Embedded Programing (Lab 4)
zyBooks Chapter 3 & Visual Studio

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Embedded Systems Programming
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INTRODUCTION

➢ In this lab, we used a combination of practices. We read chapter 3 of "Embedded Systems Programming" in zyBooks. Following the reading, we wrote two separate programs in Visual Studio. The first one was to calculate the LCM of two numbers (the numbers were inputted by the user). The second one deals with finding all pairs of AMICABLE numbers between 200 and 6000.

OBJECTIVES

➢ Further enhance our understanding in C.
➢ Develop more efficient ways to create code in C.
➢ Introduction to while loop in C.

MATERIAL USED

➢ (1x) computer for zyBooks and Visual Studio.

PROCEDURE

➢ *Step 1:* Read the instructions outlined in the **lab paper**.
➢ *Step 2:* Follow the instructions given from the **lab paper** (Follow the order of given instructions *i.e. "Read zyBooks first then do the C code"*).

RESULTS AND DISCUSSION

(Continued on next page)

C code for Question 1

```c
////////////////////////////////////////////////////////////////////////////////////////////////////////////
//This program is desinged to calculate the LCM (lowest common multiple) from two values. The values are inputted by the user.   //
//Embedded Systems Programming (Lab 4)(Question 1)                                                          //
//Subash Handa                                                                                              //
//Program made by: Leonardo Fusser (1946995)                                                                //
////////////////////////////////////////////////////////////////////////////////////////////////////////////


#include <stdio.h>

int main()
{
    //variable declaration
    int usr_num1;
    int usr_num2;

    printf("Enter your 1st Number: ");
    scanf_s("%d", &usr_num1); //receive 1st number
    printf("Enter your 2nd number: ");
    scanf_s("%d", &usr_num2); //receive 2nd number
    printf("---------------------------------------------\n"); //page break
    printf("The lowest common multiple of %d and %d is: %d.\n", usr_num1, usr_num2, lcm(usr_num1, usr_num2)); //print result of LCM
    printf("---------------------------------------------\n"); //page break
}
//call to function (for greatest common denominator)
int gcd(int usr_num1, int usr_num2)
{
    if (usr_num1 == 0)
        return usr_num2;
    return gcd(usr_num2 % usr_num1, usr_num1);
}

//call to function (for lowest common denominator)
int lcm(int usr_num1, int usr_num2)
{
    return ((usr_num1 * usr_num2) / gcd(usr_num1, usr_num2));
}
```

C code output for Question 1

```
Microsoft Visual Studio Debug Console                                    —    □    ✕
Enter your 1st Number: 2
Enter your 2nd number: -93
---------------------------------------------
The lowest common multiple of 2 and -93 is: 186.
---------------------------------------------

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ual Studio 2019\Projects\Embedded Systems Programming\Lab 4 (Question 1)\Debug\Lab 4 (Question 1).exe (process 17772) ex
ited with code 0.
Press any key to close this window . . .
```

```c
1    //////////////////////////////////////////////////////////////////////////////////////////
2    //This program computes AMICABLE operations from two numbers. The numbers are inputted by the user.//
3    //Lab 4-Question 2                                                                          //
4    //Embedded Systems Programming                                                              //
5    //Subash Handa                                                                              //
6    //Program made by: Leonardo Fusser (1946995)                                                //
7    //////////////////////////////////////////////////////////////////////////////////////////
8
9
10   #include <stdio.h>
11   #include <math.h>
12
13   void main() {
14
15       //variable declarations
16       int num1;
17       int num2;
18       int sumw = 0;
19       int sumx = 0;
20       int w;
21       int x;
22
23       //user input
24       printf("Enter the first number (between 200 and 6000): "); //first number
25       scanf_s("%d", &num1);
26
27       printf("Enter the second number (between 200 and 6000): "); //second number
28       scanf_s("%d", &num2);
29
30       //AMICABLE check
31       for (w = 1; w < num1; w++) {
32           if (num1 % w == 0) {
33               (sumw = sumw + w);
34           }
35       }
36       for (x = 1; x < num2; x++) {
37           if (num2 % x == 0) {
38               (sumx = sumx + x);
39           }
```

```
39            }
40        }
41
42        //if and else: output print to user
43        if ((num1 == sumx) && (num2 == sumw)) {
44            printf("%d ", num1);
45            printf("and %d ", num2);
46            printf("are AMICABLE.\n");
47        }
48        else {
49            printf("%d ", num1);
50            printf("and %d ", num2);
51            printf("are not AMICABLE.\n");
52        }
53    }
```

C code output for Question 2

```
Microsoft Visual Studio Debug Console

Enter the first number (between 200 and 6000): 200
Enter the second number (between 200 and 6000): 200
200 and 200 are not AMICABLE.

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ted with code 0.
Press any key to close this window . . .
```