COMP 212
Written Assignment 2
Due 10:30 am, March 6, 2001
All problems are of equal value.

1. Create a binary tree with nodes labeled by letters such that when a
preorder traversal of the tree is taken the result is EXAMFUN and
when an inorder traversal is taken the result is MAFXUEN.

2. Consider a binary tree with greater than one node. Is it possible for
the preorder traversal of the tree to result in the same sequence of
values as the postorder traversal? If so, give an example. If not, why
not? Is it possible for the preorder traversal of the tree to result in the
same sequence of values as the reverse of the postorder traversal? If
so, give an example. If not, why not?

3. The path length of a binary tree is the sum of the depths of all of its
nodes. Write a method to compute the path length of a tree rooted
at a given binary tree node. What is the worst case running time of
your algorithm?

4. Given a binary tree node n and an object x, write a boolean method
that returns true if x appears in the binary tree rooted at n. What is
the worst case running time of your algorithm?

5. A ternary tree is full if all nodes either have 3 children or no children
and is complete if all of its leaves are at the same height. How many
nodes does a complete full ternary tree of height h have? Prove your
answer using induction.