

# Quiz 1

(September 30th @ 5:30 pm)

## PROBLEM 1 (30 PTS)

- Complete the following table. We are representing positive integer numbers.

Decimal	BCD (bits)	Binary	Hexadecimal
			4F
	0001 0100		
78		01001110	

- Perform the following operations of 8-bit unsigned integers. Determine whether there is an overflow (in the addition) and whether we need to borrow from a higher byte (in the subtraction).  $91 = \$5B$ ,  $194 = \$C2$ .
  - $91 + 194$
  - $91 - 194$
- Perform the following operation using the 2's complement representation with 8 bits. Determine whether the operation results in an overflow.  $-13 = \$F3$  in 2's complement representation with 8 bits.
  - $-91 - 13$

## PROBLEM 2 (20 PTS)

- A microprocessor has a 16-bit address line, where each address contains 8 bits. An SRAM device is connected to the microprocessor. The microprocessor has assigned the addresses  $0xA000$  to  $0xBFFF$  to this SRAM. What is the size (in KB, or MB) of this SRAM? What is the minimum number of bits required to represent the addresses on this SRAM?

## PROBLEM 3 (50 PTS)

Given the following set of instructions, complete the following:

- Register values (in hexadecimal format) as the instructions are executed.
- The state of the memory contents (in hexadecimal format) after the last instruction has been executed.
- The addressing mode of each instruction. Be specific, if for example the addressing mode is indexed, indicate which one in particular. Note that the `movw` instruction uses two addressing modes.

Addressing Mode	D	X	Y
_____ <code>sty 2,X-</code>	<input type="text" value="\$207F"/>	<input type="text" value="\$20C0"/>	<input type="text" value="\$10A0"/>
_____ <code>movw \$20C0,1,+Y</code>	<input type="text"/>	<input type="text"/>	<input type="text"/>
_____ <code>clrb</code>	<input type="text"/>	<input type="text"/>	<input type="text"/>
_____ <code>adda #\$40</code>	<input type="text"/>	<input type="text"/>	<input type="text"/>
_____ <code>staa [0,Y]</code>	<input type="text"/>	<input type="text"/>	<input type="text"/>

