Problem A. 1

Time limit	2000 ms
Mem limit	65536 kB
OS	Windows

Given a number N and an array A of N numbers. Determine if the number X **exists** in array A or **not** and print its position **(0-index)**.

Note: X may be found **once** or **more than once** and **may not be found**.

Input

First line contains a number N $(1 \le N \le 10^5)$ number of elements.

Second line contains N numbers $(0 \le A_i \le 10^9)$.

Third line contains a number X $(0 \le X \le 10^9)$.

Output

Print the **position** of X in the first time you find it. If it doesn't **exist** print **-1**.

Examples

Input	Output

3
3 0 1
0
	1

Input	Output

5
1 3 0 4 5
10
	-1

Input	Output

4
2 3 2 1
2
	0

Problem B. 2

Time limit 1000 ms
Mem limit 262144 kB
OS Windows

Given a number N and an array A of N numbers. Print the array after doing the following operations:

- Replace every **positive** number by 1.
- Replace every **negative** number by 2.

Input

First line contains a number N ($2 \leq N \leq 1000$) number of elements.

Second line contains N numbers ($-10^5 \leq A_i \leq 10^5$).

Output

Print the array after the **replacement** and it's values separated by space.

Examples

Input	Output
5 1 -2 0 3 4	1 2 0 1 1

Problem C. 3

Time limit	2000 ms
Mem limit	65536 kB
OS	Windows

Given a number N and an array A of N numbers. Print the **absolute summation** of these numbers.

absolute value : means to remove any negative sign in front of a number .

EX : |-5| = 5 , |7| = 7

Input

First line contains a number N ($1 \le N \le 10^5$) number of elements.

Second line contains N numbers ($-10^9 \le A_i \le 10^9$).

Output

Print the **absolute summation** of these numbers.

Examples

Input	Output
4 7 2 1 3	13

Input	Output
3 -1 2 -3	2

Note

Second Example :

-1 + 2 + -3 = -2 and it absolute is 2 so the answer is **2**.

Problem D. 4

Time limit	1000 ms
Mem limit	262144 kB
OS	Windows

Given a number N and an array A of N numbers. Determine if it's **palindrome** or **not**.

Note:

An array is called **palindrome** if it reads the same backward and forward, for example, arrays { **1** } and { **1,2,3,2,1** } are **palindromes**, while arrays { **1,12** } and { **4,7,5,4** } are **not**.

Input

First line contains a number N $(1 \le N \le 10^5)$ number of elements.

Second line contains N numbers $(1 \le A_i \le 10^9)$.

Output

Print "**YES**" (without quotes) if A is a **palindrome** array, otherwise, print "**NO**" (without quotes).

Examples

Input	Output
5 1 3 2 3 1	YES

Input	Output
4 1 2 3 4	NO

Problem E. 5

Time limit	1000 ms
Mem limit	262144 kB
OS	Windows

Given a number N. Print first N numbers of the **Fibonacci** sequence.

Note: In order to create the **Fibonacci** sequence use the following function:

- fib(1) = 0.
- fib(2) = 1.
- fib(n) = fib(n - 1) + fib(n - 2).

Input

Only one line containing a number $N\,(1 \le N \le 45)$.

Output

Print the first N numbers from the **Fibonacci** Sequence .

Examples

Input	Output
`7`	`0 1 1 2 3 5 8`

Note

For more information visit Fibonacci: https://www.mathsisfun.com/numbers/fibonacci-sequence.html.

Problem F. 6

Time limit	1000 ms
Mem limit	262144 kB
OS	Windows

Given a number N and an array A of N numbers. Print all array **positions** that store a number less than or equal to **10** and the **number stored** in that position.

Input

First line contains a number N $(2 \leq N \leq 1000)$ number of elements.

Second line contains N numbers ($-10^5 \leq A_i \leq 10^5$).

it's guaranteed that there is at least one number in array less than or equal to 10.

Output

For each number in the array that is equal to or less than **10** print a single line contains "A[i] = X", where **i** is the **position** in the array and X is the number **stored in the position**.

Examples

Input	Output

`5`
`1 2 100 0 30`
	`A[0] = 1`
	`A[1] = 2`
	`A[3] = 0`

Problem G. 7

Time limit	1000 ms
Mem limit	262144 kB
OS	Windows

Given a string S. Print the **origin string** if it's **not too long** otherwise, print the **special abbreviation**.

Note: The string is called **too long**, if its length is strictly more than **10** characters. If the string is **too long** then you have to print the string in the following manner:

- Print the **first** character in the string.
- Print number of characters between the first and the last characters.
- Print the **last** character in the string.

For example: "localization" will be "l10n", and "internationalization" will be "i18n".

Input

The first line contains a number T $(1 \leq T \leq 100)$ number of test cases.

Each of the T following lines contains a string S $(1 \leq |S| \leq 100)$ where |S| is the length of the string.

It's guaranteed that S contains only lowercase Latin letters.

Output

For each test case, print the result string.

Examples

Input	Output
4 word localization internationalization pneumonoultramicroscopicsilicovolcanoconiosis	word l10n i18n p43s

Problem H. 8

Time limit 1000 ms
Mem limit 65536 kB
OS Windows

Given a number N and an array A of N numbers. Print the numbers after **sorting** them.

Note:

- Don't use built-in-functions.
- try to solve it with bubble sort algorithm or Selection Sort.
- for more information watch : https://www.youtube.com/watch?v=EnodMqJuQEo.

Input

First line contains a number N $(0 < N < 10^3)$ number of elements.

Second line contains N numbers $(- 100 \le A_i \le 100)$.

Output

Print the numbers after **sorting** them.

Examples

Input	Output
3 3 1 2	1 2 3

Input	Output
4 5 2 7 3	2 3 5 7

Problem I. 9

Time limit	1000 ms
Mem limit	262144 kB
OS	Windows

Given a number N and an array A of N numbers. Print **the smallest** possible result of $A_i + A_j$ $+ \boldsymbol{j} - \boldsymbol{i}$, where $\mathbf{1} \le \mathbf{i} < \mathbf{j} \le \boldsymbol{N}$.

Input

The first line contains a number $T\,(1 \le T \le 100)$ number of test cases.

Each test case contains two lines:

- The first line consists a number $N\,(2 \le N \le 100)$ number of elements.
- The second line contains N numbers $(- 10^6 \le A_i \le 10^6)$.

Output

For each test case print a single line contains **the smallest** possible sum for the corresponding test case.

Examples

Input	Output

1
4
20 1 9 4
	7

Note

First Case :

All possibles **(i,j)** where $(\mathbf{1} \le \mathbf{i} < \mathbf{j} \le \boldsymbol{N})$ are :

i = 1 , j = 2 then result = $\boldsymbol{a_1} + \boldsymbol{a_2}$ **+ j - i = 20 + 1 + 2−1 = 22**.

i = 1 , j = 3 then result = $a_1 + a_3$ **+ j - i = 20 + 9 + 3-1 = 31**.

i = 1 , j = 4 then result = $a_1 + a_4$ **+ j - i = 20 + 4 + 4-1 = 27**.

i = 2 , j = 3 then result = $a_2 + a_3$ **+ j - i = 1 + 9 + 3-2 = 11**.

i = 2 , j = 4 then result = $a_2 + a_4$ **+ j - i = 1 + 4 + 4-2 = 7**.

i = 3 , j = 4 then result = $a_3 + a_4$ **+ j - i = 9 + 4 + 4-3 = 14**.

So the smallest possible result is **7**.

Problem J. 10

Time limit	2000 ms
Mem limit	65536 kB
OS	Windows

Given a string S. Determine whether this string is **Good** or **Bad**.

Note: The string is **Good** if and only if it has "**010**" or "**101**" as one of its sub-strings and it's not necessary to have both of them.

A substring of a string is a contiguous subsequence of that string. So, string "forces" is substring of string "codeforces", but string "coder" is not.

Input

The first line contains a number $T\,(1 \le T \le 100)$ number of test cases.

Each of the T following lines contains a string $S\,(1 \le |S| \le 10^5)$ where |S| is the length of the string..

It's guaranteed that S contains only '1s' and '0s'.

Output

For each test case, print "**Good**" if the string is **Good** otherwise, print "**Bad**".

Examples

Input	Output
2 11111110 10101010101010	Bad Good

Note

Example case 1:

The string doesn't contain **010** or **101** as sub-strings.

Example case 2:

The string contains both **010** and **101** as sub-strings.

Problem K. 11

Time limit 1000 ms
Mem limit 262144 kB
OS Windows

A sub-array of array is an array composed from a contiguous block of the original array's elements.

In other words A sub-array **A[i-j]**, where $(1 \leq i \leq j \leq N)$, is a sequence of integers A_i, A_{i+1}, ..., A_j.

For Example :

IF array = **[1,6,3,7]** then the **subarrays** are **[1]** , **[6]** , **[3]** , **[7]** , **[1,6]** , **[6,3]**,**[3,7]**, **[1,6,3]** , **[6,3,7]** , **[1,6,3,7]** .

Something like **[1,3]** would not be a sub-array as it's not a contiguous subsection of the original array.

Given a number N and an array A of N numbers. Print the **maximum** number of every sub-array separated by space.

Input

First line contains a number $T\,(1 \leq T \leq 5)$ number of test cases.

Each test case contains two lines:

- First line contains a number $N\,(1 \leq N \leq 100)$ number of elements.
- Second line contains N numbers $(-10^5 \leq A_i \leq 10^5)$.

Output

For each test case print a single line contains the **maximum** number of every sub-array separated by space.

print the answer in any order.

Examples

Input	Output

2
4
1 6 3 7
3
3 1 2
	1 6 3 7 6 6 7 6 7 7
	3 3 3 1 2 2

Note

First Case :

All Sub arrays are :

[1] , [6] , [3] , [7] , [1,6] , [6,3],[3,7], [1,6,3] , [6,3,7] , [1,6,3,7]

- Sub-array **[1]** it maximum number is **1**.

- Sub-array **[6]** it maximum number is **6**.

- Sub-array **[3]** it maximum number is **3**.

- Sub-array **[7]** it maximum number is **7**.

- Sub-array **[1,6]** it maximum number is **6**.

- Sub-array **[6,3]** it maximum number is **6**.

- Sub-array **[3,7]** it maximum number is **7**.

- Sub-array **[1,6,3]** it maximum number is **6**.

- Sub-array **[6,3,7]** it maximum number is **7**.

- Sub-array **[1,6,3,7]** it maximum number is **7**.

so the maximum numbers are **[1,6,3,7,6,6,7,6,7,7] you can print them in any order**.

Problem L. 12

Time limit	2000 ms
Mem limit	65536 kB
OS	Windows

Given a string S. Determine how many times does each letter **occurred** in S.

Input

Only one line contains the string S $(1 \le |S| \le 10^7)$ where |S| is the length of the string and it consists of only **lowercase** English letters.

Output

For each character that appears in S, print a single line that contains the following format: "$X : Y$" where X is the letter and Y is the number of times that letter X occurred in S.

Note: you must print letters in **ascending** order.

Examples

Input	Output

`aaabbc`	`a : 3`
	`b : 2`
	`c : 1`

Input	Output

`regff`	`e : 1`
	`f : 2`
	`g : 1`
	`r : 1`

Problem M. 13

Time limit 1000 ms
Mem limit 262144 kB
OS Windows

Given a name S. Print "Hello, (name)" without parentheses.

Input

Only one line containing a string S.

Output

Print "Hello, " without quotes, then print name.

Examples

Input	Output
`programmer`	`Hello, programmer`

Problem N. 14

Time limit 1000 ms
Mem limit 262144 kB
OS Windows

Given a string S. Determine whether S is **Palindrome** or **not**

Note: A string is said to be a **palindrome** if **the reverse** of the string is **same** as the string. For example, "abba" is **palindrome**, but "abbc" is not **palindrome**.

Input

Only one line contains a string S $(1 \leq |S| \leq 1000)$ where |S| is the length of the string and it consists of **lowercase** letters only.

Output

Print "**YES**" if the string is **palindrome**, otherwise print "**NO**".

Examples

Input	Output
abba	YES

Input	Output
icpcassiut	NO

Input	Output
mam	YES

Problem O. 15

Time limit	1000 ms
Mem limit	262144 kB
OS	Windows

Given a number N. Print a face down right angled triangle that has N rows.

For more clarification see the example below.

Input

Only one line containing a number N $(1 \le N \le 99)$.

Output

Print the answer according to the required above.

Examples

Input	Output
4	**** *** ** *

Note

Don't print any extra spaces after symbol " * ".

Problem P. 16

Time limit	2000 ms
Mem limit	65536 kB
OS	Windows

Given a number N. Print the **factorial** of number N.

Input

First line contains a number $T\,(1 \leq T \leq 15)$ number of test cases.

Next T lines will contain a number $N\,(0 \leq N \leq 20)$

Output

For each test case print a single line contains the **factorial** of N.

Examples

Input	Output
2 5 3	120 6

Note

Factorial, in mathematics, the product of all positive integers less than or equal to a given positive integer and denoted by that integer and an exclamation point.

Thus, factorial seven is written $7!$, meaning **1 * 2 * 3 * 4 * 5 * 6 * 7 = 5040** .

Factorial zero is defined as equal to 1.

In first test case for N = 5 , **5! = 1 * 2 * 3 * 4 * 5 = 120** so the answer is **120**.

In Second test case for N = 3 , **3! = 1 * 2 * 3 = 6** so the answer is **6**.

Problem Q. 17

Time limit	1000 ms
Mem limit	262144 kB
OS	Windows

Given N numbers. **Count** how many of these values are **even, odd, positive** and **negative**.

Input

First line contains one number $N\,(1 \le N \le 10^3)$ number of values.

Second line contains N numbers $(-10^5 \le X_i \le 10^5)$.

Output

Print four lines with the following format:

First Line: "Even: X", where X is the number of **even** numbers in the given input.

Second Line: "Odd: X", where X is the number of **odd** numbers in the given input.

Third Line: "Positive: X", where X is the number of **positive** numbers in the given input.

Fourth Line: "Negative: X", where X is the number of **negative** numbers in the given input.

Examples

Input	Output
5 -5 0 -3 -4 12	Even: 3 Odd: 2 Positive: 1 Negative: 3

Note

First Example :

Even Numbers are : **0, -4 , 12**

Odd Numbers are : **-5 , -3**

Positive Numbers are : **12**

Negative Numbers are : **-5 , -3 , -4**

Problem R. 18

Time limit 1000 ms
Mem limit 262144 kB
OS Windows

Given a number N. Print a left angled triangle that has N rows.

For more clarification see the example below.

Input

Only one line containing a number N $(1 \leq N \leq 99)$.

Output

Print the answer according to the required above.

Examples

Input	Output
4	* ** *** ****

Note

Don't print any extra spaces after symbol " * ".

Problem S. 19

Time limit 1000 ms

Mem limit 262144 kB

OS Windows

Given a number N. Print a pyramid that has N rows.

For more clarification see the example below.

Input

Only one line containing a number N $(1 \le N \le 99)$.

Output

Print the answer according to the required above.

Examples

Input	Output

4	*
	   ***
	  *****
	 *******

Note

Don't print any extra spaces after symbol " * ".

Problem T. 20

Time limit 3000 ms
Mem limit 65536 kB
OS Windows

Given a number X. Determine if the number is **prime** or **not**

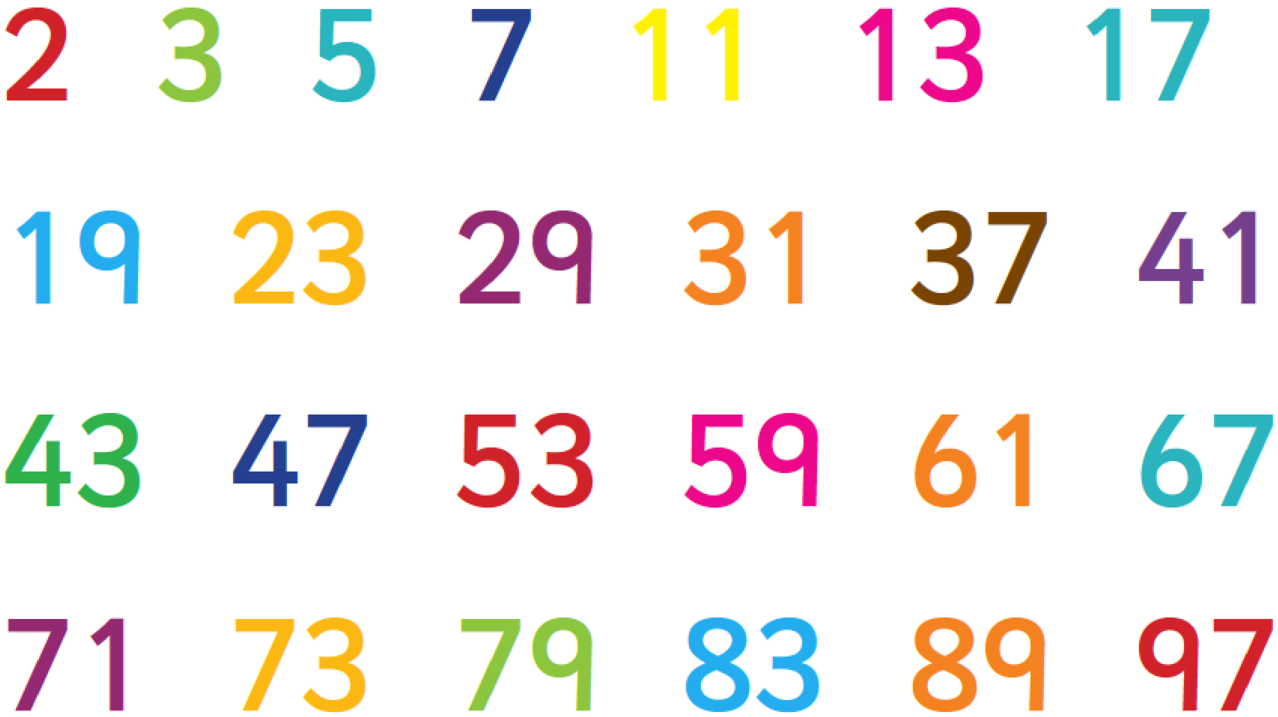
Note:

A **prime** number is a number that is greater than **1** and has only two factors which are **1** and **itself**.

In other words : **prime number divisible only by 1 and itself**.

Be careful that 1 is not prime .

The first few **prime** numbers are



2 3 5 7 11 13 17

19 23 29 31 37 41

43 47 53 59 61 67

71 73 79 83 89 97

Input

Only one line containing a number X $(2 \le X \le 10^5)$.

Output

print "**YES**" if the number is **prime** and "**NO**" otherwise.

Examples

Input	Output
`7`	`YES`

Input	Output
`15`	`NO`

Note

First Example :

7 is prime because it is not divisible by **2,3,4,5,6,** and only divisible by 1 and itself, so the answer is **YES**.

Second Example :

15 not is prime because it is divisible by **3 ,5**, so the answer is **NO**.