Question 1: (40 points)

When listing document page numbers, it is common to use "-" for the first and last page numbers instead of all pages for at least 3 consecutive pages. Given page numbers needed to list, use the "-" sign to shorten the list

Input

The first line is N, 1≤N≤1000, the page number listed.

The next line contains N integers, representing page numbers. The numbers are all unique.

Output

Print out a list of pages in order from smallest to largest.

Sample

Input	Output
6 180 141 174 143 142 175	141-143 174 175 180

Question 2: (30 points)

Given a set A with N elements.

- The first non-empty subset of A corresponds to the bit representation of 1.
- The 2nd non-empty subset of A corresponds to the bit representation of 2
- …
- The Mth non-empty subset of A corresponds to the bit representation of M

For example:

{1}{2}{3}
1 => 0 0 1 => {} {} {3}
2 => 0 1 0 => {} {2} {}
…
(See output for more details)

Input

- The first line is N (1<=N<=20)
- The next line contains N distinct double an element of the set. (1<=a<=100)

Output

- The first line is M, the number of non-empty subsets
- The next m lines are the subsets.

Sample

Input	Output
3 1 2 3	7 3 2 2 3 1 1 3 1 2 1 2 3

Question 3: (30 points)

Imagine you have a series of fences in a straight line, represented by an integer array height of length **n**, where **height[i]** indicates the height of the fence at position **i**.

You are tasked with setting up two lamps on these fences to illuminate the smallest rectangular area on the ground, with the lamps acting as boundaries on either side. The illuminated area is determined by the shorter fence between the two, and the width is the distance between these two fences.

Your goal is to minimize the total illuminated area.

Input

- The first line contains an integer **n** ($1 <= N <= 10^6$), the number of fences.
- The second line contains **n** integers, each represents a fence's height ($<= 10^4$).

Output

The smallest illuminated area.

Sample

Input	Output
9 5 8 6 3 5 4 8 3 7	3
2 1 1	1

Explain Sample 1: The smallest illuminated area is blue section, and its area is 3*1=3