Problem F
Find the Multiples

Input: F.in
Time Limit: 60 seconds

You are given a sequence $a_0 a_1 \cdots a_{N-1}$ of digits and a prime number Q. For each $i \leq j$ with $a_i \neq 0$, the subsequence $a_i a_{i+1} \cdots a_j$ can be read as a decimal representation of a positive integer. Subsequences with leading zeros are not considered. Your task is to count the number of pairs (i, j) such that the corresponding subsequence is a multiple of Q.

Input

The input consists of at most 50 datasets. Each dataset is represented by a line containing four integers N, S, W, and Q, separated by spaces, where $1 \leq N \leq 10^5$, $1 \leq S \leq 10^9$, $1 \leq W \leq 10^9$, and Q is a prime number less than 10^8. The sequence $a_0 \cdots a_{N-1}$ 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, 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

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

Sample Input

```
3 32 64 7
4 35 89 5
5 555 442 3
5 777 465 11
100000 666 701622763 65537
0 0 0 0
```

Output for the Sample Input

```
2
4
6
3
68530
```

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 representation 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.