

Find the Multiples (findmults)

You are given a sequence $a_0a_1 \dots a_{n-1}$ of digits and a **prime** number q .

For each $i \leq j$ with $a_i \neq 0$, the subsequence $a_ia_{i+1} \dots a_j$ can be read as a decimal representation of a positive integer. Subsequences with leading zeroes are ignored.

Task

Your task is to count the number of pairs (i, j) such that the corresponding subsequence corresponds to a multiple of q .

Input specification

The input consists of at most 50 datasets. Each dataset is represented by a line containing four integers separated by spaces: n , s , w , and q . You may assume that $1 \leq n \leq 10^5$, $1 \leq s, w \leq 10^9$, and that q is a prime number less than 10^8 .

The sequence $a_0a_1 \dots a_{n-1}$ of length n is generated by the following code (in which a_i is written as `a[i]`):

```
int g = s;
for(int i=0; i<n; i++) {
    a[i] = (g/7) % 10;
    if( g%2 == 0 ) g = (g/2); else g = (g/2) ^ w;
}
```

Note: the operators `/`, `%`, and `^` are the integer division, the modulo, and the bitwise exclusive-or (xor), respectively. The above code is meant to be a random number generator. The intended solution does not rely on the way how the sequence is generated.

The end of the input is indicated by a line containing four zeros separated by spaces.

Output specification

For each dataset, output the answer in a line. You may assume that the answer is less than 2^{30} .

Examples

input	output
3 32 64 7	2
4 35 89 5	4
5 555 442 3	6
5 777 465 11	3
100000 666 701622763 65537	68530
0 0 0 0	

In the first dataset, the sequence is 421. We can find two multiples of $q = 7$, namely, 42 and 21.

In the second dataset, the sequence is 5052, from which we can find 5, 50, 505, and 5 being the multiples of $q = 5$. Notice that we don't count 0 or 05 since they are not a valid representations of positive integers. Also notice that we count 5 twice, because it occurs twice in different positions.

In the third and fourth datasets, the sequences are 95073 and 12221, respectively.