

Recitation 6

Practice Problems

```
1  /** Returns the height of the subtree rooted at Position p. */
2  public int height(Position<E> p) {
3      int h = 0;                                // base case if p is external
4      for (Position<E> c : children(p))
5          h = Math.max(h, 1 + height(c));
6      return h;
7  }
```

Code Fragment 8.5: Method `height` for computing the height of a subtree rooted at a position p of an `AbstractTree`.

R-8.4 What is the running time of a call to $T.\text{height}(p)$ when called on a position p distinct from the root of tree T ? (See Code Fragment 8.5.)

R-8.20 Let T be an ordered tree with more than one node. Is it possible that the preorder traversal of T visits the nodes in the same order as the postorder traversal of T ? If so, give an example; otherwise, explain why this cannot occur. Likewise, is it possible that the preorder traversal of T visits the nodes in the reverse order of the postorder traversal of T ? If so, give an example; otherwise, explain why this cannot occur.

R-8.22 Draw a binary tree T that simultaneously satisfies the following:

- Each internal node of T stores a single character.
- A *preorder* traversal of T yields EXAMFUN.
- An *inorder* traversal of T yields MAFXUEN.

C-8.28 The **path length** of a tree T is the sum of the depths of all positions in T . Describe a linear-time method for computing the path length of a tree T .

Hint: use a few examples to find a recursive relationship using auxiliary variables

Write the pre-, in-, post- order traversals of the tree on the whiteboard.

Also draw a binary tree on the board with 20 nodes and ask them to write the pre, post, and in-order traversals of the tree.