

Dept. of Electrical Engineering and Computer Science
 EECS2021
 Computer Organization
 Quiz 3 – 15 minutes
 Nov. 30 2016

Name _____

ID _____

Question 1 – 10 (3+3+4) points

Consider a IEEE-754-like representation. A sign bit, 3 bits for exponent (bias of 4) and 8 bits for fraction (with an added hidden 1).

a) Represent the following number in the above format 2.5

$\#$ must be between 1 & 2, $2.5 = 1.25 \times 2^1$
 A hidden 1 $\rightarrow 0.25 \times 2$
 $0.25 = 0.01000000$
 exponent: $1 + \text{bias} = 1 + 4 = 5 = 101$
 $\# =$

0	101	01000000	
sign	exp	Fraction	$= 540_{16}$

b) Represent the following number in the above format 0.125

$0.125 = 1 \times 2^{-3}$ Fraction = 0
 exponent: $-3 + 4 = 1$

 0 001 00000000
 100_{16}

c) Show in step by step how to add these two numbers.

Add
Number 1 sign exp Fraction
 0 101 01000000

Number 2 0 001 00000000
must make exponent the same

add 4 to number 2 exponent & shift right
by 4 (include the hidden 1 in shifting)

N1	0	101	01000000
N2	0	101	00010000

Add	0	101	01010000
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$\frac{1}{4} + \frac{1}{16} = 0.3125$
 $\# = 1.3125 \times 2^{5-4} = 2.625$