Integer Generator

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	512 megabytes

Given a set of integers S, your task is to generate a given integer x using no more than 70 bitwise operations on S.

Specifically, given an integer set S of size n and an integer x, each operation allows you to choose two integers a and b from S (they can be the same) and insert one of the integers a `or` b, $a \oplus b$, or a `and` b into S. You need to determine whether it is possible to make $x \in S$ with no more than 70 operations, and if so, provide a valid sequence of operations.

Here, a `or` b refers to the bitwise OR of a and b, $a \oplus b$ refers to the bitwise XOR of a and b, and a `and` b refers to the bitwise AND of a and b.

Input

The first line contains two integers n, x ($1 \le n \le 10^5, 0 \le x < 2^{30}$).

The second line contains n integers $a_1, a_2, \ldots, a_n$ ($0 \le a_i < 2^{30}$), representing the initial elements in S, ensuring that these integers are all distinct.

Output

If it is not possible to make $x \in S$ with no more than 70 operations, output a single integer -1.

Otherwise, output the first line with an integer k ($0 \le k \le 70$), indicating the number of operations.

Next, output k lines, each representing one of the k operations. For each operation, output three integers t, a, b ($t \in \{0, 1, 2\}$). If $t = 0$, it means this operation inserts a `or` b into S; if $t = 1$, it means it inserts $a \oplus b$ into S; if $t = 2$, it means it inserts a `and` b into S. You need to ensure that for the S before this operation, both $a \in S$ and $b \in S$ should be met.

In this problem, you do not need to minimize the number of operations; if there are multiple valid operation sequences, any one of them will be accepted.

Examples

standard input	standard output
3 7 1 2 4	2 1 1 2 1 3 4
3 15 9 10 4	2 0 10 9 1 4 11
3 7 1 2 3	-1