

## Problem E. Add or XOR

**Time Limit** 1000 ms

**Mem Limit** 262144 kB

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You are given two non-negative integers  $a, b$ . You can apply two types of operations on  $a$  any number of times and in any order:

- $a \leftarrow a + 1$ . The cost of this operation is  $x$ ;
- $a \leftarrow a \oplus 1$ , where  $\oplus$  denotes the [bitwise XOR operation](#). The cost of this operation is  $y$ .

Now you are asked to make  $a = b$ . If it's possible, output the minimum cost; otherwise, report it.

### Input

Each test contains multiple test cases. The first line contains the number of test cases  $t$  ( $1 \leq t \leq 10^4$ ). The description of the test cases follows.

The only line of each test case contains four integers  $a, b, x, y$  ( $1 \leq a, b \leq 100, 1 \leq x, y \leq 10^7$ ) — the two integers given to you and the respective costs of two types of operations.

### Output

For each test case, output an integer — the minimum cost to make  $a = b$ , or  $-1$  if it is impossible.

### Examples

Input	Output
7 1 4 1 2 1 5 2 1 3 2 2 1 1 3 2 1 2 1 1 2 3 1 1 2 1 100 100000000 100000000	3 6 1 3 -1 -1 9900000000

## Note

In the first test case, the optimal strategy is to apply  $a \leftarrow a + 1$  three times. The total cost is  $1 + 1 + 1 = 3$ .

In the second test case, the optimal strategy is to apply  $a \leftarrow a + 1, a \leftarrow a \oplus 1, a \leftarrow a + 1, a \leftarrow a \oplus 1$  in order. The total cost is  $2 + 1 + 2 + 1 = 6$ .

In the fifth test case, it can be proved that there isn't a way to make  $a = b$ .