16.317: Microprocessor Systems Design I

Spring 2012

Lecture 16: Key Questions
March 2, 2012

1. **Example:** Given the following initial state, list <u>all</u> changed registers and/or memory locations and their new values. Where appropriate, you should also list the state of the carry flag (CF).

<u>Initial state:</u>

EAX: 00000000H
EBX: 0000000AH
ECX: 00000005H
EDX: 00000000H
ESI: 00000008H
EDI: FFFF0000H
EBP: 00000400H
ESP: 00002000H
DS: 100FH
SS: 1000H
FLAGS: 00H

Address

Address		
10110H	04	00
10112H	10	10
10114H	89	01
10116H	20	40
10118H	02	00
1011AH	00	16
1011CH	17	03
1011EH	FF	00
10120H	1E	00
10122H	06	00
10124H	08	00
10126H	0A	00

<u>Instructions:</u>

```
LAHF
MOV     [20H], AH
MOV     AH, [30H]
SAHF
MOV     AX, [26H]
CMC
RCL     AX, CL
```

2. Describe the operation of the compare instruction.

3. Complete the following table that describes the different x86 condition codes.

Mnemonic (cc)	Condition tested	Status flag setting for true condition
O		
NO		
B, NAE, C		
NB, AE, NC		
S		
NS		
P, PE		
NP, PO		
E, Z		
NE, NZ		
BE, NA		
NBE, A		
L, NGE		
NL, GE		
LE, NG		
NLE, G		

4. Describe the operation of the SETcc instruction. How can this instruction be used?

5. **Example:** Show the results of the following instructions, assuming that
    DS:100H = 0001H, DS:102H = 0003H, DS:104H = 1011H, DS:106H = 1011H,
    DS:108H = ABCDH, DS:10AH = DCBAH

    What complex condition does this sequence test?

    MOV   AX, [100H]
    CMP   AX, [102H]
    SETLE   BL
    MOV   AX, [104H]
    CMP   AX, [106H]
    SETE   BH
    AND   BL, BH
    MOV   AX, [108H]
    CMP   AX, [10AH]
    SETNE   BH
    OR   BL, BH