C-6.19

Using a linked structure, the positions and elements functions are linear because we must still walk through the entire linked representation, getting every position/element. The root(), parent(), children(), leftChild(), rightChild(), and sibling() functions are all constant because we must follow only one or two links to determine these values. The swap() and replace() functions are also constant because no traversal of the data structure is needed. We need only to swap a few links/pointers in order to complete. The functions isInternal(), isExternal(), and isRoot() are also constant since we need only to check local fields or links to determine these. Finally, expandExternal(), and removeAboveExternal() are also constant since we need only to change a small (constant) number of fields and links.