

EECE.3170: Microprocessor Systems Design I

Summer 2017

Lecture 4: Key Questions

May 22, 2016

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

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

```
MOV AL, 0x55  
AND AL, 0x1F  
OR AL, 0xC0  
XOR AL, 0x0F  
NOT AL
```

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

4. **Example:** Given $AL = 0x15$, $CL = 0x03$, 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
```

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

6. **Example:** Given AL = 0x43, CL = 0x04, 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
```