

1. Translating Unsigned Decimal to Binary

$$\begin{array}{rcl}
 (37)_D = & 37 / 2 = 18 & r \ 1 \\
 & 18 / 2 = 9 & r \ 0 \\
 & 9 / 2 = 4 & r \ 1 \\
 & 4 / 2 = 2 & r \ 0 \\
 & 2 / 2 = 1 & r \ 0 \\
 & 1 / 2 = & r \ 1
 \end{array}
 \qquad
 \begin{array}{cc}
 0010 & 0101
 \end{array}$$

2. Binary Addition

$$\begin{array}{r}
 1 \\
 (1100)_B + (0111)_B = \\
 1 1 0 0 \\
 + 0 1 1 1 \\
 \hline
 1 0 0 1 1
 \end{array}
 \qquad
 \begin{array}{cc}
 0001 & 0011
 \end{array}$$

3. Binary Subtraction

$$\begin{array}{r}
 1 0 1 \\
 (1100)_B - (0111)_B = \\
 1 0 1 0 \\
 - 0 1 1 1 \\
 \hline
 0 1 0 1
 \end{array}
 \qquad
 \begin{array}{cc}
 0000 & 0101
 \end{array}$$

4. Converting Hexadecimal to Decimal

$$\begin{aligned}
 (1234)_H &= (1 \times 16^3) + (2 \times 16^2) + (3 \times 16^1) + (4 \times 16^0) \\
 &= 4096_{10}
 \end{aligned}$$

5. Converting Decimal to Hexadecimal

$$\begin{aligned}
 (422)_{10} &= 422 / 16 = 26 \text{ r } 6 \\
 26 / 16 &= 1 \text{ r } 10 \text{ (A)} \\
 1 / 16 &= \text{r } 1
 \end{aligned}$$

$1A6_H$

6. Hexadecimal Addition

6.1 $(28)_H + (58)_H =$

$$\begin{array}{r}
 1 \\
 28 \\
 + 58 \\
 \hline
 80
 \end{array}$$

$$8 + 8 = 16 = 10_H$$

$\rightarrow 80_H$

6.2 $(6A)_H + (4B)_H =$

$$A + B$$

$$\begin{aligned}
 &= 10 + 11 = 21_{10} \\
 &= 15_H
 \end{aligned}$$

$$\begin{array}{r}
 1 \\
 6A \\
 + 4B \\
 \hline
 B5
 \end{array}$$

$\rightarrow B5_H$

7. Hexadecimal Subtraction

7.1 $(B6)_H - (6B)_H =$

$$\begin{array}{r}
 A \\
 B6 \\
 - 6B \\
 \hline
 4B
 \end{array}$$

7.2 $(75)_H - (47)_H =$

$$\begin{array}{r}
 6 \\
 75 \\
 - 47 \\
 \hline
 2E
 \end{array}$$

$$\begin{aligned}
 21 / 16 \\
 &= 1 \text{ r } 5 \\
 1 / 16 \\
 &= \text{r } 1
 \end{aligned}$$