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| **CS 224, SP2015**  **Homework #5**  **S06: Assembler** | Name | | Section | Score  / 68 |
| Questions: | | Answers: | | |
| 1. (12 points) What native MSP430 instruction is used by the assembler for each of the following emulated instruction?  **a. DEC dst**  **b. INC dst**  **c. INV.B dst**  **d. RLA.W dst**  **e. RLC.B dst**  **f. CLR dst**  **g. POP dst**  **h. TST.B dst**  **i. BR dst**  **j. DINT**  **k. EINT**  **l. RET** | |  | | |
| 2. (5 points) How would you multiply register r5 by 10 using only 5 instructions and 1 additional register? | |  | | |
| 3. (16 points) If the assembly code to the right is loaded into memory at address **0xf83a**,  a) fill in the following symbol table values:   |  |  |  | | --- | --- | --- | | **Symbol/Value** | **Assembler** | **Memory** | | **mainloop** |  |  | | **delayloop1** |  |  | | **delayloop2** |  |  |   b) What are the source operands for the instructions at **mainloop** and **delayloop1**? | | **.cdecls C,"msp430.h"**  **COUNT1 .equ 0xffff**  **COUNT2 .equ -53**  **.text**  **start: mov.w #0x0280,SP**  **mov.w #WDTPW+WDTHOLD,&WDTCTL**  **mainloop: mov.w #-COUNT2%6,r12**  **delayloop1: mov.w #COUNT1&~COUNT2<<8,r15**  **delayloop2: sub.w #1,r15**  **jnz delayloop2**  **sub.w #1,r12**  **jne delayloop1**  **jmp mainloop** | | |
| 4. (3 points) What MSP430 instruction is equivalent to a bit-wise OR? | |  | | |
| 5. (16 points) For each of the following assembly lines, 1) will it assemble, and 2) **why** is the statement semantically incorrect:   * 1. **mov.b #address,r4**   2. **bic.w #2,&P1OUT**   3. **cmp &buzzON,#0**   4. **add.w r3,r4**   5. **call myFunc**   6. **jmp #loop**   7. **1stlabel:**   8. **mov.w #1200000/10,r16** | |  | | |
| 6. (4 points) How many different sections are referenced by the following code? What is the size of the **.text** section?  **.text**  **start: mov.w #0x0400,SP**  **mov.w #WDT,&WDTCL**  **mov.w #LPM0|GIE,SR**  **WDT: .equ 0x5a18**  **.bss dog,2**  **isr: xor.b #0x01,&dog**  **reti**  **.sect ".int10"**  **.word isr**  **.sect ".reset"**  **.word start**  **.end** | |  | | |
| 7. (6 points) What are the assembler symbol table values for each of the following symbols?  .text   1. **count1 .equ 1200** 2. **count2 .set 1200** 3. **count3 .word 1200** | |  | | |
| 8. (6 points) What is the value in register R4 after **each** of the following 3 lines of assembly code is executed?  **0x801a: MOV.W #AA,R4**  **0x801e: MOV.W @R4,R4**  **0x8020: MOV.W @R4+,R4**  **0xff00: AA: .word BB**  **0xff02: BB: .word AA** | |  | | |