

GOVERNMENT DEGREE COLLEGE SHADNAGAR

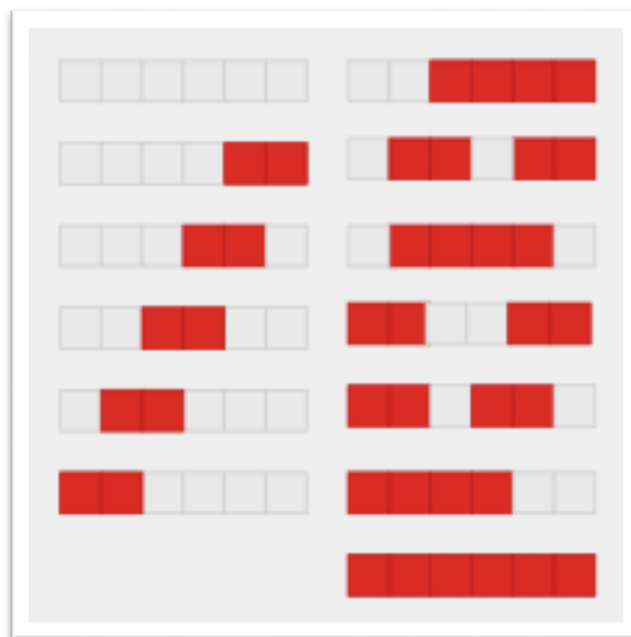


Ranga Reddy - Dist

Department of Mathematics

STUDY PROJECT – 2021 – 22

On



“Hemachandra's Numbers and Series”

Government Degree College - Shadnagar

Ranga Reddy (Dist)

Student Study Project

on

“Hemachandra's Numbers and Series”

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[Signature]
Principal
GOVT. DEGREE COLLEGE
SHADNAGAR
RANGA REDDY DIST.


Government Degeer College Shadnagar

Ranga Reddy (Dist)

Certificate

This is to certify that BSc (MPC & MPCs) SEM I students has successfully completed a Study Project on “**Hemachandra's Numbers and Series**” for the academic year 2021 - 22 under the Supervision of **T. Sri Krishna, Department of Mathematics**.

Hence it is certified


Principal
GOVT. DEGEER COLLEGE
SHADNAGAR
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Hemachandra:

Acharya Hemachandra was a 12th century Indian Jain scholar, poet, mathematician, logician. He gained the title Kalikabharvajana the knower of all knowledge in his times and father of Gujarati language.

Prosody:

He composed the Chandrasahasana, a work on prosody with commentary. He followed the earlier Gopala described the Fibonacci sequence in around 1150 about 50 years before Fibonacci (1202). He was considering the number of cadences of length n , and showed that these could be formed by adding a short syllable to one of $n-2$. This recursion relation $F(n) = F(n-1) + F(n-2)$. This recursion relation is

What defines the Fibonacci sequence.

He studied the rhythms of Sanskrit poetry. Syllables in Sanskrit are either long or short. Long syllables have twice the length of short syllables. The question he asked is how many rhythm patterns with a given total length can be formed from short and long syllables.

For example, how many patterns have the length of five short syllables (i.e., five beats). There are eight: SSSSS, SSSL, SSL, SLSS, LSSS, SLL, LSL, LLS. As rhythm patterns, these are

xxxxx, xxxx, xxx, xx.xx, x.xxx,
xx.x, x.xx, x.x.x.

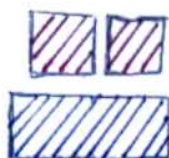
Hemachandra number series begins with 1, 1, 2, 3, 5, 8, 13, and so on. They were known in India before Fibonacci as the Hemachandra numbers. And the ratio of any two successive Fibonacci numbers approximate a ratio, ~ 1.618 , called the golden section or golden mean.

Fibonacci is remembered for two important contributions to Western mathematics. He helped spread the use of Hindu systems of writing numbers in Europe (0, 1, 2, 3, 4, 5) in place of Roman numerals. The seemingly insignificant series of numbers later named the Fibonacci sequence after him.

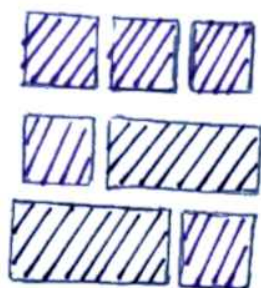
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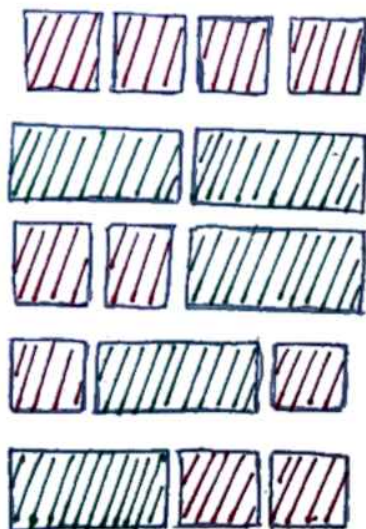
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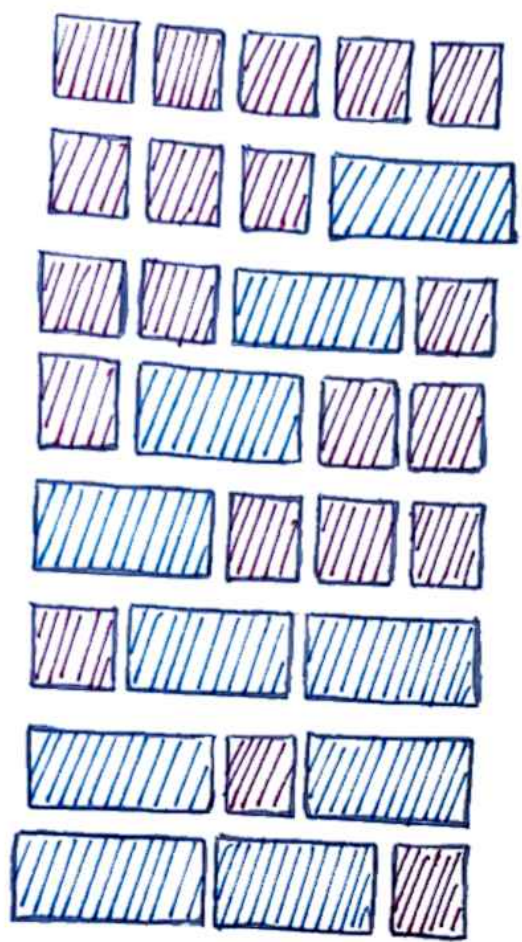
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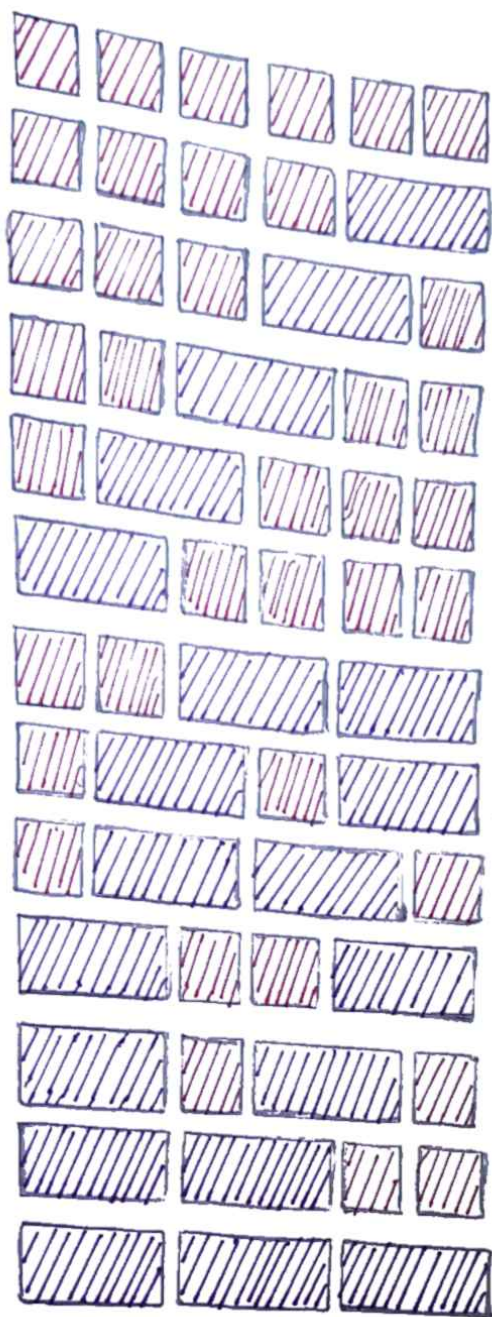
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$$H_5 = 8$$



$$H_6 = 13$$



Lexicography :

Abhidhan - chintamani (IAST abhidhana-chintamani - kosa) is a lexicon while anekarth kosa is a lexicon of words bearing multiple meanings - Deshi-shabda-sangraho or Desi-nama-mala is the lexicon of local or non-sanskrit origin. Nisvanthu sesa is a botanical lexicon.

Other works :

His other works are a commentary in rhetoric work alankara chudamani, Abhidhana-chintamani, Pramana mimansa (logic), Vintaraga - stotra (Prayers).