Codeforces Round #448 (Div. 2)

A. Pizza Separation

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

Students Vasya and Petya are studying at the BSU (Byteland State University). At one of the breaks they decided to order a pizza. In this problem pizza is a circle of some radius. The pizza was delivered already cut into n pieces. The i-th piece is a sector of angle equal to a_i. Vasya and Petya want to divide all pieces of pizza into two *continuous* sectors in such way that the difference between angles of these sectors is minimal. Sector angle is sum of angles of all pieces in it. Pay attention, that one of sectors can be empty.

Input

The first line contains one integer n $(1 \le n \le 360)$ — the number of pieces into which the delivered pizza was cut.

The second line contains n integers a_i $(1 \le a_i \le 360)$ — the angles of the sectors into which the pizza was cut. The sum of all a_i is 360.

Output

Print one integer — the minimal difference between angles of sectors that will go to Vasya and Petya.

Examples

input
4 90 90 90 90
output
0

input
3 100 100 160
output
40

input
1 360
output
360

input
4 170 30 150 10
output
0

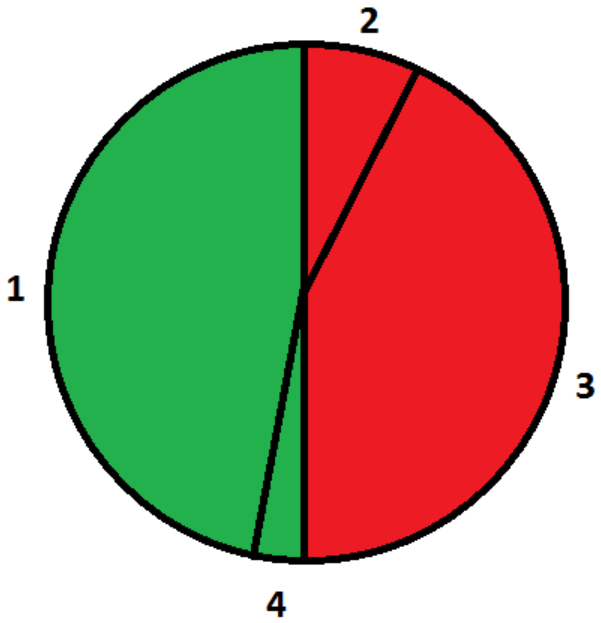
Note

In first sample Vasya can take 1 and 2 pieces, Petya can take 3 and 4 pieces. Then the answer is $|(90 + 90) - (90 + 90)| = 0$.

In third sample there is only one piece of pizza that can be taken by only one from Vasya and Petya. So the answer is $|360 - 0| = 360$.

In fourth sample Vasya can take 1 and 4 pieces, then Petya will take 2 and 3 pieces. So the answer is $|(170 + 10) - (30 + 150)| = 0$.

Picture explaning fourth sample:



Both red and green sectors consist of two adjacent pieces of pizza. So Vasya can take green sector, then Petya will take red sector.

B. XK Segments

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

While Vasya finished eating his piece of pizza, the lesson has already started. For being late for the lesson, the teacher suggested Vasya to solve one interesting problem. Vasya has an array a and integer x. He should find the number of different ordered pairs of indexes (i, j) such that $a_i \le a_j$ and there are exactly k integers y such that $a_i \le y \le a_j$ and y is divisible by x.

In this problem it is meant that pair (i, j) is equal to (j, i) only if i is equal to j. For example pair $(1, 2)$ is not the same as $(2, 1)$.

Input

The first line contains 3 integers n, x, k ($1 \le n \le 10^5$, $1 \le x \le 10^9$, $0 \le k \le 10^9$), where n is the size of the array a and x and k are numbers from the statement.

The second line contains n integers a_i ($1 \le a_i \le 10^9$) — the elements of the array a.

Output

Print one integer — the answer to the problem.

Examples

input
4 2 1 1 3 5 7
output
3

input
4 2 0 5 3 1 7
output
4

input
5 3 1 3 3 3 3 3
output
25

Note

In first sample there are only three suitable pairs of indexes — $(1, 2)$, $(2, 3)$, $(3, 4)$.

In second sample there are four suitable pairs of indexes$(1, 1)$, $(2, 2)$, $(3, 3)$, $(4, 4)$.

In third sample every pair (i, j) is suitable, so the answer is $5 * 5 = 25$.

C. Square Subsets

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

Petya was late for the lesson too. The teacher gave him an additional task. For some array a Petya should find the number of different ways to select non-empty subset of elements from it in such a way that their product is equal to a square of some integer.

Two ways are considered different if sets of indexes of elements chosen by these ways are different.

Since the answer can be very large, you should find the answer modulo $10^9 + 7$.

Input

First line contains one integer n ($1 \le n \le 10^5$) — the number of elements in the array.

Second line contains n integers a_i ($1 \le a_i \le 70$) — the elements of the array.

Output

Print one integer — the number of different ways to choose some elements so that their product is a square of a certain integer modulo $10^9 + 7$.

Examples

input
4 1 1 1 1
output
15

input
4 2 2 2 2
output
7

input
5 1 2 4 5 8
output
7

Note

In first sample product of elements chosen by any way is 1 and $1 = 1^2$. So the answer is $2^4 - 1 = 15$.

In second sample there are six different ways to choose elements so that their product is 4, and only one way so that their product is 16. So the answer is $6 + 1 = 7$.

D. String Mark

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

At the Byteland State University marks are strings of the same length. Mark x is considered better than y if string y is lexicographically smaller than x.

Recently at the BSU was an important test work on which Vasya recived the mark a. It is very hard for the teacher to remember the exact mark of every student, but he knows the mark b, such that every student recieved mark strictly smaller than b.

Vasya isn't satisfied with his mark so he decided to improve it. He can swap characters in the string corresponding to his mark as many times as he like. Now he want to know only the number of different ways to improve his mark so that his teacher didn't notice something suspicious.

More formally: you are given two strings a, b of the same length and you need to figure out the number of different strings c such that:

1) c can be obtained from a by swapping some characters, in other words c is a permutation of a.

2) String a is lexicographically smaller than c.

3) String c is lexicographically smaller than b.

For two strings x and y of the same length it is true that x is lexicographically smaller than y if there exists such i, that $x_1 = y_1, x_2 = y_2, \ldots, x_{i-1} = y_{i-1}, x_i < y_i$.

Since the answer can be very large, you need to find answer modulo $10^9 + 7$.

Input

First line contains string a, second line contains string b. Strings a, b consist of lowercase English letters. Their lengths are equal and don't exceed 10^6.

It is guaranteed that a is lexicographically smaller than b.

Output

Print one integer — the number of different strings satisfying the condition of the problem modulo $10^9 + 7$.

Examples

input
abc ddd
output
5

input
abcdef abcdeg
output
0

input
abacaba ubuduba
output
64

Note

In first sample from string abc can be obtained strings acb, bac, bca, cab, cba, all of them are larger than abc, but smaller than ddd. So the answer is 5.

In second sample any string obtained from $abcdef$ is larger than $abcdeg$. So the answer is 0.

E. Eyes Closed

time limit per test: 2.5 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

Vasya and Petya were tired of studying so they decided to play a game. Before the game begins Vasya looks at array a consisting of n integers. As soon as he remembers all elements of a the game begins. Vasya closes his eyes and Petya does q actions of one of two types:

$1)$ Petya says 4 integers $l1, r1, l2, r2$ — boundaries of two non-intersecting segments. After that he swaps one random element from the $[l1, r1]$ segment with another random element from the $[l2, r2]$ segment.

$2)$ Petya asks Vasya the sum of the elements of a in the $[l, r]$ segment.

Vasya is a mathematician so he answers Petya the mathematical expectation of the sum of the elements in the segment.

Your task is to write a program which will answer the second type questions as Vasya would do it. In other words your program should print the mathematical expectation of the sum of the elements of a in the $[l, r]$ segment for every second type query.

Input

The first line contains two integers n, q $(2 \le n \le 10^5, 1 \le q \le 10^5)$ — the number of elements in the array and the number of queries you need to handle.

The second line contains n integers a_i $(1 \le a_i \le 10^9)$ — elements of the array.

The next q lines contain Petya's actions of type 1 or 2.

If it is a type 1 action then the line contains 5 integers $1, l1, r1, l2, r2$ $(1 \le l1 \le r1 \le n, 1 \le l2 \le r2 \le n)$.

If it is a type 2 query then the line contains 3 integers $2, l, r$ $(1 \le l \le r \le n)$.

It is guaranteed that there is at least one type 2 query and segments $[l1, r1]$, $[l2, r2]$ don't have common elements.

Output

For each type 2 query print one real number — the mathematical expectation of the sum of elements in the segment.

Your answer will be considered correct if its absolute or relative error doesn't exceed 10^{-4} — formally, the answer is correct if $min(|x - y|, \frac{|x-y|}{x}) \le 10^{-4}$ where x is jury's answer and y is yours.

Examples

input
4 4 1 1 2 2 1 2 2 3 3 2 1 2 1 1 2 3 4 2 1 2
output
3.0000000 3.0000000

input
10 5 1 1 1 1 1 2 2 2 2 2 1 1 5 6 10 2 1 5 1 1 5 6 10 1 1 5 6 10 2 6 10
output
6.0000000 8.0400000

input
10 10 1 2 3 4 5 6 7 8 9 10 1 1 5 6 10 1 1 5 6 10 2 1 5 1 1 3 6 9 2 1 3 1 5 7 8 10 1 1 1 10 10 2 1 5 2 7 10 2 1 10

output

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23.0000000
14.0000000
28.0133333
21.5733333
55.0000000
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