

# 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	3
1 5 3 2 4	2
1 10 4 2 4	-1
2 10 5 2 4	1
1 3 2 1 3	-1
1 3 2 1 2	