If n is the nth [Fibonacci number](https://artofproblemsolving.com/wiki/index.php/Fibonacci_number), then by Binet's Formula.

Proof that Fibonacci series is equivalent to the Golden Ratio and this derivation in file

Fibonacci Seq-proof.pdf

The code to calculate the nth step in Python is finding Fibonacci nth number.py

Note that the last line computes the number of combinations of 2 items in a list of n items.  
results for n = 45  
Fibonacci: 1134903170  
Combination: 990

Since this only calculates for one number and there is no recursion, the code is pretty fast.