Greetings From Globussoft

- Given below are 5 Programming questions, you have to solve any 3 out of 5 questions.

- These 5 questions you can attempt in any technology like C/C++, java, .Net, PHP

- To solve these 3 questions you've max. 3 hours.

- While Solving these questions you are not allowed to use any Search Engine like Google, Yahoo, Bing ...

All the best for your test

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QUESTION - 1

Sameer and Arpit want to overcome their fear of Maths and so they have been recently practicing Maths problems a lot. Aman, their friend has been helping them out. But as it goes, Sameer and Arpit have got bored of problems involving factorials. Reason being, the factorials are too easy to calculate in problems as they only require the residue modulo some prime and that is easy to calculate in linear time. So to make things interesting for them, Aman - The Mathemagician, gives them an interesting task. He gives them a prime number P and an integer N close to P, and asks them to find N! modulo P. He asks T such queries.

Input

First line contains an integer T, the number of queries asked.

Next T lines contains T queries of the form “N P”. (quotes for clarity)

Output

Output exactly T lines, containing N! modulo P.

Example

Input:

```
3

2 5

5 11

21 71
```

Output:

```
2

10

6
```

QUESTION – 2

Two strings are said to be anagrams of each other if the letters of one string may be rearranged to make the other string. In this problem you’ll be given two strings. Your job is to find if the two

strings are anagrams of each other. If they are not anagrams then find the lexicographically smallest palindrome (in lowercase letters) that may be appended to the end of one of the two strings so that they become anagrams of each other.

The lower and upper case letters are considered equivalent. The number of spaces or any other punctuation is not important.

INPUT:

The first line of the input contains a number T, the number of test cases. T test cases follow. Each test case consists of two lines, one string in each line.

OUTPUT:

For each test case output a single line. Print 'YES' (without the quotes) if the two strings are anagrams of each other. If they are not, then print the lexicographically smallest string as discussed above. If no such string exists, then print 'NO LUCK' (without the quotes).

CONSTRAINTS:

1<=T<=100

1<=length of the strings<=100

SAMPLE TEST CASES:

INPUT:

```
4
Computer programmer
mature germ romp crop
Awaaay
away
internet
web
the terminator
I'm rotten hater
```

OUTPUT:

```
YES
```

```
aa
NO LUCK
YES
```

QUESTION – 3

Trouble has befallen the ninja world (again!). As always, our hero Naruto has taken the responsibility to defend everyone from the evil forces. His signature attack is the cloning jutsu (i.e. cloning technique) in which he produces one clone of himself in one second. Each clone of Naruto can also perform the cloning technique.

Naruto arrives alone at the battlefield at t=1 second. At each time step , t= 1,2,3,….,n second , some of the Narutos will leave to start fighting the enemy and the rest will stay back and perform the cloning jutsu again. If a clone has left to fight the enemy he cannot come back to perform the jutsu. Also at t=n seconds all Narutos will go to fight with the enemy, i. e. no more cloning will take place on and after n seconds. Naruto is a very dedicated ninja so he won't allow any of his clone to stay out of the fight.
The commander of the ninja forces observes Naruto's actions. He notes down the number of clones that went to fight the enemy at each time step(from t=1 second till t=n second). However he is old and doubts if his observations are correct. He hires you, a ninja with sharp analytical skills, to check if his observations can be valid or not.

INPUT:

The first line of the input contains t the number of test cases. The first line of each test case contains n, the time when all Naruto clones go to fight. In the second line of each test case there are n space separated integers that tell how many Naruto clones went to fight at successive seconds, starting from t = 1 second till t = n seconds;

OUTPUT:

For each test case output either "Yes" or "No" (without quotes) in a single line. "Yes" if the commander's observations were correct and "No" if they were wrong;

CONSTRAINTS:

1<= T <= 20

1<= n <=10^6

Each of the n integers will be less than or equal to 2 ^ 30

SAMPLE TEST CASES:

INPUT:

3
3
0 0 4
2
0 5
3
0 1 2

3

3

0 0 4

2

0 5

3

0 1 2

OUTPUT:

Yes

No

Yes

QUESTION – 4

You have an array containing n elements. At any move, you choose two indices i and j (0 <= i,j <n and i != j) and increment value at one index and decrement value at other index. You can make this move any number of times. What is the maximum number of elements which can have the same value (after any number of moves) ?

Input

First line consists of t, the number of test cases. (1<=t<=100)

t sets follow. Each set contains n, the number of elements in the array, in the first line. (1<=n<=100000)

Next line of each set consists of n space separated integers (0<=value<=100000)

Output

Output t lines each containing the required answer.

Example

```
Input:
1
4
1 2 3 4
Output:
3
```

QUESTION – 5

Suppose we have a sequence of non-negative integers, Namely a_1, a_2, ... ,a_n. At each time we can choose one term a_i with $0 < i < n$ and we subtract 1 from both a_i and a_{i+1}. We wonder whether we can get a sequence of all zeros after several operations.

Input

The first line is the number of test cases T ($0 < T <= 20$).

The first line of each test case is a number N. ($0 < N <= 10000$) The next line is N non-negative integers, $0 <= a_i <= 10^9$

Output

If it can be modified into all zeros with several operations output “YES” in a single line, otherwise output “NO” instead.

Example

```
Input:
```

```
2
2
1 2
2
2 2
```

Output:

```
NO
YES
```