

COP4020 Spring 2008 Sample Exam Solutions

1.

```
proc T();
    Ta(); N = 1;
    while NT = ',' {
        Read(',');
        Ta();
        N ++;
    }
    if N > 1 BuildTree('tau', N);
end;

proc Ta();
    Tc();
    while NT = 'aug' {
        Read ('aug');
        Tc ();
        BuildTree ('aug', 2);
    }
end;

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

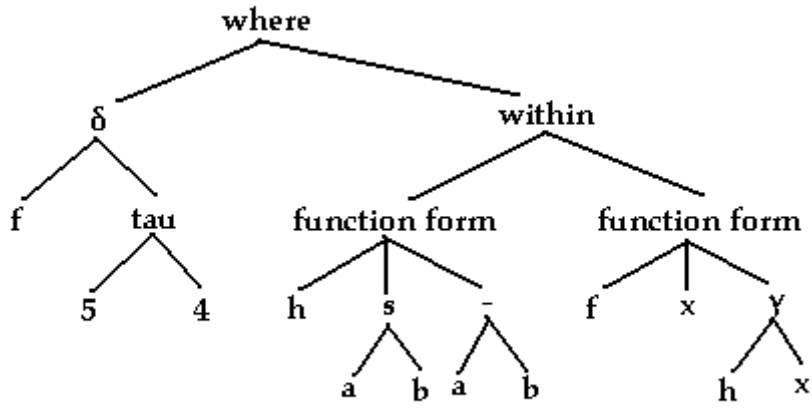
2.

(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.

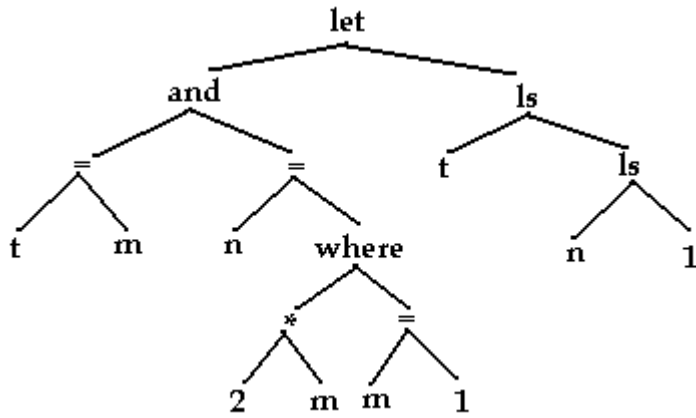
(2) Uncle(X,Y) :- Parent(W,X), Parent(Z,W), Parent(Z,Y)

3.

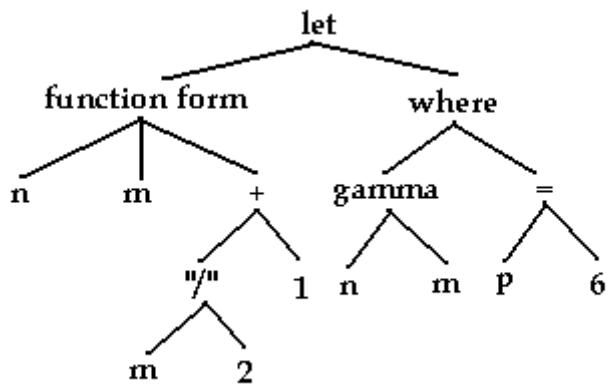
(1)



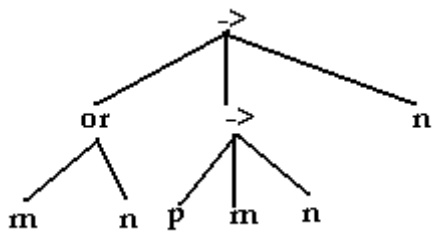
(2)



(3)



(4)



4.

let $x = a*b/c$

in e or f -> g -> $x**x**2$ | y

| (f x

where (f y = $y*2$

and $x = 3+x*2$

)

)