ECE199JL: Introduction to Computer Engineering   **Fall 2012**
Homework 3   **Due: at start of lecture on Friday 14 September**

Logic Operations and Basic C Programs

If you have not already read the guidelines posted to Web Board about your homework, please do so now.

Please do problems 2.46, 2.48, 2.52, and 11.12 from the textbook.

Here are five additional problems for this week:

1. Logic Operations on Bits
Perform the following logic operations on their respective bit strings.

A. 11101 AND 01010 =

B. 00101 OR 10110 =

C. (NOT (1011010111 OR 1111111111)) AND 0011011001 =

D. NOT (NOT (0101010101)) =

2. Conversion to Floating-Point
For each of the following decimal numbers, convert the number to base 2 notation, using only as many bits as are necessary to precisely specify the number (using no leading nor trailing zeroes), then convert your answer into the IEEE single-precision floating-point representation (as discussed in the book and in lecture).

A. 3.75

B. -313.3125

3. Conversion from Floating-Point
For each of the following bit patterns, calculate the number represented by the bits when interpreted using the IEEE single-precision floating-point representation (as discussed in the book and in lecture). Write your answer in decimal (scientific notation is fine).

A. 0 00000000 11100000000000000000000

B. 1 10000001 00011000000000000000000

4. Understanding a C Program
Read through the C program **on the back of this page**. For each pair of variable values listed below, imagine that these values hold after the call to `scanf` returns. For each pair, write the resulting output of the program starting after the `scanf` call.

A. num1=10000 and num2=0

B. num1=10 and num2=200

C. num1=20 and num2=3

```
#include <stdio.h>

#define FINISH 1

int
main ()
{
    int num1, num2, ans;

    printf ("Enter two integers:  ");
    scanf ("%d%d", &num1, &num2);

    printf ("Mystery program...\n");
    if (0 == num2) {
        printf ("invalid input!\n");
    } else {
        for (ans = num1 / num2; ans >= FINISH; ans = ans / 2) {
            printf ("%d\n", ans);
        }
    }

    return 0;
}
```

5. Flow Charts

Using the approach discussed in class, draw a flow chart corresponding to the C program above (the same one that you read for Problem 4).