CS & IT ENGINEERING

Computer Organization Architecture

Floating Point Representation

DPP- 01 Discussion Notes

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[MCQ]

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

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

$(-1)_{10}$ Sign = 1 for negative value

$(1)_{10} = 1.0 \times 2^0$

Mantissa = 000...0

Original Exponent = 0

Bias = 0 + 127

$= (127)_{10} = (0111111)_2$

[MCQ]

#Q. Which of the following is the representation of $+(0.0000101)^2$ in IEEE-754 single precision floating point number?

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

$1.01 * 2^{-5}$

M = 01000...0

GE = -5

-5 + 127 = (122)$_{10}$

= 01111010

[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

$(22.25)_{10} = (10110.01)_2 \Rightarrow 1.011001 \times 2^4$

$\Rightarrow M \Rightarrow 011$ or $1000\ldots0$

$BE = 4 + 127 = (13)_2\ (10000011)_2$

[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 ____ ?

Sign 0 +ve

biased exponent = $(10000011)_2 = 131$

$+ 1.11 \times 2^{131-127}$

$\Rightarrow 1.11 * 2^4 = (11100)_2 = +28$

[MCQ]

#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

Mantissa 0.

If the NV then it will be having biased exponent (1)10.

[MCQ]

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

S = 0 , DE = 000000.

M = (23 times)

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

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

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

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

$1 * 2^{-23} \times 2^{-126}$.

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

THANK - YOU