EE 4785 **Homework 4** **Due: 22 March 1996**

Problem 1: *You come home from a hard days work looking forward to watching your favorite TV program which you expect to find recorded on your VCR. Playing the tape, you discover it's not there. Why?* Write rules for the backward chaining propositional logic ES shell which determines why the show was not recorded. At least five causes must be considered. Share as much data as possible between causes. Be creative.

Here is an example of what should not be done:

```
start:-wipe,deduce(vcrProblemFound).

askable(userSaysVCRbroken,'Is the VCR broken?').
askable(userSaysShowCancelled,'Was the show cancelled?').

aGoalList([vcrBroken,showCancelled]).

r1:if vcrBroken or showCancelled then vcrProblemFound.
r2:if userSaysVCRbroken then vcrBroken.
r3:if userSaysShowCancelled then showCancelled.
```

Besides considering only two causes and glibly repeating the user's last response, the code above does not deduce the cause, it simply asks that a possible cause be confirmed. Instead, questions gathering evidence for possible causes should be asked. For example, getting evidence of a blackout by asking the user if a normally correct clock still has the right time.

Problem 2: Modify the backward chaining ES shell so that rules can be used to prove propositions false. For example,

```
r1:if c and g then h.
r2:if a and b then not c.
r3:if e and f then c.
```

suppose `h` is to be proven true. Then `r1` might be chosen and so the truth value of `c` will have to be determined. Suppose `r2` is chosen to do this and the antecedent of `r2` is true. Then `c` will have been proven false, so there will be no reason to use `r3`, instead the antecedent of `r1` evaluates to false.