F. Mahmoud and Ehab and the final stage

time limit per test: 5 seconds
memory limit per test: 512 megabytes
input: standard input
output: standard output

Mahmoud and Ehab solved Dr. Evil's questions so he gave them the password of the door of the evil land. When they tried to open the door using it, the door gave them a final question to solve before they leave (yes, the door is digital, Dr. Evil is modern). If they don't solve it, all the work will be useless and they won't leave the evil land forever. Will you help them?

Mahmoud and Ehab are given n strings $s_1, s_2, \ldots, s_n$ numbered from 1 to n and q queries, Each query has one of the following forms:

- $1\ a\ b\ (1 \le a \le b \le n)$, For all the intervals $[l;r]$ where $(a \le l \le r \le b)$ find the maximum value of this expression: $(r - l + 1) * LCP(s_l, s_{l+1}, \ldots, s_{r-1}, s_r)$ where $LCP(str_1, str_2, str_3, \ldots)$ is the length of the longest common prefix of the strings $str_1, str_2, str_3, \ldots$.
- $2\ x\ y\ (1 \le x \le n)$ where y is a string, consisting of lowercase English letters. Change the string at position x to y.

Input

The first line of input contains 2 integers n and q $(1 \le n \le 10^5, 1 \le q \le 10^5)$ – The number of strings and the number of queries, respectively.

The second line contains n strings str_i consisting of lowercase English letters.

The next q lines describe the queries and may have one of the 2 forms:

- $1\ a\ b\ (1 \le a \le b \le n)$.
- $2\ x\ y\ (1 \le x \le n)$, where y is a string consisting of lowercase English letters.

the total length of all strings in input won't exceed 10^5

Output

For each query of first type output its answer in a new line.

Example

input

```
5 9
mahmoud mahmoudbadawy drmahmoud drevil mahmoud
1 1 5
1 1 2
1 2 3
2 3 mahmoud
2 4 mahmoud
2 2 mahmouu
1 1 5
1 2 3
1 1 1
```

output

```
14
14
13
30
12
7
```