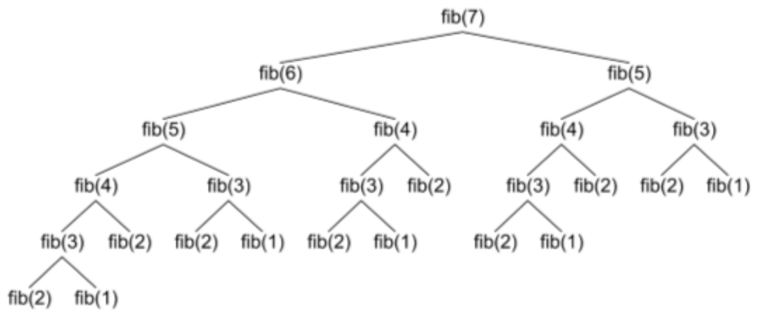
Efficient Recursion

The naïve version of the recursive Fibonacci function which you met in the last lesson was **very** inefficient. As the numbers get larger, it takes an increasingly large amount of time to generate each one. This is because for each number we find, we have to generate **all** of the Fibonacci numbers preceding it.



In Computer Science, we say that this implementation has an **exponential**, or ***O*(2^n)** runtime performance; as n gets larger, we double the number of calculations at each step. That means that it could **literally take years** to calculate a Fibonacci number of even a moderate size using this function.

We can reduce those years to a fraction of a second by learning about **wrappers** and **helpers**. A wrapper is a **non-recursive** function that **calls** a **recursive** function. A helper is the recursive function that the wrapper calls. Let’s apply that to the Fibonacci sequence.