

## Conversion Integer

$$123_{10} \rightarrow 2, 8, 16$$

$$123 \% 16 = 11$$
$$\text{int}(123/16 = 7) \% 16 = 7$$

$$\text{So, } 123_{10} = \underline{7B_{16}}$$

$$\begin{array}{cc} 7 & B \\ 0111 & 1011_2 \end{array} \rightarrow \underline{1111011_2}$$

For Base 8 every 3 places Base 2

$$\begin{array}{ccc} 1 & 111 & 011 \\ 1 & 7 & 3 \end{array} \rightarrow \underline{173_8}$$

Convert back as a check

$$1 \times 8^2 + 7 \times 8^1 + 3 \times 8^0$$
$$64 + 56 + 3 = 123_{10}$$

Since  $123_{10}$  is what we started with  
then we are assured the intermediate  
results are correct.

MCL

$$10101_2 \rightarrow 8, 10, 16$$

$$\begin{array}{ccc} 010 & 101 & 2 \\ 2 & 5 & 8 \end{array} \rightarrow 2 \times 8 + 5 = 21_{10}$$

$$\begin{array}{ccc} 0001 & 0101 & 2 \\ 1 & 5 & 16 \end{array} \rightarrow 1 \times 16 + 5 = 21_{10}$$

$$\begin{aligned} 10101 &\rightarrow 1 \times 2^4 + 0 \times 2^3 + 1 \times 2^2 + 0 \times 2^1 + 1 \times 2^0 \\ &= 16 \quad \quad \quad + 4 \quad \quad \quad + 1 \\ &= \underline{21_{10}} \end{aligned}$$

$$123_8 \rightarrow 2, 10, 16$$

$$\begin{array}{ccc} 1 & 2 & 3_8 \\ 001 & 010 & 011_2 \end{array} \rightarrow 1 \times 2^6 + 1 \times 2^4 + 1 \times 2^1 + 1 \times 2^0$$

$$= 64 + 16 + 2 + 1 = 83_{10}$$

$$\begin{array}{ccc} 0101 & 0011 & 2 \\ 5 & 3 & 16 \end{array} \rightarrow 5 \times 16^1 + 3 \times 16^0$$

$$80 + 3 = 83_{10}$$

$$\begin{aligned} 1 \times 8^2 + 2 \times 8^1 + 3 \times 8^0 &= 64 + 16 + 3 \\ &= \underline{83_{10}} \end{aligned}$$

*Amr*

123<sub>16</sub>

1	2	3
0001	0010	0011 <sub>2</sub>

100	100	011 <sub>2</sub>
4	4	3 <sub>8</sub>

$$\rightarrow 1 \times 16^2 + 2 \times 16^1 + 3 \times 16^0 = \begin{array}{r} 256 \\ 32 \\ 3 \end{array}$$

$$\begin{array}{r} 3 \\ \hline 291_{10} \end{array}$$

$$\rightarrow 4 \times 8^2 + 4 \times 8^1 + 3 \times 8^0 = \begin{array}{r} 256 \\ 32 \\ 3 \end{array}$$

$$\begin{array}{r} 32 \\ 3 \\ \hline 291_{10} \end{array}$$

Checks

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