Recursion: Fibonacci Numbers

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.

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.

fibonacci has the following parameter(s):

- *int n:* the index of the sequence to return

Returns
- *int:* the n^{th} element in the Fibonacci sequence

Input Format

The integer n.

Constraints

- $0 < n \leq 30$

Sample Input

```
STDIN   Function
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```

```
3       n = 3
```

Sample Output

```
2
```

Explanation

The Fibonacci sequence begins as follows:

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

In the sequence above, $fibonacci(3)$ is 2.