Name: **Id#**

COE 301/ICS 233, Term 151

Computer Architecture & Assembly Language

Quiz# 4

Date: Tuesday, Nov. 3, 2015

Q1.

(i) What is the decimal value of the following single-precision floating-point number?

`0100 0011 0110 1001 1000 0100 0000 0000`.

(ii) Show the single-precision floating-point binary representation for: **555.9375**.

(iii) Perform the following floating-point operation rounding the result to the **nearest even**. Perform the operation using **guard**, **round** and **sticky** bits.

$$
\begin{array}{ll}
 & 1.000\ 0000\ 1000\ 0000\ 0000\ 0000 \times 2^{37} \\
- & 1.000\ 0000\ 0000\ 0000\ 0100\ 0000 \times 2^{29} \\
\hline
\end{array}
$$

Q2. Consider a simplified 8-bit floating point representation following the general guidelines of the IEEE format in representing normalized, denormalized, Nan, infinity and 0. Suppose that the number of bits used for the exponent is 3 and for the fraction is 4 bits.

(i) Determine the smallest and largest positive values of normalized numbers.

(ii) Determine the smallest and largest positive values of denormalized numbers.

(iii) Determine the representation used for +0 and $+\infty$.

(iv) What is the largest and smallest error in this representation?