**Types of Binary Trees:**

i = the number of internal nodes

n = be the total number of nodes

l = number of leave

λ = number of levels

**Full Binary Tree**

|  |  |  |  |
| --- | --- | --- | --- |
| **Definition** | **Diagram (Example)** | | **General Formulas** |
| It is the type of binary tree which has either two children or no children. It means that that a parent is parent of two children or it is a leaf. If a node has only one child it is not a full binary tree. The number of leafs is equal to number of internal nodes plus one. | |  | 1. The number of leaves is i + 1. 2. The total number of nodes is 2i + 1. 3. The number of internal nodes is (n – 1) / 2. 4. The number of leaves is( n+1)/2. 5. The total number of nodes is2l – 1. 6. The number of internal nodes is l – 1. 7. The number of leaves is at most 2λ - 1. |
|  | **Perfect Binary Tree** | |  |
| **Definition** | **Diagram (Example)** | | **General Formulas** |
| A perfect binary tree should must have two children and every lead should be on the same depth. |  | | Height=log(n+1)-1  Nodes=2h  Depth=O(ln(0)) |
|  | **Complete Binary Tree** | |  |
| **Definition** | **Diagram (Example)** | | **General Formulas** |
| It is type of binary tree in which all the nodes are completely filed with nodes except the Lowest level of the tree. In this type of tree the last node should reside on the left side. |  | |  |
|  | **Balanced Binary Tree** | |  |
| **Definition** | **Diagram (Example)** | | **General Formulas** |
| A binary tree is balanced if its height is O(logN), where ‘N’ is the number of nodes. In this case the height of left and right node should only vary by only one. |  | |  |
|  | **Degenerate Binary Tree** | |  |
| **Definition** | **Diagram (Example)** | | **General Formulas** |
| A binary tree is said to be degenerate if its internal node has only a single child. Such trees are similar to linked-list in functionality. |  | | Depth=log2(n) |
|  | **Skewed Binary Tree** | |  |
| **Definition** | **Diagram (Example)** | | **General Formulas** |
| A skewed binary tree is the tree in which ever node has only one child or no child. |  | | To be filled by the Student |