ARCHITECTURE COMPUTER

ASSIGNMENT

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Represent Floating number 32bit from these number :

1. 1110.011101
2. 10000.010001

Answer :

Note : Scientific Notation : $1.xxxxx \times 2^e$ where xxxxxx is the mantissa.

For : 1110.011101

1. Let's normalize this binary number, $1110.011101 = 1.110011101 \times 2^{011}$
2. Biased exponent for IEEE 754 Floating point : 127 + Exponent Bits

   Exponent bits + Exponent Biased : $011 + 01111111 = 10000010 = 130_2$

3. $e = 130_2 - 127_2 = 3_2$

4. 1 10000010 11001110100000000000000

   The order is : sign,exponent bits,mantissa

   m (mantissa) = $11100111010000000000000 = 0.806640625_2$

5. Result :

   $(-1)^s \times (1 + m) \times 2^e = -1.806640625_2 \times 2^3$

For 10000.010001

1. Let's normalize this binary number, $10000.010001 = 1.0000010001 \times 2^{100}$

2. Biased exponent for IEEE 754 Floating point : 127 + Exponent Bits

   Exponent bits + Exponent Biased : $100 + 01111111 = 10000011 = 131_2$

3. $e = 131_2 - 127_2 = 4_2$

4. 1 10000011 00000100010000000000000

   The order is : sign,exponent bits,mantissa

   $m = 11100111010000000000000 = 0.0166015625_2$

5. Result :

   $(-1)^s \times (1 + m) \times 2^e = -1.0166015625_2 \times 2^4$