In this post, I am going to explain the next combination technique around '過大実乗法' (Multiplication with Excessive multiplicand) called '過大実省一乗法.'

It is useful when the excessive-multiplicand is simpler than the multiplicand itself (as I explained in previous post) AND the initial digit of the multiplier is 1.

The principle:
When calculating $A \times B$, if we add some value 'D' to multiplicand 'A' (the sum is called excessive-multiplicand 'E'), and eliminate the initial digit 1 from multiplier 'B' (let's call it 'M' for modified-multiplier), the expression would be:

$$A \times B = (E-D) \times (10^n + M)$$
$$= 10^n \times (E-D) + E \times M - D \times M$$

Since $10^n \times (E-D)$ is on the board (although we have to mentally change the decimal point), all we have to do is add $E \times M$ to the board, and subtract $D \times M$ from it.

Example: 39698*157=6232586

\[
\begin{array}{c}
\text{ABC} & \text{abedefg} \\
157 & 39698 & \text{First, eliminate the initial 1 from the multiplier [A].} \\
057 & 39698 & \text{We are going to process 'E\times M' term first,}  \\
& & \text{so look at the other side of [e], which is 2,}  \\
& & \text{multiply this value by [B] (5),}  \\
& & \text{and subtract the result (10) from [ef].} \\
057 & 39697 & \text{then multiply 2 by [C] (7), and subtract the result (14) from [fg].} \\
057 & 3969686 & \text{Look at the other side of [c], which is 3,}  \\
& & \text{multiply this value by [B] (5),}  \\
& & \text{and subtract the result (15) from [cd].} \\
057 & 3954686 & \text{then multiply 3 by [C] (7), and subtract the result (21) from [ef].} \\
057 & 3952586 & \text{And now the process for '+ E\times M',}  \\
& & \text{so look at the top digit [a] (2) and realize}  \\
& & \text{the excessive multiplicand is 40000,}  \\
& & \text{multiply 4 by [B] (5) and add the result to [ab].} \\
057 & 5952586 & \text{then multiply 4 by [C] (7) and add the result to [bc].} \\
057 & 6232586 & \text{done.} \\
\end{array}
\]