CSC 3210
Computer Organization and Programming
Lab 4
Answer Sheet

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Section: 014

Debug through each line of code.
Take screenshot that includes code and register window.
Record the register content.
and explain the register contents.

Line number: 10,11,12,13

Instruction:

mov al 0F5h,
mov bl 029h,
mov cl 00BH,
mov dl 0D7h

Register values:

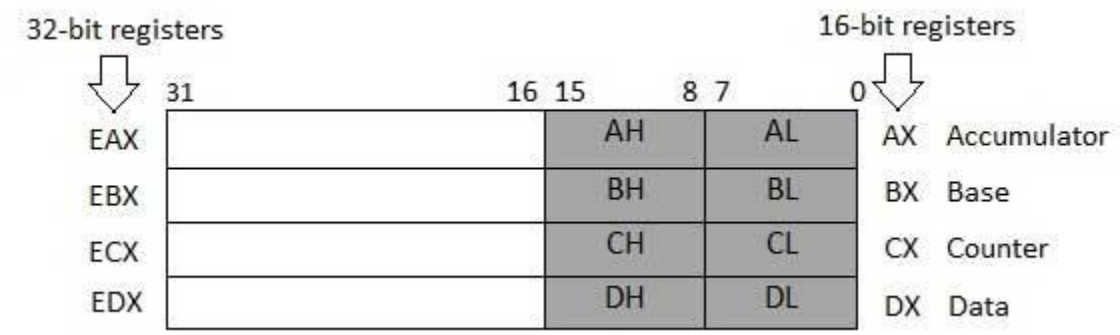
eax 0019F9F5
ebx 00241029
ecx 009F100B
edx 009F10D7

Screenshot:

Explanation:

These lines do the same action but for different registers, so I copied all into one explanation.

Each 32 bit register, eax, ebx, ecx and edx are consisted of four 16 bit data registers. These are called AX BX CX AND DX. These are also made of two 8 bit registers for each 16 bit. They are called AH AL for AX, BH BL for BX, CH CL for CX and finally DH DL for DX.



Although ax bx cx and dx also have their own reasons to be used, for this purpose I'll only be doing an arithmetic calculation.

In line 10 through 13 I'm moving the numbers I was instructed to do as hexadecimals.
0F5 means 245
029 means 41
00B means 11
And finally 0D7 means 241.

Line number: 14
Instruction: sub al,dl
Register values: eax:1E
Screenshot:

Explanation:

The al register's value which is F5 is subtracted from the dl's value which is 0D7, resulting in 1E which means 30.

Line number: 15
Instruction: sub cl,bl
Register values: ECX = 009F10E2
Screenshot:

Explanation:

We are subtracting two values from each other. In this case, we have one signed value. (-41 bl), So the math we will do will represent the SIGNED value.

11-41 = -30 which is represented as E2 as a 8 bit binary converted to hexadecimal.

00001011+ 11010111= 11100010 which is a negative number. (-30)

Line number: 15
Instruction: sub al,cl
Register values:
Screenshot:

Explanation:

All the values in which we got from line 15 were stored in CL, and the all the values we got from al,dl subtraction were stored in line 14. Thus, we essentially add those two values together. E2 is signed so we need to make sure that we are doing our calculation with signed hexadecimal conventions, not unsigned. If you do it unsigned, you'll get 1C3 which will be over the value that AL can store.

The answer is 00h which is true if we do the math. (245-215) +(11-41) = 0.