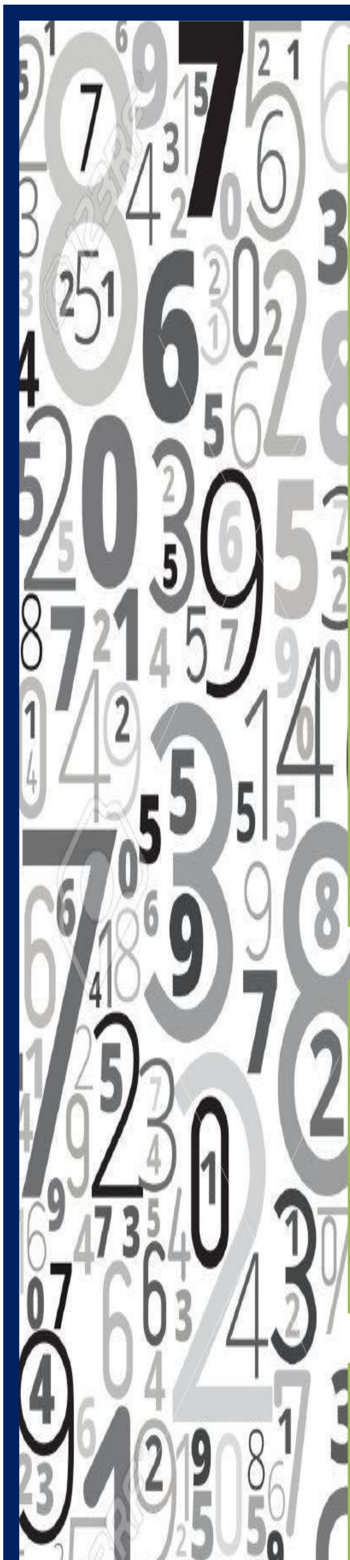

The new way to multiply.

Discovering new possibilities and developing alternatives with numbers.

Author Zeolla Gabriel Martín

The art of multiplying by adding.

46 x 21=

	4	6	
	4	6	
+		4	6
	9	6	6

Simple Tesla Algorithm.

A useful method for students.
It is not necessary to know the multiplication tables.

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The new way to multiply
Simple Tesla algorithm.

Author and researcher: **Professor** Zeolla Gabriel Martin

Index

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Introduction

A multiplication algorithm is an algorithm (or method) to multiply two numbers. Depending on the size of the numbers, there are different algorithms. The multiplication algorithms exist since the advent of the decimal system.

This research was born from the fascination of finding alternatives to traditional multiplication methods, my dream was to find an easier method for the student, mathematics has many different multiplication algorithms, such as the Egyptian, the Karatsuba method, the method of lattice, etc., inspired and fascinated I began to look for other possibilities until I managed to find and discover a wonderful and simple method that works and is absolutely unknown to date.

Summary:
This document develops and demonstrates the discovery of a new, reliable and efficient multiplication algorithm that works absolutely with all numbers and its method is very simple, we just have to add.

I will call this new method Simple Tesla Algorithm in honor of Nikola Tesla since I have read countless information about him, about his enormous discoveries and I have also studied his spiral multiplication map.
While the operation of this Algorithm has little to do with the multiplication map of Tesla for me it was a source of inspiration to begin the search for something new, something different and incomparable.

August 2019 San Vicente, Buenos Aires, Argentina.

82 x 31 =				
		8	2	
		8	2	
		8	2	
	+		8	2
	2	**5**	**4**	**2**

The 82 would be the multiplying and the 31 would be the multiplier, the result is the product (2.542)

The Simple Tesla algorithm does NOT require prior learning of the multiplication tables.

Demonstration of the operation of the Simple Tesla Algorithm.

We can use this method to calculate the product of any number with true accuracy. It has indisputable applications in various areas such as polynomials, complex numbers, binary numbers and many more.
Basically multiplying is an act of repeated sums, and true to this concept is how this algorithm is developed.

1. Two digits for two digits.

The Simple Tesla algorithm is very graphic and simple visualizing the examples we will easily understand how it works. The key to the exercise is based on how to locate the numbers to be able to make a sum that generates the product.
In the Simple Tesla Algorithm no multiplication is necessary, so it is not an impediment not to know the multiplication tables to solve a multiplication.

The method is very different from the known ones, this consists of writing the number of the multiplying in rows the times indicated by the multiplier and then adding.

Example A
We start above the left side, write the number 43 in columns as many times as indicated by the ten of the multiplier. In this case 3 times (since it multiplies by 32)
Then we run a locker to the left and write the number 43 in columns as many times as indicated by the multiplier unit. In this case 2 times (Unit of 32)
Finally we add.

Example A

43 x 32 =**1.376**

		4	3		
3		4	3		
		4	3		
2			4	3	
	+		4	3	
	1	**3**	**7**	**6**	Product

Example B

98 x 14 =**1.372**

1		9	8		
			9	8	
4			9	8	
			9	8	
	+		9	8	
	1	**3**	**7**	**2**	Product

2. Example of multiplication using a digit.

The method is exactly the same as in the previous point, but when having a single digit the numbers are located in a single column. We just have to add.

43 x 5 = **215**

5			4	3	
			4	3	
			4	3	
	+		4	3	
			4	3	
		2	**1**	**5**	Product

3. Three digits by three digits.

The Simple algorithm can be used to multiply any two numbers, no matter how small or large. Look at the following examples of multiplication to deepen your behavior.

396 x 123 = **48.708**

1		3	9	6			
			3	9	6		
2			3	9	6		
				3	9	6	
3				3	9	6	
	+			3	9	6	
		4	**8**	**7**	**0**	**8**	Product

As we can see the number of the multiplier is in the left column formed in blue, giving dimension to each of the parts of the multiplying.

4. <u>Four digits by Four digits.</u>

Every time we multiply by a new multiplier number we run the digits one place to form a new column, we always move to the right.

The blue numbers in columns on the left are placed in such a way that it is easier to assemble the column displacement without making mistakes, but it is not necessary to locate them, they are only to help us organize visually.

9.876 x 1.432 =**14.142.432**

1		9	8	7	6				
			9	8	7	6			
			9	8	7	6			
4			9	8	7	6			
			9	8	7	6			
				9	8	7	6		
3				9	8	7	6		
				9	8	7	6		
2	+				9	8	7	6	
					9	8	7	6	
	1	**4**	**1**	**4**	**2**	**4**	**3**	**2**	Product

Multiplying is fast and natural. It is very difficult to make mistakes since we always add the same number in different positions.

5. Five digits by Five digits.

Multiplying by multi-digit numbers is no problem. The Tesla Simple Algorithm is fast, simple and has no limitations.

In this case the number 78.942 will be repeated in a total of 16 times (4 + 3 + 2 + 4 + 3), following the procedure developed in the document we finally add and obtain the product.

78.942 x 43.243 = **3.413.688.906**

			7	8	9	4	2					
4			7	8	9	4	2					
			7	8	9	4	2					
			7	8	9	4	2					
				7	8	9	4	2				
3				7	8	9	4	2				
				7	8	9	4	2				
					7	8	9	4	2			
2					7	8	9	4	2			
						7	8	9	4	2		
						7	8	9	4	2		
4						7	8	9	4	2		
						7	8	9	4	2		
							7	8	9	4	2	
3	+						7	8	9	4	2	
							7	8	9	4	2	
		3	**4**	**1**	**3**	**6**	**8**	**8**	**9**	**0**	**6**	Product

The sums can become extensive depending on the number of digits we have, but this is not an obstacle to achieve the product.

The Simple Tesla algorithm has a particularity the longest sum in a multiplication is always done in all cases in the unit of the multiplication of the first top row, this is a Pattern that forms a central column.

12 x 12 =144

1	2	
	1	2
	1	2
1	4	4

6. Example of Multiplication when we have zeros in the multiplier digits.

When we have some zero in the multiplier we must complete the row with the number zero for each of the digits of the multiplying. This will allow proper and orderly operation. In the following example, the number 15.328 will be replaced by 00000.

15.328 x 20.403 = **312.737.184**

2	1	5	3	2	8					
	1	5	3	2	8					
0		0	0	0	0	0				
			1	5	3	2	8			
4			1	5	3	2	8			
			1	5	3	2	8			
			1	5	3	2	8			
0				0	0	0	0	0		
					1	5	3	2	8	
3					1	5	3	2	8	
	+				1	5	3	2	8	
	3	**1**	**2**	**7**	**3**	**7**	**1**	**8**	**4**	Product

The Simple Tesla algorithm is very easy, very visual and every time the practice becomes more effective, I would like you to teach this in school, it would surely have a very good acceptance.

If we multiply negative numbers we apply the sign rule.

7. Alternative method for long digit sums

When we have digits with numbers 7, 8 or 9 in the multiplier the sums are made quite long, so we can apply an alternative method by solving 2 operations by adding and then subtracting both results, in this technique we also do not use the multiplication tables, Therefore it is a different and alternative way to summarize long sums.

997 x 98= 97.706

Simple Tesla Algorithm	Alternative Method With addition and subtraction

9 9 7
9 9 7
9 9 7
9   9 9 7
9 9 7
9 9 7
9 9 7
9 9 7
9 9 7
  9 9 7
  9 9 7
8   9 9 7
  9 9 7
  9 9 7
  9 9 7
+   9 9 7
  9 9 7
9 7 7 0 6 Producto
	I multiply it by 100, but the 2 that I missed have them present for the second operation.
	
	997 x 98=
	
	997 x 100=99.700
	I solve it by sums using the Simple Tesla Algorithm.
	
	997 x 2= 1.994
	I solve it by sums using the Simple Tesla Algorithm.
	
	Now we subtract both results.
	9 9 7 0 0
	- 1 9 9 4
	9 7 7 0 6

In the first example we add the number 997 17 times, in the alternative method, we add it 1 time, then 2 times and subtract it 1. (In total 4 operations)

If we use the traditional method of standard multiplication we must first multiply 6 times, before making the sum to obtain the product. In this case we must know the multiplication tables.

8. <u>Large Numbers</u>

The method is always the same, it is very easy to achieve the product between very large numbers. We just need patience.

222.222.222.222 x 111.111.111.111=

24.691.358.024.641.975.308.642

2,22222E+11 x 1,11111E+11= **2,46914E+22**

1		2	2	2	2	2	2	2	2	2	2	2	2													
1			2	2	2	2	2	2	2	2	2	2	2	2												
1				2	2	2	2	2	2	2	2	2	2	2	2											
1					2	2	2	2	2	2	2	2	2	2	2	2										
1						2	2	2	2	2	2	2	2	2	2	2	2									
1							2	2	2	2	2	2	2	2	2	2	2	2								
1								2	2	2	2	2	2	2	2	2	2	2	2							
1									2	2	2	2	2	2	2	2	2	2	2	2						
1										2	2	2	2	2	2	2	2	2	2	2	2					
1											2	2	2	2	2	2	2	2	2	2	2	2				
1												2	2	2	2	2	2	2	2	2	2	2	2			
1	+												2	2	2	2	2	2	2	2	2	2	2	2		
		2	**4**	**6**	**9**	**1**	**3**	**5**	**8**	**0**	**2**	**4**	**6**	**4**	**1**	**9**	**7**	**5**	**3**	**0**	**8**	**6**	**4**	**2**	Product	

<u>Comparison with Standard multiplication</u>

The Standard multiplication is what we have learned in school and it is the one used by most people in Argentina and I think it is also in much of the world.
Comparing with the Simple Tesla Algorithm, I affirm that standard multiplication is slow.
The reason why it is slow is because for each digit in each number in the exercise, a separate multiplication operation must be performed, and the results must be methodically accommodated before adding all the products.

This might not be a problem for you and for me, which eventually we rarely resort to standard multiplication for large numbers, since we replace it with a calculator or computer.
But it is an inconvenience that school children are familiar with, working painfully on their calculations while learning the magic of multiplication.
Basically, Standard multiplication is a popular algorithm, but it is not particularly the most efficient, since the process is inevitably laborious especially for large numbers.

The Simple Tesla algorithm is a new opportunity for teaching, for the student, and for all those who seek to reach the same place from different visions.
I dare not define which algorithm is better, I simply believe that it is another way of so many that already exist.

9. Multiplication with Scientific Notation

A. Very large numbers

We take non-zero decimal values and perform the same procedure that we have been developing in this document. The difference will be in taking into account that the first digit will have the comma. We must also locate the exponential values at the end and to the right to achieve their sum.

226.000.000.000 x 251.000.000=

$2,26*10^{11}$ x $2,51*10^{8}$

$5,6726*10^{19}$

56.726.000.000.000.000.000

		2,	2	6				
2		2,	2	6				
			2	2	6			
5			2	2	6			
			2	2	6			
			2	2	6			
			2	2	6			
1				2	2	6	$*10^{11}$	
$*10^{8}$	+						$*10^{8}$	
		5,	**6**	**7**	**2**	**6**	$* \mathbf{10^{19}}$	Product

B. Very small numbers

0,0000000000089 x 0,0000234 = **2,0826** $\mathbf{10^{-16}}$

$8,9 *10^{-12}$ $2,34 *10^{-5}$

2		8,	9				
		8,	9				
			8	9			
3			8	9			
			8	9			
				8	9		
4				8	9		
				8	9	$*10^{-12}$	
$*10^{-5}$				8	9	$*10^{-5}$	
	2	**0,**	**8**	**2**	**6**	$\mathbf{*10^{-17}}$	Product

Clarification

$20,826 *10^{-17} = 2,0826 *10^{-16}$

C. Natural exercise of the same example above

The procedure is the same that I have been developing in the text. The comma is always located in the first digit.

0,0000000000089 x 0,0000234 = **2,0826** $*10^{-16}$

0	0,	0	0	0	0	0	0	0	0	0	0	0	0	0							
0		0	0	0	0	0	0	0	0	0	0	0	0	0	0						
0			0	0	0	0	0	0	0	0	0	0	0	0	0	0					
0				0	0	0	0	0	0	0	0	0	0	0	0	0	0				
0					0	0	0	0	0	0	0	0	0	0	0	0	0	0			
2						0	0	0	0	0	0	0	0	0	0	0	0	8	9		
						0	0	0	0	0	0	0	0	0	0	0	0	8	9		
							0	0	0	0	0	0	0	0	0	0	0	0	8	9	
3							0	0	0	0	0	0	0	0	0	0	0	0	8	9	
							0	0	0	0	0	0	0	0	0	0	0	0	8	9	
								0	0	0	0	0	0	0	0	0	0	0	0	8	9
4								0	0	0	0	0	0	0	0	0	0	0	0	8	9
		+						0	0	0	0	0	0	0	0	0	0	0	0	8	9
								0	0	0	0	0	0	0	0	0	0	0	0	8	9
Product	**0,**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**8**	**2**	**6**

Multiplying very small numbers is very new with the Simple Tesla Algorithm.

10. Simple algorithm in groups (not efficient).

In this case we divide the multiplier into two groups on the one hand the number 11 and on the other hand the number 07. These will be the values that establish the repetition of the multiplicand. Due to having split it in two we must run 2 places when we use the unit.

In this example, multiplying (9369) is repeated 18 times (11 + 7), it would be much more efficient if we do it naturally in which it would only be repeated 9 times (1 + 1 + 0 + 7). This would make the sums easier and less long.

The reason for this example is to demonstrate that within the same Tesla Simple Algorithm there are variables that we can take or not take beyond that in this case the operations of addition become more extensive.

9.369 x 1.107 = **10.371.483**

			9	3	6	9			
			9	3	6	9			
			9	3	6	9			
11			9	3	6	9			
			9	3	6	9			
			9	3	6	9			
			9	3	6	9			
			9	3	6	9			
			9	3	6	9			
			9	3	6	9			
			9	3	6	9			
					9	3	6	9	
					9	3	6	9	
07					9	3	6	9	
					9	3	6	9	
					9	3	6	9	
					9	3	6	9	
		+			9	3	6	9	
	1	**0**	**3**	**7**	**1**	**4**	**8**	**3**	Product

11. Decimal numbers

The mechanism to solve the operations with decimal numbers is the same that I have been writing throughout the document, the only thing we have to take into account are the places occupied by the decimals and then place the comma in the product. Here the same mechanism is used as in the standard algorithm to be able to locate the comma.

Example A

16,8 x 32 = **537,6**

		1	6	8		
3		1	6	8		
		1	6	8		
2			1	6	8	
	+		1	6	8	
		5	**3**	**7,**	**6**	Product

Example B

48,2 x 23,1 = **1113,42**

2		4	8	2			
		4	8	2			
3			4	8	2		
			4	8	2		
			4	8	2		
1				4	8	2	
	1	**1**	**1**	**3,**	**4**	**2**	Product

We can also multiply periodic decimal numbers, using fractions as the conventional method does but instead of multiplying with the standard Algorithm we can do it with the Tesla Simple Algorithm, first to the numerator and then to the denominator.

12. Decomposition of the Simple Tesla Algorithm

399 x 223= **88.977**

2		3	9	9		
		3	9	9		
2			3	9	9	
			3	9	9	
3				3	9	9
				3	9	9
	+			3	9	9
		8	**8**	**9**	**7**	**7**	Product

$399\ X\ 223 = 88.977$

$A\ x\ BCD = \ \ B * A * 10^2 \ + \ C * A * 10^1 \ + \ D * A * 10^0$

$A\ x\ BCD = A * (B * 10^2 + C * 10^1 + D * 10^0)$

$399\ x\ 223 = 399 * (2 * 10^2 + 2 * 10^1 + 3 * 10^0)$

$$399\ x\ 223 = 399 * (2 * 10^2 + 2 * 10^1 + 3 * 10^0)$$

13. Simple Tesla algorithm and Binary numbers

We can also use this Algorithm to operate with binary numbers. We just have to convert the product to a binary number. Taking into account that in order to convert it, I must use the following parameters:

0 = 0 (I write 0)
1 = 1 (I write in 1)
1 + 1 = 2 = 10 (I write 0 and I take 1)
2 + 1 = 3 = 11 (I write down 1 I take 1)
3 + 1 = 4 = 20 (write down 0 and take 2)
4 + 1 = 5 = 21 (I write 1 and take 2)
5 + 1 = 6 = 30 (I write 0 and take 3)
6 + 1 = 7 = 31 (I write 1 I take 3)
Etc.
We always start on the right and go to the left.
This is applicable to the result of a binary multiplication only.

Attention: To convert a decimal number to Binary, the Traditional method is used.

Example of Binary Number Multiplication

100110 x 1011= 110100010

38=100110
11=1011

1		1	0	0	1	1	0			
0			0	0	0	0	0	0		
1				1	0	0	1	1	0	
1	+				1	0	0	1	1	0
Product		1	0	1	2	1	1	2	1	0
Conversion		1	1	0	1	0	0	0	1	0

110100010 It is equivalent to **418**

Using this Algorithm in binary numbers is extremely efficient, since the numbers do not expand in columns as it happens in the decimal system in which its maximum expansion per column is 9. This allows to solve the operations with great speed and without any type of error. As is well known, computers use the binary system.

14. Simple Tesla algorithm and polynomials

We can also apply this fabulous Multiplication Algorithm to polynomials, the method is basically the same as we have written in this document with the difference that the exponents add up as well. With the following two examples, your understanding will be very simple.

Example A

Distributive property:

$$(2x^2 + 3x + 1) * (x + 2) = 2x^3 + 3x^2 + 1x + 4x^2 + 6x + 2$$

$$= \mathbf{2x^3 + 7x^2 + 7x + 2}$$

Tesla Simple Algorithm

We take the terms of the multiplicand and write them the times that indicate the coefficients of the multiplier.

1x	$2x^2$	$3x$	1	
		$2x^2$	$3x$	1
2		$2x^2$	$3x$	1

Now the letter x of the number 1 multiplies to the terms on the right. Clarification: The coefficients do not multiply. Then all the monomials in columns are added, which remain with the same power.

1x		$2x^3$	$3x^2$	$1x$	
			$2x^2$	$3x$	1
2	+		$2x^2$	$3x$	1
		$2x^3$	$7x^2$	$7x$	2

$$\boldsymbol{Product = 2x^3 + 7x^2 + 7x + 2}$$

Example B

Distributive property:

$$(4x^2 + 5x + 3) * (2x^2 + 3x + 1) =$$

$$8x^4 + 10x^3 + 6x^2 + 12x^3 + 15x^2 + 9x + 4x^2 + 5x + 3$$

$$= \mathbf{8x^4 + 22x^3 + 25x^2 + 14x + 3}$$

Tesla Simple Algorithm

We take the terms of the multiplicand and write them the times that indicate the coefficients of the multiplier.

Tomamos los términos del multiplicando y los escribimos las veces que indican los coeficientes del multiplicador.

$\mathbf{2}x^2$	$4x^2$	$5x$	3		
	$4x^2$	$5x$	3		
		$4x^2$	$5x$	3	
$\mathbf{3}x$		$4x^2$	$5x$	3	
		$4x^2$	$5x$	3	
$\mathbf{1}$			$4x^2$	$5x$	3

Now the letter $\boldsymbol{x^2}$ of the coefficient 2 multiplies the terms on the right, the letter $\boldsymbol{x}$ of the coefficient 3 does the same. (Clarification: The coefficients do not multiply.) Then add all the monomials in columns, which are left with the same power

$2\boldsymbol{x^2}$	$4x^4$	$5x^3$	$3x^2$		
	$4x^4$	$5x^3$	$3x^2$		
		$4x^3$	$5x^2$	$3x$	
$3\boldsymbol{x}$		$4x^3$	$5x^2$	$3x$	
	+	$4x^3$	$5x^2$	$3x$	
1			$4x^2$	$5x$	3
	$8x^4$	$22x^3$	$25x^2$	$14x$	3

$$\boldsymbol{Product = 8x^4 + 22x^3 + 25x^2 + 14x + 3}$$

Multiplying polynomials is very simple, I think it is simpler than the Standard method and distributive property.

We can also add polynomials using only the coefficients

Using only the coefficients reduces the complexity of the exercise and its execution time to achieve the product. Also visually it is much simpler and more compact.

$$(4x^2 + 5x + 3) * (2x^2 + 3x + 1) =$$

2		4	5	3		
		4	5	3		
			4	5	3	
3			4	5	3	
	+		4	5	3	
1				4	5	3
		8	22	25	14	3

We start from left to right to complete each of the terms with their respective letters and powers

The 3 remains as a number. 3
The 14 is like $14x$
The 25 is like $25x^2$
The 22 is like $22x^3$
The 8 is like $8x^4$

$$\boldsymbol{Product = 8x^4 + 22x^3 + 25x^2 + 14x + 3}$$

15. Square of a binomial with the Simple Tesla Algorithm

Applying distributive property

$$(a+b)^2 = (a+b)*(a+b) =$$
$$a^2 + ab + ba + b^2$$
$$a^2 + 2ab + b^2$$

Applying Tesla Simple Algorithm

We locate the terms according to the number of the multiplying, in this case the number 1 for both terms.

$$\begin{array}{lcccc} 1a & & a & b & \\ 1b & + & & a & b \\ \hline \end{array}$$

Now the letters add and enhance, the letter a in the rows that go up, then the letter b in the rows that go down. Then I add.

$$\begin{array}{lcccc} 1a & & a^2 & ab & \\ 1b & + & & ab & b^2 \\ \hline & & \mathbf{a^2} & \mathbf{2ab} & \mathbf{b^2} \end{array}$$

Product= $a^2 + 2ab + b^2$

16. Imaginary Numbers

The Tesla Simple Multiplication algorithm is also applicable for imaginary numbers. The method is very similar to the one we apply with polynomials.

Traditional example applying distributive property.

$$(5 + 2i) * (2 - 3i) =$$
$$(10 - 15i + 4i - 6i^2) =$$
$$-6i^2 - 11i + 10 = \text{Product}$$
$$6 - 11i + 10 =$$
$$\mathbf{16 - 11}\boldsymbol{i}\mathbf{= Result}$$

Applying the Tesla Simple Algorithm.

First we order the terms of the multiplier according to the multiplier numbers.

	5	2i	
2	5	2i	
		5	2i
		5	2i
-**3**i		5	2i

Then the letter (i) is added to the multiplying values and the minus sign acts according to the rules of the signs, so everything is negative. Finally we add in columns and obtain the product.

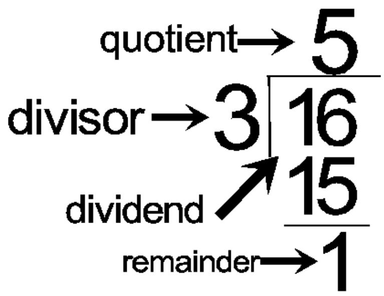
		5	2i		
2		5	2i		
			-5i	$-2i^2$	
	+		-5i	$-2i^2$	
-3**i**			-5i	$-2i^2$	
			-		
		10	**11i**	$\mathbf{-6}\boldsymbol{i}^{\mathbf{2}}$	Product

$$10 - 11i + 6 =$$
$$\mathbf{16 - 11}\boldsymbol{i}\mathbf{= Result}$$

17. Simple Tesla Algorithm and Division

Just as this algorithm produces multiplication through sums, it produces division by subtraction. Therefore it is not necessary to know the multiplication tables to solve the division, this allows to obtain the result through a single operation.

In this chapter I will give an example of demonstration of its operation but soon I will be preparing a document with the development of it for each of the variables that may arise. Coming Soon New Tesla Simple Division Algorithm



The parts of the division are the same as in the standard algorithm, only the method changes.

A) Example 35.955:85= 423

	Dividend					Divisor			
	3	5	9	5	5	8	5		
A	-	8	5	0	0	1			Quotient
	2	7	4	5	5				
B	-	8	5	0	0	1			
	1	8	9	5	5				4
C	-	8	5	0	0	1			
	1	0	4	5	5				
D	-	8	5	0	0	1			
		1	9	5	5				
E		-	8	5	0		1		
		1	1	0	5				2
F		-	8	5	0		1		
			2	5	5				
G			-	8	5			1	
			1	7	0				
H			-	8	5			1	3
				8	5				
I			-	8	5			1	
				0	0	Remainder			

In all the steps I just have to subtract.

A. In this complete step to number 85 with zeros until you reach the unit of the dividend, if the divisor is larger than the complete dividend with a zero minus as in this example. Every time I make a subtraction I write down a number 1 on the left side which ends up forming the quotient.
B. In this step we perform the same procedure, we complete 85 with zeros up to the dividend unit. (8,500) then rest.
C and D. In these steps we solve the same as in the previous steps.
E. Here we get a lower value than we were subtracting, so now we run the 85 one place to the right and complete with zeros to the unit. In this case rest for 850.
F. Here we do the same as in the previous step.
G. Here we get again a lower value than we were subtracting, so now we run the 85 a place to the right and complete with zeros to the unit. In this case there is no possibility of completing with zeros, we only subtract by 85.
H and I. In these steps we subtract by 85 until we get the rest less than 85, in this exercise the rest is 0, so the result is a natural number.
The result or quotient is formed by the sum of the quotients that form the same power with respect to 85.

We subtract 4 times for 8,500.
We subtract 2 times for 850
We subtract 3 times for 85
Therefore the result will be 423

As we can see in the yellow rows, the sequence of the number 85 is formed, which if we add it forms the product.

The Simple Tesla division algorithm can also be applied to decimal numbers, polynomials, binary numbers and much more.

Currently, multiplication and division more specifically is an issue that generates a very problematic situation in Argentina for elementary and secondary school children (according to my observation in public schools), since they are very familiar with the ignorance of the tables and They are immensely accustomed to using the calculator of their phones.

The Simple Tesla algorithm makes it possible to achieve the objective by a simpler path, although I do not propose the ignorance of traditional methods and that of multiplication tables.

Conclusion

The Simple Tesla multiplication algorithm has surprising accuracy, which transforms it into a reliable and honest system or method to perform multiplication operations.

It is a method that allows to obtain the product with a single operation (the sum).

This algorithm is the easiest and simplest method known to achieve the product available so far, in fact it could solve multiplications a very small child who only has the knowledge to add.

This algorithm is a great opportunity to incorporate it into the educational system so that multiplication is within reach of the little ones.

I think the Tesla Simple Algorithm is a great discovery and contribution to the teaching community. In particular, among primary school teachers.

It is simply different, it is a novel, interesting and incomparable alternative.

The Simple Tesla algorithm has many applications such as binary numbers or polynomials, also in imaginary numbers among other examples that are developed in this document. It is a very useful complement to apply on computers from the binary system.

The Simple Tesla algorithm presents the possibility of developing division by subtracting it simply and without using multiplication. This also has many applications in various areas.

By way of criticism the Algorithm requires long sums in some cases. Although this should not be a difficulty.

The Simple Tesla multiplication algorithm is a fascinating complement to the different known methods that exist today for multiplication.

Professor Zeolla Gabriel Martín
08/26/2019

This document is part III of other works on multiplication algorithms.

References on other multiplication algorithms of the same Author.

1) **Nuevo Algoritmo de multiplicación (Argentino)**, Zeolla Gabriel M.
http://vixra.org/abs/1811.0211
2) **New Multiplication Algorithm (Argentino),** Zeolla Gabriel M.
http://vixra.org/abs/1811.0320 (Ingles)
3) **Algoritmo de multiplicación Distributivo**, Zeolla Gabriel M.
http://vixra.org/abs/1903.0167
4) Otros trabajos de investigación matemática del autor:
http://vixra.org/author/zeolla_gabriel_martin,
https://independent.academia.edu/GabrielZeolla

References

1. Gary Eason, Back to school for parents, *BBC News*, 13 February 2000
2. Buján, Victor; Vargas, Gillermo (1975). Matemática. Séptimo año. Conjuntos, naturales, enteros (1.ª edición). San José, Costa Rica: Editorial S. O. F. O. S., S. A. p. 239.
3. Ramos, Francisco (2010). Aritmética. Teoría y práctica. Colección Signos (1.ª edición). Lima, Perú: Empresa Editora Macro. p. 510. ISBN 9786124034909.
4. Valverde Cervantes, Anthony, ed. (2017). Matemática 7. Puentes del Saber (1.ª edición). San José, Costa Rica: Santillana. p. 272. ISBN 9789930527276. Rob Eastaway, Why parents can't do maths today, *BBC News*, 10 September 2010
5. Richard P. Brent. A Fortran Multiple-Precision Arithmetic Package. Australian National University. March 1978.
6. Corlu, M. S., Burlbaw, L. M., Capraro, R. M., Corlu, M. A.,& Han, S. (2010). The Ottoman Palace School Enderun and The Man with Multiple Talents, Matrakçı Nasuh. Journal of the Korea Society of Mathematical Education Series D: Research in Mathematical Education. 14(1), pp. 19–31.
7. *Bogomolny, Alexander. "Peasant Multiplication". www.cut-the-knot.org. Retrieved 2017-11-04.*
8. *D. Wells (1987). The Penguin Dictionary of Curious and Interesting Numbers. Penguin Books. p. 44.*
9. "Novel Methods of Integer Multiplication and Division" by G. Reichborn-Kjennerud
10. *Robson, Eleanor (2008). Mathematics in Ancient Iraq: A Social History. p. 227. ISBN 978-0691091822.*
11. *"Reviews", The Civil Engineer and Architect's Journal: 54–55, 1857.*
12. *Holmes, Neville (2003), "Multiplying with quarter squares", The Mathematical Gazette, **87**(509): 296–299, doi:10.1017/S0025557200172778, JSTOR 3621048.*
13. *Everett L., Johnson (March 1980), "A Digital Quarter Square Multiplier", IEEE Transactions on Computers, Washington, DC, USA: IEEE Computer Society, **C-29** (3), pp. 258–261, doi:10.1109/TC.1980.1675558, ISSN 0018-9340*
14. Jump up to:[a] [b] *Knuth, Donald E. (1988), The Art of Computer Programming volume 2: Seminumerical algorithms, Addison-Wesley, pp. 519, 706*
15. *KWRegan (2019-03-29). "Integer Multiplication in NlogN Time". Gödel's Lost Letter and P=NP. Retrieved 2019-05-03.*
16. "Strassen algorithm for polynomial multiplication".
17. *Hartnett, Kevin. "Mathematicians Discover the Perfect Way to Multiply". Quanta Magazine. Retrieved 2019-05-03.*
18. David Harvey, Joris Van Der Hoeven (2019). Integer multiplication in time O(n log n)
19. José Ángel Murcia, "El método "japonés" para multiplicar contando rayitas", en *Verne*, suplemento de *El País*, 20-XI-2017: https://verne.elpais.com/verne/2017/11/20/articulo/1511200846_331476.html
20. Thomas: *Cálculo infinitesimal y geometría analítica*, Aguilar, Madrid. Véase también Drae
21. Se usa el BCD, hexadecimal, etc; "Matemática digital" ISBN 958-600-821-5
22. ING. EVA VIVEROS ZENTENO. «Matemáticas Discretas». Consultado el 14 de marzo de 2016.