Enumeration

Task ID: enum	Time Limit: 1 second

Problem

Write a program to read an integer N and output $\frac{N\times(N+1)}{2}$ integers in the format specified below.

Input

The input contains an integer N ($1 \le N \le 10$).

Output

The output consists of N lines, the i-th line contains $N - i + 1$ integers, separated by a single space. The first integer of each line is N. Other integers are less than the integer on its left by 1.

Sample tests

Input	Output
4	4 3 2 1 4 3 2 4 3 4

Outstanding Integer

Task ID: oint	Time Limit: 1 second

Problem

Some integers are better than the others. We refer those integers as *Outstanding Integers* (OI).

To be an Outstanding Integer, the integer has a special property. For every digit, it is actually the unit digit of the product of the two preceding digits, except the first two digits. This means for every integer which has fewer than 3 digits, it is always an Outstanding Integer. Your task is to find the total number of Outstanding Integer from a to b (inclusive).

Of course, in case you don't understand, here are some examples.
2982 is an Outstanding Integer, because $2 \times 9 = 18$, the unit digit is 8, and $9 \times 8 = 72$, the unit digit is 2. Similarly, 6, 87, 575 and 4144 are Outstanding Integers. However, 301 and 4145 are not.

Input

Two lines, the first line is a and the second line is b. There is no trailing zeroes.

Output

A single integer representing the number of Outstanding Integers between a and b (include a and b).

Sample test

Input	Output
3 11	9

Input	Output
2981 2983	1

Constraints

In test cases worth 30% of the total points, $1 \leq a \leq b \leq 10,000$.
In test cases worth 60% of the total points, $1 \leq a \leq b \leq 100,000,000$.
In all test cases, $1 \leq a \leq b \leq 10^{100}$.

Hints

You may want to use 64-bit integer to store the answer.

Hotel

Task ID: hotel	Time Limit: 1 second

Problem

Congratulations! You did quite well in the Team Formation Test and have been selected to represent Hong Kong in IOI2012.

Upon arrival in Milan, your team realized that there was a serious problem – the organiser forgot to book the hotel for your team, and the hotel was already full and did not have any room for you team.

Luckily, your smart brain came up with an affordable solution. Your team rented a large rectangle hall of $R \times C$ unit squares. The hall is supported by a single pillar of 1×1 unit square. To have a good sleeping quality for the competition, each student needs a rectangular sleeping area of 1×2 unit squares. Due to economic reason, you do not want to waste any area(i.e. each unit square must be occupied by either the pillar or a student)

Given the size of the hall and the position of the pillar, find a possible method to fill in all students.
You may assume there is always enough students to fill in the hall.

Input

The first line contains two integers R, C, the size of the hall.
The second line contains two integers r, c, the position of the pillar. Row numbers go from top to bottom and column numbers go from left to right.

Output

Output $R \times C$ characters. Each student must be described by a lowercase letter. If two students share an edge, they must be described by different letters.
Use the character '*' to represent the pillar.

If there are more than one solution, output any of them.
If there is no valid solution, output a single line contain the string 'Impossible'(without quotes).

Sample tests

Input	Output
4 4 1 3	Impossible

Input	Output
3 5 2 2	aabbc d*eec dffaa

Constraints

In 50% test cases, $R, C \leq 10$.
In all test cases, $1 \leq R, C \leq 100$, $1 \leq r \leq R$, $1 \leq c \leq C$.

Cheating Dice

Task ID: dice	Time Limit: 1 second

Problem

The game of 'Cheating Dice' is a multiplayer game. First, each player will roll 5 dice, and take turns to make guesses. A guess (c, v) comprises of two numbers – c meaning the count, and v meaning the value. A guess is worth $6c + v$ points. Also, guesses are subject to the following rules:

Rule 1: Players may only make guesses which worth more points than the last players'
Rule 2: The total number of dice rolled 1 or v must be at least c. (If v=1, count only the dice rolled 1)

For example, in a two player game where the dice rolled are: 1 2 4 5 5 and 1 4 5 5 6, guesses (2,1), (4,4) and (6,5) are examples which meet Rule 2. In the contrary, guesses (4,2), (3,3) and (4,6) violate Rule 2.

If a judge determines that the player is impossible to make valid guesses, he/she is deemed lost, and the game ends.

After understanding the rules, Dr. Jones invented a cheating machine which allows him to peek at the all dice rolled, so that he can make the right guesses all the time. At the same time, to prevent causing suspicion, he tries to play conservatively by selecting the guess which worth the least points out of all valid guesses.

Given all the values of the dice rolled and the last guess, determine Dr. Jone's guess. It is guaranteed that there are at least one valid guess.

Input

The first line consists of three integers N, C, V, representing the number of players, last guess's count and last guess's value respectively.
The next line consists of $5N$ integers from 1-6, the values of the dice rolled.

Output

You should output two integers, count and value of Dr. Jones' guess. They should be in one line separated by a space.

Sample tests

Input	Output
2 3 5 1 2 4 5 5 1 4 5 5 6	3 6

Input	Output
2 3 6 1 2 4 5 5 1 4 5 5 6	4 4

Constraints

In test cases worth 30%, $N = 2$
In test cases worth 50%, dice values are from 2 to 6 inclusive.
In all test cases, $2 \leq N \leq 10000$, $2 \leq V \leq 6$

Penicillin

Task ID: peni	Time Limit: 1 second

Problem

You may know that penicillin is a kind of antibiotics used for treating bacterial infections in the past. However, do you know how penicillin was discovered?

The suggestion of using penicillin as a drug was first raised by a Scottish biologist called Alexander Fleming. Originally, he wanted to investigate a type of bacteria called staphylococcus. He stored the agar plates (i.e. bacterial growth medium) containing stahylococci inside the laboratory. But later, he found that one plate was contaminated by fungi and the staphylococci around the fungi were all killed. He discovered that they were killed by a substance released by a fungus belonging to Penicillium genus, so he named this substance 'penicillin'.

Dr. Jones was very surprised about Fleming's discovery. Therefore he would like to conduct an experiment similar to this story.

He adds staphylococci onto N points inside a rectangular agar plate of size $P \times Q$, with the upper-left corner as (0, 0). For simplicity, assume that the colonies[1] of staphylococci grow as a square, i.e. if Dr. Jones adds the bacteria at the point (x, y), after t hours, the colony will grow as a square with vertices $(x - t, y - t)$, $(x - t, y + t)$, $(x + t, y + t)$ and $(x + t, y - t)$. For example, if he adds onto (2, 1) inside a plate of 9×10, after 1 hour, the colony will be a square with vertices (1, 0), (1, 2), (3, 2) and (3, 0). (See figure 1)

Instead of adding Penicillum, Dr. Jones directly added a drop of very concentrated penicillin onto the point (h, k). Again, for simplicity, assume that after t hours, penicillin diffuses as a square with vertices $(h - s \times t, k - s \times t)$, $(h - s \times t, k + s \times t)$, $(h + s \times t, k + s \times t)$ and $(h + s \times t, k - s \times t)$, where t is a positive integer. For example, if $s = 2$ and the penicillin is added at (4, 3), after 1 hour, it will grow to form a square with vertices (2, 1), (2, 5), (6, 5) and (6, 1). (See Figure 1)

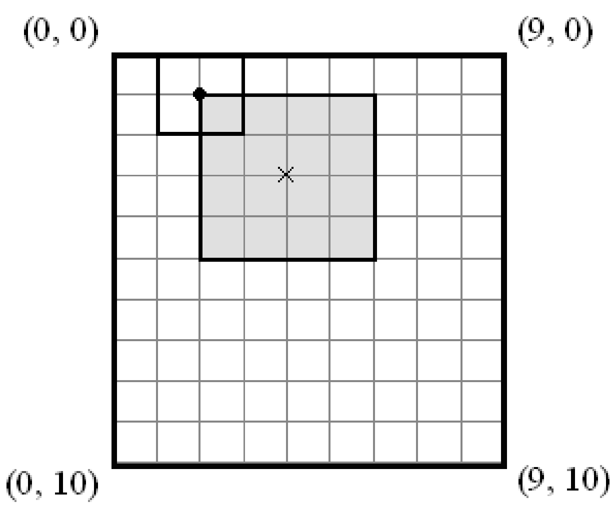

Figure 1

Note that both the growth of staphyococci and diffusion of penicillin are limited by the boundaries of the agar plate.

[1] It means 'area controlled by the staphyloccci'

As you can see, certain region of staphylococci is covered by penicillin. Obviously, they will be killed, while others will still be alive. No staphylococci can be grown again on the area covered by penicillin. The aim of Dr. Jones' experiment is to find out the area of staphylococci not killed by penicillin after t hours. Now, given the N points that he added the staphylococci and the point he added penicillin, calculate the required area. Overlapped areas of staphylococci are counted repeatdly.

Input

The first line has four integers: N, P, Q and s.
Each of the next N lines contains a pair of integers, x_i and y_i, representing the points where the staphylococci were added. You may assume that the N points must be distinct.
The $(N+2)$-th line is a pair of integers, h and k.
The last line is an integer t.

Output

The output has 1 number, the area of staphylococci **not** killed by penicillin after t hours.
Hints: The answer may exceed 32-bit integer.

Sample tests

Input	Output
1 9 10 2 2 1 4 3 1	3

Input	Output
1 9 10 1 2 2 4 4 3	9

Input	Output
2 9 10 2 2 1 1 2 4 3 1	6

Constraints

In test cases worth 50%,
$N \leq 50$
$P, Q, s, t \leq 100$

In all test cases,
$1 \leq N \leq 10,000$
$1 \leq P, Q, s, t \leq 100,000$
$0 \leq x_i, h \leq P$
$0 \leq y_i, k \leq Q$

Explanation

Explanation for Sample I/O 2: Since the growth of staphylococci is limited by the boundaries of the agar plate, the area found is less than that the bacteria can grow (Figure 2).
Explanation for Sample I/O 3: After 1 second, two sources of staphylococci overlapped, but the area is counted twice.

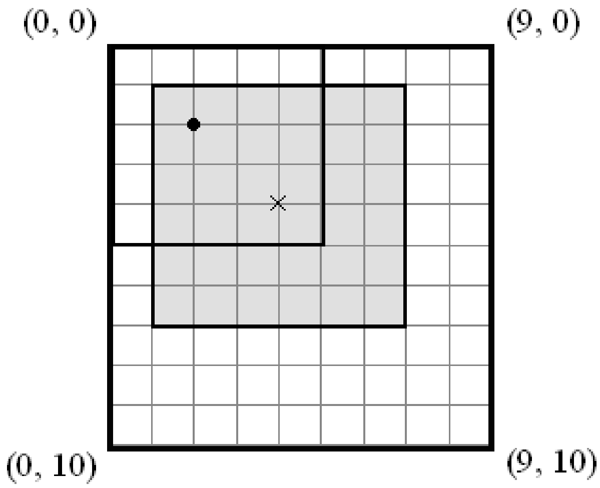

Figure 2