CSC 3210
Computer Organization and Programming
Lab 3 (b)
Answer Sheet

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Section: 11:00-12:40 Lab Section
(my answers/inputs are in gray to show the difference between question and answer)

Debug through each line of code and explain the register content.
(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
Register value of EAX register, after executing line 14.
EAX = 12341189
Explain the content of the EAX register.
mov instruction updates the AX or 16-bit register by replacing 22h with 89h. The first part of the EAX has not change.

Line 15:
Instruction: add al, 10h
Register value of EAX, after executing line 15:
EAX = 12341199
Show the step of the hexadecimal addition.
12341189h + 00000010h = 12341199h

Line 16:
Instruction: sub al, al
What Register value of EAX, after executing line 15?
EAX = 12341100
Show the step of the hexadecimal subtraction.
AL = 99, the lower 8-bit of the AX register
12341199h – 00000099h = 12341100h

Line 17, 18:
Instruction:

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mov al, 98h
add al, 89h
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Register value of EAX, after executing line 17 and 18:
17 EAX = 12341198
18 EAX = 12341121
Show the step of the hexadecimal addition.
12341198h + 00000089h
*al + al
= 98 + 89
8 + 9 = 17; 17 – 16 = 1
9 (+ 1) + 8) = 18; 18 – 16 = 2
1 + 0 = 1
so, 98 + 89 = 121
therefore,
12341198h + 00000089h = 12341121h