Problem A. Fidonacci Numbers

Fidonacci numbers are defined by conditions $F_0 = 0$, $F_1 = F_2 = 1$ and $F_k = F_{k-1} + F_{k-3}$ for all $k \geq 3$. You are to find F_N for a given N .

Input

One integer number N , $0 \leq N \leq 1000$.

Output

Just output the N -th Fidonacci number.

Example

Example	Example
0	0
1	1
2	1

Problem B. Day of Week

We now use the Gregorian style of dating in Russia. The leap years are years with number divisible by 4 but not divisible by 100, or divisible by 400.

For example, years 2004, 2180 and 2400 are leap. Years 2001, 2181 and 2300 are not leap.

You task is to write a program which will compute the day of week corresponding to a given date in the nearest past or in the future using today's agreement about dating.

Input

The input file consists of one or more test cases. Each test case is located in a single line. This line contains the day number d, month name M and year number y ($1980 \le y \le 10^{300}$). The month name is the corresponding English name starting from the capital letter. Some extra spaces and/or line feeds may follow the last case.

Output

For each test case, output a single line with the English name of the day of week corresponding to the date, statring from the capital letter. All other letters must be in lower case.

Example

Example	Example
9 October 2001 14 October 2001	Tuesday Sunday

Problem C. Fibonacci Strings

A Fibonacci string is a string of `0`s and `1`s that does not contain consecutive `1`s.

Output a Fibonacci string by its position in the lexicographically ordered set of all Fibonacci strings of the same length.

Input

The input file contains two integers n and k; n is the length of the Fibonacci string ($1 \le n \le 44$), and k is the postion of the string to be displayed (valid $k \ge 1$).

Output

Output n-th Fibonacci string in the only line of output.

Example

Exampe	Example
3 3	010

Problem D. Generation of a Permutation

Generate a permutation of $1 \le N \le 100$ elements by its lexicographical number $1 \le K \le N!$.

Input

The only line of input contains N and K separated by an arbitrary number of whitespace characters.

Output

In the only line of output file print N different integers $x_1, \ldots, x_N$ ranging from one to N , separated by single spaces. No trailing spaces are allowed.

Example

Example	Example
3 2	1 3 2

Problem E. Reversive Inversions

Inversion table for a permutation P of numbers {1, 2, . . . , N } is the table $A = (A_i)_{1 \le i \le N}$ which maps each $i = P_j$ into the number of indices j^0 such that $j^0 \le j$ but $P_{j^0} > P_j = i$.
Given an inversion table for a permutation P , calculate the inversion table for the inverse permutation P^{-1}.

Input

File consists only of N integer numbers, delimited by spaces and newline characters, that form the inversion table of a permutation. You may assume that $1 \le N \le 5000$.

Output

Output N integer numbers separated by single spaces — inversion table for the inverse permutation. Leave no trailing spaces at the end of the single line of output.

If there are several possible answers, output any of them. If there are no answers, output the first N primes instead.

Example

Example	Example
5 0 1 3 2 1 0	1 5 1 3 2 0 0

Problem F. Joseph Problem

n boys are standing in circle. They start counting themselves clockwise, starting from 1. As soon as the count reaches p, the last boy counted leaves the circle, and they continue counting from the next boy, starting from 1 again.

Last remaining boy wins.

Can you calculate his number in clockwise order, if the boy from whom the counting originally started has number 1?

Input

Input file contains two integer numbers, n and p. ($1 \le n, p \le 1000000$).

Output

Output file should contain one number — the original number of the last boy.

Example

Example	Example
3 4	2

Problem G. Combinations-2

A combination of k elements out of n is an increasing sequence of k integer numbers in range from 1 to n.

Generate all combinations of k elements out of n in any order such that any two adjacent combinations have no more than one difference (that is, if S_1 and S_2 are two adjacent combinations, then $\#(S_1 - S_2) \le 1$).

Input

Input file contains two integer numbers n and k such that $1 \le k \le n \le 15$.

Output

Output C(n,k) lines – all combinations of k elements out of n in any order satisfying the conditions above.

Example

Example	Example
3 2	1 2 1 3 2 3

Problem H. Common Measure

The common measure of two segments is length of maximal segment such that any of the two segments can be obtained by repeating it several times on a straight line. E. g. the common measure of segments with lengths SQRT(50) and SQRT(8) is SQRT(2). / Here SQRT is square root of a number/

Of course, not all pairs of segments have common measure. For example, the side and the diagonal of a square are incommensurable.

You have to check whether two given segments have a common measure and to find it in the case of positive answer.

Input

Input file contains eight integers, all of them not exceeding 10^4 by an absolute value: $x_{(1,source)}$, $y_{(1,source)}$, $x_{(1,but)}$, $y_{(1,but)}$, $x_{(2,source)}$, $y_{(2,source)}$, $x_{(2,but)}$, $y_{(2,but)}$ — coordinates of the ends of the first and second segments respectively. The segments will not have zero length.

Output

The first line must contain either `YES` or `NO`. In the case of positive answer, output in the second line the common measure with the precision of six digits after decimal point.

Example

Example	Example
0 0 2 2 10 15 15 10	YES 1.414214
0 0 0 1 0 0 1 1	NO

Problem I. Least Common Multiple

Calculate the least common multiple of all integers between 1 and n.

Input

One integer $1 \leq n \leq 1000$.

Output

One integer.

Example

Example	Example
3	6

Problem J. Permutations

Generate all permutations of numbers 1, . . . , n in such an order that any two adjacent permutations differ only by the order of two adjacent elements (that is, 1, 2, 3, 4 can be followed by 1, 2, 4, 3, but not by 1, 4, 3, 2).

Input

Input file contains an integer number $1 \le n \le 8$.

Output

Output file should contain n! lines, n numbers each (separated by spaces).

Example

Example	Example
3	1 2 3 1 3 2 3 1 2 3 2 1 2 3 1 2 1 3

Problem K. String

Find the number of string S in the lexicographically ordered set of strings composed of the same set of letters.

Input

The only line contains the string S, composed of not more than 32 lowercase Italian characters.

Output

Output the number required.

Example

Example	Example
abba	3
baba	5

Problem L. Square Roots

Your task is to find the real roots of the equation $ax^2 + bx + c = 0$.

Input

Input file consists of three integers a, b and c. Their absolute values may not exceed 10^9.

Output

The first line of the output file represents the number of roots of the equation. The next k lines contain one real number each rounded up to six digits after decimal point — the root of this equation. The roots have to be displayed in ascending order. If there are infinitely many roots, output a single number −1 instead of the number of roots.

Example

Example	Example
1 -2 -3	2 -1.000000 3.000000

Problem M. Combinations

A combination of k elements out of n is an increasing sequence of k integer numbers in range from 1 to n.

Combinations can be sorted in lexicographical order. Your task will be to find a specified combination by its position in that order.

Input

Input file contains three integer numbers n, k, l ($1 \le n \le 100$, $1 \le k \le n$, $1 \le l \le C(n,k)$).

Output

Output file must contain k integer numbers, separated by spaces – l-th combination of k elements out of n in lexicographical order.

Example

Example	Example
3 3 1	1 2 3

Problem N. Prime Number

Output the k-th prime number.

Input

k ≤ 10000.

Output

The answer.

Example

Example	Example
3	5
7	17

Problem O. Simple Sorting

You are given an unsorted array of 32-bit integer numbers. Your task is to sort this array and kill possible duplicated elements occurring in it.

Input

The first line of the input file contains an integer number N representing the quantity of numbers in this array (1 ≤ N ≤ 65536). Next N lines contain N 32-bit integer numbers (one number per each line) of the original array.

Output

Output file should contain at most N numbers sorted in descending order if the value of N was even, otherwise the numbers are to be sorted in ascending order. Every number in the output file should occur only once.

Example

Example	Example
6 8 8 7 3 7 7	8 7 3