BLDE Association's

S B Arts and KCP Science College, Vijayapur

Re-accredited at `A' by NAAC

Department of BCA

Date:19/08/2017

NOTICE

It is here by informed to all the BCA students to attend the "Ted Talk" 21/08/2017on the topic “Arithmetic operation using Napier’s bones”. All the students should be present on time.

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B.L.D.E. Association's

S.B.ARTS & K.C.P SCIENCE COLLEGE
VIJAYAPUR

BCA Department

A REPORT ON

TED TALK

Topic

Arithmetic operation using Napier's bones

August 21st , 2017

For

BCA First Year

2017-18

Presenter

Prof: Pavankumar Mahindrakar

Contd..

A Report on a Ted-Talk

Presenter : Prof. PavankumarMahindrakar M.Sc (C.S)
Title : Arithmetic operation using Napier's bones
Dategiven : August 21st, 2017

In Brief:

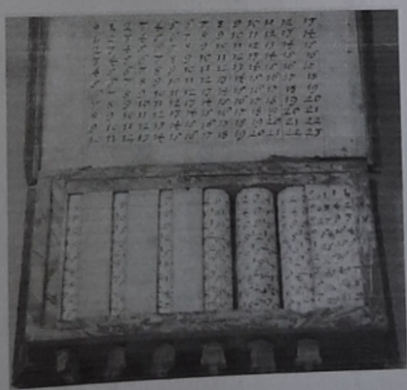
John Napier (1550-1617), a Scottish mathematician, is mostly known for his invention of *logarithms* - a device that revolutionized calculations by reducing difficult and tedious multiplication to addition of table entries. In 1617, three years after appearance of Mirifici logarithm rum canonisdescriptio (A Description of the Wonderful Law of Logarithms), he published Rabdologiae which was recently reproduced as Rabdology by the Charles Babbage Institute in the Reprint Series for the History of Computing.

About Napier's bones

Napier's bones is a manually-operated calculating device created by John NapierofMerchiston for calculation of products and quotients of numbers. The method was based on Arab mathematics and the lattice multiplication used by MatrakciNasuh in the Umdet-ulHisab and Fibonacci's work in his Liber Abaci.

Why is it called Napier's bones?

Napier's bones, also **called Napier's** rods, are numbered rods which can be used to perform multiplication of any number by a number 2-9. ... In practice, multiple sets of **bones** were needed for multiplication of numbers containing repeated digits



How do Napier bones work?

To calculate 83 × 24, place the multiplier and the **bones** for the number being multiplied (i.e. the '8' and '3' **bones** for 83) side by side as shown below. To find the product first multiply by 4 and then multiply by 20, and add just as you would for long multiplication to find the answer

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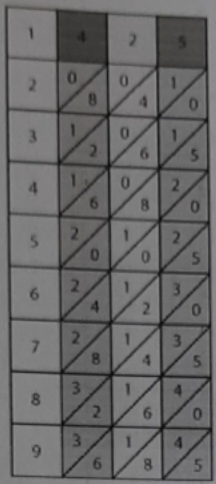
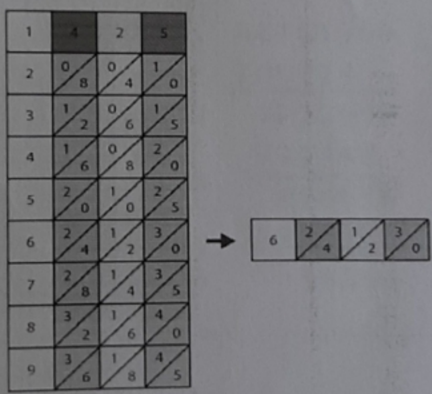
Problem: Multiply 425 by 6.

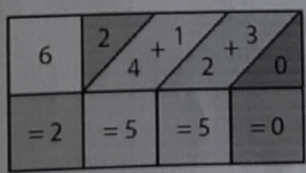
Start by placing the bones corresponding to the leading number of the problem into the boards. If a 0 is used in this number, a space is left between the bones corresponding to where the 0 digit would be. In this example, the bones 4, 2, and 5 are placed in the correct order as shown below.



Looking at the first column, choose the number wishing to multiply by. In this example, that number is 6. The row this number is located in is the only row needed to perform the remaining calculations and thus the rest of the board is cleared below to allow more clarity in the remaining steps.



Starting at the right side of the row, evaluate the diagonal columns by adding the numbers that share the same diagonal column. Single numbers simply remain that number.



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Once the diagonal columns have been evaluated, one must simply read from left to right the numbers calculated for each diagonal column. For this example, reading the results of the summations from left to right produces the final answer of 2550.

Therefore: The solution to multiplying 425 by 6 is 2550. (425 x 6 = 2550)

Problem: Divide 46785399 by 96431

Division can be performed in a similar fashion. Let's divide 46785399 by 96431, the two numbers we used in the earlier example. Put the bars for the divisor (96431) on the board, as shown in the graphic below. Using the abacus, find all the products of the divisor from 1 to 9 by reading the displayed numbers. Note that the dividend has eight digits, whereas the partial products (save for the first one) all have six. So you must temporarily ignore the final two digits of 46785399, namely the '99', leaving the number 467853. Next, look for the greatest partial product that is less than the truncated dividend. In this case, it's 385724. You must mark down two things, as seen in the diagram: since 385724 is in the '4' row of the abacus, mark down a '4' as the left-most digit of the quotient; also write the partial product, left-aligned, under the original dividend, and subtract the two terms. You get the difference as 8212999. Repeat the same steps as above: truncate the number to six digits chose the partial product immediately less than the truncated number, write the row number as the next digit of the quotient, and subtract the partial product from the difference found in the first repetition. Following the diagram should clarify this. Repeat this cycle until the result of subtraction is less than the divisor. The number left is the remainder.

```
96431
192862     46785399 |96431
289293     385724     485
385724      8212999
482155      771448
578586       498519
675017       482155
771448        16364
867879
```

So in this example, we get a quotient of 485 with a remainder of 16364. We can just stop here and use the fractional form of the answer.

Link :- youtube.com/watch?v=3gjDfc2AFsw

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