Vedic Multiplication

The secret to any effective mental arithmetic algorithm is simple: at any given time, you only have to remember at most one number.

Vedic multiplication is based on this principle. Here is an example, multiplying 346 x 527:

It is easiest to start at the right, and work to the left (because of carries):

The digit in the 1s place in the answer comes from multiplying 1s by 1s:

```
      3   4   6
              |
  x   5   2   7         6 x 7 = 42.  Write 2, remember 4.
  ------------
              2
```

The digit in the 10s place in the answer comes from multiplying 10s by 1s, and adding:

```
      3   4   6
            X
  x   5   2   7         28 + 12 = 40; + 4 = 44.
  ------------
          4   2         Write 4, remember 4.
```

The digit in the 100s place in the answer comes from multiplying 100s by 1s, and 10s by 10s, and adding:

```
      3   4   6
         \|/
         /|\
  x   5   2   7          21 + 8 = 29; +30 = 59; + 4 = 63.
  ------------
      3   4   2         Write 3, remember 6.
```

The digit in the 1,000s place in the answer comes from multiplying 100s by 10s, and adding:

```
      3   4   6
        X
  x   5   2   7         6 + 20 = 26; + 6 = 32.
  ------------
  2   3   4   2         Write 2, remember 3.
```

The digit in the 10,000s place in the answer comes from multiplying 100s by 100s:

```
      3   4   6
      |
  x   5   2   7         3 x 5 = 15; + 3 = 18.
  ------------
1   8   2   3   4   2   Write 18.
```

The technique extends to any number of digits. The number of digits can be different in the multiplicand and the multiplier.