**Trees** - connected graph with no cycle

![Tree Diagram](attachment:tree_diagram.png)

- Not a tree

- Rooted tree

- Special vertex is called root

- Distance 1 children of root

- Leaves = nodes without children

- \( u \) is parent of \( v \), \( v \) is child of \( u \)
Q: Consider family tree. If I am the root, which nodes are child nodes of me?

A) My children  
B) My Parents  
C) Children & Parents

**def:** An $k$-ary tree is a rooted tree where every node has at most $k$ children.

**Most Famous in Computer Science:** Binary Tree  
2-ary tree.
Cool use for binary trees: Codes from letters to bits

When leaves are letters, easy to recover original word.