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| **CS 224, W2015**  **Homework #3**  **S04: Microarchitecture** | Name | | Section | Score  / 36 |
| Questions: | | Answers: | | |
| 1. (9 points) Using MSP430 assembly instructions:  a) Add the contents of memory location “count” to memory location “sum” using a register.  b) Add the contents of memory location “count” to memory location “sum” without using a register.  c) How is the single CISC instruction better than using three faster RISC instructions? | |  | | |
| 2. (3 points) If the most significant 10 bits of a 16-bit, byte addressable, memory address is used to select a single memory mapped I/O space, how many memory mapped locations are possible in that I/O space? | |  | | |
| 3. (3 points) Which MSP430 double operand instructions do **NOT** require a store phase? | |  | | |
| 4. (9 points) Some computer ISA’s define special instructions for I/O.  a. (PM 4.4) How then does the MSP430 communicate with I/O devices? What advantage does this have?  b. Why are output ports on the MSP430 readable? What advantage does this have?  c. (PM 9.6) Which MSP430 I/O ports have interrupt capability? | |  | | |
| 5. (12 points) Draw a line from each of the following descriptions to the corresponding BYU MSP430 Microarchitecture component.   1. Memory 2. Program Counter 3. Address Bus 4. Memory Address Register 5. Port 1 Output Register 6. Destination Operand Register 7. Source Operand Register 8. Arithmetic Logic Unit 9. Instruction Register 10. Condition Code 11. Jump Offset 12. Bus Driver | |  | | |