EECE.3170: Microprocessor Systems Design I

Spring 2016

Lecture 5: Key Questions
January 29, 2016

1. **Example:** Compute the address for the memory operand in each of the following instructions. The register contents and variables are as follows:
   - (ESI) = 0x00000100
   - (EDI) = 0x00000200
   - (EBX) = 0x00000300

a. Destination operand in: MOV [EBX+0x0400], CX

b. Destination operand in: MOV [EDI+2*EBX], AH

c. Destination operand in MOV [EBX+EDI+0x0400], AL

2. Describe the basic structure of an assembly language statement.

3. 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 = 1A2B3C4DH).

4. Describe how to determine the number of bytes being accessed from memory in an x86 instruction.

5. Describe the use of the MOV instruction.

6. The example program 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
```

7. Describe the operation of the MOVSX/MOVZX instructions. How/when are these instructions useful?

8. Assume: AX = 0x0100, DX = 0x8100, (0x100) = 0x00, (0x101) = 0xFF. What are the results of the following instructions? ***(Example covered in Lecture 6)***

a. MOVSX EBX, AX

b. MOVSX EBX, DX

c. MOVZX EBX, DX

d. MOVSX EBX, BYTE PTR [0x100]

e. MOVSX EBX, WORD PTR [0x100]