

CCO '13 - Repetitivity

Canadian Computing Olympiad: 2013 Day 2, Problem 3

Any string of length n has 2^n subsequences, which are the strings obtained by deleting some subset of the characters. But these subsequences may not all be distinct. For example, the string `zoo` has only 6 distinct subsequences:

- the subsequences `z`, `oo`, and `zoo` appear only once,
- the empty subsequence appears only once,
- and the subsequences `o` and `zo` each appear twice.

Suppose a string S has k distinct subsequences, and that the i -th one appears f_i times. Then the *repetitiveness* of s is defined as $\sum_{i=1}^k f_i^2$

For example, the repetitiveness of `zoo` is

$$1^2 + 1^2 + 1^2 + 1^2 + 2^2 + 2^2 = 12$$

Input Specification

Each test case contains a line containing the string S (with length at most 10 000), followed by a line containing a single integer M ($2 \leq M \leq 10^9$). You may assume that S only contains characters with ASCII codes between 33 and 126 inclusive (these are all printable, non-whitespace characters).

For test cases worth 20% of the points, you may assume that S will be at most 20 characters long.

Output Specification

The output should consist of a single line, containing the repetitiveness of S , modulo M .

Sample Input 1

```
zoo
10
```

Output for Sample Input 1

```
2
```

Sample Input 2

@#\$\$%
1000000

Output for Sample Input 2

16