Problem A. Children and Candies (ABC Edit)

Time Limit 2000 ms

Problem Statement

There are N children in AtCoder Kindergarten. Mr. Evi will arrange the children in a line, then give 1 candy to the first child in the line, 2 candies to the second child, ..., N candies to the N-th child. How many candies will be necessary in total?

Constraints

- $1 \leqq N \leqq 100$

Input

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

```
N
```

Output

Print the necessary number of candies in total.

Sample 1

Input	Output
3	6

The answer is $1 + 2 + 3 = 6$.

Sample 2

Input	Output
10	55

The sum of the integers from 1 to 10 is 55.

Sample 3

Input	Output
1	1

Only one child. The answer is 1 in this case.

Problem B. Again Twenty Five!

Time Limit 500 ms
Mem Limit 65536 kB

The HR manager was disappointed again. The last applicant failed the interview the same way as 24 previous ones. "Do I give such a hard task?" — the HR manager thought. "Just raise number 5 to the power of n and get last two digits of the number. Yes, of course, n can be rather big, and one cannot find the power using a calculator, but we need people who are able to think, not just follow the instructions."

Could you pass the interview in the machine vision company in IT City?

Input

The only line of the input contains a single integer n ($2 \le n \le 2 \cdot 10^{18}$) — the power in which you need to raise number 5.

Output

Output the last two digits of 5^n without spaces between them.

Examples

Input	Output
2	25

Problem C. AC or WA

Time Limit 2000 ms

Problem Statement

Takahashi is participating in a programming contest, AXC001. He has just submitted his code to Problem A.
The problem has N test cases, all of which must be passed to get an AC verdict.
Takahashi's submission has passed M cases out of the N test cases.
Determine whether Takahashi's submission gets an AC.

Constraints

- $1 \leq N \leq 100$
- $0 \leq M \leq N$
- All values in input are integers.

Input

Input is given from Standard Input in the following format:

N M

Output

If Takahashi's submission gets an AC, print `Yes`; otherwise, print `No`.

Sample 1

Input	Output
3 3	Yes

All three test cases have been passed, so his submission gets an AC.

Sample 2

Input	Output
`3 2`	`No`

Only two out of the three test cases have been passed, so his submission does not get an AC.

Sample 3

Input	Output
`1 1`	`Yes`

Problem D. Calculating Function

Time Limit	1000 ms
Mem Limit	262144 kB
Input File	stdin
Output File	stdout

For a positive integer n let's define a function f:

$$f(n) = -1 + 2 - 3 + .. + (-1)^n n$$

Your task is to calculate $f(n)$ for a given integer n.

Input

The single line contains the positive integer n ($1 \le n \le 10^{15}$).

Output

Print $f(n)$ in a single line.

Examples

Input	Output
4	2

Input	Output
5	-3

Note

$$f(4) = -1 + 2 - 3 + 4 = 2$$

$$f(5) = -1 + 2 - 3 + 4 - 5 = -3$$

Problem E. ABC Swap

Time Limit 2000 ms

Problem Statement

We have three boxes A, B, and C, each of which contains an integer.
Currently, the boxes A, B, and C contain the integers X, Y, and Z, respectively.
We will now do the operations below in order. Find the content of each box afterward.

- Swap the contents of the boxes A and B
- Swap the contents of the boxes A and C

Constraints

- $1 \leq X, Y, Z \leq 100$
- All values in input are integers.

Input

Input is given from Standard Input in the following format:

$X \ Y \ Z$

Output

Print the integers contained in the boxes A, B, and C, in this order, with space in between.

Sample 1

Input	Output
1 2 3	3 1 2

After the contents of the boxes A and B are swapped, A, B, and C contain 2, 1, and 3, respectively.

Then, after the contents of A and C are swapped, A, B, and C contain 3, 1, and 2, respectively.

Sample 2

Input	Output
`100 100 100`	`100 100 100`

Sample 3

Input	Output
`41 59 31`	`31 41 59`

Problem F. Stones on the Table

Time Limit	2000 ms
Mem Limit	262144 kB
Input File	stdin
Output File	stdout

There are n stones on the table in a row, each of them can be red, green or blue. Count the minimum number of stones to take from the table so that any two neighboring stones had different colors. Stones in a row are considered neighboring if there are no other stones between them.

Input

The first line contains integer n $(1 \le n \le 50)$ — the number of stones on the table.

The next line contains string s, which represents the colors of the stones. We'll consider the stones in the row numbered from 1 to n from left to right. Then the i-th character s equals "R", if the i-th stone is red, "G", if it's green and "B", if it's blue.

Output

Print a single integer — the answer to the problem.

Examples

Input	Output
3 RRG	1

Input	Output
5 RRRRR	4

Input	Output
4 BRBG	0

Problem G. Helpful Maths

Time Limit	2000 ms
Mem Limit	262144 kB
Input File	stdin
Output File	stdout

Xenia the beginner mathematician is a third year student at elementary school. She is now learning the addition operation.

The teacher has written down the sum of multiple numbers. Pupils should calculate the sum. To make the calculation easier, the sum only contains numbers 1, 2 and 3. Still, that isn't enough for Xenia. She is only beginning to count, so she can calculate a sum only if the summands follow in non-decreasing order. For example, she can't calculate sum 1+3+2+1 but she can calculate sums 1+1+2 and 3+3.

You've got the sum that was written on the board. Rearrange the summans and print the sum in such a way that Xenia can calculate the sum.

Input

The first line contains a non-empty string s — the sum Xenia needs to count. String s contains no spaces. It only contains digits and characters "+". Besides, string s is a correct sum of numbers 1, 2 and 3. String s is at most 100 characters long.

Output

Print the new sum that Xenia can count.

Examples

Input	Output
3+2+1	1+2+3

Input	Output
1+1+3+1+3	1+1+1+3+3

Input	Output
2	2

Problem H. Replacing Elements

Time Limit 2000 ms
Mem Limit 262144 kB

You have an array $a_1, a_2, \dots, a_n$. All a_i are positive integers.

In one step you can choose three distinct indices i, j, and k ($i \neq j$; $i \neq k$; $j \neq k$) and assign the sum of a_j and a_k to a_i, i. e. make $a_i = a_j + a_k$.

Can you make all a_i lower or equal to d using the operation above any number of times (possibly, zero)?

Input

The first line contains a single integer t ($1 \le t \le 2000$) — the number of test cases.

The first line of each test case contains two integers n and d ($3 \le n \le 100$; $1 \le d \le 100$) — the number of elements in the array a and the value d.

The second line contains n integers $a_1, a_2, \dots, a_n$ ($1 \le a_i \le 100$) — the array a.

Output

For each test case, print `YES`, if it's possible to make all elements a_i less or equal than d using the operation above. Otherwise, print `NO`.

You may print each letter in any case (for example, `YES`, `Yes`, `yes`, `yEs` will all be recognized as positive answer).

Examples

Input	Output
3 5 3 2 3 2 5 4 3 4 2 4 4 5 4 2 1 5 3 6	NO YES YES

Note

In the first test case, we can prove that we can't make all $a_i \le 3$.

In the second test case, all a_i are already less or equal than $d = 4$.

In the third test case, we can, for example, choose $i = 5$, $j = 1$, $k = 2$ and make $a_5 = a_1 + a_2 = 2 + 1 = 3$. Array a will become $[2, 1, 5, 3, 3]$.

After that we can make $a_3 = a_5 + a_2 = 3 + 1 = 4$. Array will become $[2, 1, 4, 3, 3]$ and all elements are less or equal than $d = 4$.

Problem I. Long Sequence

Time Limit 2000 ms

Problem Statement

We have a sequence of N positive integers: $A = (A_1, \ldots, A_N)$.
Let B be the concatenation of 10^{100} copies of A.

Consider summing up the terms of B from left to right. When does the sum exceed X for the first time?
In other words, find the minimum integer k such that:

$$\sum_{i=1}^{k} B_i > X.$$

Constraints

- $1 \le N \le 10^5$
- $1 \le A_i \le 10^9$
- $1 \le X \le 10^{18}$
- All values in input are integers.

Input

Input is given from Standard Input in the following format:

```
N
A_1 ... A_N
X
```

Output

Print the answer.

Sample 1

Input	Output
3 3 5 2 26	8

We have $B = (3, 5, 2, 3, 5, 2, 3, 5, 2, \dots)$.
$\sum_{i=1}^{8} B_i = 28 > 26$ holds, but the condition is not satisfied when k is 7 or less, so the answer is 8.

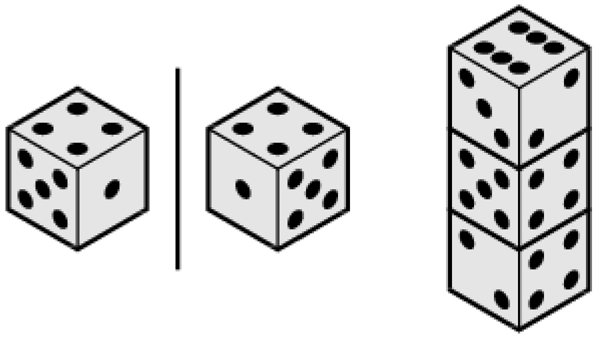
Sample 2

Input	Output
4 12 34 56 78 1000	23

Problem J. Dice Tower

Time Limit 2000 ms
Mem Limit 262144 kB
Input File stdin
Output File stdout

A dice is a cube, its faces contain distinct integers from 1 to 6 as black points. The sum of numbers at the opposite dice faces always equals 7. Please note that there are only two dice (these dices are mirror of each other) that satisfy the given constraints (both of them are shown on the picture on the left).



Alice and Bob play dice. Alice has built a tower from n dice. We know that in this tower the adjacent dice contact with faces with distinct numbers. Bob wants to uniquely identify the numbers written on the faces of all dice, from which the tower is built. Unfortunately, Bob is looking at the tower from the face, and so he does not see all the numbers on the faces. Bob sees the number on the top of the tower and the numbers on the two adjacent sides (on the right side of the picture shown what Bob sees).

Help Bob, tell whether it is possible to uniquely identify the numbers on the faces of all the dice in the tower, or not.

Input

The first line contains a single integer n $(1 \le n \le 100)$ — the number of dice in the tower.

The second line contains an integer x $(1 \le x \le 6)$ — the number Bob sees at the top of the tower. Next n lines contain two space-separated integers each: the i-th line contains numbers a_i, b_i $(1 \le a_i, b_i \le 6;\ a_i \ne b_i)$ — the numbers Bob sees on the two sidelong faces of the i-th dice in the tower.

Consider the dice in the tower indexed from top to bottom from 1 to n. That is, the topmost dice has index 1 (the dice whose top face Bob can see). It is guaranteed that it is possible to make a dice tower that will look as described in the input.

Output

Print "`YES`" (without the quotes), if it is possible to to uniquely identify the numbers on the faces of all the dice in the tower. If it is impossible, print "`NO`" (without the quotes).

Examples

Input	Output
3 6 3 2 5 4 2 4	YES

Input	Output
3 3 2 6 4 1 5 3	NO

Problem K. Utopian Tree

OS Linux

The Utopian Tree goes through 2 cycles of growth every year. Each spring, it *doubles* in height. Each summer, its height increases by 1 meter.

A Utopian Tree sapling with a height of 1 meter is planted at the onset of spring. How tall will the tree be after n growth cycles?

For example, if the number of growth cycles is $n = 5$, the calculations are as follows:

```
Period  Height
0          1
1          2
2          3
3          6
4          7
5          14
```

Function Description

Complete the *utopianTree* function in the editor below.

utopianTree has the following parameter(s):

- *int n*: the number of growth cycles to simulate

Returns

- *int:* the height of the tree after the given number of cycles

Input Format

The first line contains an integer, t, the number of test cases.
t subsequent lines each contain an integer, n, the number of cycles for that test case.

Constraints

$1 \leq t \leq 10$
$0 \leq n \leq 60$

Input	Output
3 0 1 4	1 2 7

Explanation

There are 3 test cases.

In the first case ($n = 0$), the initial height ($H = 1$) of the tree remains unchanged.

In the second case ($n = 1$), the tree doubles in height and is 2 meters tall after the spring cycle.

In the third case ($n = 4$), the tree doubles its height in spring ($n = 1, H = 2$), then grows a meter in summer ($n = 2, H = 3$), then doubles after the next spring ($n = 3$, $H = 6$), and grows another meter after summer ($n = 4, H = 7$). Thus, at the end of 4 cycles, its height is 7 meters.

Problem L. Palindrome with leading zeros

Time Limit 2000 ms
Mem Limit 1048576 kB

Problem Statement

Given is an integer N.

Is it possible to add zero or more `0`s at the beginning of the string representing N in base ten to get a palindrome?

Constraints

- $0 \leq N \leq 10^9$

Input

Input is given from Standard Input in the following format:

```
N
```

Output

If a palindrome can be made, print `Yes`; otherwise, print `No`.

Sample 1

Input	Output
1210	Yes

Adding one `0` at the beginning of `1210` results in `01210`, a palindrome.

Sample 2

Input	Output
777	Yes

`777` is already a palindrome.

Sample 3

Input	Output
123456789	No

Problem M. Honest Coach

Time Limit 2000 ms
Mem Limit 262144 kB

There are n athletes in front of you. Athletes are numbered from 1 to n from left to right. You know the strength of each athlete — the athlete number i has the strength s_i.

You want to split all athletes into two teams. Each team must have at least one athlete, and each athlete must be exactly in one team.

You want the strongest athlete from the first team to differ as little as possible from the weakest athlete from the second team. Formally, you want to split the athletes into two teams A and B so that the value $|\max(A) - \min(B)|$ is as small as possible, where $\max(A)$ is the maximum strength of an athlete from team A, and $\min(B)$ is the minimum strength of an athlete from team B.

For example, if $n = 5$ and the strength of the athletes is $s = [3, 1, 2, 6, 4]$, then one of the possible split into teams is:

- first team: $A = [1, 2, 4]$,
- second team: $B = [3, 6]$.

In this case, the value $|\max(A) - \min(B)|$ will be equal to $|4 - 3| = 1$. This example illustrates one of the ways of optimal split into two teams.

Print the minimum value $|\max(A) - \min(B)|$.

Input

The first line contains an integer t ($1 \leq t \leq 1000$) — the number of test cases in the input. Then t test cases follow.

Each test case consists of two lines.

The first line contains positive integer n ($2 \leq n \leq 50$) — number of athletes.

The second line contains n positive integers $s_1, s_2, \ldots, s_n$ ($1 \leq s_i \leq 1000$), where s_i — is the strength of the i-th athlete. Please note that s values may not be distinct.

Output

For each test case print one integer — the minimum value of $|\max(A) - \min(B)|$ with the optimal split of all athletes into two teams. Each of the athletes must be a member of exactly one of the two teams.

Examples

Input	Output
5 5 3 1 2 6 4 6 2 1 3 2 4 3 4 7 9 3 1 2 1 1000 3 100 150 200	1 0 2 999 50

Note

The first test case was explained in the statement. In the second test case, one of the optimal splits is $A = [2, 1]$, $B = [3, 2, 4, 3]$, so the answer is $|2 - 2| = 0$.