

10. a) 8 bit float

↳ 3 bit exponent: 111

↳ 4 bit mantissa: 1111

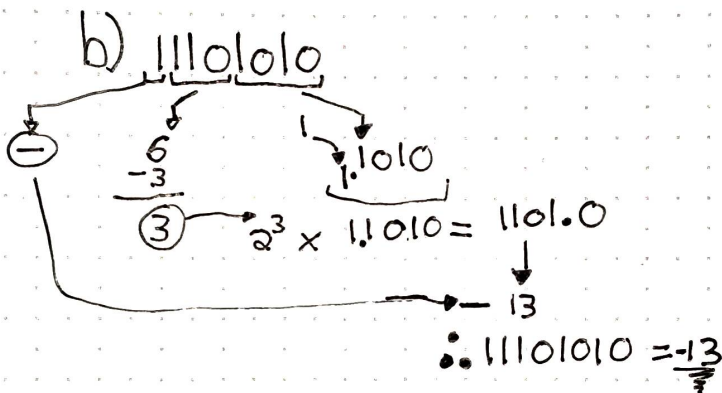
↳ 1 bit sign

0.5

0.5 in binary fixed point

Normalized $\rightarrow 1.0 \times 2^{-1}$ mantissa = 0000Convert exponent
Using excess-3 $-1 + 3 = 2 \rightarrow 010$

sign

00100000 = 0.5

11.

a) What's the smallest positive number = 00010000

↳ Large negative exponent

↳ 001 in excess 3 is $1-3 = -2$

↳ small mantissa

↳ 0000 (only implied 1 stays)

 $1.000 \dots 010 \times 2^{-2}$ \therefore Smallest ^{positive} number is 0.25

Assuming 0 is not considered Positive

0.01 \downarrow = 0.25

b) What is the smallest number? ^{101064168 N.E[10]}

↳ The largest negative number

↳ Largest exponent → 110

$$\begin{array}{r} 6 - 3 = 3 \\ \text{excess-3} \end{array}$$

↳ Largest mantissa → 1111

$$\text{implicitly: } 1.111 \times 2^3 = 1111$$

$$15.5$$

-15.5 since negative bit