Name Answers

CE-1901 – Dr. Durant – Quiz 9
Fall 2015, Week 10 Quiz

1. (5 points) In binary, multiply A=0101 by B=1101, showing all 4 properly shifted intermediate products. Calculate the overall sum, showing the correct number of output bits needed to handle the largest possible product. In decimal, confirm whether your results agree with 5×13 = 65

(-1/4) (-1/2)

$$
\begin{array}{r}
0101 \\
\times\ 1101 \\
\hline
0101 \\
0000 \\
0101 \\
0101 \\
\hline
01000001_2 = 64+1 = 65\ \checkmark
\end{array}
$$

2. (5 points) Interpret 0x40E00000 as a single-precision IEEE 754 floating point number...

1.5 a. Write the value in binary and box in the sign, exponent, and mantissa

1.5 b. Calculate 2^{exponent} after accounting for the bias.

1 c. Write the complete binary fraction based on the mantissa and convert it to a decimal fraction.

1 d. Multiply the contributions of the sign, exponent, and mantissa to arrive at the decimal value.

(a) 0 1000_0000_1110_0000_0000_0000_0000

s exp mant

(b) $exp = 129$

$bias = 127$

exp really 2

$\therefore 2^2 = \boxed{4}$

(c) 1.1100 0000... $= 1 + \frac{1}{2} + \frac{1}{4} = 1\frac{3}{4} = 1.75$

↑ implicit 1

(d) $+1 \times .4 \times 1.75 = 7$