Steven Murr

HW 11.1

Problems = { 1 - 9 odd, 11a, 44}

1) Which of these graphs are trees?
**See attached paper.

3) Answer these questions about the rooted tree illustrated.

a) Which vertex is the root?
a

b) Which vertices are internal?
a, b, c, d, f, h, j, q, t

c) Which vertices are leaves?
e, g, i, l, m, n, o, p, r, s, u

d) Which vertices are children of j?
q,r

e) Which vertex is the parent of h?
c

f) Which vertices are siblings of o?
p

g) Which vertices are ancestors of m?
f, b, a

h) Which vertices are descendants of b?
e, f, l, m, n

5) Is the rooted tree in Exercise 3 a full m-ary tree for some positive integer m?

It is not a full m-ary tree because some internal vertices have 1, 2 or 3 children. A full m-ary tree requires no more than m children on every vertex.

7) What is the level of each vertex of the rooted tree in Exercise 3?

Level 0: a - Level 1: b,c,d - Level 2: e,f,g,h,i,j,k - Level 3: l,m,n,o,p,q,e - Level 4: s,t - Level 5: u

Draw the subtree of the tree in Exercise 3 that is rooted at:

a

c

e

**See attached paper.

11a) How many nonisomorphic unrooted trees are there with three vertices?
1

44) Show that every tree can be colored using two colors. The rooted Fibonacci trees T_n are defined recursively in the following way. T_1 and T_2 are both the rooted tree consisting of a single vertex, and for n = 3,4 . . . the rooted tree T_n is constructed from a root with T_{n-1} as its left subtree and T_{n-2} as its right subtree.
**See attached paper.