Fibonacci Sequence

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The Fibonacci Prime Conjecture

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PSUMS 2012
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Leonardo Pisano Bigollo (1170 – 1250) was also known simply as Fibonacci. He used the number sequence in a book called Liber Abaci (Book of Calculation). Fibonacci did not discover the sequence but used it as an example in Liber Abaci.
Define what a Sequence

Defn: We define a sequence to be a list of objects that are in some order or a function whose domain is either $\{1, 2, 3, \ldots, n\}$ for some $n \in \mathbb{N}$ or is $\mathbb{N}$ itself.

EX) Let $f: \mathbb{N} \rightarrow \mathbb{R}$ be given by $f(n) = \frac{1}{n}$, since the $\text{dom}(f) = \mathbb{N}$, $f$ is a sequence by definition.
Define the Fibonacci Sequence

Defn: The Fibonacci Sequence is given by the equation

\[ F_n = F_{n-1} + F_{n-2} \]

Where

\[ F_0 = 0 \quad F_1 = 1 \]

Each number in the sequence is the sum of the previous two numbers, starting with 0 and 1

\{0,1,1,2,3,5,8,13,21,34, 55, 89, 144, 233, 377, 610, 987, 1597, 2584, 4181, 6765, 10946, 17711, 28657, 46368, 75025, 121393, 196418, 317811, \ldots \}
The Fibonacci sequence appears in Pascal’s Triangle as the sum of shallow diagonals.
Fibonacci’s Sequence can also be seen in nature

A Fibonacci spiral created by drawing circular arcs connecting the opposite corners of squares in the Fibonacci tiling

The Fibonacci Spiral can be found in seashells
Even the planets have something to do with Fibonacci’s sequence. It is called the dance of the planets.

Take the orbits of any two planets and draw a line between the two planet positions every few days. Because the inner planet orbits faster than the outer planet, interesting patterns evolve. Each planetary pairing has its own unique dance rhythm. For example, the Earth-Venus dance returns to the original starting position after eight Earth years. Eight Earth years equals thirteen Venus years. Note that 8 and 13 are members of the Fibonacci number series.
Fibonacci Primes

Defn: A Fibonacci Prime is a number in the sequence that is a prime

The first seven Fibonacci Primes are  \{2,3,5,13,89,233,1597\}

Fibonacci Primes with thousands of digits have been found, but it is unknown whether there are infinitely many

The largest Fibonacci Prime I have been able to find is

19,134,702,400,093,278,081,449,423,917
I take no credit for the pictures used in this slide
Below are the url for all of the websites I used the pictures from

Planet Pedals

fibonacci spirals
http://www.maths.surrey.ac.uk/hosted-sites/R.Knott/Fibonacci/fibnat.html#spiral

Big Fibonacci Spiral

Fibonacci equation
https://spherecow.wordpress.com/

Pascal's Triangle
http://www.mathsisfun.com/pascals-triangle.html

Pascal's Triangle #2
http://www.pdfebooks1.info/3/Alex8217s_Ad-_in_Numberland_split_039.html

Seashell picture
http://mathforum.org/mathimages/index.php/Fibonacci_Numbers