October 1st, 2010

COE 538/BME 538 Quiz

Name: _____ Student #: _____ Time: 50 min.

Notes:

1. Closed book
2. Write the answers in the space provided
3. Show the process that is used to derive your answers
4. No question during the quiz. State your assumptions.

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1. How many different memory locations can a CPU with a 16-bit address bus and an 8-bit data bus access? [1 mark]

2^{16} x 8 = 65536B = 64 KB

2. Give an instruction that can store the contents of accumulator A at the memory location with an address larger than the contents of X by 8. [2 marks]

STAA 8,X

3. What are the contents of accumulator D following the execution of the instruction at $5000? [2 marks]

```
ORG     $4000
FDB     5       [$4000]=$00; [$4001]=$05
FCB     6       [$4002]=$06
ORG     $5000
LDD     $4001   [A]=$05; [B]=$06
```

4. How many times does the DECA instruction execute if the initial value of AccA is 8? [3 marks]

```
LOOP    DECA
        CMPA    #2
        BNE     LOOP
```

Six times

5. What will be the content of the memory location at $1000, after the following program has been executed? Will the program end with the SWI at label SMALL or the SWI at label BIG? [6 marks]

```
N       EQU     5
        ORG     $1000
TOTL    RMB     1
        ORG     $1500
        LDAA    #0
        STAA    TOTL
        LDX     #ARRY
        LDAB    #N

LOOP    ADDA    0,X
        INX
        DECB
        BNE     LOOP
        STAA    TOTL
        CMPA    #0
        BGT     BIG             signed comparison
SMALL   SWI
BIG     SWI
ARRY    FCB     2,4,6,3,128
        END
```

[$1000]=143=10001111. This is a negative number; therefore, the program will end with the SWI at label SMALL.

6. Find the values of condition flags N, Z, V, and C in the CCR register after the execution of each of the following instructions, given that [A] = $50 and the condition flags are N = 0, Z = 1, V = 0, and C = 1 [6 marks]

	N (0)	Z (1)	V (0)	C (1)	**Content of A $50 = 80**
SUBA #40	**0**	**0**	**0**	**0**	**40**
TSTA	**0**	**0**	**0**	**0**	**40**
ADDA #$50	**0**	**0**	**0**	**0**	**120=01111000**
LSRA	**0**	**0**	**0**	**0**	**00111100 0**