

16.317: Microprocessor Systems Design I

Fall 2012

Homework 4

Due Monday, 12/3/12, by the end of class (8:50 AM)

For each of the following 80386 instructions, write a sequence of PIC 16F684 instructions that performs an equivalent operation.

Assume each instruction is in a program that starts with the following cblock directive:

cblock 0x20

AL, AH, EAL, EAH ; All bytes of register EAX
; EAH = most significant byte, AL = least significant
BL, BH, EBL, EBH ; All bytes of register EBX
CL, CH, ECL, ECH ; All bytes of register ECX
DL, DH, EDI, EDH ; All bytes of register EDX

endc

In other words, variables are defined for all bytes of 80386 registers so that you can write operations that cover any data size, from 8 bits to 32 bits. While register names like “EAL” and “EAH” are not officially part of the 80386 architecture, they are defined to provide a way to refer to the upper 16 bits of the 32-bit 80386 registers.

NOTE: each problem is worth 10 points, for a total of 100 points on this assignment.

1. ADD EAX, EBX
2. MOVSX EAX, BL
3. DEC AX
4. CMP AX, BX
5. JZ label
6. JG label
7. JLE label
8. SAR AX, 10
9. SHL EAX, 20
10. ROR EAX, 5