mdHW-Chapter3

2023年4月1日 星期六 22:00

3.7 3.20 3.26 3.27 3.32

3.7

2|185 1
2|92 0
2|46 0
2|23 1
2|11 1
2|5 1
2|2 0
1

$(185)_{10} = (10111001)_2$
$= 010111001$

2|122 0
2|61 1
2|30 0
2|15 1
2|7 1
2|3 1
1

$(122)_2 = (1111010)_2$
$= 00111010$

10111001
01111010 122
100110011
10111000
01000111 −71
64 421

1+2+16+32
19

$$\begin{array}{r} 185+122= \quad 010111001 \\ +001111010 \\ \hline 100110011 \end{array}$$

neither

3.20 a 2's complement integer

0X0C000000
↓ ↓
符号位,表示正数 0000 $\underline{1100}$ 0 0 0 0 0 0

$\therefore$ 是 $2^{27}+2^{26} = 134217728+67108864$
$= 201326592$

unsigned integer 一样子

3.26

$$\underset{\substack{\downarrow \\ \text{exponent}}}{\boxed{001111111100}}\boxed{010\overbrace{\cdots\cdots\cdots\cdots 0}^{22个0}}$$

no hidden 1 is used
0.101×2^{-2}

0.15625 十进制

$$\begin{array}{rl} 0.15625 & \\ \times \quad 2 & \\ \hline 0.31250 & 0 \\ \times \quad 2 & \\ \hline 0.6250 & 0 \\ \times \quad 2 & \\ \hline 0.250 & 1 \\ \times \quad 2 & \\ \hline 0.50 & 0 \\ \times \quad 2 & \\ \hline 1.00 & 1 \end{array}$$

0.00101 0.01
$= 1.01 \times 2^{-3}$ X

Exponent: $-3+2^{11}-1 = 2044$

2|2044 0
2|1022 0
2|511 1
2|255 1
2|127 1
2|63 1
2|31 1
15

2|15 1
2|7 1
2|3 1
1

range: $-2^{11}+1 \le e \le 2^{11}$
$0 \le e+2047 \le 4095$

accuracy: 小数点后24位

3.27

$$\underset{\substack{\downarrow \\ \text{sign}}}{\boxed{1}}\underset{\substack{\downarrow \\ \text{exp}}}{\boxed{01100}}\underset{\substack{\downarrow \\ \text{fraction}}}{\boxed{010\cdots\cdots 0}}$$

$-3+15=12$
1100

$-2^4+1 \le e \le 2^4$
$0 \le e+15 \le 31$

3.32 $3.984375 \times 10^{-1} + 3.4375 \times 10^{-1}$
$(0.3984375)_{10} = (0.0110011)_2 = 1.10011 \times 2^{-2}$ $-2+15=13$
$(0.34375)_{10} = (0.01011)_2 = 1.011 \times 2^{-2}$

$$\begin{array}{r} 1.10011 \\ +1.01100 \\ \hline 10.11111 \end{array} \times 2^{-2}$$

1.771×10^3
$= 1771$
$= 11011101011 0 \times 2^{-1}$

Normal: 1.011111×2^{-1}

$= 11011101011.011111 \times 2^{-1}$

$= 1.\underline{1011101011}1011111 \times 2^{10}$

$10+15=25$ 11001

小数部分留10位: guard 1
round 1 ✓
sticky 1

$\therefore = 1.1011101100 \times 2^{10}$

$\therefore$ answer: 0 11001 1011101100
11011101100 = 1772