CS & IT ENGINEERING

Computer Organization Architecture

Floating Point Representation

DPP- 01 Discussion Notes

By- Vishvadeep Gothi sir

[MCQ]

#Q. Which of the following is the representation of $(-1)_{10}$ in IEEE-754 single precision floating point number?

$(1.0)_{10} = (1.0)_2 \Rightarrow 1.0 * 2^0$

$e = 0$

$E = 0 + 127 = (127)_{10}$

$= (01111111)_2$

$M = 00\text{---}0$

A. S = 1, E = 00000000, M = 00000000000000000000000

B. S = 1, E = 01111111, M = 00000000000000000000000

C. S = 1, E = 10000000, M = 00000000000000000000000

D. S = 1, E = 01111111, M = 10000000000000000000000

[MCQ]

#Q. Which of the following is the representation of $(+0.0000101)_2$ in IEEE-754 single precision floating point number?

$(0.0000101)_2 \Rightarrow 1.01 * 2^{-5}$

$e = -5$

$E = -5 + 127 = 122$

$= 01111010$

$M = 0100\ldots0$

A. S = 0, E = 01111010, M = 10100000000000000000000

B. S = 1, E = 01111010, M = 10100000000000000000000

C. S = 0, E = 01111010, M = 01000000000000000000000

D. S = 0, E = 01111011, M = 10100000000000000000000

[MCQ]

#Q. The value of a float type variable is represented using the single- precision 32-bit floating point format IEEE-754 standard that uses 1bit for sign, 8 bits for biased exponent and 23 bits for mantissa. A float type variable X is assigned the decimal value of −22.25. The representation of X in hexadecimal notation is

A C1B40000H

B 41B20000H

C C1B20000H

D 41B40000H

$s = 1$

$(22.25)_{10} = (10110.01)_2$

⇓

Implicitly normalized

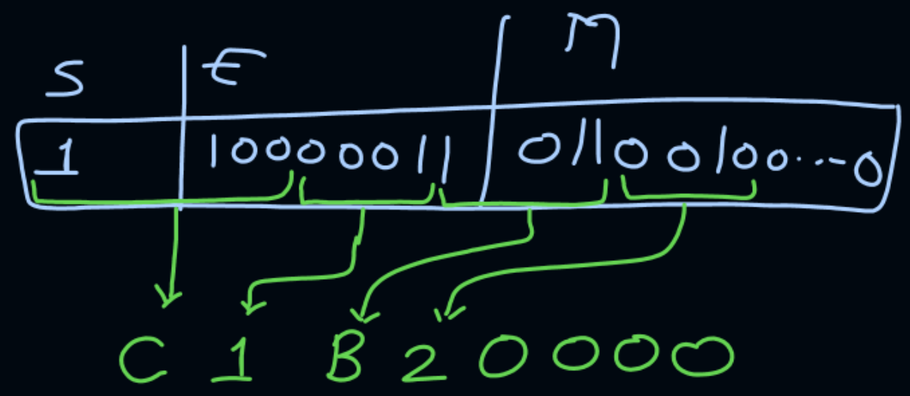
⇓

$1.011001 * 2^4$

$M = 01100100000\ldots0$

$e = 4$

$E = 4 + 127 = 131 = (10000011)_2$



[NAT]

#Q. Consider the following representation of a number in IEEE 754 single-precision floating point format?

0 10000011 11000000000000000000000

The decimal value corresponding to the above representation is ___ ?

$E = 131$

$\text{Value} = + \ 1.11 \ * 2^{131-127}$

$= 1.11 * 2^{4}$

$= (11100.0)_2 = +(28)_{10}$

Ans = 28

[MCQ]

min E = $(1)_{10}$ = $(00000001)_2$

#Q. Minimum possible positive normalized value represented in IEEE-754 single precision format is?

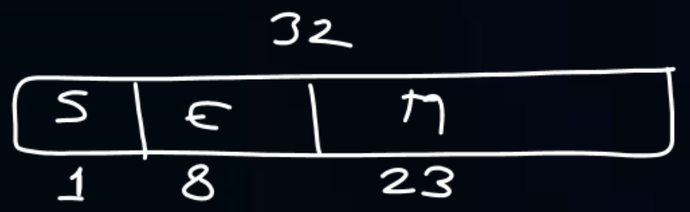
A. S = 0, E = 00000000, M = 00000000000000000000000

B. S = 0, E = 00000001, M = 00000000000000000000000

C. S = 0, E = 00000000, M = 10000000000000000000000

D. S = 1, E = 00000001, M = 10000000000000000000000

[MCQ]



#Q. Maximum possible positive denormalized value represented in IEEE-754 single precision format is?

A. $(A)(2^{23}-1)*2^{-150}$

B. $(A)(2^{24}-1)*2^{-149}$

C. $(A)(2^{23}-1)*2^{-149}$

D. $(A)(2^{24}-1)*2^{-150}$

Denormalized :-

- $E = 00\cdots0$
- $M \neq 00\cdots0$

for max value

$M = 11\ldots\ldots1$

$$\text{value} = + \; 0.11\ldots1 * 2^{-126}$$

$$= 11\ldots1.0 * 2^{-23} * 2^{-126}$$

$$= 11\ldots1.0 * 2^{-149}$$

$$= (2^{23} - 1) * 2^{-149}$$

Ans.

THANK - YOU