Print Recursion

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

Given a number N. Print "**I love Recursion**" N times.

Note: Solve this problem using recursion.

Input

Only one line containing a number N $(1 \leq N \leq 100)$.

Output

Print "**I love Recursion**" N times.

Example

standard input	standard output
3	I love Recursion
	I love Recursion
	I love Recursion

Print from 1 to N

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	64 megabytes

Given a number N. Print numbers from **1** to N in separate lines.

Note: Solve this problem using recursion.

Input

Only one line containing a number N $(1 \leq N \leq 10^3)$.

Output

Print N lines according to the required above.

Example

standard input	standard output
5	1 2 3 4 5

Print from N to 1

Input file:	standard input
Output file:	standard output
Time limit:	1 second
Memory limit:	64 megabytes

Given a number N. Print all numbers from N to **1** separated by a single space.

Note: Solve this problem using recursion.

Input

Only one line containing a number N $(1 \leq N \leq 10^3)$.

Output

Print from N to **1** separated by a single space.

Example

standard input	standard output
4	4 3 2 1

Note

Make sure don't print any leading or trailing spaces.

Print Digits using Recursion

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

Given a number N. Print the digits of N separated by a space.

Note: Solve this problem using recursion.

Input

First line contains a number T $(1 \leq T \leq 10)$ number of test cases.

Next T lines will contain a number N $(0 \leq N \leq 10^9)$.

Output

For each test case print a single line contains the **digits of the number** separated by space.

Example

standard input	standard output
3 121 39 123456	1 2 1 3 9 1 2 3 4 5 6

Base Converssion

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

Given a number N. Print the binary equivalent of N.

Note: Solve this problem using recursion.

Input

First line contains a number T $(1 \leq T \leq 10^4)$ number of test cases.

Next T lines will contain a number N $(1 \leq N \leq 10^9)$.

Output

For each test case print a single line contains the answer according to the required above.

Example

standard input	standard output
2 10 3	1010 11

Note

To convert decimal number to binary :

A decimal integer can be converted to binary by dividing it by 2.

Take the quotient, and keep dividing it by 2, until you reach zero.

Each time you perform this division, take note of the remainder. Now reverse the remainders list, and you get the number in binary form

Example to convert 29 to binary

Step	Operation	Result	Remainder
Step 1	29 / 2	14	1
Step 2	14 / 2	7	0
Step 3	7 / 2	3	1
Step 4	3 / 2	1	1
Step 5	1 / 2	0	1

for more details visit this `https://flaviocopes.com/converting-decimal-to-binary/`.

Print Even Indices

Input file:	standard input
Output file:	standard output
Time limit:	1 second
Memory limit:	256 megabytes

Given a number N and an array A of N numbers. Print the numbers in **even** indices in a reversed order.

Note:

- Assume array A is 0-based indexing.

- Solve this problem using recursion.

Input

First line contains a number N $(1 \leq N \leq 10^3)$ number of elements.

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

Output

Print numbers in even indices in a reversed order separated by spaces.

Examples

standard input	standard output
4 1 4 2 7	2 1
7 1 5 8 2 3 9 11	11 3 8 1

Pyramid

Input file:	**standard input**
Output file:	**standard output**
Time limit:	1 second
Memory limit:	256 megabytes

Given a number N. Print a pyramid of height N.

Note: Solve this problem using recursion.

Input

Only one line containing a number N ($1 \le N \le 10^3$).

Output

Print the pyramid in N lines.

Examples

standard input	standard output
1	`*`
2	` *` `***`

3	`  *`
	` ***`
	`*****`

4	`   *`
	`  ***`
	` *****`
	`*******`

Note

Don't print any extra space after '*'.

Inverted Pyramid

Input file:	**standard input**
Output file:	**standard output**
Time limit:	1 second
Memory limit:	256 megabytes

Given a number N. Print an inverted pyramid of height N.

Note: Solve this problem using recursion.

Input

Only one line containing a number N $(1 \leq N \leq 10^3)$.

Output

Print the pyramid in N lines.

Don't print any extra space after '*'.

Examples

standard input	standard output
1	*
2	*** *
3	***** *** *

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

Count Vowels

Input file:	standard input
Output file:	standard output
Time limit:	1 second
Memory limit:	256 megabytes

Given a string S. Print number of vowels in the string.

Note:

- Vowel letters: ['**a**', '**e**', '**i**', '**o**', '**u**'].

- Vowel letters could be capital or small.

- Solve this problem using recursion.

Input

Only one line containing a string S ($1 \leq |S| \leq 200$) where |S| is the length of the string and it consists only of **capital** ,**small** letters and **spaces**.

Output

Print number of vowels in string S.

Example

standard input	standard output
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Factorial

Input file:	standard input
Output file:	standard output
Time limit:	1 second
Memory limit:	64 megabytes

Given a number N. Print factorial of N.

Note: Solve this problem using recursion.

Input

Only one line containing a number N $(1 \leq N \leq 20)$.

Output

Print the factorial of the number N.

Example

standard input	standard output
5	120

Max Number

Input file:	standard input
Output file:	standard output
Time limit:	1 second
Memory limit:	64 megabytes

Given a number N and an array A of N numbers. Print the **maximum** value in this array.

Note: Solve this problem using recursion.

Input

First line contains a number N $(1 \leq N \leq 10^3)$ number of elements.

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

Output

Print the **maximum** value in this array.

Example

standard input	standard output
5 1 -3 5 4 -6	5

Summation

Input file:	standard input
Output file:	standard output
Time limit:	1 second
Memory limit:	256 megabytes

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

Note: Solve this problem using recursion.

Input

First line contains a number N $(1 \leq N \leq 10^3)$ number of elements.

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

Output

Print the **summation** of the N numbers.

Examples

standard input	standard output
4 1 4 2 7	14
4 5 5 5 5	20

Suffix Sum

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

Given two numbers N and M, and an array A of N numbers. Calculate the sum of the last M numbers.

Note: solve this problem using recursion.

Input

First line contains two numbers N and M ($1 \le M \le N \le 10^5$).

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

Output

Print the sum of the last M numbers of the given array.

Example

standard input	standard output
5 3 1 8 2 10 3	15

Sum of a Matrix

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

Given two matrices A and B of size $R * C$. Print the **summation** of A and B.

Note: Solve this problem using recursion.

Input

First line contains two numbers R and C ($1 \le R, C \le 100$). number of rows and number of columns respectively.

Next R lines will contain C numbers ($-100 \le A_{i,j} \le 100$) matrix A numbers.

Next R lines will contain C numbers ($-100 \le B_{i,j} \le 100$) matrix B numbers.

Output

Print the **summation** result.

Example

standard input	standard output
2 3 1 2 3 4 5 6 1 3 5 7 9 11	2 5 8 11 14 17

Fibonacci

Input file:	standard input
Output file:	standard output
Time limit:	1 second
Memory limit:	256 megabytes

Given a number N. Print the value of the N_{th} Fibonacci number.

$$F(n) \begin{cases} 0 & \text{if } n = 1 \\ 1 & \text{if } n = 2 \\ F(n\text{-}1) + F(n\text{-}2) & \text{if } n \geq 3 \end{cases}$$

Note: Solve this problem using recursion.

Input

Only one line containing a number N $(1 \leq N \leq 30)$.

Output

Print the value of the N_{th} Fibonacci number.

Example

standard input	standard output
5	3

Note

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

Log2

Input file:	standard input
Output file:	standard output
Time limit:	1 second
Memory limit:	256 megabytes

Given a number N. Print $\lfloor log_2(N) \rfloor$.

Note: Solve this problem using recursion.

Input

Only one line containing a number N $(1 \leq N \leq 10^{18})$.

Output

Print the answer required above.

Examples

standard input	standard output
1	0
8	3

3n + 1 sequence

Input file:	**standard input**
Output file:	**standard output**
Time limit:	1 second
Memory limit:	256 megabytes

Given a number n, you should print the length of the $3n + 1$ sequence starting with n.

The sequence is constructed as follows:

- If the number n is odd, the next number will be $3n + 1$.

- If the number n is even, the next number will be $n/2$.

For example, the $3n + 1$ sequence of 3 is $3, 10, 5, 16, 8, 4, 2, 1$ and its length is 8.

Note: Solve this problem using recursion.

Input

Only one line containing a number n $(1 \leq n \leq 10^5)$.

Output

Print the length of $3n + 1$ **sequence** of the given n.

Examples

standard input	standard output
1	1
2	2
3	8

Palindrome Array

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

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**.

NOTE: Solve it using recursion.

Input

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

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

Output

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

Examples

standard input	standard output
5 1 3 2 3 1	YES
4 1 2 3 4	NO

Array Average

Given a number N and an array A of N numbers. Calculate the average of these numbers.

Note: solve this problem using recursion.

Input

First line contains a number N ($1 \leq N \leq 100$) number of elements.

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

Output

Print the calculated **average**, with **6** digits after the decimal point.

Example

standard input	standard output
5 1 2 3 4 5	3.000000

Combination

Input file:	standard input
Output file:	standard output
Time limit:	2 seconds
Memory limit:	64 megabytes

Given two numbers N and R. Print the $^{N}C_{R}$ value.

Note: Solve this problem using recursion.

Input

Only one line contains two numbers N and R ($0 \leq N, R \leq 30$).

Output

Print the $^{N}C_{R}$ value.

Examples

standard input	standard output
4 2	6
3 3	1

Note

For more information visit combination:

https://www.mathsisfun.com/combinatorics/combinations-permutations.html

Knapsack

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	256 megabytes

There are N items numbered from **1** to N. The i_{th} item has a weight of w_i and a value of v_i.

You have to choose some items out of the N items and carry them home in a knapsack. The capacity of the knapsack is W which donate the **maximum** weight that can be carried inside the knapsack. In other words, W means the total summation of all weights of items that can be carried in the knapsack.

Print **maximum** possible sum of values of items that you can take home.

Note: Solve this problem using recursion.

Input

First line contains two numbers N and W $(1 \le N \le 20, 1 \le W \le 100)$ number of items and the capacity of the knapsack.

Next N lines will contain two numbers w_i and v_i $(1 \le w_i \le 50, 1 \le v_i \le 1000)$

Output

Print **maximum** possible sum of values of items that you can take home.

Examples

standard input	standard output
3 8 3 30 4 50 5 60	90
6 15 6 5 5 6 6 4 6 6 3 5 7 2	17

Creating Expression1

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

Given two numbers N ,X and an array A of N numbers. Determine if there is a way to put '+' or '-' signs between every two numbers in the array A in order to make an expression that is equal to X.

Note: Solve this problem using recursion.

Input

First line contains two numbers N and X ($1 \leq N \leq 20, -10^9 \leq X \leq 10^9$).

Second line contains N distinct numbers $A_1, A_2, ...A_N$ ($1 \leq A_i \leq 10^5$).

Output

Print "**YES**" if you can put '+' or '-' signs between every two number to create an expression that is equal to X otherwise, print "**NO**".

Examples

standard input	standard output
5 5 1 2 3 4 5	YES
5 2 1 2 3 4 5	NO

Note

In the first example: **1 - 2 - 3 + 4 + 5 = 5**

Reach Value

Input file:	standard input
Output file:	standard output
Time limit:	1 second
Memory limit:	256 megabytes

Given a number N. Initially you have a value equal **1** and you can perform one of the following operation any number of times:

1. Multiply your current value by 10.

2. Multiply your current value by 20.

Determine if your value can reach N or not.

Note: Solve this problem using recursion.

Input

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

Next T lines will contain a number N $(1 \le N \le 10^{12})$.

Output

For each test case print "**YES**" if your value can reach exactly N otherwise, print "**NO**".

Example

standard input	standard output
5	YES
1	NO
2	YES
10	NO
25	YES
200	

The maximum path-sum

Input file:	standard input
Output file:	standard output
Time limit:	1 second
Memory limit:	256 megabytes

Given a matrix A of size $N*M$. Print the **maximum sum** of numbers that can be obtained when you take a path from $A_{1,1}$ to $A_{N,M}$.

If you stay in $A_{i,j}$ you can only go to :

- $A_{i+1,j}$ if and only if $i \leq N$

- $A_{i,j+1}$ if and only if $j \leq M$

Note: Solve this problem using recursion.

Input

First line contains two numbers N and M ($1 \leq N, M \leq 10$) N donates number of rows and M donates number of columns.

Next N lines each of them will contain M numbers ($-10^5 \leq A_{i,j} \leq 10^5$).

Output

Print the **maximum sum** of numbers can be obtained.

Example

standard input	standard output
3 3 5 2 4 1 3 5 9 2 7	24

Number of Ways

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

Given two numbers S and E where S denotes a start point and E denotes an end point. Determine how many possible ways to reach point E if you can move either **1** step, **2** steps or **3** steps at a time.

Note: Solve this problem using recursion.

Input

Only one line contains two numbers S and E ($1 \leq S \leq E \leq 15$).

Output

Print the answer required above.

Example

standard input	standard output
2 5	4

Note

In the first example:

There are **4** ways to reach from point **2** to point **5** as follows: [**2, 3, 4, 5**], [**2, 3, 5**], [**2, 4, 5**] and [**2, 5**].

Left Max

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

Given a number N and an array A of N numbers, print the maximum in the range from 1 to i for each $i \leq N$.

Note: Solve this problem using recursion.

Input

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

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

Output

Print N numbers, the maximum from index 1 to index i.

Example

standard input	standard output
5 4 3 5 7 3	4 4 5 7 7