Overview

Use the “Textual (MzScheme, includes R5RS)” language in DrScheme.

To run: execute the code in ch4-query.ss, then, in the interaction window, type
(initialize-data-base microshaft-data-base)
(query-driver-loop)
for working with the Microshaft Corporation personnel records, or
(initialize-data-base genesis-data-base)
(query-driver-loop)
for working with the father / son relations from Genesis.

If you type (query-driver-loop) and immediately get an error, re-execute ch4-query.ss and re-initialize the database.

Problems

Problem 1  Simple queries:
Exercise 4.55 on page 446.

Problem 2  Compound queries:
Exercise 4.56 on page 448.
(You may only use lisp-value in part b)
Problem 3  Rules:
Exercise 4.58 on page 450.
Simplify the problem to create a rule that someone is a big-shot if they have a supervisor who works in a
different department. The original problem would show (big-shot (Warbucks Oliver)) since Warbucks has
no supervisor at all.

To add a rule to the data-base, at the Scheme iteration level do:

(add-rule! (query-syntax-process

   ,(rule
      (vp ?x)
      (supervisor ?x (Warbucks Oliver))))

(query-driver-loop)

Problem 4  Operations versus logic
Genesis-data-base contains the relationships shown in problem 4.63 on page 453. It contains one extra rule:

(rule
 (parent-of ?child ?parent)
 (or (son ?parent ?child)
     (and (wife ?parent ?wife)
         (son ?wife ?child)))

You can type:

(initialize-data-base genesis-data-base)
(query-driver-loop)

;;; Query input:
(partial ?child ?parent)

to find all child - parent relationships.

We want to define the relation of ancestor.

(rule
 (ancestor-of ?descendant ?ancestor)
 (or (parent-of ?descendant ?ancestor)
     (and (ancestor-of ?descendant ?intermediate)
         (ancestor-of ?intermediate ?ancestor))))

This defines the rule in logic. If we use this rule, the query evaluator goes into an infinite loop after maybe
printing some answers. a) Why?
b) Rewrite the ancestor-of rule so that will print all ancestors for a given person, or all descendants of a
given person and will return to the prompt after printing.
c) Even with your fix, we claim that the revised rule does not really print all descendants of a given person.
Why do we make this claim?