Problem H. King

Input file:	*standard input*
Output file:	*standard output*
Time limit:	2 seconds
Memory limit:	256 mebibytes

As we all know, the number of *Pang*'s papers follows exponential growth. Therefore, we are curious about *King* sequence.

You are given a prime p. A sequence $(a_1, a_2, \ldots, a_n)$ is a *King* sequence if and only if there is an integer $1 \le q < p$ such that for all integers $i \in [2, n]$, $qa_{i-1} \equiv a_i \pmod{p}$.

Given a sequence $B = (b_1, \ldots, b_m)$, what is the length of the longest *King* subsequence of B?

A subsequence is a sequence that can be derived from another sequence by deleting some elements without changing the order of the remaining elements.

Pang is super busy recently, so the only thing he wants to know is whether the answer is greater than or equal to $\frac{n}{2}$.

If the length of the longest *King* sequence is less than $\frac{n}{2}$, output -1. Otherwise, output the length of the longest *King* subsequence.

Input

The first line contains an integer T denoting the number of test cases ($1 \le T \le 1000$).

The first line in a test case contains two integers n and p ($2 \le n \le 200000$, $2 \le p \le 1000000007$, p is a prime). The sum of n over all test cases does not exceed 200000.

The second line in a test case contains a sequence $b_1, \ldots, b_n$ ($1 \le b_i < p$).

Output

For each test case, output one line containing the answer which is -1 or the length of the longest *King* subsequence.

Example

standard input
4 6 1000000007 1 1 2 4 8 16 6 1000000007 597337906 816043578 617563954 668607211 89163513 464203601 5 1000000007 2 4 5 6 8 5 1000000007 2 4 5 6 7

standard output
5 -1 3 -1