16.317: Microprocessor Systems Design I

Fall 2012

Lecture 11: Key Questions
September 28, 2012

1. Describe the two general classes of jump instruction.

2. Describe the different ways of specifying jump targets.

3. **Example:** Given CS = 1200H, IP = 0100H, and EBX = 14000020H, what are the target addresses of the following jump instructions?

- JMP 08H

- JPE FFF0H

- JE BX

- JNZ EBX

4. Given the instructions below, what are the resulting register values if:
   - AX = 0010H, BX = 0010H
   - AX = 1234H, BX = 4321H

What type of high-level program structure does this sequence demonstrate?

```
        CMP   AX, BX
        JE    L1
        ADD   AX, 1
        JMP   L2
L1:     SUB   AX, 1
L2:     MOV   [100H], AX
```

5. **Example:** Given the instructions below, what are the resulting register values if, initially, AX = 0001H?

What type of high-level program structure does this sequence demonstrate?

```
        MOV   CL, 5
L:      SHL   AX, 1
        DEC   CL
        JNZ   L
```

6. **Example:** Given the instructions below, what are the resulting register values if, initially, AX = 0001H?

What type of high-level program structure does this sequence demonstrate?

```
        MOV   CX, 5
L:      JCXZ  END
        ADD   AX, AX
        DEC   CX
        JMP   L
END:    MOV   [10H], AX
```

7. Describe the 80386 loop instructions, as well as how these instructions can be used in a typical program.

8. Rewrite the post-tested loop example from earlier to use a loop instruction.

```
        MOV   CL, 5
L:      SHL   AX, 1
        DEC   CL
        JNZ   L
```

9. Describe the operation of the following program (Example 6.15-6.16).
   What is the final value of SI if the 15 bytes between 0A001 and 0A00F have the following values?
   00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E

```
        MOV   DL, 05
        MOV   AX, 0A00
        MOV   DS, AX
        MOV   SI, 0000
        MOV   CX, 000F
AGAIN:  INC   SI
        CMP   [SI], DL
        LOOPNE AGAIN
```