Problem A. A

Time limit 1000 ms
Mem limit 262144 kB

You are given three integers a, b, and c. Determine if one of them is the sum of the other two.

Input

The first line contains a single integer t ($1 \leq t \leq 9261$) — the number of test cases.

The description of each test case consists of three integers a, b, c ($0 \leq a, b, c \leq 20$).

Output

For each test case, output "YES" if one of the numbers is the sum of the other two, and "NO" otherwise.

You can output the answer in any case (for example, the strings "yEs", "yes", "Yes" and "YES" will be recognized as a positive answer).

Sample 1

Input	Output
7 1 4 3 2 5 8 9 11 20 0 0 0 20 20 20 4 12 3 15 7 8	YES NO YES YES NO NO YES

Note

In the first test case, $1 + 3 = 4$.

In the second test case, none of the numbers is the sum of the other two.

In the third test case, $9 + 11 = 20$.

Problem B. B

Time limit 1000 ms
Mem limit 262144 kB

There are two sisters Alice and Betty. You have n candies. You want to distribute these n candies between two sisters in such a way that:

- Alice will get a ($a > 0$) candies;
- Betty will get b ($b > 0$) candies;
- each sister will get some **integer** number of candies;
- Alice will get a greater amount of candies than Betty (i.e. $a > b$);
- all the candies will be given to one of two sisters (i.e. $a + b = n$).

Your task is to calculate the number of ways to distribute exactly n candies between sisters in a way described above. Candies are indistinguishable.

Formally, find the number of ways to represent n as the sum of $n = a + b$, where a and b are positive integers and $a > b$.

You have to answer t independent test cases.

Input

The first line of the input contains one integer t ($1 \le t \le 10^4$) — the number of test cases. Then t test cases follow.

The only line of a test case contains one integer n ($1 \le n \le 2 \cdot 10^9$) — the number of candies you have.

Output

For each test case, print the answer — the number of ways to distribute exactly n candies between two sisters in a way described in the problem statement. If there is no way to satisfy all the conditions, print 0.

Sample 1

Input	Output
6 7 1 2 3 2000000000 763243547	3 0 0 1 999999999 381621773

Note

For the test case of the example, the 3 possible ways to distribute candies are:

- $a = 6, b = 1$;
- $a = 5, b = 2$;
- $a = 4, b = 3$.

Problem C. C

Time limit 2000 ms
Mem limit 262144 kB

Problem Statement

We have a long seat of width X centimeters. There are many people who wants to sit here. A person sitting on the seat will always occupy an interval of length Y centimeters.

We would like to seat as many people as possible, but they are all very shy, and there must be a gap of length at least Z centimeters between two people, and between the end of the seat and a person.

At most how many people can sit on the seat?

Constraints

- All input values are integers.
- $1 \leq X, Y, Z \leq 10^5$
- $Y + 2Z \leq X$

Input

Input is given from Standard Input in the following format:

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X Y Z
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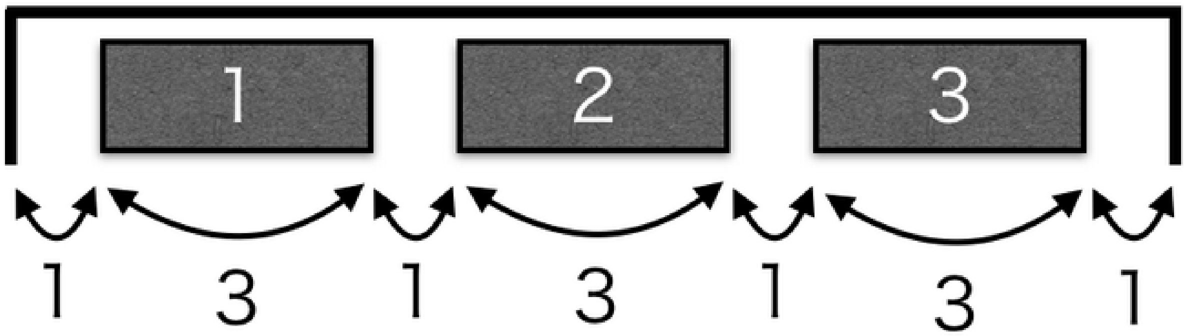
Output

Print the answer.

Sample 1

Input	Output
13 3 1	3

There is just enough room for three, as shown below:



Figure

Sample 2

Input	Output
`12 3 1`	`2`

Sample 3

Input	Output
`100000 1 1`	`49999`

Sample 4

Input	Output
`64146 123 456`	`110`

Sample 5

Input	Output
`64145 123 456`	`109`

Problem D. D

Time limit 2000 ms
Mem limit 262144 kB

You are given a rectangular board of $M \times N$ squares. Also you are given an unlimited number of standard domino pieces of 2×1 squares. You are allowed to rotate the pieces. You are asked to place as many dominoes as possible on the board so as to meet the following conditions:

1. Each domino completely covers two squares.

2. No two dominoes overlap.

3. Each domino lies entirely inside the board. It is allowed to touch the edges of the board.

Find the maximum number of dominoes, which can be placed under these restrictions.

Input

In a single line you are given two integers M and N — board sizes in squares ($1 \le M \le N \le 16$).

Output

Output one number — the maximal number of dominoes, which can be placed.

Sample 1

Input	Output
2 4	4

Sample 2

Input	Output
3 3	4

Problem E. E

Time limit 2000 ms
Mem limit 262144 kB

It seems like the year of 2013 came only yesterday. Do you know a curious fact? The year of 2013 is the first year after the old 1987 with only distinct digits.

Now you are suggested to solve the following problem: given a year number, find the minimum year number which is strictly larger than the given one and has only distinct digits.

Input

The single line contains integer y $(1000 \le y \le 9000)$ — the year number.

Output

Print a single integer — the minimum year number that is strictly larger than y and all it's digits are distinct. It is guaranteed that the answer exists.

Sample 1

Input	Output
1987	2013

Sample 2

Input	Output
2013	2014

Problem F. F

Time limit 1000 ms
Mem limit 262144 kB

A penguin Rocher has n sticks. He has exactly one stick with length i for all $1 \le i \le n$.

He can connect some sticks. If he connects two sticks that have lengths a and b, he gets one stick with length $a + b$. Two sticks, that were used in the operation disappear from his set and the new connected stick appears in his set and can be used for the next connections.

He wants to create the maximum number of sticks that have the same length. It is not necessary to make all sticks have the same length, some sticks can have the other length. How many sticks with the equal length he can create?

Input

The input consists of multiple test cases. The first line contains a single integer t ($1 \le t \le 1000$) — the number of test cases. Next t lines contain descriptions of test cases.

For each test case, the only line contains a single integer n ($1 \le n \le 10^9$).

Output

For each test case, print a single integer — the answer to the problem.

Sample 1

Input	Output
4 1 2 3 4	1 1 2 2

Note

In the third case, he can connect two sticks with lengths 1 and 2 and he will get one stick with length 3. So, he will have two sticks with lengths 3.

In the fourth case, he can connect two sticks with lengths 1 and 3 and he will get one stick with length 4. After that, he will have three sticks with lengths $\{2, 4, 4\}$, so two sticks have the same length, and one stick has the other length.

Problem G. G

Time limit 1000 ms
Mem limit 262144 kB

Given a lowercase Latin character (letter), check if it appears in the string **`codeforces`**.

Input

The first line of the input contains an integer t ($1 \leq t \leq 26$) — the number of test cases.

The only line of each test case contains a character c — a single lowercase Latin character (letter).

Output

For each test case, output "`YES`" (without quotes) if c satisfies the condition, and "`NO`" (without quotes) otherwise.

You can output the answer in any case (for example, the strings "`yEs`", "`yes`", "`Yes`" and "`YES`" will be recognized as a positive answer).

Sample 1

Input	Output
10 a b c d e f g h i j	NO NO YES YES YES YES NO NO NO NO

Problem H. H

Time limit 2000 ms
Mem limit 262144 kB

There are three sticks with integer lengths l_1, l_2 and l_3.

You are asked to break exactly one of them into two pieces in such a way that:

- both pieces have positive (strictly greater than 0) **integer** length;
- the total length of the pieces is equal to the original length of the stick;
- it's possible to construct a rectangle from the resulting four sticks such that each stick is used as exactly one of its sides.

A square is also considered a rectangle.

Determine if it's possible to do that.

Input

The first line contains a single integer t ($1 \le t \le 10^4$) — the number of testcases.

The only line of each testcase contains three integers l_1, l_2, l_3 ($1 \le l_i \le 10^8$) — the lengths of the sticks.

Output

For each testcase, print "YES" if it's possible to break one of the sticks into two pieces with positive integer length in such a way that it's possible to construct a rectangle from the resulting four sticks. Otherwise, print "NO".

You may print every letter in any case you want (so, for example, the strings yEs, yes, Yes and YES are all recognized as a positive answer).

Sample 1

Input	Output
4 6 1 5 2 5 2 2 4 2 5 5 4	YES NO YES YES

Note

In the first testcase, the first stick can be broken into parts of length 1 and 5. We can construct a rectangle with opposite sides of length 1 and 5.

In the second testcase, breaking the stick of length 2 can only result in sticks of lengths $1, 1, 2, 5$, which can't be made into a rectangle. Breaking the stick of length 5 can produce results $2, 3$ or $1, 4$ but neither of them can't be put into a rectangle.

In the third testcase, the second stick can be broken into parts of length 2 and 2. The resulting rectangle has opposite sides 2 and 2 (which is a square).

In the fourth testcase, the third stick can be broken into parts of length 2 and 2. The resulting rectangle has opposite sides 2 and 5.

Problem I. I

Time limit 1000 ms
Mem limit 262144 kB

Theatre Square in the capital city of Berland has a rectangular shape with the size $n \times m$ meters. On the occasion of the city's anniversary, a decision was taken to pave the Square with square granite flagstones. Each flagstone is of the size $a \times a$.

What is the least number of flagstones needed to pave the Square? It's allowed to cover the surface larger than the Theatre Square, but the Square has to be covered. It's not allowed to break the flagstones. The sides of flagstones should be parallel to the sides of the Square.

Input

The input contains three positive integer numbers in the first line: n, m and a ($1 \leq n, m, a \leq 10^9$).

Output

Write the needed number of flagstones.

Sample 1

Input	Output
6 6 4	4

Problem J. J

Time limit 1000 ms
Mem limit 262144 kB

You are a lover of bacteria. You want to raise some bacteria in a box.

Initially, the box is empty. Each morning, you can put any number of bacteria into the box. And each night, every bacterium in the box will split into two bacteria. You hope to see exactly x bacteria in the box at some moment.

What is the minimum number of bacteria you need to put into the box across those days?

Input

The only line containing one integer x ($1 \leq x \leq 10^9$).

Output

The only line containing one integer: the answer.

Sample 1

Input	Output
5	2

Sample 2

Input	Output
8	1

Note

For the first sample, we can add one bacterium in the box in the first day morning and at the third morning there will be 4 bacteria in the box. Now we put one more resulting 5 in the box. We added 2 bacteria in the process so the answer is 2.

For the second sample, we can put one in the first morning and in the 4-th morning there will be 8 in the box. So the answer is 1.