Spinning Roulettes (casino)

Kida has found herself in the casino again! In front of her, there are N roulettes, each having M pins. Each of the M pins of a roulette wheel is coded by a lowercase letter of the English alphabet.

Kida considers two roulettes to be similar if the configuration of the pins of the first roulette can be obtained on the second roulette by shifting left or right all the pins of the second roulette an arbitrary number of times. Note that each shift is a cyclic shift.

For example *abca* can be obtained from *caab*, but *abac* or *aacb* cannot be obtained from *abca*.

Figure 1: A roulette.

Kida asks you to count the number of unordered pairs of similar roulettes.

> ☞ Among the attachments of this task you may find a template file `casino.*` with a sample incomplete implementation.

Input

The first line contains two integers N and M. Each of the following N lines contains a string of M characters representing a roulette.

Output

You need to write a single integer, representing the number of unordered pairs of similar roulettes.

Constraints

- $1 \leq N \cdot M \leq 1\,000\,000$.
- Each roulette contains only lowercase letters of the English alphabet.

Scoring

Your program will be tested against several test cases grouped in subtasks. In order to obtain the score of a subtask, your program needs to correctly solve all of its test cases.

– **Subtask 1** (0 points) Examples.

– **Subtask 2** (25 points) $N \leq 100$, $M \leq 100$.

– **Subtask 3** (35 points) $N \leq 600$, $M \leq 600$.

– **Subtask 4** (40 points) No additional limitations.

Examples

input	output
4 4 abcd xbcd cdab dabc	3
3 6 adaada aaadda aadaad	1

Explanation

In the **first sample case**, the 3 pairs are $(0, 2)$, $(0, 3)$ and $(2, 3)$.

In the **second sample case**, the only pair is $(0, 2)$.