Problem D. D

Time limit 1000 ms
Mem limit 262144 kB

You are given a grid with n rows and m columns. Rows and columns are numbered from 1 to n, and from 1 to m. The intersection of the a-th row and b-th column is denoted by (a, b).

Initially, you are standing in the top left corner $(1, 1)$. Your goal is to reach the bottom right corner (n, m).

You can move in four directions from (a, b): up to $(a - 1, b)$, down to $(a + 1, b)$, left to $(a, b - 1)$ or right to $(a, b + 1)$.

You cannot move in the same direction in two consecutive moves, and you cannot leave the grid. What is the minimum number of moves to reach (n, m)?

Input

The input consists of multiple test cases. The first line contains a single integer t ($1 \le t \le 10^3$) — the number of the test cases. The description of the test cases follows.

The first line of each test case contains two integers n and m ($1 \le n, m \le 10^9$) — the size of the grid.

Output

For each test case, print a single integer: -1 if it is impossible to reach (n, m) under the given conditions, otherwise the minimum number of moves.

Examples

Input	Output
6 1 1 2 1 1 3 4 2 4 6 10 5	0 1 -1 6 10 17

Note

Test case 1: $n = 1, m = 1$, and initially you are standing in $(1, 1)$ so 0 move is required to reach $(n, m) = (1, 1)$.

Test case 2: you should go down to reach $(2, 1)$.

Test case 3: it is impossible to reach $(1, 3)$ without moving right two consecutive times, or without leaving the grid.

Test case 4: an optimal moving sequence could be:
$(1, 1) \to (1, 2) \to (2, 2) \to (2, 1) \to (3, 1) \to (3, 2) \to (4, 2)$. It can be proved that this is the optimal solution. So the answer is 6.