# The Equation (12pts, 20pts)

## Competitive Submissions

You have not attempted this problem.

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## Problem

The laws of the universe can be represented by an array of **N** non-negative integers. The i-th of these integers is $\mathbf{A_i}$.

The universe is *good* if there is a non-negative integer k such that the following equation is satisfied: ($\mathbf{A_1}$ xor k) + ($\mathbf{A_2}$ xor k) + ... ($\mathbf{A_N}$ xor k) ≤ **M**, where xor denotes the bitwise exclusive or.

What is the largest value of k for which the universe is good?

## Input

The first line of the input gives the number of test cases, **T**. **T** test cases follow. Each test case begins with a line containing the two integers **N** and **M**, the number of integers in **A** and the limit on the equation, respectively.

The second line contains **N** integers, the i-th of which is $\mathbf{A_i}$, the i-th integer in the array.

## Output

For each test case, output one line containing `Case #x: y`, where x is the test case number (starting from 1) and y is the largest value of k for which the

case number (starting from 1) and y is the largest value of k for which the universe is good, or -1 if there is no such k.