

16.317: Microprocessor Systems Design I

Spring 2013

Lecture 14: Key Questions

February 27, 2013

1. 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
```

2. **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:    SHL AX, 1
      DEC CX
      JNZ L
```

3. **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
```

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

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

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

6. 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
```