Autochess

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

Fish likes playing games, and recently he is addicted to Autochess.

There are N spots (initially empty) in a line named **waiting zone**, and Fish can add some chessmen into it. Each spot can be occupied by exactly one chessman and each chessman has a name and a level tag (1,2 or 3). Whenever Fish decides to add a chessman named s of level 1 into the **waiting zone**, some routines will be on process in order:

- Firstly, if there is a chessman named s of level 3 in the **waiting zone**, Fish's operation fails and the process continue(skip following operations and move to add next chessmen).
- Secondly, if there are already $K-1$ chessmen named s of level 1 in the **waiting zone**, all these chessmen will be removed and the chessman Fish holds will upgrade to level 2, and if at this time there are already $K-1$ chessmen named s of level 2, all these chessmen will be removed and the chessman Fish holds will upgrade to level 3.
- Finally, if there are any spots available, the chessman Fish holds will be placed in the leftmost one.

Fish decides to add M chessmen of level 1 into the **waiting zone**, so please help him figure out the final status of the **waiting zone**.

Input

The first line of input contains an integer T, representing the number of test cases.

Then for each test case:

The first line contains three integers M, N, K, the number of chessmen Fish wants to add, the number of spots in **waiting zone** and the parameter in the process.

Then M lines follow, each line containing a string s consisting of only lowercase Latin characters, which is the name of chessman Fish wants to add.

Output

For each test case, you should output **Case x:** first, where x indicates the case number starting from 1. Then N strings separated by one space follow, representing the final status of the **waiting zone**. Each string is the combination of the name and the level tag of the chessman in that spot: for those of level 1, use the name only; for those of level 2 or 3, use the name followed by an extra 2 or 3 respectively. If one spot is empty, print **-1** instead.

Example

standard input	standard output
2 9 7 3 axe axe jugg axe jugg jugg mars axe axe 10 7 2 axe axe jugg axe jugg jugg mars axe axe mars	Case 1: axe2 jugg2 mars axe axe -1 -1 Case 2: axe3 jugg2 mars2 jugg -1 -1 -1

Note

$1 \leq T \leq 100$

$1 \leq N, M \leq 10^5$

$2 \leq K \leq N$

Length of s will not exceed 10

For 90% test cases: $1 \leq N, M, K \leq 1000$