A. Quadratic equation

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

You are given a quadratic equation with integer coefficients $A * X^2 + B * X + C = 0$. It is guaranteed that $A \neq 0$ and that the equation has at least one real root. Output the roots of the equation.

Input

The only line of input contains integers A, B and C ($-1000 \leq A, B, C \leq 1000$, $A \neq 0$), separated by spaces.

Output

Output the roots of the equation in increasing order. If the equation has a single root of multiplicity 2, output it once. The root is considered to be correct if its absolute or relative error does not exceed 10^{-4}.

Sample test(s)

input

```
1 -2 1
```

output

```
1
```

input

```
1 0 -1
```

output

```
-1 1
```

input

```
2 -3 1
```

output

```
0.5 1
```

B. String inside out

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

You are given a string S of even length $s_1..s_{2n}$. Perform the following manipulations:

- divide it into two halves $s_1..s_n$ and $s_{n+1}..s_{2n}$
- reverse each of them $s_n..s_1$ and $s_{2n}..s_{n+1}$
- concatenate the resulting strings into $s_n..s_1s_{2n}..s_{n+1}$

Output the result of these manipulations.

Input

The only line of the input contains a string of lowercase Latin letters. The length of the string is between 2 and 20, inclusive, and it is even.

Output

Output the string which is the result of the described manipulations.

Sample test(s)

input

```
codeforces
```

output

```
fedocsecro
```

input

```
qwertyasdfgh
```

output

```
ytrewqhgfdsa
```

C. Diophantine equation

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

You are given an equation $A * X + B * Y = C$, A, B, C are positive integer coefficients, X and Y are variables which can have positive integer values only. Output the number of solutions of this equation and the solutions themselves.

Input

The only line of input contains integers A, B and C ($1 \leq A, B, C \leq 1000$), separated with spaces.

Output

In the first line of the output print the number of the solutions N. In the next N lines print the solutions, formatted as "XY", sorted in ascending order of X, one solution per line.

Sample test(s)

input

```
3 5 35
```

output

```
2
5 4
10 1
```

input

```
3 35 5
```

output

```
0
```

D. Set subtraction

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

You are given a starting set consisting of all integers from 1 to 1000, inclusive. You are also given several sets which need to be subtracted from the starting set (i.e., each number which is in at least one of these sets needs to be removed from the starting set). Each subtracted set is represented as an interval of integers from A to B, inclusive. Output the result after all subtractions.

Input

The first line of input contains an integer N $(0 \le N \le 100)$ — the number of intervals to be subtracted. The following N lines contain pairs of integers A and B $(1 \le A \le B \le 1000)$ — lower and upper bounds of the intervals. Intervals can intersect. An interval can consist of a single number.

Output

Output the result of subtractions in the following format: in one line output first the number of integers in the resulting set and then the integers of the set, sorted in increasing order, separated by single space.

Sample test(s)

input

```
2
1 900
902 999
```

output

```
2 901 1000
```

input

```
3
1 500
200 746
150 1000
```

output

```
0
```

E. Sum and product

time limit per test: 2 seconds

memory limit per test: 256 megabytes

input: standard input

output: standard output

You are given integers N and D. Find N positive integers $x_1 \dots x_N$ such that the difference of their product and their sum equals D.

Input

The only line of input contains integers N $(2 \le N \le 1000)$ and D $(0 \le D \le 1000)$.

Output

Output N integers that satisfy the given condition in non-decreasing order (in a single line, separated with spaces). Note that some numbers can be equal. Numbers printed by you must not exceed 10^6.

Sample test(s)

input

```
2 1
```

output

```
2 3
```

input

```
3 5
```

output

```
1 2 8
```

F. Jumping frogs

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

A rectangular swamp is inhabited by 10 species of frogs. Frogs of species i can jump from hillocks to hillock exactly i units along X-axis or Y-axis. Initially frogs of all types sit at the hillock at coordinates (0, 0). You are given coordinates of all other hillocks in the swamp. Find the largest Manhattan distance from (0, 0) to any hillock to which one of the frogs can travel by jumping between hillocks.

Manhattan distance between (x_1, y_1) and (x_2, y_2) is $|x_1 - x_2| + |y_1 - y_2|$.

Input

The first line of the input contains an integer N ($1 \le N \le 100$) - the number of hillocks. The following N lines contain the coordinates of the hillocks, formatted as "X Y" ($-20 \le X, Y \le 20$). All hillocks are distinct, and none of them is located at (0, 0).

Output

Output a single integer — the largest Manhattan distance to any hillock reachable by one of the frogs by jumping between hillocks.

Sample test(s)

input

```
3
0 1
0 -2
0 3
```

output

```
3
```

input

```
5
0 1
0 2
0 3
2 2
2 4
```

output

```
6
```

input

```
1
18 0
```

output

```
0
```

Note

In the first example frogs of species 1, 2 and 3 can jump as far as the first, the second and the third hillocks, respectively.

In the second example frog of species 2 can jump to the second hillock, then to the fourth and finally to the fifth.

In the third example no frog can reach the hillock.

G. Levenshtein distance

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

Levenshtein distance between two strings of letters is calculated as the minimal total cost of a sequence of edit actions that converts one of the strings into the other one. The allowed edit actions are:

- substitution: the cost of substituting one letter with another is equal to the difference of index numbers of these letters in English alphabet.
- insertion/deletion: the cost of inserting a letter into a string or deleting a letter from a string is equal to the index number of this letter in English alphabet (see examples).

You are given two strings. Find the Levenshtein distance between them.

Input

The input data consists of two lines, each line contains a string of lowercase Latin letters. Each string is between 1 and 100 letters long, inclusive.

Output

Output a single integer — the Levenshtein distance between the strings.

Sample test(s)

input

```
arc
bug
```

output

```
8
```

input

```
dome
drone
```

output

```
19
```

Note

In the first example you should replace a with b (cost 1), r with u (cost 3) and c with g (cost 4).

In the second example you should insert r (cost 18) are replace m with n (cost 1).

H. Points in triangle

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

You are given a set of points on a plane with positive integer coordinates. Find a triangle of minimum area with vertices in points $(0, 0)$, $(A, 0)$ and $(0, B)$ (A and B are unknown positive integers) that contains all the given points inside it (points on the edges count towards being inside).

Input

The first line of the input contains an integer N $(1 \leq N \leq 100)$ — the number of points. The following N lines contain pairs of numbers X and Y $(1 \leq X, Y \leq 100)$ - the coordinates of the points. All points are distinct.

Output

Output one floating-point number — the minimal area of the triangle. The answer is considered to be correct if its absolute or relative error does not exceed 10^{-4}.

Sample test(s)

input

```
2
1 1
1 3
```

output

```
6.0
```

input

```
2
2 1
1 2
```

output

```
4.5
```

I. Different variables

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

N variables $X_1, ..., X_N$ can have positive integer values. You are given K constraints for these value that look like "the values of variables $X_{i_1}, X_{i_2}, ..., X_{i_M}$ are different". Among all possible lists of values of these variables that satisfy these constraints select the ones which have minimum possible $max(X_i)$. Output lexicographically least of these lists.

Input

The first line of input contains two integers n and k $(2 \le N \le 10,\ 1 \le K \le 100)$ — the number of variables and the number of constraints.

The following K lines contain the constraints, formatted as follows: the first number in the line M $(2 \le M \le N)$ gives the number of variables in the constraint. After it follow M space-separated integers $i_1, ..., i_M$ — the indices of the variables used in the constraint ($1 \le i_j \le N$). All i_j in one constraint are different.

Output

Output the values of $X_1, X_2, ..., X_N$ in a single line, separated with single spaces.

Sample test(s)

input

```
2 1
2 1 2
```

output

```
1 2
```

input

```
3 2
2 1 2
2 2 3
```

output

```
1 2 1
```