Problem A. Bermutation

Input file:	`bermutation.in`
Output file:	*`standard output`*
Time limit:	1 second
Memory limit:	256 mebibytes

Your are given a permutation p of integers from 1 to n. You are allowed to modify this permutation in the following way: choose a segment of $2b$ consecutive elements and swap the halves of this segment. Formally, if you choose the segment $a_i, a_{i+1} \ldots, a_{i+2b-1}$, you will get $a_{i+b}, a_{i+b+1}, \ldots, a_{i+2b-1}, a_i, a_{i+1}, \ldots, a_{i+b-1}$ after swapping its halves.

Consider the set S of all permutations which can be obtained from the given permutation p by applying this modification zero or more times. The segment of $2b$ consecutive elements for each modification can be chosen independently of the segments chosen for other modifications. List all these permutations in lexicographical order and enumerate them starting from 1. Your task is to find the number of p itself in this ordered list. Print the answer modulo 120 586 241.

Input

The first line of input contains one positive integer T, the number of test cases. The test cases follow.

Each test case is given on two lines. The first line contains with two integers n and b ($2 \le n \le 10^5$, $1 \le b$ and $2b \le n$). The second line of each test case contains n integers: the permutation p. Each integer from 1 to n appears on this line exactly once.

The sum of all n in the input does not exceed 10^5.

Output

Print the 1-based number of permutation p in the lexicographically ordered list of all permutations which can be obtained by the described modifications, modulo 120 586 241.

Example

bermutation.in	standard output
2 5 1 2 3 1 4 5 5 2 2 3 1 4 5	31 3