Problem C. Heap

Input file:	`heap.in`
Output file:	*`standard output`*
Time limit:	2 seconds
Memory limit:	256 mebibytes

A *d-ary heap* of size n is an array $a_1, a_2, \ldots, a_n$ where for each pair of indices i and j such that $1 \le i \le n$, $1 \le j \le n$ and $(i-1) \cdot d + 2 \le j \le i \cdot d + 1$, the strict inequality $a_j > a_i$ holds. For example, for a ternary ($d = 3$) heap of size 8, the required inequalities are: $a_2 > a_1$, $a_3 > a_1$, $a_4 > a_1$, $a_5 > a_2$, $a_6 > a_2$, $a_7 > a_2$, and $a_8 > a_3$.

Consider all d-ary heaps of size n which also happen to be permutations of numbers from 1 to n. Let us write them all down in lexicographical order comparing permutations as sequences of numbers. After that, we enumerate the heaps in the resulting ordered list starting from 1.

You are given a d-ary heap of size n which is also a permutation. Your task is to find the number of this heap in the ordered list constructed above. As the answer can be very large, compute it modulo $(10^9 + 7)$.

Input

The first line of input contains a positive integer T: the number of test cases. The test cases follow.

Each test case is given on two lines. The first of these lines contains two integers n and d ($1 \le n \le 3000$, $1 \le d \le 3000$). The second line contains n integers describing the permutation. Each integer from 1 to n occurs on that line exactly once. The given permutation is also a d-ary heap.

The sum of all values of n in the input does not exceed 3000.

Output

For each test case, print the 1-based number of the given sequence in the lexicographically ordered list of d-ary heaps which are also permutations, modulo $(10^9 + 7)$.

Example

heap.in	standard output
2 5 2 1 3 2 4 5 5 3 1 4 3 2 5	7 12