Objectives

- Be able to explain the strategy behind the Insertion Sort
- Be able to explain the strategy behind the Merge Sort and the Quick Sort
- Be able to give the best-case, worst-case, and average-case analyses of Bubble Sort, Selection Sort, Insertion Sort, Merge Sort, and Quick Sort
- Be able to identify all the following parts of a tree: Node, Edge, Root, Child, Descendant, Path, Parent, Sibling, Subtree, Leaf Node, Level, and Height

Analysis of Selection Sort

Analysis of Bubble Sort

Insertion Sort

29
72
34
58
61
38

Analysis of Insertion Sort

Quick Sort

50
40
47
46
69
82
65

Analysis of Quick Sort

The Master Theorem

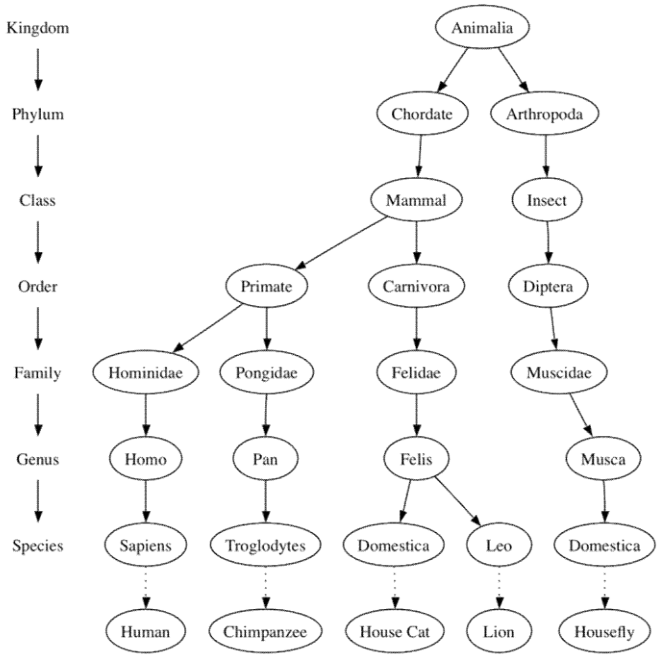
Theorem: If $T(n)$ is increasing, and if $T(n) = aT\left(\frac{n}{b}\right) + cn^d$ whenever n is a power of b, with $a \geq 1$, $b > 1$, $c > 0$, and $d \geq 0$, then

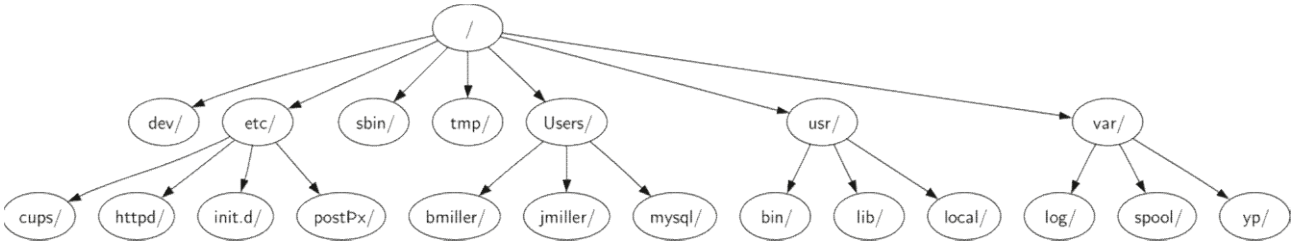
(a) $T(n) is\ O(n^d)$ if $a < b^d$;

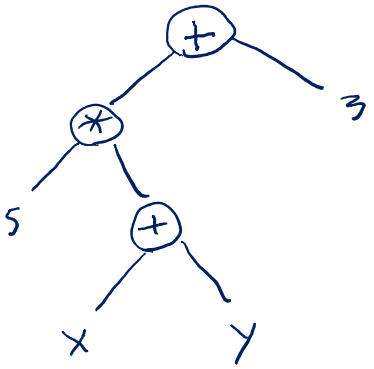
(b) $T(n) is\ O(n^d \log n)$ if $a = b^d$; and

(c) $T(n) is\ O(n^{\log_b a})$ if $a > b^d$.

Chapter 6: Trees and Tree Algorithms







Terms

- Node
- Edge
- Root
- Child

Terms Continued

- Descendant
- Path
- Parent
- Sibling

Terms Continued

- Subtree
- Leaf Node
- Level
- Height