

050.334/634 — Computational models of Cognition

Lab 1: Due 9/30/05

Read the “Modeling Memory” chapter.

Part I

Complete exercises 2.1.1-2.1.5. You will find the necessary prolog file (`semnet.pl`) on the course web site. In doing exercise 2.1.4, you should use the `time/1` predicate rather than `speed/3`. `time` returns both the number of inferences and time taken to evaluate a query, though you should ignore the latter in comparing the queries, since the time is negligible in both cases.

Part II

In exercise 2.1.5, a number of problematic aspects are noted concerning the way in which this semantic network represents information. These are addressed in the frame-based model considered in the second half of the chapter, but we will develop a simpler alternative in this part of the lab.

Question 1: One problem for the way in which queries are evaluated concerns the definition of `has_property`, according to which concepts will always inherit the properties of their superordinates. One way in which we can avoid this is to redefine `has_property` so that inheritance from a higher concept is only considered if that concept is not specified for some property. In order for this to work, we will have to alter our representation of properties in a manner like that suggested in the book on pp.30–31. Redefine the network from part 1 in this way, and give a new definition of `has_property` that functions as desired. You may wish to model your proposal on the (more complex) definition of `has_value` given in the text.

Question 2: Add the following rules using the `if_needed` mechanism discussed on pp.32–33.

1. if an individual is pink, it can't swim.
2. if an individual is small in size, it fears individuals that are large in size.
3. if an individual is color C, it likes individuals that are color C.

Question 3: Modify your definition of `has_property` to allow `if_needed` rules to play a role in inference, following to the strategy of Z-inheritance (described on p.34). According to your network can salmon swim? What would be the result if your network were to use N-inheritance instead?