## **Overlapping Subproblems**

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

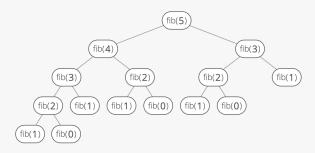
As an example, let's look at the Fibonacci sequence (the series where each number is the sum of the two previous ones-0, 1, 1, 2, 3, 5, 8, ...).

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

```
Python 3.6 ▼
def fib(n):
   if n == 0 or n == 1:
       return n
    return fib(n - 1) + fib(n - 2)
```

We'd call fib(n - 1) and fib(n - 2) subproblems of fib(n).

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



Our function ends up recursively calling fib(2)  $\it three\ times$ . So the problem of finding the  $\it nth$ Fibonacci number has overlapping subproblems.



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