Problem 1001. Fish In Aquariums

Time limit: 0.2 sec
Memory limit: 64 Mb

Once upon a time, the pinscher-mathmatician Pythagoras paid a visit to the cat Pascaline. They were planning to come up with an interesting problem for Summer School in mathematics and programming.

At Pascaline's home, there were three large aquariums with beautiful fish. Being a true mathematician, Pythagoras decided to count the fish. First it turned out that there were different number of fish in each aquarium. Pythagoras and Pascaline quickly came up with a problem. Pythagoras derived formulas, while Pascaline wrote the program and prepared the test data.

You are also invited to write a program that determines whether it's possible to transfer some fish from one aquarium to another in such a way that all three aquariums have the same number of fish. If it's possible, your program should also indicate how many fish need to be transferred.

Input

The first line of input contains the number K_1 – the number of fish in the first aquarium. The second line contains the number K_2 – the number of fish in the second aquarium. The third line contains the number K_3 – the number of fish in the third aquarium.

Output

Output a single number – the minimum number of fish which must be transferred to ensure that all three aquariums have the same number of fish. If this is not possible, output the word «`IMPOSSIBLE`».

Constraints

$1 \le K_1 \le 100$

$1 \le K_2 \le 100$

$1 \le K_3 \le 100$

Examples

test	answer
1 2 3	1
99 100 100	IMPOSSIBLE

Problem 1002. Pythagoras's Preparation

Time limit: 0.2 sec
Memory limit: 64 Mb

The pinscher-mathematician Pythagoras has decided to participate in a programming olympiad. But to do so, the preparation is necessary!

Pythagoras wants to solve at least N problems. Yesterday Pythagoras solved K problems, and starting from today he will solve one more problem each day compared to the previous day.

Determine how many days it will take Pythagoras to prepare for the olympiad.

Input

The input consists of two lines. The first line contains the number N, and the second line contains the number K.

Output

Output one number, which represents the number of days required for Pythagoras to prepare for the programming olympiad.

Constraints

$1 \le N \le 2\,000\,000$

$1 \le K \le 2\,000\,000$

Examples

test	answer
10 3	3
28 2	7

Problem 1003. Pythagoras And Dice Game

Time limit: 0.2 sec
Memory limit: 64 Mb

A standard six-sided dice has three pairs of opposite faces, which are marked in such a way that the face with number 1 is opposite the face with number 6, the face with number 2 is opposite the face with number 5, and the face with number 3 is opposite the face with number 4.

Pinscher-mathematician Pythagoras came up with a new game using these dice. He will play this game with cat Pascaline. The game proceeds as follows: the first player rolls one or more standard dice (the number of dice is determined by the player). After that, the first player earns a number of points equal to the sum of the numbers on the top faces of all the dice rolled, and the second player earns the sum of the numbers on the bottom faces of the same dice. The player with the higher score wins.

For example, if one dice is rolled and the top face shows number two, the first player earns two points, and the second player earns five. If two dice are rolled and number one appears on the top faces of both dice, the first player also earns two points, while the second player earns twelve points, as the bottom faces of these dice show sixes.

Write a program that, given the number of points the first player scored from the roll, determines the minimum and maximum number of points the second player can get from that roll.

Input

Your program receives as input one integer N – the number of points earned by the first player.

Output

Output two space-separated integers: the minimum and maximum number of points, respectively, which the second player could earn with this dice roll.

Constraints

$2 \leq N \leq 10^{10}$

Examples

test	answer
123	14
100	1

Problem 1004. Sausage Garland For Pythagoras

Time limit: 0.2 sec
Memory limit: 64 Mb

Cat-programmer Pascaline decided to prepare a surprise sausage garland for pinscher Pythagoras. She has sausages of three types:

- Frankfurt sausages, which are thin and long sausages known for their unique aroma due to cold smoking. In Germany, Frankfurt sausages are called Viennese sausages;
- Käsekrainer sausages, which are Austrian smoked sausages with cubes of cheese mixed in;
- Weißwurst sausages, which are white sausages meant to be boiled in a natural casing.

Pascaline cannot decide how the sausage garland for Pythagoras should look. Let's formalize the problem:

- Pascaline has K_1 sausages of the first type;
- Pascaline has K_2 sausages of the second type;
- Pascaline has K_3 sausages of the third type;
- The garland must contain exactly N sausages;
- The order of sausages in the garland doesn't matter.

Write a program that calculates how many different garlands of N sausages can be formed.

Input

The first line of input contains a natural number N – the number of sausages in the garland. The second line contains natural numbers K_1, K_2, and K_3 – the number of sausages of the first, second, and third types, respectively.

Output

Output a single number – the number of different ways to compose a garland of N sausages. If it's not possible to compose any garlands from the given set of sausages, output 0.

Constraints

$1 \le N \le 100$

$1 \le K_1 \le 100$

$1 \le K_2 \le 100$

$1 \le K_3 \le 100$

Examples

test	answer
6 2 2 2	1
100 10 10 10	0
6 10 1 1	4

Problem 1005. Pascaline And Dates

Time limit: 0.2 sec
Memory limit: 64 Mb

Cat-programmer Pascaline has received a task to write a program for automatic processing of a large array of texts. Some of the texts use the date format commonly used in Europe: «day.month.year». Another set of texts uses the American format «month/day/year».

Here, the year is a number from 1 to 9999, possibly padded with leading zeros to 2, 3, or 4 digits. The month is a number from 1 to 12, possibly padded with a leading zero to 2 digits, and the day is a number from 1 to 31, possibly padded with a leading zero to 2 digits.

Pascaline has identified the dates in the text and, for the convenience of further processing, wants to standardize them into a unified format. Since she doesn't know which format would be more convenient to pass to the next developer, she wants to output each date in both formats. If necessary, she wants to pad the day and month to 2 digits, and the year to 4 digits, using leading zeros.

You are given a line of strings provided by Pascaline, each representing a date. For each date, output it first in the format «`DD.MM.YYYY`», and then in the format «`MM/DD/YYYY`».

Input

The first line of the input contains the number n. The next n lines contain dates. Each line contains a date either in the format «day.month.year», or in the format «month/day/year».

Output

Output n lines. In each line, provide two representations of the corresponding date: first in the format «`DD.MM.YYYY`», and then separated by a space, in the format «`MM/DD/YYYY`».

Constraints

$1 \le n \le 20\,000$

Examples

test	answer
2 11.12.2000 1.2.1	11.12.2000 12/11/2000 01.02.0001 02/01/0001
2 20.10.2100 1/29/3000	20.10.2100 10/20/2100 29.01.3000 01/29/3000

Problem 1006. Odd Bouquet For Pascaline

Time limit: 0.2 sec
Memory limit: 64 Mb

Pythagoras, a math pinscher, wants to give his cat friend Pascalina a beautiful bouquet of flowers for her birthday.

There is a store near his house that sells n types of flowers. Pythagoras has discovered that the store has a_i of ith type of flower. He knows that Pascaline is very fond of odd numbers. So Pythagoras decided that there should be an odd number of flowers of each species in the bouquet, and the total number of flowers in the bouquet should also be odd.

Help Pythagoras determine the maximum number of flowers he can choose for the bouquet.

Input

The first line of input data contains an integer n — the number of types of flowers available in the storeA The second line contains n integers $a_1, a_2, \ldots, a_n$ — for each type of color, it indicates how many colors of that type are available in the store.

Output

Output a single number — the maximum number of flowers that can make up a bouquet.

Constraints

$1 \le n \le 100\,000$

$1 \le a_i \le 1\,000$

Examples

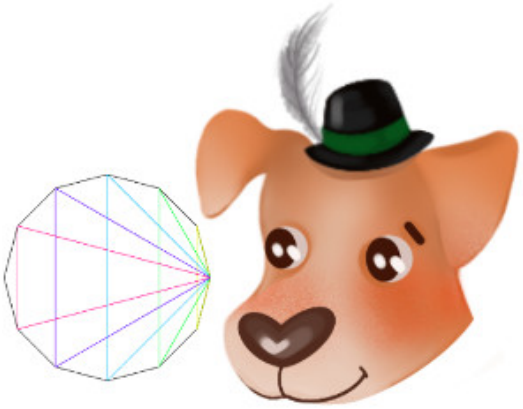
test	answer
3 3 5 8	15
3 1 1 1	3

Problem 1007. Pythagoras And Regular Polygon

Time limit: 0.2 sec
Memory limit: 128 Mb

Given a regular polygon with n vertices, Pythagoras, a math pinscher, wants to count the number of isosceles triangles whose vertices coincide with the polygon's vertices.

Write a program to help Pythagoras with his task!



Input

The input consists of a single integer n — the number of vertices of the regular polygon.

Output

Output a single integer — the number of isosceles triangles whose vertices are the vertices of the polygon.

Constraints

$3 \le n \le 10^9$

Examples

test	answer
3	1
5	10

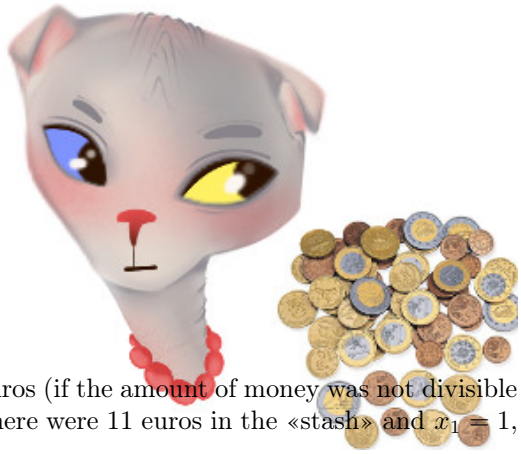
Note

An isosceles triangle is defined as a triangle with at least two equal sides.

Problem 1008. Shopoholic Pascaline

Time limit: 0.2 sec
Memory limit: 64 Mb

Programmer cat Pascaline –



is a shopaholic. When she arrived in Austria, she had a small «stash»

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N euro coins, which she spent on shopping and and now she wants to assess the damage to her budget. The thing is, she doesn't remember how many coins were originally in the stash, but she does remember taking the money. And it went like this.

- On the first day she took half of all the money and another x_1 euros (if the amount of money was not divisible by two, Pascaline could round it up or down). For example, if there were 11 euros in the «stash» and $x_1 = 1$, she could take either 6 euros or 7 euros.
- On the second day, she took half of the remaining money and another x_2 euros (if there was an odd number of coins, she could also round up or down).
- And so on...
- On the Kth day, she took half of all the euros left after the $K-1$ day, and another x_K of coins. In the end, there was no money left in the "stash"!

But even worse, Pascaline doesn't remember how she rounded the result of dividing by two

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on any given day, she could have rounded either up or down!

Write a program that will determine the minimum and maximum amount of money that Pascaline originally had in her stash.

Input

The first line of input data contains number K

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the number of shopping days. The second line contains K of non-negative integers $x_1, x_2, \ldots, x_K$.

Output

Output two non-negative integers – the minimum and maximum possible number of euro coins in Pascaline's «stash».

Constraints

$1 \le K \le 1000$

$0 \le x_i \le 1000$

Examples

test	answer
1 1	1 3
2 0 1	1 7
2 1 2	7 13

Problem 1009. Numerical Intervals

Time limit: 0.2 sec
Memory limit: 64 Mb

One day, Pythagoras and Pascaline had a very big homework at school, which was to determine the number of integer points in a given numerical interval.

Math pinscher Pythagoras took a pen, a notebook, a calculator and managed to complete all the exercises in a few hours. And the cat-programmer Pascaline decided to write a program that would solve all the problems for her.

Write such a program yourself!

Input

The first character is an opening parenthesis or square bracket. Next is the number X in the format a/b or a where $|a| \le 10^9$, $0 < b \le 10^9$. This is followed by a comma and a space. Then comes the number Y in the same format. After that is a closing parenthesis or square bracket. The bracket is followed by a line break and the end of the file.

It is guaranteed that this numeric interval is not empty, i.e. it contains at least one number, not necessarily an integer.

Output

Output one number – the number of points with integer coordinates that belong to the given numerical interval.

Examples

test	answer
[3/2, 4)	2
[-2/4, 5/3]	2
[-10, 10]	21
(1/200000, 99/100]	0

Problem 1010. Pascaline and Fermat's Great Theorem

Time limit: 2 sec
Memory limit: 64 Mb

As you probably know, the inequality $a^n + b^n \neq c^n$ is accomplished for all natural numbers a, b, c and n at $n \geq 3$. However, all known proofs of this fact are difficult to verify, so the cat-programmer Pascaline decided to write her own proof, which she thought would be much easier to verify.

Pascaline wrote a program that iterated all quadruples of natural numbers (a, b, c, n) such that $n \geq 3$, in the order of increasing maxima of these numbers, and if the maxima are equal, in the lexicographical order.

Thus, the quadruple $(1, 1, 1, 3)$ will be checked first, then the quadruple $(1, 1, 2, 3)$, and so on. And, for example, the quadruple $(3, 3, 3, 3)$ will be followed by the quadruple $(1, 1, 1, 4)$. For each fourset, the program compares the numbers $a^n + b^n$ and c^n and outputs the corresponding inequality: $a^n + b^n > c^n$ or $a^n + b^n < c^n$.

Now Pascaline wants to verify her proof. So she asks you to reproduce her work and output the inequalities from lth to rth, inclusive, written out by her program.

Input

The first line of input data contains two integers l and r.

Output

Output the part of Pascaline's proof starting with the lth inequality and ending with the rth inequality, each on a separate line. Use the caret character («^», an ASCII table character with the code 94) to denote an enlargement in degree. Do not output spaces.

Constraints

$1 \leq l \leq r \leq 10^{12}$

$r - l \leq 10^4$

Example

test	answer
1 4	1^3+1^3>1^3 1^3+1^3<2^3 1^3+1^3<3^3 1^3+2^3>1^3