

Arithmetic operation :

1-Binary addition :

	<u>Carry</u>	<u>sum</u>
0 + 0 =		0
0 + 1 =		1
1 + 0 =		1
1 + 1 =	1	0

EX:

1 11	100	1 1 111	110
<u>+11</u>	<u>+ 10</u>	<u>+ 11</u>	<u>+100</u>
110	110	1010	1010

2-Binary subtraction :

0 - 0 = 0
1 - 1 = 0
1 - 0 = 1
¹⁰ 0 - 1 = 1 with borrow 1

EX:

11	11	¹⁰ 101	¹⁰ 110
<u>-01</u>	<u>-10</u>	<u>-011</u>	<u>-101</u>
10	01	010	001

3-Binary multiplication :

0 x 0 = 0	
0 x 1 = 0	the same manner as in Decimal
1 x 0 = 0	
1 x 1 = 1	

EX:

11	111
<u>X 11</u>	<u>x 101</u>

$$\begin{array}{r} 11 \\ + 11 \\ \hline 1001 \end{array}$$

Hexadecimal addition :

$$\begin{array}{r} 111 \\ + 000 \\ \hline 111 \\ \hline 100011 \end{array}$$

EX:

$$\begin{array}{r} 23 \\ + 16 \\ \hline 39_H \end{array}$$

$$\begin{array}{r} 58 \\ + 22 \\ \hline 7A_H \end{array}$$

$$\begin{array}{r} 2B \\ + 84 \\ \hline AF_H \end{array}$$

EX:

$$\begin{array}{r} \textcircled{D} \textcircled{F} \\ + \textcircled{A} \textcircled{C} \\ \hline 18_B \end{array}$$

$15_D + 12_D = 27_D \rightarrow 27_D - 16_D = 11_D = B_H$ with 1 carry
 $1 + 13_D + 10_D = 24_D \rightarrow 24_D - 16_D = 8_D = 8_H$ with 1 carry

Octal addition :

EX:

$$\begin{array}{r} 14 \\ + 23 \\ \hline 37_o \end{array}$$

EX:

$$\begin{array}{r} 37 \\ + 53 \\ \hline 112 \end{array}$$

$7_o + 3_o = 10_o - 8_o = 2_o + 1$ carry
 $1 + 3_o + 5_o = 9_o - 8_o = 1_o + 1$ carry