EGC442 Problem Set 10 Dr. Izadi

First Name:_____ Last Name: _____

1) Add the following numbers using the floating-point addition algorithm. Assume 4 bits of precision.

a. $1.010 \times 2^{-3} + 0.011 \times 2^{-3} = ?$

- 1.101
- 1.101×2^{-6}
- 1.101×2^{-3}

b. $1.001 \times 2^{-4} + 1.000 \times 2^{-6} = ?$

- 10.001×2^{-4}
- 1.011×2^{-4}

c. $1.000 \times 2^{3} + 0.011 \times 2^{5} = ?$

- 1.010×2^{4}
- 0.101×2^{5}
- 10.001×2^{5}

2. Multiply -14_{ten} and -0.25_{ten}, or $-1.110 \times 2^{3} \times -1.000 \times 2^{-2}$. Assume 4 bits of precision.

- **1.110000**
- **$1.110000_{two} \times 2^{1}$**
- **$1.1100_{two} \times 2^{1}$**
- **+**
- **3 + (-2) = 1**
- **2^{1}**
- **3.5_{ten}**

Adding the non-biased exponents of the operands

Multiply the significands:
$1.110 \times 1.000 = ?$

Product = $1.110000 \times ?$

Normalize the product

Round the product

Set the sign of the product: ? $1.1100_{two} \times 2^{1}$

$-14_{ten} \times -0.25_{ten} = ?$

3. Design the least significant a 32 bit ALU with the following functionality.

AND
OR
XOR
ADD
SUB
SLT

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5. Using Verilog design a 32 bit ALU with the following specification. Your code should include indicated flags.

AND
OR
XOR
ADD
SUB
SLT