

# ECE 265

## Homework #4

### Problems:

1. If A contains \$A5, B contains \$61, and CCR contains \$2F initially, what values are in these registers after execution of the following instructions? Assume that the results are not cumulative. That is, start with the initial values for the registers each time.
  - a) COMA
  - b) NEGA
  - c) ORAB #\$80
  - d) TSTB
  - e) MUL
  - f) LSLA  
ROLB
  - g) STAB TMP  
ADCA TMP
2. Write a M68HC11 program to subtract two 8-bit signed, 2's complement numbers, which does not use a subtract instruction. Assume that the numbers to be subtracted are in registers A and B initially, and the result is to be put into A.
3. Write a M68HC11 program to add two four-digit BCD numbers that are each packed into two bytes. Leave the result of the addition in the D register. Assume that the numbers are originally in locations \$0100 and \$0102. Use the label TMP for any temporary memory storage that might be needed in the program.
4. What instruction could you use to zero the most significant bit (Bit 7) of the B register?

5. Write a M68HC11 program that rotates A on itself left the number of times given by the contents of the B accumulator. That is, perform the register transfers  $A\langle 6:0 \rangle \rightarrow A\langle 7:1 \rangle$  and  $A\langle 7 \rangle \rightarrow A\langle 0 \rangle$  the number of times given in the B register. For the problem, assume that the contents of B could be 0 upon entry. Note that none of the shift and rotate instructions quite do the required operation. However, any bit that ends up in C (carry) may be used to branch on with the BCC or BCS instructions. Also note how ORAA (ANDA) can be used to set (clear) any of the bits of A as needed.
6. If the clock frequency for the M68HC11 is 2 Mhz, how long does the following program run?

```
DELAY:  LDX  #$37
LOOP:   NOP
        DEX
        BNE LOOP
```