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# Overlapping Subproblems

A problem has **overlapping subproblems** if finding its solution involves solving the *same* subproblem multiple times.

As an example, let's look at the Fibonacci sequence (the series where each number is the sum of the two previous ones—0, 1, 1, 2, 3, 5, 8, ...).

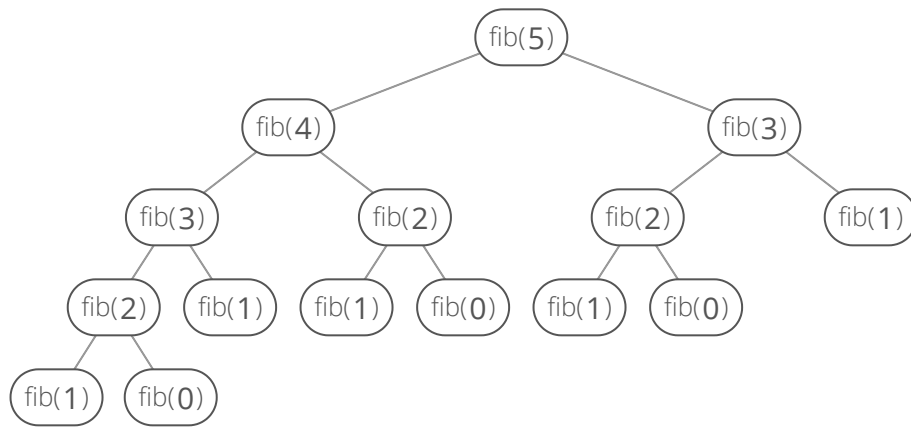
If we wanted to compute the  $n$ th Fibonacci number, we could use this simple recursive algorithm:

```
NSInteger ICKFib(NSUInteger n) {  
  
    // base case  
    if (n == 0 || n == 1) {  
        return n;  
    }  
  
    return ICKFib(n - 1) + ICKFib(n - 2);  
}
```

Objective-C ▼

We'd call `ICKFib(n-1)` and `ICKFib(n-2)` **subproblems** of `ICKFib(n)`.

Now let's look at what happens when we call `ICKFib(5)`:



Our function ends up recursively calling `ICKFib(2)` **three times**. So the problem of finding the  $n$ th Fibonacci number has overlapping subproblems.

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