

9

$$1- 1101_2 + 1011_2$$

$$\begin{array}{r} 1101 \\ + 1011 \\ \hline 11000 \end{array}$$

$$11000_2$$

$$11000$$

$$\begin{array}{l} \rightarrow 0 \cdot 2^0 = 0 \\ \rightarrow 0 \cdot 2^1 = 0 \\ \rightarrow 0 \cdot 2^2 = 0 \\ \rightarrow 1 \cdot 2^3 = 8 \\ \rightarrow 1 \cdot 2^4 = 16 \end{array}$$

$$\underline{24}$$

Validación

$$1011$$

$$\begin{array}{l} \rightarrow 1 \cdot 2^0 = 1 \\ \rightarrow 1 \cdot 2^1 = 2 \\ \rightarrow 0 \cdot 2^2 = 0 \\ \rightarrow 1 \cdot 2^3 = 8 \end{array}$$

$$\underline{11}$$

$$1101$$

$$\begin{array}{l} \rightarrow 1 \cdot 2^0 = 1 \\ \rightarrow 0 \cdot 2^1 = 0 \\ \rightarrow 1 \cdot 2^2 = 4 \\ \rightarrow 1 \cdot 2^3 = 8 \end{array}$$

$$\underline{13}$$

$$11 + 13 = \underline{24}$$

$$1101_2 + 1011_2 = 11000_2$$

$$2- 11010_2 + 10101_2$$

$$\begin{array}{r} 11010 \\ 10101 \\ \hline 101111 \end{array}$$

$$\begin{array}{l} 101111 \\ \begin{array}{l} \rightarrow 1 \cdot 2^0 = 1 \\ \rightarrow 1 \cdot 2^1 = 2 \\ \rightarrow 1 \cdot 2^2 = 4 \\ \rightarrow 1 \cdot 2^3 = 8 \\ \rightarrow 0 \cdot 2^4 = 0 \\ \rightarrow 1 \cdot 2^5 = 32 \end{array} \\ \hline 47 \end{array}$$

$$\begin{array}{l} 11010 \\ \begin{array}{l} \rightarrow 0 \cdot 2^0 = 0 \\ \rightarrow 1 \cdot 2^1 = 2 \\ \rightarrow 0 \cdot 2^2 = 0 \\ \rightarrow 1 \cdot 2^3 = 8 \\ \rightarrow 1 \cdot 2^4 = 16 \end{array} \\ \hline 26 \end{array}$$

$$\begin{array}{l} 10101 \\ \begin{array}{l} \rightarrow 1 \cdot 2^0 = 1 \\ \rightarrow 0 \cdot 2^1 = 0 \\ \rightarrow 1 \cdot 2^2 = 4 \\ \rightarrow 0 \cdot 2^3 = 0 \\ \rightarrow 1 \cdot 2^4 = 16 \end{array} \\ \hline 21 \end{array}$$

$$26 + 21 = \underline{\underline{47}}$$

$$11010_2 + 10101_2 = \underline{\underline{101111_2}}$$

$$3 - 57_8 + 24_8$$

$$\begin{array}{l} 57_8 \\ \begin{array}{|l} \rightarrow 7 \cdot 8^0 = 7 \\ \rightarrow 5 \cdot 8^1 = 40 \end{array} \\ \hline 47_{10} \end{array}$$

$$\begin{array}{l} 24_8 \\ \begin{array}{|l} \rightarrow 4 \cdot 8^0 = 4 \\ \rightarrow 2 \cdot 8^1 = 16 \end{array} \\ \hline 20_{10} \end{array}$$

$$47_{10} + 20_{10} = \underline{\underline{67_{10}}}$$

$$\begin{array}{r} 67 \quad | \quad 8 \\ 67 \quad 8 \quad | \quad 8 \\ \hline 3 \quad 0 \quad (1) \end{array} \quad 103_8$$

~ (curved arrow from the 1 in the units place to the 3 in the 8's place)

$$57_8 + 24_8 = \underline{\underline{103_8}} = \underline{\underline{67_{10}}}$$

$$4- 145_8 + 73_8$$

$$\begin{array}{l}
 145_8 \\
 \left[ \begin{array}{l} \rightarrow 5 \cdot 8^0 = 5 \\ \rightarrow 4 \cdot 8^1 = 32 \\ \rightarrow 1 \cdot 8^2 = 64 \end{array} \right. \\
 101_{10}
 \end{array}$$

$$\begin{array}{l}
 73_8 \\
 \left[ \begin{array}{l} \rightarrow 3 \cdot 8^0 = 3 \\ \rightarrow 7 \cdot 8^1 = 56 \end{array} \right. \\
 59_{10}
 \end{array}$$

$$101_{10} + 59_{10} = 160_{10}$$

$$\begin{array}{r}
 160_{10} \quad \begin{array}{l} \overline{) 8} \\ 20 \\ \underline{16} \\ 4 \end{array} \\
 160 \\
 \hline
 0
 \end{array}
 \quad
 \begin{array}{r}
 20 \quad \begin{array}{l} \overline{) 8} \\ 4 \end{array} \\
 \underline{16} \\
 4 \quad (2)
 \end{array}
 \quad
 240_8$$

$$145_8 + 73_8 = 240_8$$

$$240_8 = 160_{10}$$

$$5- A3_{16} + 5F_{16}$$

$$\begin{array}{l} A3_{16} \\ \left\{ \begin{array}{l} \rightarrow 3 \cdot 16^0 = 3 \\ \rightarrow 10 \cdot 16^1 = 160 \end{array} \right. \\ \hline 163_{10} \end{array}$$

$$\begin{array}{l} 5F_{16} \\ \left\{ \begin{array}{l} \rightarrow 15 \cdot 16^0 = 15 \\ \rightarrow 5 \cdot 16^1 = 80 \end{array} \right. \\ \hline 95_{10} \end{array}$$

$$163_{10} + 95_{10} = 258_{10}$$

$$\begin{array}{r} 258_{10} \overline{) 16} \\ 256 \phantom{00} \overline{) 16} \\ \hline 2 \phantom{00} \overline{) 16} \\ \hline 0 \end{array} \quad 102_{16}$$

$$A3_{16} + 5F_{16} = 102_{16}$$

$$102_{16} = 258_{10}$$



$$6- 20_{16} + 19_{16}$$

$$\begin{array}{l} 20_{16} \\ \left\{ \begin{array}{l} \rightarrow 13 \cdot 16^0 = 13 \\ \rightarrow 2 \cdot 16^1 = 32 \end{array} \right. \\ \hline 45_{10} \end{array}$$

$$\begin{array}{l} 19_{16} \\ \left\{ \begin{array}{l} \rightarrow 9 \cdot 16^0 = 9 \\ \rightarrow 1 \cdot 16^1 = 16 \end{array} \right. \\ \hline 25_{10} \end{array}$$

$$45_{10} + 25_{10} = 70_{10}$$

$$\begin{array}{r} 70_{10} \quad 16 \\ 64 \quad 4 \\ \hline 6 \end{array} \quad 46_{16}$$

$$20_{16} + 19_{16} = 46_{16}$$

$$46_{16} = 70_{10}$$

$$7- 101011_2 + 11010_2$$

101011

$$\begin{aligned} & \rightarrow 1 \cdot 2^0 = 1 \\ & \rightarrow 1 \cdot 2^1 = 2 \\ & \rightarrow 0 \cdot 2^2 = 0 \\ & \rightarrow 1 \cdot 2^3 = 8 \\ & \rightarrow 0 \cdot 2^4 = 0 \\ & \rightarrow 1 \cdot 2^5 = 32 \\ & \hline & 43_{10} \end{aligned}$$

11010

$$\begin{aligned} & \rightarrow 0 \cdot 2^0 = 0 \\ & \rightarrow 1 \cdot 2^1 = 2 \\ & \rightarrow 0 \cdot 2^2 = 0 \\ & \rightarrow 1 \cdot 2^3 = 8 \\ & \rightarrow 1 \cdot 2^4 = 16 \\ & \hline & 26_{10} \end{aligned}$$

$$43_{10} + 26_{10} = \underline{\underline{69_{10}}}$$

69 / 2

68 34 / 2

1 34 0 / 2

17 / 2

16 8 / 2

1 8 4 / 2

0 4 2 / 2

0 2 1 / 2

0 1 0 / 2

0 0 0 / 2

0 0 0 / 2

0 0 0 / 2

0 0 0 / 2

0 0 0 / 2

0 0 0 / 2

0 0 0 / 2

0 0 0 / 2

0 0 0 / 2

0 0 0 / 2

0 0 0 / 2

0 0 0 / 2

0 0 0 / 2

0 0 0 / 2

1000101<sub>2</sub>

$$101011_2 + 11010_2 = 1000101_2$$

$$1000101_2 = 69_{10}$$

$$8- 77_8 + 56_8$$

$$\begin{array}{l} 77_8 \\ \swarrow \rightarrow 7 \cdot 8^0 = 7 \\ \searrow \rightarrow 7 \cdot 8^1 = 56 \\ \hline 63_{10} \end{array}$$

$$\begin{array}{l} 56_8 \\ \swarrow \rightarrow 6 \cdot 8^0 = 6 \\ \searrow \rightarrow 5 \cdot 8^1 = 40 \\ \hline 46_{10} \end{array}$$

$$63_{10} + 46_{10} = 109_{10}$$

$$\begin{array}{r} 109_{10} \quad \begin{array}{|l} 8 \\ \hline 13 \quad 8 \\ \hline 8 \quad 1 \\ \hline 5 \end{array} \\ \hline 104 \quad \begin{array}{|l} 8 \\ \hline 13 \quad 8 \\ \hline 8 \quad 1 \\ \hline 5 \end{array} \\ \hline 5 \end{array}$$

$155_8$

$$77_8 + 56_8 = 155_8$$

$$155_8 = 109_{10}$$



$$9- 1F_{16} + E_{16}$$

$$\begin{array}{l} 1F_{16} \\ \left\{ \begin{array}{l} \rightarrow 15 \cdot 16^0 = 15 \\ \rightarrow 1 \cdot 16^1 = 16 \end{array} \right. \\ \hline 31 \end{array}$$

$$\begin{array}{l} E_{16} \\ \rightarrow 14 \cdot 16^0 = \underline{14} \end{array}$$

$$31_{10} + 14_{10} = \underline{\underline{45_{10}}}$$

$$\begin{array}{r} 45_{10} \\ 32 \\ \hline 13 \end{array} \quad \begin{array}{l} /16 \\ \textcircled{2} \end{array} \quad 2D_{16}$$

$$1F_{16} + E_{16} = 2D_{16}$$

$$2D_{16} = 45_{10}$$

$$10.- 1101_2 + 101_2$$

1101<sub>2</sub>

$$\begin{aligned} & \rightarrow 1 \cdot 2^0 = 1 \\ & \rightarrow 0 \cdot 2^1 = 0 \\ & \rightarrow 1 \cdot 2^2 = 4 \\ & \rightarrow 1 \cdot 2^3 = 8 \\ & \hline & 13_{10} \end{aligned}$$

101<sub>2</sub>

$$\begin{aligned} & \rightarrow 1 \cdot 2^0 = 1 \\ & \rightarrow 0 \cdot 2^1 = 0 \\ & \rightarrow 1 \cdot 2^2 = 4 \\ & \hline & 5_{10} \end{aligned}$$

$$13_{10} + 5_{10} = 18_{10}$$

18 | 2

18 | 9 | 2

0

8

4

2

1

4

2

1

0

0

10010<sub>2</sub>

$$1101_2 + 101_2 = 10010_2$$

$$10010_2 = 18_{10}$$

⑥

$$1-1011_2 + 27_8$$

$1011_2$

$$\begin{aligned} & \rightarrow 1 \cdot 2^0 = 1 \\ & \rightarrow 1 \cdot 2^1 = 2 \\ & \rightarrow 0 \cdot 2^2 = 0 \\ & \rightarrow 1 \cdot 2^3 = 8 \end{aligned}$$

$11_{10}$

$27_8$

$$\begin{aligned} & \rightarrow 7 \cdot 8^0 = 7 \\ & \rightarrow 2 \cdot 8^1 = 16 \end{aligned}$$

$23_{10}$

$$11_{10} + 23_{10} = 34_{10}$$

$34_{10}$

$34$   
 $0$

$17$   
 $16$   
 $1$

$8$   
 $8$   
 $0$

$4$   
 $2$   
 $0$

$12$   
 $2$   
 $0$

$12$   
 $2$   
 $0$

$12$   
 $2$   
 $0$

$100010_2$

~~$34_{10}$~~

$34_{10}$

$32$   
 $2$

$8$

$4$

$42_8$

$$34_{10} = 100010_2 = 42_8$$

$$2- 3F_{16} + 1010_2$$

$$\begin{array}{l} 3F_{16} \\ \left\{ \begin{array}{l} \rightarrow 15 \cdot 16^0 = 15 \\ \rightarrow 3 \cdot 16^1 = 48 \end{array} \right. \\ \hline 63_{10} \end{array}$$

$$\begin{array}{l} 1010_2 \\ \left\{ \begin{array}{l} \rightarrow 0 \cdot 2^0 = 0 \\ \rightarrow 1 \cdot 2^1 = 2 \\ \rightarrow 0 \cdot 2^2 = 0 \\ \rightarrow 1 \cdot 2^3 = 8 \end{array} \right. \\ \hline 10_{10} \end{array}$$

$$63_{10} + 10_{10} = 73_{10}$$

$$\begin{array}{r} 673_{10} \overline{) 16} \\ 64 \phantom{00} \\ \hline 09 \end{array}$$

$$49_{16}$$

$$\begin{array}{r} 73_{10} \overline{) 2} \\ 72 \phantom{00} \\ \hline 1 \end{array} \quad \begin{array}{r} 36 \overline{) 2} \\ 36 \phantom{00} \\ \hline 0 \end{array} \quad \begin{array}{r} 18 \overline{) 2} \\ 18 \phantom{00} \\ \hline 0 \end{array} \quad \begin{array}{r} 9 \overline{) 2} \\ 9 \phantom{00} \\ \hline 0 \end{array} \quad \begin{array}{r} 4 \overline{) 2} \\ 4 \phantom{00} \\ \hline 0 \end{array} \quad \begin{array}{r} 1 \overline{) 2} \\ 1 \phantom{00} \\ \hline 0 \end{array} \quad \begin{array}{r} 1 \overline{) 2} \\ 1 \phantom{00} \\ \hline 0 \end{array}$$

$$1001001_2$$

$$73_{10} = 49_{16} = 1001001_2$$





$$4-10011_2 + 30_{16}$$

$$\begin{array}{l}
 10011_2 \\
 \begin{array}{l}
 \rightarrow 1 \cdot 2^0 = 1 \\
 \rightarrow 1 \cdot 2^1 = 2 \\
 \rightarrow 0 \cdot 2^2 = 0 \\
 \rightarrow 0 \cdot 2^3 = 0 \\
 \rightarrow 1 \cdot 2^4 = 16
 \end{array} \\
 \hline
 19_{10}
 \end{array}$$

$$\begin{array}{l}
 30_{16} \\
 \begin{array}{l}
 \rightarrow 0 \cdot 16^0 = 0 \\
 \rightarrow 3 \cdot 16^1 = 48
 \end{array} \\
 \hline
 48_{10}
 \end{array}$$

$$19_{10} + 48_{10} = 67_{10}$$

$$\begin{array}{r}
 67_{10} \overline{) 2} \\
 66 \phantom{00} \overline{) 33} \overline{) 2} \\
 \underline{1} \phantom{00} \phantom{00} \overline{) 16} \overline{) 2} \\
 \phantom{00} \phantom{00} \underline{1} \phantom{00} \overline{) 16} \overline{) 8} \overline{) 2} \\
 \phantom{00} \phantom{00} \phantom{00} \underline{0} \phantom{00} \overline{) 8} \overline{) 4} \overline{) 2} \\
 \phantom{00} \phantom{00} \phantom{00} \phantom{00} \underline{0} \phantom{00} \overline{) 4} \overline{) 2} \overline{) 2} \\
 \phantom{00} \phantom{00} \phantom{00} \phantom{00} \phantom{00} \underline{0} \phantom{00} \overline{) 2} \overline{) 2} \overline{) 1} \\
 \phantom{00} \phantom{00} \phantom{00} \phantom{00} \phantom{00} \phantom{00} \underline{0} \phantom{00} \overline{) 2} \overline{) 1} \overline{) 1}
 \end{array}$$

$$1000011_2$$

$$\begin{array}{r}
 67_{10} \overline{) 16} \\
 64 \phantom{00} \overline{) 9} \\
 \underline{3}
 \end{array}$$

$$43_{16}$$

$$67_{10} = 1000011_2 = 43_{16}$$

$$5- 5A_{16} + 54_8$$

$$\begin{array}{l} 5A_{16} \\ \left\{ \begin{array}{l} \rightarrow 10 \cdot 16^0 = 10 \\ \rightarrow 5 \cdot 16^1 = 80 \end{array} \right. \\ \hline 90_{10} \end{array}$$

$$\begin{array}{l} 54_8 \\ \left\{ \begin{array}{l} \rightarrow 4 \cdot 8^0 = 4 \\ \rightarrow 5 \cdot 8^1 = 40_{10} \end{array} \right. \end{array}$$

$$90_{10} + 40_{10} = 130_{10}$$

$$\begin{array}{r} 130_{10} \overline{) 16} \\ 128 \phantom{00} \\ \hline 2 \end{array} \quad \begin{array}{l} 8 \\ \textcircled{8} \end{array} \quad 82_{16}$$

$$\begin{array}{r} 130_{10} \overline{) 8} \\ 128 \phantom{00} \\ \hline 2 \end{array} \quad \begin{array}{r} 16 \overline{) 8} \\ 16 \phantom{00} \\ \hline 0 \end{array} \quad \begin{array}{l} 2 \\ \textcircled{2} \end{array} \quad 202_8$$

$$130_{10} = 82_{16} = 202_8$$







$$7 - 47_8 + 1001_2$$

$$\begin{array}{r} 47 \\ \downarrow \rightarrow 7 \cdot 8^0 = 7 \\ \downarrow \rightarrow 4 \cdot 8^1 = 32 \\ \hline 39_{10} \end{array}$$

$$\begin{array}{r} 1001_2 \\ \downarrow \rightarrow 1 \cdot 2^0 = 1 \\ \downarrow \rightarrow 0 \cdot 2^1 = 0 \\ \downarrow \rightarrow 0 \cdot 2^2 = 0 \\ \downarrow \rightarrow 1 \cdot 2^3 = 8 \\ \hline 9_{10} \end{array}$$

$$39_{10} + 9_{10} = 48_{10}$$

$$\begin{array}{r} 48 \text{ } 18 \\ 38 \text{ } 6 \\ \hline 0 \end{array} \quad 60_8$$

$$\begin{array}{r} 48 \text{ } 12 \\ 48 \text{ } 24 \text{ } 12 \\ \hline 0 \end{array} \quad \begin{array}{r} 12 \text{ } 12 \\ 12 \text{ } 6 \text{ } 12 \\ \hline 0 \end{array} \quad \begin{array}{r} 6 \text{ } 12 \\ 6 \text{ } 3 \text{ } 12 \\ \hline 0 \end{array} \quad 110000_2$$

$$48_{10} = 60_8 = 110000_2$$

$$8 - AS_{16} + 1010_2$$

$$AS_{16}$$

$$\begin{array}{l} \rightarrow 5 \cdot 16^0 = 5 \\ \rightarrow 10 \cdot 16^1 = 160 \\ \hline 165_{10} \end{array}$$

$$1010_2$$

$$\begin{array}{l} \rightarrow 0 \cdot 2^0 = 0 \\ \rightarrow 1 \cdot 2^1 = 2 \\ \rightarrow 0 \cdot 2^2 = 0 \\ \rightarrow 1 \cdot 2^3 = 8 \\ \hline 10_{10} \end{array}$$

$$165_{10} + 10_{10} = 175_{10}$$

$$175_{10} \begin{array}{l} 16 \\ 10 \end{array}$$

$$\begin{array}{r} 175_{10} \\ 160 \\ \hline 15 \end{array}$$

AF<sub>16</sub>

$$175_{10} \begin{array}{l} 2 \\ 87 \end{array} \begin{array}{l} 2 \\ 43 \end{array} \begin{array}{l} 2 \\ 21 \end{array} \begin{array}{l} 2 \\ 10 \end{array} \begin{array}{l} 2 \\ 5 \end{array} \begin{array}{l} 2 \\ 2 \end{array} \begin{array}{l} 2 \\ 1 \end{array} \begin{array}{l} 2 \\ 0 \end{array}$$

$$\begin{array}{r} 175_{10} \\ 174 \\ \hline 1 \end{array} \begin{array}{r} 87 \\ 86 \\ \hline 1 \end{array} \begin{array}{r} 43 \\ 42 \\ \hline 1 \end{array} \begin{array}{r} 21 \\ 20 \\ \hline 1 \end{array} \begin{array}{r} 10 \\ 10 \\ \hline 0 \end{array} \begin{array}{r} 5 \\ 4 \\ \hline 1 \end{array} \begin{array}{r} 2 \\ 2 \\ \hline 0 \end{array}$$

$$10101111_2$$

$$175_{10} = AF_{16} = 10101111_2$$

$$9- 37_8 + 1F_{16}$$

$$\begin{array}{l} 37_8 \\ \begin{array}{l} \text{L} \rightarrow 7 \cdot 8^0 = 7 \\ \text{L} \rightarrow 3 \cdot 8^1 = 24 \end{array} \\ \hline 31_{10} \end{array}$$

$$\begin{array}{l} 1F_{16} \\ \begin{array}{l} \text{L} \rightarrow 15 \cdot 16^0 = 15 \\ \text{L} \rightarrow 1 \cdot 16^1 = 16 \end{array} \\ \hline 31_{10} \end{array}$$

$$31_{10} + 31_{10} = 62_{10}$$

$$\begin{array}{l} 58'2_{10} \quad | \quad 8 \\ 56 \\ \hline 6 \end{array} \quad \begin{array}{c} \textcircled{7} \\ \swarrow \end{array} \quad 76_8$$

$$\begin{array}{l} 58'2_{10} \quad | \quad 16 \\ 48 \\ \hline 14 \end{array} \quad \begin{array}{c} \textcircled{3} \\ \swarrow \end{array} \quad 3D_{16}$$

$$62_{10} = 76_8 = 3D_{16}$$

