SE-1105 HOMEWORK-3

Write a C program that represents a computer screen as 20x20 2D array of integers where each cell of the array represents a pixel of the screen. A pixel of the screen can be either 1 or 0. Define the necessary data type for Screen as a custom data type and implement the following methods

<table>
<tr><td><code>drawRectangle(…)</code></td><td colspan="2">Takes a Screen, the row, and the column of the top left corner of the rectangle and the width and the height of the rectangle as parameters. The function must draw (make the necessary pixels 1) an empty rectangle on the given screen at the given position with the given sizes. Assume that the rectangle will be oriented horizontally. See example
Example: If screen were 6x10 and initially as S1 below and top left is given as 1,1 and width =3 height=4 then the function must change the screen to S2</td></tr>
<tr><td></td><td>S1
0000000000
0000000000
0000000000
0000000000
0000000000
0000000000</td><td>S2
0000000000
0111000000
0101000000
0101000000
0111000000
0000000000</td></tr>
<tr><td><code>fillRectangle(..)</code></td><td colspan="2">Takes a Screen, the row, and the column of the top left corner of the rectangle and the width and the height of the rectangle as parameters. The function must draw (make the necessary pixels 1) a filled rectangle on the given screen at the given position with the given sizes. Assume that the rectangle will be oriented horizontally. See example
Example: If screen were 6x10 and initially as S1 below and top left is given as 1,1 and width =3 height=4 then the function must change the screen to S2</td></tr>
<tr><td></td><td>S1
0000000000
0000000000
0000000000
0000000000
0000000000
0000000000</td><td>S2
0000000000
0111000000
0111000000
0111000000
0111000000
0000000000</td></tr>
<tr><td><code>drawHLine(..)</code></td><td colspan="2">Takes a Screen, the row, and the column of the left corner of the line and the length of the line as parameters. The function must draw (make the necessary pixels 1) a horizontal line on the given screen at the given position with the given length.
Example: If screen were 6x10 and initially as S1 below and left is given as 1,1 and length =5 then the function must change the screen to S2</td></tr>
</table>

<table>
<tr><td></td><td colspan="2"></td></tr>
<tr><td></td><td>S1
000000000
000000000
000000000
000000000
000000000
000000000</td><td>S1
000000000
011111000
000000000
000000000
000000000
000000000</td></tr>
<tr><td>drawVLine(..)</td><td colspan="2">Takes a Screen, the row, and the column of the top corner of the line and the length of the line as parameters.
The function must draw (make the necessary pixels 1) a vertical line on the given screen at the given position with the given length.
Example: If screen were 6x10 and initially as S1 below and top is given as 0,4 and length =5 then the function must change the screen to S2</td></tr>
<tr><td></td><td>S1
000000000
000000000
000000000
000000000
000000000
000000000</td><td>S2
000010000
000010000
000010000
000010000
000010000
000000000</td></tr>
<tr><td>Important Note:</td><td colspan="2">The functions described above do not print anything as output. They only change the given parameter that represents the screen. The functions also do not erase any pixel on the screen array (Do not change 1’s to 0s) They only change the necessary pixels to 1. If there is already something (some pixels that are 1) on the screen it remains.</td></tr>
<tr><td>clearScreen(..)</td><td colspan="2">Takes a Screen as parameter and clears it (makes all pixels 0)</td></tr>
<tr><td></td><td>S1
000000000
100100000
100100000
100111110
100000000
111100000</td><td>S1 after
000000000
000000000
000000000
000000000
000000000
000000000</td></tr>
<tr><td>printScreen(..)</td><td colspan="2">Takes a Screen as parameter prints it out. The function must print “* ” (1 star and 1 space) for the pixels that are 1 and “ “ (2-space) for the pixels that are 0. The function should also frame the screen by using “| ” and “- “ characters. (See the example)
Example: If screen were 5x5 and initially as S1 the output would be as follows:</td></tr>
</table>

	S1 00000 01010 01010 01110 00000	Output - - - - - - - - | | | * * | | * * | | * * * | | | - - - - - - - -
main()	Create an empty screen and draw 1 empty rectangle, 1 filled rectangle, 1 h-line one, and v-line arbitrarily without clearing the screen. Print the screen after drawing each shape.	