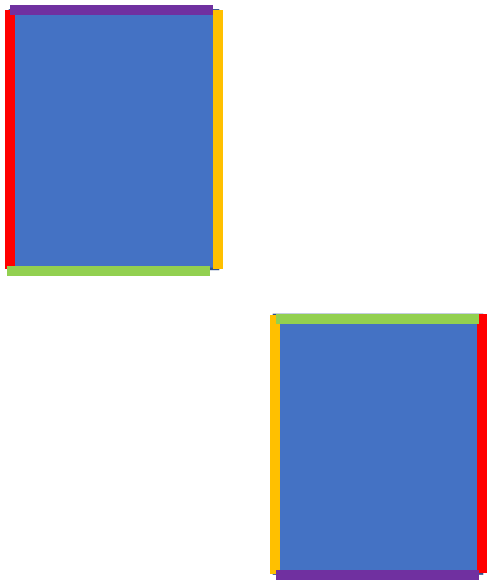
Programming Practice

2018-11-29

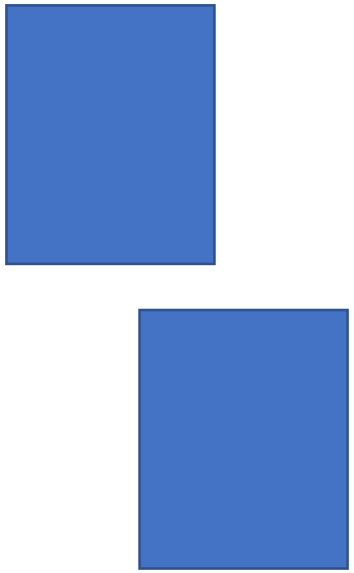
Week 13

Practice Lecture

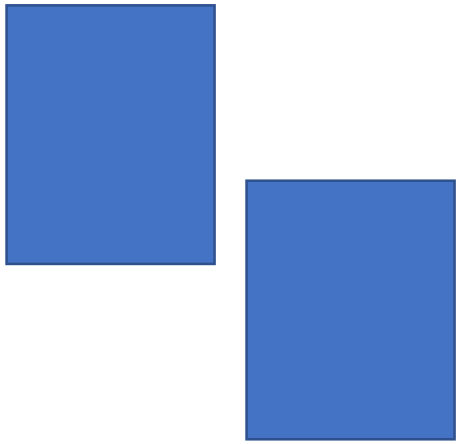
Intersection of rectangles



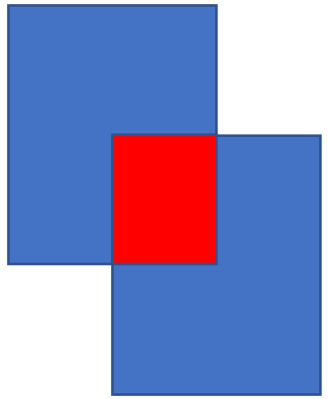
False



False

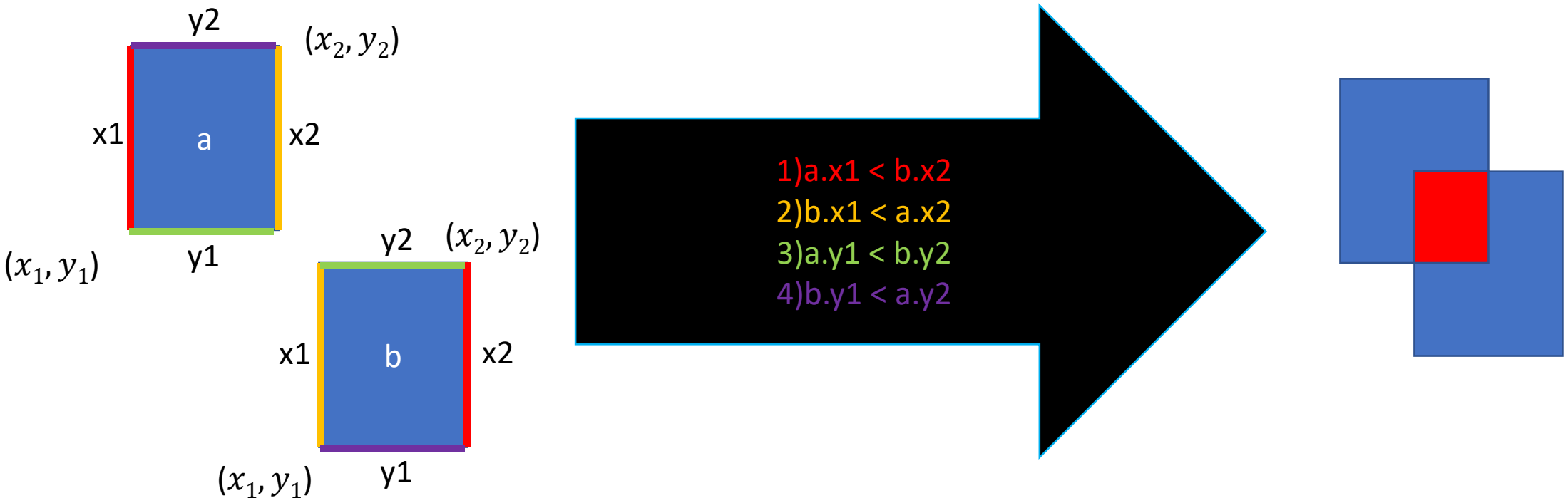


False



True

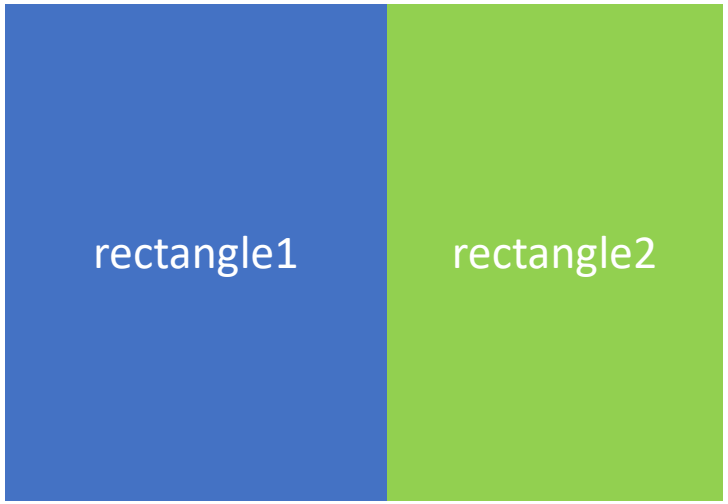
Intersection of rectangles



False

True

Intersection of rectangles



No intersection

Homework Problems

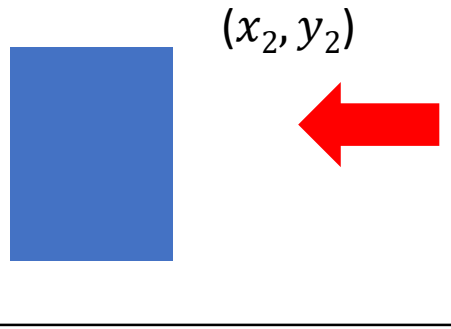
1. Intersection of two rectangles
2. Intersection of many rectangles

Problem. **1**

Intersection of two rectangles

Description

Write a program that returns a existence of intersection when given two rectangles on 2D rectangular coordinate system.



The notation that we will use to represent a rectangle on 2D rectangular coordinate system.

$$x_1 < x_2 \;\&\&\; y_1 < y_2$$

Input

First line: $x_1\ y_1\ x_2\ y_2 (of\ first\ rectangle)$

Second line: $x_1\ y_1\ x_2\ y_2 (of\ second\ rectangle)$

Coordinate values(CV) are $Integer$ and have range($-100{,}000 \leq \mathrm{CV} \leq 100{,}000$)

Output

YES *or* *NO*

Sample

```
[input]
1 1 3 3
2 2 4 4
[output]
YES
```

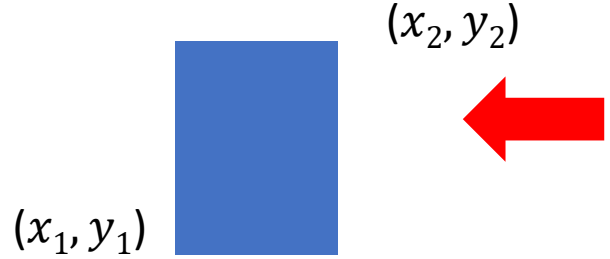
```
[input]
1 1 3 3
4 4 7 7
[output]
NO
```

Problem. **2**

Intersection of many rectangles

Description

Write a program that returns a area value of total intersection when given $N(2 \leq N \leq 100{,}000)$ rectangles on 2D rectangular coordinate system.



The notation that we will use to represent a rectangle on 2D rectangular coordinate system.

$$x_1 < x_2 \;\&\&\; y_1 < y_2$$

Input

First line contains a single integer N $(2 \leq N \leq 100{,}000)$.

Next N lines(for n_{th} line): $x_1\ y_1\ x_2\ y_2 (of\ (n-1)_{th}\ rectangle)$

* Coordinate values(CV) are $Integer$ and have range($-10{,}000 \leq \mathrm{CV} \leq 10{,}000$)

Output

Area of total intersection(intersection of N rectangles)

*0 when there is no intersection

Sample

```
[input]
3
0 0 2 2
1 1 2 2
3 3 4 4
[output]
0
```

```
[input]
4
0 0 2 2
1 1 2 2
-1 -1 4 4
0 0 3 3
[output]
1
```

Area = 1