Graphical user interface, text, application, email

Description automatically generated

CSC 3210

Computer Organization and Programming

Lab 3 (b)

Answer Sheet

Student Name:

Section:

Debug through each line of code and explain the register content and flags.

(We already answered line 10 to 13 for your reference. Start writing your answer from Line 14)

Line: 10

Instruction: mov eax, 12345678h

Register value: EAX = 12345678

Explanation: 12345678 is a hexadecimal value which is 32-bit in binary. EAX register is also 32-bit.

Line 11:

Instruction: mov ax, 1122h

Register value: EAX = 12341122h

Explanation: 1122 is hexadecimal and it is 16-bit in binary. this mov instruction only updates AX (16 bit) register, a part of EAX register. That’s why you can see that the upper portion of EAX register is NOT updated.

Line 12:

Instruction: mov bl, al

Register value: EBX = \_ \_ \_ \_ \_ \_ 22

Explanation: AL register is 8-bit long. When you mov the content of al register (22) to BL register, it only updates the first 8-bit of the EBX register. The rest contains the garbage value.

Line 13:

Instruction: mov bl, ah

Register value: EBX = \_ \_ \_ \_ \_ \_ 11

Explanation: Ah register is 8-bit long. When you mov the content of AH register (11) to BL register, it only updates the first 8-bit of the EBX register. The rest contains the garbage value.

Line 14:

Instruction: mov al, 89h

What Register value of EAX register, after executing line 14.

Explain the content of the EAX register.

Register value: EAX = 12341189

Explanation: The AL register is 8 bit long, and the hexadecimal value is 4 bits per digit. When the value is being “mov”ed to the AL register, only the first 8 bits of the EAX register get updated. The rest contains garbage values.

Line 15:

Instruction: add al, 10h

What Register value of EAX, after executing line 15?

Do you see any change in flags?

Show the step of the hexadecimal addition.

Register value: EAX = 12341199

Explanation: The AL register is 8 bit long, and the hexadecimal value is 4 bits per digit. When 10h gets added to AL, the first 8 bits are updated because the sum does not exceed 8 bits. 89h + 10h = 99h. The 9 gets added to nothing and 8+1 = 9.

Positive flag has a value:

OV = 0, UP = 0, EI = 1, PL = 1, ZR = 0, AC = 0, PE = 1, CY = 0.

Line 16:

Instruction: sub al, al

What Register value of EAX, after executing line 16?

Do you see any change in flags?

Show the step of the hexadecimal subtraction.

EAX = 12341100

The positive flag was changed to 0 and the zero flag was incremented by 1.

12341199 – 00000099 = 12341100. Flags: OV = 0, UP = 0, EI = 1, PL = 0, ZR = 1, AC = 0, PE = 1, CY = 0.

Line 17, 18:

Instruction:

mov al, 98h

add al, 89h

What Register value of EAX, after executing line 17 and 18?

Do you see any change in flags?

Show the step of the hexadecimal addition.

EAX after line 17: 12341198

EAX after line 18: 12341121

There is an overflow here, the carry flags have changed.

OV = 1, UP = 0, EI = 1, PL = 0, ZR = 0, AC = 1, PE = 1, CY = 1.









