

Problem A. Sasha vs. Kate

During the regular Mars's World Finals Subregional Programming Contest a boy Sasha lost N "Mars" bars of chocolate to a girl Kate. But for two years already Sasha does not hurry to pay his debt. And now Sasha and Kate decided that Sasha will give Kate P chocolate bars, where number P can be obtained from the number N by removing exactly K decimal digits. Sasha generously let Kate to choose digits to be removed. Your task is to find out how many bars Sasha will give Kate. Of course Kate will choose K digits from the number N in such a way that the resulting number P would be maximal.

Input

The first line of the input file contains two integer numbers N and K ($1 \leq N \leq 10^{100}$; $0 \leq K \leq 999$). Number K is strictly less than the number of digits in N . N will not have any leading zeros.

Output

Output the unknown P .

Examples

standard input	standard output
1992 2	99
1000 2	10

Problem B. Fair-play

Once after the regular working week a group of N friends gathered and went to the best local pub. After the party they decided to divide the total bill in equal parts. It is not always possible to divide the total sum (S_1 rub.) to N parts without the remainder. So each of the friends pays the integer amount of rubles and the remainder from the division of S_1 by N is paid only by some of them by adding one additional ruble. Using this scheme the maximum difference between any of two friends is not more then 1 rub. After the first pub they decided to continue their tour and visited all M pubs in the city. Visiting each pub they followed the same strategy of paying their bills. As the result the maximum difference for any of two friends between total sums they paid should be minimal. Obviously the value will not be more then 1 rub. Your task is to find the number of friends X who paid 1 rub more then the others.

Input

The first line of the input contains two integer numbers N ($1 \leq N \leq 100$) and M ($1 \leq M \leq 100$). Each of the following M lines contains the total bill in the i -th pub — integer number S_i ($1 \leq S_i \leq 10^4$, for all i from 1 to M).

Output

Write to the output the only number X .

Example

standard input	standard output
3 2 200 100	0
7 3 1 4 5	3

Problem C. King Berl VI

King Berl VI has N daughters and no sons. During his long life

he gave a number of promises to his daughters. All the promises have the following wording: "daughter X_i , I promise to give you dowry not less than C_i burles more than to daughter Y_i ", where i represents the number of the promise. Before his death the king decided to give some amount of money to each daughter. As far as he was the fair king, he decided to fulfill all his promises. But he was not only fair but also very greedy, he decided that he can give negative amount of burles as a dowry (i.e. daughter should pay this amount of burles to the treasury). Because of his born greed and by advice of the minister of finances, he made a decision that absolute value of each dowry should not exceed 10000 burles and the difference between dowry of the oldest and of the youngest daughters should be as small as possible (note, this value can be negative).

I.e. if the dowry given to the i -th daughter is A_i , following conditions should be satisfied:

- $-10000 \leq A_i \leq 10000$
- $A_N - A_1$ should be minimal

Input

The first line of the input file contains two integers numbers N and M ($2 \leq N \leq 10000$; $0 \leq M \leq 100000$), where N is the number of daughters and M is the number of promises. The following M lines contain the description of promises in the following form: X_i, Y_i, C_i ($1 \leq X_i, Y_i \leq N$; $X_i \neq Y_i$; $0 \leq C_i \leq 1000$). The youngest daughter has the number one, the oldest — N . Each pair X_i, Y_i can appear in the input several times.

Output

Write to the output number -1 if there is no solution for the problem (i.e. there is no sequence of N integers which satisfies all described above requirements). Write to the output N integer numbers — the amount of dowry of each daughter in burles, if solution exists. If there are several solutions output any of them.

Examples

standard input	standard output
4 5 2 1 1 3 1 2 3 2 3 4 2 1 4 3 2	-3 -2 1 3
2 2 1 2 0 2 1 0	-7 -7

Problem D. Triangle

It is well known that three segments can make a triangle if and only if the sum of lengths of any two of them is strictly greater than the length of the third one. Professor Vasechkin has N segments. He asked you, if you could find at least one set of three segments among them which can be used by professor to make a triangle.

Input

The first line of the input contains the only integer number N ($3 \leq N \leq 1000$). The following N lines contain the length of segments professor has. The length of any segment is the integer number from 1 to 10^{500} .

Output

Write to the output the length of segments requested by the professor

— three numbers delimited by spaces. Write three zeros if there are no such three segments.

Example

standard input	standard output
7 1 2 6 4 8 100 73	8 4 6

Problem E. Train

The restoration of the old Berland railroad has been finished at last. From above the railroad has the form of the polyline possibly with self-intersections but without self-covering. All segments of the polyline are either parallel or perpendicular to the earth equator line, which is considered to be a straight line.

Ministers now have a very difficult task. They have to determine the length of the train traveling back and forth. The decision was made to minimize the fuel expenses. To achieve this goal the length of the train should be maximal. There and then the assumption was made that the length of the train should be equal to the length of the railroad. In this case the fuel expenses will be equal to zero. The problem is that the train cannot have any self-intersections and self-touchings at any moment of time, although the head and the tail can occupy the same point. That's why the length of the train should possibly be reduced. Your task is to find the maximum possible length of the train. You can neglect the width of the rails and consider it equals to zero.

Input

The first line of the input contains integer number N ($1 \leq N \leq 4000$) — the number of vertices in the polyline. The following lines contain the coordinates of the vertices — the pairs of integers x_i, y_i . Coordinates values are not greater than 10000 by absolute value. The train will pass the vertices in order they are listed in the input. All segments of polyline are parallel to the grid axis.

Output

Write to the output the unknown maximum length of the train.

Example

standard input	standard output
5 0 0 3 0 3 1 1 1 1 -1	6
7 0 0 0 1 1 1 3 1 3 0 1 0 1 -1	6

Problem F. Boring. Hot. Summer...

*“Hello, dear Dima Malikov.
If you still do not know me,
My name is Ignat...”*

From the letter of Ignat (the biggest fan)
to Dima Malikov.

You are the head of the ROVD of the village Big Valenki. Recently you got a message informing that some stranger hijacked a tractor and currently is making his way from point X to point Y . The roads in the village are bidirectional and connect the pairs of junctions. Village has N junctions and M roads. Each road has some fixed length. Points X and Y are junctions. The hijacker certainly chose one of the shortest routes from X to Y . Your first deputy chief suggested that the criminal should be intercepted on the junction number 1, but you noticed that at the moment when the criminal reaches this junction he can possibly be at A_1 different points of the village (some of these points could be at the roads). Your second deputy chief suggested that interception should be arranged at the second junction. But you noticed again that at that time criminal could be at A_2 different points of the village. The last suggestion came from N -th deputy chief, and you answered him with number A_N . If the way of the criminal does not pass through the junction K for sure, A_K will be equal to zero.

As you later noticed, the process of finding of $A_1, A_2, \dots, A_N$ sequence can be automated. You are to write a program which will find this sequence.

Input

The first line of the input contains three natural numbers N, X, Y ($1 \leq N \leq 2000; 1 \leq X, Y \leq N$). The second line contains the only number M ($0 \leq M \leq 200000$). The following lines contains the description of roads. Each description is three integer numbers x_i, y_i, l_i — the pair of junctions it connects and its length. The lengths of all roads are integer numbers from 1 to 10000. Between each pair of junctions there is no more than one road. The road cannot connect junction to itself.

Output

Output the desired sequence.

Examples

standard input	standard output
6 2 5 9 1 2 1 1 3 10 1 6 1 4 6 1 6 5 1 2 6 2 3 6 1 5 3 1 4 5 1	2 1 0 0 1 1
4 1 4 5 1 2 1 1 4 2 1 3 1 2 4 1 3 4 1	1 3 3 1

Problem G. BHTML 1.0

The hypertext markup language BHTML 1.0 has only two paired tags. They are $\langle \text{UP} \rangle \langle / \text{UP} \rangle$ and $\langle \text{DOWN} \rangle \langle / \text{DOWN} \rangle$. The $\langle \text{UP} \rangle \langle / \text{UP} \rangle$ tag capitalizes all letters inside its body (between an open tag and a close one), and $\langle \text{DOWN} \rangle \langle / \text{DOWN} \rangle$ makes all inside the body letters lowercase. You are given the text consisting of latin letters and tags. Your task is to write the text right as it will be shown in the Bernet Explorer browser window. Tags in the text

are arranged correctly, i.e. they form correct bracket sequence. If a letter lays inside several tags, its case is defined by the most inner tag.

Input

The input contains the string S with the text. The length of the string is a natural number not exceeding 1000. Tags are always written in uppercase.

Output

Write to the output text after the processing.

Example

input.txt
Thi<UP>sIs<DOWN>EaSY</DOWN>Pr<UP>O</UP>ble</UP>m
output.txt
ThiSiSeasyPROBLEm

Problem H. Great Berland Wall

Berland is in civil war. This time peaceful solution is hardly possible. Collapse to the East and West Berland is inevitable! Commander-in-chief of grey, general Kruglyakovski, has made a decision to hasten the process and to surround his headquarters with a wall (which later be called Great Berland Wall). The wall should be built in such a way that the enemy's headquarters would stay at the other side of the wall.

Looking to the Berland map general Kruglyakovski noticed that the country consists of a number of provinces. Each province has the form of a simple (but possibly not convex) polygon. The country of Berland has no enclaves and does not contain any enclaves of other countries inside, i.e. it is possible to get from one point of Berland to another without leaving the country. The "passability" is known for each segment of the border of each province. "Passability" is the maximum speed the soldier can move with along the corresponding segment.

General Kruglyakovski decided that the wall will pass only along the borders of the provinces and will have the form of a simple polygon. He sent the group of soldiers to build the wall during the night. And you got a task to find such a form and position of the wall that the time of building would be minimal. The time of building of the section of the wall is equal to the "passability" of the corresponding border segment. The time of building of the wall is equal to the sum of building of its segments.

Input

The first line of the input file contains the number of segments of province borders — integer number N ($5 \leq N \leq 300$). The segments themselves follow further. Each segment is defined by five numbers x_1, y_1, x_2, y_2, v , where (x_1, y_1) and (x_2, y_2) are the coordinates of the segment end points and the integer number v ($1 \leq v \leq 1000$) is the "passability". Any pair of segments has not more than one common point and this point can only be their common end-point. Input data finishes with one more quadruple of numbers X_1, Y_1, X_2, Y_2 , where $(X_1, Y_1), (X_2, Y_2)$ are the coordinates of headquarters of the general Kruglyakovski and his opponent correspondingly. Both headquarters are situated strictly inside one of the provinces. The headquarters are situated in different provinces. All coordinates in the input are integer numbers less than 10^4 by the absolute value.

Output

Write to the first line of the output the total time of building of the wall. Write to the second line the number of border segments

the wall will occupy. To the next line write the sequence of the numbers of the segments. The segments are numbered in the order they appear in the input. If there are several solutions choose any of them.

Example

standard input	standard output
13	6
0 6 3 6 9 0 0 4 2 8	6
4 4 6 6 7 2 4 3 6 1	9 10 4 7 5 6
3 6 6 6 1 6 4 6 6 1	
4 2 6 4 1 0 0 0 6 6	
2 2 2 4 1 2 2 4 2 1	
0 6 2 4 5 2 4 4 4 4	
4 2 4 4 3	
3 3	
2 5	

Problem I. Mars Stomatology

Martian girl Kate has a toothache. The martian anatomy is very specific. They all have N teeth, each situated on one of K gums. Kate should pay dentist A_i mars euros for the treatment of i -th tooth. Moreover, Kate should pay B_j euros for the anesthesia of the gum j if this gum has at least one tooth cured. What is the maximal number of teeth Kate can cure if parents gave her P mars euros?

Input

The first line of the input contains three integer numbers N, K and P ($1 \leq N \leq 600$; $1 \leq K \leq N$; $1 \leq P \leq 10^6$). The second line contains the sequence of K integer numbers $B_1, B_2, \dots, B_K$, where B_j is the cost of anesthesia of the j -th gum ($1 \leq B_j \leq 600$ for all $j = 1, 2, \dots, K$). Each of the following N lines contains the description of tooth. Each description is the pair of integer numbers A_i and C_i , where A_i is the cost of curing of the i -th tooth, C_i is the number of the gum the tooth occupies ($1 \leq A_i \leq 600$; $1 \leq C_i \leq K$ for all $i = 1, 2, \dots, N$).

Output

Write to the first line of the output the maximal number of cured teeth S . Write to the second line S numbers of the cured teeth from the given set. If there are several solutions output any of them.

Example

standard input	standard output
4 2 10	3
1 2	4 3 1
1 2	
5 2	
3 1	
3 2	

Problem J. Exhibition

The exhibition of arithmetical progressions will be opened in Berland soon. Each of N presented progressions is characterized by two integer numbers A_i and B_i . These numbers mean that all numbers X belong to the i -th progression if $X = A_i * K + B_i$ for some non-negative integer K . Organizers decided that each sequence will be given a unique number from 1 to M . The organizers want as much as possible progressions to be assigned by such a number, that would be a member of this progression. They hired you to do this job.

Input

The first line of the input contains two integer numbers N and M ($1 \leq N \leq 300; N \leq M \leq 10^9$). Each of the following N lines contains the pair of numbers A_i and B_i ($-10^9 \leq A_i, B_i \leq 10^9$).

Output

Write to the output distribution of numbers among sequences — N numbers delimited by spaces. All numbers should be unique. If there are several solutions output any of them.

Example

standard input	standard output
5 6 1 1 2 1 3 1 3 1 6 4	2 3 1 6 4