# Rabbits and Recurrence Relations

A [**recurrence relation**](http://rosalind.info/glossary/recurrence-relation/) is a way of defining the terms of a sequence with respect to the values of previous terms. In the case of Fibonacci's rabbits from the introduction, any given month will contain the rabbits that were alive the previous month, plus any new offspring. A key observation is that the number of offspring in any month is equal to the number of rabbits that were alive two months prior. As a result, if FnFn represents the number of rabbit pairs alive after the nn-th month, then we obtain the [**Fibonacci sequence**](http://rosalind.info/glossary/fibonacci-sequence/) having terms FnFn that are defined by the recurrence relation Fn=Fn−1+Fn−2Fn=Fn−1+Fn−2 (with F1=F2=1F1=F2=1 to initiate the sequence). Although the sequence bears Fibonacci's name, it was known to Indian mathematicians over two millennia ago.

**Assumption :**

Positive integers n≤40n≤40 and k≤5..

**Design Method:**

Dynamic programming.

**Programming language**:

Python

**Why Python?**

Easy to implement.

**Result** :

Time Complexity = O(n)