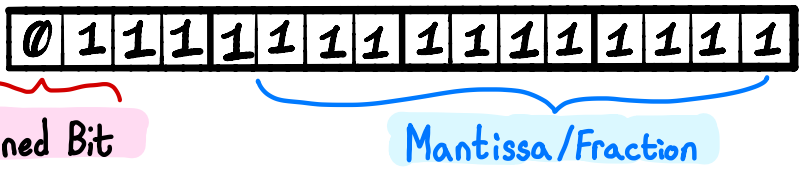
HW #2

CSc 137, Fall 2020, Harvey

Total (16 pts)

1.6. What is the biggest positive FP number that can be represented in 16-bit format using 1-bit sign, 4-bit biased exponent, and 11-bit fraction, where bias is 7? (4 pts)

Sign
0 = positive



Biased Component

$1.11111 \times 2^{15} = 1111_{(2)}$

Signed Component — Fractional Component

Biased Exponent = 1.01011×2^2

$2_{(10)} + 7_{(10)} = 15_{(10)}$ (Convert) $\rightarrow 15_{(10)} = 1111_{(2)}$ (to Binary)

255.3750

1.8 Do the following assuming 16-bit FP numbers with 4-bit bias exponent, bias = 7, and 11-bit fraction: (4 pts)

a) **What real number does an FP number with sign= 0, bias exponent =1 and fraction = 0 represent?**

0.015625

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2.4 Proof Demorgan's Theorem $\overline{x+y} = \overline{x}\,\overline{y}$ by creating truth tables for $f = \overline{x+y}$ and $g = \overline{x}\,\overline{y}$. Are the two truth tables identical? (4 pts)

DeMorgan's Theorem

$g = \overline{A \cdot B}$

Inputs		Outputs
A	B	$\overline{A \cdot B}$
0	0	1
0	1	1
1	0	1
1	1	0

$f = \overline{A} + \overline{B}$

Inputs				Outputs
A	B	$\overline{A}$	$\overline{B}$	$\overline{A}+\overline{B}$
0	0	1	1	1
0	1	1	0	1
1	0	0	1	1
1	1	0	0	0

2.5 Draw the circuit schematic for $f = x\overline{y} + yz$ and then convert the schematic to NAND gates using the steps illustrated in the textbook. (4 pts)

$f = x\bar{y} + yz$