

Peasant Arithmetic

The idea behind this algorithm is to demonstrate that there are other ways to multiply two numbers besides our traditional algorithm of lining up the columns and multiplying one decimal place at a time. In this method, it is only necessary to know how to double a number, halve a number, and add numbers. Three columns are used. One number is written at the top of the first column, the other is written at the top of the second. If the number in the second column is odd, the number in the first column is written on that row in the third column, then on the second row, number in the first column is written again and one is subtracted from the number in the second column and the result is written there. The number in the second column is now even, so on the next row we double the number in the first column, and halve the number in the second column. If the number in the second column is even, we repeat this process; if it is odd, we again write the number in the first column in the third, then subtract one from the number in the second column and repeat. The process ends when the number 1 remains in the second column. At this point we add the number at the bottom of the first column with all numbers in the third column, this is the product of the original two numbers.

The process is shown below for $37 \cdot 24 = 888$:

37	24	
74	12	
148	6	
296	3	296
296	2	
592	1	

We now add $592 + 296 = 888$.

With a simple example we can see what is happening in the algorithm. Lets look at $4 \cdot 4 = 16$. Using dots we see that the multiplication looks like this,

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When we double the first number and halve the second, it is just a rearrangement of dots.

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One more time we see that we just get all the dots lined up.

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To see what happens when an odd number appear we can look at $4 \cdot 3 = 12$.

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So we isolate one of the rows of 4 dots and save it for later.

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Now we carry out the algorithm on the top portion and add it to the saved (highlighted dots).

