Problem H
Hoptimisation

You are practicing a sequence of hops on a rather boring hopscotch track consisting of several consecutive cells in a straight line, spaced 1m apart.

You have a planned route of cell names to visit. The total hopping distance depends on how you assign these names to the physical positions (1 to k).

For example, to complete the route A, B, A, C with the layout [A, B, C, D, E], the hops take $1 + 1 + 2 = 4$ metres total.



Figure H.1: Illustration of Sample Input 1.

Given your sequence of hops, determine how to arrange the names across the cells (left to right) to minimize the total hopping distance.

Input

- One line of input containing the number of cells, k ($1 \leq 16$), and the number of hops, n ($1 \leq n \leq 10^6$).
- A second line of input containing n lower-case strings, the i th string s_i containing the target cell for the i th hop. ($1 \leq |s| \leq 10$).

It is guaranteed that no more than k distinct cell names are given.

Output

Output k strings of up to 10 lower-case letters each: the names you want to assign to each cell from left to right. If there are multiple potential solutions, you may output any.

In case fewer than k names are given in the input, feel free to invent more to fill the space.

Sample Input 1	Sample Output 1
5 4 hop skip hop jump	anything jump hop skip something

Sample Input 2	Sample Output 2
9 16 a b c a b c a x y z x y z e f g	g f e z y x a c b

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