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Course	
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Theory

Question 1

	Result

• Execute the following operation between binary numbers first interpreting them as pure binary (integer numbers without sign) and then as 2's complement (integer numbers with sign) and indicate if overflow occurs:
 	
11110101 + 01101101
	`Binary:`
	
	`overflow (yes/no):`
	
	`2'C:`
	
	`overflow (yes/no):`

Most significant passages to obtain the result:	

Question 2

What do Program Counter (PC) and InstructionRegister (IR) contain?	*PC:* *IR:*

Question 3

Say if this expression is valid according to Boolean algebra: xy + xyz=xyz	*Answer (yes/no)*
Most significant passages to obtain the result:	

Programming

A file, whose name is passed as argument from the command line, contains the description of a set of rectangles positioned on a matrix of points. The matrix is based on a system of Cartesian coordinates where each coordinate is an integer number between 0 and N (extremes included), the origin is the upper left point and the coordinates increase from left to right and from top to bottom. N is a constant that is known a priori and defined by means of a #**define** directive. Each line of the file contains the description of a rectangle in the following format:

```
<x1> <y1> <x2> <y2>
```

where (<x1>, <y1>) are the coordinates of the upper left corner of the rectangle and (<x2>, <y2>) are the coordinates of the lower right corner (therefore x1 ≤ x2 e y1 ≤ y2). |The total number of rectangles (i.e. the number of the lines of the file) is not known a priori. Do not assume any ordering of the lines.

Write a C program to check that all the rectangles reported in the file do not overlap (i.e. they occupy disjoint cells of the matrix). The program should check the file whose name is passed from the command line, position the rectangles in the matrix and display the message "No overlaps between the rectangles" if the file satisfies this criterion, otherwise it should display the message "The rectangles have (at least) one overlap".

In case the file contains integer numbers not included in the 0 to N range, or not satisfying the aforementioned conditions of ordering, the program should display the message "Error in the format of the file" and terminate the execution. Besides that, you can assume that the format of the file is correct.

 For example (if N is equal to 10), a file containing the following rectangles' description:

```
2 1 6 2
8 7 10 9
5 2 9 6
0 8 5 8
```

corresponds to the rectangles' location shown in the following figure, where the first and third rectangles partially overlap: