Chapter 3: Exercises

3.2 [5] <§3.2> What is 5ED4 − 07A4 when these values represent signed 16-bit hexadecimal numbers stored in sign-magnitude format? The result should be written in hexadecimal. Show your work.

3.4 [5] <§3.2> What is 4365 − 3412 when these values represent unsigned 12-bit octal numbers? The result should be written in octal. Show your work.

3.6 [5] <§3.2> Assume 185 and 122 are unsigned 8-bit decimal integers. Calculate 185 − 122. Is there overflow, underflow, or neither?

3.20 [5] <§3.5> What decimal number does the bit pattern 0×0C000000 represent if it is a two's complement integer? An unsigned integer?

3.22 [10] <§3.5> What decimal number does the bit pattern 0×0C000000 represent if it is a floating point number? Use the IEEE 754 standard.

3.23 [10] <§3.5> Write down the binary representation of the decimal number 63.25 assuming the IEEE 754 single precision format.

3.24 [10] <§3.5> Write down the binary representation of the decimal number 63.25 assuming the IEEE 754 double precision format.

3.27 [20] <§3.5> IEEE 754-2008 contains a half precision that is only 16 bits wide. The leftmost bit is still the sign bit, the exponent is 5 bits wide and has a bias of 15, and the mantissa is 10 bits long. A hidden 1 is assumed. Write down the bit pattern to represent -1.5625×10^{-1} assuming a version of this format, which uses an excess-16 format to store the exponent. Comment on how the range and accuracy of this 16-bit floating point format compares to the single precision IEEE 754 standard.

3.41 [10] <§3.5> Using the IEEE 754 floating point format, write down the bit pattern that would represent −1/4. Can you represent −1/4 exactly?