

Given is a set of n points with integer coordinates. Your task is to decide whether the set has a center of symmetry.

A set of points S has the center of symmetry if there exists a point s (not necessarily in S) such that for every point p in S there exists a point q in S such that $p - s = s - q$.

Input

The first line of input contains a number c giving the number of cases that follow. The first line of data for a single case contains number $1 \leq n \leq 10000$. The subsequent n lines contain two integer numbers each which are the x and y coordinates of a point. Every point is unique and we have that $-10000000 \leq x, y \leq 10000000$.

Output

For each set of input data print 'yes' if the set of points has a center of symmetry and 'no' otherwise.

Sample Input

```
1
8
1 10
3 6
6 8
6 2
3 -4
1 0
-2 -2
-2 4
```

Sample Output

```
yes
```

