Task Mensza

Mr. Malnar recently founded *Mensza* – the greatest, most prestigious and the only international association of highly-intelligent gastronomy enthusiasts. As you might have guessed, not anyone can join the association, only special candidates that have excelled on an entrance exam. Of course, the exam consists of an IQ-related part, and a food-related part. We will showcase an example of an IQ-related part in this task, and the contestants will have a chance to attempt the food-related part after the contest.

The entrance exam candidates in this story are Alojzije, Benjamin and Cecilija. Mr. Malnar sized them up, invented a worthy problem, and first spoke to Alojzije:

"Alojzije, you'll be the first to enter my office, where I'll show you the integer A. Then, you'll write an array of integers $a = (a_1, a_2, \ldots, a_{l_a})$ on a piece of paper, but it's length l_a must not exceed L."

After that, he turned over to Benjamin:

"Benjamin, you'll be the next to enter my office, where I'll show you the integer $B \neq A$. Then, you'll write an array of integers $b = (b_1, b_2, \ldots, b_{l_b})$ on a piece of paper, but it's length l_b must not exceed L."

Lastly, he addressed Cecilija:

"Cecliija, you'll be the last to enter my office, where I'll show you the array of integers c which I've determined based on arrays a and b. More precisely, for each number appearing in the arrays a and b, I'll append to the array c number of times that number occurs in the union of a and b. Also, I'll present the array c to you in a non-decreasing order. For example, if $a = (1, 2, 4)$ and $b = (1, 1, 2, 3)$, I'll show you $c = (1, 1, 2, 3)$ because numbers 3 and 4 appear once, number 2 twice, and number 1 thrice. After I show you the array c, you should tell me which of the integers A and B is greater."

He once more addressed all of the candidates:

"You have 60 minutes to think of a strategy and then we'll proceed with the exam. After that, you're not allowed to communicate any more. We'll repeat the whole procedure a couple of times until ~~I confirm you're not just lucky~~ the food arrives."

Your task is to think of a strategy that would allow Alojzije, Benjamin and Cecilija to pass the IQ-part of the exam.

Input

The first line contains an integer L from the task description.

The second line contains an integer Q representing the number of scenarios you must process. Each scenario corresponds to some interaction happening in the office of Mr. Malnar.

The i-th of the next Q lines describes the i-th scenario. The line will begin with either `alojzije`, `benjamin` or `cecilija`, depending on which candidate was summoned to the office.

If the i-th line begins with the word `alojzije`, then it will also contain the integer A from the task description.

If the i-th line begins with the word `benjamin`, then it will also contain the integer B from the task description.

If the i-th line begins with the word `cecilija`, then it will be continued with l_c (length of an array c), followed by the elements of c in non-decreasing order ($c_1 \leq c_2 \leq \ldots \leq c_{l_c}$).

Output

The i-th of the next Q lines should contain an answer to the i-th input scenario.

If the i-th input scenario was of the form `alojzije` A, then you should first output the number $0 \leq l_a \leq L$ (length of a), followed by the elements of a representing the array that Alozije would write on the piece of paper after being presented with the number A in Mr. Malnar's office. Elements of a need to be between 0 and 10^9 inclusive.

If the i-th input scenario was of the form `benjamin` B, then you should first output the number $0 \leq l_b \leq L$ (length of b), followed by the elements of b representing the array that Benjamin would write on the piece of paper after being presented with the number B in Mr. Malnar's office. Elements of b need to be between 0 and 10^9 inclusive.

If the i-th input scenario was of the form `cecilija` l_c c_1 $\ldots$ c_{l_c}, then you need to output "`A`" if Ceclija would determine that $A > B$ based on array c. Conversely, you need to output "`B`", of Cecilija would determine that $A < B$ based on array c. You can assume that an array c will be generated based on arrays a and b that your program has produced when processing scenarios `alojzije` A and `benjamin` B. It is possible that your program has produced the arrays a and b in a previous run.

Scoring

Your solution will be tested in two runs. First it will be ran on a test case containing only scenarios of the form `alojzije` A or `benjamin` B. Assuming your program processes all scenarios and produces outputs in a valid format, it will be ran a second time. In the second run, all scenarios will begin with the word `cecilija`, and the corresponding arrays c will be generated based on various combinations of the arrays a and b your program has produced in the first run. The value of the input parameter L will be the same in both runs. If your program correctly answers all scenarios in the second run, it will be considered correct.

The execution time of your submission is the sum of execution times of both runs.

If we denote with N the maximum value of numbers A and B in all test cases of a particular subtask, your solutions will be scored according to the following table:

Subtask	Score	Constraints
1	11	$N = 100$, $L = 200$, $1 \leq Q \leq 10\,000$
2	23	$N = 1\,000$, $L = 110$, $1 \leq Q \leq 1\,000\,000$
3	66	$N = 500\,000$, $L = 20$, $1 \leq Q \leq 1\,000\,000$

Example

First Run

Input	Output	Comment
200		Arrays that Alojzije and Benjamin are writing down can have at most 200 elements.
3		You must process 3 scenarios.
`alojzije 1`	`1 23`	Alojzije is writing down $a = (23)$ based on number 1.
`benjamin 2`	`1 42`	Benjamin is writing down $b = (42)$ based on number 2.
`alojzije 3`	`2 11 11`	Alojzije is writing down $a = (11, 11)$ based on number 3.

Second Run

Input	Output	Comment
200		Arrays that Alojzije and Benjamin are writing down can have at most 200 elements.
2		You must process 2 scenarios.
`cecilija 2 1 1`	`B`	Array $c = (1, 1)$ was generated based on $a = (23)$ and $b = (42)$, so $A < B$.
`cecilija 2 1 2`	`A`	Array $c = (1, 2)$ was generated based on $a = (11, 11)$ and $b = (42)$, so $A > B$.