General Tree

General Tree

A general tree (a tree) is defined to be a nonempty finite set T of elements, called nodes such that

(1) T contains a distinguished element R, called the root of T.

(2) The remaining elements of T form an ordered collection of zero or more disjoint trees T1, T2,…..Tm.

• The trees T1, T2,…Tm are called subtrees of root R and the roots of T1, T2,…Tm are called successors of R.

• Example:

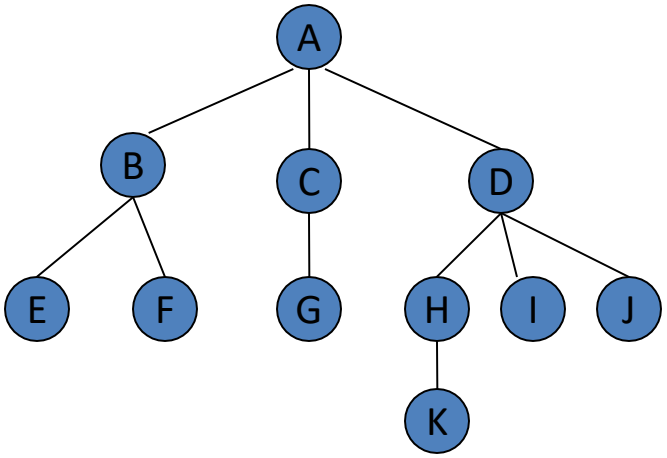


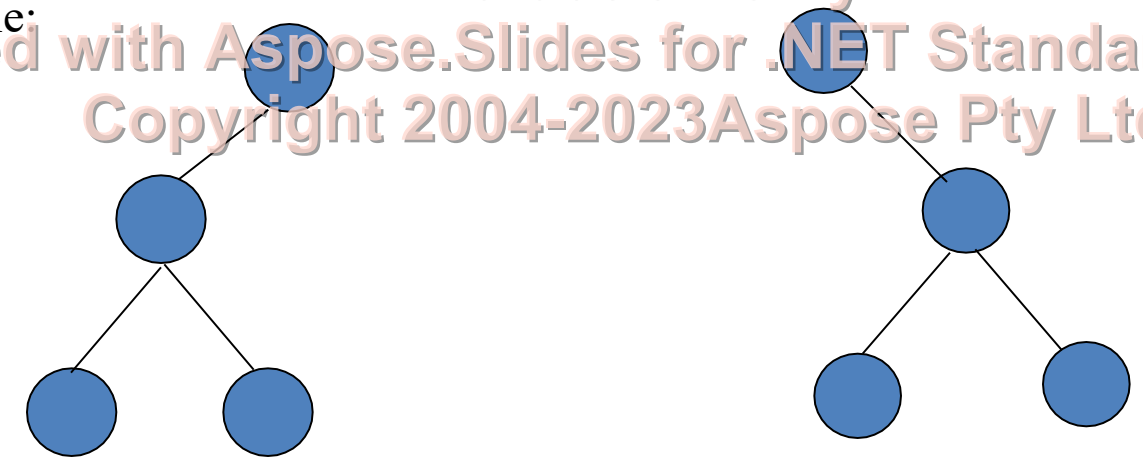
Figure: General Tree

Difference between General Tree and Binary Tree

(1) A binary tree T' is not a special case of a general tree T.

(2) Suppose a node N has only one child. Then the child is identified as a left child or right child in binary tree T', but no such distinction exists in a general tree T.

Example:



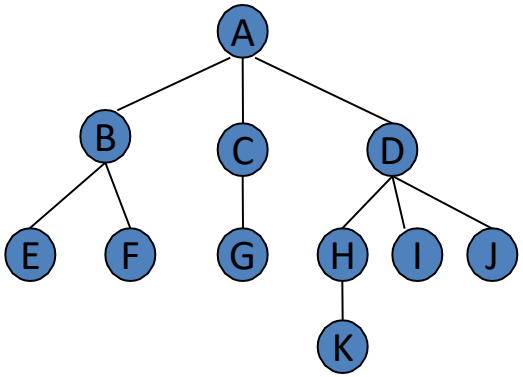
Tree T1 Tree T2

Memory Representation of General Tree

- Suppose T is a general tree. T is maintained in memory by means of a linked representation that uses following three parallel arrays:

  1. INFO[K] = Information at node N
  2. CHILD[K] = location of the first child of N.
  3. SIBL[K] = location of next sibling of N

- Here K is the location of node N of T.
- Here ROOT is used as the root of T.
- Example:



ROOT 6

	INFO	CHILD	SIBL
1	C	3	13
2	B	5	1
3	G	0	0
4	K	0	0
5	F	0	9
6	A	2	0
7	I	0	12
8			
9	F	0	0
10			
11	H	4	7
12	J	0	0
13	D	11	0

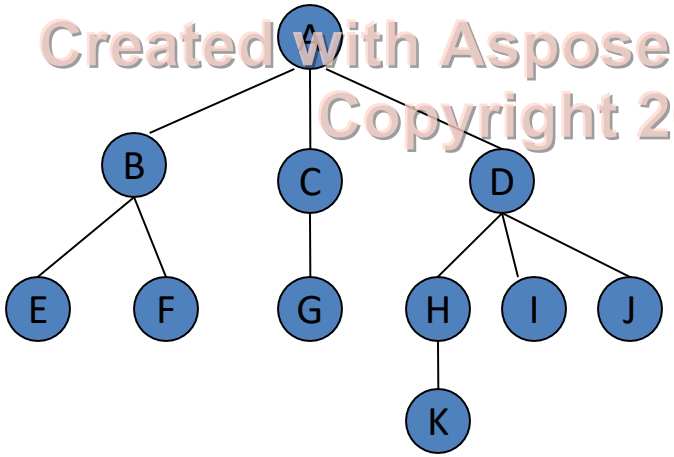
Figure: General Tree and Its Memory Representation

Correspondence between General Tree and Binary Tree

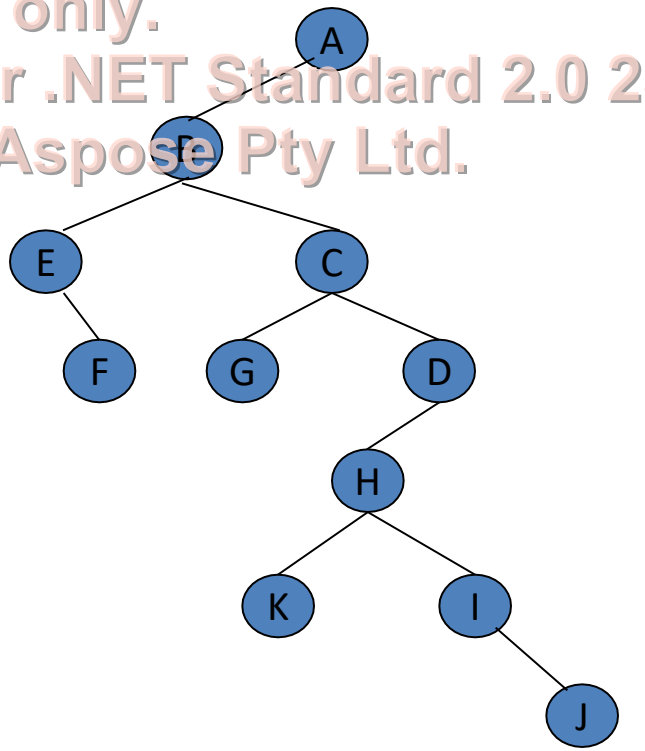
(1) The root of T' will be the root of T.

(2) The left child of N' in T' will be the first child of node N in T and the right child of N' in T' will be the next sibling of N in T.

General Tree T



Binary Tree T'



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