

## Problem J

# Hanako's Art II

Time Limit: 2 seconds

There are  $2n$  points in the  $xy$ -plane. Any two points have neither the same  $x$ -coordinate nor the same  $y$ -coordinate. Each point has a color represented by an integer between 1 and  $n$  (inclusive). For each of the  $n$  colors, there are exactly two points of that color.

An artist, Hanako, is willing to create a masterpiece by drawing  $n$  polygonal chains in the  $xy$ -plane. According to her aesthetic sense, a masterpiece must satisfy all the following conditions.

- Any two points having the same color are the endpoints of one of the polygonal chains.
- Each polygonal chain consists of exactly two line segments, each of which is parallel to the  $x$ - or  $y$ -axis.
- No two polygonal chains intersect.

Your task is to determine whether Hanako can create such a masterpiece.

### Input

The input consists of multiple test cases. The first line of input contains an integer  $t$  ( $1 \leq t \leq 50\,000$ ) representing the number of test cases. After that,  $t$  test cases follow. Each of them is given in the following format.

```
 $n$   
 $y_1$   $c_1$   
⋮  
 $y_{2n}$   $c_{2n}$ 
```

The first line contains an integer  $n$  ( $1 \leq n \leq 1\,000$ ) representing the number of polygonal chains which Hanako has to draw. Each of the following  $2n$  lines contains two integers  $y_i$  and  $c_i$  satisfying  $1 \leq y_i \leq 2n$  and  $1 \leq c_i \leq n$ . Each line represents that the  $i$ -th point has the coordinate  $(i, y_i)$  and the color  $c_i$ .

It is guaranteed that  $y_i \neq y_j$  if  $i \neq j$ . In addition, no three points have the same color.

The sum of  $n^2$  over all the test cases does not exceed  $10^6$ .

### Output

If Hanako can create a masterpiece, print "Yes"; otherwise, print "No".

Sample Input	Sample Output
2	Yes
3	No
2 1	
1 2	
4 3	
6 1	
3 3	
5 2	
3	
2 3	
6 1	
5 2	
1 1	
4 3	
3 2	

One of the possible masterpieces in Sample Input 1 is depicted in Figure J-1.

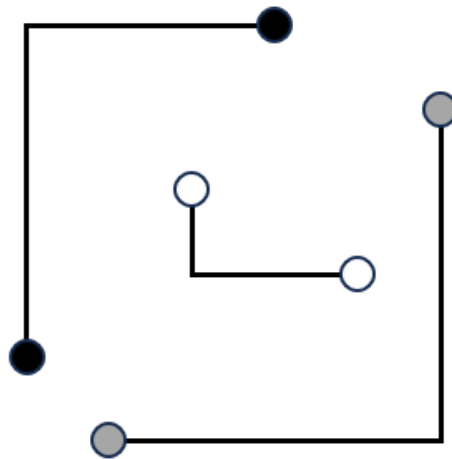


Figure J-1: Illustration of Sample Input 1