CPTR-215
HW # 17- Due Friday
REVISED VERSION

The goals of this home work are to gain experience with:
- converting 16 bit binary numbers to binary coded decimal
- converting binary coded decimal numbers to ASCII
- writing characters on the LCD display

(The revision is to remove writing to the LCD display because the routines to do that are not yet ready)

Write a subroutine for the ARM processor on an Embedded Artists LPC2148 board that will take a 16 bit binary number and create a Binary Coded Decimal (BCD) version. To test and demonstrate it you will write a main program that calls the subroutine and passes to it a number (this number can be "hard coded" into the main routine and changed as needed for testing the subroutine by changing the source code). Use register zero to pass the number. The subroutine will return a 32 bit word where the upper 12 bits are zeros and the lower 20 bits contain five BCD digits (see description of BCD below) in register zero. The main program is very small for this assignment.

I suggest that you may wish to break the problem up into one or more subroutines that are used inside the overall subroutine. All the subroutines that are used should be included in the source file with the main program. As noted in class, program 8.3 in the textbook is a division routine that you can use to do the required division.

As you take the binary number and start determining what value each of the 5 decimal digits will have, recall that each decimal digit's value ranges from 0 to 9. Note that it takes 4 bits to represent 9 in binary. This use of 4 bits to represent the value of a decimal digit is called Binary Coded Decimal (BCD). Thus if we wanted to we could put an 8 digit decimal number into a 32 bit register (4 bits per digit X 8 digits = 32).

Before writing assembly code, design the program. Create NS diagrams or flow charts that show program operation. Then code and test.

Turn in: hard copy of your design documentation and a program listing. On the program listing write a note describing the success (or failure) of your program and any particular issues you had in creating it. E-mail me a copy of your source file.