Problem J. Graph Changing

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	32 megabytes

There are $10^9 + 1$ graphs with n vertices each. In the 0-th graph $G_0(V_0, E_0)$, there is an edge between vertices i and $i + 1$ for all $1 \leq i < n$.

Denote the length of the shortest path between x and y in the graph i by $d_i(x, y)$. If x and y aren't reachable from each other, let $d_i(x, y)$ be -1. In the graph i ($i \geq 1$), there's an edge between x and y if and only if $d_{i-1}(x, y) \geq k$.

There are q queries. In each query you are given five numbers t, n, k, x, y. You need to output $d_t(x, y)$.

Input

The first line contains one number q ($1 \leq q \leq 10^6$).

In the following q lines, there are five numbers t, n, k, x, y ($0 \leq t \leq 10^9$, $2 \leq n \leq 10^9$, $1 \leq k \leq 10^9$, $1 \leq x, y \leq n$, $x \neq y$), denoting the query.

Output

For each query, output one line with one number $d_t(x, y)$.

Example

standard input	standard output
5 1 5 3 2 4 1 10 4 2 4 2 10 5 2 4 1 3 2 1 3 1 3 2 1 2	3 2 -1 1 -1