Problem A. A + B

Time limit 2000 ms
Mem limit 1048576 kB

Problem Statement

You are given integers A and B. Print $A + B$.

Constraints

- $0 \leq A, B \leq 10^9$

Input

$A \ B$

Output

$A + B$

Sample

Input	Output
`1234 5678`	`6912`

Input	Output
`1000000000 1000000000`	`2000000000`

Problem B. Weird Algorithm

Time limit 1000 ms
Mem limit 524288 kB

Consider an algorithm that takes as input a positive integer n. If n is even, the algorithm divides it by two, and if n is odd, the algorithm multiplies it by three and adds one. The algorithm repeats this, until n is one. For example, the sequence for $n = 3$ is as follows:

$$3 \to 10 \to 5 \to 16 \to 8 \to 4 \to 2 \to 1$$

Your task is to simulate the execution of the algorithm for a given value of n.

Input

The only input line contains an integer n.

Output

Print a line that contains all values of n during the algorithm.

Constraints

- $1 \leq n \leq 10^6$

Example

Input	Output
`3`	`3 10 5 16 8 4 2 1`

Problem C. Missing Number

Time limit 1000 ms
Mem limit 524288 kB

You are given all numbers between $1, 2, \ldots, n$ except one. Your task is to find the missing number.

Input

The first input line contains an integer n.

The second line contains $n - 1$ numbers. Each number is distinct and between 1 and n (inclusive).

Output

Print the missing number.

Constraints

- $2 \leq n \leq 2 \cdot 10^5$

Example

Input	Output
5 2 3 1 5	4

Problem D. Hamming Distance

Time limit 2000 ms
Mem limit 1048576 kB

Problem Statement

You are given a positive integer N and two strings S and T, each of length N and consisting of lowercase English letters.

Find the Hamming distance between S and T. That is, find the number of integers i such that $1 \leq i \leq N$ and the i-th character of S is different from the i-th character of T.

Constraints

- $1 \leq N \leq 100$
- N is an integer.
- Each of S and T is a string of length N consisting of lowercase English letters.

Input

The input is given from Standard Input in the following format:

N
S
T

Output

Print the answer.

Sample 1

Input	Output
6 abcarc agcahc	2

S and T differ in the 2nd and 5th characters, but not in other characters. Thus, the answer is 2.

Sample 2

Input	Output
7 atcoder contest	7

Sample 3

Input	Output
8 chokudai chokudai	0

Sample 4

Input	Output
10 vexknuampx vzxikuamlx	4

Problem E. Watermelon

Time limit	1000 ms
Mem limit	65536 kB
Input file	stdin
Output file	stdout

One hot summer day Pete and his friend Billy decided to buy a watermelon. They chose the biggest and the ripest one, in their opinion. After that the watermelon was weighed, and the scales showed w kilos. They rushed home, dying of thirst, and decided to divide the berry, however they faced a hard problem.

Pete and Billy are great fans of even numbers, that's why they want to divide the watermelon in such a way that each of the two parts weighs even number of kilos, at the same time it is not obligatory that the parts are equal. The boys are extremely tired and want to start their meal as soon as possible, that's why you should help them and find out, if they can divide the watermelon in the way they want. For sure, each of them should get a part of positive weight.

Input

The first (and the only) input line contains integer number w ($1 \le w \le 100$) — the weight of the watermelon bought by the boys.

Output

Print `YES`, if the boys can divide the watermelon into two parts, each of them weighing even number of kilos; and `NO` in the opposite case.

Examples

Input	Output
8	YES

Note

For example, the boys can divide the watermelon into two parts of 2 and 6 kilos respectively (another variant — two parts of 4 and 4 kilos).

Problem F. Chat room

Time limit	1000 ms
Mem limit	262144 kB
Input file	stdin
Output file	stdout

Vasya has recently learned to type and log on to the Internet. He immediately entered a chat room and decided to say hello to everybody. Vasya typed the word s. It is considered that Vasya managed to say hello if several letters can be deleted from the typed word so that it resulted in the word "`hello`". For example, if Vasya types the word "`ahhellllloou`", it will be considered that he said hello, and if he types "`hlelo`", it will be considered that Vasya got misunderstood and he didn't manage to say hello. Determine whether Vasya managed to say hello by the given word s.

Input

The first and only line contains the word s, which Vasya typed. This word consisits of small Latin letters, its length is no less that 1 and no more than 100 letters.

Output

If Vasya managed to say hello, print "`YES`", otherwise print "`NO`".

Examples

Input	Output
ahhellllloou	YES

Input	Output
hlelo	NO

Problem G. Pro Bending

Time limit 1000 ms
Mem limit 262144 kB
OS Windows

Avatar Korma is competing in Republic City's latest pro bending tournament, but isn't sure if she can manage to come out on top. Thankfully, due to her intel, she has accurate ELO level that indicate how strong her team and all other teams competing in the pro bending tournament are. Each team, including Korma's, has a distinct ELO level and a team with a higher ELO level will always defeat a team with a lower ELO level.

The tournament will proceed in a single-elimination format, which will continue until all teams except one are eliminated.

Korma wants to know if she can expect to win the tournament or not, so you need to write a computer program to calculate this for her. Korma will always be able to determine if she will win or lose the tournament given this accurate intel. Print out `Easy Win!` if Avatar Korma will win the tournament and print out out `Difficult Loss` otherwise.

Input

The first line will consist of a two integers n $(1 \leq n \leq 10^3)$ and k $(1 \leq k \leq 10^5)$, which give the number of competing teams (not including Korma's) and Avatar Korma's ELO level, respectively. The next line consists of n integers where the ith integer e_i gives the ELO level of the ith team $(1 \leq e_i \leq 10^5)$.

Output

Print `Easy Win!` if Avatar Korma will win the tournament and `Difficult Loss` otherwise.

Examples

Input	Output
3 4 1 2 3	Easy Win!

Input	Output
5 5 1 4 3 8 2	Difficult Loss

Problem H. Team Training

Time limit 2000 ms
Mem limit 262144 kB

At the IT Campus "NEIMARK", there are training sessions in competitive programming — both individual and team-based!

For the next team training session, n students will attend, and the skill of the i-th student is given by a positive integer a_i.

The coach considers a team strong if its *strength* is at least x. The *strength* of a team is calculated as the number of team members multiplied by the minimum skill among the team members.

For example, if a team consists of 4 members with skills $[5, 3, 6, 8]$, then the team's *strength* is $4 \cdot min([5, 3, 6, 8]) = 12$.

Output the maximum possible number of strong teams, given that each team must have at least one participant and every participant must belong to exactly one team.

Input

Each test contains multiple test cases. The first line contains the number of test cases t ($1 \le t \le 10^4$). The description of the test cases follows.

The first line of each test case contains two integers n and x ($1 \le n \le 2 \cdot 10^5, 1 \le x \le 10^9$) — the number of students in training and the minimum *strength* of a team to be considered strong.

The second line of each test case contains n integers a_i ($1 \le a_i \le 10^9$) — the skill of each student.

It is guaranteed that the sum of n over all test cases does not exceed $2 \cdot 10^5$.

Output

For each test case, output the maximum possible number of teams with *strength* at least x.

Examples

Input	Output
5 6 4 4 5 3 3 2 6 4 10 4 2 1 3 5 3 5 3 2 3 2 3 6 9 1 7 6 10 6 1 3 6 3 2	4 0 4 2 1

Problem I. Shohag Loves Strings

Time limit 1000 ms
Mem limit 262144 kB

For a string p, let $f(p)$ be the number of distinct non-empty substrings* of p.

Shohag has a string s. Help him find a non-empty string p such that p is a substring of s and $f(p)$ is even or state that no such string exists.

*A string a is a substring of a string b if a can be obtained from b by deletion of several (possibly, zero or all) characters from the beginning and several (possibly, zero or all) characters from the end.

Input

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

The first and only line of each test case contains a string s ($1 \le |s| \le 10^5$) consisting of lowercase English letters.

It is guaranteed that the sum of the length of s over all test cases doesn't exceed $3 \cdot 10^5$.

Output

For each test case, print a non-empty string that satisfies the conditions mentioned in the statement, or -1 if no such string exists. If there are multiple solutions, output any.

Examples

Input	Output
5 dcabaac a youknowwho codeforces bangladesh	abaa -1 youknowwho eforce bang

Note

In the first test case, we can set $p = \texttt{abaa}$ because it is a substring of s and the distinct non-empty substrings of p are `a`, `b`, `aa`, `ab`, `ba`, `aba`, `baa` and `abaa`, so it has a total of 8 distinct substrings which is even.

In the second test case, we can only set $p = \texttt{a}$ but it has one distinct non-empty substring but this number is odd, so not valid.

In the third test case, the whole string contains 52 distinct non-empty substrings, so the string itself is a valid solution.