Quiz 2 ECE-3120: Fall '08

 Write an instruction sequence to add two 16 bit numbers stored at \$2000-\$2001 and \$2002~\$2003 and subtract the 16 bit number stored at \$1000 from the sum. Store the result in \$\$2100

org	\$1000	;starting address of the program
ldd	\$2000	;D←m[\$2000]
addd	\$2002	;D←m[\$2002]
subd	\$1000	;D←m[\$1000]
std	\$2100	;D←m[\$2100]

2) Write a sequence of instructions to compute the sum of N signed 8-bit numbers stored at memory locations \$1000 and store the result in \$2000

	Ν	equ	5	;array count
		org	\$1000	;starting address of the array
	array:	db	1,2,3,4,5	
		org	\$2000	;starting address of the array
	sum:	rmb	1	;array sum assuming we need just 1 byte
	i:	rmb	1	;array index
		org	\$1500	;starting address of the program
		ldaa	#0	
		staa	i	;initialize loop (array) index to 0
		staa	sum	;initialize sum to 0
	loop:	ldab	i	
		cmpb	#N	; is $I = N$?
		beq	done	;if done, then branch
		ldx	#array	;use index register X as a pointer to the array
		abx		;compute the address of array[i]
		ldab	0,x	;place array[i] in B
		ldy	sum	;place sum in Y
		aby		;sum←sum+array[i]
		sty	sum	;update sum
		inc	i	;increment loop counter by 1
		bra	loop	
	done:	swi		;return to D-Bug12 monitor
		end		

3) Write a sequence of instruction to toggle the upper four bits of an 8-bit number stored at memory location \$1000. Also write instructions to clear the lower four bits of the same number [e.g:- $10101010 \rightarrow 01010000$]

ldaa	\$1000	;D \leftarrow m[\$1000], loading the number to be
		;manipulated in D
eora	#\$F0	;Toggles upper 4 bits in A
anda	#\$F0	;clears the lower 4 bits in A

<u>Logic</u>

<u>Example</u> : A← 10111100				
ldaa	\$1000	;A ← 10111100		
eora	#\$F0	;A XOR \$F0 → 10111100		
		; XOR $11110000 \rightarrow 01001100$		
So after eora A \leftarrow 01001100 (finished toggle part)				
anda	#\$F0	;A AND \$F) \rightarrow 01001100		
		; AND \rightarrow 11110000 \rightarrow 01000000		
So after and A ← 01000000 (finished clearing lower 4 bits)				