Codeforces Round #207 (Div. 2)

A. Group of Students

time limit per test: 1 second
memory limit per test: 256 megabytes
input: standard input
output: standard output

At the beginning of the school year Berland State University starts two city school programming groups, for beginners and for intermediate coders. The children were tested in order to sort them into groups. According to the results, each student got some score from 1 to m points. We know that c_1 schoolchildren got 1 point, c_2 children got 2 points, ..., c_m children got m points. Now you need to set the passing rate k (integer from 1 to m): all schoolchildren who got less than k points go to the beginner group and those who get at strictly least k points go to the intermediate group. We know that if the size of a group is more than y, then the university won't find a room for them. We also know that if a group has less than x schoolchildren, then it is too small and there's no point in having classes with it. So, you need to split all schoolchildren into two groups so that the size of each group was from x to y, inclusive.

Help the university pick the passing rate in a way that meets these requirements.

Input

The first line contains integer m ($2 \le m \le 100$). The second line contains m integers c_1, c_2, ..., c_m, separated by single spaces ($0 \le c_i \le 100$). The third line contains two space-separated integers x and y ($1 \le x \le y \le 10000$). At least one c_i is greater than 0.

Output

If it is impossible to pick a passing rate in a way that makes the size of each resulting groups at least x and at most y, print 0. Otherwise, print an integer from 1 to m — the passing rate you'd like to suggest. If there are multiple possible answers, print any of them.

Sample test(s)

input
5 3 4 3 2 1 6 8
output
3

input
5 0 3 3 4 2 3 10
output
4

input
2 2 5 3 6
output
0

Note

In the first sample the beginner group has 7 students, the intermediate group has 6 of them.

In the second sample another correct answer is 3.

B. Flag Day

time limit per test: 1 second
memory limit per test: 256 megabytes
input: standard input
output: standard output

In Berland, there is the national holiday coming — the Flag Day. In the honor of this event the president of the country decided to make a big dance party and asked your agency to organize it. He has several conditions:

- overall, there must be m dances;
- exactly three people must take part in each dance;
- each dance must have one dancer in white clothes, one dancer in red clothes and one dancer in blue clothes (these are the colors of the national flag of Berland).

The agency has n dancers, and their number can be less than $3m$. That is, some dancers will probably have to dance in more than one dance. All of your dancers must dance on the party. However, if some dance has two or more dancers from a previous dance, then the current dance stops being spectacular. Your agency cannot allow that to happen, so each dance has at most one dancer who has danced in some previous dance.

You considered all the criteria and made the plan for the m dances: each dance had three dancers participating in it. Your task is to determine the clothes color for each of the n dancers so that the President's third condition fulfilled: each dance must have a dancer in white, a dancer in red and a dancer in blue. The dancers cannot change clothes between the dances.

Input

The first line contains two space-separated integers n ($3 \le n \le 10^5$) and m ($1 \le m \le 10^5$) — the number of dancers and the number of dances, correspondingly. Then m lines follow, describing the dances in the order of dancing them. The i-th line contains three distinct integers — the numbers of the dancers that take part in the i-th dance. The dancers are numbered from 1 to n. Each dancer takes part in at least one dance.

Output

Print n space-separated integers: the i-th number must represent the color of the i-th dancer's clothes (1 for white, 2 for red, 3 for blue). If there are multiple valid solutions, print any of them. It is guaranteed that at least one solution exists.

Sample test(s)

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

input
9 3 3 6 9 2 5 8 1 4 7
output
1 1 1 2 2 2 3 3 3

input
5 2 4 1 5 3 1 2
output
2 3 1 1 3

C. Knight Tournament

time limit per test: 3 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

Hooray! Berl II, the king of Berland is making a knight tournament. The king has already sent the message to all knights in the kingdom and they in turn agreed to participate in this grand event.

As for you, you're just a simple peasant. There's no surprise that you slept in this morning and were late for the tournament (it was a weekend, after all). Now you are really curious about the results of the tournament. This time the tournament in Berland went as follows:

- There are n knights participating in the tournament. Each knight was assigned his unique number — an integer from 1 to n.
- The tournament consisted of m fights, in the i-th fight the knights that were still in the game with numbers at least l_i and at most r_i have fought for the right to continue taking part in the tournament.
- After the i-th fight among all participants of the fight only one knight won — the knight number x_i, he continued participating in the tournament. Other knights left the tournament.
- The winner of the last (the m-th) fight (the knight number x_m) became the winner of the tournament.

You fished out all the information about the fights from your friends. Now for each knight you want to know the name of the knight he was conquered by. We think that the knight number b was conquered by the knight number a, if there was a fight with both of these knights present and the winner was the knight number a.

Write the code that calculates for each knight, the name of the knight that beat him.

Input

The first line contains two integers n, m ($2 \le n \le 3 \cdot 10^5$; $1 \le m \le 3 \cdot 10^5$) — the number of knights and the number of fights. Each of the following m lines contains three integers l_i, r_i, x_i ($1 \le l_i < r_i \le n$; $l_i \le x_i \le r_i$) — the description of the i-th fight.

It is guaranteed that the input is correct and matches the problem statement. It is guaranteed that at least two knights took part in each battle.

Output

Print n integers. If the i-th knight lost, then the i-th number should equal the number of the knight that beat the knight number i. If the i-th knight is the winner, then the i-th number must equal 0.

Sample test(s)

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

input
8 4 3 5 4 3 7 6 2 8 8 1 8 1
output
0 8 4 6 4 8 6 1

Note

Consider the first test case. Knights 1 and 2 fought the first fight and knight 1 won. Knights 1 and 3 fought the second fight and knight 3 won. The last fight was between knights 3 and 4, knight 4 won.

D. Xenia and Hamming

time limit per test: 1 second
memory limit per test: 256 megabytes
input: standard input
output: standard output

Xenia is an amateur programmer. Today on the IT lesson she learned about the Hamming distance.

The Hamming distance between two strings $s = s_1 s_2 \ldots s_n$ and $t = t_1 t_2 \ldots t_n$ of equal length n is value $\sum_{i=1}^{n} [s_i \neq t_i]$. Record $[s_i \neq t_i]$ is the Iverson notation and represents the following: if $s_i \neq t_i$, it is one, otherwise — zero.

Now Xenia wants to calculate the Hamming distance between two long strings a and b. The first string a is the concatenation of n copies of string x, that is, $a = x + x + \cdots + x = \sum_{i=1}^{n} x$. The second string b is the concatenation of m copies of string y.

Help Xenia, calculate the required Hamming distance, given n, x, m, y.

Input

The first line contains two integers n and m $(1 \leq n, m \leq 10^{12})$. The second line contains a non-empty string x. The third line contains a non-empty string y. Both strings consist of at most 10^6 lowercase English letters.

It is guaranteed that strings a and b that you obtain from the input have the same length.

Output

Print a single integer — the required Hamming distance.

Please, do not use the `%lld` specifier to read or write 64-bit integers in C++. It is preferred to use the `cin`, `cout` streams or the `%I64d` specifier.

Sample test(s)

input
100 10 a aaaaaaaaaa

output
0

input
1 1 abacaba abzczzz

output
4

input
2 3 rzr az

output
5

Note

In the first test case string a is the same as string b and equals 100 letters `a`. As both strings are equal, the Hamming distance between them is zero.

In the second test case strings a and b differ in their 3-rd, 5-th, 6-th and 7-th characters. Thus, the Hamming distance equals 4.

In the third test case string a is `rzrrzr` and string b is `azazaz`. The strings differ in all characters apart for the second one, the Hamming distance between them equals 5.

E. Compartments

time limit per test: 1 second
memory limit per test: 256 megabytes
input: standard input
output: standard output

A team of students from the city S is sent to the All-Berland Olympiad in Informatics. Traditionally, they go on the train. All students have bought tickets in one carriage, consisting of n compartments (each compartment has exactly four people). We know that if one compartment contain one or two students, then they get bored, and if one compartment contain three or four students, then the compartment has fun throughout the entire trip.

The students want to swap with other people, so that no compartment with students had bored students. To swap places with another person, you need to convince him that it is really necessary. The students can not independently find the necessary arguments, so they asked a sympathetic conductor for help. The conductor can use her life experience to persuade any passenger to switch places with some student.

However, the conductor does not want to waste time persuading the wrong people, so she wants to know what is the minimum number of people necessary to persuade her to change places with the students. Your task is to find the number.

After all the swaps each compartment should either have no student left, or have a company of three or four students.

Input

The first line contains integer n ($1 \le n \le 10^6$) — the number of compartments in the carriage. The second line contains n integers $a_1, a_2, ..., a_n$ showing how many students ride in each compartment ($0 \le a_i \le 4$). It is guaranteed that at least one student is riding in the train.

Output

If no sequence of swapping seats with other people leads to the desired result, print number "-1" (without the quotes). In another case, print the smallest number of people you need to persuade to swap places.

Sample test(s)

input
5 1 2 2 4 3
output
2

input
3 4 1 1
output
2

input
4 0 3 0 4
output
0