Decimal fractions → Binary

$4\frac{1}{2} = 100.1$

$\frac{1}{2} * 2 = \frac{2}{2} = 1$ → no fractions left → Done

$2\frac{3}{4} = 10.11$

$\frac{3}{4} * 2 = \frac{6}{4} = 1\ \frac{1}{2}$

$\frac{1}{2} * 2 = \frac{2}{2} = 1$

$$1\frac{5}{16} = 1.0101_b$$

$$\frac{5}{16} * 2 = \frac{10}{16} = 0\ \frac{5}{8}$$

$$\frac{5}{8} * 2 = \frac{10}{8} = 1\ \frac{1}{4}$$

$$\frac{1}{4} * 2 = \frac{2}{4} = 0\ \frac{1}{2}$$

$$\frac{1}{2} * 2 = \frac{2}{2} = 1$$

$0.3 \Rightarrow 0.\overline{0\,1\,0\,0\,1}_b$

$0.3 * 2 = 0.6$

$0.6 * 2 = 1.2$

$0.2 * 2 = 0.4$

$0.4 * 2 = 0.8$

$0.8 * 2 = 1.6$

0.6 Repeats

Ec + 1pt $0.45 = ?_b$

max 8 bits

Binary → Decimal

$11.01_b = 3\frac{1}{4}$

$2^0 = 1$

$2^1 = 2$

$0 \times 2^{-1} = 0$

$1 \times 2^{-2} = \frac{1}{4}$

$110.101_b = 6\frac{5}{8} = 6.625$

$\frac{1}{2}$ $\frac{1}{4}$ $\frac{1}{8}$

2^{-1} 2^{-2} 2^{-3}

0.5 0.125

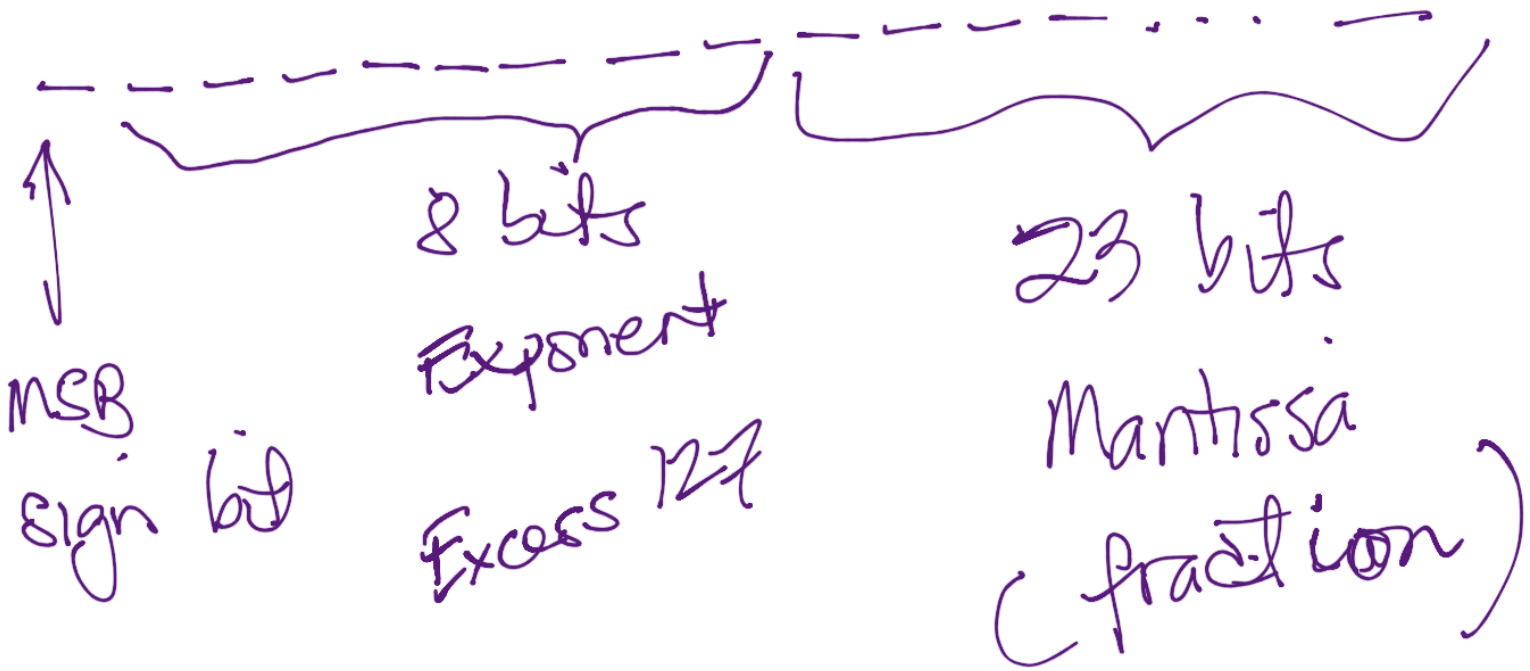
$\frac{1}{2} + \frac{1}{8} = \frac{4+1}{8} = \frac{5}{8}$

$110.1010_b = 6\frac{21}{32}$

$\frac{1}{2} + \frac{1}{8} + \frac{1}{32}$

EC: 1 pt Take the 8 bits from 0.45 → Binary and convert to decimal.

IEEE 754 - Single Precision (32 bits)



Normalization:

- move the radix point to the RIGHT of the LEFTMOST '1'