TREES

Previous

- Linear structures
  - Arrays
  - Lists
  - Stacks
  - Queues
- Trees are non-linear

A Picture & Definitions

Root

Parent

Child

Leaf

Non-leaf

Siblings

Ancestors

Descendants

Subtree

Level

Depth/Height

Binary Tree

Quad Tree

- Just so you know that not all trees are binary...

Tree ADT

- Let's define the **struct Tree**
  - **to hold ints**

```
typedef struct Tree
{









} Tree;
```

Example Usage

- Pre-fix expression
  - put the operator first
  - 4 + 2
  - + 4 2
  - + - 2 1 * 9 1

Traversals

- inorder: Left, Node, Right
- preorder: Node, Left, Right
- postorder: Left, Right, Node

Binary Search Tree (BST)

- Consider an arbitrary node in a tree called A.
- All values in the left subtree are less than the value in A.
- All values in the right subtree are greater than the value in A.

Example

- Insert the following items
  100 34 56 99 77 23 1 0 2 98

Code

- bstFind(Tree, int)
- bstInsert(Tree,int)
- bstFindLevel(Tree,int)
- bstFindMaxDepth(Tree)
- bstDelete(Tree, int)

Problems

- What are the main problem with trees?