**CIS 5220 Computer Organization**

**Homework #1**

**Due: September 9, 2015**

SHOW ALL WORK. Please be neat. Clearly label all answers.

These problems are from the textbook, Chapter 3, and can be found on pages 96-99.

3.1 a. Determine the power of each digit for five-digit numbers in base 6.

3.1 b. Use the results from part (a) to convert the base 6 number 245316 to decimal.

3.3 Convert the following hexadecimal numbers to decimal:

a. 4E

b. 3D7

c. 3D70

3.5 a. How many bits (base 2) will it take to represent the decimal number 3,175,000?

3.5 b. How many bytes will it take to store this number?

3.7 b. Use the hexadecimal table in the text book’s Figure 3.8 to perform the following addition:

2AB3

+ 35DC

3.7 c. Add the following numbers:

1FF9

+ F7

3.8 Add the following binary numbers:

a.

101101101

+ 10011011

b.

110111111

+ 110111111

e. Repeat the previous additions, (a) and (b), by converting each binary number to hexadecimal, adding the hexadecimal number together, and converting the results back to binary. Show all work.

3.9 Multiply the following binary numbers together:

a.

1101

x 101

b.

11011

x 1011

3.13 Using the division method (pages 83-84), convert the following decimal numbers (show all work):

a. 13,750 to base 12

b. 6026 to hexadecimal

3.14 Using the division method, convert the following decimal numbers to binary (show all work):

a. 4098

b. 71269

In each case, check your work by using the power of each binary digit to convert back to decimal.

3.16 Convert the following binary numbers directly to hexadecimal:

a. 101101110111010

b. 1111111111110001

3.17 Convert the following hexadecimal numbers to binary:

a. 4F6A

b. 9902

c. A3AB

**Extra credit (optional) problem NOT in text book**:

Develop an algorithm (set of steps) for converting a decimal number to base N. This algorithm can be presented in plain English or pseudocode or a detailed flow-chart.