Codeforces Round #187 (Div. 1)

A. Sereja and Contest

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

During the last Sereja's Codesecrof round the server crashed many times, so the round was decided to be made unrated for some participants.

Let's assume that n people took part in the contest. Let's assume that the participant who got the first place has rating a_1, the second place participant has rating a_2, ..., the n-th place participant has rating a_n. Then changing the rating on the Codesecrof site is calculated by the formula $d_i = \sum_{j=1}^{i-1} (a_j \cdot (j-1) - (n-i) \cdot a_i)$.

After the round was over, the Codesecrof management published the participants' results table. They decided that if for a participant $d_i < k$, then the round can be considered unrated for him. But imagine the management's surprise when they found out that the participants' rating table is dynamic. In other words, when some participant is removed from the rating, he is removed from the results' table and the rating is recalculated according to the new table. And of course, all applications for exclusion from the rating are considered in view of the current table.

We know that among all the applications for exclusion from the rating the first application to consider is from the participant with the best rank (the rank with the minimum number), for who $d_i < k$. We also know that the applications for exclusion from rating were submitted by all participants.

Now Sereja wonders, what is the number of participants to be excluded from the contest rating, and the numbers of the participants in the original table in the order of their exclusion from the rating. Pay attention to the analysis of the first test case for a better understanding of the statement.

Input

The first line contains two integers n, k ($1 \le n \le 2 \cdot 10^5$, $-10^9 \le k \le 0$). The second line contains n space-separated integers $a_1, a_2, ..., a_n$ ($1 \le a_i \le 10^9$) — ratings of the participants in the initial table.

Output

Print the numbers of participants in the order in which they were removed from the table. Print the initial numbers of the participants, that is, the numbers that the participants had in the initial table.

Examples

input
5 0 5 3 4 1 2
output
2 3 4

input
10 -10 5 5 1 7 5 1 2 4 9 2
output
2 4 5 7 8 9

Note

Consider the first test sample.

1. Initially the sequence of the contest participants' ratings equals [5, 3, 4, 1, 2]. You can use this sequence to calculate the sequence of rating changes: [0, -9, -13, 8, 14]. According to the problem statement, the application of the participant who won the second place will be considered first.
2. As soon as the second place winner is out from the ratings, the participants' rating sequence will equal [5, 4, 1, 2]. By this sequence you can count the new sequence of rating changes: [0, -8, 2, 6]. According to the problem statement, the application

of the participant who won the second place will be considered. Initially this participant won third place.

3. The new rating sequence equals [5, 1, 2], the new sequence of rating changes equals [0, -1, 1]. The second place participant's application is taken into consideration, initially this participant won the fourth place.
4. The new rating sequence equals [5, 2], the new sequence of rating changes equals [0, 0]. No more applications will be considered.

Thus, you should print 2, 3, 4.

B. Sereja and Periods

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

Let's introduce the designation $[x, n] = x + x + \cdots + x = \sum_{i=1}^{n} x$, where x is a string, n is a positive integer and operation " $+$ " is the string concatenation operation. For example, $[abc, 2] = abcabc$.

We'll say that string s *can be obtained* from string t, if we can remove some characters from string t and obtain string s. For example, strings ab and $acba$ can be obtained from string $xacbac$, and strings bx and aaa cannot be obtained from it.

Sereja has two strings, $w = [a, b]$ and $q = [c, d]$. He wants to find such maximum integer p $(p > 0)$, that $[q, p]$ can be obtained from string w.

Input

The first line contains two integers b, d $(1 \le b, d \le 10^7)$. The second line contains string a. The third line contains string c. The given strings are not empty and consist of lowercase English letters. Their lengths do not exceed 100.

Output

In a single line print an integer — the largest number p. If the required value of p doesn't exist, print 0.

Examples

input
10 3 abab bab
output
3

C. Sereja and Subsequences

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

Sereja has a sequence that consists of n positive integers, $a_1, a_2, \ldots, a_n$.

First Sereja took a piece of squared paper and wrote all **distinct** non-empty non-decreasing subsequences of sequence a. Then for each sequence written on the squared paper, Sereja wrote on a piece of lines paper all sequences that *do not exceed* it.

A sequence of positive integers $x = x_1, x_2, \ldots, x_r$ doesn't exceed a sequence of positive integers $y = y_1, y_2, \ldots, y_r$, if the following inequation holds: $x_1 \le y_1, x_2 \le y_2, \ldots, x_r \le y_r$.

Now Sereja wonders, how many sequences are written on the lines piece of paper. Help Sereja, find the required quantity modulo 1000000007 $(10^9 + 7)$.

Input

The first line contains integer n $(1 \le n \le 10^5)$. The second line contains n integers $a_1, a_2, \ldots, a_n$ $(1 \le a_i \le 10^6)$.

Output

In the single line print the answer to the problem modulo 1000000007 $(10^9 + 7)$.

Examples

input
1 42
output
42

input
3 1 2 2
output
13

input
5 1 2 3 4 5
output
719

D. Sereja and Straight Lines

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

Sereja placed n points on a plane. Now Sereja wants to place on the plane two straight lines, intersecting at a right angle, so that one of the straight lines intersect the Ox axis at an angle of 45 degrees and the maximum distance from the points to the straight lines were minimum.

In this problem we consider the distance between points (x_1, y_1) and (x_2, y_2) equal $|x_1 - x_2| + |y_1 - y_2|$. The distance between the point and the straight lines is the minimum distance from the point to some point belonging to one of the lines.

Help Sereja, find the maximum distance from the points to the optimally located straight lines.

Input

The first line contains integer n ($1 \le n \le 10^5$). Next n lines contain the coordinates of the lines. The i-th line contains two integers x_i, y_i ($|x_i|, |y_i| \le 10^9$).

Output

In a single line print a real number — the answer to the problem. Your answer will be considered correct iff its absolute or relative error doesn't exceed 10^{-6}.

Examples

input
4 0 0 2 0 0 2 2 2
output
0.000000000000000

input
4 1 0 0 1 2 1 1 2
output
1.000000000000000

E. Sereja and Squares

time limit per test: 4 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

Sereja painted n points on the plane, point number i $(1 \le i \le n)$ has coordinates $(i, 0)$. Then Sereja marked each point with a small or large English letter. Sereja don't like letter "x", so he didn't use it to mark points. Sereja thinks that the points are marked beautifully if the following conditions holds:

- all points can be divided into pairs so that each point will belong to exactly one pair;
- in each pair the point with the lesser abscissa will be marked with a small English letter and the point with the larger abscissa will be marked with the same large English letter;
- if we built a square on each pair, the pair's points will be the square's opposite points and the segment between them will be the square's diagonal, then among the resulting squares there won't be any intersecting or touching ones.

Little Petya erased some small and all large letters marking the points. Now Sereja wonders how many ways are there to return the removed letters so that the points were marked beautifully.

Input

The first line contains integer n the number of points $(1 \le n \le 10^5)$. The second line contains a sequence consisting of n small English letters and question marks — the sequence of letters, that mark points, in order of increasing X-coordinate of points. Question marks denote the points without letters (Petya erased them). It is guaranteed that the input string doesn't contain letter "x".

Output

In a single line print the answer to the problem modulo 4294967296. If there is no way to return the removed letters, print number 0.

Please, do not write 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.

Examples

input
4 a???
output
50

input
4 abc?
output
0

input
6 abc???
output
1