Recursion - Lab 10
Tree Recursion

• Occurs when:
  – There are multiple recursive calls
    • E.g., Fibonacci series
  – Processing a data structure
    • E.g., binary search tree
Trace Execution

• Create a drawing showing the methods calls developed when executing this program \( f \), using the argument of 16:

```java
public int f(int n)
{
    int result = 0;
    if (n <= 4) result = 1;
    else result = f(n/2) + f(n/4);
    return result;
}
```
Exercise

• Write a recursive method, f, that is given a non-negative number, n, and returns:
  – n%2 when n is in range 0 to 9
  – f(n/10)+f(n%10) for all other values
Tree Recursion

- Create a method to print in order all values in the binary search tree >n

- Assume each node has val, left, and right
- If N=5, this method should print:
  - 6, 7, 8, 10, 12, 15, 18, 20, 27, 30, 45
Tree Recursion

• Suppose our tree has val, down, & next

```
    86       65       34       26
   / \      / \      / \      / \
  7   9   2   15   86   15   18
 / \  / \  / \  / \  / \  / \  / \
15 4 5 12

45
```

• When we go down, print “(” first, returning from a lower level print “)"
  – (86 (7 (15 (45) 4) 9 (5) 2) 65 (15 (12)) 34 (86 18) 26)
Questions about PA 5