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Contest Code: SNCK1B21   **Problem Code:** INSIDER

Read problem statements in **Mandarin Chinese** **Vietnamese**, and **Russian**

You are given an array A with N positive integers.

An x-insider of this array is a subsequence of A such that x is **strictly** in between any two consecutive elements of the subsequence.

More formally, a subsequence $S = [s_0, s_1, \ldots s_{k-1}]$ of the array A is an x-insider if for every integer i such that $1 \le i \le k - 1$, either

- $s_{i-1} < x < s_i$ or
- $s_{i-1} > x > s_i$

For example, for the array $[1, 4, 2, 4]$, the subsequence $[1, 4, 2]$ is a 3-insider because $1 < 3 < 4$ and $4 > 3 > 2$. The subsequence $[1, 2]$ is **not** an x-insider for any integer x. The subsequence $[1, 4]$ is a 2-insider as well as a 3-insider.

Let m_k be the smallest **integer** such that A contains an m_k-insider of length **exactly** k. If such an integer does not exist then $m_k = -1$.

Similarly, let M_k be the largest **integer** such that A contains an M_k-insider of length **exactly** k. If such an integer does not exist then $M_k = -1$.

Find $m_2, m_3, \ldots m_N$ and $M_2, M_3, \ldots M_N$.

Input Format

- The first line contains an integer T, the number of testcases. The description of the T testcases follows.
- Each testcase consists of two lines.
- The first line contains a single integer, N, the size of the array A.
- The second line contains N space-separated integers, $A_1, A_2, \ldots A_N$, the elements of the array A.

Output Format

- For each testcase print two lines.
- In the first line print $N - 1$ space separated integers, the values of $m_2, m_3, \ldots m_N$ respectively.
- In the second line print $N - 1$ space separated integers, the values of $M_2, M_3, \ldots M_N$ respectively.

Constraints

- $1 \le T \le 10^5$
- $2 \le N \le 10^5$
- sum of N over all testcases $\le 2 \cdot 10^5$
- $1 \le A_i \le 10^9$ for all valid i

Sample Input 1

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

```
3
3 2 1
```

Sample Output 1

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

Explanation

Test Case 1: The given array is $[1, 2, 4, 1, 5]$.

Insiders of length 2: The only subsequences of length 2 that are x-insiders for integer values of x are $[1, 4], [1, 5], [4, 1], [2, 4], [2, 5]$. The subsequences $[1, 4], [1, 5], [4, 1]$ are 2-insiders. All of them are 3-insiders. The subsequence $[2, 5]$ is also a 4-insider. Thus $m_2 = 2$ and $M_2 = 4$.

Insiders of length 3: The only subsequence of length 3 that is an x-insider for some integer x is $[1, 4, 1]$, which is clearly both a 2-insider as well as a 3-insider. Thus $m_3 = 2$ and $M_3 = 3$.
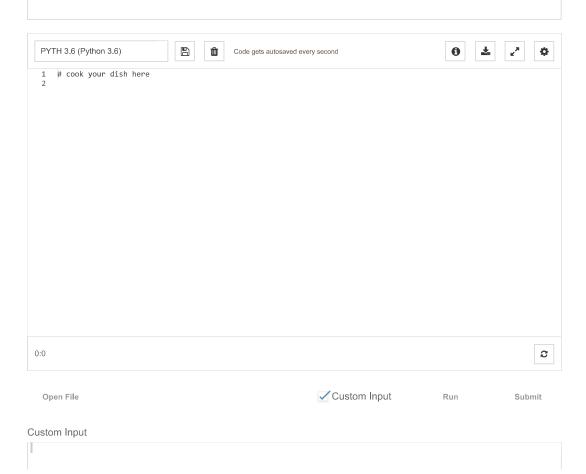
Insiders of length 4: The only subsequence of length 4 that is an x-insider for some integer x is $[1, 4, 1, 5]$, which is clearly both a 2-insider as well as a 3-insider. Thus $m_4 = 2$ and $M_4 = 3$.

Insiders of length 5: The only subsequence of length 5 is the array A itself, which is not an x-insider for any integer value of x. Thus $m_5 = M_5 = -1$.

Hence the answers for this testcase are $m = [2, 2, 2, -1]$ and $M = [4, 3, 3, -1]$.

Test Case 2: The given array is $[1, 1, 1]$. Since all elements are equal, none of the subsequences of this array are x-insiders (for any integer x). Hence the answers are $m = [-1, -1]$ and $M = [-1, -1]$.

Test Case 3: The only subsequence (of length at least 2) that is an x-insider (for **integer** values of x) is $[3, 1]$ which is a $2-$insider. Hence the answers are $m = [2, -1]$ and $M = [2, -1]$.

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```
1   # cook your dish here
2
```

0:0   ↻

Open File   ✔️ Custom Input   Run   Submit

Custom Input

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The time now is: 07:23:10 AM
Your IP: 49.204.136.6

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Contest Hosting	Hard	College Chapters	Refund Policy
Problem Setting	Challenge	CodeChef for Business	Code of Conduct
CodeChef Tutorials	Peer		Bug Bounty Program
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