Problem I: Interesting numbers

Time limit: 10s, memory limit: 1GB.

The *bitwise exclusive or*, or simply `XOR`, is an operation denoted by $\oplus$ which works on two integers by `XOR`-ing their corresponding bits: if x_i, y_i, z_i denote the i-th binary digit of x, y and z, where $z = x \oplus y$, then $z_i = (x_i + y_i) \mod 2$.

You are given a positive integer k. A sequence of integers is *interesting* if `XOR` of any its two elements is less than or equal k.

Given a sequence $a_1, \ldots, a_n$, determine the largest possible length of its interesting subsequence. (A subsequence is a sequence that can be derived from the given sequence by deleting zero or more elements.)

Input

The first line of input contains the number of test cases z ($1 \leqslant z \leqslant 1\,000$). The descriptions of the test cases follow.

The first line of each case contains two integers n, k ($1 \leqslant n \leqslant 30\,000$, $1 \leqslant k < 2^{20}$) – the length of the sequence, and the upper bound on maximum `XOR` of its two elements.

The second line contains n nonnegative integers $a_1, \ldots a_n$ ($0 \leqslant a_i < 2^{20}$) – the given sequence described above.

The sum of n and k over all test cases do not exceed 200 000 and 3 200 000 respectively.

Output

For every test case output a single integer – the maximum possible length of an interesting subsequence of the given sequence.

Example

For an example input:	the correct output is:
1 7 11 3 12 9 10 16 3 4	4

Explanation

The elements 3, 9, 10 and 3 form an interesting subsequence, as `XOR` of every pair is not larger then 11. For example $9 \oplus 10 = 1001_2 \oplus 1010_2 = 11_2 = 3 \leqslant 11$. There is no subsequence consisting of five elements with the same property, e.g. the sequence $(3, 9, 10, 3, 4)$ is not interesting because of $4 \oplus 9 = 100_2 \oplus 1001_2 = 1101_2 = 13 > 11$.