**CSCI 360 Assembler Programming Tips**

**Add the following to Notes in your System/370 Reference Summary (Yellow Card)**

0 - 3    length 2  
4 - B    length 4  
C - F    length 6

This means that encoded instructions that begin with 0, 1, 2, or 3 (in hex) are 2 bytes long, those that begin with 4, 5, 6, 7, 8, 9, A or B (in hex) are 4 bytes long and those that begin with C, D, E or F (in hex) are 6 bytes long.

CSECTs and LTORGs always begin on a DWB (doubleword boundary).  
    
When an LTORG is encountered, the order of movement from the Literal Table to the Symbol Table is those literals of length 8 bytes, then those of length 4, then 2 and, finally, all of the others from the longest (in bytes) to the shortest.

**ORG Trick**

By placing the following two lines in your Assembler program immediately following the LTORG at the beginning of your program's storage area, you will put a recognizable label at the beginning of that storage. Remember that, if your program dumps, the hex output is printed in two sets of four fullwords per line. More appropriately, the data is dumped on a 32-byte boundary. Also, when you look to the right of each line, you will see a display of any EBCDIC characters that happen to be found within those 32 bytes. The recognizable label will be shown there and can direct you immediately to your own storage in the dump!

ORG *csectname*+((\*-*csectname*+31)/32)\*32

DC C'*recognizable label goes here*'

The ORG and DC both go in column 10 and the code following each begins in column 16.

The *csectname* is, of course, the name of your program, or CSECT. Then put a recognizable character string label in between the tick marks on the second line. This character string should be no more than 32 bytes long.

**Establishing a Second Base Register for Large Programs**

If a program happens to exceed 4095 bytes, an addressability error will occur in the first pass of the Assembler for those bytes that go beyond.  If this happens, a second base register needs to be established. It is common to use register 11 as the second base register and, if a third is necessary, it is common to use register 10.

With standard entry linkage, do the following:

      LA    11,4095(,12)  
      LA   11,1(,11)  
      USING csectname+4096,11