

3.23

63.25 Floating single precision.

I] Binary of 63 = 0011 1111

2	63
2	31
	15
	7
	3
	1
	0

1

1

1

1

1

1

II] Binary of 0.25 = 0.01

$$0.25 \times 2 = 0.50$$

$$0.50 \times 2 = 1.00$$

0

1

$$63.25 = 0011\ 1111.01$$

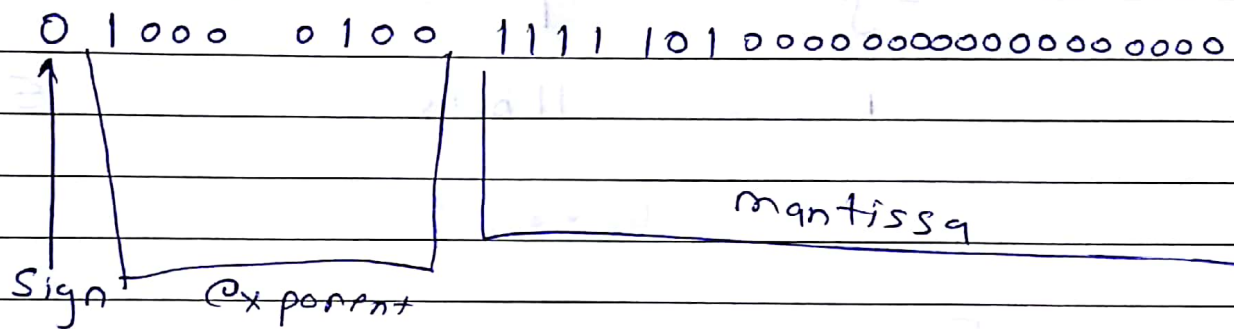
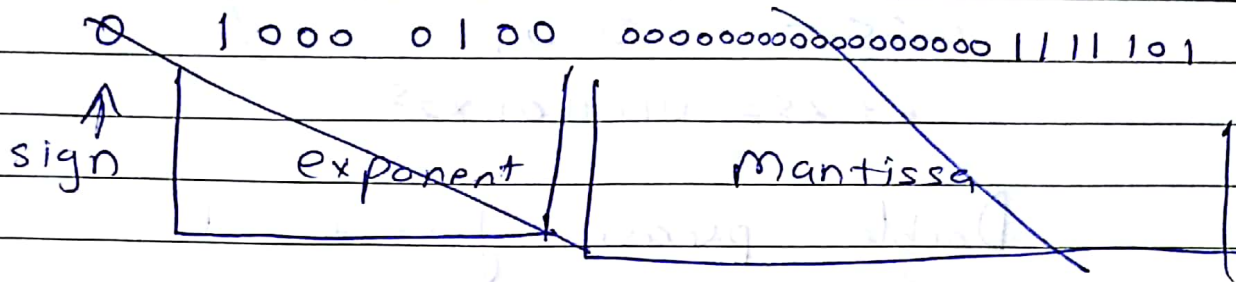
$$= 1.111101 \times 2^5$$

Sign	Exponent	Mantissa
1	8	23

$$\begin{aligned} \text{Exponent} &= 127 + 5 = 132 \\ &= 1000\ 0100 \end{aligned}$$

Mantissa = 1111101

63.25 =



3.24

63.25 in double precision format

$$63 = 0011\ 1111$$

$$0.25 = 0.01$$

$$63.25 = 1111\ 01 \times 2^5$$

} from previous sum

Double precision format

Sign

Exponent

Mantissa

1

11 bits

52 bit

From previous sum

~~Exponent = 1000 0100~~

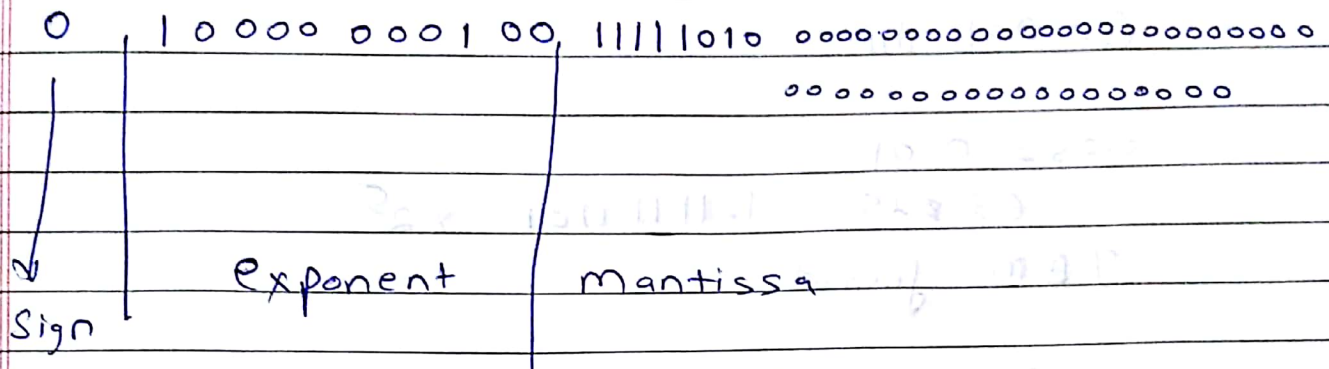
~~Mantissa = 111 101~~

~~0 1000 0100~~

$$\begin{aligned} \text{Exponent} &= 1023 + 5 \\ &= 1028 \end{aligned}$$

$$\text{Binary for } 1028 = 1000\ 0000\ 100$$

$$\text{Mantissa} = 1111\ 101$$



3.25 using IBM format

$$63 = 0011111$$

$$0.25 = 0.01$$

$$63.25 = 1.1111101 \times 2^5$$

IBM format

Sign	Exponent	Mantissa
1	7	24

$$\text{Exponent} = \cancel{127} + 5 =$$

$$\text{Exponent} = 63 + 5 = 68$$

$$= 1000100$$

$$\text{Mantissa} = 111101$$

0 1000100 111101 000000000000000000000000

↑ ↑ ↑

Sign Exponent Mantissa + 17 zeros

3.41

$$\frac{-1}{4} = -0.25$$

$$0.25 \times 2 = 0.50 \quad 0$$

$$0.50 \times 2 = 1.00 \quad 1$$

$$0.25 = 0.01$$

$$-0.25 = \textcircled{1}.01$$

2's complement is not possible as it changes the bit before the point

Therefore $-0.25 = 0.01$