Homework2: CMPS 499-003 Embedded Software Systems Fall 2007

Date Assigned: Tuesday Sep 11, 2007
Date Due: Thursday, Sept 25, 2007

Objectives:

1. **To revise the basic concepts about the architecture of an 8051 microcontroller**
2. **To install and run the Keil compiler**
3. **To develop software for reading and writing to ports of an 8051 microcontroller**

Q1. Install the Keil MicroVision simulator that accompanies the book, run the "Hello World" program by following all the steps and examine the port output(s) as they change. Submit a brief description of your experience while doing it, especially what did you learn.

Q2. Write a software that does the following (all of it in one software):-

i) Writes a byte to Port P2 periodically (change the byte every now and then to test properly)

ii) Reads pin 6 of P2 periodically and if the value of that pin is 1, it writes a 0 to pin 4 of Port 3, else it writes a 1 to it.

iii) Reads pin 6 of Port P2 periodically and if the value of that pin has changed since last time, it writes a 1 to pin 4 of Port 3, else it writes a 0 to it.

Start developing by adding one function at a time and test by examining the port values using the Keil MicroVision simulator. Submit your code with proper documentation. You would be asked to demonstrate your running code in the class (using classroom laptop).

Q3. In ANSI C/C++, write a program that accepts two inputs each a 1-byte number and performs the following operation on them and displays the results in binary form:- bitwise-and, bitwise-or, bitwise-xor. Submit your code as well as runtime outputs.

Q4. Explain with proper circuitry/architecture about why it is necessary/meaningful to write a 1 to a pin (or, an 0xFF to an entire port) before reading it? Is there really a read/write mode in 8051?

Q5. Draw the block diagram of an 8051 embedded controller and describe its pins. Explain how the choice of oscillator frequency affects speed and power consumption.