Banana Tree Best Demonstrating Fibonacci Sequencing

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Abstract-The Fibonacci numbers are Nature's numbering system discovered by the Italian mathematician Leonardo Fibonacci. They appear everywhere in Nature, from the leaf arrangement in plants, to the pattern of the florets of a flower. Fibonacci numbers are commonly observed in nature and are important for maintaining the architecture balance in nature creations i.e. arrangements in different part of plant. The present article banana is biggest grass and shows psedo plant structures. We can easily note down the presence of Fibonacci sequence in fruit bearings and even in the single banana fruit.

WHO IS FEBONACCI ?

Fibonacci (/ˌfɪbəˈnɑːtʃi/;[3] also US: /ˌfiːb-/,[4][5] Italian: [fibo'nattʃi]; c. 1170 – c. 1240–50),[6] also known as Leonardo Bonacci, Leonardo of Pisa, or Leonardo Bigollo Pisano ('Leonardo the Traveller from Pisa'[7]),was an Italian mathematician from the Republic of Pisa, considered to be "the most talented Western mathematician of the Middle Ages".[8] Fibonacci was born around 1170 to Guglielmo, an Italian merchant and customs official.[7] Guglielmo directed a trading post in Bugia (Béjaïa) in modern-day Algeria), the capital of the Hammadid empire.[16] Fibonacci travelled with him as a young boy, and it was in Bugia (Algeria) where he was educated that he learned about the Hindu–Arabic numeral system.[17][6]

Fibonacci travelled around the Mediterranean coast, meeting with many merchants and learning about their systems of doing arithmetic.[18] He soon realised the many advantages of the Hindu-Arabic system,which, unlike the Roman numerals used at the time, allowed easy calculation using a place-value system.In 1202, he completed the Liber Abaci (Book of Abacus or The Book of Calculation),[19] which popularized Hindu–Arabic numerals in Europe.[6]

Fibonacci was a guest of Emperor Frederick II, who enjoyed mathematics and science. In 1240, the Republic of Pisa honored Fibonacci (referred to as Leonardo Bigollo)[20] by granting him a salary in a decree that recognized him for the services that he had given to the city as an advisor on matters of accounting and instruction to citizens.[21][22]

Fibonacci is thought to have died between 1240[23] and 1250,[24] in Pisa.

WHAT IS FEBONACCI SEQUENCE ?

Liber Abaci posed and solved a problem involving the growth of a population of rabbits based on idealizedassumptions. The solution, generation by generation, was a sequence of numbers later known as Fibonacci numbers. Although Fibonacci's Liber Abaci contains the earliest known description of the sequence outside of India, the sequence had been described by Indian mathematicians as early as the sixth century. [30][31][32][33]In the Fibonacci sequence, each number is the sum of the previous two numbers. Fibonacci omitted the "0" and first "1" included today and began the sequence with 1, 2, 3, He carried the calculation up to the thirteenth place, the value 233, though another manuscript carries it to the next place, the value 377.[34][35] Fibonacci did not speak about the golden ratio as the limit of the ratio of consecutive numbers in this sequence.

DO WE FIND FEBONACCI SEQUENCE IN PLANTS ?

Fibonacci sequences appear in biological settings, [69] such as branching in trees, arrangement of leaves on a stem, the fruitlets of a pineapple, [70] the flowering of artichoke, an uncurling fern and the arrangement of a pinecone, [71] and the family tree of honeybees. [72][73] Kepler pointed out the presence of the Fibonacci sequence in nature, using it to explain the (golden ratio-related) pentagonal form of some flowers. [74] Field daisies most often have petals in counts of Fibonacci numbers. A model for the pattern of florets in the head of a sunflower was proposed by Helmut Vogel in 1979. In 1754, Charles Bonnet discovered that the spiral

phyllotaxis of plants were frequently expressed in Fibonacci number series.

Morphology of Banana Plant –

The banana plant is the largest herbaceous flowering plant. All the above-ground parts of a banana plantgrow from a structure usually called a "corm". Plants are normally tall and fairly sturdy with a treelike appearance, but what appears to be a trunk is actually a "false stem" or pseudostem, a compact assemblage of overlapping and spirally arranged leaf sheaths. The 'true' stem is made up of three parts: the underground rhizome, the aerial stem to which are attached the leaves, and the peduncle to which isattached the inflorescence.

Banana and Fibonacci Sequence –

In my home stead garden I discovered there stand a beautiful banana tree. It bears single hanging bunch of banana each time. 1 is a Fibonacci number. Then if we count the ridges of single banana fruit, it was divided into 5 ridges. 5 is again a Fibonacci number. When I counted total number of bananas of a bunch it was around 233 bananas and 233 is a Fibonacci number.

Bunch of Banana (233 No.)

Each banana had 5 ridges

Bfanana plants express the Fibonacci sequence in their growth points, the places where tree branches form or split. One trunk grows until it produces a branch, resulting in two growth points. The main trunk then produces another branch, resulting in three growth points. Banana tree shows fractal pattern in branching, fruiting nodes and in the cross section of stem. Pairs of leaves are arranged vertically opposite and their branching angel is always 30^0 . if we look at the fruiting nodes of banana it shows rotational symmetry. The coiling of leaves clearly visible as concentric circles in cross section of psedo stem of Banana plant.

Coiling of leaves clearly visible as concentric circles

Fruiting nodes of banana it shows rotational symmetry

Pairs of leaves are arranged verticallyopposite

Branching angel is always 300

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