COP4020 Spring 2008 Sample Exam Solutions

1.

proc T();
    proc Ta();
    T a ( ) ;  N  =  1 ;       T c ( ) ;
    while NT = ‘,’ {    while NT = ‘aug’ {
        Read(‘,’);
        Read(‘aug’);
        T a ( ) ;        T c  ( ) ;
        N ++;
        BuildTree(‘aug’, 2);
    }
    if N > 1 BuildTree(‘tau’, N);  end;
end;

proc Tc();
    B();
    if NT = ‘->’ {
        Read(‘->’);
        Tc();
        Read(‘|’);
        Tc();
        BuildTree(‘->’, 3);
    }
end;

2.

(1) No, the two lists do not unify. Unifying them would require first that [Y,a] unify with [a,X]. They do unify, but Y is bound to a, and so is X. Next, Y would have to unify with b, which it can't, because it is already bound to a. Changing the first list to [ [Y, a], a, c] would solve the problem.

(2) Uncle(X,Y) :- Parent(W,X), Parent(Z,W), Parent(Z,Y)
4.

let x = a*b/c
    in e or f -> g -> x**x**2 | y
        | (   f x
            where (   f y = y*2
                        and x = 3+x*2
                    )
            )