

# Chapter 7 : Recursion



- A method that calls itself

- Count to  $n$

for:  $1, 2, 3, 4, 5, \dots, n$

or

$Sum(n) = n + Sum(n-1)$

\* Base case

~~error~~

- recursion must bottom out

\* Make progress

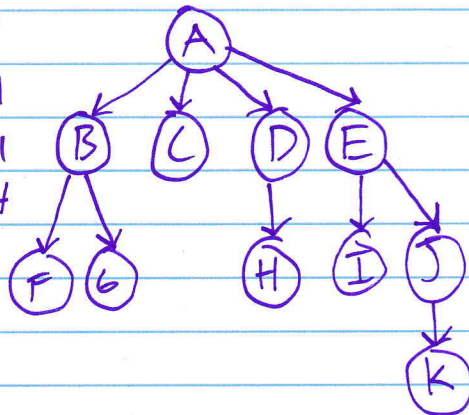
- Each call must be a smaller version of the previous

\* Believe in method call

Fast Compound interest

- Don't duplicate work

## Trees



Root - Top 1

Node - Circles 11

Leaves - Nodes that end 5

Search

$Fib(0) = 1$

$Fib(1) = 1$

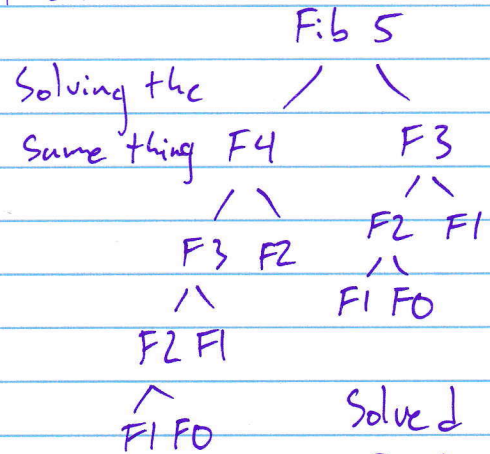
$Fib(n) = Fib(n-2) + Fib(n-1)$

Base case

if  $(n == 0 \parallel n == 1)$

return 1

↑ Slow



Solved by  
Dynamic  
Programming!!