

Floating point

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Floating → hexadecimal representation

My magic floating point number: 2.4609375

1. Sign: positive, therefore 0
2. Exponent: 2^1 , therefore 1
 $1 + 127 = 128$
128 in binary: 1000 0000
3. Mantissa
 - A. 2.4609375 can be written as fraction: $\frac{315}{128}$
 - B. $\frac{\frac{315}{128}}{2} = \frac{315}{256}$
 - C. $\frac{315}{256} - 1 = \frac{59}{256}$
 - D. Subtracting increasing powers of $1/2$
 - i. Cannot subtract $1/2 \rightarrow 0$
 - ii. Cannot subtract $1/4 \rightarrow 0$
 - iii. Can subtract $1/8 \rightarrow 1$
 1. $\frac{59}{256} - \frac{32}{256} = \frac{27}{256}$
 - iv. Can subtract $1/16 \rightarrow 1$
 1. $\frac{27}{256} - \frac{16}{256} = \frac{11}{256}$
 - v. Can subtract $1/32 \rightarrow 1$
 1. $\frac{11}{256} - \frac{8}{256} = \frac{3}{256}$
 - vi. Cannot subtract $1/64 \rightarrow 0$
 - vii. Can subtract $1/128 \rightarrow 1$
 1. $\frac{3}{256} - \frac{2}{256} = \frac{1}{256}$
 - viii. Can subtract $1/256 \rightarrow 1$
 1. 0
 - E. Mantissa: 0011 1011
4. Final binary: 0100 0000 0001 1101 1000 0000 0000 0000
5. Hexadecimal representation: 0x00801d40 (little Endian)

Hexadecimal → floating number

My hexadecimal representation is: 0x00401fc1

Big endian: 0xc11f4000

Binary: 1100 0001 0001 1111 0100 0000 0000 0000

- Sign: 1
- Exponent: 1000 0010
- Mantissa: 001 1111 0100 0000 0000 0000
- -9.95312