Task	SIBICE	SKENER	PRSTENI	ZBRKA	JOGURT	ISPITI
Input	standard input (keyboard)					
Output	standard output (screen)					
Memory limit (heap)	32 MB	32 MB	32 MB	64 MB	32 MB	32 MB
Memory limit (stack)	8 MB	8 MB	8 MB	8 MB	8 MB	8 MB
Time limit (per test)	1 sec	1 sec	1 sec	1 sec	1 sec	3 sec
Number of tests	10	10	10	12	10	10
Points per test	2	3	3	5	7	9
Total points	**20**	**30**	**30**	**60**	**70**	**90**
	300					

Note: The time limit is set for the evaluation system, running two AMD Athlon MP 2600+ processors under the Linux operating system.

C and C++ programs will be compiled with the following options: –O2 –lm –static
Pascal programs will be compiled with the following options: –O1 –XS

1. SIBICE

Young Mirko threw matches all over the floor of his room.

His mom did not like that and ordered him to put all the matches in a box. Mirko soon noticed that not all of the matches on the floor fit in the box, so he decided to take the matches that don't fit and throw them in the neighbour's garbage, where his mom (hopefully) won't find them.

Help Mirko determine which of the matches fit in the box his mom gave him. A match fits in the box if its entire length can lie on the bottom of the box. Mirko examines the matches one by one.

Input

The first line of input contains an integer N (1 ≤ N ≤ 50), the number of matches on the floor, and two integers W and H, the dimensions of the box (1 ≤ W ≤ 100, 1 ≤ H ≤ 100).

Each of the following N lines contains a single integer between 1 and 1000 (inclusive), the length of one match.

Output

For each match, in the order they were given in the input, output on a separate line "DA" if the match fits in the box or "NE" if it does not.

Sample test data

input	input
5 3 4	2 12 17
3	21
4	20
5	
6	**output**
7	
	NE
output	DA
DA	
DA	
DA	
NE	
NE	

2. SKENER

Having solved the match issue, Mirko faced another challenging problem. His mom ordered him to read an article about the newest couples on the Croatian show-biz scene in the "Moja Tajna" magazine. The article is written in a very small font size which Mirko cannot read. Luckily, Mirko has a scanner in the closet which will enlarge the article for him.

The article is a matrix of characters with R rows and C columns. The characters are letters of the English alphabet, digits and the character '.' (period). Mirko's scanner supports two parameters, ZR and ZC. It **substitutes each character** it scans with a **matrix of ZR rows and ZC columns**, where all entries are equal to the scanned character.

Mirko realized his scanner's software no longer works so he needs your help.

Input

The first row contains four integers, R, C, ZR and ZC. R and C are between 1 and 50, while ZR and ZC are between 1 and 5.
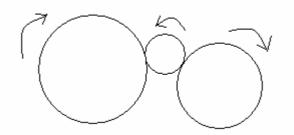
Each of the following R rows contains C characters each, representing the article from "Moja Tajna".

Output

The output should be a matrix of characters with R·ZR rows and C·ZC columns, the enlarged article.

Sample test data

```
input

3 3 1 2
.x.
x.x
.x.

output

..xx..
xx..xx
..xx..
```

```
input

3 3 2 1
.x.
x.x
.x.

output

.x.
.x.
x.x
x.x
.x.
.x.
```

3. PRSTENI

After an exhausting morning, Mirko fell asleep. His brother Stanko, however, just awoke and, like his brother, is all about excitement. Stanko found N rings of varying radiuses in the garage. He arranged them on the floor so that each ring (except the first and last) touches the ones before and after it.

He started turning the first ring and noticed that the other rings turned as well; some faster, some slower!

Thrilled with his discovery, he decided to count how many times the other rings turn while the first ring turns once. He gave up after noticing that this number is not always an integer and not knowing what to do.

Write a program that determines how many times each ring turns while the first turns once.

Input

The first line of input contains an integer N (3 ≤ N ≤ 100), the number of rings.

The next line contains N integers between 1 and 1000, the radiuses of Stanko's rings, in the order they are laid out on the floor.

Output

The output must contain N-1 lines. For every ring other than the first, in the order they are given in the input, output a fraction A/B, meaning that the respective ring turns A/B times while the first ring turns once.

The fractions must be in reduced form (the numerator and denominator must not have a common divisor larger than 1).

Sample test data

input	input	input
3	4	4
8 4 2	12 3 8 4	300 1 1 300
output	**output**	**output**
2/1	4/1	300/1
4/1	3/2	300/1
	3/1	1/1

Consider a sequence of N integers where each integer between 1 and N appears exactly once.

A pair of numbers in the sequence is **confused** if the number that comes earlier in the sequence is larger than the later number.

The **confusion** of the sequence is the number of confused pairs in it. For example, the confusion of the sequence (1, 4, 3, 2) is 3 because there are 3 confused pairs: (4, 3), (4, 2) and (3, 2).

Write a program that calculates the number of sequences of length N whose confusion is exactly C.

Input

The first and only line of input contains two integers, N ($1 \le N \le 1000$) and C ($0 \le C \le 10000$).

Output

Output the number of sequences modulo $1\,000\,000\,007$.

Sample test data

input	input	input
10 1	4 3	9 13
output	output	output
9	6	17957

5. JOGURT

A complete binary tree is made of nodes arranged in a hierarchic structure. One of the nodes is the root node, said to be at level 0. The root node has two child nodes, which are at level 1. Each of those has two children at level 2 etc.

In general, a complete binary tree with N levels has 2^N-1 nodes, each of which has two child nodes, except those at level L–1.

A number can be written into each node. Write the numbers 1 to 2^N-1 into a complete binary tree with N levels so that, for each node at level D, the absolute value of the difference of the sum of all numbers in the left subtree and the sum of all numbers in the right subtree is 2^D.

For example, the sum of the left subtree of the root node must differ from the sum of the right subtree by 1. The sums of the left and right subtrees of a node at level 1 must differ by 2.

Each number must be used exactly once. The solution need not be unique.

Input

The first and only line of input contains the integer N ($1 \leq N \leq 15$), the number of levels in the tree.

Output

Output the 2^N-1 separated by spaces on a single line, the binary tree in the preorder traversal. The preorder traversal first outputs the number in the root node, then outputs the left subtree (again in the preorder traversal), then the right subtree.

Sample test data

input	input
2	3
output	**output**
3 1 2	3 1 7 5 6 2 4

6. ISPITI

It's exam time in Mirko's village. Everyone wants to pass the exam with as little effort as possible, which is not easy. Mirko realized that it would be best for him to find someone who knows more than him and learn from them. Everyone followed and now everyone is looking for someone to learn from.

We can model how well a student is prepared for the exam with two integers, A and B. The number A represents how well a student understands the subject, while the number B is proportional to the quantity of their knowledge.

As the head of the village, Mirko decided that a student will ask another student for help only if that student has **both numbers greater than or equal to** the first student's numbers (no student will ask someone who doesn't understand the subject as well as themselves or who knows less).

Additionally, students will try to minimize the difference in knowledge quantity (so that students don't bother those that are way better). If this choice is not unique, they will try to minimize the difference in understanding.

Mirko's village has recently become a very popular suburb and new students keep moving in (in time for the exam). With Mirko's strict rules, they get confused about Mirko's rules and don't know where to go). They decided to ask a programmer from a neighbouring village for help.

Input

The first line of input contains an integer N ($1 \leq N \leq 200\ 000$), the number of queries and arrivals in the village. Each of the following N lines contains either:

- "D A B", a student has moved in whose knowledge is A and B
- "P i", the i-th student to move in wants to know whom to ask for help

The numbers A and B are between 1 and $2 \cdot 10^9$. No two students have both numbers equal.

Output

For each query ("P i" line), output which student the i-th student should ask for help. The students are numbered in the order they moved into the village (starting from 1). If a student cannot be helped, output "NE".

Sample test data

input	input	input
6	6	7
D 3 1	D 8 8	D 5 2
D 2 2	D 2 4	D 5 3
D 1 3	D 5 6	P 1
P 1	P 2	D 7 1
P 2	D 6 2	D 8 7
P 3	P 4	P 3
		P 2
output	**output**	
		output
NE	3	
NE	1	2
NE		4
		4