Croc Champ 2013 - Round 2 (Div. 2 Edition)

A. Ksusha and Array

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

Ksusha is a beginner coder. Today she starts studying arrays. She has array $a_1, a_2, \ldots, a_n$, consisting of n positive integers.

Her university teacher gave her a task. Find such number in the array, that all array elements are divisible by it. Help her and find the number!

Input

The first line contains integer n ($1 \le n \le 10^5$), showing how many numbers the array has. The next line contains integers $a_1, a_2, \ldots, a_n$ ($1 \le a_i \le 10^9$) — the array elements.

Output

Print a single integer — the number from the array, such that all array elements are divisible by it. If such number doesn't exist, print -1.

If there are multiple answers, you are allowed to print any of them.

Examples

input
3 2 2 4
output
2

input
5 2 1 3 1 6
output
1

input
3 2 3 5
output
-1

B. Ksusha the Squirrel

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

Ksusha the Squirrel is standing at the beginning of a straight road, divided into n sectors. The sectors are numbered 1 to n, from left to right. Initially, Ksusha stands in sector 1.

Ksusha wants to walk to the end of the road, that is, get to sector n. Unfortunately, there are some rocks on the road. We know that Ksusha hates rocks, so she doesn't want to stand in sectors that have rocks.

Ksusha the squirrel keeps fit. She can jump from sector i to any of the sectors $i + 1, i + 2, ..., i + k$.

Help Ksusha! Given the road description, say if she can reach the end of the road (note, she cannot stand on a rock)?

Input

The first line contains two integers n and k ($2 \le n \le 3 \cdot 10^5, 1 \le k \le 3 \cdot 10^5$). The next line contains n characters — the description of the road: the i-th character equals "`.`", if the i-th sector contains no rocks. Otherwise, it equals "#".

It is guaranteed that the first and the last characters equal "`.`".

Output

Print "YES" (without the quotes) if Ksusha can reach the end of the road, otherwise print "NO" (without the quotes).

Examples

input
2 1 ..
output
YES

input
5 2 .#.#.
output
YES

input
7 3 .#.###.
output
NO

C. Weird Game

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

Yaroslav, Andrey and Roman can play cubes for hours and hours. But the game is for three, so when Roman doesn't show up, Yaroslav and Andrey play another game.

Roman leaves a word for each of them. Each word consists of $2 \cdot n$ binary characters "0" or "1". After that the players start moving in turns. Yaroslav moves first. During a move, a player must choose an integer from 1 to $2 \cdot n$, which hasn't been chosen by anybody up to that moment. Then the player takes a piece of paper and writes out the corresponding character from his string.

Let's represent Yaroslav's word as $s = s_1 s_2 \ldots s_{2n}$. Similarly, let's represent Andrey's word as $t = t_1 t_2 \ldots t_{2n}$. Then, if Yaroslav choose number k during his move, then he is going to write out character s_k on the piece of paper. Similarly, if Andrey choose number r during his move, then he is going to write out character t_r on the piece of paper.

The game finishes when no player can make a move. After the game is over, Yaroslav makes some integer from the characters written on his piece of paper (Yaroslav can arrange these characters as he wants). Andrey does the same. The resulting numbers can contain leading zeroes. The person with the largest number wins. If the numbers are equal, the game ends with a draw.

You are given two strings s and t. Determine the outcome of the game provided that Yaroslav and Andrey play optimally well.

Input

The first line contains integer n ($1 \le n \le 10^6$). The second line contains string s — Yaroslav's word. The third line contains string t — Andrey's word.

It is guaranteed that both words consist of $2 \cdot n$ characters "0" and "1".

Output

Print "First", if both players play optimally well and Yaroslav wins. If Andrey wins, print "Second" and if the game ends with a draw, print "Draw". Print the words without the quotes.

Examples

input
2 0111 0001
output
First

input
3 110110 001001
output
First

input
3 111000 000111
output
Draw

input
4 01010110 00101101
output
First

input
4 01100000 10010011

output
Second

D. Distinct Paths

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

You have a rectangular $n \times m$-cell board. Some cells are already painted some of k colors. You need to paint each uncolored cell one of the k colors so that any path from the upper left square to the lower right one doesn't contain any two cells of the same color. The path can go only along side-adjacent cells and can only go down or right.

Print the number of possible paintings modulo 1000000007 $(10^9 + 7)$.

Input

The first line contains three integers n, m, k $(1 \le n, m \le 1000, 1 \le k \le 10)$. The next n lines contain m integers each — the board. The first of them contains m uppermost cells of the board from the left to the right and the second one contains m cells from the second uppermost row and so on. If a number in a line equals 0, then the corresponding cell isn't painted. Otherwise, this number represents the initial color of the board cell — an integer from 1 to k.

Consider all colors numbered from 1 to k in some manner.

Output

Print the number of possible paintings modulo 1000000007 $(10^9 + 7)$.

Examples

input
2 2 4 0 0 0 0
output
48

input
2 2 4 1 2 2 1
output
0

input
5 6 10 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
output
3628800

input
2 6 10 1 2 3 4 5 6 0 0 0 0 0 0
output
4096

E. Cube Problem

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

Yaroslav, Andrey and Roman love playing cubes. Sometimes they get together and play cubes for hours and hours!

Today they got together again and they are playing cubes. Yaroslav took unit cubes and composed them into an $a \times a \times a$ cube, Andrey made a $b \times b \times b$ cube and Roman made a $c \times c \times c$ cube. After that the game was finished and the guys left. But later, Vitaly entered the room. He saw the cubes and wanted to make a cube as well. But what size should the cube be? Of course it should be a large cube with the side of length $a + b + c$. Besides, Vitaly decided to decompose the cubes built by Yaroslav, Andrey and Roman and compose his own large cube out of them. However, it turned out that the unit cubes he got from destroying the three cubes just weren't enough to make a large cube. We know that Vitaly was short of exactly n cubes. Vitaly got upset, demolished everything and left. As he was leaving, he met Petya and told him that there had been three cubes in the room and that he needed another n unit cubes to make his own large cube.

Petya entered the room and saw the messily scattered cubes. He wanted to make it neat and orderly again. But he only knows that there had been three cubes, made of small unit cubes and that Vitaly needed n more unit cubes to make a large one! Help Petya understand, how many ways of sizes a, b, c are there to restore Yaroslav's, Andrey's and Roman's cubes.

Input

The single line of the input contains integer n ($1 \le n \le 10^{14}$). We know that all numbers a, b, c are positive integers.

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.

Output

In the single line print the required number of ways. If it turns out that there isn't a single way of suitable sizes of a, b, c, print 0.

Examples

input
24
output
1

input
648
output
7

input
5
output
0

input
93163582512000
output
39090