

BIL 105E – Introduction to Scientific and Engineering Computing (C)

Spring 2014-2015

Homework 1

Assignment Date: 12.03.2015

Due Date: 19.03.2015

Duration: One week

You will write a C program (rectangle.c) that uses “*” character to draw a rectangle of a given height, width and thickness. The program first asks the user to enter the height, width and thickness of the shape. If the user want to draw a rectangle, all three parameters should be given by the user.

The thickness of a shape indicates the number of stars(*) between the inner space and the outer shell of a shape. You need to make a calculation beforehand to inform the user if it is feasible to draw a shape with the thickness value provided. If it is not possible to draw a rectangle with the specified thickness value, the user should be informed with a message *“It is not possible to draw your rectangle with the specified thickness. The rectangle without the thickness option is drawn below:”* and the rectangle should be drawn without any thickness (see the example below).

Notice that thickness cannot be achieved in all four sides of a rectangle. For example, when the rectangle is 7 (h) x 5 (w) with a thickness of 3, you can draw a rectangle whose upper and lower sides have a thickness of 3, but the left and right sides would have a thickness of 2 at maximum (see the example below).

After the first drawing, the program asks the user if he/she wants to continue drawing more rectangles. If the user wants to continue, **1** is given, otherwise **0** is given. When **0** is given by the user, the program terminates. When **1** is given by the user, the program asks the user to enter height, width and thickness of the rectangle again.

You can assume that the inputs are valid integers from 1 to 20 (inclusive). Based on the user inputs, you will draw the shape to the console.

Below are sample outputs from the execution of the program:

Enter the height for your rectangle: 10

Enter the width for your rectangle: 7

Enter the thickness: 2

```
* * * * *
* * * * *
* *      * *
* *      * *
* *      * *
* *      * *
* *      * *
* *      * *
* *      * *
* * * * *
* * * * *
```

Do you want to continue? (1 for Yes, 0 for No): 1

Enter the height for your rectangle: 7

Enter the width for your rectangle: 5

Enter the thickness: 3

```
* * * * *
* * * * *
* * * * *
* *  * *
* * * * *
* * * * *
* * * * *
```

Do you want to continue? (1 for Yes, 0 for No): 1

Enter the height for your rectangle: 5

Enter the width for your rectangle: 4

Enter the thickness: 2

```
* * * *
* * * *
*      *
* * * *
* * * *
```

Do you want to continue? (1 for Yes, 0 for No): 1

Enter the height for your rectangle: 3

Enter the width for your rectangle: 3

Enter the thickness: 2

It is not possible to draw your rectangle with the specified thickness. The rectangle without the thickness option is drawn below:

* * *

* * *

* * *

Do you want to continue? (1 for Yes, 0 for No): 0