Exercise 6

Integrated Logic Systems (Part I)

Prof. Michael Thielscher, Sebastian Voigt

International Master Program in Computational Logic — summer term 2009

10.07.2009

Exercise 6.1 Repetition

(Chapter 1,2,3: "Prolog")

Consider the following program

$$member(H, [H|T]).$$
$$member(E, [H|T]) \quad :- \quad member(E, T).$$

together with the query $?- L = [a, b], member(X, L)$.

a) Extend the WAM such that predicate $= /2$ is predefined with the expected behaviour.

b) Give the Code for the program and the query.

c) Trace the execution of the code to determine two C.A.S.

Exercise 6.2 Repetition

(Chapter 1,2,3: "Prolog")

Permanent variables need no longer be remembered after all put instructions for the ultimate `call` in the body of a rule are passed. Thus an environment could be discarded before this `call` in order to save space on the stack.

Properly change the WAM to achieve the mentioned effect and test it with the query $?- p(A, B)$. and the program

$$p(X, Y) \quad :- \quad q(X), r(Y).$$
$$q(a).$$
$$r(b).$$

Exercise 6.3 Repetition

(Chapter 4: "Tableaux Prover")

Prove that for all concept descriptions C and D: D subsumes C iff $C \sqcap \neg D$ is unsatisfiable.

Exercise 6.4 Repetition

(Chapter 5: "Answer Set Programming")

Consider the following scenario: We assume that a bird can fly if the converse is not explicitly stated. We also assume that a penguin does not fly. Now let tux be a penguin and tweety be a chicken (both are birds).

a) Give an encoding of this scenario using an ASP with *classical negation* (cf. Slides 5/14-15).

b) Use the propagation rules to derive that your encoding entails that tweety flies whereas tux does not fly (where a program P entails a ground literal l if l is satisfied by every answer set of P).