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CSCI112 - Lab 1

To Binary:

1) 23_{10} :
$$\begin{array}{r} 2 \overline{) 23-1} \\ 2 \overline{) 11-1} \\ 2 \overline{) 5-1} \\ 2 \overline{) 2-0} \\ 2 \overline{) 1-1} \\ 0 \end{array} \left. \vphantom{\begin{array}{r} 2 \overline{) 23-1} \\ 2 \overline{) 11-1} \\ 2 \overline{) 5-1} \\ 2 \overline{) 2-0} \\ 2 \overline{) 1-1} \\ 0 \end{array}} \right\} \rightarrow = 0001 \ 0111 \#$$

2) 13_{16} :
$$\begin{array}{r} 1 \overline{) 3} \\ \downarrow \downarrow \\ 0001 \ 0011 \end{array} \left. \vphantom{\begin{array}{r} 2 \overline{) 5-1} \\ 2 \overline{) 1-1} \\ 0 \end{array}} \right\} 0011 \rightarrow = 0001 \ 0011 \#$$

To Octal:

1) 985_{10} :
$$\begin{array}{r} 8 \overline{) 985-1} \\ 8 \overline{) 123-3} \\ 8 \overline{) 15-7} \\ 8 \overline{) 1-1} \\ 0 \end{array} \left. \vphantom{\begin{array}{r} 8 \overline{) 985-1} \\ 8 \overline{) 123-3} \\ 8 \overline{) 15-7} \\ 8 \overline{) 1-1} \\ 0 \end{array}} \right\} \rightarrow = 1731 \#$$

2) $2F3_{16}$:
$$\begin{array}{c} 2F3 \\ \downarrow \downarrow \downarrow \\ 0010 \ 1111 \ 0011 \end{array} \rightarrow 001 \ 011 \ 110 \ 011 = 1363 \#$$

$$\begin{array}{l} \begin{array}{c} 001 \\ \downarrow \downarrow \downarrow \\ 2^2 \ 2^1 \ 2^0 \\ (1 \times 1) + (0 \times 2) + (0 \times 4) \\ = 1 \end{array} \quad \begin{array}{c} 011 \\ \downarrow \downarrow \downarrow \\ 2^2 \ 2^1 \ 2^0 \\ (1 \times 1) + (1 \times 2) + (0 \times 4) \\ = 1 + 2 + 0 = 3 \end{array} \quad \begin{array}{c} 110 \\ \downarrow \downarrow \downarrow \\ 2^2 \ 2^1 \ 2^0 \\ (0 \times 1) + (1 \times 2) + (1 \times 4) \\ = 6 \end{array} \quad \begin{array}{c} 011 \\ \downarrow \downarrow \downarrow \\ 2^2 \ 2^1 \ 2^0 \\ (0 \times 1) + (1 \times 2) + (1 \times 4) \\ = 3 \end{array} \end{array}$$

To Decimal:

1) 10000110_2 :
$$\begin{array}{c} 1 \\ | \\ 0 \\ | \\ 0 \\ | \\ 0 \\ | \\ 0 \\ | \\ 1 \\ | \\ 1 \\ | \\ 0 \end{array} \begin{array}{c} \downarrow \\ 2^0 \\ \downarrow \\ 2^1 \\ \downarrow \\ 2^2 \\ \downarrow \\ 2^3 \\ \downarrow \\ 2^4 \\ \downarrow \\ 2^5 \\ \downarrow \\ 2^6 \\ \downarrow \\ 2^7 \end{array}$$

$$= (2^0 \times 0) + (2^1 \times 1) + (2^2 \times 1) + (2^3 \times 0) + (2^4 \times 0) + (2^5 \times 0) + (2^6 \times 0) + (2^7 \times 1)$$

$$= 0 + 2 + 4 + 0 + 0 + 0 + 0 + 128 = 134 \#$$

$$2) 642_8: \begin{array}{c} 642 \\ \downarrow \downarrow \downarrow \\ 8^2 \ 8^1 \ 8^0 \end{array} = (2 \times 1) + (4 \times 8) + (6 \times 64) \\ = 2 + 32 + 384 = 418 \#$$

To Hexadecimal:

$$1) 10111101_2: \begin{array}{c} 1011 \mid 1101 \\ \downarrow \quad \downarrow \\ 11 \quad 13 \\ \downarrow \quad \downarrow \\ B \quad D \end{array} \quad \begin{array}{c} 1011 \\ \downarrow \downarrow \downarrow \downarrow \\ 2^3 \ 2^2 \ 2^1 \ 2^0 \end{array} \quad \begin{array}{l} (1 \times 2^3) + (0 \times 2^2) + (1 \times 2^1) + (1 \times 2^0) \\ = 1 + 2 + 0 + 8 = 11 \end{array}$$

$$\begin{array}{c} 1101 \\ \downarrow \downarrow \downarrow \downarrow \\ 2^3 \ 2^2 \ 2^1 \ 2^0 \end{array} \quad \begin{array}{l} (1 \times 2^3) + (1 \times 2^2) + (0 \times 2^1) + (1 \times 2^0) \\ = 1 + 4 + 0 + 1 = 6 \end{array}$$

$\rightarrow = BD \#$

$$2) 2568_{10}: \left. \begin{array}{r} 16 \overline{) 2568 - 8} \\ 16 \overline{) 160 - 0} \\ 16 \overline{) 10 - 10} \\ 0 \end{array} \right\} \rightarrow 1008 \Rightarrow A08 \#$$