A. Fibonacci Sequences

Limits: 1 sec., 256 MiB

Consider a generalized Fibonacci sequence $F_1, F_2, F_3, ..., F_n, ...$, where $F_1 = A$, $F_2 = B$, $F_n = F_{n-1} + F_{n-2}$ $(n > 2)$. Here A and B are positive integers which define the sequence.

You have to find the number of generalized Fibonacci sequences that contain some given number K and their first two elements are less than K $(F1 < K, F2 < K)$.

Input

The integer K.

Output

The number of generalized Fibonacci sequences.

Constraints

$1 \leq K \leq 10^{18}$.

Samples

Input (*stdin*)	Output (*stdout*)
5	7

B. Neat Game

Limits: 1 sec., 256 MiB

John and Brus are playing a neat game on an N by N chess board. John has infinite supply of white checkers and Brus has infinite supply of black ones. Players alternate turns and John moves first. He places one white checker on any board cell. Then Brus places his black checker on any available cell. Two checkers cannot be placed on the same cell. Then John places another white checker on any available cell in such way that the chosen cell has at least one neighboring cell which already contain white checker. Then Brus chooses a board cell that has at least one neighboring cell with black checker on it at places his black checker on the chosen cell. And so on.

Two cells are considered to be neighboring if they share a common side. For example, an internal cell has four neighbors.

A player who cannot make his move loses the game and his opponent is considered to be a winner. Both players are using an optimal game strategy. You have to find the winner of the game.

Input

The integer N.

Output

Print `John` if John wins, otherwise print `Brus`.

Constraints

$1 \leq N \leq 100$.

Samples

Input (*stdin*)	Output (*stdout*)
2	Brus

C. Zero Sequence

Limits: 1 sec., 256 MiB

You have a sequence of N zeros. You have to replace K of them with positive integers $A_1, A_2, ..., A_K$ in such way that each positive integer C is surrounded by at least C consecutive zeroes from the left and with at least C consecutive zeros from the right. These zeros have to appear just before and just after the number C itself: $..., 0, 0, ..., 0, C, 0, 0, ..., 0, ...$.

You have to find the number of distinct sequences you can get by replacing exactly K zeros and print it modulo 1234567891.

Input

The first line contains two integers N and K separated by a single space. The following line contains N integers $A_1, A_2, ..., A_K$ separated by single spaces.

Output

The number of sequences modulo 1234567891.

Constraints

$1 \leq N \leq 1000$,
$1 \leq K \leq 100$,
$1 \leq A_j \leq 100$.

Samples

Input (*stdin*)	Output (*stdout*)
`10 3` `1 2 1`	`12`

D. The Smallest Number

Limits: 1 sec., 256 MiB

Some integer number N is written on a board. You can erase at most K it's digits (maybe none). Then you consider the number X formed by digits that are left on the board. You want X to have at least one digit, do not start with zero and to be as small as possible. What is the smallest X you can get?

Input

Two integers N and K separated by a single space.

Output

The smallest number you can get.

Constraints

$1 \leq N, K \leq 10^9$.

Samples

Input (*stdin*)	Output (*stdout*)
`7074 2`	`70`

E. The Lucky Sequence

Limits: 1 sec., 256 MiB

You have n strings $s_1, s_2, ..., s_n$, each of which consists of digits 4, 7, or question marks.

You want to pick a lucky string (that only consists of digits 4 and 7) and call it t. The following two conditions must be fulfilled:

- String t is non-decreasing, meaning that each next digit is not smaller than the previous one.
- There is a way to change at most k (in total) question marks in strings $s_1, s_2, ..., s_n$ to lucky digits in such a way that string t is a subsequence of each of the n strings.

Your task is to find the number of different strings t that you can choose.

Input

The first line contains two integers n and k. The next n lines contain strings s_1, s_2, ..., s_n, each of which consists of digits 4 or 7, or question marks.

Output

In the only line print a single integer – the answer to the problem.

Constraints

$1 \leq n \leq 8000$,
$0 \leq k \leq 10^9$,
The total length of all strings is up to 10^5.

Samples

Input (*stdin*)	Output (*stdout*)
3 2 4447 47???74 4?77?	5

F. The Subsets

Limits: 1 sec., 256 MiB

You are given n integers placed in a row. You have to choose a subset of the integers such that the following is fulfilled:

- Each chosen integer is between a та b, inclusive.
- For each integer value between a and b, inclusive, there should be at least one chosen number with that value.

Among all such subsets you want to choose one that minimizes the number of groups. A group is defined as a sequence of consecutive chosen numbers.

Find the minimum number of groups or print `-1` if there's none.

Input

The first line contains three integers n, a and b. The next line contains n space-separated values p_i.

Output

In the only line print the answer to the problem.

Constraints

$1 \le n \le 60$,
$1 \le a \le b \le 60$.

Samples

Input (*stdin*)	Output (*stdout*)
`7 2 4` `2 7 4 1 3 4 3`	`2`
`3 1 2` `4 1 7`	`-1`

G. The Tree Problem

Limits: 1 sec., 256 MiB

You are given a tree — a non-directed connected acyclic graph, containing n nodes and $n-1$ edges. We will consider the tree nodes numbered by integers from 1 to n.

You wonder, how to find the number of pairs of paths that don't have common nodes. More formally, you should find the number of groups of four integers a, b, c and d such that:

- $1 \leq a < b \leq n$;
- $1 \leq c < d \leq n$;
- there's no such node that lies on both the shortest path from node a to node b and from node c to node d.

The shortest path betweem two nodes is the path that is shortest in the number of edges.

Find the number of such pathes.

Input

The first line contains integer n — the number of tree nodes. Each of the following $n-1$ lines contains a pair of integers u_i and v_i — the i-th edge of the tree.

It is guaranteed that the given graph is a tree.

Output

In a single line print a single integer — the answer to the problem.

Constraints

$1 \leq n \leq 80000$,
$1 \leq u_i, v_i \leq n;\ u_i \neq v_i$.

Samples

Input (*stdin*)	Output (*stdout*)
4 1 2 2 3 3 4	2