

# 16.317: Microprocessor Systems Design I

Spring 2012

## Lecture 12: Key Questions

February 17, 2012

1. **Example:** Given AL = 43H, CL = 04H, and CF = 0, show the state of AL after each instruction in the sequence below:

ROR AL, 2  
ROL AL, CL  
RCR AL, 3  
RCL AL, 4

2. Assume the machine has the following state prior to executing the instructions below:

EAX: 00000000H  
EBX: 00000000H  
ECX: 00000000H  
EDX: 00000000H  
ESI: 00000000H  
EDI: 00000000H  
EBP: 00000000H  
ESP: 00000000H  
DS: 1000H  
SS: 0000H

Address		
10100H	04	00
10102H	10	10
10104H	12	00
10106H	20	40
10108H	02	00
1010AH	00	16
1010CH	17	03
1010EH	FF	00
10110H	1E	00
10112H	00	00
10114H	FF	FF
10116H	FF	FF

Show the results of executing the following sequence:

LDS SI, [0100H]  
LSS DI, [SI]  
MOV SP, FFFE H  
MOV BP, SP

3. Assume the machine has the following state prior to executing the instructions below:

EAX: 00000000H  
EBX: 00000000H  
ECX: 00000000H  
EDX: 00000000H  
ESI: 00000004H  
EDI: 00000012H  
EBP: 0000FFFEH  
ESP: 0000FFFEH  
DS: 1010H  
SS: 4020H

Address		
10100H	04	00
10102H	10	10
10104H	12	00
10106H	20	40
10108H	02	00
1010AH	00	16
1010CH	17	03
1010EH	FF	00
10110H	1E	00
10112H	00	00
10114H	FF	FF
10116H	FF	FF

Show the results of executing the following sequence:

```
MOV CX, [SI+0004H]
MOV AX, [SI+000CH]
SHL AX, CL
ADD AX, [SI+000CH]
ADD AX, [SI+000CH]
MOV [DI], AX
```

4. Assume the machine has the following state prior to executing the instructions below:

EAX: 000000B4H  
EBX: 00000000H  
ECX: 00000002H  
EDX: 00000000H  
ESI: 00000004H  
EDI: 00000012H  
EBP: 0000FFF8H  
ESP: 0000FFF4H  
DS: 1010H  
SS: 4020H

Address		
10100H	04	00
10102H	10	10
10104H	12	00
10106H	20	40
10108H	02	00
1010AH	00	16
1010CH	17	03
1010EH	FF	00
10110H	1E	00
10112H	00	00
10114H	FF	FF
10116H	FF	FF

Address		
501E8H	00	00
501EAH	00	00
501ECH	00	00
501EEH	00	00
501F0H	00	00
501F2H	00	00
501F4H	12	00
501F6H	04	00
501F8H	FE	FF
501FAH	01	00
501FCH	0A	00
501FEH	0C	00

Show the results of executing the following sequence:

```
MOV SI,SS:[BP+0004H]
MOV DI,SS:[BP+0006H]
MOV AX,[SI]
XCHG [DI],AX
XCHG DI,SI
MOV [DI],AX
```