

## E2. A Story of One Country (Hard)

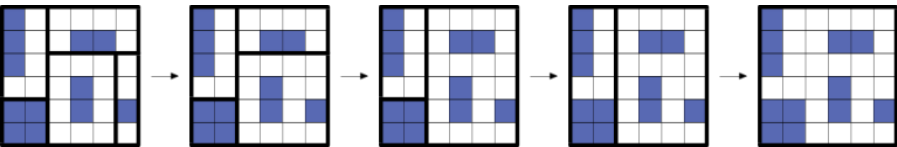
time limit per test: 4 seconds  
memory limit per test: 512 megabytes  
input: standard input  
output: standard output

This problem differs from the previous problem only in constraints.

Petya decided to visit Byteland during the summer holidays. It turned out that the history of this country is quite unusual.

Initially, there were  $n$  different countries on the land that is now Berland. Each country had its own territory that was represented as a rectangle on the map. The sides of the rectangle were parallel to the axes, and the corners were located at points with integer coordinates. Territories of no two countries intersected, but it was possible that some territories touched each other. As time passed, sometimes two countries merged into one. It only happened if the union of their territories was also a rectangle. In the end only one country remained — Byteland.

Initially, each country had a rectangular castle inside its territory. Its sides were parallel to the axes and its corners had integer coordinates. Some castles might touch the border of the corresponding country and sides or other castles. Miraculously, after all the unions the castles are still intact. Unfortunately, their locations are the only information we have to restore the initial territories of the countries.



The possible formation of Byteland. The castles are shown in blue.

Petya wonders why no information about the initial countries remained. He suspected that the whole story is a fake. You were recommended to him as a smart person. Please check whether or not there exists a possible set of initial territories that could make the story true.

### Input

The first line contains a single integer  $n$  ( $1 \leq n \leq 100\,000$ ) — the number of countries and castles.

Each of the next  $n$  lines contains four integers  $a_i, b_i, c_i, d_i$  ( $0 \leq a_i < c_i \leq 10^9$ ,  $0 \leq b_i < d_i \leq 10^9$ ) — the coordinates of the  $i$ -th castle, where  $(a_i, b_i)$  are the coordinates of the lower left corner and  $(c_i, d_i)$  are the coordinates of the upper right corner.

It is guaranteed that no two castles intersect, however, they may touch.

### Output

If there exists a possible set of territories that satisfies the story, print "YES", otherwise print "NO".

You can print each letter in any case (upper or lower).

### Examples

<b>input</b>	<a href="#">Copy</a>
4 0 0 1 2 0 2 1 3 1 0 2 1 1 1 2 3	
<b>output</b>	<a href="#">Copy</a>
YES	
<b>input</b>	<a href="#">Copy</a>

### Codeforces Round #567 (Div. 2)

Finished

Practice



### → Virtual participation

Virtual contest is a way to take part in past contest, as close as possible to participation on time. It is supported only ACM-ICPC mode for virtual contests. If you've seen these problems, a virtual contest is not for you - solve these problems in the archive. If you just want to solve some problem from a contest, a virtual contest is not for you - solve this problem in the archive. Never use someone else's code, read the tutorials or communicate with other person during a virtual contest.

Start virtual contest

### → Practice

You are registered for practice. You can solve problems unofficially. Results can be found in the contest status and in the bottom of standings.

### → Clone Contest to Mashup

You can clone this contest to a mashup.

Clone Contest

### → Submit?

Language: 

GNU G++11 5.1.0

Choose file: 

选择文件

 未选择任何文件

Be careful: there is 50 points penalty for submission which fails the pretests or resubmission (except failure on the first test, denial of judgement or similar verdicts). "Passed pretests" submission verdict doesn't guarantee that the solution is absolutely correct and it will pass system tests.

Submit

### → Problem tags

brute force





greedy

sortings

\*3000

No tag edit access

### → Contest materials

- Announcement #1 (en) 
- Announcement #2 (ru) 
- Tutorial #1 (en) 
- Tutorial #2 (ru) 

```
4
0 0 2 1
1 2 3 3
2 0 3 2
0 1 1 3
```

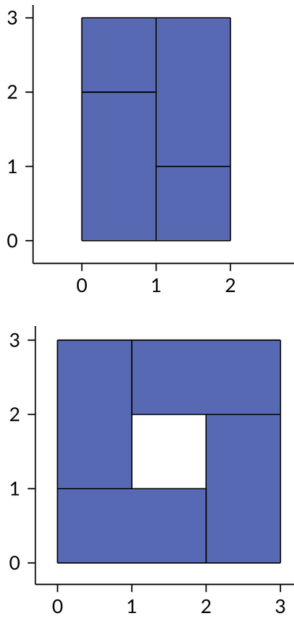
output

Copy

NO

Note

The castles in the first and second examples are shown on the pictures below.



Supported by

