

CS1203 Assignment 3

Fall 2020

Due **Monday October 5th** before **4pm Atlantic** in the Desire2Learn dropbox.

Note: All answers need to be contained in a single document using a word processor. For answers that require work to be shown you may choose to take a picture or scan your work and insert the image into the document in the correct order (your answers need to be labelled with the question number and appear in the correct order). Make sure all handwritten work can be easily read. The first page of the document must be a title page (see sample posted in D2L).

Once you have finished your document, save the document as a PDF file. **Submit the PDF file** to the appropriate drop box on Desire2Learn. Name your document as follows:

CS1203_YourName_A3

1. Convert the value -678 decimal to 5 decimal digit 10's compliment.
2. Convert the value 35090 decimal to 5 decimal digit 10's compliment.
3. Convert the 5 decimal digit 10's compliment value 90879 to base 10.
4. Convert the 5 decimal digit 10's compliment value 47900 to base 10.
5. Complete the following arithmetic operations in 4 decimal digit 10's compliment (you must **show your work** to receive full marks):
 - a. $9925 + 1053$
 - b. $7539 - 8002$
6. Convert the value -112 decimal to 8 bit 2's compliment binary representation.
7. Convert the value 109 decimal to 8 bit 2's compliment binary representation.
8. Convert the 8 bit 2's compliment binary representation 11001010 to base 10.
9. Convert the 8 bit 2's compliment binary representation 01101110 to base 10.
10. Complete the following arithmetic operations in 8 bit 2's compliment (you must **show your work** to receive full marks):
 - a. $10110110 + 01000010$
 - b. $00011001 - 11101100$
11. Give an example of an 8 bit 2's compliment **subtraction** that results in overflow. Work out the subtraction in 8 bit 2's compliment and then convert each value to decimal to prove that overflow occurred. Provide a brief explanation of your example including why overflow occurred.
12. Is a "discarded carry" the same as overflow? Provide examples to support your answer.