GPC-UNI Resto del Mundo - Contest 02

February 10th, 2020

Problem A. A + B = C

Author:	TISparta
Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

Leonidas is learning how to code in C++. He already knows how to print "Hello World" and now he is looking for a harder challenge. He wants to take three numbers a, b and c and check if $a+b=c$. However, he hasn't mastered the language yet, so he asks for your help.

Input

The first line of input contains three real values a, b and c ($-100.00 \leq a, b, c \leq 100.00$) — The numbers to compare. It is guaranteed that the numbers will be given with exactly 2 decimals.

Output

Print a single line — SI or YES if it holds that $a+b=c$ or NO otherwise. You can print the characters in any case.

Examples

standard input	standard output
1.00 2.00 3.00	YES
1.00 2.00 3.01	NO

Note

For the first sample case $a = 1.00$, $b = 2.00$, $c = 3.00$ it holds that $a + b = c$. Therefore, the answer is YES. SI would also be considered correct.

For the second sample case $a = 1.00$, $b = 2.00$, $c = 3.01$ it holds taht $a + b \neq c$. Therefore, the answer is NO.

Problem B. Quick Game

Author:	racsosabe
Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

LiTi was watching online his favorite anime, Naturo, on a free webpage. Since it was a free service, the ads were unavoidable.

Each time and ad poped up, LiTi had to beat the following game:

The ad showed a string s with english lowercase letters and in each turn LiTi had to take some letters of the current string that could be reordered to form a palindrome and then erase those letters.

The game ended when all the characters were erased.

Since LiTi wants to continue watching his anime as soon as possible, he wants your help to compute the minimum number of turns he has to take in order to finish the game.

Input

The first line of input contains a string s ($1 \leq |s| \leq 10^6$) — The string showed by the ad.

Output

Print a single line — The answer to the problem.

Example

standard input	standard output
aaabbb	2

Note

For the sample case, LiTi can use the sequence of turns:

1) Palindrome aba, which transforms our string “aaabbb” to “abb”

2) Palindrome bab, which erases the rest of the string.

Problem C. Integer Circumradius

Author:	Fischer
Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

Given a and b integers, check if it exists any integer c such that we could form a **non-degenerate** triangle using the triplet (a, b, c) as the lengths of its sides and its circumradius has integer length.

Input

The first line of input contains an integer t ($1 \leq t \leq 10$) — The number of testcases.

The following t lines of input contain two integers a and b each ($1 \leq a, b \leq 20000$) — The two initial sides of the triangle.

Output

Print t lines — The i-th line must contain the answer to the i-th testcase. If there is no answer, print -1.

Example

standard input	standard output
3 6 8 8 10 3 3	10 6 -1

Problem D. The answer to the life

Author:	TISparta
Input file:	`standard input`
Output file:	`standard output`
Time limit:	3 seconds
Memory limit:	256 megabytes

Jorge was reading that the number 42 is the answer to the life, the universe and everything. Suddenly, he finds this number everywhere:

- The youngest president of USA was 42 years old when he was elected.
- In Harry Potter and the Philosopher's Stone, Harry discovers that he is a mage in the page 42.
- In Dr. Who, the episode called "42" lasts 42 minutes.
- The three best selled albums — Michael Jackson's Thriller, AC/DC' Back in Black and Pink Floyd's The Dark Side of the Moon — last 42 minutes.
- Dr. House's favorite number is 42.

Now, Jorge is conviced that all this is part of a conspiracy and he states the following problem:

Let S be the set of positive integers in which every digit is 2 or 4 (The first elements of S are 2, 4, 22, 24, 42, 222, 224).

We will call an interval $l \leq r$ **good** if the number of elements of S that lie in that interval is 42. Now, Jorde wants to find some good intervals, so he asks for your help.

Jorge will give you an integer q followed by q intervals, for each interval you must answer if it is good or not.

Input

The first line of input contains an integer q ($1 \leq q \leq 10^3$) — The number of queries.

The following q lines of input contain two integers l_i and r_i each ($1 \leq l_i \leq r_i \leq 10^{11}$) — The limits of the query.

Output

Print q lines — The i-th line must contain the answer to the i-th query: SI or YES if the given interval is good or NO otherwise. You can print the characters in any case.

Examples

standard input	standard output
3 2 24244 422 42424 1 100000000000	YES YES NO
2 22224222422 22224424442 242222442 242442222	NO NO

Problem E. Carmichael Attack

Author:	racsosabe
Input file:	`standard input`
Output file:	`standard output`
Time limit:	5 seconds
Memory limit:	512 megabytes

Carmichael was in a Number Theory Lecture given by Fermat. The main topic was Fermat's Little Theorem, which states that for a given prime p and an integer a coprime with p it holds that:

$$a^{p-1} \equiv 1 \mod p$$

So, Fermat was saying — "You can use this method to check if an integer n is prime by testing all the integer a coprime with n that are in the interval $[2, n-1]$. If my little theorem holds, then n is definitely prime".

However, Carmichael stood up and said — "Teacher, that's not true!". For a given n, Carmichael claimed that he could find the smallest integer x such that:

1) x is composite

2) $n \leq x$

3) For any integer a coprime with x in the interval $[2, x-1]$, it holds that

$$a^{x-1} \equiv 1 \mod x$$

Help Carmichael by computing such value x.

Input

The first line of input contains an integer n ($1 \leq n \leq 5 \cdot 10^6$) — The lower bound for the wanted Carmichael Number.

Output

Print a single line — The answer to the problem. It can be guaranteed that there exists an answer for any value of n.

Example

standard input	standard output
2	561

Problem F. Divisible Subarray

Author:	Fischer
Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

Given an array a of n integers, find the length of the longest subarray $a[l, \ldots, r]$ such that:

- $\forall l < i \leq r$, it holds that $a_{i-1} | a_i$. This is, a_i is a multiple of a_{i-1}

Input

The first line of input contains and integer n ($1 \leq n \leq 10^5$) — The number of elements in the array a.

The second line of input contains n integers a_i ($1 \leq a_i \leq 10^9$) — The i-th integer is the i-th element of the array.

Output

Print a single line — The answer to the problem.

Example

standard input	standard output
1 1 1 1 1 " 1 1 1 1 1 "	" "

Problem G. 3-sum

Author:	TISparta
Input file:	`standard input`
Output file:	`standard output`
Time limit:	3 seconds
Memory limit:	256 megabytes

Giordano will teach a class of competitive programming at UTEC but he hasn't finished the slides, then he's giving a problem to its students so that he can finish his task. Giordano is giving them a number n and a number $target$ followed by an arrar a of n **distinct** integers. The tasks of the students if to find three numbers $x, y, z \mid x < y < z \wedge x + y + z = target$ where x, y, z are numbers of the array. Their students do not know how to solve the problem, that is why they are asking you to solve it.

Input

The first line of input contains two integers n ($1 \leq n \leq 3000$) — the number of elements in the array a — and $target$ ($1 \leq target \leq 10^9$) — the target sum.

The second line of input contains n integers a_i ($1 \leq a_i \leq 10^9$) — The i-th integer is the i-th element of the array.

Output

Print in a line x y z as described in the problem – if there exists more than one answer you can print any of them – or -1 is such numbers does not exists.

Examples

standard input	standard output
6 7 1 2 3 4 5 6	1 2 4
6 4 1 2 3 4 5 6	-1

Problem H. Rare Factorial

Author:	racsosabe
Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

You are in your math class reading some problems left by the teacher. In the previous class, you learned binary base; this time you are analyzing factorials.

The problem asks the following:

Given L and M, find the number of pairs of integers (k, n) such that:

- $1 \leq k \leq L$ y $1 \leq n \leq M$.
- $k! = \prod_{i=0}^{n-1} (2^n - 2^i)$

Since the answer could be large, find it modulo $10^9 + 7$.

Input

The first line of input contains two integers L and M ($1 \leq L, M \leq 10^{18}$) — The bounds for the integer pairs.

Output

Print a single line — The answer to the problem modulo $10^9 + 7$.

Example

standard input	standard output
2 2	1

Note

For the sample case, the only pair is $(1, 1)$.

Problem I. Hyper Sum

Author:	Fischer
Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

Given 3 integers a, b and c, check if it exist 3 integers x, y and z such that:

- $x, y, z > 0$.

- $x|a$, $y|b$ y $z|c$; This is, a is multiple of x, b is multiple of y y c is multiple of z.

- $x + y = z$.

We call this an **hyper sum**.

Input

The first line of input contains three integers a, b and c ($1 \leq a, b, c \leq 10^9$) — The values to determine the hyper sum.

Output

Print a single line — SI if there exists an hyper sum or NO otherwise.

Example

standard input	standard output
16 7 11	YES