ICS 233: Computer Architecture & Assembly Language
Fall Semester 2021 (211) – Section 01
Quiz 4

Name: *ID#*

Q1. (3 points) find the normalized single precision float representation of +59.25:

$(+59.25)_{10} = (+111011.01)_2 \times 2^0 = (+1.1101101)_2 \times 2^5$
S = 0 (positive number)
E = Exp + Bais = 5 + 127 = 132 = $(10000100)_2$
F = $(1101\ 1010\ 0000\ 0000\ 0000\ 000)_2$
The single precision representation of +59.25 is

0	1000 0100	1101 1010 0000 0000 0000 000

Q2. (5 points) Find the normalized **difference** between A and B by using rounding to nearest even. Perform the operation using guard, round and sticky bits:

A = + 1.000 0000 0000 0000 0000 0000 × 2^4
B = + 1.111 1000 0000 0000 0000 0000 × 2^3

Align A and B (make the exponents equal)
A = 0 1.000 0000 0000 0000 0000 0000 0 0 0 × 2^4
B = 0 0.111 1100 0000 0000 0000 0000 0 0 0 × 2^4

Take the 2's complement of B
A = 0 1.000 0000 0000 0000 0000 0000 0 0 0 × 2^4
B = 1 1.000 0100 0000 0000 0000 0000 0 0 0 × 2^4
= 0 0.000 0100 0000 0000 0000 0000 0 0 0 × 2^4

Normalize
= + 1.000 0000 0000 0000 0000 0000 0 0 0 × 2^{-1}

ICS 233: Computer Architecture & Assembly Language
Fall Semester 2021 (211) – Section 02
Quiz 4

Name: *ID#*

Q1. (3 points) find the normalized single precision float representation of – 67.75:

$(-67.75)_{10} = (-1000011.11)_2 \times 2^0 = (-1.00001111)_2 \times 2^6$
S = 1 (negative number)
E = Exp + Bais = 6 + 127 = 133 = $(10000101)_2$
F = $(0000\ 1111\ 0000\ 0000\ 0000\ 000)_2$
The single precision representation of -67.75 is

1	1000 0101	0000 1111 0000 0000 0000 000

Q2. (5 points) Find the normalized **difference** between A and B by using rounding to nearest even. Perform the operation using guard, round and sticky bits:

A = + 1.000 0000 0000 0000 0000 0000 × 2^{-4}
B = + 1.101 1010 0000 0000 0000 0000 × 2^{-3}

Align A and B (make the exponents equal)
A = 0 0.100 0000 0000 0000 0000 0000 0 0 0 × 2^{-3}
B = 0 1.101 1010 0000 0000 0000 0000 0 0 0 × 2^{-3}
Take the 2's complement of B
A = 0 0.100 0000 0000 0000 0000 0000 0 0 0 × 2^{-3}
B = 1 0.010 0110 0000 0000 0000 0000 0 0 0 × 2^{-3}
= 1 0.110 0110 0000 0000 0000 0000 0 0 0 × 2^{-3}
Take the 2's complement since the answer is -ve
= - 1.001 1010 0000 0000 0000 0000 0 0 0 × 2^{-3}
No need for normalization