csc324 Quiz #4 Tuesday 14 March 2000

Duration: 15 minutes

Aids allowed: None

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Grade: ______________

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1. The predicate numbers(X, Y) doesn't meet its specifications. It should succeed iff X is a list, and Y is a list containing all the numbers in X, in the same order. Example:

```
numbers( [a, 5, [6, 7], 5, 14, -1], [5, 5, 14, -1])
```

should succeed. Note: built-in predicate number(X) succeeds iff X is a number.

```
numbers( [], [] ).
numbers( [First|Rest], Ans ) :-
                number(First),  numbers(Rest, NewRest),
                Ans = [First|NewRest].
numbers( [_|Rest], NewRest ) :- numbers(Rest, NewRest).
```

Show an example numbers query that gives the wrong answer.

Query: numbers([a, 5, [6, 7], 5, 14, -1], [5, 5, -1]).

Answer: yes

Fix the code by making changes directly on it.

The second clause needs a cut, so that we never backtrack and use the third clause inappropriately. Here is the revised second clause:

```
numbers( [First|Rest], Ans ) :-
                number(First),  !,  numbers(Rest, NewRest),
                Ans = [First|NewRest].
```

2. Here is a Prolog predicate:

```
whatchama( [X,_|Y], [X|Z] ) :- whatchama( Y, Z ).
whatchama( [], [] ).
```

Complete the following sentence: whatchama(A, B) succeeds iff A is a list and ...
A has even length, and B is the same list but with only every second element (that is, the second, fourth, sixth etc. elements are missing).

3. Consider the following Prolog code.

```
top2(X):- female(X), isa2(X).
isa2(X):- parent(X,_), !.

top3(X):- female(X), isa3(X).
isa3(X):- !, parent(X,_).
```

```
parent(fred,sue).
parent(janet,sue).
parent(fred,tim).
parent(janet,tim).
parent(diane,william).
parent(cathy,kit).
male(fred).
female(janet).
female(diane).
female(cathy).
```

Give all possible answers to the query top2(X), in the order that Prolog would produce them.

X = janet; X = diane; X = cathy

Give all possible answers to the query top3(X), in the order that Prolog would produce them.

X = janet; X = janet; X = diane; X = cathy;