Linear Floor

Input file: `standard input`
Output file: `standard output`
Time limit: 2 seconds
Memory limit: 1024 megabytes

You are given integers N, K and an integer sequence $X = (X_0, X_1, \ldots, X_{N-1})$ of length N.

An integer triple (M, A, B) is called a **good triple** if it satisfies all of the following conditions:

- $1 \le M < 2^{30}$
- For all $k = 0, 1, \ldots, N-1$, $X_k = \left\lfloor \frac{Ak + B}{M} \right\rfloor$ holds.

It can be proven that, under the given constraints, the number of good triples is finite. Let this number be C.

Determine whether $K \le C$ holds. If it does, find the K-th smallest good triple in lexicographical order.

You are given T test cases. Solve each test case independently.

Input

The input is given in the following format:

T
case_1
case_2
$\vdots$
case_T

Each test case case_i is given in the following format:

N K
X_0 X_1 $\ldots$ X_{N-1}

- All input values are integers.
- $1 \le T \le 1000$
- $2 \le N \le 2 \times 10^5$
- $1 \le K \le 10^9$
- $0 \le X_i < 2^{30}$
- The sum of N over all test cases does not exceed 2×10^5.

Output

Print T lines.

For the i-th line, if $K \le C$ holds for case_i, output the K-th smallest good triple in lexicographic order by printing M, A, B in this order separated by spaces. Otherwise, output `-1`.

Example

standard input	standard output
3 4 1 0 1 1 2 3 1 2 0 1 6 7 9 8 6 4 2 1	2 1 1 -1 11 -19 107

Note

In the first example, the good triples in lexicographical order are $(M, A, B) = (2, 1, 1)$, $(3, 2, 1)$, $(4, 2, 2)$, $(4, 2, 3)$, $(4, 3, 1)$, $\ldots$.

In the second example, no good triple exists.

In the third example, the good triples in lexicographical order are $(M, A, B) = (4, -7, 39)$, $(7, -12, 68)$, $(8, -14, 78)$, $(8, -14, 79)$, $(9, -16, 89)$, $(10, -17, 97)$, $(11, -19, 107)$, $\ldots$.