Branch: CSE & IT

Computer Organization and Architecture

Floating Point Representation

DPP

Batch: Hinglish

1. [NAT]

Consider the following 1EEE single precision floating point number shown below.

 $010000111101\ 0000\ 0000\ 0000\ 0000\ 0000$

The decimal equivalued of above number is_____

2. [MCQ]

Consider the hexadecimal representation in IEEE754 signal precision floating number system: 0X43758000. What is the decimal value represented by it?

- (a) 245.5
- (b) 244.5
- (c) 240.5
- (d) None of the above

3. [MCQ]

In IEEE 754 single precision floating point standard the number

- (a) NAN
- (b) −∞
- (c) A negative normalized number
- (d) None of the above

4. [MCO]

Consider the following hexadecimal value in the IEEE 754 signal precision floating point number: 0XC4127000, then what is the value represented by it in decimal?

- (a) (-585.75)
- (b) (-586.75)
- (c) (-580.75)
- (d) None of these

5. [MCQ]

What is IEEE 754 32 bits floating point format representation of 16?

- (d) None of the above

6. [MCQ]

Consider the following binary value in 1EEE 754 signal precision floating point number representation.

- (a) 300
- (b) 400
- (c) 500
- (d) None of these

Answer Key

1. (416) 2. (a)

(b) 3.

(a) (a) **4. 5.**

6. (c)



Hints & Solutions

1. (416)

S	Е	M
1 bit	8 bits	23 bits

0	10000111	101 0000 0000 0000 0000 0000

Value =
$$1.M \times 2^{E-127}$$

= $1.1010 \times 2^{135-127}$
= $(1.1010)_2 \times 2^8$
= (1.625×2^8)
= $(416)_{10}$

2. (a)

010000 110111 01011 00000 00000 00000

Actual exponent = stored – binary
=
$$134 - 127$$

= 7
= $1.11\ 101011 \times 2^{7}$
= $1.111\ 01\ 011 \times 2^{7} \times 2^{-8}$
= $1111\ 010111 \times 2^{-1}$
= $\frac{491}{2} = 245.5$

3. (b)

1	11111111	0000 00000
1bit	8bits	23bits
S	E	M

The value $+\infty$ and $-\infty$ are represented with an exponent of all ones and a mantissa of all zeros. The sign bit distinguishes between $-\infty$ and $+\infty$.

4. (a)

C4127000

1	10001000	00100100111 0000 0000 0000
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Exponent = 136 - 127

Actual exponent = 9

So, the number will be $=-1.001001001111 \times 2^9$

 $= 100\ 1001\ 00111 \times 2^9 \times 2^{-11}$

 $=-2343\times 2^{-2}$

=-585.75

 \therefore (a) is correct option.

5. (a)

 $(16)_{10} = (10000)_2$

 $10000 = 1.0000 \times 2^4$

Exponent = 4

Mantissa = all zeros

Exponent stored = 4 + 127 (bias)

= 131

0 10000011 0000 0000 0000 0000 0000 000

Sign bit exponent mantissa

6. (c)

S	E	M
0	10000111	111101 0000 0000 0000 00000

Sign bit is
$$+$$
 so it is 0

Exponent =
$$135 - 127$$

$$= 8$$

$$= 1.111101 \times 2^8$$

$$=(1.953125)\times256$$

$$=500$$



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