COSC 4P79 Expert Systems
Date: Wednesday March 26, 2008
Instructor: Brian Ross

NAME (print): _____

STUDENT NUMBER: _____

All questions are to be answered on the test paper. Use the backs of pages if necessary.
Please keep written answers brief and to the point.
No aids are permitted, other than a calculator without a memory bank, and a 3" by 5" index card with handwritten notes.
Use or possession of unauthorized materials will automatically result in the award of a zero grade for this test.

Question	Total	Mark
1	**20**	
2	**14**	
3	**16**	
4	**30**	
Total:	**80**	

Question 1 [20] Define the following terms as used in the course:

a) conflict set

b) MYCIN cutoff threshold

c) expert system shell

d) slot

e) semantic gap

Question 2 [14]

Discuss the basic architecture of an expert system. Discuss the function and relevance of all the components. Use a diagram.

Question 3 [16]

(a) [8] Define forward chaining and backward chaining. Compare and contrast these two concepts, as they pertain to expert system problems.

(b) [4] Consider the following KB rules (in Prolog notation):

1) p :- q, r.
2) p :- r, w.
3) r :- s.
4) r :- t.
5) q.
6) s.
7) w.

Show a complete computation tree for the query "?- p", using Prolog's style of backward chaining. Show what rules are used in the tree nodes and the order in which backtracking visits the nodes.

(c) [4] Show a possible forward chaining inference for the above rules, given that the known facts are q, s, and w. Be sure to show each step of the inference, and the rules used.

Question 3 (cont)

Question 4 [30] Select **three** of the following.

(a) Define the term “knowledge acquisition”. Discuss its importance with respect to building expert systems. Also discuss the general process of performing knowledge acquisition over the life of a project.

(b) Identify and discuss 2 different interview strategies that can be used for knowledge base creation. Indicate when these strategies are most effective, and why.

(c) Discuss the basic model of software/systems development that is most successful when building expert systems. Why is this model critical with expert systems?

(d) Discuss the MYCIN model of uncertainty, mentioning some of its highlights. Also compare its inference strategy with “vanilla” backward chaining.

Question 4 (cont)

Question 4 (cont)

?- assert(Good Luck on the Project CF 100).