ELEC 2220 - Computer Systems
Homework #10
Due: Monday, June 15

PROGRAM 1

To practice with multi-precision arithmetic, design a program to compute Bob = Sue + Joe - Ann, where all variables are **96-bit unsigned binary numbers**. You may ignore any overflow conditions for this exercise. Using "dcd" directives, define the values of Bob, Sue, Joe, and Ann as 96-bit numbers (three 32-bit words), stored in "little-endian format".

Recall that the default storage convention for multi-precision numbers is for the least significant byte to be stored at the lowest address.

Example: ;Bob = 0x0123456789abcdef76543210 (96 bits = 24 hex digits in 12 bytes)

Bob dcd 0x76543210, 0x89abcdef, 0x01234567

Low 32 bits	**Mid 32 bits**	**High 32 bits**	
Bob+0: 10	Bob+4: ef	Bob+8: 67	(Address: Value)
Bob+1: 32	Bob+5: cd	Bob+9: 45	
Bob+2: 54	Bob+6: ab	Bob+10: 23	
Bob+3: 76	Bob+7: 89	Bob+11: 01	

Run the program using the following data.

```
Bob = undefined initially
Sue = 0x123456789abcfabcdef11234
Joe = 0xbbbbeeeeaaaa4567bcde0123
Ann = 0x2345ef01ab67edcba9876543
```

Submit your program and the debugger memory window, circling or highlighting the values of the four variables at the completion of the program.

Notes:

1. Multi-precision arithmetic requires the use of add-with-carry and subtract-with-carry.
2. If adding or subtracting, an entire multi-precision result must be computed before moving on to another operation.

PROGRAM 2 on next page.

PROGRAM 2

To exercise the logical operations, write a program that works with two one-byte data variables labeled STATUS and CONTROL. The program is to perform the following operations.

- Force bits 2 and 5 of CONTROL to 1, without changing the other 6 bits.
- Force bits 3 and 4 of CONTROL to 0, without changing the other 6 bits.
- If bit 0 of STATUS is 1, complement bit 7 of CONTROL, otherwise no changes to CONTROL.

Data are to be stored in memory in “little endian” format (bits are numbered 7 down to 0, from left to right, within each byte.)

Test the program by initializing CONTROL to the value 0x3C and STATUS to 0x0F. Display these values in a watch window and capture and submit that window to show the final values of CONTROL and STATUS.

Repeat for CONTROL initialized to 0xC3 and STATUS to 0xf0.