CSCE 236 Embedded Systems, Spring 2012
Homework 1

Started: Thursday, January 12, 2012
Due: Beginning of class Thursday, January 19, 2012

Instructions: This homework is an individual assignment, collaboration is not allowed. If you discuss any problems with others, please note this on the assignment as described in the syllabus. Also note any materials outside of lecture notes, course textbooks, and datasheets that you used. Answer all questions with **complete sentences** and describe your reasoning where appropriate for full credit. This homework is due on the date listed above before the start of class.

Name:

Problem 1 (5pts). *(To be completed at end of assignment) Approximately how much time did the total assignment take? Which problem took longest and how much time did it take?*

Problem 2 (40pts). *Programming assignment: On the course website there is a C source code file that you will need to complete. The comments in the file indicate the portions of the code you must complete. Include a printout of the code output and also a printout of your final source code. You can compile and test this code by sshing to* `cse.unl.edu` *or using most any other standard C compiler. On the cse server, compile it using the command:* `gcc hw1.c -Wall -o hw1` *and then test it by running* `./hw1`. *See the instructor or TA if you have questions about this process.*

Problem 3 (5pts). *What section of memory does* `malloc` *use? Why is it a bad idea to use* `malloc` *on an embedded system?*

Problem 4. *Data types*

a) (5pts). *What are the maximum and minimum values of int8_t and uint8_t in decimal?*

b) (5pts). *What is the maximum value of int16_t in hex?*

c) (5pts). *What is the value of* `output` *after the following code has been executed?*

```
uint8_t output = 12;
uint16_t counter = 0xCDCD;
output += counter;
while(counter > 0){
  counter = counter >> 1;
  output++;
}
```

Problem 5. *Pointers and memory, refer to the following code for these problems:*

```
uint8_t var = 12;
uint8_t data[] = {0,1,2,3,4,5,6,7};
uint8_t *p1 = &var;
uint8_t *p2 = data+2;

data[3] = *p1;
p2[2] = 0;
```

a) (10pts). *Draw a picture showing where each of the variables are stored and for the pointers, where the data they point to is stored.*

b) (5pts). *What are the values of* `var` *and* `data` *after running this code?*