

CPE 187L Embedded Systems Design

Praveen Meduri

Section #2

Lab 5 Report

Xavier Howell

Introduction

The purpose of this lab is to write software that involves functions, parameters, and if-then conditions. I will use C coding to write these conditions.

The first step is to write a function called Calc_Area. This function will calculate the area of a rectangle by taking two scanf inputs and multiplying them together. It will then output to the display using printf. The function has a parameter though. We will calculate the area only if both the length and width are between 3 and 20 inclusively. Otherwise a result of zero will be displayed.

The second step will be to run it on the real board. The board doesn't actually take inputs so we will use TExaSdisplay application to show our print statements and input our scan parameters.

```
unsigned long Calc_Area(unsigned long l, unsigned long w) {  
    unsigned long result;  
    // Put your Lab 5 code here  
    if ((l < 3) || (l > 20)){  
        return(0);  
    } else if ((w < 3) || (w > 20)){  
        return(0);  
    } else {  
        result = l * w;  
    }  
  
    return(result);  
}
```

Debug In Simulation

D:\Keil\Labware\Lab5_Functions\Lab5.uvproj - µVision4

File Edit View Project Flash Debug Peripherals Tools SVCS Window Help

Registers

Register	Value
R0	0x00000090
R1	0x000010E5
R2	0x0000000A
R3	0x2000000C
R4	0x00000044
R5	0x20000068
R6	0x7FFFFFFF
R7	0x00000000
R8	0x00000000
R9	0x0000000A
R10	0x20000018
R11	0xFFFFFFFF
R12	0x00000000
R13 (SP)	0x200000D4
R14 (LR)	0x000010E0
R15 (PC)	0x00000D8A
xPSR	0x21000000

Disassembly

```
23: int main(void) {
24:   unsigned long length, width, area;
25:   TExaS_Init(UART_PIN_PA0, UART_PIN_PA1); // this initializes the TExaS grader lab 5
26:   printf("This program calculates areas of rectangular rooms.\n");
27:   EnableInterrupts(); // the grader needs interrupts
28:   while(1) {
29:     printf("Give length: "); scanf("%ld", &length); // Get input
30:     printf("Give width: "); scanf("%ld", &width); // Get input
31:     area = Calc_Area(length, width); // Get input
32:     printf("Area of the room = %ld\n", area);
33:   }
34: }
35:
36:
37: // Computes the Area of a rectangular room whose sides are given
38: // Input: the length (l) and width (w) are the dimensions of a rectangle
39: // Output: the area of the rectangular room
40: // Notes: Return a result of zero if
41: //   the length is less than 3,
42: //   the width is less than 3,
43: //   the length is greater than 20 or
44: //   the width is greater than 20.
45: unsigned long Calc_Area(unsigned long l, unsigned long w) {
46:   unsigned long result;
47:
48:   // Put your Lab 5 code here
49:   if ((l < 3) || (l > 20)) {
50:     return(0);
51:   } else if ((w < 3) || (w > 20)) {
52:     return(0);
53:   } else {
54:     result = l * w;
55:   }
56:   return(result);
57: }
58: }
```

UART #1

Pass: RCC SYSDIV2 bits are 4

1) Input/output tests :
Done grading. Score is 100

ASSIGN BreakDisable BreakEnable BreakKill BreakList BreakSet BreakAccess COVERAGE DEFINE DIR Display

Simulation t1: 0.73144811 sec L23 C1 CAP NUM SCRL OVR: R/W

TExaS edX Lab 5

Port F Hardware

TM4C123

PF3 80 MHz

PF4

PF2

PF1

PF0

SW1

SW2

LED

LED

LED

Port F Registers

DATA: _____ PUR: _____ LOCK: _____

DIR: _____ PDR: _____ CR: _____

DEN: _____ RCGC2: 0x00000009 Clock disabled

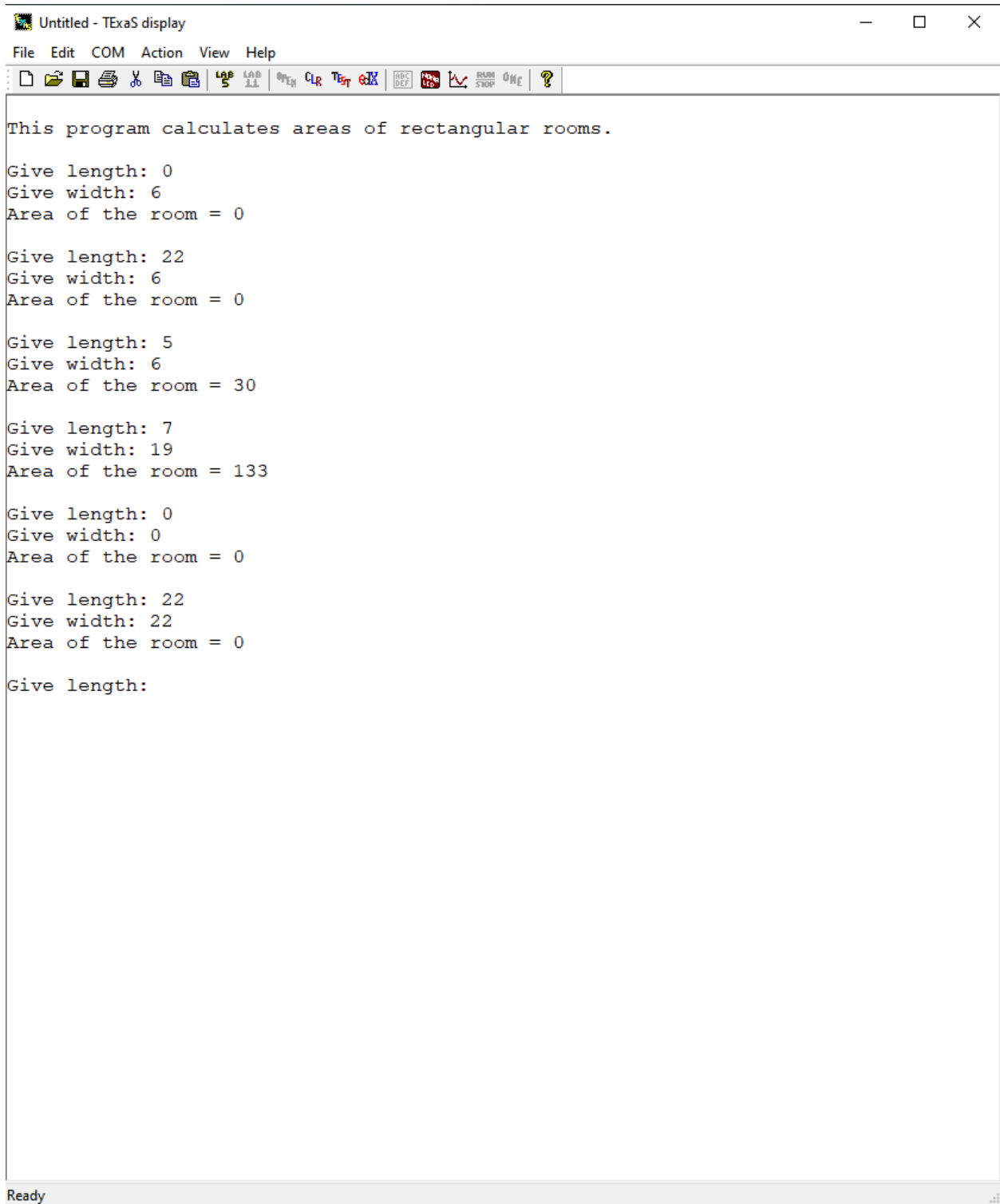
Grading Controls

Grade _____ Score: 100

Number from edX: _____

Copy this to edX: Dp8ie6lm

Debug On The Real Board



Untitled - TExaS display

File Edit COM Action View Help

This program calculates areas of rectangular rooms.

Give length: 0
Give width: 6
Area of the room = 0

Give length: 22
Give width: 6
Area of the room = 0

Give length: 5
Give width: 6
Area of the room = 30

Give length: 7
Give width: 19
Area of the room = 133

Give length: 0
Give width: 0
Area of the room = 0

Give length: 22
Give width: 22
Area of the room = 0

Give length:

Ready

Questions

1. How is the function Calc_Area being called? (Call by value or call by reference)

The function Calc_Area is called by value.

2. What are the actual and formal arguments in the function Calc_Area?

Formal argument is w and actual arguments are length and width