ECE 271 - Homework #5

1. For each operation, fill in the result and the flags, and for each given branch instruction state whether a branch would occur or not (give "yes" or "no")

	$45 -$2A	$2A -$45	$C4 -$59	$59 -$C4	$E7 -$AB	$AB -$E7	$63 -$63
Result:							
NZVC flags:	0 0 0 0						
BGT							
BHI							
BPL							
BNE							
BCS							
BVS							

2. After doing a subtraction, a condition branch is executed. For each of the following pairs of conditional branches, give an example of a subtraction result that would cause both conditional branches to actually branch. Answers to the first two are given as examples.

    a) BRA and BNE: 25 (any non-zero value would cause either to branch)

    b) BEQ and BNE: none (no result could cause both to branch)

    c) BPL and BNE:

    d) BPL and BEQ:

    e) BPL and BMI:

    f) BMI and BNE:

    g) BMI and BEQ:

3. What conditional branch is the "opposite" of each of the following (one branches if and only if the other doesn't): Example: BVS - _BVC_.   BCS - _____, BPL - _____, BEQ - _____, BGT - _____, BGE - _____, BHI - _____, BHS - _____.

4. Give code which will branch to location $9000 if the result of the previous operation is zero. Assume that this code is far from location $9000 (e.g., it is at location $1020).

5. Which of the following conditional branches might with good reason follow an ADD instruction? Circle the reasonable ones. BHI, BGT, BMI, BEQ, BCC, BVC.

6. If you are required to write code which "loops" 100 times, you have a number of choices. Write code for each of the following variations. The first is given as an example.

   a) Count up using a counter which "lives" in the A register

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                CLRA
    LOOP1       INCA
                CMPA        #100
                BNE         LOOP1
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   b) Count down using a counter which "lives" in the A register

   c) Count up using a counter which "lives" in memory location $9000.

   d) Count down using a counter which "lives" in memory location $9000.