



**METRO STATE
UNIVERSITY**

**ICS 232 Computer Organization & Architecture
Homework 7 – Irvine Chapter 2 & 4 - 10 points
Due Date: 6/28/2023**

Name: Key

Note: Please post your homework to ICS232 D2L on or before the due date.

Irvine Chapter 2 - x86 Processor Architecture

Irvine Chapter 4 – Data Transfers, Addressing, Arithmetic

1. In a MOV instruction, which operand is the source and which is the destination?

Operand 1 is the destination and operand 2 is the source. For example
MOV EAX, 10 moves 10 into EAX

2. (True/False): The EIP register cannot be the destination operand of a MOV instruction.

True

3. In the operand notation used by Intel, what does reg/mem32 indicate?

The operand may be either a 32-bit register or a 32-bit memory location.

4. What will be the value of the destination operand after each of these instructions?

```
var2 WORD 1000h, 2000h, 3000h, 4000h
var3 SWORD -16, -42
var4 DWORD 12345
```

MOV AX, var2	a. 1000h
MOV AX, [var2 + 4]	b. 3000h
MOV AX, var3	c. FFF0h
MOV AX, [var3 - 2]	d. 4000h
MOV AX, LENGTHOF var2	e. 0004h
MOV AX, SIZEOF var3	f. 0004h



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5. Write instructions that subtract val4 from val2.

```
MOV EAX, val4  
SUB val2, EAX
```

```
MOV EAX, val2  
SUB EAX, val4  
MOV val2, EAX
```

6. What will be in the registers as executing this code

```
myBytes    BYTE 10h,20h,30h,40h  
myWords    WORD 8Ah,3Bh,72h,44h,66h  
myDoubles  DWORD 1,2,3,4,5  
myPointer  DWORD myDoubles
```

```
mov  esi,OFFSET myBytes  
mov  al,[esi]                ; a. AL = 10h  
mov  al,[esi+3]              ; b. AL = 40h  
mov  esi,OFFSET myWords + 2  
mov  ax,[esi]                ; c. AX = 003Bh  
mov  edi,8  
mov  edx,[myDoubles + edi]   ; d. EDX = 3  
mov  edx,myDoubles[edi]      ; e. EDX = 3  
mov  ebx,myPointer  
mov  eax,[ebx+4]             ; f. EAX = 2
```

7. What will be the final value of EAX in this example?

```
mov  eax,0  
mov  ecx,10    ; outer loop counter  
L1:  mov  eax,3  
      mov  ecx,5    ; inner loop counter  
L2:  add  eax,5  
      loop L2    ; repeat inner loop
```



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```
loop L1 ; repeat outer loop
```

Answer: This is a trick! The program does not stop, because the first LOOP instruction decrements ECX to zero. The second LOOP instruction decrements ECX to FFFFFFFFh, causing the outer loop to repeat.

Prepare for next class by reading lecture notes Irvine Chapter 5 and 6

Complete Project 1

Continue working on Your Group Project

Optional Questions:

1. Now that the semester is about one-half way complete, do you have any comments about the first half and how would you like the second half to be improved?