C. Constructing Tests

time limit per test: 1 second
memory limit per test: 256 megabytes
input: standard input
output: standard output

Let's denote a m-free matrix as a binary (that is, consisting of only 1's and 0's) matrix such that every square submatrix of size $m \times m$ of this matrix contains at least one zero.

Consider the following problem:

You are given two integers n and m. You have to construct an m-free square matrix of size $n \times n$ such that ***the number of 1's in this matrix is maximum possible****. Print the maximum possible number of 1's in such matrix.*

You don't have to solve this problem. Instead, you have to construct a few tests for it.

You will be given t numbers $x_1, x_2, ..., x_t$. For every , find two integers n_i and m_i ($n_i \geq m_i$) such that the answer for the aforementioned problem is exactly x_i if we set $n = n_i$ and $m = m_i$.

Input

The first line contains one integer t ($1 \leq t \leq 100$) — the number of tests you have to construct.

Then t lines follow, i-th line containing one integer x_i ($0 \leq x_i \leq 10^9$).

Note that in hacks you have to set $t = 1$.

Output

For each test you have to construct, output two positive numbers n_i and m_i ($1 \leq m_i \leq n_i \leq 10^9$) such that the maximum number of 1's in a m_i-free $n_i \times n_i$ matrix is exactly x_i. If there are multiple solutions, you may output any of them; and if this is impossible to construct a test, output a single integer -1.

Example

input
3 21 0 1
output
5 2 1 1 -1