# 16.317: Microprocessor Systems Design I

Summer 2013

Lecture 9: Key Questions
August 8, 2013

1. Describe the PIC goto, call, and return instructions.

2. Describe the instructions used for conditional execution on the PIC 16F684.

3. **Example:** Show the values of all changed registers after each of the following sequences.
   What high-level operation does each perform?

```
a.  movf      a, W
    sublw     0xA
    btfsc     STATUS, Z
    goto      L1
    incf      b, W
    goto      L2
L1
    decf      b, W
L2
    movwf     a
```

```
b.  movf      NUM2, W
    subwf     NUM1, W
    btfss     STATUS, C
    goto      BL
    movf      NUM1, W
    goto      Done
BL
    movf      NUM2, W
Done
    movwf     MIN
```

4.  Describe how to write PIC code to implement operations that deal with two registers (e.g. moving the contents of one register to another; adding two registers).

5.  Describe how to implement conditional jumps.

6. Describe how to implement shift and rotate operations.

7.  Translate these x86 operations to PIC code. Assume that there are registers defined for each
    x86 register (e.g. AL, AH, BL, BH, etc.)
    *   OR      AL, BL

    *   SUB    BL, AL

    *   JNZ    label

    *   JL      label

    *   SAR    AL, 1

    *   ROL    AL, 5

8.   Describe how to work with multi-byte data.

9. Translate these x86 operations to PIC code. Assume that there are registers defined for each x86 register (e.g. AL, AH, BL, BH, etc.). 16-bit values (e.g., AX) must be dealt with as individual bytes

- MOVZX   AX, BL

- MOVSX   AX, BL

- INC        AX

- SUB       BX, AX

- RCL       AX, 5