

CMPT 383  
Quiz #6  
November 17, 2005

- 1) Describe the complete execution trace (using a graphic representation) of the following goals
  - a) `append([],Y,Y).`  
`append([H|T],Y,[H|T2]) :- append(T,Y,T2).`  
`?- append(X,Y,[1,2]).`
  - b) `append([],Y,Y) :- !.`  
`append([H|T],Y,[H|T2]) :- append(T,Y,T2).`  
`?- append(X,Y,[1,2]).`
  - c) `ancestor(X,Y) :- ancestor(Z,Y), parent(X,Z).`  
`ancestor(X,X).`  
`parent(amy,bob).`  
`?- ancestor(X,bob).`
- 2) a) Write the following statements as a series of Prolog facts and rules.  
“Mammals have four legs and no arms, or two legs and two arms. A cow is a mammal. A cow has no arms.”  
b) Can Prolog derive the conclusion that a cow has four legs? Explain.
- 3) Write the predicate `add_at_end(List,Item,NewList)` to add `Item` at the end of the `List` producing `NewList`.
- 4) Write the predicate `nth_member(N,List,X)` which is true if `X` is the `Nth` member of `List`.
- 5) Define a predicate `even_length(List)` that succeeds if the `List` has an even number of elements. Do not use arithmetic; do the computation entirely by picking off elements of the `List`.