Cajun Multiplication:
A History, Description, and Algebraic Verification of a Peasant Algorithm

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Abstract

This article will provide a brief history, description, and algebraic verification of an algorithm that is sometimes referred to as "French peasant" multiplication. The algorithm is not suggested as a replacement for conceptual teaching of multiplication, but rather as a refreshing way to look at multiplication after the concept is developed. The history is a nice connection for anyone interested in mathematics, and the algebraic verification is an application that can be used with algebra students. We close with a justification for calling the algorithm "Cajun" multiplication.

History of the Algorithm

Many algorithms (or processes) for performing multiplication have been developed throughout history. In the early 17th century it was common to use multiplication tables as high as 5x5, but what about for products up to 10x10? During that period of history, arithmetic was not always an academic subject, however it was important for merchants to know the product of larger numbers in their business of trading. Various clever algorithms for quickly finding products were developed in different parts of the world. Students can find reference to some of the methods that have survived such as Russian peasant multiplication, Italian lattice style, German low-stress algorithm and French peasant to name a few of them (see Musser, Burger & Peterson).

According to some mathematics historians we can trace the French peasant algorithm to a method used in Italy in the middle ages. The method was based on a rule that was called *regula ignavi* (roughly translated as *lazy rule*). The rule referred to the mathematical identity that $(5+a)(5+b) = (5!a)(5!b)+10(a+b)$. Ball (1888) gives the rule as:

Let the number five be represented by the open hand; the number six by the hand

with one finger closed; the number seven by the hand with two fingers closed; the

number eight by the hand with three fingers closed; and the number nine by the hand

with four fingers closed. To multiply one number by another let the multiplier be

represented by one hand, and the number multiplied by the other, according to the

above convention. Then the required answer is the product of the number of fingers

(counting the thumb as a finger) open in the one hand by the number of fingers open

in the other together with ten times the total number of fingers closed. (p. 189)

So, this algorithm supplies a "lazy" way to find any product from 5 x 5

through 10 x 10.

Most modern interpretations of this algorithm reverse the fingers that are open or closed in

the original rule. I prefer the modern interpretation because the open fingers then represent the tens

(or longs) and the closed fingers look more like ones (or units) in standard base ten blocks.

Description of the algorithm

A typical description for the product of the two numbers **n** and **m** is given here. If the

difference between 10 and **n** is A, then close (or fold down) A fingers on one hand. If the

difference between 10 and **m** is B, then close B fingers on the other hand and leave the other fingers

open (or raised). Now, the sum of the open fingers represents the number of tens in the product and

the product of the numbers of closed fingers on each hand represents the number of ones.   It is

possible for students to simply remember the configuration of fingers as in Figure 1.
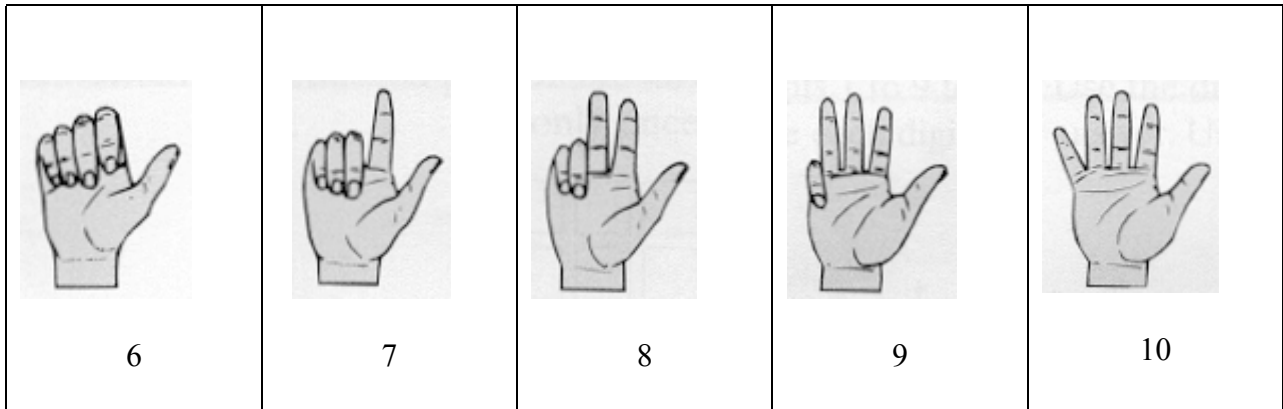
Figure 1. An illustration of the numbers six through ten with fingers opened and closed.

For example, to find the product of 8 and 7, we take 10!8 = 2 and close 2 fingers on the left

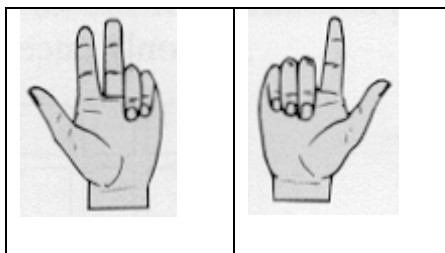hand and 10!7 =3, so we close 3 fingers on the right hand as in Figure 2.

Figure 2. An illustration of 8 x 7.

If we add the open fingers we get 5 tens and if we multiply the closed fingers we get

3 x 2 = 6 ones. Hence, the answer is 56.

To find the product of 7 and 6, we see in Figure 3 that the answer appears to only have three

tens. The students are amazed to notice that they have twelve ones, so there are actually four tens
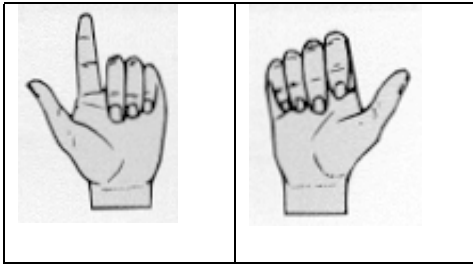
and two ones.

Figure 3. **An illustration of 7 x 6.**

7 x 6 = (10!3)(10!4), so add the tens 2 + 1 = 3 and 3 x 10 = 30

Multiply the ones 3 x 4 = 12

7 x 6 = 30 + 12 = 42

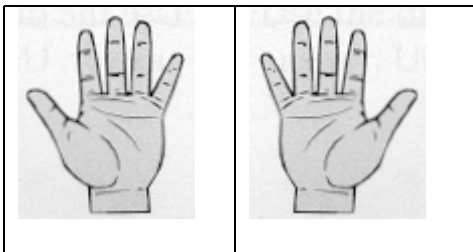One final example for 10 x 10 is shown in Figure 4.

Figure 4. **An illustration of 10 x 10.**

After my students learn this algorithm, I have them teach it to someone at home to reinforce their understanding. Invariably, they come back asking why no one ever showed them such a clever algorithm. Could it be that we think they will become "lazy" if they use this rule?

Older students should be asked to look at why the algorithm works. A verification is presented in the next section.

Algebraic Verification

We will use the alternative form of the "lazy rule" in which fingers follow Figure 1.

A = # of closed fingers on left hand	C = # of open fingers on left hand
B = # of closed fingers on right hand	D = # of open fingers on right
∨ A + C = B + D = 5	

To find the product of **n** and **m**. Express **n** = 10 ! A and **m** = 10 ! B and follow these steps which are justified by algebraic properties:

n Xm = (10 ! A)(10 ! B)   Substitution

=100 ! 10A ! 10B + AB   Distributive

=100 ! 10(5 ! C) ! 10(5 ! D) + AB   Substitution ∨

=100 ! 50 + 10C ! 50 + 10D + AB   Distributive

=100 ! 100 + 10(C+D) + AB   Distributive and Closure for Addition

= 10(C+D) + AB   Addition Property of Zero

= 10(sum of all open fingers) + (product of numbers of closed fingers on each hand).

Cajun Connection

Acadia was the name given by France to its Atlantic possessions in North America in the 17th and 18th centuries. The Treaty of Utrecht in 1713 gave the mainland part of what is today Nova Scotia to Great Britain. The British wanted the "Acadians" to pay homage to the Queen of England and to give up their Catholic religion, but they refused. Forty-two years later, in 1755, many Acadians were deported. They left in ships heading south to be placed in prison camps. Many stopped in the New England states, some were probably returned to Nova Scotia, but a large number eventually landed in an area of Southwest Louisiana which was mostly bayous and prairies.

There, these French people continued their rich traditions of folk music and culinary delights and many still live the simple lives of their ancestors. Their French language supposedly sounds like 17th century French and it is quite possible that these same ancestors used the multiplication algorithm often credited to the French.

There is reference to the fact that the Russian peasant method could still be used in some parts of Russia today (Bunt, p. 13). There is also a reference to the fact that French peasants around the region of Auvergne are still using "a curious method" (Dantzig, p. 11).

I have shown this multiplication algorithm to many future teachers of mathematics and to their students ever since I heard about it in a lecture by Dr. Lawrence Couvillon, a fellow Cajun and professor of mathematics at Southern University in Baton Rouge. Dr. Couvillon (personal communication, April 20, 2001) said his ancestors actually came from the region around Auvergne. Since he is a mathematics historian, he was very excited to learn that there was something in mathematics for which Cajuns might be famous. He dubbed the method "Cajun" multiplication and has even extended it for use with numbers up to 15 x 15.

The spirit of survival can be seen in the unique spirit of the descendants of the French Acadians in Louisiana. It is found in their incredibly rich music, culture and culinary traditions. I see that same joyous spirit of the Cajuns in the faces of my students as they learn the finger algorithm. Let's keep it alive for future generations. After all, the finger patterns seem far superior to reaching for a calculator every time you want to know the product of two numbers between 5 x 5 and 10 x 10.

References

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