Codeforces Beta Round #31 (Div. 2, Codeforces format)

A. Worms Evolution

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

Professor Vasechkin is studying evolution of worms. Recently he put forward hypotheses that all worms evolve by division. There are n forms of worms. Worms of these forms have lengths a_1, a_2, ..., a_n. To prove his theory, professor needs to find 3 different forms that the length of the first form is equal to sum of lengths of the other two forms. Help him to do this.

Input

The first line contains integer n ($3 \le n \le 100$) — amount of worm's forms. The second line contains n space-separated integers a_i ($1 \le a_i \le 1000$) — lengths of worms of each form.

Output

Output 3 distinct integers i j k ($1 \le i, j, k \le n$) — such indexes of worm's forms that $a_i = a_j + a_k$. If there is no such triple, output -1. If there are several solutions, output any of them. It possible that $a_j = a_k$.

Examples

input
5 1 2 3 5 7
output
3 2 1

input
5 1 8 1 5 1
output
-1

B. Sysadmin Bob

time limit per test: 0.5 second
memory limit per test: 256 megabytes
input: standard input
output: standard output

Email address in Berland is a string of the form A@B, where A and B are arbitrary strings consisting of small Latin letters.

Bob is a system administrator in «Bersoft» company. He keeps a list of email addresses of the company's staff. This list is as a large string, where all addresses are written in arbitrary order, separated by commas. The same address can be written more than once.

Suddenly, because of unknown reasons, all commas in Bob's list disappeared. Now Bob has a string, where all addresses are written one after another without any separators, and there is impossible to determine, where the boundaries between addresses are. Unfortunately, on the same day his chief asked him to bring the initial list of addresses. Now Bob wants to disjoin addresses in some valid way. Help him to do that.

Input

The first line contains the list of addresses without separators. The length of this string is between 1 and 200, inclusive. The string consists only from small Latin letters and characters «@».

Output

If there is no list of the valid (according to the Berland rules) email addresses such that after removing all commas it coincides with the given string, output `No solution`. In the other case, output the list. The same address can be written in this list more than once. If there are several solutions, output any of them.

Examples

input
a@aa@a
output
a@a,a@a

input
a@a@a
output
No solution

input
@aa@a
output
No solution

C. Schedule

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

At the beginning of the new semester there is new schedule in the Berland State University. According to this schedule, n groups have lessons at the room 31. For each group the starting time of the lesson and the finishing time of the lesson are known. It has turned out that it is impossible to hold all lessons, because for some groups periods of their lessons intersect. If at some moment of time one groups finishes it's lesson, and the other group starts the lesson, their lessons don't intersect.

The dean wants to cancel the lesson in one group so that no two time periods of lessons of the remaining groups intersect. You are to find all ways to do that.

Input

The first line contains integer n ($1 \le n \le 5000$) — amount of groups, which have lessons in the room 31. Then n lines follow, each of them contains two integers l_i r_i ($1 \le l_i < r_i \le 10^6$) — starting and finishing times of lesson of the i-th group. It is possible that initially no two lessons intersect (see sample 1).

Output

Output integer k — amount of ways to cancel the lesson in exactly one group so that no two time periods of lessons of the remaining groups intersect. In the second line output k numbers — indexes of groups, where it is possible to cancel the lesson. Groups are numbered starting from 1 in the order that they were given in the input. Output the numbers in increasing order.

Examples

input
3 3 10 20 30 1 3
output
3 1 2 3

input
4 3 10 20 30 1 3 1 39
output
1 4

input
3 1 5 2 6 3 7
output
0

D. Chocolate

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

Bob has a rectangular chocolate bar of the size $W \times H$. He introduced a cartesian coordinate system so that the point $(0, 0)$ corresponds to the lower-left corner of the bar, and the point (W, H) corresponds to the upper-right corner. Bob decided to split the bar into pieces by breaking it. Each break is a segment parallel to one of the coordinate axes, which connects the edges of the bar. More formally, each break goes along the line $x = x_c$ or $y = y_c$, where x_c and y_c are integers. It should divide one part of the bar into two non-empty parts. After Bob breaks some part into two parts, he breaks the resulting parts **separately and independently from each other**. Also he doesn't move the parts of the bar. Bob made n breaks and wrote them down in his notebook in arbitrary order. At the end he got $n + 1$ parts. Now he wants to calculate their areas. Bob is lazy, so he asks you to do this task.

Input

The first line contains 3 integers W, H and n ($1 \le W, H, n \le 100$) — width of the bar, height of the bar and amount of breaks. Each of the following n lines contains four integers $x_{i,1}, y_{i,1}, x_{i,2}, y_{i,2}$ — coordinates of the endpoints of the i-th break ($0 \le x_{i,1} \le x_{i,2} \le W, 0 \le y_{i,1} \le y_{i,2} \le H$, or $x_{i,1} = x_{i,2}$, or $y_{i,1} = y_{i,2}$). Breaks are given in arbitrary order.

It is guaranteed that the set of breaks is correct, i.e. there is some order of the given breaks that each next break divides exactly one part of the bar into two non-empty parts.

Output

Output $n + 1$ numbers — areas of the resulting parts in the increasing order.

Examples

input
2 2 2 1 0 1 2 0 1 1 1
output
1 1 2

input
2 2 3 1 0 1 2 0 1 1 1 1 1 2 1
output
1 1 1 1

input
2 4 2 0 1 2 1 0 3 2 3
output
2 2 4

E. TV Game

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

There is a new TV game on BerTV. In this game two players get a number A consisting of $2n$ digits. Before each turn players determine who will make the next move. Each player should make exactly n moves. On it's turn i-th player takes the leftmost digit of A and appends it to his or her number S_i. After that this leftmost digit is erased from A. Initially the numbers of both players (S_1 and S_2) are «empty». Leading zeroes in numbers A, S_1, S_2 are allowed. In the end of the game the first player gets S_1 dollars, and the second gets S_2 dollars.

One day Homer and Marge came to play the game. They managed to know the number A beforehand. They want to find such sequence of their moves that both of them makes exactly n moves and which maximizes their total prize. Help them.

Input

The first line contains integer n ($1 \le n \le 18$). The second line contains integer A consisting of exactly $2n$ digits. This number can have leading zeroes.

Output

Output the line of $2n$ characters «H» and «M» — the sequence of moves of Homer and Marge, which gives them maximum possible total prize. Each player must make exactly n moves. If there are several solutions, output any of them.

Examples

input
2 1234
output
HHMM

input
2 9911
output
HMHM