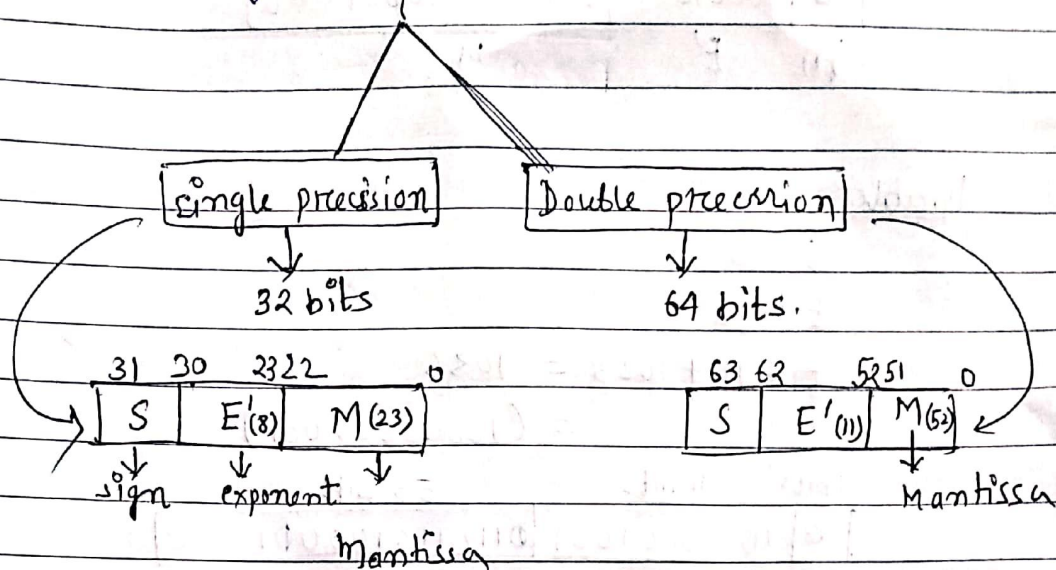


COP Computers Arithmetic

IEEE Floating point Representation =



$$\text{here, } E' = E + \text{bias}$$

single - 127

Double - 1023

① ex: $(1460.125)_{10}$

$$\rightarrow (1460.125)_{10}$$

$$\rightarrow (10110110100.001)_2$$

↓
Normalise

$$\rightarrow 1.\underbrace{0110110100001}_M \times 2^{10}$$

single:

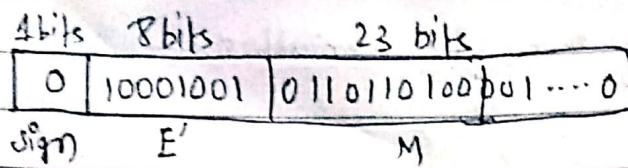
$$S = 0$$

$$E = 10$$

$$M = 0110110100001$$

$$E' = E + \text{bias}$$

$$= 10 + 127 = (137)_{10} = 10001001$$



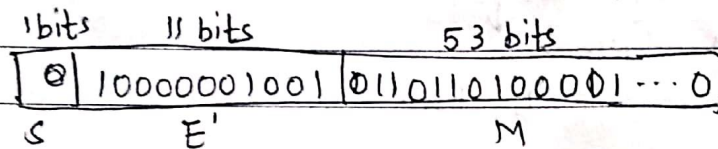
Double:

$$S = 0$$

$$E = 10$$

$$E' = 10 + 1023 = 1033$$

$$= (10000001001)$$



② ex: The negative numbers (-0.750)

$$\rightarrow (0.750)_{10} \rightarrow 0.11$$

↓ Normalization

$$\rightarrow \text{normalized } 1.1 \times 2^{-1}$$

M

$$0.750 \times 2 = 1.5$$

$$0.05 \times 2 = 1.0$$

Single:

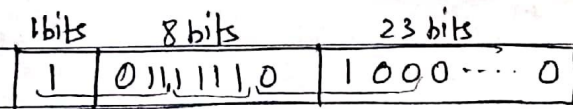
$$S = 0$$

$$E = -1$$

$$M = 1$$

$$E' = E + \text{bias} = -1 + 127 = 126_{10} = (01111110)_2$$

$$\begin{matrix} 0 & 1 & 1 & 1 & 1 & 1 & 0 \\ 128 & 64 & 32 & 16 & 8 & 4 & 2 & 1 \end{matrix}$$



8421

1011	1111	0100	0000	0000	0000	0000	0000
(11)	(15)	↓	↓	1	1	1	1
↓	↓	4	0	0	0	0	0
B	F						

$$(BF400000)_{16}$$