CMPU-224 Lab3 Quiz

Spring 2025

Name: _____

This is a closed book, closed notes quiz. No electronic devices are allowed. You have until 3:30pm to complete the quiz. There are a total of 4 questions and 10 points.

There should be enough space on the quiz for your answers. If you need more space to work out a problem, blank paper will be available, just ask.

Good Luck!

1. You are given the following 8-bit two's-complement number.

   `10001000`

   (a) (1 point) What is the decimal value of this number?

   _____

   (b) (1 point) What is representation of that number as a 10-bit two's-complement number? Give your answer as in hexadecimal.

   _____

2. For this question, assume all the numbers are internally represented as **5-bit two's complement** binary numbers.

   (a) (1 point) What is the decimal value of $10 + 8$?

   _____

   (b) (1 point) The above answer is an example of (choose one):

   A. Positive Overflow

   B. Negative Overflow

   C. Modular arithmetic

   D. None of the above

   (c) (1 point) What is value of $-9 >> 1$? Give your answer as a decimal number.

   _____

3. Consider a 12-bit floating point representation called "TinyFloat". It follows the standard floating point scheme, but has fewer bits.

   The bits are arranged as follows:
   Bit 11: Sign bit (s)
   Bits 10–6: Exponent field (exp)
   Bits 5–0: Fraction field (frac)

   (a) (1 point) In the above TinyFloat system, what is the bias used to calculate `exp`?

   _____

   (b) (1 point) Consider the following Tiny Float number:

   `0x3DC`

   What is the decimal value of this number in the TinyFloat system described above.

   _____

4. (3 points) Convert the decimal number 12.2 into the TinyFloat representation described above. Give the binary results for the sign, exp, and frac fields in the boxes below.

sign	exp	frac