Tutorial 4

COMP 2611

1. Consider the following traversals of a binary tree. From these traversals, reconstruct the the binary tree:

   Post-order: F E C H G D B A

   In-order: F C E A B H D G

   [Hint: Recall that the root of the tree would be the last node in the Post-order traversal].

2. Consider the following traversals of a binary tree. From these traversals, reconstruct the the binary tree:

   Pre-order: X K P H T A N R E S D

   In-order: P K T H A X R N S E D

   [Hint: Recall that the root of the tree would be the first node in the Pre-order traversal].

3. Prove that in a perfect binary tree, at level l, we have 2^l nodes. Recall that at $l = 0$, we have the root node. [Hint: Use Proof by Induction]

4. Prove that in a perfect binary tree with height h, we have no more than $2^{h+1} - 1$ nodes. Recall that at level $l = 0$, i.e. a binary tree with height $h = 0$, we have at most 1 node. [Hint: Use the result from Part (3)]

5. Prove that in a perfect binary tree with n nodes, we have height no more than $log_2(n + 1) - 1$. [Hint: Use the result from (4)]