16.317: Microprocessor Systems Design I

Spring 2012

Lecture 8: Key Questions
February 8, 2012

1. Explain the operation of the MOV instruction. What restrictions are placed on this instruction? What effect does this instruction have on the flags register?

2. 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. Also, explain why AX is used to initialize segment registers.

```
MOV  AX,2000H
MOV  DS, AX
MOV  ES, AX
MOV  AX,3000H
MOV  SS,AX
MOV  AX,0H
MOV  BX,AX
MOV  CX,0AH
MOV  DX,100H
MOV  SI,200H
MOV  DI,300H
```

3. Explain the operation of the MOVSX and MOVZX instructions. Under what circumstances might you use each of these instructions?

4. Explain the operation of the XCHG instruction. What restrictions are placed on this instruction?

5. Explain the operation of the LEA instruction.

6. Explain the operation of the instructions used for loading a full address pointer (LDS, LSS, LES, LFS, LGS).

7. Show the results of running the following program if DATA_SEG_ADDR = 1200H, assuming the memory contents shown:

DATA_SEG_ADDR:0000		
DATA_SEG_ADDR:INIT_TABLE	11	22
	33	44
	55	66
	77	88
	99	AA
	BB	CC
	DD	EE
	FF	16
	03	17

```
MOV  AX, DATA_SEG_ADDR
MOV  DS,AX
MOV  SI,[INIT_TABLE]
LES  DI,[INIT_TABLE+02H]
MOV  AX,[INIT_TABLE+06H]
MOV  SS,AX
MOV  AX,[INIT_TABLE+08H]
MOV  BX,[INIT_TABLE+0AH]
MOV  CX,[INIT_TABLE+0CH]
MOV  DX,[INIT_TABLE+0EH]
```