

CS322 Fall 1999  
Module 7 (Knowledge Representation Issues)  
Assignment 7

Due: 1:30pm, Friday 29 October 1999.

The aim of this assignment is to learn about some knowledge representation issues that will be used later in the course.

### Question 1

Consider the relations:

- $course(Id, Year, Inst, Room, Limit)$  that is true if the course with identifier  $Id$ , in year  $Year$  has instructor  $Inst$ , is held in room  $Room$  and has a limit of  $Limit$  students.
- $limit(Id, Year, Limit)$  that is true if the course with identifier  $Id$ , in year  $Year$  has a limit of  $Limit$  students.

Consider the knowledge base:

```
limit(Id,Year,Limit) <-  
  course(Id,Year,Inst,Room,Limit).  
course(cs322,1999,david,cicsr208,120).  
course(cs322,1998,craig,cicsr208,100).  
course(cs327,1999,jim,cicsr202,50).
```

- Give the knowledge base where we represent the  $course$  relation using the object-attribute-value representation. (I.e., specify the above three facts for  $course$  in terms of the  $prop$  relation.)
- Define  $limit$  in terms of this new representation for the course information. (The  $limit$  relation should have the same semantics as before.)
- Explain why it may be advantageous to use the object-attribute-value representation for course information.

Check that your representation works with CILog. Your new axiomatization should be able to answer exactly the same  $limit$  queries as the original version.

## Question 2

Suppose a conditional expression is either:

- a value, where a value is either a number or is a Boolean value (*true* or *false*); or
- is of the form *if(Att, Then, Else)* where *Att* is a Boolean attribute, and *Then* and *Else* are conditional expressions.

You are to write a relation

- *ceval(Obj, CE, Val)* where *Obj* is an object, *CE* is a conditional expression and *Val* is the resulting value of evaluating the conditional expression for the individual *Obj*.

To evaluate a conditional expression for an individual is simple: if the conditional expression is a value, then that value is returned. If the conditional expression is of the form *if(Att, Then, Else)*, then if the value of the attribute *Att* for the individual is *true*, you evaluate the *Then* conditional expression, otherwise evaluate the *Else* conditional expression.

For example, given the knowledge base:

```
prop(cs322, fun, true).  
prop(cs322, easy, false).  
prop(cs322, interesting, true).  
prop(cs322, confusing, true).
```

Then *ceval(cs322, if(fun, if(easy, 99, 80), if(confusing, 55, 70)), Val)* should return *Val = 80*.

## Question 3

For each question in this assignment, say how long you spent on it. Was this reasonable? What did you learn?