

16.317: Microprocessor Systems Design I

Fall 2015

Lecture 6: Key Questions

September 16, 2015

1. (Review) Describe the operation of the MOVSX/MOVZX instructions.

2. Assume: AX = 0100H, DX = 8100H, (100H) = 00H, (101H) = FFH. 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 [100H]

 - e. MOVSX EBX, WORD PTR [100H]

3. Explain the operation of the XCHG instruction.

4. Explain the operation of the LEA instruction.

5. **Example:** 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, 528000h
MOV    EBX, [EAX+2]
XCHG   BL, BH
LEA    EDX, [EAX+8]
MOV    ECX, [EDX-3]
```

6. Describe the x86 flags.
7. Describe the operation of the ADD, ADC, and INC instructions.
8. Describe the operation of the SUB, SBB, DEC, and NEG instructions.

9. Given the following initial state:

- AX = 1234H
- BL = ABH
- Memory location SUM = 00CDH

Show the results of each step of the following instruction sequence. Be sure to track the carry flag throughout the sequence:

```
ADD AX, [SUM]
ADC BL, 05H
NEG BL
SUB AX, 12H
INC WORD PTR [SUM]
```