single object can be grouped together into a frame.

We can write this as a list of *attribute* = *value* or *slot* = *filler*.

$$
\begin{aligned}
&[owned\_by = craig,\\
&deliver\_to = ming,\\
&model = lemon\_laptop\_10000,\\
&brand = lemon\_computer,\\
&logo = lemon\_disc,\\
&color = brown,\\
&\ldots]
\end{aligned}
$$

# Primitive versus Derived Relations

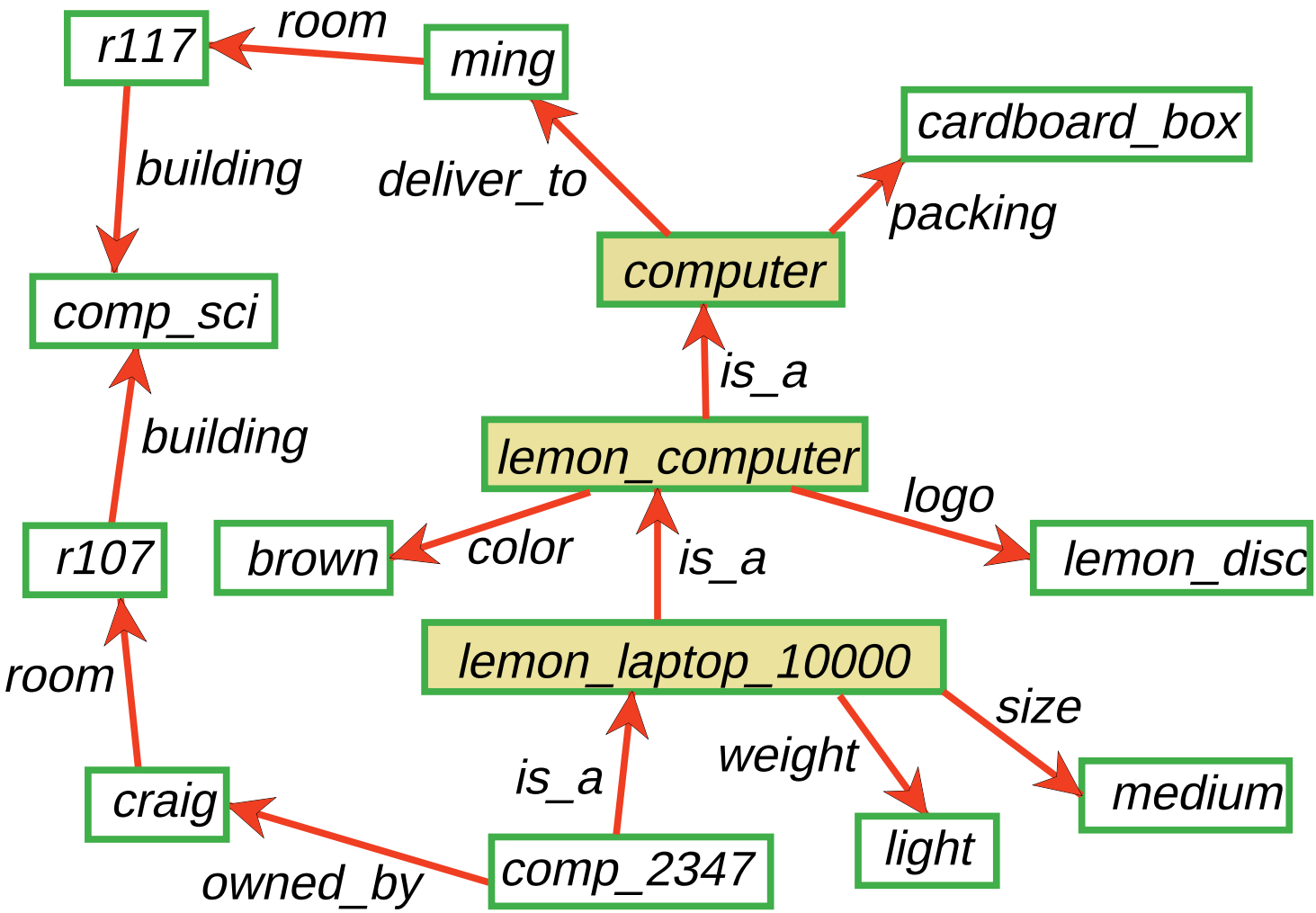
Primitive knowledge is that which is defined explicitly by facts.

Derived knowledge is knowledge defined by rules.

Example: All lemon laptops may have have *size* = *medium*. Associate this property with the class, not the individual.

Allow a special attribute *is_a* between an individual and a class or between two classes that allows for property inheritance.

# A Structured Semantic Network



# Logic of Property Inheritance

An arc $\xrightarrow{p} n$ from a class $c$ means every individual in the class has value $n$ of attribute $p$:

$$prop(Obj, p, n) \leftarrow$$
$$prop(Obj, is\_a, c).$$

Example:

$$prop(X, weight, light) \leftarrow$$
$$prop(X, is\_a, lemon\_laptop\_10000).$$
$$prop(X, is\_a, lemon\_computer) \leftarrow$$
$$prop(X, is\_a, lemon\_laptop\_10000).$$

# Choosing Primitive and Derived Relations

- Associate an attribute value with the most general class with that attribute value.
- Don’t associate contingent properties of a class with the class.
- Axiomatize in the causal direction. You want knowledge that is stable as the world changes.