

HW Sol 1

**1.1 (a)**  $757.25_{10}$

$$\begin{array}{r}
 16 \overline{) 757} \\
 \underline{16 \overline{) 47}} \quad r5 \\
 \underline{16 \overline{) 2}} \quad r15=F_{16} \\
 0 \quad r2
 \end{array}
 \qquad
 \begin{array}{r}
 0.25 \\
 \underline{\quad 16} \\
 (4).00
 \end{array}$$

$$\begin{aligned}
 \therefore 757.25_{10} &= 2F5.40_{16} \\
 &= \underline{0010} \underline{1111} \underline{0101} \underline{0100} \underline{0000}_2 \\
 &\qquad\qquad 2 \quad F \quad 5 \quad 4 \quad 0
 \end{aligned}$$

**1.2 (b)**  $59D.C_{16} = 5 \times 16^2 + 9 \times 16^1 + D \times 16^0 + C \times 16^{-1}$   
 $= 5 \times 256 + 9 \times 16 + 13 + 12/16 =$   
 $1437.75_{10}$

$$\begin{array}{r}
 \underline{0101} \underline{1001} \underline{1101} \underline{1100}_{16} \\
 5 \quad 9 \quad D \quad C
 \end{array}$$

$2635.6_8 = 2 \times 8^3 + 6 \times 8^2 + 3 \times 8^1 + 5 \times 8^0 + 6 \times 8^{-1}$   
 $= 2 \times 512 + 6 \times 64 + 3 \times 8 + 5 + 6/8 =$

$1437.75_{10}$   
 $\begin{array}{r} \underline{010} \underline{110} \underline{011} \underline{101} \underline{110}_8 \\ 2 \quad 6 \quad 3 \quad 5 \quad 6 \end{array}$

**1.3**  $3BA.25_{14} = 3 \times 14^2 + 11 \times 14^1 + 10 \times 14^0 + 2 \times 14^{-1} + 5 \times 14^{-2}$   
 $= 588 + 154 + 10 + 0.1684 = 752.1684_{10}$

$6 \overline{)752}$					
$6 \overline{)125}$	r2				0.1684
$6 \overline{)20}$	r5				<u>6</u>
$6 \overline{)3}$	r2				(1).0104
0	r3				<u>6</u>
					(0).0624
					<u>6</u>
					(0).3744
					<u>6</u>
					(2).2464
					<u>6</u>
					(1).4784

$\therefore 3BA.25_{14} = 752.1684_{10} = 3252.1002_6$

**1.7,** See FLD p. 730 for solutions.

**1.17 (a)**

$\begin{array}{r} \overset{111}{1111} \\ \underline{1001} \\ 11000 \end{array}$	(Add)	$\begin{array}{r} \overset{111}{1111} \\ \underline{1001} \\ 0110 \end{array}$	(Subtract)
		$\begin{array}{r} 1111 \\ \underline{1001} \\ 1111 \\ \underline{0000} \\ 01111 \\ \underline{0000} \\ 001111 \\ \underline{1111} \\ 10000111 \end{array}$	(Multiply)

**1.17 (b)**

$\begin{array}{r} \overset{1}{1101001} \\ \underline{110110} \\ 10011111 \end{array}$	(Add)	$\begin{array}{r} \overset{11}{1101001} \\ \underline{110110} \\ 110011 \end{array}$	(Sub)
		$\begin{array}{r} 1101001 \\ \underline{110110} \\ 0000000 \\ \underline{1101001} \\ 11010010 \\ \underline{1101001} \\ 1001110110 \\ \underline{0000000} \\ 1001110110 \\ \underline{1101001} \\ 100100000110 \\ \underline{1101001} \\ 1011000100110 \end{array}$	(Mult)

1.20(a)

$$\begin{array}{r} \phantom{110} \overline{)10001101} \quad \text{Quotient} \\ \phantom{110} \underline{110} \\ \phantom{110} 1011 \\ \phantom{110} \underline{110} \\ \phantom{110} 1010 \\ \phantom{110} \underline{110} \\ \phantom{110} 1001 \\ \phantom{110} \underline{110} \\ \phantom{110} 11 \quad \text{Remainder} \end{array}$$

1.20(b)

$$\begin{array}{r} \phantom{1011} \overline{)11000011} \quad \text{Quotient} \\ \phantom{1011} \underline{1011} \\ \phantom{1011} 10001 \\ \phantom{1011} \underline{1011} \\ \phantom{1011} 1101 \\ \phantom{1011} \underline{1011} \\ \phantom{1011} 10 \quad \text{Remainder} \end{array}$$

1.39

(a)

$$\begin{array}{r} \text{add} \\ 101010 \\ + \underline{011101} \\ (1)000111 \\ \quad \text{└─→ 1} \\ \quad \underline{001000} \end{array} \qquad \begin{array}{r} \text{subt} \\ 101010 \\ - \underline{011101} \\ 001101 \\ \text{overflow} \end{array}$$

(b)

$$\begin{array}{r} \text{add} \\ 101010 \\ + \underline{011101} \\ (1)000111 \end{array} \qquad \begin{array}{r} \text{subt} \\ 101010 \\ - \underline{011101} \\ 001101 \\ \text{overflow} \end{array}$$