

Problem A. Andromedans

Input file: `andromedans.in`
Output file: `andromedans.out`
Time limit: `2 seconds`
Memory limit: `64 megabytes`

An energy being or astral being is a name given to a group of fictional or alleged life forms sharing some aspects of their appearance or abilities attributed to the idea that they are composed of pure energy and not made of matter. They appear in myths/legends, paranormal/UFO accounts, and in various works of speculative fiction.

The Andromedans (who were backtracked to a galaxy visible in the Andromeda constellation from Earth) were first contacted in the Alpha Octant in Y166, and in the Omega Octant in Y167; though they had already made their presence felt in the Lesser Magellanic Cloud. In Y188, they launched an all out attack on the Milky Way. They utilise technology unlike any used by known Galactic or Magellanic races, such as Power Absorbers instead of shields, which allow them to use incoming attacks to help power their ships, as well as the devastating Tractor-Repulsor Beam, which can rip enemy vessels apart.

According to the one legend, the andromedans have they own “andromedans” numbers, looks like human numbers, but derived from the next formula :

$$a = 11^s \cdot 13^t \cdot 17^r, \text{ where } s, t, r \in [0, +\infty).$$

It's so necessary to derive the M -th number in ascending order in this sequence.

Input

Input file contains single integer number M ($1 \leq M \leq 853$).

Output

Please, write to output file one number, the answer to the problem.

Examples

<code>andromedans.in</code>	<code>andromedans.out</code>
2	11
3	13

Problem B. Ball and box

Input file: ballandbox.in
Output file: ballandbox.out
Time limit: 2 seconds
Memory limit: 64 megabytes

There is a ball in a box. It equiprobably can be one of N different colors, including white. Another white ball was put into the box. Then a random ball was removed and it was white. Calculate the probability of the case, when the ball which left in the box is also white.

Input

Input file contains only one integer N ($1 \leq N \leq 2^{31} - 1$).

Output

Output the probability as an irreducible natural fraction.

Examples

ballandbox.in	ballandbox.out
2	2 / 3

Problem C. Bernoulli

Input file: `bernoulli.in`
Output file: `bernoulli.out`
Time limit: 2 seconds
Memory limit: 64 megabytes

Given a number n . Find $1^5 + 2^5 + 3^5 + \dots + n^5$.

Input

The only line of the input file contains an integer no more than 10^9 .

Output

Output only one number — the answer modulo $10^9 + 7$.

Examples

<code>bernoulli.in</code>	<code>bernoulli.out</code>
2	33

<code>bernoulli.in</code>	<code>bernoulli.out</code>
3	276

Problem D. Binomial Coefficient

Input file: `binom.in`
Output file: `binom.out`
Time limit: `2 seconds`
Memory limit: `64 megabytes`

Binomial coefficient $\binom{n}{k}$ arises from its combinatorial interpretation. It enumerates the number of possible choices for k objects from n distinct elements. Its formula is given by

$$\binom{n}{k} = \frac{n(n-1)\dots(n-k+1)}{k!},$$

where $k! = 1 \cdot 2 \dots k$.

Your task is to compute binomial coefficient.

Input

One line of the input file contains two integer numbers n and k ($1 \leq |n| \leq 10$, $1 \leq k \leq 10$).

Output

Output only one number — the value of binomial coefficient.

Examples

<code>binom.in</code>	<code>binom.out</code>
5 2	10

Problem E. Boards

Input file: boards.in
Output file: boards.out
Time limit: 2 seconds
Memory limit: 64 megabytes

Player A and player B play the following game.

There is one line with the M square boards. Each board painted white on one side and black on other side. At the beginning, all boards are white side up. In one move, player can flip the board which is the white side up, if and only if the neighbor boards are not black side up. Player who cannot make a turn loses. Two players are playing optimally. Player A start the game.

Input

Input file contains single integer number M ($1 \leq M \leq 100$).

Output

Please, write to output file "Possible", if the player B can win the game, and otherwise "Impossible".

Examples

boards.in	boards.out
2	Impossible
4	Possible

Problem F. Brainfuck

Input file: **brainfuck.in**
Output file: **brainfuck.out**
Time limit: **2 seconds**
Memory limit: **64 megabytes**

The brainfuck programming language is an esoteric programming language noted for its extreme minimalism.

The language consists of eight commands, listed below. A brainfuck program is a sequence of these commands, possibly interspersed with other characters (which are ignored). The commands are executed sequentially, except as noted below; an instruction pointer begins at the first command, and each command it points to is executed, after which it normally moves forward to the next command. The program terminates when the instruction pointer moves past the last command.

The brainfuck language uses a simple machine model consisting of the program and instruction pointer, as well as an array of at least 30000 byte cells initialized to zero; a movable data pointer (initialized to point to the leftmost byte of the array); and two streams of bytes for input and output (most often connected to a keyboard and a monitor respectively, and using the ASCII character encoding).

The eight language commands, each consisting of a single character :

- > - increment the data pointer (to point to the next cell to the right).
- < - decrement the data pointer (to point to the next cell to the left).
- + - increment (increase by one) the byte at the data pointer.
- - - decrement (decrease by one) the byte at the data pointer.
- . - output a character, the ASCII value of which being the byte at the data pointer.
- , - accept one byte of input, storing its value in the byte at the data pointer (this command must not be used in your solution).
- [- if the byte at the data pointer is zero, then instead of moving the instruction pointer forward to the next command, jump it forward to the command after the matching] command*.
-] - if the byte at the data pointer is nonzero, then instead of moving the instruction pointer forward to the next command, jump it back to the command after the matching [command*.

Your task is to output a correct program on brainfuck, that prints given string.

Input

Input file contains a single line consisting of English letters, digits, spaces and punctuation. The length of the line will not exceed 100 symbols.

Output

Output file must contain a single line program on brainfuck, that prints given string when executed. There should be no spaces. Size of your output must not exceed 10000 bytes. Your brainfuck should complete no more than in 100000 operations.

Examples

brainfuck.in	brainfuck.out
Hello World!	+++++++>[>+++++++>+++++++>++++>+<<<<<-]>++.>+.+++++. .+++.>+.<<++++>+++++++>+.+++>----->++++>+.

Note

Sample output is splitted to fit the page. Your should not split your output.

Problem G. Commas

Input file: `commas.in`
Output file: `commas.out`
Time limit: 2 seconds
Memory limit: 64 megabytes

A sequence of digits is written on a sheet of paper. Your task is to add commas between some of them, so that, if nonseparated digits are joined to form a number, the result is an increasing sequence.

From all such sequences you should find the one where largest number is minimal possible. If there are several such sequences, find one with maximal first number. If there are still several such sequences, find the one with maximal second number and so on.

Leading zeroes in numbers are allowed.

Input

Input file contains a sequence of no more than 1000 digits.

Output

Output the sequence with commas in needed places.

Example

<code>commas.in</code>	<code>commas.out</code>
3456	3,4,5,6
3546	35,46
3526	3,5,26
100000101	100,000101

Problem H. La france

Input file: `french.in`
Output file: `french.out`
Time limit: `2 seconds`
Memory limit: `64 megabytes`

On vous donne un nombre entier n . Calculer le nombre de bits qui sont égaux à une dans la représentation binaire de n .

Input

Fichier d'entrée ne contiennent qu'un seul nombre entier n ($0 \leq n \leq 10^9$).

Output

Sortie un seul numéro — la réponse.

Examples

<code>french.in</code>	<code>french.out</code>
5	2
100	3

Problem I. Glass Wares

Input file: `glasswares.in`
Output file: `glasswares.out`
Time limit: `2 seconds`
Memory limit: `64 megabytes`

Chemical laboratory of KBTU has N glass wares with capacity a_1, a_2, \dots, a_N respectively. Each glass ware filled with DANGEROUS acid. Assistant Baha instructed to release all of these glass wares and pour the liquid to another glass wares and also he want that all additional glass wares should be full filled after pouring. Additionally Baha has M glass wares with capacity b_1, b_2, \dots, b_M respectively. For safety Baha do not want share acid from one glass ware in to the several glass wares. Help to Baha determine whether can he release all glass wares using additional glass wares.

Input

First line contains two integer numbers N ($1 \leq N \leq 10$) and M ($1 \leq M \leq 10$). Second line contains N integer numbers : a_1, a_2, \dots, a_N ($1 \leq a_i \leq 10^9$). Third line contains M integer numbers : b_1, b_2, \dots, b_M . ($1 \leq b_i \leq 10^9$).

Output

Print “YES” if Baha can release all glass wares, and “NO” otherwise.

Example

<code>glasswares.in</code>	<code>glasswares.out</code>
5 2 1 1 1 1 2 3	YES
3 2 3 3 3 2 7	NO

Problem J. Minesweeper

Input file: `minesweeper.in`
Output file: `minesweeper.out`
Time limit: 2 seconds
Memory limit: 64 megabytes

You are playing in modified minesweeper game. The field consists of 2 rows with N cells in each. Top row cells can contain mines, bottom row cells are always empty. For each cell of bottom row you know, how many mines are near it. Your task is to find which cells of top row definitely contain mines and which definitely don't. If there is no mines combination that will satisfy input data, output the string "Fool's Day is over!"

Input

First line contains one integer number N — number of cells in each row ($1 \leq N \leq 20$). Next line contains N space-separated integers 0, 1, 2 or 3 — i -th number is the number of mines from top row adjacent to i -th cell of the bottom row.

Output

If input data are not consistent, output "Fool's Day is over!". In other case output N space-separated integers, one for each cell of the top row. i -th number must be 0 if the cell definitely doesn't contain a mine, 1 if the cell definitely contains a mine and 2 otherwise.

Examples

<code>minesweeper.in</code>	<code>minesweeper.out</code>
4 1 1 1 1	1 0 0 1
5 1 1 1 1 1	2 2 0 2 2

Problem K. Popular attraction

Input file: popular.in
Output file: popular.out
Time limit: 2 seconds
Memory limit: 64 megabytes

The new attraction is built over Vesnovka river. There is a horizontal bridge with N ropes attached to it. A crazy man tied with all these ropes jumps from the bridge. Where will he finish his falling? Let assume that X-axis is going along the bridge and ropes attached to the bridge in points x_1, x_2, \dots, x_N . Corresponding ropes lengths are l_1, l_2, \dots, l_N

Input

First line contains an integer N ($1 \leq N \leq 5000$) — number of ropes. Next N lines contain ropes description. Each line contains two real numbers x_i, l_i ($0 \leq x_i, l_i \leq 10^5$).

Output

Output two real numbers X_r, Y_r — target point coordinates. At least 4 digits after the decimal point must be correct. If input data are inconsistent (the man cannot jump), output $-1 -1$.

Example

popular.in	popular.out
3 7 5.65685 0 5 4 10	3.0000 -4.0000

Problem L. Sets

Input file: `sets.in`
Output file: `sets.out`
Time limit: 2 seconds
Memory limit: 64 megabytes

You are given a set $S \subset \mathcal{N}$. Let's define P as the power set of S and T as following :

$$T = \{p : p \in P \wedge \max(k : a \equiv 0 \pmod k) \forall a \in p) = 1\}$$

Your task is to calculate the cardinality of the set T .

Input

First line contains one integer number N — the number of elements in S ($1 \leq N \leq 63$). Next line contains N positive integers, each not larger than 82, separated with spaces.

Output

Output only one number — the answer.

Examples

<code>sets.in</code>	<code>sets.out</code>
1 1	1
1 2	0

Problem M. Square

Input file: `square.in`
Output file: `square.out`
Time limit: 2 seconds
Memory limit: 64 megabytes

There is a square on a plane with sides parallel to axes and vertices in integer points. Calculate the sum of areas of all possible convex polygons that can be inscribed into this square. In this task we assume that 'inscribed' means that every edge of the square contains at least one vertex of the polygon. Note, all polygons must be strictly convex (the angle between each two consecutive edges is less than 180 degrees and greater than 0 degrees).

Since the answer can be quite big, output it modulo P .

Input

You are given two integer number N and P — the size of square and the module ($1 \leq N \leq 40, 2 \leq P \leq 2 \cdot 10^9, P$ is prime).

Output

Output only one number — the answer.

Examples

<code>square.in</code>	<code>square.out</code>
1 103	3
2 103	77

Problem N. Triples

Input file: triples.in
Output file: triples.out
Time limit: 2 seconds
Memory limit: 64 megabytes

You are given prime number p and a sequence of n nonnegative integers : a_1, a_2, \dots, a_n .

Find the number of triples $\langle i, j, k \rangle$, such that $i \neq j$, $i \neq k$, $j \neq k$ and

$$a_i^{a_j} = a_k \pmod{p}.$$

Assume, that $0^0 = 1$.

Input

First line contains n and p ($3 \leq n \leq 100\,000$, $p \leq 1500$). Next line contains n nonnegative integers a_1, a_2, \dots, a_n ($0 \leq a_i \leq 10^9$).

Output

Output the number of triples.

Example

triples.in	triples.out
3 2 1 2 3	2

Problem O. War

Input file: `war.in`
Output file: `war.out`
Time limit: `2 seconds`
Memory limit: `64 megabytes`

In a certain state Kazbrit, competing companies, “Androido” and “yaMobilo”. In order to hurt the economy of “yaMobilo”, “Androido” once a year, sets fire to the harvest of a competitor. Fire spreads until it reaches the fence. ‘yaMobilo” to reduce damage puts the fence. Since 2011, the company “Androido” appeared spy which reports “yaMobilo” exact coordinates of where it will be carried out arson. Your task is to help the company “yaMobilo”, determine what portion of the crop is burned up, if not urgently take safety measures.

Input

You are given N and M , then array $M \times N$, where “0” - is crop, and “1” - is fence ($1 \leq N, M \leq 1000$) Then, X and Y are given, the coordinates reported by a spy.

Output

You should output array $M \times N$, by replacing the value of crop to “1” if it had been burned.

Examples

<code>war.in</code>	<code>war.out</code>
7 5 0000000 0011100 0100010 0011100 0000000 3 3	0000000 0011100 0111110 0011100 0000000

Problem P. KISS

Input file: kiss.in
Output file: kiss.out
Time limit: 2 seconds
Memory limit: 64 megabytes

You are given a string. Determine whether it binary or not.

Input

Only one string, consisting of English letters and digits.

Output

Output "Yakshi!" if the string is binary and "Yok :(" otherwise.

Examples

kiss.in	kiss.out
00011100	Yakshi!
0001112	Yok :(