

CSC 3210
Computer Organization and Programming
Assignment #1
Fall 2021

Due on 09/16/2021, 11:59 PM Eastern Time (US and Canada)

Objective: Learn some core concepts closely relating to assembly language.

Total 15 points

1. **(1 point)** Why is assembly language not usually used when writing large application programs?
2. **(1 point)** Assume that you have three 8-bit storages (registers) named A, B, and C to store binary numbers. Register A contains 10100111 and register B contains 11110110. Compute $A+B$ and store the value in C register. What is the content of register, C after the computation?
Show the computation in details with carries.
3. **(2 points)** Assume that you have 4-bit storage to store the numbers. Calculate the following operations using **two's complement method**. (assuming 4-bit register is used)
$$-7 - 1 + 4$$

[Hint: Perform the computation in binary system, then convert it back to decimal]
4. **(1 point)** What is the binary representation of the following hexadecimal numbers? Show the conversion in details.
$$4AE7F98A0$$
5. **(2 points)** What is the *16-bit* hexadecimal representation of the following *signed decimal* integer? Show all the steps of conversion in details.
$$-61$$
6. **(2 points)** What is the decimal representation of each of the following *signed binary* numbers?
 - a. **(1 point)** 11110101
 - b. **(1 point)** 10110101
7. **(2 point)** Evaluate the following Hexadecimal expression. **All the numbers are hexadecimal.**
Show all the steps of computation and the carries.

$$AED + CEF - F51$$

8. **(1 point)** Is it possible to store **-19** in a 4-bit storage. If your answer is YES, then show how to store **-19** in 4-bit register. If your Answer is No, Explain why.
9. **(1 point)** What is the smallest decimal value you can represent, using a **125-bit signed integer**?
You can write the number in exponent form.
10. **(2 points)** What is the Boolean expression for P?

x	y	z	P
0	0	0	0
0	0	1	0
0	1	0	1
0	1	1	0
1	0	0	0
1	0	1	1
1	1	0	0
1	1	1	1

Design a circuit that can produce output P for inputs x, y, and z as expressed in the table above.

Note:

- **Make sure to justify all answers – show all work.**
- The Assignment **must be submitted electronically** through ICollege.
- You can do your work in a text editor (Microsoft word, open office, etc.)
- Or you can do it in a piece of paper, then scan or take a picture of the paper.
- Upload the answers in a **pdf file** to iCollege in the respective assignment dropbox.
- All work must be **neat and legible**. Illegible work will receive no credit. This includes work where the print contrast or darkness are too faint.
- The work that you turn in must be your own --- **copying is not allowed for any assignments**.
- Using another student's work as your own, allowing another student to use your work as their own, is academic misconduct.