Problem G. Transform

Input file: `standard input`
Output file: `standard output`

Yuki has a multiset $S = \{s_1, \ldots, s_n\}$ of size n and an integer k.

Yuki defines a transformation as follows:

- Choose a subset S' of S (where S' can be an empty set), remove S' from S, and add the mex* of S' to S.

Now, Yuki wants to perform several transformations such that S becomes $\{k\}$. You need to help Yuki find the minimum number of transformations required to make S equal to $\{k\}$. Since the answer can be very large, you only need to output the answer modulo 998244353.

It can be proven that there always exists at least one sequence of operations that can transform S into $\{k\}$.

*: The mex of a multiset is the smallest non-negative integer that does not appear in the multiset. For example, $\operatorname{mex}\{0,1,2\} = 3$, $\operatorname{mex}\{1,0,3,1\} = 2$, and $\operatorname{mex} \varnothing = 0$.

Input

This problem contains multiple test cases.

The first line contains a positive integer t ($1 \le t \le 10^5$), representing the number of test cases.

For each test case:

- The first line contains two integers n, k ($1 \le n \le 5 \cdot 10^5$, $0 \le k \le 10^9$).
- The second line contains n integers $s_1, \ldots, s_n$ ($0 \le s_i \le 10^9$).

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

Output

For each test case, output a single line containing an integer representing the minimum number of transformations required to make S equal to $\{k\}$, modulo 998244353.

Example

standard input	standard output
6 1 2 1 1 4 4 3 3 0 2 2 4 2 1 0 3 2 4 3 2 1 0 2 3 52 20 2 6	2 0 3 2 1 262875292

Note

For the 1st test case:

- Yuki can choose $S' = \varnothing$ in the 1st transformation, making $S = \{0, 1\}$, and then choose $S' = \{0, 1\}$ in the 2nd transformation, making $S = \{2\}$.
- It can be proven that no sequence of operations with fewer transformations exists, so the answer is 2.

For the 2nd test case:

- Yuki does not need to perform any transformations to make $S = \{4\}$, so the answer is 0.

For the 3rd test case:

- Yuki can choose $S' = \varnothing$ in the 1st transformation, making $S = \{0, 0, 2, 2\}$, choose $S' = \{0, 2\}$ in the 2nd transformation, making $S = \{0, 1, 2\}$, and then choose $S' = \{0, 1, 2\}$ in the 3rd transformation, making $S = \{3\}$.
- It can be proven that no sequence of operations with fewer transformations exists, so the answer is 3.

For the 4th test case:

- Yuki can choose $S' = \{2, 3\}$ in the 1st transformation, making $S = \{0, 0, 1\}$, and then choose $S' = \{0, 0, 1\}$ in the 2nd transformation, making $S = \{2\}$.
- It can be proven that no sequence of operations with fewer transformations exists, so the answer is 2.

For the 5th test case:

- Yuki can directly choose $S' = \{0, 1, 2, 2\}$ in the 1st transformation, making $S = \{3\}$.
- It can be proven that no sequence of operations with fewer transformations exists, so the answer is 1.