

Figure 17.1 A tree, with height and depth information

Leaves have no children.

Figure 17.1 illustrates a tree. The root node is *A*. *A*'s children are *B*, *C*, *D*, and *E*. Because *A* is the root, it has no parent. All other nodes have parents. For instance, *B*'s parent is *A*. Some nodes have no children. These nodes are called *leaves*. The leaves in this tree are *C*, *F*, *G*, *H*, *I*, and *K*. The length of the path from *A* to *K* is three (edges). The length of the path from *A* to *A* is zero edges.

The *depth* of a node is the length of the path from the root to the node. The *height* of a node is the length of the path from the node to the deepest leaf.

A tree with N nodes must have $N - 1$ edges because every node except the root has an incoming edge. The *depth* of any node in a tree is the length of the path from the root to the node. Thus the depth of the root is always 0, and the depth of any node is 1 more than the depth of its parent. The *height* of a node is the length of the path from the node to the deepest leaf. Thus the height of *E* is 2. The height of any node is 1 more than the height of its maximum-height child. The height of a tree is equal to the height of the root.

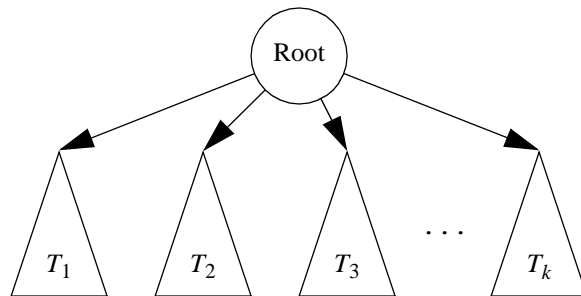


Figure 17.2 A tree viewed recursively