Homework 3

Due on September 23 (Thursday), 2021

Problem 1.

By the IEEE 754 format, what decimal number is represented by the following 32-bit sequence?

1 01111101 00100000000000000000000

Problem 2.

The floating-point format to be used in this problem is an 8-bit IEEE 754 normalized format with 1 sign bit, 4 exponent bits, and 3 floating faction bits. It is identical to the 32-bit and 64-bit formats in the meaning of fields and special encodings. The bit fields in a number are (sign, exponent, floating). We use rounding to the nearest even specified in the IEEE floating-point standard.

Questions 1

What bias value for the exponent field do you choose?

Questions 2

Encode the following numbers the 8-bit IEEE format:

(1) 0.0011011_{binary}

(2) $16.0_{decimal}$

Problem 3.

Decode the following 8-bit IEEE number into their decimal value: 1 1010 101

Problem 4.

Decide which number in the following pairs are greater in value (the numbers are in 8-bit IEEE 754 format):

(1) 0 0100 100 and 0 0100 111

(2) 0 1100 100 and 1 1100 101

Problem 5.

Express the following numbers in 32-bit IEEE 754 format:

(a) 384
(b) 1/16
(c) -1/32