

Discrete Mathematics Exam III Review

This exam will be over **chapter 5** on trees. First review the following homework's. They are taken from the web page. Skip 5.6

pg234:9,11,12,13,16,17,27,28,31,32

pg248:1,3,5,8,9,11,15,17,19

pg 263:1,3,7,10,13,15

pg 284:1,3,5,9,13,15,19,21,25,27,31,33,43,45,51

Additional Notes and questions

1. Know the defn of a tree.
2. Review the tree theorems in 5.1
3. Be able to do Prufers algorithm
4. Define a spanning tree
5. Do a Breadth first search (BFS) of a graph and generate the BFS tree
6. Do a Depth first Search (DFS) of a graph and generate DFS tree
7. Be able to apply Prim's algorithm and generate a minimal spanning tree.
8. Define a binary search tree and be able to search it.
9. Be able to do all three traversals preorder, inorder and postorder
9. Define an expression tree and be able to do traversals on it.
10. Be able to evaluate a postfix expression using a stack as done in class.
11. Draw the tree that has a post order traversal of DGHEBAFC and an inorder traversal of DBGEHAFC

Chapter 9

Pascal's triangle and its associated recurrence relation.

Fibonacci sequence and its recurrence relation.

Be able to determine a solution for the following recurrence relations. Using the iteration feedback method I used in class.

$$T(n) = 2T(n/2) + n$$

$$T(n) = T(n-1) + n$$

$$T(n) = 3T(n/2) + n$$

$$T(n) = 3T(n/2) + n^2$$

$$T(n) = 2T(n/2) + 1$$

$$T(n) = T(n/2) + 1$$

General Theorem for $T(n) = aT(n/b) + cn^e$

Which is

$$\text{If } a < b^e \text{ then } n^e$$

$$\text{If } a = b^e \text{ then } n^e \log_b n$$

$$\text{If } a > b^e \text{ then } n^{\log_b a}$$