K Subsequences

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

For an array b, define $f(b)$ as the maximum sum on a subsegment of this array. For example, $f([-1,-1,-1]) = 0$, $f([-1,1,1,1,-1]) = 3$.

You are given an array a of length n, containing only 1s and -1s. Partition it into k subsequences $a_1, a_2, \ldots, a_k$ such that $max_{1 \le i \le k} f(a_i)$ is the minimum possible. If there are many solutions, output any.

Input

The first line contains a single integer t $(1 \le t \le 10^5)$ — the number of test cases. The description of test cases follows.

The first line of each test case contains two integers n and k $(1 \le k \le n \le 2 \cdot 10^5)$ — the length of the array and the number of subsequences.

The second line of each test case contains n integers $a_1, a_2, \ldots, a_n$ $(a_i = \pm 1)$ — elements of the array.

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 n integers $b_1, b_2, \ldots, b_n$ $(1 \le b_i \le k)$. Here b_i means that element a_i belongs to the b_i-th subsequence.

Note that subsequences are allowed to be empty: it's allowed for some number $\le k$ to not appear in b.

Example

standard input	standard output
5 3 2 1 -1 1 4 2 -1 1 1 -1 7 3 1 1 1 1 1 1 1 10 3 1 1 1 1 -1 -1 1 1 1 1 12 4 1 1 1 1 -1 -1 -1 -1 1 1 1 1	1 1 1 1 1 2 2 1 1 2 2 3 3 3 1 2 1 2 1 2 1 2 3 3 1 2 3 4 1 2 3 4 1 2 3 4

Note

In the first test case, we can put all elements into a single subsequence $[1,-1,1]$, with max subsegment sum 1 (the max subsegment sum for the remaining, empty subsequence is 0).

In the second test case, we can split elements into two subsequences $[-1,1],[1,-1]$, both with max subsegment sum 1.

In the third test case, we can split elements into three subsequences $[1,1],[1,1],[1,1,1]$, with max subsegment sums $2,2,3$ correspondingly.

In the fourth test case, we can split elements into three subsequences $[1,1,-1,1],[1,1,-1,1],[1,1]$, all with max subsegment sum 2.

In the fifth test case, we can split elements into four subsequences $[1,-1,1],[1,-1,1],[1,-1,1],[1,-1,1]$, all with max subsegment sum 1.