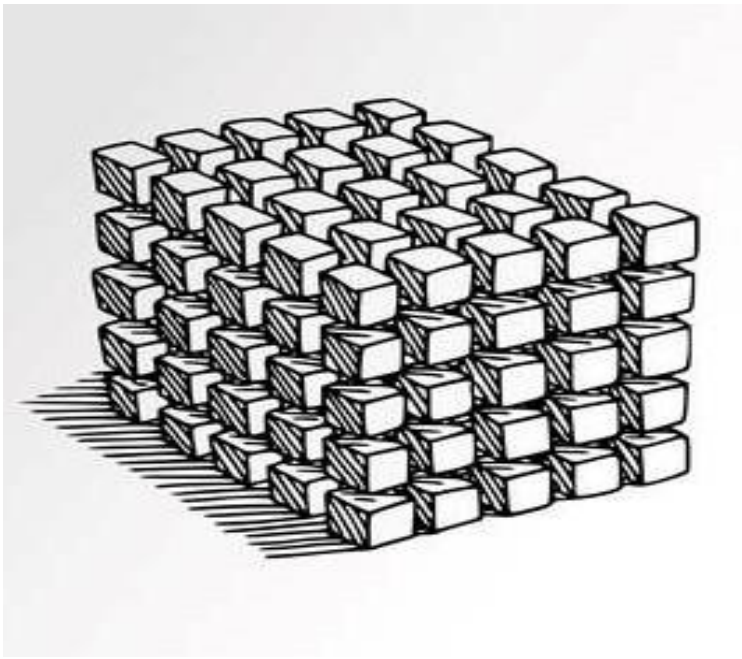

# *The 2021 Art of Data Structures training contest.*

The Art of Data Structure

# Problem A. Reverse Array

Time complexity: O(n)

You are given an Array A consisting of N integers. You are asked to reverse the Array without using a built-in function.

## Input

The first line contains one integer N ($2 \le N \le 100$) — the number of elements of the array.

The second line contains N integers $A1, A2, \ldots, An$ ($1 \le Ai \le 10^9$).

## Output

Print N integers. Representing the reversed Array.

**Sample:**

| Input | Output |
|---|---|
| 6<br>3 2 1 10 4 3 | 3 4 10 1 2 3 |
| 3<br>1 2 3 | 3 2 1 |

# Problem B. First Duplicate

Time complexity: O(n log(n))

You are given an Array A consisting of N integers. You are asked to print the first element to appear more than once.

## Input

The first line contains one integer N ($2 \le N \le 100$) — the number of elements of the array.

The second line contains N integers A1 , A2,…,An ($-10^7 \le Ai \le 10^7$).

## Output

Print a single integer. Representing the first element to appear more than once. It is guaranteed that the solution always exists.

**Sample:**

| Input | Output |
|---|---|
| 6<br>1 2 1 2 3 3 | 1 |
| 6<br>2 1 3 5 3 2 | 3 |

# Problem C. Find median without sorting

Time complexity: O(n log(n))

You are given an Array A consisting of N integers. You are asked to find the median of the Array without sorting the array. It is guaranteed that N is an odd number.

## Input

The first line contains one integer N ($2 \le N \le 100$ && N%2!=0) — the number of elements of the array.

The second line contains N integers A1 , A2,…,An ($1 \le Ai \le 10^9$).

## Output

Print the median of the array.

**Sample:**

| Input | Output |
|---|---|
| 7<br>20 10 30 7 5 2 3 | 7 |
| 3<br>1 2 3 | 2 |

Note: Median is the middle number in a sorted list of numbers.

# Problem D. Find if two numbers equal to 25

Time complexity: O(n)

You are given an Array A consisting of N integers. You are asked to find if the sum of two integers in the array is equal to 25.

## Input

The first line contains one integer N ($2 \le N \le 100$) — the number of elements of the array.

The second line contains N integers A1 , A2,…,An ($1 \le Ai \le 10^3$).

## Output

Print Yes if the sum of two integers in the array is 25. Print No otherwise.

**Sample:**

| Input | Output |
|---|---|
| 5<br>10 20 20 10 15 | Yes |
| 7<br>1 3 6 3 1 5 3 | No |

# Problem E. Mostakshef El Atlas

You are given N pairs of Latin noncapital letters strings. The first being the country and the second being the city. It is guaranteed that all given cities are unique (The same city can't be given more than once in input). Your asked to print each country in alphabetically ascending order followed by all their cities also in alphabetically ascending order.

## Input

The first line contains one integer N ($2 \le N \le 100$) — the number given pairs.

The next N lines contains pair of strings – the country and the city.

## Output

print each country in alphabetically ascending order followed by all their cities also in alphabetically ascending order.

**Sample:**

| Input | Output |
|---|---|
| 3<br>egypt cairo<br>egypt alexandria<br>australia canberra | australia<br>canberra<br>egypt<br>alexandria<br>cairo |
| 5<br>emirates dubai<br>france paris<br>russia moscow<br>emirates fujirah<br>qatar duha | emirates<br>dubai<br>fujirah<br>france<br>paris<br>qatar<br>duha<br>russia<br>moscow |