

16.317: Microprocessor Systems Design I

Spring 2015

Lecture 8: Key Questions

February 13, 2015

1. **Example:** Given AL = 15H, CL = 03H, and CF = 0, show the state of AL and CF after each instruction in the sequence below:

```
SHL AL, 1  
SHR AL, CL  
SAL AL, 5  
SAR AL, 2
```

2. Explain the operation of the rotate instructions (ROL, ROR, RCL, RCR).

3. **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
```

4. Explain the operation of the bit test instructions (BT, BTR, BTS, BTC)

5. Explain the operation of the bit scan instructions (BSF, BSR).