

Chapter 1: Summary

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three methods for converting from one base to another:

- ① convert from other base to decimal
expansion method

$$13.2_4 = 1 \times 4^1 + 3 \times 4^0 + 2 \times 4^{-1} = 7.5$$

- ② convert from decimal to other base
repeated division / multiplication

$$30.125 \rightarrow \text{base } 4$$

	Q	R
$30 \div 4$	7	2
$7 \div 4$	1	3
$1 \div 4$	<u>0</u>	1

step

	int	non-int
$0.125 \times 4 =$	0	+ 0.5
$0.5 \times 4 =$	2	+ 0

$$\underline{132.02_4}$$

- ③ convert between
binary \leftrightarrow octal \leftrightarrow hexadecimal
(or any base that is a power of 2)

convert $5670_8 \rightarrow$ hexadecimal

$$\begin{aligned} 5670_8 &= 101\ 110\ 111\ 000_2 \\ &= 1011\ 1011\ 1000_2 \\ &= BB8_{16} \end{aligned}$$

$$= 1011\ 1011\ 1000_2$$
$$= 8B8_{16}$$

It is important to know when to use each method!