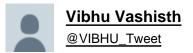
<u>BUZZ CHRONICLES</u> > <u>ALL</u> <u>Saved by @SriramKannan77</u> See On Twitter

### Twitter Thread by Vibhu Vashisth

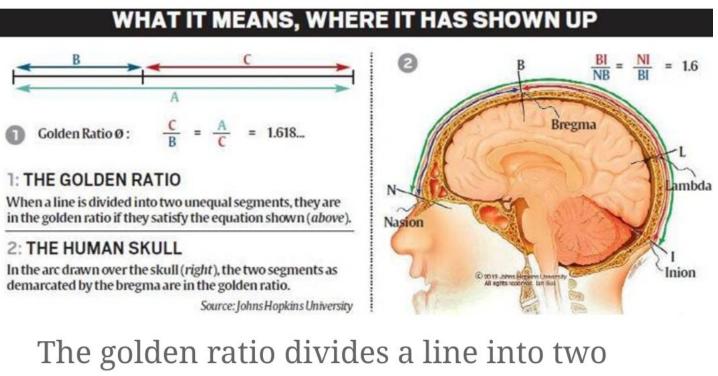




#### RISHI PINGALA: THE ANCIENT INDIAN SAGE DISCREDITED FOR HIS MAJOR CONTRIBUTIONS TO MATHEMATICS & PHI

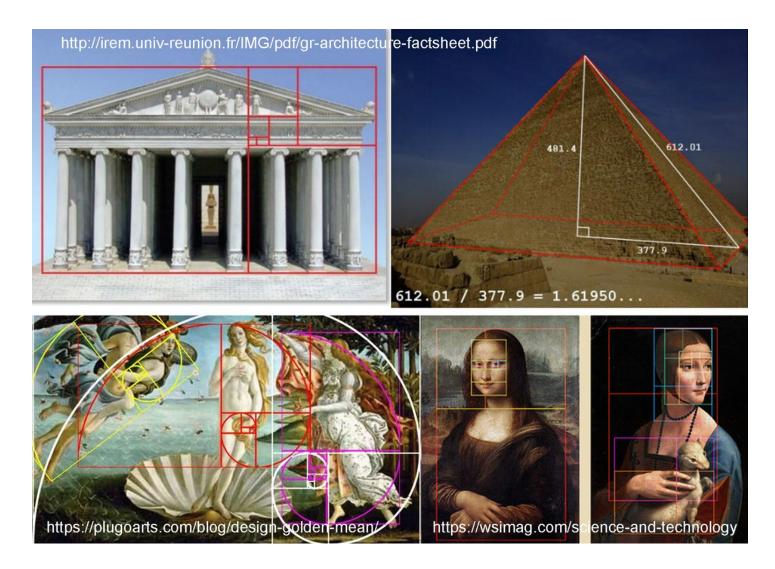
Have you ever heard about,"The Golden Ratio"?

The Golden Ratio or Phi(Greek) is a mathematical ratio of nature. Mother Nature is the most exquisite artist in herself.



The golden ratio divides a line into two unequal parts as shown. The same ratio shows up in the human skull, when the arc over it is divided at the bregma. (Source: Johns Hopkins University) &Its this Phi she uses to create all the beauty in World.

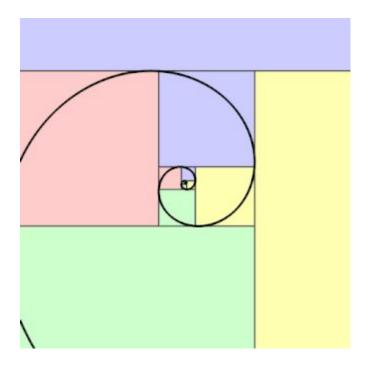
If anyone uses this ratio correctly in their art, it can turn into a spell-binding piece of work. Such is the significance of Phi'. But my thread isn't about it. Its about somethin called 'Fibonacci Series' & who actually made it



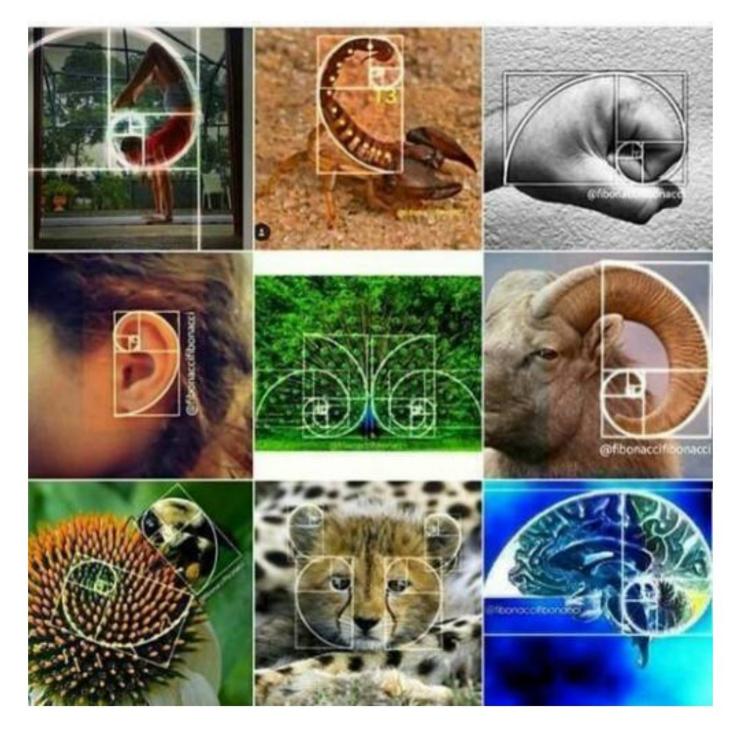
Phi is related to Fibonacci series(0,1,1,2,3,5,8,13,21,34...)

&this series is responsible for everything dat is beautiful on this planet. Just try to calculate the ratio of any 2 successive numbers ÷ each of them by the number before it in above infinite series.

E.g. 3/2=1.5, 5/3=1.666, 8/5=1.6, 34/21=1.61904 and so on. Did you notice something? The ratio is coming almost same every time. This ratio is called 'Phi 'which is numerically represented as 1:1.618. This Golden Spiral is made in exact proportion of 1:1.618.



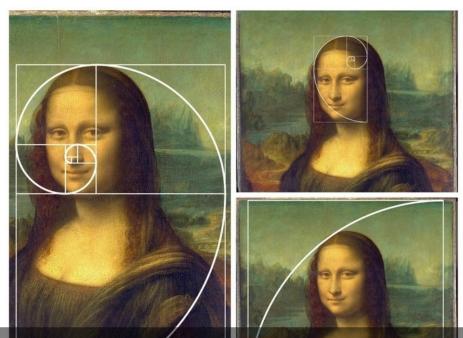
The thing I want to emphasize here is that we always find only those things appealing and attractive that have Phi. It's in our subconscious. Isn't it some revelation? We are the part of this Divine proportion of the God or the Mother Nature. Check these:



## Golden Ratio in nature Image source: you-areanother-me.tumblr.com

Modern architects, artists etc. Know about it and that's how they create the modern marvels but even the ancient artists, architects etc. knew about it and that's how they built all those wonders which we still can't stop gushing about.





Leonardo Da Vinci often used Golden mean in his paintings. Monalisa is one of the finest works he did using this simple math. Image credit: craftwhack.com

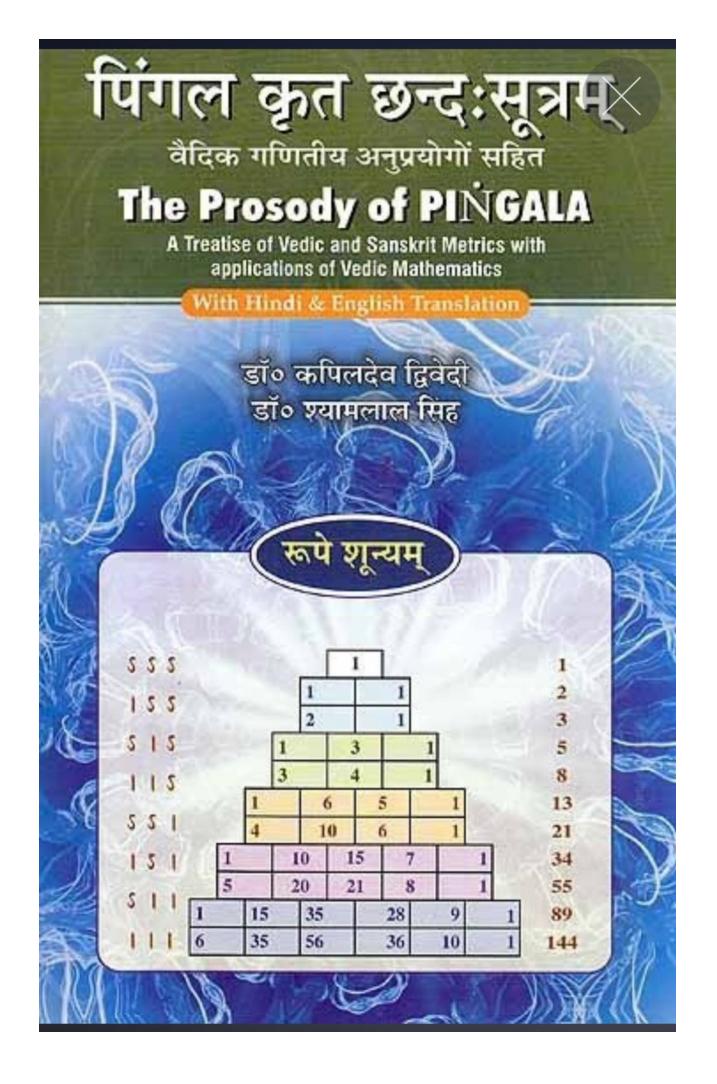
Now, the question emerges, 'Who discovered this Divine ratio of universal significance on mankind?' We have studied it in our Schools that an Italian scientist named Leonardo Fibonacci gave the concept of this numerical series in 13th century CE. But did he really do it???



The answer most certainly is no. Fibonacci series goes back to more than 2500 yrs ago and it's origin lies in ancient Indian language of Sanskrit. The ancient Indian Rishis & scholars remembered and propagated their knowledge through Sanskrit poetry which made it easy to remember.

2nd century BCE Bharat was ahead of its times in everything.Let it be Science, Mathematics, Astronomy, Astrology, Literature, Philosophy etc, you name it and the ancient Indians knew it. Sanskrit was the most ideal language to share the knowledge right from the Vedic times.

But to make the composition of the Poetry was not that easy a task. To make it easy, beautiful and pleasant to ears something called 'The Sanskrit Prosody' was formed. 'Sanskrit Prosody' or 'the Chhanda Shastra' as the ancient Indians used to call it is a framework of poetry.

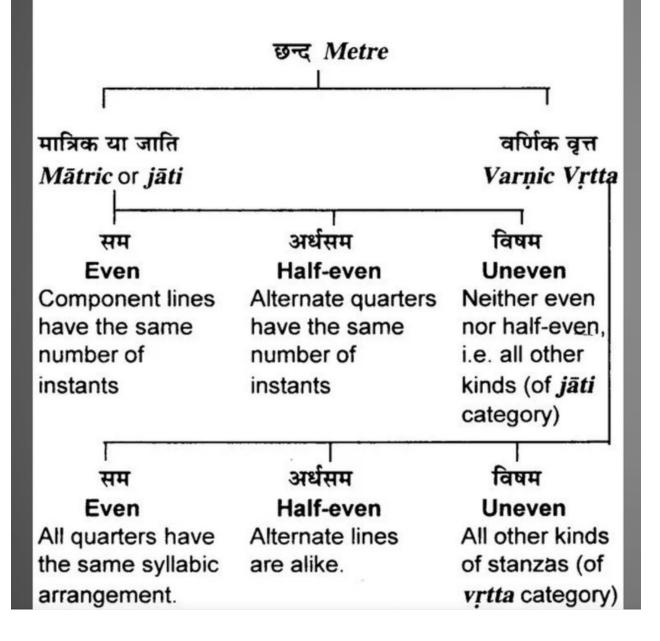


This framework uses natural rhythms and pleasant arrangement of tones to create what we call 'Chhanda' in Sanskrit or 'Verse 'in English &hence the term 'Chhanda Shastra' came into being. And this Shastra has its foundations in the mathematical concept known as Fibonacci Sequence

by the number and position of *varņas* in each quarter. Vedic *gāyatrī* etc. and popular *anuṣṭup*, *indravajrā*, etc. are the examples of *vṛtta*.

A stanza is of *jāti* (जाति) category, if its each quarter is regulated by the number of syllabic instants (*moras*). They are called *moric* metres or *mātric chandas* (मात्रिक छन्द) or *mātric* metres. *Āryā*, *mātrā samaka* are the examples of *moric* metres.

The following schematic presentation gives a bird view of *jāti* and *vitta* metres with their subdivisions.



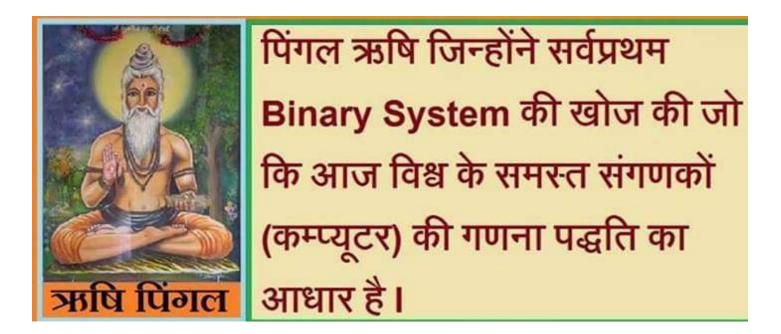
Chhanda Shastra was engineered by an ancient Indian Sage called Pingala. Have you ever heard about him? I m quite sure the answer would be no. Let's get to know him a little.

Rishi Pingala was a 4th century BCE Indian Mathematician and Sanskrit Grammarian.

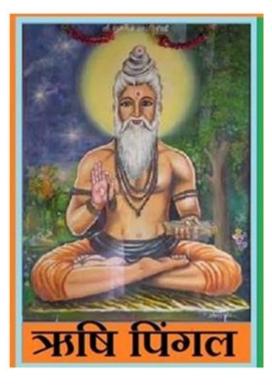
# Rishi PINGALA CREATOR OF BINARY SYSTEM

Binary numbers are the basic language that is written to the computer programs. Binary basically refers to a set of two numbers I and O, the combinations thereof are called bits and bytes. The binary number system was first described by the Vedic scholar Pingala, in his book Chandaśhāstra, which is the earliest known Sanskrit treatise on prosody (the study of poetic meter and verse).

There are not many specifications available as far as the birth and death of Pingala Rishi is concerned. But what is known about him with evidenced records is that his contributions in the fields of Maths, Science & Literature during the Vedic period were very vast and great.



Many scholars identify him as the younger brother of Panini, a 4th century BCE grammarian and some identify him as the 2nd century BCE scholar called Patanjali. These links are still to be proved but what we know surely with records is that he created 'Chhanda Shastra'.



Pingala's 'Chhanda Shastra' is believed to be the most ancient Sanskrit treatise on prosody. His greatest contributions in the field of Maths include Pascal's Triangle, Binomial Theorem & Fibonacci sequence called as 'Maatra Meru'.

'ChhandaShastra' on 'Sanskrit Prosody' is most exquisite literary masterpiece created by him. Its further extended to the concept of a Pyramid,stacked numbers dat we know by name,'Pascal's Triangle'.But it wasn't the name used by Pingala obviously.He called it 'Meru Prasastara'.

'Meru Prasastara' was a stack of numbers in a Triangle that converged to the Golden Ratio. Halayudha is particularly known for his commentary on Pingala's Meru Prasastara which stands for the staircase to 'Mount Meru' referred to as 'the centre of

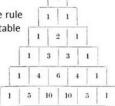
#### मेरु प्रस्तार (From हलायुध commentary on छन्दशास्त्र, by पिङ्गल)

त्रतीऽनेकदितिलघ् कियासिदार्थं यावदभिमतं प्रथमप्रसा-रवन् मेरुप्रस्तारं दर्भयति, उपरिष्टादेनं चतुरस्रकोष्ठं(<sup>8</sup>) लिखित्वा तस्याधस्तादुभयतोऽई निष्कृान्तं कोष्ठकद्वयं लिखेत, तस्याप्यधस्तात्त्वयं (१) तस्याप्यधस्ताचतुष्टयं यावदाभिमतं स्थान-मिति प्रथममेरुप्रस्तारः । तस्य प्रथमे कोष्ठि (१) एकसङ्ख्यां व्यवस्थाप्य लचणमिदं प्रवर्त्तयेत् । तच परे कोष्ठे यहत्तसङ्ख्या-जातं तत् पूर्व्वकोष्ठयोः पूर्णं निविभयते । तचोभयीः कोष्ठ-योरेकैकमद्धं दयात् । तत्तस्ततीयायां पङ्क्तौ पर्धन्तकोष्ठयोः परकोष्ठगतमेकैकमद्धं दयात् । मध्ये कोष्ठे तु (९) परकोष्ठ-दयाद्धमेकौकत्व पूर्णं निविभयदिति पूर्णग्रव्दार्धः । चतुर्थां पङ्क्तावपि पर्व्यन्तकोष्ठयोरेकैकमेव स्थापयेत । मध्यमकोष्ठयोस्तु परकोष्ठदयाद्भमेकौकत्व पूर्णं चिसङ्ख्यारूपं स्थापयेत् । उत्तर-ताप्ययमेव न्यासः । तत्र (४) दिकोष्ठायां पङ्क्तौ एकाचरस्य विन्यासः । तचैक-

गुर्वेकलघुहत्तं भवति । त्यतीयायां पङ्कौ दाचरस्य प्रस्तार: । तत्रैकं सर्वग्रह द्वे एकलघुनौ एकं सर्वलघिति कोष्ठक्रमेण हत्तानि भवन्ति । चतर्थां पङकौ नाचरस्य प्रस्तार: ।

To get every combination of one, two, etc. syllables as required From first row onwards, the meru tabulation will be shown below. At the top itself one square cell is drawn Below this row let us have a pair, half over lapping. Two cells are drawn. Again the row below will have three Again its next line will have four Same way, up to the required stage, cells are constructed This is called Meru Prastara or Meru-Tabulation Its first stage-cell will hold the number 1 From here on, the following is the way it grows In its twin-cell row, the pair of cells holds numbers 1,1 Then in the 3rd row, the extreme cells will hold numbers 1,1 middle cell takes the added value of the two cells above Thus completes the table for 2nd power Then in the 4th row also, the extreme cells will hold numbers 1,1 Middle cells take the added values of the two cells above each This completes the 3rd power Next and next stages also follow the same rule 1 1 Here the twin-cell row gives one syllable table 2 1 1 the 3rd row gives two syllables table

the 3rd row gives two syllables table Thus 4th row gives three syllables table And so on.



There r detailed mentions of Pingala's Chhanda Shastra made by ancient Indian scholars for their respective fields of art. Fibonacci series was used by ancient Indian musicians, poets & architects alike. Astronomer Varamihira used it in his work related to Binomial coefficients.

## An excerpt from "**The Venus Blueprint: Uncovering the Ancient Science of Sacred Spaces**" by **Richard Merrick** beautifully illustrates this concept.

Of special significance was the fact Mount Meru had been described as a Fibonacci spiral by the Vedic grammarian Pingala in his Art of Prosody (the Chhandah-shastra, 400–200 BC). Pingala claimed that Maatraameru actually represents a sacred mathematical cadence that converges toward the golden mean—the same constant found in the intersections of the Star of Venus.

#### **Mountain of Cadence**

In Pingala's account, Mount Meru was a pyramid of stacked numbers from which diagonals could be added to produce the numerical series  $\{1, 1, 2, 3, 5, 8, 13, 21, ...\}$  (Fig. 8). Known today as Pascal's triangle, the sequence of numbers within this pyramid is the Fibonacci series generated by the equation f(n) = f(n-1) + f(n-2). Long recognized as an organizing property in nature, Fibonacci proportions are found in the distribution of limbs on a tree, spiral geometries in sea creatures, and branching proportions of the human body, to name just a few.

As Pingala explained it, this series creates a "mountain of cadence" in how the diagonals of the pyramid ascend to Unity or one at the top of the pyramid, while also spiraling downward as adjacent arithmetic proportions that converge toward the golden mean of about 1.618033.<sup>14</sup>

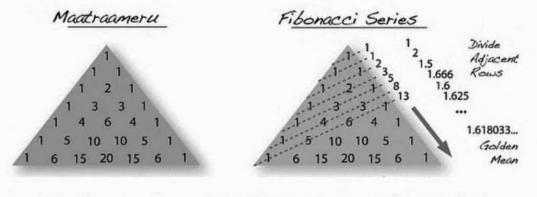


FIGURE 8. Mount Meru as a Fibonacci cadence

Acharaya Hemraj strengthened Rishi Pingala's legacy 1000 yrs ago.

The legitimate question is how come the 'Meru Prasastara' of Pingala became world famous as 'Pascal's Triangle' and how come 'Maatra Meru' of Pingala came to be known as 'Fibonacci Series' worldwide.

## Fibbonacci or मात्रामेरु?

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to mathematics	•	•	1	6	5	1		13		1	6	15	20	15	6	1					•
			4	10	6	1		21		1	7	21	35	35	21	7	1				
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e ina q inanci a sqstein		5	20	21	8	1		55	۰.	1	9	36	84	126	126	84	36	9	1		
- Mātrāmeru series	1	15	35	28	9	1		89		1	10	45	120	210	252	210	120	45	10	1	
	6	35	56	36	10	1	•	144	•	1	11	55	165	330	462	462	330	165	55	11	1

Before Fibonacci wrote his work, the sequence  $F_n$  had already been discussed by Indian scholars, who had long been interested in rhythmic patterns that are formed from one-beat and two-beat notes or syllables. The number of such rhythms having *n* beats altogether is  $F_{n+1}$ ; therefore both Gopāla (before 1135) and Hemachandra (c. 1150) mentioned the numbers 1, 2, 3, 5, 8, 13, 21, ... explicitly. [See P. Singh, *Historia Math.* 12 (1985), 229-244; see also exercise 4.5.3-32.]

> Donalad Knuth, The Art Of Computer Programming, Volume 1, 3/E

And this happened not only with Pingala, it has happened with many other ancient Indian Rishis also who have been discredited of the major works they did in the fields of Maths, Science etc. Did this happen bcoz of the raids & ultimately conquest of Bharatvarsh by the western powers

I think so. These forces came to our Motherland, termed us uncivilized, looted our wealth, stole our scriptures, took it back, copied everything and propagated it as theirs. That's what happened. But it must be corrected now. What belongs to us must be returned to us.

What all we have been discredited for, must be accredited to us. It's a universal truth that Bharatvarsh is the source of civilization and all knowledge of the world and it is being proved slowly but steadily.

It's also time for the Indian education system to teach its youth the true history of Bharatvarsh and make them feel proud of their country's lost heritage and ancestral wisdom.

Jai Bharatvarsh ■ Jaitu Sanatan ■

