C. Prefix Min and Suffix Max

time limit per test: 2 seconds

memory limit per test: 256 megabytes

You are given an array a of **distinct** integers.

In one operation, you may either:

- choose a nonempty **prefix**[*] of a and replace it with its minimum value, or
- choose a nonempty **suffix**[†] of a and replace it with its maximum value.

Note that you may choose the entire array a.

For each element a_i, determine if there exists some sequence of operations to transform a into $[a_i]$; that is, make the array a consist of only one element, which is a_i. Output your answer as a binary string of length n, where the i-th character is 1 if there exists a sequence to transform a into $[a_i]$, and 0 otherwise.

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[*] A **prefix** of an array is a subarray consisting of the first k elements of the array, for some integer k.

[†] A **suffix** of an array is a subarray consisting of the last k elements of the array, for some integer k.

Input

The first line contains an integer t ($1 \le t \le 10^4$) — the number of test cases.

The first line of each test case contains one integer n ($2 \le n \le 2 \cdot 10^5$) — the size of the array a.

The second line of each test case contains n integers, $a_1, a_2, \ldots, a_n$ ($1 \le a_i \le 10^6$). It is guaranteed that all a_i are distinct.

It is guaranteed that the sum of n over all test cases does not exceed $2 \cdot 10^5$.

Output

For each test case, output a binary string of length n — the i-th character should be 1 if there exists a sequence of operations as described above, and 0 otherwise.

Example

input

```
3
6
1 3 5 4 7 2
4
13 10 12 20
7
1 2 3 4 5 6 7
```

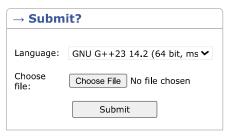### output

```
100011
1101
1000001
```

Note

In the first sample, you can first choose the prefix of size 3. Then the array is transformed into

| 1 | 4 | 7 | 2 |

Next, you can choose the suffix of size 2. Then the array is transformed into

| 1 | 4 | 7 |

Finally, you can choose the prefix of size 3. Then the array is transformed into

| 1 |

So we see that it is possible to transform a into $[1]$.

It can be shown that it is impossible to transform a into $[3]$.