# Exercise 3 Problems

1. For each of the code fragments below, determine which of the 8 simple branches (BPL, BMI, BNE, BEQ, BVC, BVS, BCC, BCS) are taken, not taken, or cannot be determined. Note the Bxx is used to represent a generic branch instruction.
   1. LDAA #$00

Bxx 10

* 1. LDAA #$01

Bxx 10

* 1. LDAA #$D3

Bxx 10

* 1. LDAA #97

Bxx 10

* 1. LDAA #$C0

ADDA #$40

Bxx 10

* 1. LDAA #$C0

ADDA #$C0

Bxx 10

* 1. LDAB #$FF

ADDB #$7F

Bxx 10

* 1. LDAB #$7F

ADDB #$7F

Bxx 10

* 1. LDAA #$50

ADDA #$50

Bxx 10

* 1. LDAA #$A0

SUBA #$50

Bxx 10

* 1. LDAA #$B0

SUBA #$C0

Bxx 10

* 1. LDAB #$40

SUBB #$90

Bxx 10

* 1. LDAB #$80

SUBB #$80

Bxx 10

1. For each of the code fragments below, determine which of the 10 comparison branches (BHI, BHS, BLS, BLO, BGT, BGE, BLE, BLT, BNE, BEQ) are taken, not taken, or cannot be determined. Note the Bxx is used to represent a generic branch instruction.
   1. LDAA #$90

CMPA #$10

Bxx 10

* 1. LDAA #$70

CMPA #$10

Bxx 10

* 1. LDAB #$60

CMPB #$80

Bxx 10

* 1. LDD #$9000

CPD #$7000

Bxx 10

* 1. LDX #$5000

CPX #$4000

Bxx 10

* 1. LDY #$9000

CPY #$A000

Bxx 10

* 1. LDD #$FFFF

CPD #$FFFF

Bxx 10

* 1. LDAA #$7F

TSTA

Bxx 10

* 1. LDD #$7090

TSTB

1. Complete a program trace for the programs below. Use a “-“ for the contents of locations and/or registers that are not known. Your trace should include all registers used and the N, Z, V, and C CCR bits.
2. Code Line Inst. Addr. Assembly Code

1: $1000 CLRA

2: $1001 CLR $2000

3: $1004 LDAB #3

4: $1006 BEQ 5

5: $1008 ADDA #$C

6: $100A DECB

7: $100B BRA -7

8: $100D STAA $2001

9: $1010 SWI

1. Code Line Inst. Address Assembly Code

Memory locations

$3000-$3003 are initialized to $64, $44, $54, and $20.

1: $1000 LDX #$3000

2: $1003 MOVB #0, $2000

3: $1008 LDY #3

4: $100B BEQ 13

5: $100D LDAA 0,X

6: $100F INX

7: $1010 CMPA #69

8: $1012 BHI 3

9: $1014 INC $2000

10: $1017 DEY

11: $1018 BRA -15

12: $101A SWI

1. Convert the programs in Problem 3 to machine code.