Problem
DS Team Selection 3
Time limit: 15 seconds

The 38th International Olympiad in Data Structures will take place soon! Little Cyan Fish wants to qualify, so he must pass the national team selection contest. As a member of the Fish team, he has been given the following problem in the Fish Team Selection contest.

In three-dimensional space, there are infinitely many points (x, y, z) with integer coordinates. All point weights are initially 0. Little Cyan Fish must perform q operations in order, each of the form:

- `1 x y z d w`: For every point (X, Y, Z) with $|X - x| < d$, $|Y - y| < d$, and $|Z - z| < d$, add $w \cdot (d - \max(|X - x|, |Y - y|, |Z - z|))$ to its weight.
- `2 x1 x2 y1 y2 z1 z2`: Output the total weight of the points (X, Y, Z) with $x_1 \le X \le x_2$, $y_1 \le Y \le y_2$, and $z_1 \le Z \le z_2$. The total can be large, so give it modulo 2^{28}.

Input

There are multiple test cases. The first line of the input contains a single integer T ($1 \le T$), indicating the number of test cases.

For each test case, the first line contains a single integer q ($1 \le q \le 5 \times 10^4$), indicating the number of operations.

Each of the next q lines contains integers in one of the following forms:

- `1 x y z d w` ($-10^9 \le x, y, z \le 10^9$, $1 \le d \le 10^9$, $0 \le w < 2^{28}$).
- `2 x1 x2 y1 y2 z1 z2` ($-10^9 \le x_1 \le x_2 \le 10^9$, $-10^9 \le y_1 \le y_2 \le 10^9$, $-10^9 \le z_1 \le z_2 \le 10^9$).

It is guaranteed that the sum of q over all test cases does not exceed 5×10^4.

Output

For each test case, print one integer on a separate line for every operation of type 2: the required sum of point weights modulo 2^{28}. Give the answers in the order of the operations.

Sample Input 1

```
2
7
1 0 0 0 2 1
2 -1 1 -1 1 -1 1
2 0 0 0 0 0 0
1 1 1 0 1 3
2 1 1 1 1 0 0
2 -1 1 -1 1 -1 1
2 2 2 0 0 0 0
1
2 0 0 0 0 0 0
```

Sample Output 1

```
28
2
4
31
0
0
```

In the first test case, the first update gives weight 2 to the origin and weight 1 to each of the other 26 points in $[-1, 1]^3$. The second update adds 3 to the point $(1, 1, 0)$.

In the second test case, all weights are initially 0 again.