CSS422 Homework 7 Grade Rubric

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| --- | --- | --- | --- |
| Q1 | 4pts | Points | Your Grade |
|  | Q1-1.  27 = 128 locations | 2 | 2 |
| Q1-2  Since the computer has a 27-bit address bus, 227 locations are available.  227 / 27 = 220 = 1M = 10242 = 1048,576.  Answer: 1048,576 or 1 million devices. | 2 | 2 |
| Q2 | 6pts |  |  |
|  | Q2-1. 23-bit address space (A23-A1) is an 8M addressable space. Each entry corresponds to 2 bytes. Answer: 16MB | 1.5 | 1 |
| Q2-2. 4M = 222 Therefore 22 lines. Answer: 22 lines | 1.5 | 1.5 |
| Q2-3. The memory chip we will use has only 4M-addressable space that corresponds to 22 address lines. To reach the 23 lines of this memory system M, we need 1 more address line. Answer: 1 | 1.5 | 1.5 |
| Q2-4. Chip: 4M = 222B  M: 16M = 224B  224 / 222 = 22 = 4  Answer: 4 | 1.5 | 1 |
| Q3 | 6pts |  |  |
|  | CPU-initiated data transfer:  6 \* X words = 6X. … 2pts  DMA-initiated data transfer  12 + 5 \* X words + 30 = 42 + 5X … 2pts  6X > 42 + 5X  X > 42 … 2pts  Answer: Beyond 42 words (or 168 bytes). **Simply 42 words are good.** | 6 | 6 |
| Q4 | 6pts |  |  |
|  | **; void timer\_update( )**  **EXPORT \_timer\_update**  **\_timer\_update**  **; Code the rest.**  **LDR r3, =SECOND\_LEFT ; retrieve seconds left 🡪 1pt**  **LDR r0, [r3]**  **SUB r0, r0, #1 ; decrement seconds 🡪 1pt**  **STR r0, [r3] ; save seconds left**  **CMP r0, #0**  **BNE timer\_update\_done ; if seconds still remain, don't stop SysTick 🡪 1pt**    **LDR r3, =STCTRL ; Stop SysTick 🡪 1pt**  **MOV r4, #STCTRL\_STOP**  **STR r4, [r3]**    **; invoke a user-provided signal handler**  **MOVS R0, #3 ; Set SPSEL bit 1, nPriv bit 0**  **MSR CONTROL, R0 ; Now thread mode uses PSP for user**  **LDR r3, =USR\_HANDLER ; call a user-provided handler**  **LDR r4,[r3]**  **BX r4 ; Invoke the handler (r0) 🡪 2pts**    **\_timer\_update\_done**  **MOV pc, lr ; return to SysTick\_Handler** | 6 | 6 |
| Total: | | 22/20 | 21 |

Comments: