

16.317: Microprocessor Systems Design I

Spring 2014

Lecture 9: Key Questions

February 12, 2014

1. **Example:** Given $EAX = 00000005h$ and $EBX = 0000FF02h$, what are the results of the following instructions? Assume each instruction starts with the values shown above in EAX and EBX .
 - a. `MUL BL`
 - b. `MUL BH`
 - c. `IMUL BH`
 - d. `DIV BL`
 - e. `DIV BH`
 - f. `IDIV BH`

2. Explain the general operation of the AND, OR, XOR, and NOT instructions.

3. **Example:** Show the state of AL after each instruction in the following sequence:

```
MOV AL, 55H  
AND AL, 1FH  
OR AL, C0H  
XOR AL, 0FH  
NOT AL
```

4. Explain the operation of shift instructions. What is the difference between SHR and SAR?

5. **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
```