**7-1 Shift and Rotate Instructions, Multiplication and Division Instructions**

Objective: Understanding the rotate instructions, “MUL” instruction, and “IMUL” instruction.

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| .data  a. Based on code in the left,  myArray BYTE 33, 3, 256, 17 What are the register values at L1?  .code the registers values at L1 are:   |  |  |  |  |  | | --- | --- | --- | --- | --- | | main PROC | EAX | 00000021h | EBP | 0018ff94h | | movzx eax, myArray[0] | EBX | 00000003h | ESP | 0018ff8ch | | movzx ebx, myArray[1] | ECX | 00000000h | ESI | 00000000h | |  | EDX | 00400100h | EDI | 00000000h |   b. What are the register values  when the program run each steps at L1   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | BX | | BL(bit) | CF | |  | BH | BL | | L1: | 00h | 03h | 00000011b | 00 | | ror bl, 3 | 00h | 60h | 01100000b | 00 | | or bl, 110b | 00h | 66h | 01100110b | 00 | | ror bl, 2 | 00h | 99h | 10011001b | **01** | | mov bl, 10h | 00h | 10h | 00010000b | 01 |     c. What are the register values  when the program run each steps at L2?   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | |  | DX | AX | | BX | | CF | |  | AH | AL | BH | BL | | L2: | 0100h | 00h | 21h | 00h | 10h | 0 | | mul bl ;ax=Product | 0100h | 02h | 10h | 00h | 10h | 1 | | mov bl, myArray[2] | 0100h | **02h** | 10h | 01h | 00h | 1 | | mul bx ;dx:ax=Product | 0002h | 10h | 00h | 01h | 00h | 1 |   L3:  exit  main ENDP  END main |

(2)

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| .code  main PROC  What are the register values at each position?   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | |  |  | AX | | BL | OF | |  |  | AH | AL | | mov al, 19h |  | 00h | 19h | 00h | 0 | | mov bl, 08h |  | 00h | 19h | 08h | 0 | | imul bl |  | **00h** | C8h | 08h | 1 | |  |  |  |  |  |  |   main ENDP  END main |