

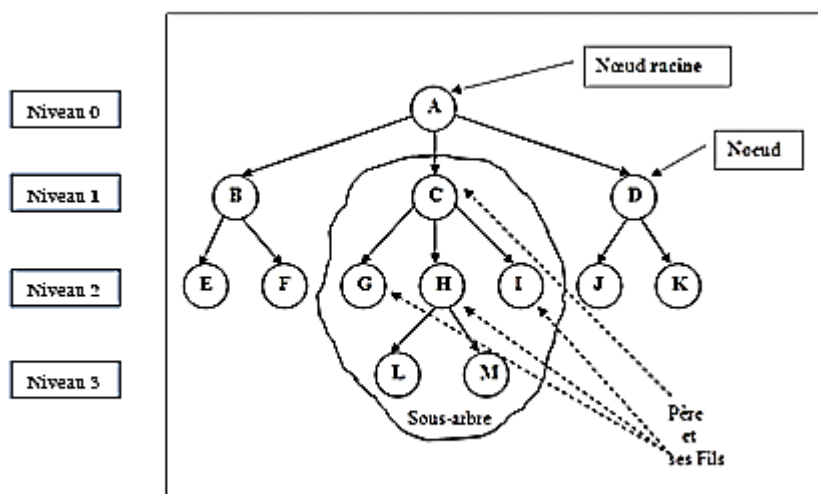
Chapter IV: Trees

1) Definition of “Tree”:

A tree is a hierarchical data structure made up of nodes connected by edges. A tree is usually represented as a set of nodes connected in such a way that there is no cycle (i.e., no closed path). A tree always has a single root node, from which all other nodes derive.

2) Notion of node and tree

- ✓ A node is a fundamental unit of a tree that can contain a value or key and references to its child nodes.
- ✓ The tree is a structured set of nodes.
- ✓ Root: the top node of the tree.
- ✓ Leaves: knots without children.
- ✓ Each node (except the root) has exactly one parent



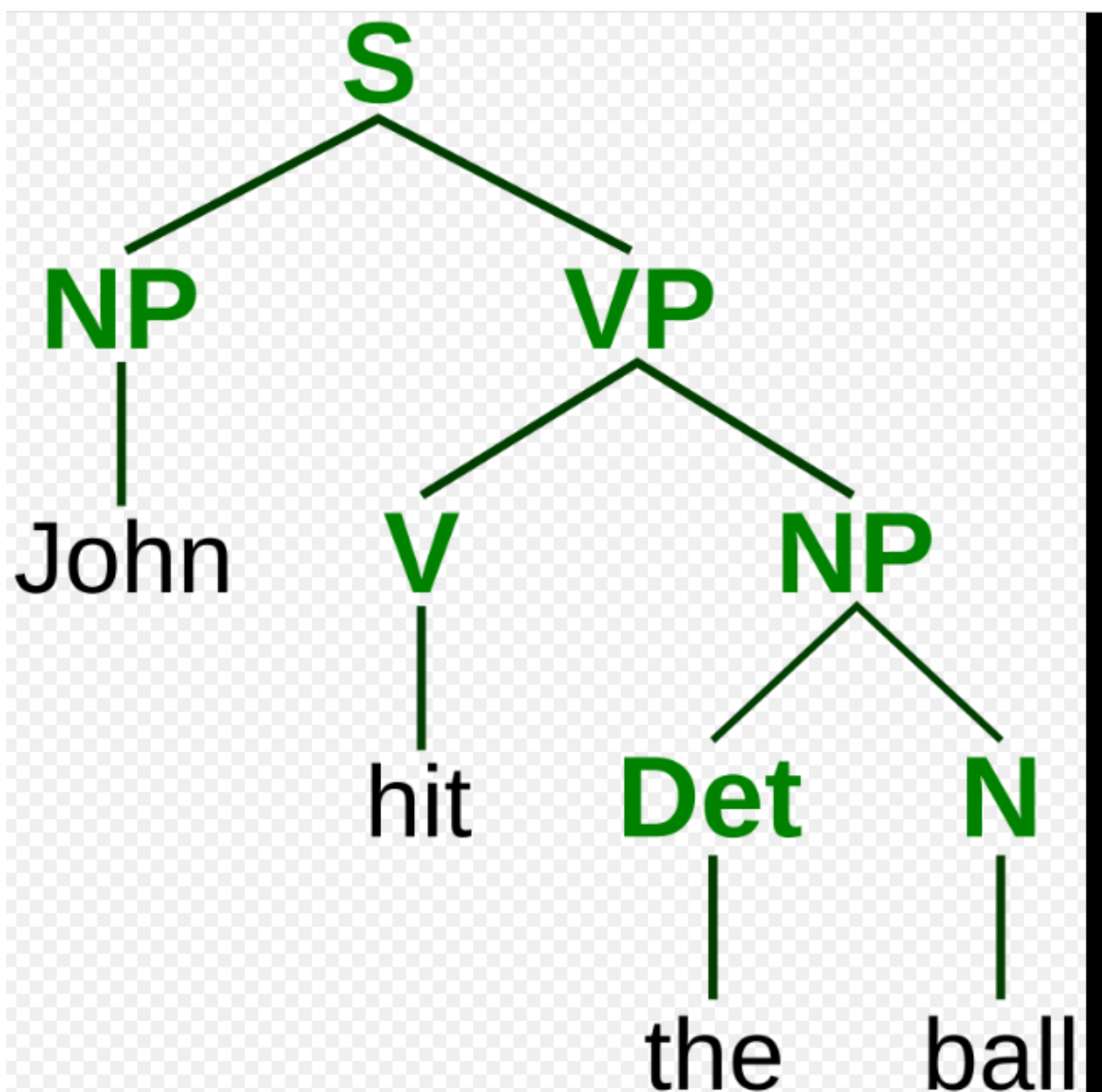
3) n-area trees

An n-area tree is a tree where each node can have at most n children. This generalizes the notion of binary tree (where $n = 2$).

Applications include:

The modeling of file systems,

The syntax trees in language analysis.



4) Binary trees

A binary tree is a special case of an n-area tree where each node has at most two children, usually called left (left) and right (right).

5) Specific types of binary trees:

Complete binary tree: all levels except maybe the last one are completely filled.

Perfect binary tree: all levels are completely filled.

Search binary tree (BST): the left child has a lower value than the parent node, and the right child has a higher value.

