

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 $\text{fibonacci}(0) = 0$ and $\text{fibonacci}(1) = 1$ 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:

- $\text{fibonacci}(0) = 0$
- $\text{fibonacci}(1) = 1$
- $\text{fibonacci}(n) = \text{fibonacci}(n - 1) + \text{fibonacci}(n - 2)$

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:

$\text{fibonacci}(0) = 0$

$$\textit{fibonacci}(1) = 1$$

$$\textit{fibonacci}(2) = (0 + 1) = 1$$

$$\textit{fibonacci}(3) = (1 + 1) = 2$$

$$\textit{fibonacci}(4) = (1 + 2) = 3$$

$$\textit{fibonacci}(5) = (2 + 3) = 5$$

$$\textit{fibonacci}(6) = (3 + 5) = 8$$

...

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