

Submit a solution for A-111521. Royal Flush

Time limit:	1 s
Real time limit:	5 s
Memory limit:	256M

Problem A: 111521. Royal Flush

You are in a casino, the croupier offers you to play. You started playing and there is given a sorted deck of cards numbered 1 to N . He shows you a trick:

- We pick up 1 card and put it on the back of the deck.
- Now, we pick up another card, it turns out to be card numbered 1 , we put it outside the deck.
- Now we pick up 2 cards and put it on the back of the deck one by one.
- Now, we pick up another card and it turns out to be card numbered 2 , we put it outside of the deck.
- ...
- We perform this steps till the last card.

Note, that at some step i the number of cards in the deck can be less than i , in this case some cards can processed several times, see notes. You are questioned if you can repeat that trick. Output initial arrangement of the deck if possible, or say if it is impossible.

Input format

The first line of the input contains the number of test cases T ($1 \leq T \leq 100$), each of next T lines contain single integer N ($1 \leq N \leq 1000$) - the size of the deck for this test.

Output format

For each test case, in separate line output n space separated integers - the order of the deck from top card to bottom if such arrangement of decks is possible, or -1 otherwise.

Examples

Input

```
2
4
5
```

Output

```
2 1 4 3
3 1 4 5 2
```

Input

```
3
5
6
6
```

Output

```
3 1 4 5 2
4 1 6 3 2 5
4 1 6 3 2 5
```

Notes

In the first test case of the first example the deck is processed as follows:

- initially deck is $[2143]$,
- put one card at the back: $[1432]$,
- take out 1 : $[432]$,
- put two cards at the back, one by one: $[243]$,
- take out 2 : $[43]$,
- put three card at the back one by one: $[43] \rightarrow [34] \rightarrow [43] \rightarrow [34]$,
- take out 3 : $[4]$,
- pretend to do smth then take out 4 : $[]$.

Submit a solution for B-187147. Nugman and Stack

Time limit: 2 s

Real time limit: 5 s

Memory limit: 256M

Problem B: 187147. Nugman and Stack

One day Nugman was solving problems from LAB1 and he almost solved every problem in the laboratory work. Just one problem left that Nugman couldn't solve. Nugman asks for your help.

You are given N people in the queue, i -th person has age a_i . Queue starts at position 1. Each person wants to know if there is a younger person before him in a queue, in particular, the age of the closest person that is younger before him, otherwise print -1 .

Input format

The first line of input consists of a single integer $1 \leq N \leq 10^5$ that describes the number of people in the queue. The next line contains N integers $1 \leq a_i \leq 10^9$, which describes the age of people in the i -th position.

Output format

Output N numbers separated by the whitespaces, where i -th number is the answer for the i -th person.

Examples

Input

```
5
2 1 5 8 3
```

Output

```
-1 -1 1 5 1
```

Input

```
5
1 2 3 4 5
```

Output

```
-1 1 2 3 4
```


Submit a solution for C-153651. Equal strings

Time limit: 1 s

Real time limit: 5 s

Memory limit: 256M

Problem C: 153651. Equal strings

Given two strings. Each string contains lower case English letters and the # symbol, which means you typed backspace. Check if two strings are equal.

Input format

Input contains single line consisting of two strings s_1 ($0 \leq |s_1| \leq 10^5$) and s_2 ($0 \leq |s_2| \leq 10^5$) separated by the whitespace.

Output format

Print single 'Yes' if they are equal or 'No' otherwise.

Examples

Input

```
abc## a#b#a
```

Output

```
Yes
```

Input

```
ab#c ad#c
```

Output

```
Yes
```

Input

```
a#c bb##
```

Output

```
No
```

Submit a solution for D-151435. Balanced sequence of letters

Time limit: 1 s

Real time limit: 5 s

Memory limit: 256M

Problem D: 151435. Balanced sequence of letters

You are given a string s containing lowercase Latin letters $[a - z]$. Determine if string is *balanced*.

Here is description of balanced strings:

- empty string is balanced
- if strings s and t are balanced, then string st (concatenation) is also balanced
- if string s is balanced, then string xsx is balanced for any lowercase Latin letter x .

For example, string *abba* is balanced, but string *abbb* is not.

Input format

The input line contains single string S ($1 \leq S.length() \leq 10^5$).

Output format

Print "YES" if string is balanced, otherwise print "NO"

Examples

Input

```
sbaabsss
```

Output

```
YES
```

Input

```
sbabasss
```

Output

```
NO
```

Input

```
baab
```

Output

```
YES
```

Input

```
abpa
```


Submit a solution for E-153545. Boris vs Nursik

Time limit: 1 s

Real time limit: 5 s

Memory limit: 256M

Problem E: 153545. Boris vs Nursik

Boris and Nursik play a drunkard card game. In the drunkard card game, all cards are divided equally between two players. Then they reveal one top card, and the one whose card is higher takes both of the revealed cards for himself, which are put under the bottom of his deck. The one who is left without cards loses.

The player who takes the cards for himself first puts the Boris's card under the bottom of his deck, then the Nursik's card (that is, the Nursik's card is at the bottom of the deck).

Write a program that simulates the drunkard card game and determines who wins. The game involves 10 cards with values from 0 to 9, the larger card wins the smaller one. The one special thing is that the card with a value of 0 wins card 9.

Input format

The program receives two lines as input: the first line contains 5 numbers separated by spaces - the numbers of the Boris's cards, the second - Nursik's 5 cards. For simplicity, we will assume that all cards are different in value. The cards are listed from top to bottom, that is, each line starts with the card that will be opened first.

Output format

The program must determine who wins, and output the word *Boris* or *Nursik*, then output the number of moves made before winning. If the game does not end within 10^6 moves, the program should output only *blin nichya*.

Examples

Input

```
1 3 5 7 9
2 4 6 8 0
```

Output

```
Nursik 5
```

A

B

C

D

E

F

G

H

I

J

Submit a solution for F-105787. Prime Numbers

Time limit: 1 s

Real time limit: 5 s

Memory limit: 256M

Problem F: 105787. Prime Numbers

Just print n-th prime number.

Input format

Given an integer N ($1 \leq N \leq 1000$).

Output format

Print n-th prime number.

Examples

Input

5

Output

11

Notes

Note that 100th prime number is not equal to 100.

Submit a solution for G-149557. Vanya and Primes 2

Time limit: 2 s

Real time limit: 5 s

Memory limit: 256M

Problem G: 149557. Vanya and Primes 2

On the previous quiz, you needed to find n-th prime for Vanya. I think it was very easy, so let's make it a little harder. You need to find a prime whose index is n-th prime. As an example prime numbers is: 2, 3, 5, 7... have indexes 1,2,3,4... so 2 and 3 indexes are primes too, therefore we have sequence of "superprimes" like: 3, 5, 11, 17... Find n-th superprime.

Input format

Integer n. ($1 \leq n \leq 100$)

Output format

N-th superprime

Examples

Input

1

Output

3

Input

2

Output

5

Input

3

Output

11

Input

5

Output

31

Submit a solution for H-140306. Prime or not

Time limit: 1 s

Real time limit: 5 s

Memory limit: 256M

Problem H: 140306. Prime or not

Asman is very curious and likes to check whether some number is prime or not. Check if the number is prime. A prime number is a number that has only 2 divisors, it is 1 and the number itself.

Input format

The only line of the input contains one integer a ($1 \leq a \leq 10^6$).

Output format

Print "YES" (without quotes) if the number is prime. Otherwise print "NO" (without quotes)

Examples

Input

1

Output

NO

Input

10

Output

NO

Input

2

Output

YES

Input

97

Output

YES

Submit a solution for I-197984. Classroom of the Elite

Time limit: 1 s

Real time limit: 5 s

Memory limit: 256M

Problem I: 197984. Classroom of the Elite

In class A, students want to establish a class leader. The class splitted into two fractions: Sakayanagi and Katsuragi. They decided to decide the leader by the following procedure:

1. Each of n students makes a statement. They make statements one by one starting from student 1 and finishing with student n . If student were kicked from the procedure, he/she is skipped.
2. When student makes a statement, he/she can kick any other student from procedure. If someone is kicked from procedure he no longer participates in the procedure till the very end.
3. When the round is finished, i.e. all students are done with their statements, the procedure repeats from step 1.
4. The process repeats until there is only one student eligible to participate and this student becomes the group leader.

Determine the fraction of the group leader, if both fractions play optimally (i.e. both fractions act best they can to make the group leader from their fraction).

Input format

The first line contains a single integer n ($1 \leq n \leq 200000$) — the number of students in class A. The next line contains n characters. The i -th character is 'S' if the i -th student votes for Sakayanagi or 'K' if votes for Katsuragi.

Output format

Print single line: the name of the fraction without quotes.

"SAKAYANAGI" — if Sakayanagi will win.

"KATSURAGI" — if Katsuragi will win.

Examples

Input

```
4
KSKS
```

Output

```
KATSURAGI
```

Input

```
5
SSKKK
```

Output

```
SAKAYANAGI
```

Submit a solution for J-77223. Deque

Time limit: 1 s

Real time limit: 5 s

Memory limit: 256M

Problem J: 77223. Deque

Zhansaya wants to find the sum of first and the last number of her deque. If she tired she shows the character '!' , if she wants to add a number to the begin she shows '+', and if she wants to add to the back , shows character '-' and if she shows '*', you have to find the sum of first and last elements and delete elements. Help her to solve this problem.

Input format

You are given characters '+', '-', '!', '*' , and numbers.

Output format

For '*' query print the answer to the problem. Note that if deque is empty print "error".

Examples

Input

```
+ 1
- 9
+ 2
*
+ 2
- 6
+ 3
- 9
*
*
*
*
!
```

Output

```
11
12
8
2
error
```

Input

```
+ 1
+ 2
- 9
- 2
*
!
```

Output

```
4
```