

## HW1 correction

1.  $X = 1011.0101$

$$\begin{array}{r} \overset{11}{10} \overset{11}{11} \overset{1}{0} 101 \\ 1011.0101 \end{array}$$

$$\underline{110.11}$$

$$10010.0001$$

$Y = 110.11$

$$\begin{array}{r} 0202 \\ 1011.0101 \end{array}$$

$$\begin{array}{r} - 110.1100 \\ \hline 100.1001 \end{array}$$

2.  $X = 2CF3$

$$\begin{array}{r} 2CF3 \\ + \end{array}$$

$$\begin{array}{r} 2CF3 \\ + 2B \\ \hline 2D1E \end{array}$$

$Y = 2B$

$$\begin{array}{r} 13_{16} \\ E_{16} \end{array}$$

$$\begin{array}{r} 2CF3 \\ - \end{array}$$

$$\begin{array}{r} 2CF3 \\ - 2B \\ \hline 2CG8 \end{array}$$

3.  $10101.11_2$  to decimal using positional notation

$$10101.11 = 2^4 + 0 + 2^2 + 0 + 1 \cdot \left(\frac{1}{2} + \frac{1}{4}\right) = 21.75_{10}$$

$$4. ABC.04_{16} = 10 \cdot 16^2 + 11 \cdot 16 + 12 \cdot \left(\frac{0}{16} + \frac{4}{256}\right) = 2560 + 176 + 12 \cdot \left(\frac{1}{64}\right) =$$

$$= 2748 \cdot \left(\frac{1}{64}\right) = 2748.015625$$

$$5. \begin{array}{l} 2 \overline{) 110} \\ 2 \overline{) 55} \end{array} \text{ rem } 0 = a_0$$

$$2 \overline{) 27} \text{ rem } 1 = a_1$$

$$2 \overline{) 13} \text{ rem } 1 = a_2$$

$$2 \overline{) 6} \text{ rem } 1 = a_3$$

$$2 \overline{) 3} \text{ rem } 0 = a_4$$

$$2 \overline{) 1} \text{ rem } 1 = a_5$$

$$0 \text{ rem } 1 = a_6$$

$$110_{10} = 1101110_2$$

$$= 6E_{16}$$

$$\begin{array}{l} 16 \overline{) 110} \\ 16 \overline{) 6} \text{ rem } 14 = a_0 \\ \quad 0 \text{ rem } 6 = a_1 \end{array}$$

$$\begin{array}{c} \underbrace{01101110}_6 \quad \underbrace{\phantom{01101110}}_E \end{array}$$

6.  $0.65_{10}$  to binary and hex

$0.65$	$.3$	$.6$	$.2$	$.4$	$.8$	$.6$	$.2$	$.4$	
$\times 2$	$\times 2$	$\times 2$	$\times 2$	$\times 2$	$\times 2$	$\times 2$	$\times 2$	$\times 2$	$\times 2$
$1.3$	$.6$	$1.2$	$.4$	$.8$	$1.6$	$1.2$	$.4$	$.8$	
$a_{-1} = 1$	$a_{-2} = 0$	$a_{-3} = 1$	$a_{-4} = 0$	$a_{-5} = 0$	$a_{-6} = 1$	$a_{-7} = 1$	$a_{-8} = 0$	$a_{-9} = 0$	$\swarrow$

$0.65_{10} = 0.10100110_2$  (rounded at the 8th bit)

$0.65_{10} = 0.10\overline{1001}$  (repeating!)

7.  $= 10101.11_2 = \underbrace{00010101}_{16} . \underbrace{1100}_{5} = 15.C_{16} = (\text{check}) =$

$= 16 + 5 \cdot \left(\frac{12}{16}\right) = 21.75_{10}$   
 $21.75_{10}$