INTRODUCTION TO TREES
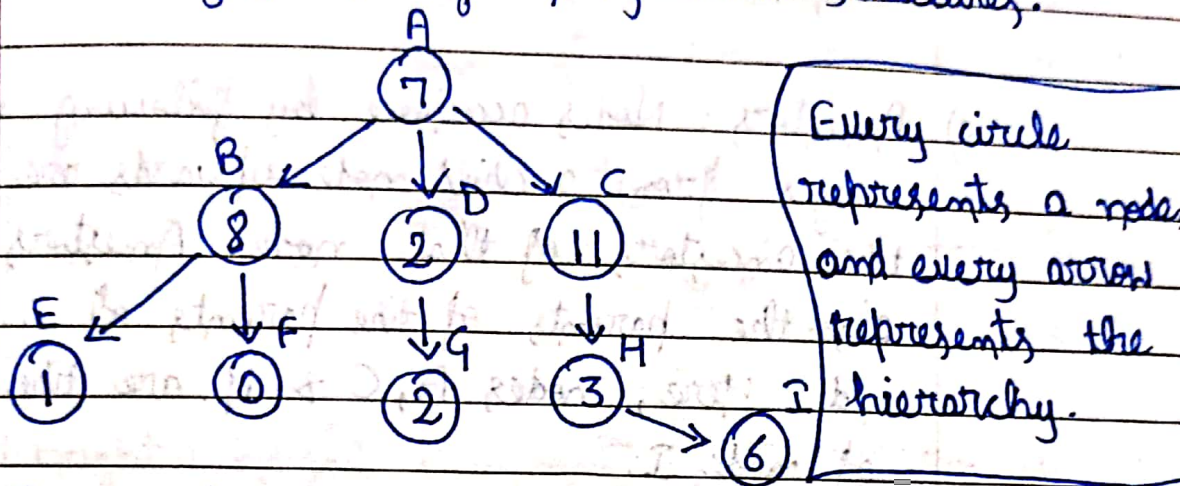
→ A tree usually represents the hierarchy of elements and depicts the relationship b/w the elements. Trees are considered as one of the largely used facets of data structures.

Every circle represents a node, and every arrow represents the hierarchy.

→ Terminologies used in trees :

1) ROOT: The topmost node of a tree is called the root. There is no edge pointing to it, but one or more than one edge originating from it. Here, A is the root node.
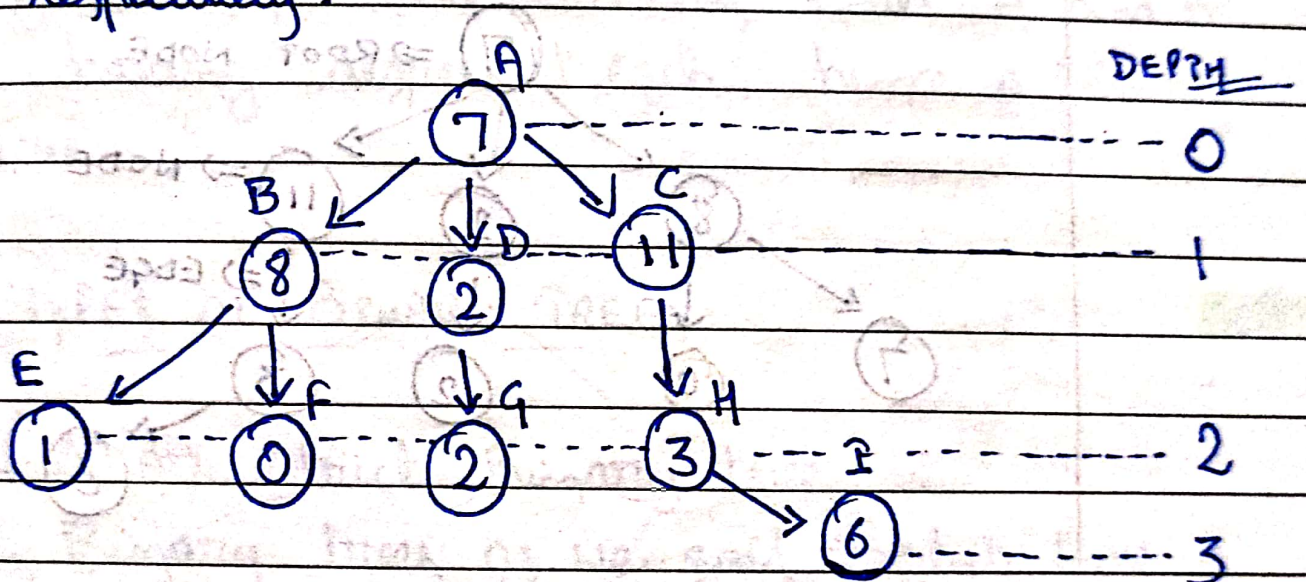
2) PARENT: Any node which connects to the child. Node which has an edge pointing to some other node. Here, C is the parent of H.

3) CHILD: Any node which is connected to a parent node. Node which has an edge pointing to it from some other node. Here, H is the child of

C.

4) **Siblings :** Nodes belonging to the same parent are called siblings of each other. Nodes B, C and D are siblings of each other, since they have the same parent node A.

5) **Ancestors :** Nodes accessible by following up the edges from a child node upwards are called the ancestors of that node. Ancestors are also the parents of the parents of ... that node. Here, nodes A, C & H are the ancestors of node I.

6) **Descendants :** Nodes accessible by following up the edges from a parent node downwards are called the descendants of that node. Descendants are also the child of the child of ... that node. Here, nodes H and I are the descendants of node C.

7) **Leaf / External Node :** Nodes which have no edge originating from it, and have no child attached to it. These nodes cannot be a parent. Here, nodes E, F, G and I are leaf nodes.

8) **Internal Node :** Nodes with at least one child. Here, nodes B, D and C are internal nodes.

9) **Depth :** Depth of a node is the number of edges from root to that node. Here, the depth of nodes A, C, H and I are 0, 1, 2 and 3 respectively.

10) **Height :** Height of a node is the number of edges from that node to the deepest leaf. Here, the height of node A is 3, since the deepest leaf from this node is node I. And similarly, height of node C is 2.