The Egyptian Method and the Russian Peasant Method of Multiplication

There are two variants of this method – the Egyptian method and the peasant, Russian peasant, or Ethiopian method of multiplication.

The Egyptian Method of Multiplication: What is required here is the ability to add a number to itself and decompose a number into the sum of powers of 2. Here we want to multiply two numbers, say 57 and 116. Choose one of the numbers, say 116 and we will double that repeatedly in a table whose first column is the powers of 2 up to the last power of 2 less than or equal to 57.

57	116
1	116
2	232
4	464
8	928
16	1956
32	3912

We can stop here since the next power of 2, 2^6, is greater than 57. Now, we do repeated subtractions of the powers of 2 from 57.

$$57–32 = 25,\ 25 – 16 = 9,\ 9 – 8 = 1,$$

Therefore, $57 = 1 + 8 + 16 + 32$. Therefore, we add the numbers in the second column that correspond to 1, 8, 16, and 32.

57	116	
1	116	✓
2	232	
4	464	
8	928	✓
16	1856	✓
32	3712	✓

$$57 \times 116 = 116 + 928 + 1856 + 3712 = 6612$$

Reversing the factors should give us the same answer:

116	57
1	57
2	114
4	228
8	456
16	912
32	1824
64	3648

Checking: $116 = 64 + 32 + 16 + 4$ so check those elements and add

116	57

1	57
2	114
4	228 ✓
8	456
16	912 ✓
32	1824 ✓
64	3648 ✓

$228 + 912 + 1824 + 3648 = 6612$. Notice that the multiplication is achieved with only additions; notice also that this is a very early use of binary arithmetic.

The Russian Peasant method: This is a modification of the Egyptian method. Again we want to multiply 57×116:

- Write the two numbers each at the head of a column.
- Starting with the first number, divide by 2, discarding any fractions, until there is nothing left to divide. Write the series of results in the first column.
- Starting with the second number, keep doubling until you have doubled it as many times as you divided the first number. Write the series of results in the second column.
- Add up all the numbers in the second column that are next to an odd number in the first column. This gives you the result.

57	116 ✓
28	232
14	464
7	928 ✓
3	1856 ✓
1	3712 ✓

Notice that these are the same factors we added previously so we will get the same result.

Should you reverse the factors:

116	57
58	114
29	228 ✓
14	456
7	912 ✓
3	1824 ✓
1	3648 ✓

You will get the same result. This technique decomposes the multiplier into powers of two automatically.