EE 354 **October 4, 2017**
Hour Exam 2 Review

This exam covers some hardware topics related to the AT89C51CC03, the C language as it is implemented for the 8051, and some assembly language as it is used in conjunction with C and the 8051.

Sample questions to ponder.
1. How does the Keil C-compiler handle parameter passage to functions?

2. What is the minimum size by which the stack grows when a function is called?

3. The C language as it is implemented for the 8051 family allows definition of the *bit* data type. Give an example which defines bit 3 of port 1 as a bit variable called P13.

4. Write a C language statements to output the lower nibble of an unsigned character variable X to the lower four bits of P0.

5. Describe the interrupt priority system used in the 8051 family. Include a discussion of polling.

6. Show how you can use C to selectively enable or disable a particular interrupt.

7. What value gets loaded into Timer 0 to produce a 1 millisecond delay with a at 28.2076MHz clock and a double clocked processor.

8. Why does it not make sense to use timer 0 to produce an interrupt every μsecond?

9. How does the 8051 family know that an interrupt has occurred?

10. Suppose that you are using an 8051 to monitor the temperature in an oven. You determine the step response of the oven by applying full power to it and measuring how fast the temperature rises. How could you use this data to determine the rate at which you must sample the oven temperature in order to get accurate values? (This is actually an EE 310 question.)

11. What are *Public* and *External* variables and how are they used.

12. What is *bank switching* and how is it used in the C language for the 8051?

13. How could you measure the *space efficiency* of C code for the 8051?

14. How could you measure the *time efficiency* of C code for the 8051?

15. If an 8051 board has two switches located on Port 0 at P0.1 (Switch 1) and Port 0.2 (Switch 2). Write a C language program which will call the subprograms listed in the following table if the switches are in the positions indicated.

Switch 1	Switch 2	Response
0	0	Call nothing
0	1	Call *Sw2*
1	0	Call *Sw1*
1	1	Call *Both*

16. What kind of A to D converter is used on the AT89C51CC03 and what is its fastest conversion rate in bits/second.

17. In C, show how to use a *cast* to convert a floating point variable f, to a long int i.

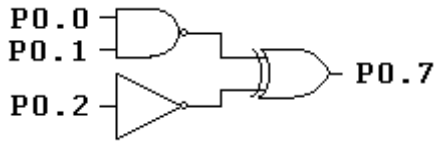
18. What is the time resolution of the AT89C51CC03 timers if the system is using an at 28.2076MHz external crystal.

19. Suppose you have a floating point number f = 1.234567 and you want to put the first three digits of this number (plus the decimal point) into a string so that it can be displayed. Explain in words what steps need to be taken.

20. The result of a floating point calculation produces a number x in the range $-3.5 \leq x \leq 4.6$. Write the scaling equation so that this number can be sent out to the D to A converter on the AT89C51CC03 and produce voltage values between 0 volts and 3.3 volts.

21. For problem 20 above, what will be the binary number and the corresponding voltage at the D to A converter output if the number x = 0.

22. Write a program in C to implement the following logic block.



23. The AT89C51CC03 has an analog multiplexor. What is an analog multiplexor and how is it used on the AT89C51CC03?

24. Given a floating point number x in the range 0 to 255.0. Show how to output this number to the 8-bit D to A converter in the AT89C51CC03 board.

25. Explain the difference between synchronous and asynchronous serial communications.