EECE.3170: Microprocessor Systems Design I

Key Questions

Data transfer instructions (Lectures. 6, 7, & 8)

QUESTIONS

1. Describe the basic structure of an assembly language statement.
2. Describe how the x86 registers are accessed as 8-bit, 16-bit, and 32-bit values. Include the answer to the example provided in the slides (EAX = 0x1A2B3C4D).
3. Describe how to determine the number of bytes being accessed from memory in an x86 instruction.
4. Describe the use of the MOV instruction.
5. Describe the operation of the MOVSX/MOVZX instructions. How/when are these instructions useful?
6. Explain the operation of the XCHG instruction.
7. Explain the operation of the LEA instruction.

EXAMPLES

1. The program snippet below shows the initialization of internal registers with immediate data and address information, using MOV instructions. Show the state of all affected registers.

```
MOV AX, 0
MOV BX, AX
MOV CX, 0x0A
MOV DX, 0x100
MOV SI, 0x200
MOV DI, 0x300
```

2. Assume: AX = 0x0100, DX = 0x8100, (0x100) = 0x00, (0x101) = 0xFF. What are the results of the following instructions?

a. MOVSX EBX, AX

b. MOVSX EBX, DX

c. MOVZX EBX, DX

d. MOVSX EBX, BYTE PTR [0x100]

e. MOVSX EBX, WORD PTR [0x100]

3. Given the initial memory state below:

	Lo			Hi
0x528000	50	88	31	A3
0x528004	B2	FF	0F	7D
0x528008	07	D0	BE	22
0x52800C	11	96	00	14

Show the results of the following short instruction sequence.

```
MOV     EAX, 0x528000
MOV     EBX, [EAX+2]
XCHG    BL, BH
LEA     EDX, [EAX+8]
MOV     ECX, [EDX-3]
```