

E. Choosing The Commander

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

As you might remember from the previous round, Vova is currently playing a strategic game known as Rage of Empires.

Vova managed to build a large army, but forgot about the main person in the army - the commander. So he tries to hire a commander, and he wants to choose the person who will be respected by warriors.

Each warrior is represented by his personality — an integer number p_i . Each commander has two characteristics — his personality p_j and leadership l_j (both are integer numbers). Warrior i respects commander j only if $(p_i \& p_j) \geq l_j$ ($\&$ is the bitwise excluding OR of x and y).

Initially Vova's army is empty. There are three different types of events that can happen with the army:

- 1 p_i — one warrior with personality p_i joins Vova's army;
- 2 p_i — one warrior with personality p_i leaves Vova's army;
- 3 $p_i l_i$ — Vova tries to hire a commander with personality p_i and leadership l_i .

For each event of the third type Vova wants to know how many warriors (counting only those who joined the army and haven't left yet) respect the commander he tries to hire.

Input

The first line contains one integer q ($1 \leq q \leq 100000$) — the number of events.

Then q lines follow. Each line describes the event:

- 1 p_i ($1 \leq p_i \leq 10^8$) — one warrior with personality p_i joins Vova's army;
- 2 p_i ($1 \leq p_i \leq 10^8$) — one warrior with personality p_i leaves Vova's army (it is guaranteed that there is at least one such warrior in Vova's army by this moment);
- 3 $p_i l_i$ ($1 \leq p_i, l_i \leq 10^8$) — Vova tries to hire a commander with personality p_i and leadership l_i . There is at least one event of this type.

Output

For each event of the third type print one integer — the number of warriors who respect the commander Vova tries to hire in the event.

Example

input
5 1 3 1 4 3 6 3 2 4 3 6 3
output
1 0

Note

In the example the army consists of two warriors with personalities 3 and 4 after first two events. Then Vova tries to hire a commander with personality 6 and leadership 3, and only one warrior respects him ($3 \& 6 = 6 \geq 3$, and $2 \& 6 = 2 < 3$, but $4 \& 6 = 4 \geq 3$).

Then warrior with personality 4 leaves, and when Vova tries to hire that commander again, there are no warriors who respect him.