

EE 308 – Exam 2, due March 11, 2016

Name: _____

1. (25 pts.) The following questions concern writing C code.

- (a) Write some C code which will set bits 1 and 6 of the byte at address 0x2100, and clear bits 0 and 7. It should leave the other bits unchanged.
- (b) Write some C code which will do the following: if bits 2,3,4,5 of PORTB have the value 0101 (binary), write a 0xF0 to PORTA. Otherwise, write a 0x0F to PORTA. (Assume that all the bits for PORTB have been set up for input, and all the bits for PORTA have been set up for output.)

2. (25 pts.) The following question concerns interrupts and resets. Assume the MC9S12 has the following in its memory:

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
1FF0	40	76	12	90	BA	34	F6	34	A1	62	C4	91	F5	67	21	33
2000	20	09	43	B1	C4	FE	12	54	7D	91	34	87	E3	AA	21	32
FFE0	4E	65	07	9A	B4	05	43	98	04	23	10	55	54	04	55	93
FFF0	23	44	87	20	78	9A	32	96	01	C2	5B	21	32	98	13	02

- (a) What is the address of the instruction of the MC9S12 will execute when it gets a Real Time Interrupt (RTI)?
- (b) Write some C code to set up the MC9S12 to generate a Timer Overflow Interrupt (TOI) every 87 ms.
3. (25 pts.) Assume that the stack pointer of an MC9S12 has been initialized to 0x2000, and the MC9S12 is currently in a RTI interrupt service routine My_RTI_ISR that interrupted the main program (refer to memory map of problem 2).
- (a) What will be the value of the (MC9S12) stack pointer register when the MC9S12 begins executing the first instruction of the RTI interrupt service routine?
- (b) What were the values of the CCR, B, A, X, and Y registers at the time of the interrupt?

4. (25 pts.) You are required to measure the duration of an event. When the event starts, it generates a rising edge on a signal connected to Port T1. When the event ends, it creates a falling edge on a signal connected to Port T2. You also know before the experiment that the duration of the event will be between 80 ms and 100 ms.

(a) How do you set up the MC9S12 timer registers to capture the times of the rising and falling edges of the two signals? Write some C code to do this. Be sure your C code does not affect the function of any other timer channels

(b) After both edges have been captured, the following is in the MC9S12 timer registers:

TC7	TC6	TC5	TC4	TC3	TC2	TC1	TC0
0x3456	0x9023	0x1B45	0xA91C	0x1674	0x1053	0x8C29	0x901C

How long did the event last (in seconds)?