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## Base Conversions

$$1) 127_{10} \rightarrow 7F_{16} \rightarrow 0111\ 1111_2 \rightarrow 177_8$$

$$\begin{aligned} & 0 \times 16^2 + 7 \times 16^1 + 15 \times 16^0 \\ & = 112 + 15 = 127 \\ & = 7F_{16} \end{aligned}$$

$$0111\ 1111_2$$

$$\begin{array}{r} 00111111 \\ \hline 1\quad 7\quad 7 \end{array} = 177_8$$

$$2) 10101_2 \rightarrow 25_8 \rightarrow 15_{16} \rightarrow 21_{10}$$

$$\begin{array}{r} 010101 \\ \hline 2\quad 5 \end{array} = 25_8$$

$$\begin{array}{r} 00010101 \\ \hline 1\quad 5 \end{array} = 15_{16}$$

$$\begin{aligned} & 2 \times 8^1 + 5 \times 8^0 \\ & 16 + 5 = 21_{10} \end{aligned}$$

$$3) 71_8 \rightarrow 111001_2 \rightarrow 39_{16} \rightarrow 57_{10}$$

$$111\ 001_2$$

$$\begin{array}{r} 00111001 \\ \hline 3\quad 9 \end{array} = 39_{16}$$

$$\begin{aligned} & 7 \times 8^1 + 1 \times 8^0 \\ & 56 + 1 = 57_{10} \end{aligned}$$

$$4) AB_{16} \rightarrow 1010 \ 1011_2 \rightarrow 253_8 \rightarrow 171_{10}$$

$$1010 \ 1011_2$$

$$\begin{array}{r} 01010 \ 1011 \\ \hline 2 \ 5 \ 3 \end{array} = 253_8$$

$$2 \times 8^2 + 5 \times 8^1 + 3 \times 8^0$$

$$128 + 40 + 3 = 171_{10}$$

# Base Conversions

1)  $ABC_{16}$

$$ABC_{16} \rightarrow 1010 \ 1011 \ 1100_2 \rightarrow 5274_8 \rightarrow 2748_{10}$$

$$\begin{array}{r} 1010 \\ \hline 5 \end{array} \quad \begin{array}{r} 1011 \\ \hline 7 \end{array} \quad \begin{array}{r} 1100 \\ \hline 4 \end{array}$$

$$\begin{aligned} 5274_8 &= 5 \times 8^3 + 2 \times 8^2 + 7 \times 8^1 + 4 \times 8^0 \\ &= 2560 + 128 + 56 + 4 \\ &= 2748_{10} \end{aligned}$$

2)  $765_8 \rightarrow 111 \ 110 \ 101_2 \rightarrow 1F5_{16} \rightarrow 501_{10}$

$$\begin{array}{r} 7 \\ 111 \end{array} \quad \begin{array}{r} 6 \\ 110 \end{array} \quad \begin{array}{r} 5 \\ 101 \end{array}_2$$

$$\begin{array}{r} 111 \ 110 \ 101 \\ \hline 1 \ F \ 5 \end{array}_{16}$$

$$\begin{aligned} 765_8 &= 7 \times 8^2 + 6 \times 8^1 + 5 \times 8^0 = \\ &= 448 + 48 + 5 = 501_{10} \end{aligned}$$

3)  $110 \ 1100_2 \rightarrow 6C_{16} \rightarrow 154_8 \rightarrow 108_{10}$

$$\begin{array}{r} 0110 \ 1100 \\ \hline 6 \ C \end{array}_{16} = 6C_{16}$$

$$\begin{array}{r} 001101100 \\ \hline 1 \ 5 \ 4 \end{array} = 154_8$$

$$\begin{aligned} 154_8 &= 1 \times 8^2 + 5 \times 8^1 + 4 \times 8^0 \\ &= 64 + 40 + 4 \\ &= 108_{10} \end{aligned}$$

$$4) 85_{10} \rightarrow 55_{16} \rightarrow 01010101_2 \rightarrow 125_8$$

$$0 \times 16^2 + 5 \times 16^1 + 5 \times 16^0$$

$$80 + 5 = 85$$

$$55_{16}$$

$$01010101_2$$

$$\begin{array}{r} 01010101 \\ \hline 1 \quad 2 \quad 5 \end{array} = 125_8$$

$$5) 762_{10} \rightarrow 2FA_{16} \rightarrow 001011111010_2 \rightarrow 1372_8$$

$$2 \times 16^2 + 15 \times 16^1 + 10 \times 16^0$$

$$= 512 + 240 + 10 = 762$$

$$2FA_{16}$$

$$001011111010_2$$

$$\begin{array}{r} 001011111010 \\ \hline 1 \quad 3 \quad 7 \quad 2 \end{array} = 1372_8$$