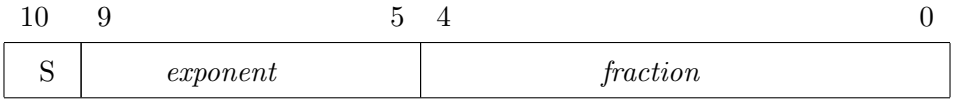
CMPUT 229 (A1) - Quiz # 5 - Fall 2013

Name:

The following is a format for the binary representation of a floating-point number:



The exponent is expressed in a bias representation. Given the binary representation above, the decimal value of the number represented can be computed by the following expression:

$$N = \begin{cases} 0.0 & \text{if } \mathit{exponent} = 0 \text{ and } \mathit{fraction} = 0 \\ (-1)^S \times 0.\mathit{fraction} \times 2^{-14} & \text{if } \mathit{exponent} = 0 \text{ and } \mathit{fraction} \neq 0 \\ (-1)^S \times 1.\mathit{fraction} \times 2^{\mathit{exponent}-15} & \text{if } 0 < \mathit{exponent} < 30 \\ (-1)^S \times \infty & \text{if } \mathit{exponent} = 31 \text{ and } \mathit{fraction} = 0 \\ NaN & \text{if } \mathit{exponent} = 31 \text{ and } \mathit{fraction} \neq 0 \end{cases}$$

1. (30 points) Let $X = 64_{10}$. Give the normalized binary representation for X and the bit pattern for the representation of X in this notation.

2. (30 points) Let $Y = 5.25_{10}$. Give the normalized binary representation for Y and the bit pattern for the representation of Y in this notation.

3. (40 points) If this machine has an adder with a round bit, a guard bit, and a *sticky* bit, what is the value of $X + Y$ computed by this machine? Give both the normalized binary notation and the decimal value.