E2. Close Tuples (hard version)

time limit per test: 4 seconds
memory limit per test: 256 megabytes

This is the hard version of this problem. The only difference between the easy and hard versions is the constraints on k and m. In this version of the problem, you need to output the answer by modulo $10^9 + 7$.

You are given a sequence a of length n consisting of integers from 1 to n. **The sequence may contain duplicates (i.e. some elements can be equal)**.

Find the number of tuples of m elements such that the maximum number in the tuple differs from the minimum by no more than k. Formally, you need to find the number of tuples of m indices $i_1 < i_2 < \ldots < i_m$, such that

$$\max(a_{i_1}, a_{i_2}, \ldots, a_{i_m}) - \min(a_{i_1}, a_{i_2}, \ldots, a_{i_m}) \le k.$$

For example, if $n = 4$, $m = 3$, $k = 2$, $a = [1, 2, 4, 3]$, then there are two such triples ($i = 1, j = 2, z = 4$ and $i = 2, j = 3, z = 4$). If $n = 4$, $m = 2$, $k = 1$, $a = [1, 1, 1, 1]$, then all six possible pairs are suitable.

As the result can be very large, you should print the value modulo $10^9 + 7$ (the remainder when divided by $10^9 + 7$).

Input

The first line contains a single integer t ($1 \le t \le 2 \cdot 10^5$) — the number of test cases. Then t test cases follow.

The first line of each test case contains three integers n, m, k ($1 \le n \le 2 \cdot 10^5$, $1 \le m \le 100$, $1 \le k \le n$) — the length of the sequence a, number of elements in the tuples and the maximum difference of elements in the tuple.

The next line contains n integers $a_1, a_2, \ldots, a_n$ ($1 \le a_i \le n$) — the sequence a.

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

Output

Output t answers to the given test cases. Each answer is the required number of tuples of m elements modulo $10^9 + 7$, such that the maximum value in the tuple differs from the minimum by no more than k.

Example

input Copy

```
4
4 3 2
1 2 4 3
4 2 1
1 1 1 1
1 1 1
1
10 4 3
5 6 1 3 2 9 8 1 2 4
```

output Copy

```
2
6
1
20
```

Codeforces Round 690 (Div. 3)
Finished
Practice

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You can clone this contest to a mashup.

Clone Contest

→ **Submit?**

Language: GNU G++20 13.2 (64 bit, win

Choose file: Choose File No file chosen

Submit

→ **Last submissions**

Submission	Time	Verdict
282141286	Sep/21/2024 04:13	Accepted
282141030	Sep/21/2024 04:07	Accepted
282140714	Sep/21/2024 04:01	Accepted

→ **Problem tags**

binary search | combinatorics | implementation | math | sorting | two pointers | *1700

No tag edit access

→ **Contest materials**

- Announcement
- Tutorial