**4.5 Early Computational Methods**

Here we will be looking at methods of multiplication. Studying other methods of multiplication can help us better understand how traditional multiplication works.

**Duplation and Mediation:** Still used in parts of Russia Today. Duplation refers to doubling one number and mediation refers to halving one number.

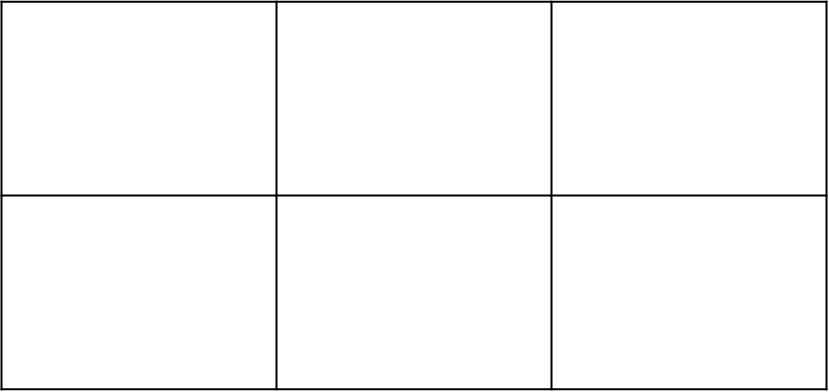
**Example 1: Multiply 25 × 31 using duplation and mediation.**

|  |  |
| --- | --- |
|  | 1. **Divide the number on the left by 2, drop the remainder, and place the quotient under the number on the left.** 2. **Double the number on the right, and place it under the number on the right.** 3. **Continue this process until 1 appears in the left-hand column** 4. **Cross out all the even numbers in the left-hand column and the corresponding numbers in the right-hand column** 5. **Add remaining numbers in right-hand column** |

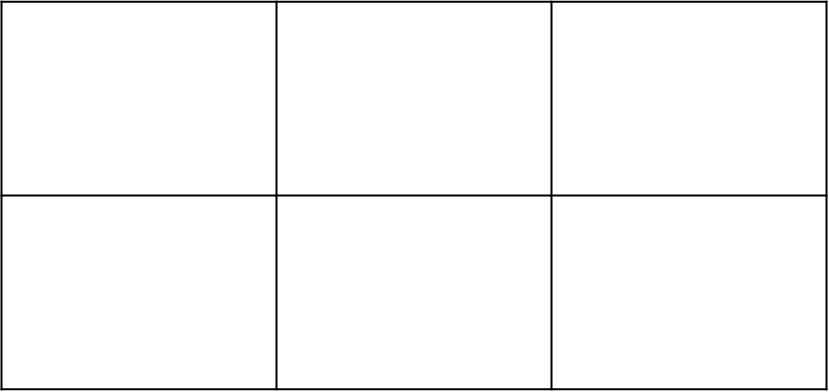
**Example 2: Multiply 28 × 22 using duplation and mediation.**

**Example 3: Multiply 312 × 75 using duplation and mediation.**

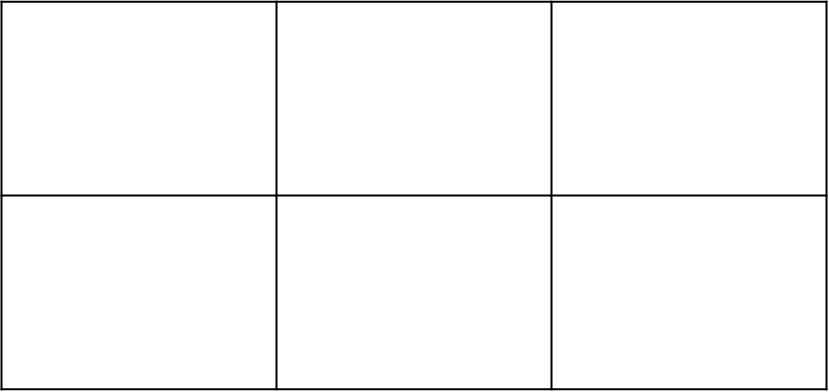
**The Lattice Form of Multiplication:** Dates back to the 1200s or before in Europe. It gets its name from the fact that to do the multiplication, you fill in a grid which resembles a lattice one might find ivy growing on. This method uses a rectangle split into columns and rows with each newly-formed rectangle split in half by a diagonal.



**Example 4: Multiply 312 × 75 using lattice multiplication.**

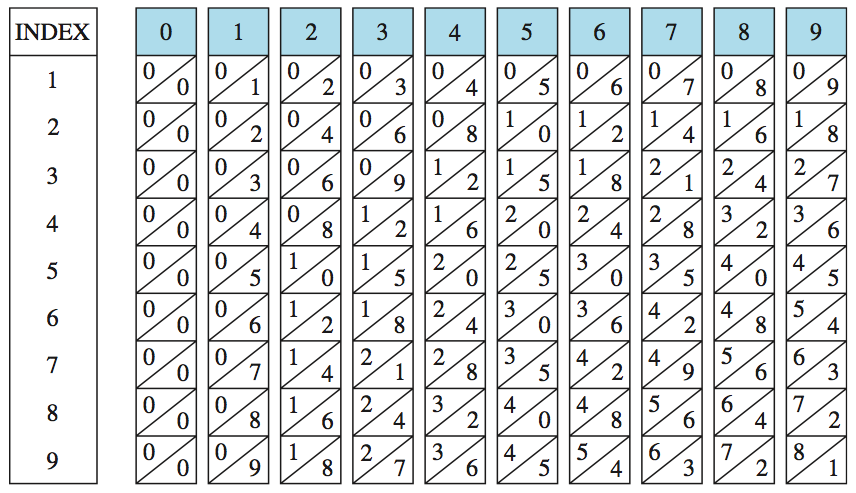


**Example 5: Multiply 469 × 37 using lattice multiplication.**

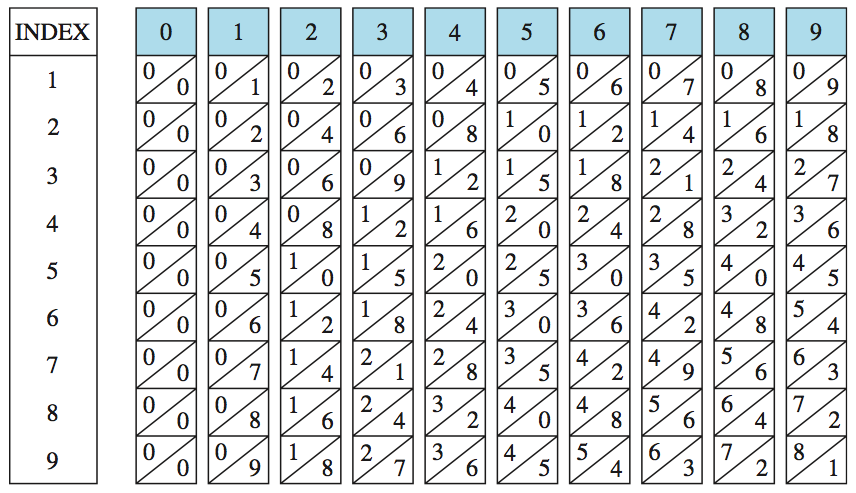
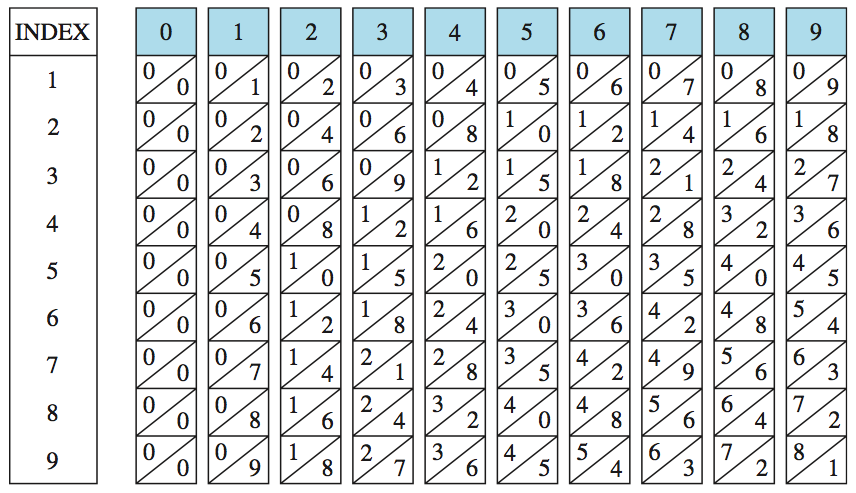


**Example 6: Multiply 326 × 189 using lattice multiplication.**

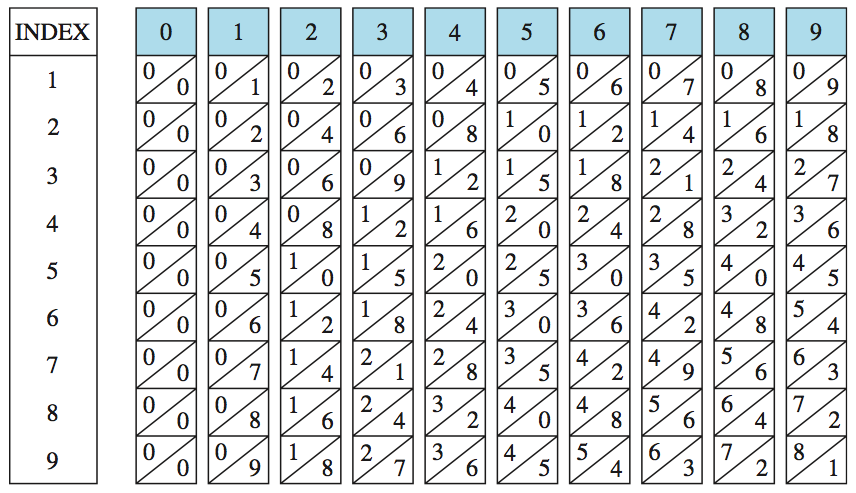
**Napier’s Rods:** Developed in the early 1600s. Proved to be one of the forerunners of the modern-day computer. System of separate rods numbered 0 through 9 and an additional rod for an index, numbered vertically 1 through 9.

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**Example 7: Multiply 8 × 345, using Napier’s rods.**

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**Example 8: Multiply 48 × 365, using Napier’s rods.**

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