

Frames

Logic and Rules

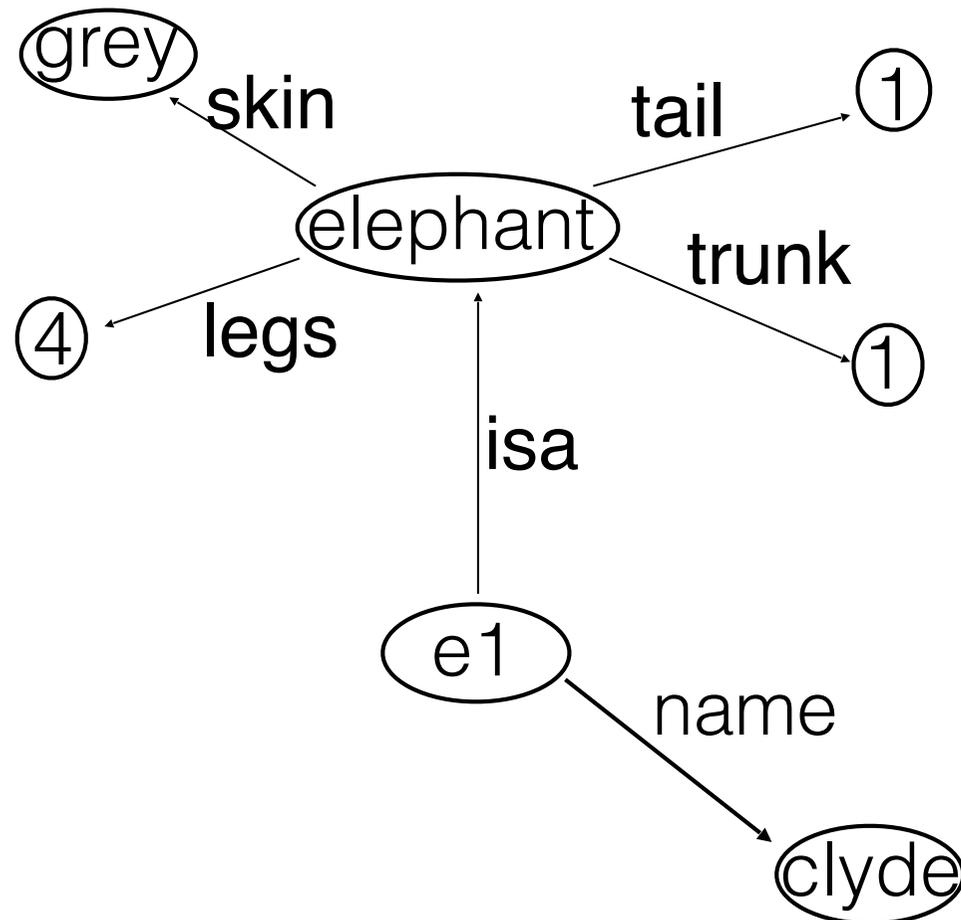
- Symbolic representation
- Inference mechanism allows conclusions to be drawn from facts and rules.
- Certainty factors and truth maintenance allow rules to deal with uncertainty.

Common Sense Reasoning

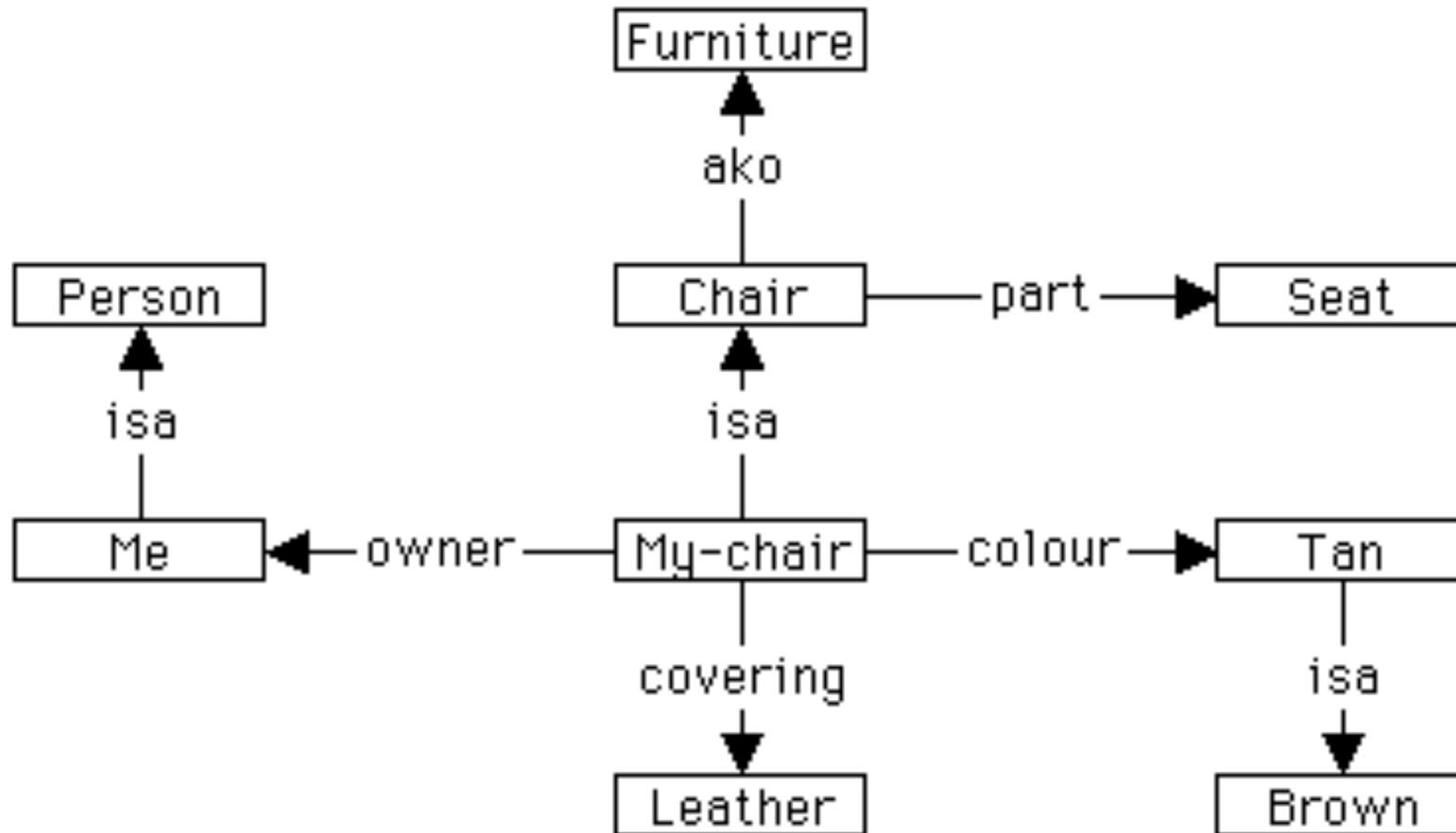
- People have vast background knowledge to cope with everyday situations.
- We don't have to be told everything explicitly because we can call on the background knowledge.
- We use 'default' knowledge to handle situations where knowledge is incomplete.
- This is called common sense reasoning.

Defaults and Inheritance

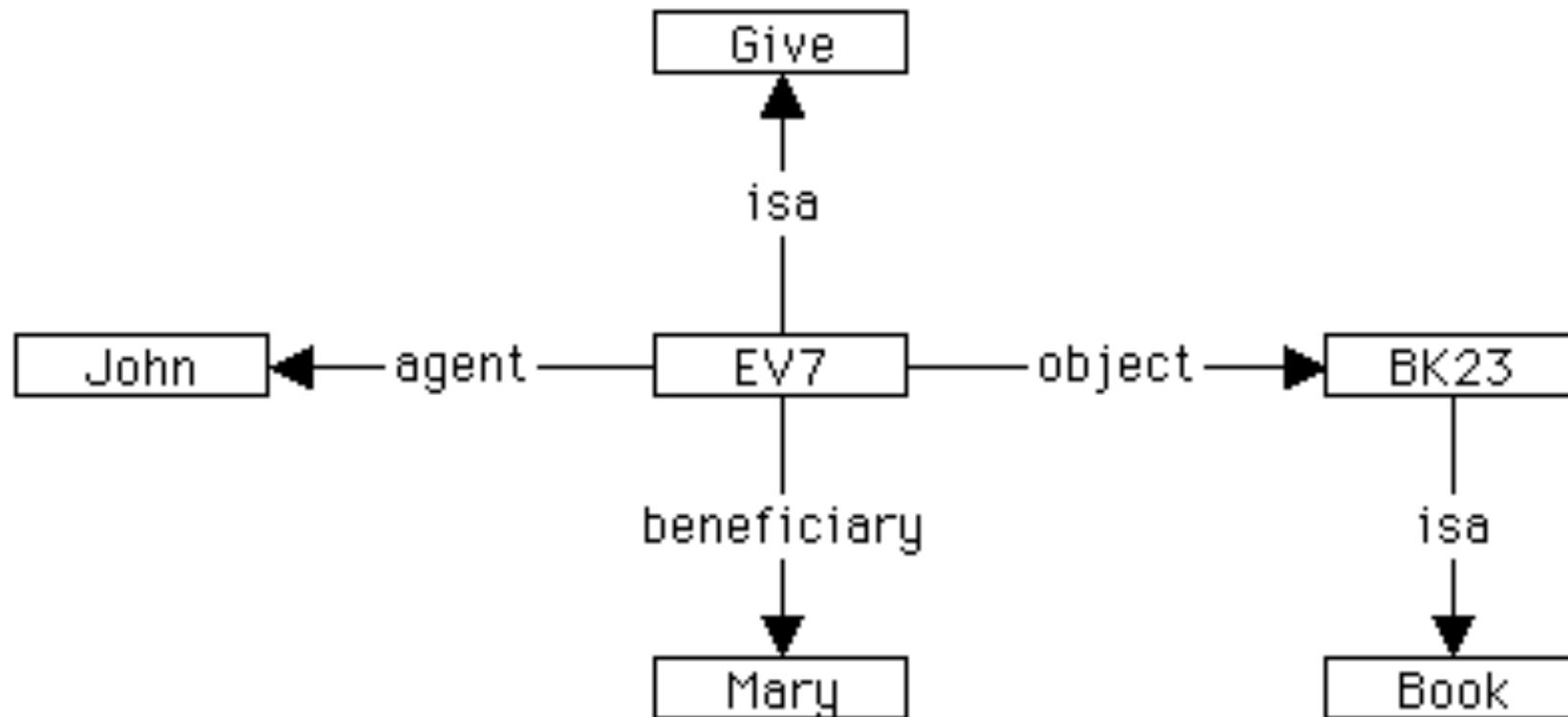
- Inheritance is a way of reasoning by default.
- That is, when information is missing, fall back to defaults.



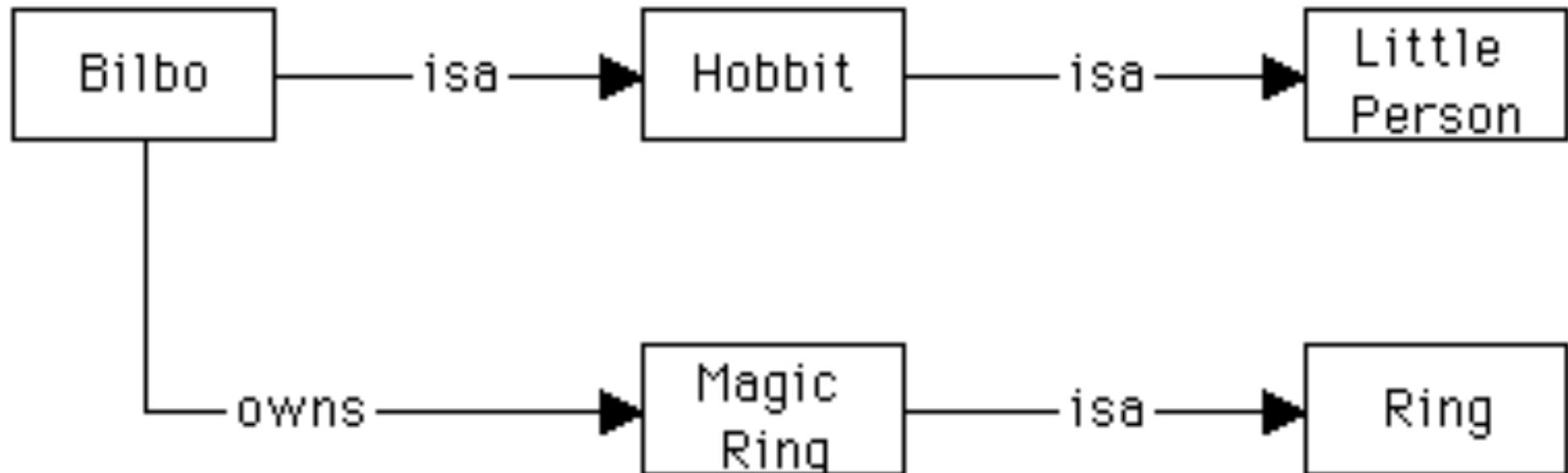
I own a tan leather chair



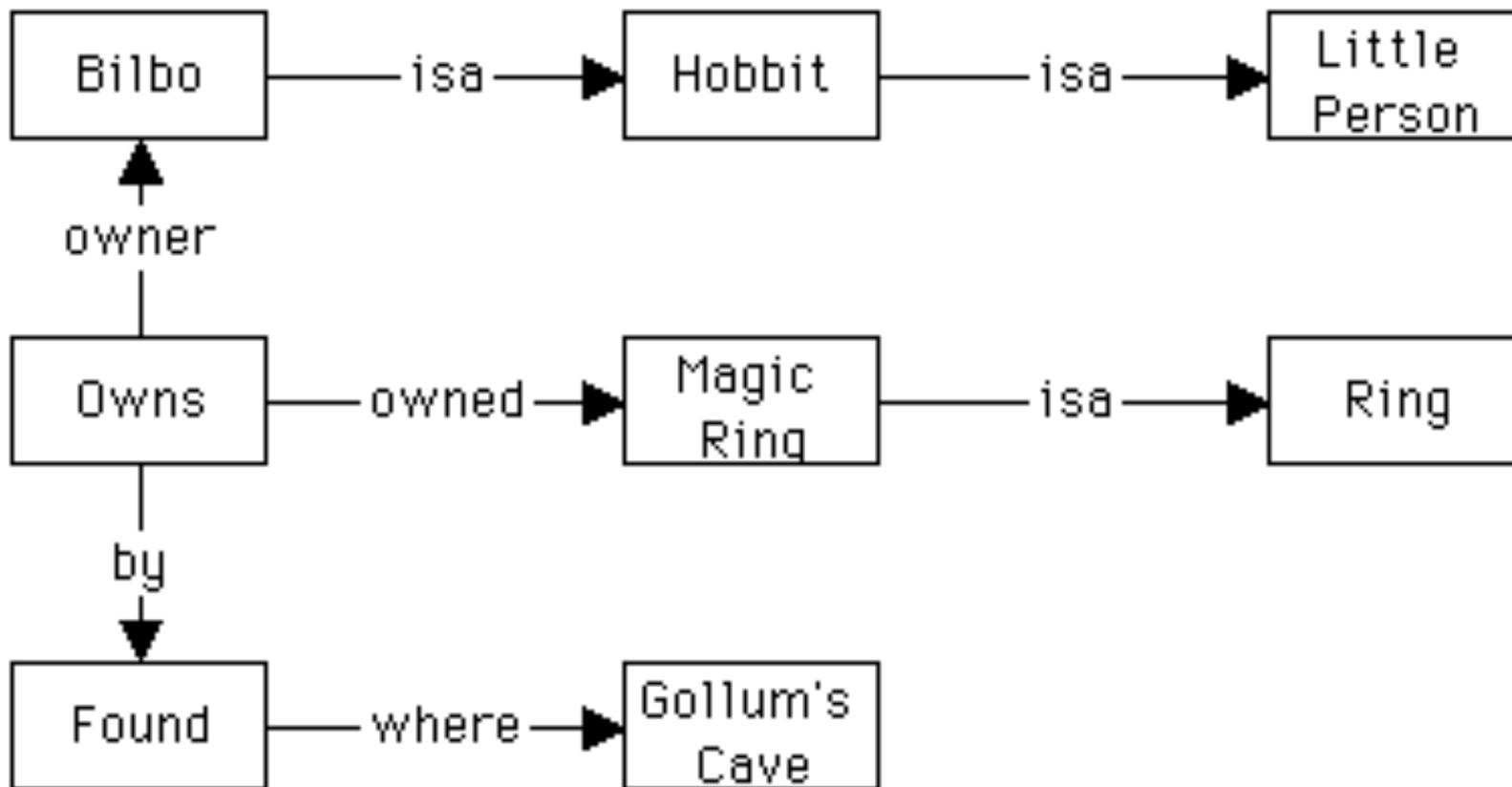
John gave the book to Mary



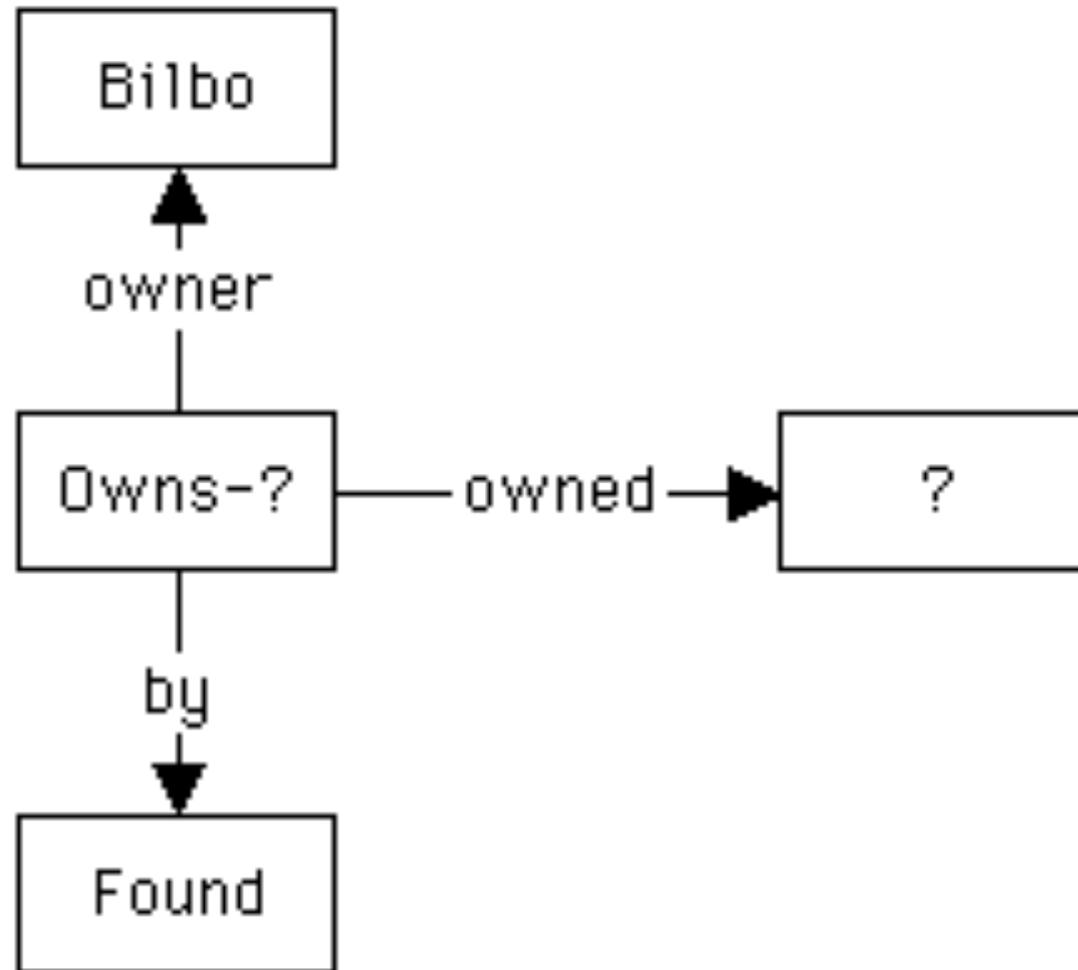
Bilbo owns the magic ring



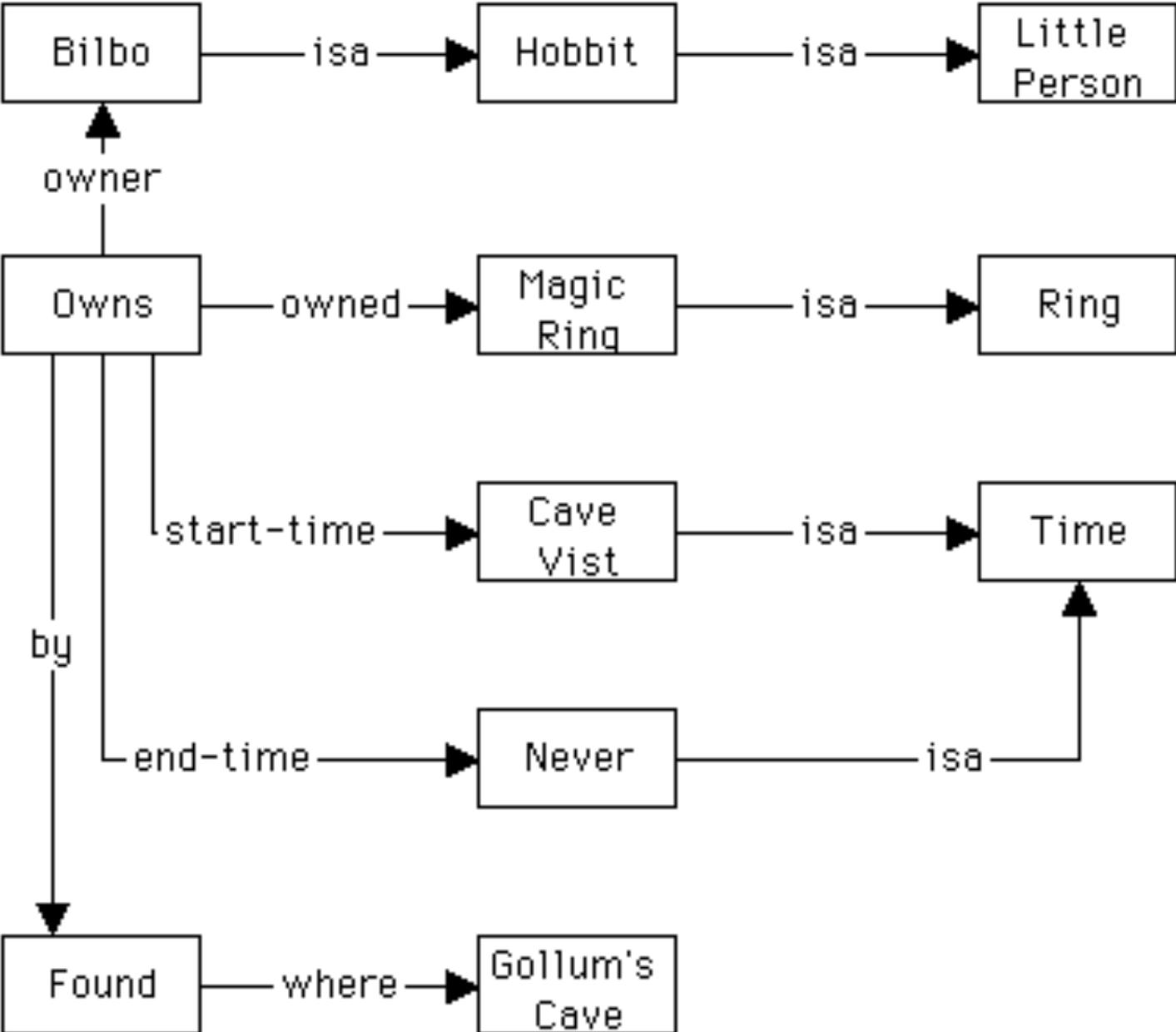
Bilbo found the magic ring in Gollum's cave



What did Bilbo find?

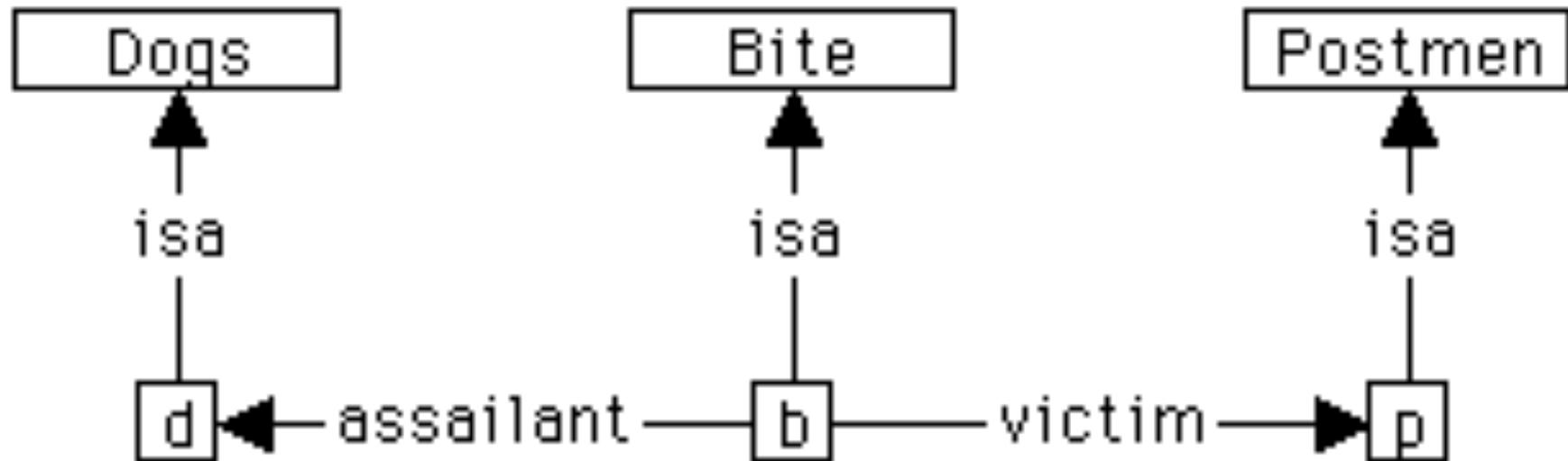


Bilbo found the magic ring when he visited Gollum's cave



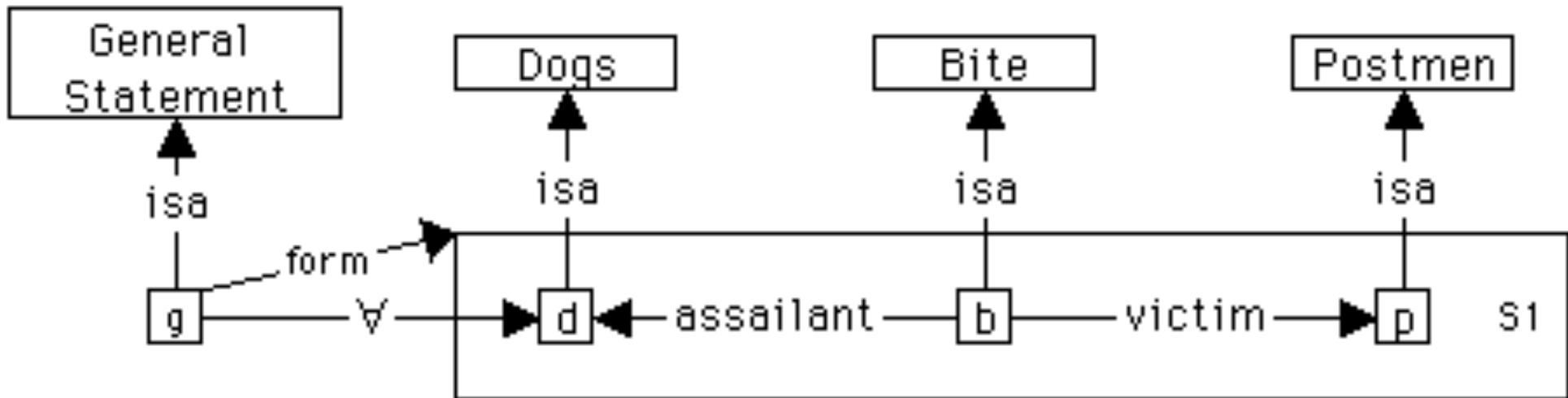
Problems with Semantic Nets

- The dog bit the postman

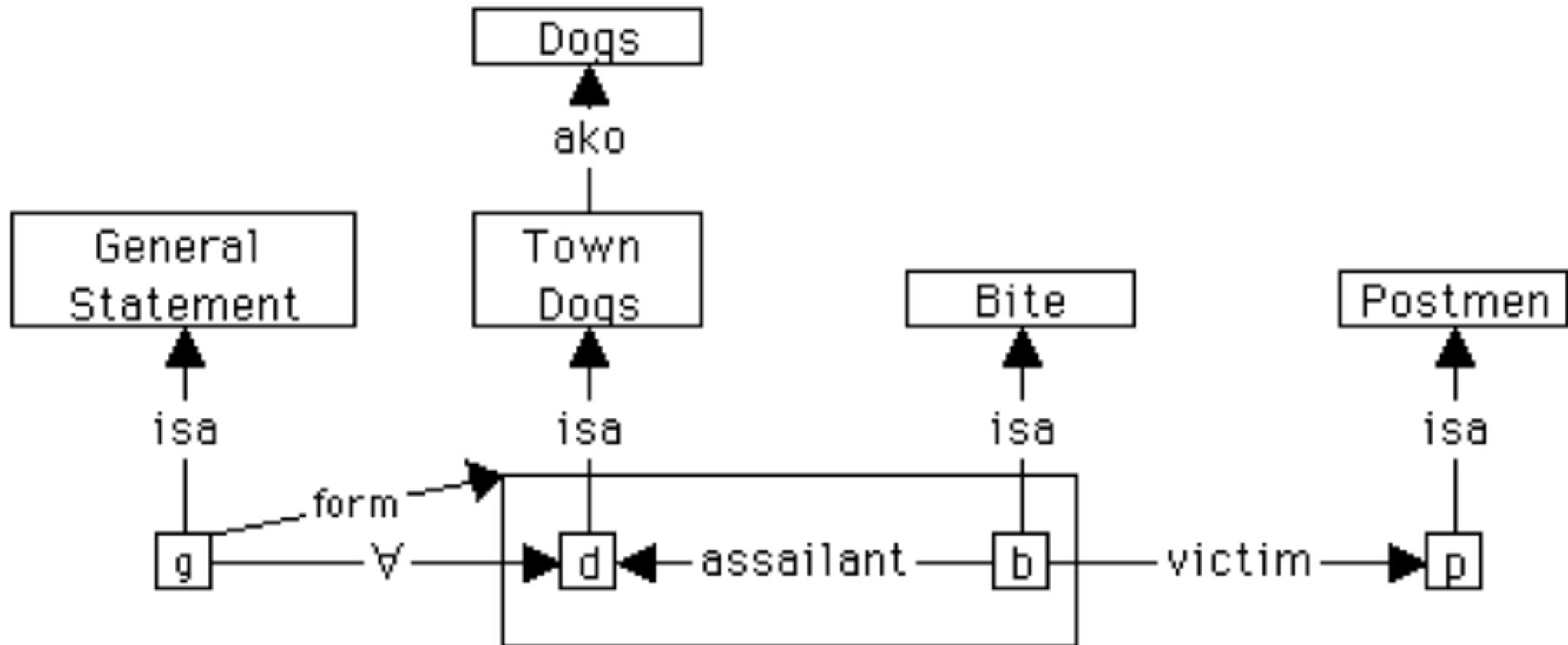


Every dog has bitten a postman

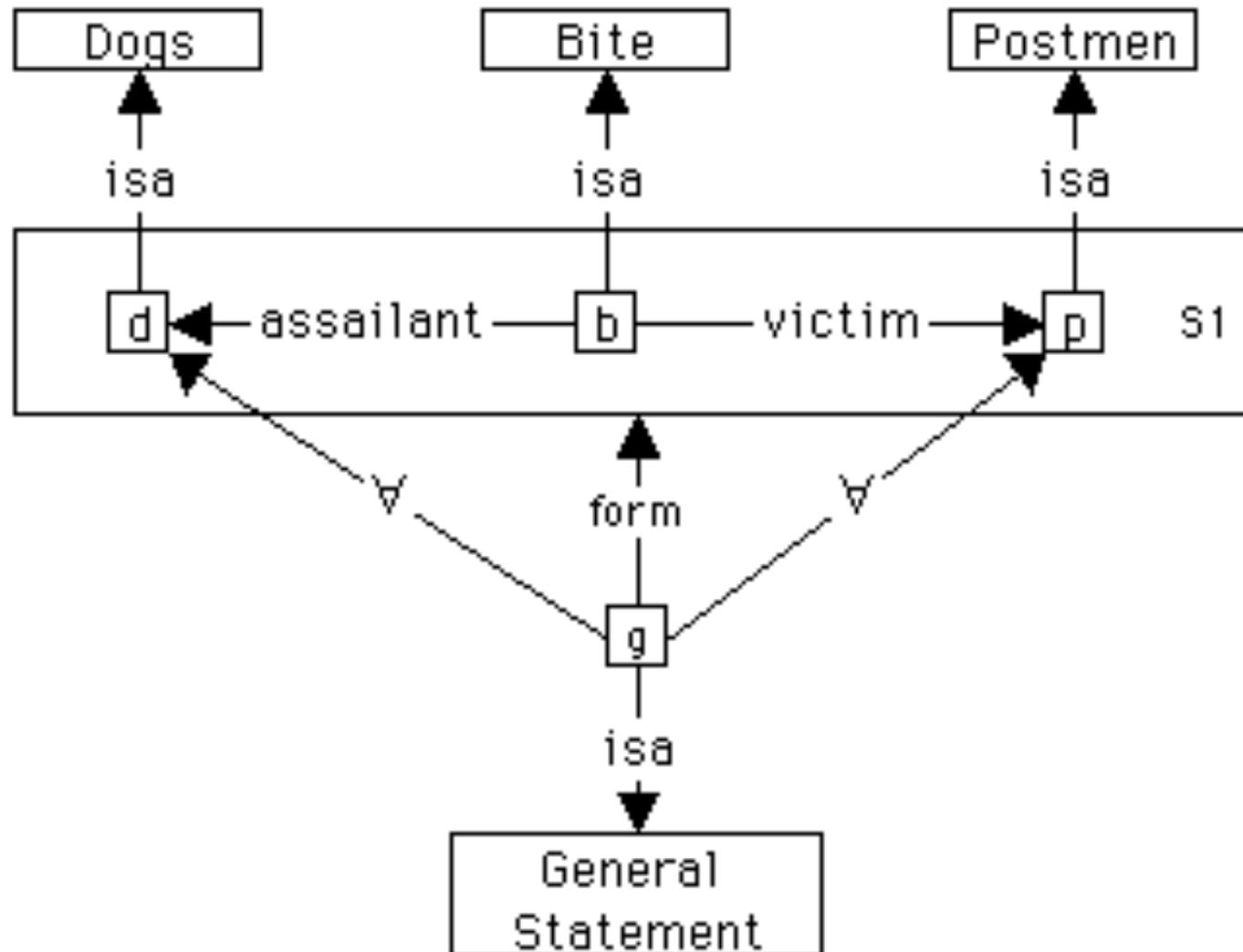
$$(\forall x)\{Dog(x) \rightarrow (\exists y)[Postman(y) \wedge Bite(x,y)]\}$$



Every dog in town has bitten the constable



Every dog has bitten every postman



Frames

- Frames implement semantic networks.
- They add procedural attachment.
- A frame has slots and slots have values.
- A frame may be generic, i.e. it describes a class of objects.
- A frame may be an instance, i.e. it describes a particular object.
- Frames can inherit properties from generic frames.

Dæmons

- Demons are attached to slots to cause side effects when the slot is accessed.
- if-added demons are triggered when a new value is put into a slot.
- if-removed demons are triggered when a value is removed from a slot.
- if-replaced is triggered when a slot value is replaced.

Dæmons (cont'd)

- if-needed demons are triggered when there is no value present in an instance frame and a value must be computed from a generic frame.
- if-new is triggered when a new frame is created.
- cache means that when a value is computed it is stored in the instance frame.

Dæmons (cont'd)

- range is triggered when a new value is added. The value must satisfy the range condition.
- help is triggered when the range demon is triggered and returns false.
- multi-valued means that the slot may contain more than one value.