Problem D. DS Team Selection

Input file:	*standard input*
Output file:	*standard output*
Time limit:	18 seconds
Memory limit:	1024 mebibytes

The 34th *International Olympiad in Data Structures* will take place soon! In order to qualify, you need to pass the team selection contest in your country. As a member of the *Cat* team, you have to solve this problem in the *Cat* Team Selection contest.

There are infinitely many points **with integer coordinates** on an infinite plane, each of which can be represented as (x, y). Initially, the weights of all points are 0. You need to perform q operations, each of which takes the form:

- `1` x y d w: For all points (X, Y) that satisfy $|X - x| < d$ and $|Y - y| < d$, increase their point weights by $w \cdot (d - \max(|X - x|, |Y - y|))$.
- `2` x_1 x_2 y_1 y_2: Print the sum of the weights of points (x, y) that satisfy $x_1 \le x \le x_2$ and $y_1 \le y \le y_2$. Since the sum can be large, output it modulo 2^{30}.

Input

The first line contains a single integer m ($1 \le m \le 10^5$), indicating the number of the operations.

The next m lines contains several integers in one of the following forms:

- `1` x y d w ($1 \le x, y, d, w \le 10^8$)
- `2` x_1 x_2 y_1 y_2 ($1 \le x_1 \le x_2 \le 10^8$, $1 \le y_1 \le y_2 \le 10^8$)

Output

For each operation of type 2, print a single line containing an integer: the desired sum of the weights modulo 2^{30}.

Example

standard input	standard output
4 1 3 4 5 1 2 1 4 3 5 1 2 4 2 2 2 4 5 3 5	46 21