Lecture 18: Binary Trees II

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Tree Traversals

- Traversals:
  - Pre-Order: root, left subtree, right subtree
  - In-Order: left subtree, root, right subtree
  - Post-Order: left subtree, right subtree, root

- Most algorithms have two parts:
  - Build tree
  - Traverse tree, performing operations on nodes
Evaluate Expression Tree

- Evaluate left subtree, right subtree, perform operation at root.
- Generate stack-based code to evaluate: post-order
Java Virtual Machine

```
int simple(int m, int n) {
    return (m + n - 1)
}

Translates to →
```

```
method int simple(int, int)
    0 iload_1
    1 iload_2
    2 iadd
    3 icast_1
    4 isub
    5 ireturn
```
Animals Game

Guess animal using only true-false questions.

See demo program.
Look at BinaryTree.java

Notice leaves are nodes w/null values
Iterators

- Pre-order: root, left subtree, right subtree
- Post-order: left subtree, right subtree, root
- In-order: left subtree, root, right subtree.
In-order

if (!isEmpty()){
    left.inOrder();
    doSomething to this.value();
    right.inOrder();
}