For this assignment, you will work with arrays of structs in C.

1. **(5 points)** Declare a struct with tag window, that contains the following members.
   * Unsigned integers named xlow, ylow, xhigh, yhigh;
   * A character named wch.

The window is a rectangle with upper left corner at coordinates (xlow, ylow) and bottom right corner at coordinates (xhigh, yhigh). The window is filled with the character wch.

1. **(15 points)** Write a function with prototype

void fill\_line(struct window W[], unsigned Wsize, unsigned x1, unsigned x2, unsigned y, char line[]);

that does the following. Given an array of windows W of size Wsize, fill the character array line with the window characters that should be displayed for the given y coordinate, but cropped to the x values between x1 and x2; i.e., all x values such that

x1 <= x <= x2

If windows overlap, then the window with higher array index should be displayed on top. The line array should contain spaces wherever there is no window.

1. **(10 points)** Write a function with prototype

unsigned fill\_windows(struct window W[], unsigned wmax);

that fills in an array of windows W of size wmax by reading the following information from standard input, in precisely the following order and format. An unsigned integer numw, that specifies the number of windows to follow, and should be returned by the function. For each window, a line of the form

xlow,ylow xhigh,yhigh ch

where (xlow,ylow) and (xhigh,yhigh) are unsigned integer coordinates for the window corners, and ch is the window's character.

1. **(10 points)** Write a C program that uses the above functions that reads from standard input
   * The coordinates of the screen to display, specified as

dxlow,dylow dxhigh,dyhigh

* + The window information, as read by function fill\_windows

and writes to standard output the windows as they would appear within the display rectangle. For example, if the input is:

0,0 10,10

5

0,0 3,3 A

2,2 5,5 B

7,7 15,9 C

0,7 5,11 D

9,0 12,4 E

then the output should be:

AAAA EE

AAAA EE

AABBBB EE

AABBBB EE

BBBB EE

BBBB

DDDDDD CCCC

DDDDDD CCCC

DDDDDD CCCC

DDDDDD

You may safely assume that the input file will not contain more than 100 windows, and the display area will not be wider than 100 characters.

Collect all this, including appropriate documentation, together into a single file, windows.c, and upload it to Canvas.  The TAs will test your code on pyrite.