16.317: Microprocessor Systems Design I

Spring 2012

Lecture 9: Key Questions
February 10, 2012

1. Explain the operation of the LEA instruction.

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

3. 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]
```

4. Describe the operation of the ADD, ADC, and INC instructions.

5. 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
INC WORD PTR [SUM]
```

6. Describe the operation of the SUB, SBB, DEC, and NEG instructions.

7. Describe the operation of the MUL and IMUL operations.

8. Describe the operation of the DIV and IDIV operations.

9. Explain the operation of the CBW, CWDE, CWD, and CDQ instructions.