Thomas Nguyen
COEN 171
Professor Vu

Assignment #10

Problem Sets

16.5 Write the following English conditional statements as Prolog headed Horn clauses:

a) If Fred is the father of Mike, then Fred is an ancestor of Mike.

ancestor(fred, mike) :- father(fred, mike).

b) If Mike is the father of Joe and Mike is the father of Mary, then Mary is the sister of Joe.

sister(mary, joe) :- father(mike, joe), father(mike, mary).

c) If Mike is the brother of Fred and Fred is the father of Mary, then Mike is the uncle of Mary.

uncle(mike, mary) :- brother(mike, fred), father(fred, mary).

16.6 Explain two ways in which the list-processing capabilities of Scheme and Prolog are similar.

1) Both treat lists to be composed of two parts, a head and a tail.
2) Both use recursion to traverse and process lists.

16.7 In what way are the list-processing capabilities of Scheme and Prolog different?

Scheme utilizes primitive functions (CAR, CDR, CONS) to construct and destruct lists. Prolog, on the other hand, does not use any of these functions.

Programming Exercises

16.3 Write a Prolog program that finds the maximum of a list of numbers.

```
1  maximum_number([X],X).
2  maximum_number([X|Y],X):- maximum_number(Y,Z), X >= Z.
3  maximum_number([X|Y],N):- maximum_number(Y,N), N > X.
```

16.4 Write a Prolog program that succeeds if the intersection of two given list parameters is empty.

```
intersection_empty([X],[Y]).
intersection_empty(X,Y):-intersection(X,Y,[]).
```

16.5 Write a Prolog program that returns a list containing the union of the elements of two given lists.

```
union_list([],X,X).
union_list([X|Y],Z,W):- member(X,Z),!,union_list(Y,Z,W).
union_list([X|Y],Z,[X|W]):- union_list(Y,Z,W).
```