CS345A PROBLEM SET #6

Due in class, Monday, May 23, 1994

1) (20 points) Write a GLUE program (a fragment, rather than a complete module, is OK) to perform seminaive evaluation on the following rules:

```
p(X,Y) :- a(X,Y)
p(X,Y) :- q(X,Z) & b(Z,Y)
q(X,Y) :- c(X,Z) & p(Z,Y)
```

2) (20 points) Write a GLUE procedure `alt(R,B:X,Y)` that takes as input two binary relations R and B that we may think of as red and blue arcs, respectively. This procedure is to return the set of pairs of nodes X and Y for which there is an "alternating" path consisting of red and blue arcs, with no two consecutive arcs the same color. Paths may begin and end with arcs of either color. Do *not* use a loop in your procedure. Rather, write NAIL rules to define appropriate IDB predicates that define the desired paths. *Hint*: First, HiLog can be used in NAIL as well as GLUE. Second, it may be helpful to write NAIL rules whose predicates have arbitrary binary relations as two of their arguments.

3) (10 points) Suppose that for each node a there is a relation named $succ(a)$ whose value is the set of all nodes b such that there is an arc from a to b. Also, there is a relation $nodes(X)$ that is true if and only if X is a node. Write a GLUE statement that assigns $path3(X,Y)$ to be the set of pairs (X,Y) such that there is a path of length 3 from node X to node Y.