Recursion: Fibonacci Numbers ☆

Check out the resources on the page's right side to learn more about recursion. The video tutorial is by Gayle Laakmann McDowell, author of the best-selling interview book Cracking the Coding Interview.

The Fibonacci Sequence

The Fibonacci sequence appears in nature all around us, in the arrangement of seeds in a sunflower and the spiral of a nautilus for example.

The Fibonacci sequence begins with $fibonacci(0) = 0$ and $fibonacci(1) = 1$ as its first and second terms. After these first two elements, each subsequent element is equal to the sum of the previous two elements.

Programmatically:

- $fibonacci(0) = 0$
- $fibonacci(1) = 1$
- $fibonacci(n) = fibonacci(n-1) + fibonacci(n-2)$

Given n, return the n^{th} number in the sequence.

As an example, $n = 5$. The Fibonacci sequence to 6 is $fs = [0, 1, 1, 2, 3, 5, 8]$. With zero-based indexing, $fs[5] = 5$.

Function Description

Complete the recursive function $fibonacci$ in the editor below. It must return the n^{th} element in the Fibonacci sequence.

fibonacci has the following parameter(s):

- n: the integer index of the sequence to return

Input Format

The input line contains a single integer, n.

Constraints

- $0 < n \leq 30$

Output Format

Locked stub code in the editor prints the integer value returned by the $fibonacci$ function.

Sample Input

```
3
```

Sample Output

```
2
```

Explanation

The Fibonacci sequence begins as follows:

$fibonacci(0) = 0$
$fibonacci(1) = 1$
$fibonacci(2) = (0 + 1) = 1$
$fibonacci(3) = (1 + 1) = 2$
$fibonacci(4) = (1 + 2) = 3$
$fibonacci(5) = (2 + 3) = 5$
$fibonacci(6) = (3 + 5) = 8$
...

We want to know the value of $fibonacci(3)$. In the sequence above, $fibonacci(3)$ evaluates to 2.

C++

```
#include <iostream>

using namespace std;

int fibonacci(int n) {
    // Complete the function.

}

int main() {
    int n;
    cin >> n;
    cout << fibonacci(n);
    return 0;
}
```

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Difficulty Easy
Max Score 15
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Recursion

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