THE

FIBONACCI

SEQUENCE

Leonardo Fibonacci
(c.1170-c.1250)

Compiled by

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Introduction

In the thirteenth-century the Italian mathematician Leonardo Fibonacci (c.1170-c.1250) travelled extensively throughout the Mediterranean world and studied under the leading Arab mathematicians of the day.

It was Fibonacci who introduced Arab numerals and the decimal system to Europe through his Book of the Abacus (*Liber Abaci*, 1202). Other works by Fibonacci included *Practica geometriae* (1220), and *Liber quadratorum* (1225).

He also discovered the "Fibonacci series", which is a sequence of numbers in which each number is the sum of the previous two. This series is common in nature, for example in the patterns of leaf growth, etc.

The story goes that Fibonacci developed his sequence by posing a question about rabbits:

"How many pairs of rabbits, placed in an enclosed area, can be produced in a single year from one pair of rabbits, if each gives birth to a new pair each month starting with the second month?"

The answer is 144.

The Fibonacci Sequence

Fibonacci founded the answer in a pattern of numbers that is now referred to as the "Fibonacci Sequence": 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, and 144.

Ratio

Additionally, mathematicians tell us that the ratio between consecutive numbers in this set approaches the popular 0.618 and 1.618, the Fibonacci ratio and its inverse. (Relating non-consecutive numbers in the set yields other popular ratios: 0.146, 0.236, 0.382, 0.618, 1.000, 1.618, 2.618, 4.236, 6.854...)

Since Leonardo Fibonacci first developed his sequence, the relevance of its inherent ratios has been proven again and again. In fact, in everything from the DNA strand to the universe itself, the Fibonacci ratio is present, denoting and illuminating the physical/esoteric cycles of growth and decay, cause and consequence.

It is interesting to note that in the world of finance and speculation, the Fibonacci ratios are monitored and used.

The Family Tree of Rabbits
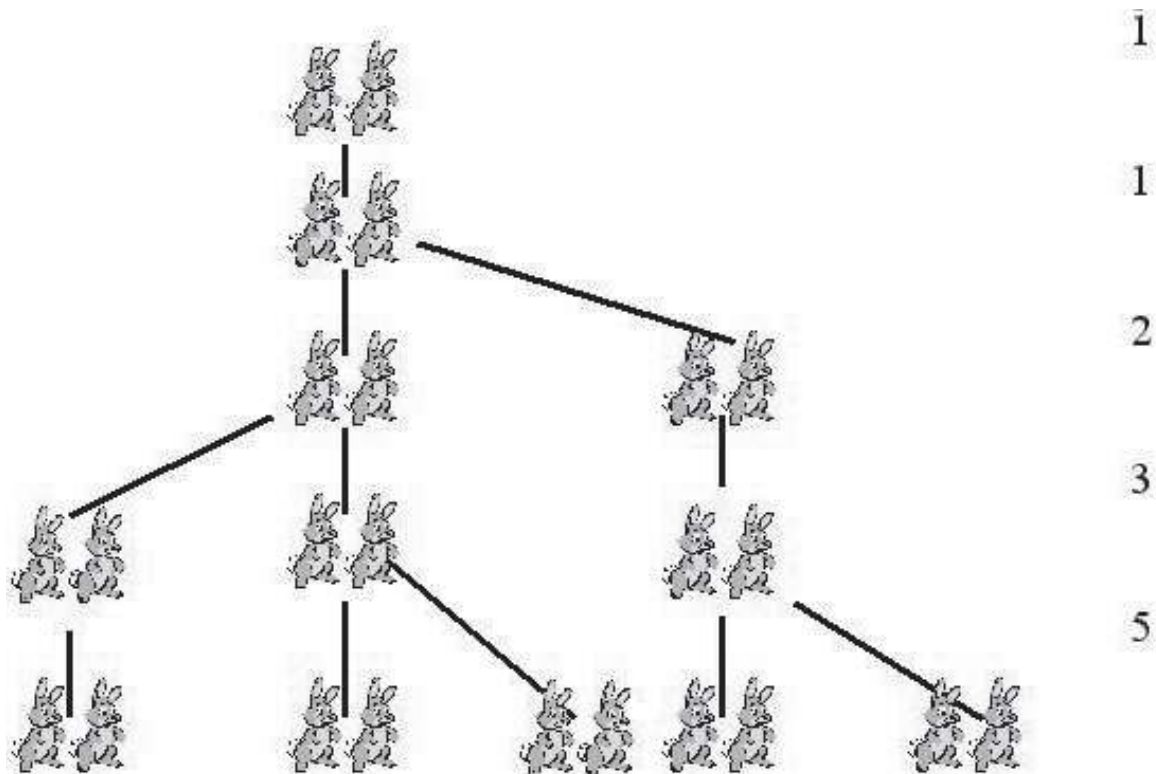
Family Tree of rabbits

How many pairs will there be in one year?

1) We start off with I pair of rabbits

2) At the end of the first month, they mate, but there is still one only 1 pair.

3) At the end of the second month the female produces a new pair, so now there are 2 pairs of rabbits.

4) At the end of the third month, the original female produces a second pair, making 3 pairs in all.

5) At the end of the fourth month, the original female has produced yet another new pair, the female born two months ago produces her first pair also, now making 5 pairs in all.

6) Consequently, the process can be summarised is: 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144 - voila, the Fibonacci sequence is born - And we will have 144 pairs of rabbits in one year

End

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