

Due date: Monday, 10/4/2016

A hard copy must be turned in at the beginning of class. Note that work must be shown for all computations or no credit will be received, even if the correct answer is given.

Chapter 9:

1. [10 pts] Represent the following decimal numbers in both binary sign magnitude and twos complement using 16 bits: +510, -39.
2. [10 pts] Represent the following twos complement values in decimal: 1101101, 0101011 [HINT: remember that they are currently being represented in twos complement format!]
3. [20 pts] Assume numbers are represented in 8-bit twos complement representation. Show the calculation of the following in binary [HINT: remember that subtraction is performed by the addition of the negative value]:
 - a. $5 + 12$
 - b. $-5 + 12$
 - c. $5 - 12$
 - d. $-5 - 12$
4. [20 pts] Find the following differences using twos complement arithmetic. [HINT: remember that the first bit represents the sign, and remember to normalize numbers by making them the same length using valid sign extension if necessary]:
 - a. $111000 - 110011$
 - b. $11001100 - 101110$
 - c. $111100001111 - 110011110011$
 - d. $11000011 - 11101000$
5. [20 pts] Express the following in numbers in IEEE 32-bit floating-point format:
 - a. -5
 - b. 632
 - c. -1.5
 - d. $1/32$
6. [20 pts] The following numbers use the IEEE 32-bit floating-point format. What are the equivalent decimal values?
 - a. 1 10000011 110000000000000000000000
 - b. 0 01111110 101000000000000000000000
 - c. 0 10000000 000000000000000000000000