2. ABC

You will be given three integers A, B and C. The numbers will not be given in that exact order, but we do know that A is less than B and B less than C.

In order to make for a more pleasant viewing, we want to rearrange them in the given order.

Input

The first line contains three positive integers A, B and C, not necessarily in that order. All three numbers will be less than or equal to 100.

The second line contains three uppercase letters 'A', 'B' and 'C' (with no spaces between them) representing the desired order.

Output

Output the A, B and C in the desired order on a single line, separated by single spaces.

Sample test data

input

```
1 5 3
ABC
```

output

```
1 3 5
```

input

```
6 4 2
CAB
```

output

```
6 2 4
```

1. BIJELE

Mirko has found an old chessboard and a set of pieces in his attic. Unfortunately, the set contains only white pieces, and apparently an incorrect number of them. A set of pieces **should** contain:

- One king
- One queen
- Two rooks
- Two bishops
- Two knights
- Eight pawns

Mirko would like to know how many pieces of each type he should **add or remove** to make a valid set.

Input

The input consists of 6 integers on a single line, each between 0 and 10 (inclusive). The numbers are, in order, the numbers of kings, queens, rooks, bishops, knights and pawns in the set Mirko found.

Output

Output should consist of 6 integers on a single line; the number of pieces of each type Mirko should add or remove. If a number is positive, Mirko needs to add that many pieces. If a number is negative, Mirko needs to remove pieces.

Sample test data

input	**input**
`0 1 2 2 2 7`	`2 1 2 1 2 1`
output	**output**
`1 0 0 0 0 1`	`-1 0 0 1 0 7`

Thrilled about his new valid set of pieces, Mirko rushed over to Slavko's, to find that Slavko too found a set of chess pieces in his attic. Slavko's set, miraculously, contains only black pieces. But since neither of them can play chess, they settled on smashing one another senseless with their chessboards.

While Slavko is warming up with a series of stretches, Mirko decided to sabotage Slavko's chessboard. An expert in carving wood, he decided to cut Slavko's chessboard so that it shatters into **as many pieces as possible** when Slavko attempts to hit Mirko.

Mirko can only make **horizontal and vertical cuts** (parallel to the sides to the board), edge to edge, and has time to make **at most N cuts**.

Input

The first line of input contains an integer N ($1 \leq N \leq 100$), the number of cuts Mirko can make.

Output

Output the largest number of pieces Slavko's chessboard can crash into.

Sample test data

input	input
1	3
output	output
2	6

When moving, ants form rows so that each ant except the first is behind another ant. It is not widely known what happens when two rows of ants moving in opposite directions run into each other in a passage too narrow for both rows to pass through. One theory says that, in that situation, ants will jump over each other.

From the moment the rows meet, each second every ant jumps over (or gets jumped over, as they agree upon) the ant in front of himself so that the two ants swap places, but only if the other ant is moving in the opposite direction. Find the order of the ants after T seconds.

Input

The first line contains two integers N1 and N2, the numbers of ants in the first and second rows, respectively.

The next two rows contain the orders of ants in the first and second row (first to last). Each ant is uniquely determined by an uppercase letter of the English alphabet (this letter is unique between both rows).

The last line of input contains the integer T ($0 \leq T \leq 50$).

Output

Output the order of the ants after T seconds on a single line. Our viewpoint is such that the first row of ants comes from our left side and the other one from our right side.

Sample test data

input	**input**	**input**
3 3 ABC DEF 0	3 3 ABC DEF 2	3 4 JLA CRUO 3
output	**output**	**output**
CBADEF	CDBEAF	CARLUJO

N points are placed in the coordinate plane.

Write a program which calculates in how many ways a **right triangle** can be formed by three of the given points. A right triangle is one in which one of the angles is 90 degrees.

Input

The first line of input contains an integer N ($3 \leq N \leq 1500$), the number of points.

Each of the following N lines contains the coordinates of one point, two integers separated by a space. The coordinates will be between -10^9 and 10^9.

No two points will be located at the same coordinates.

Output

Output the number of right triangles.

Sample test data

input

```
3
4 2
2 1
1 3
```

output

```
1
```

input

```
4
5 0
2 6
8 6
5 7
```

output

```
0
```

input

```
5
-1 1
-1 0
0 0
1 0
1 1
```

output

```
7
```

Little Ivica solves crossword puzzles every day. In case you haven't seen one, a crossword puzzle starts on a grid of R×C squares, each of which is either empty or blocked. The player's task is to write words in consecutive empty squares vertically (top down) or horizontally (left to right).

Ivica's sister has a strange habit of looking at crosswords Ivica has finished solving, and finding the **lexicographically smallest word** in it. She only considers words at least 2 characters long.

Write a program that, given a crossword puzzle, finds that word.

Input

The first line contains two integers R and C ($2 \leq R, C \leq 20$), the number of rows and columns in the crossword.

Each of the following R lines contains a string of C characters. Each of those characters is either a lowercase letter of the English alphabet, or the character '#' representing a blocked square.

The input will be such that a solution will always exist.

Output

Output the lexicographically smallest word in the crossword.

Sample test data

input

```
4 4
luka
o#a#
kula
i#a#
```

output

```
kala
```

input

```
4 4
luka
o#a#
kula
i#as
```

output

```
as
```

input

```
4 5
adaca
da##b
abb#b
abbac
```

output

```
abb
```

1. R2

The number S is called the **mean** of two numbers R1 and R2 if S is equal to (R1+R2)/2. Mirko's birthday present for Slavko was two integers R1 and R2. Slavko promptly calculated their mean which also happened to be an integer but then lost R2! Help Slavko restore R2.

Input

The first and only line of input contains two integers R1 and S, both between -1000 and 1000.

Output

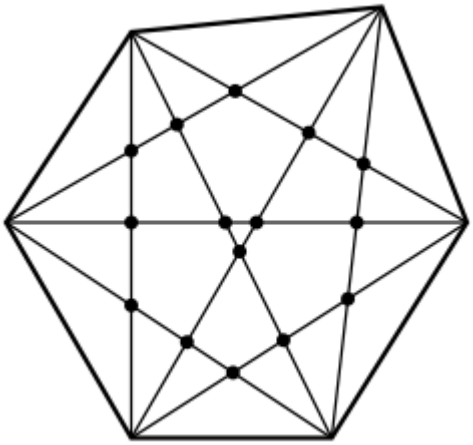
Output R2 on a single line.

Sample test data

input	input
11 15	4 3
output	output
19	2

Consider a convex polygon with N vertices, with the additional property that no three diagonals intersect in a single point. Find the number of intersections between pairs of diagonals in such a polygon.

The figure below shows one such polygon with 6 vertices.



Note: a polygon is convex if all of its interior angles are less than 180 degrees.

Input

The first and only line of input contains a single integer N, $3 \leq N \leq 100$.

Output

Output the number of intersections on a single line.

Sample test data

input	**input**	**input**
3	4	6
output	**output**	**output**
0	1	15

5. STOL

Mirko has bought an apartment and wants to invite to dinner as many people as possible to celebrate with him. For this he needs a large rectangular wooden table for which he will sit down with his guests. The number of people a table can accommodate is equal to its perimeter (the sum of the lengths of all four sides). Mirko wants to buy a table such that it fits in his apartment and that as many people as possible can sit down with him for dinner. The table must be placed so that its edges are parallel to the edges of the apartment.

Given the layout of the apartment, find the number of people Mirko can invite to dinner.

Input

The first line contains two integers R and C ($1 \leq R, S \leq 400$), the dimensions of the apartment.

Each of the following R rows contains exactly S characters (without spaces), whether a square is free ('.') or blocked ('X').

Mirko can put his table only in free squares.

Output

Output the number of guests Mirko can invite to dinner after he buys his table on a single line.

Sample test data

input

```
2 2
..
..
```

output

```
7
```

input

```
4 4
X.XX
X..X
..X.
..XX
```

output

```
9
```

input

```
3 3
X.X
.X.
X.X
```

output

```
3
```

6. STRAŽA

Near a military base there is a system of trenches, modeled as line segments on a plane. During nighttime, when most soldiers are fast asleep, three guards stand watch of the trenches. Two guards can see each other if there is a trench (or a row of trenches) along the entire straight line segment between them and there is no third guard on that line segment.

For security reasons, the guards must be placed so that each guard sees the other two. How many ways can they be placed?

Input

The first line contains the integer N ($1 \leq N \leq 20$), the number of trenches. Each of the next N lines contains the description of one trench: four positive integers X1, Y1, X2, Y2 (all less than or equal to 1000), where X1 and Y1 are coordinates of one end, while X2 and Y2 are coordinates of the other end of the trench.

Trenches in the input may overlap and share endpoints.

Output

Output the number of ways the guards can be placed on a single line.

Sample test data

input

```
6
0 0 1 0
0 0 0 1
1 0 1 1
0 1 1 1
0 0 1 1
1 0 0 1
```

output

```
8
```

input

```
4
5 1 7 1
1 1 5 1
4 0 4 4
7 0 3 4
```

output

```
1
```

input

```
3
2 2 3 2
3 2 3 3
3 3 2 3
```

output

```
0
```

Frane has been given the task of sorting an array of numbers. The array consists of N integers, each between 1 and N (inclusive), with each of those appearing exactly once in the array. Frane has come up with the following sorting algorithm which operates in N phases, and named it turbosort:

- In the first phase, the number 1 is moved to position 1 by repeatedly swapping consecutive elements.
- In the second phase, the number N is moved to position N in the same manner.
- In the third phase, the number 2 is moved to position 2.
- In the fourth phase, the number N−1 is moved to position N−1.
- And so on.

In other words, when the number of the phase is odd, Frane will choose the smallest number not yet chosen, and move it to its final position. In even phases he chooses the largest number not yet chosen.

Write a program which, given the initial array, output the **number of swaps in each phase** of the algorithm.

Input

The first line contains an integer N ($1 \leq N \leq 100000$), the number of elements in the array.

Each of the following N lines contains an integer between 1 and N (inclusive), the array to be sorted. The array will contain no duplicates.

Output

For each of the N phases, output the number of swaps on a single line.

Scoring

In test cases worth 70% of points, N will be less than 100.

Sample test data

input

```
3
2
1
3
```

output

```
1
0
0
```

input

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

output

```
4
3
2
1
0
```

input

```
7
5
4
3
7
1
2
6
```

output

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