

Lecture 18: Binary Trees II

CS 62

Fall 2017

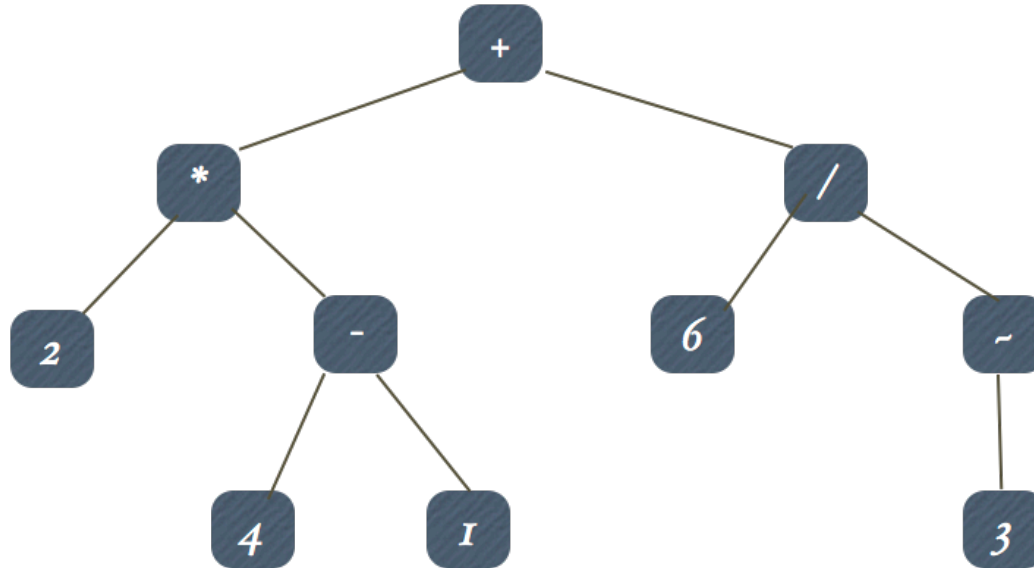
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Tree Traversals

- 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  iconst_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()  
}
```