 **ECEN 09342**

**Lab#2 (C & Assembly)- Individual Lab, 2 weeks Lab**

Q1:Write a c program for the MSP430 for the following specifications. Check your value in the variable, expression, and memory location. Write down your explanation with the appropriate screenshot. (15 pts)

1. Will store an integer and increment the value (local variables)
2. Will store a float and decrement the value (global variables)
3. Will store two unsigned characters with hex values (local variables) and perform two logic operations between them

Q2: Pick two numbers and calculate their sum in binary arithmetic. Make sure that there is an overflow. Write a c program for the MSP430 for the above specifications using a subfunction and check where the overflow bit is stored. Write down your explanation with the appropriate screenshot. (15 pts)

Q3: Write an assembly program such that:

a. When the least significant bit of registers R4 and R5 have the value 1, the register R9 gets

the value 0FF0h.

b. When only one of the least significant bits of either register R4 or R5 has the value 1, the

one’s complement of the value in register R9 will be saved in register R10. (15 pts)

Q4: What will be the values at memory locations 0x02000h, 0x02002h, 0x02004h, 0x02006h, and 0x02008h when the following program is run? (15 pts)

**mov.w** #0006h,&2000h;

**mov.w** #0009h,&2002h;

**clr.w** &2006h;

**clr.w** &2008h;

**mov.w** &2002h,&2004h;

**add.w** &2000h,&2004h;

**cmp.w** #000Ah,&2004h;

**jhs** Greater

**jlo** Less

**Greater:**

**mov.w** &2000h,&2008h;

**jmp** $;

**Less:**

**mov.w** &2002h,&2006h;

**jmp** $;

Q5: Write an assembly program with the following specifications.

a. In the main block, you should have two registers R4 and R5. They should be checked in

an infinite loop. If R4 is greater than R5, then the greater subroutine will be called. If

R4 is less than R5, then the less subroutine will be called. If R4 equals R5, then no

operations will be done.

b. In the greater subroutine, your code will fill the decimal numbers 1, 2, 3, 4, 5 in

hexadecimal form to five successive memory locations. After this operation, the value in

R4 will be decreased by one.

c. In the less subroutine, your code will fill the decimal numbers 10, 9, 8, 7, 6 in

hexadecimal form to five successive memory locations. After this operation, the value in

R4 will be decreased by one. (15 pts)

Q6: Write an assembly program such that:

a. It contains a subroutine which performs the and operation between the first (#2D97h) and second (#6239h)

numbers. Then, it performs the or operation between the result of the and operation and

the third number.

b. The final result must be written to the memory address 203Ch.

c. You cannot change the numbers in the addresses given above. (15 pts)

Q7: Record your video demonstration (maximum 5 minutes), upload it on google drive/YouTube. Mention your link to the report. If you can finish during the Lab time, you can also demonstrate in the Lab (10 pts)

\*\*\*Please upload your code in the GitHub for each of the question to get full points and share the link.

\*\*\*Write down a formal report: Objectives (Goal of this Lab), Introduction (What is C & the assembly?), Results (your answer), and Discussion/Conclusion (Your comment)