

Senda ER504

040200434

EEP205E - HW1

CRN: 10093

1. Convert the hexadecimal number 64CD to binary, to octal and decimal

$$6 \times 16^3 + 4 \times 16^2 + 12 \times 16 + 13 \times 16^0 = (25.805)_{10}$$

$$\begin{array}{r}
 25\ 805 \\
 \hline
 5 \quad | \quad 8 \\
 \hline
 3225 \\
 1 \quad | \quad 8 \\
 \hline
 403 \\
 3 \quad | \quad 8 \\
 \hline
 50 \\
 2 \quad | \quad 8 \\
 \hline
 6
 \end{array}$$

$$\begin{array}{r}
 25805 \quad | \quad 2 \\
 = \quad \textcircled{1} \quad | \quad 12902 \quad | \quad 2 \\
 = \quad \textcircled{0} \quad | \quad 6455 \quad | \quad 2 \\
 = \quad \textcircled{1} \quad | \quad 3225 \quad | \quad 2 \\
 = \quad \textcircled{1} \quad | \quad 1612 \quad | \quad 2 \\
 = \quad \textcircled{0} \quad | \quad 806 \quad | \quad 2 \\
 = \quad \textcircled{0} \quad | \quad 403 \quad | \quad 2 \\
 = \quad \textcircled{1} \quad | \quad 201 \quad | \quad 2 \\
 = \quad \textcircled{1} \quad | \quad 100 \quad | \quad 2 \\
 = \quad \textcircled{0} \quad | \quad 50 \quad | \quad 2 \\
 = \quad \textcircled{0} \quad | \quad 25 \quad | \quad 2 \\
 = \quad \textcircled{1} \quad | \quad 12 \quad | \quad 2 \\
 = \quad \textcircled{0} \quad | \quad 6 \quad | \quad 2 \\
 = \quad \textcircled{0} \quad | \quad 3 \quad | \quad 2
 \end{array}$$

OR

$$(6)_{16} = (0110)_2$$

$$(4)_{16} = (0100)_2$$

$$(C)_{16} = (1100)_2.$$

2. Convert the decimal number 431 to binary, hexadecimal and octal.

$$\begin{array}{r}
 431 \\
 - \\
 \hline
 1 & 2 \\
 215 & 2 \\
 \hline
 1 & 107 \\
 1 & 53 \\
 \hline
 1 & 26 \\
 1 & 13 \\
 \hline
 0 & 6 \\
 1 & 3 \\
 \hline
 0 & 2 \\
 1 & 1
 \end{array}$$

$$(110)_2 = (6)_8$$

$$(101)_2 = (5)_8$$

$$(111)_2 = (7)_8$$

(657)₈

$$|0001\rangle_2 = |1\rangle_{16}$$

$$(1010)_2 = (A)_{16}$$

$$(1111)_2 = (F)_{10}$$

(1AF)

3. Express the following numbers in decimal

a.

$$(10110.0101)_2 = 1 \times 2^4 + 0 \times 2^3 + 1 \times 2^2 + 1 \times 2^1 + 0 \times 2^0 + 0 \times 2^{-1} + 1 \times 2^{-2} + 0 \times 2^{-3} + 1 \times 2^{-4}$$

b.

$$(16.5)_{16} = (0001)_2 \cdot (0110)_2 \cdot (0101)_2$$

$$16 + 4 + 2 + 0,25 + 0,0625 = (22.3125)_{10}$$

c.

$$(26.24)_8 = 010 \cdot 110 \cdot 010 \cdot 100$$

$$(10110.0101)_2$$

$$= (22.315)_{10}$$

d.

$$(DADA.B)_{16}$$
$$13 \times 16^3 + 10 \times 16^2 + 13 \times 16^1 + 10 \times 16^0 + 11 \times 16^{-1} = (56026.6875)_{10}$$

e.

$$(1010.1101)_2$$
$$(10.8125)_{10} = 2^3 + 0 + 2^1 + 0 + 2^{-1} + 2^{-2} + 0 + 2^{-4}$$

f. Convert the following binary numbers to hex and to decimal

g.

$$(1.\underline{10010})_2$$
$$(1)_{16} \quad (9)_{16} \quad (1.9)_{16}$$

$$1 \times 2^0 + 1 \times 2^{-1} + 1 \times 2^{-4} = (1.5625)_{10}$$

b.

$$(\underline{110}.\underline{010})_2$$
$$(6)_{16} \quad (4)_{16} \quad (6.4)_{16}$$

$$1 \times 2^2 + 1 \times 2^1 + 1 \times 2^{-2} = (6.25)_{10}$$

Fraction point in b is two digit right than a, meaning that there are two more digit multiplication. Because we are working with binary numbers, we multiply with 2 twice.

X	Y	Z	F(X, Y, Z)
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0	0	0	0
0	0	1	1
0	1	0	1
1	0	0	0
0	1	1	1
1	1	0	0
1	0	1	1
1	1	1	1