

CPE LAB

$$\begin{aligned}
 (0)_{10} &= (0)_2 = (0)_8 = (0)_{16} \\
 (1)_{10} &= (1)_2 = (1)_8 = (1)_{16} \\
 (2)_{10} &= (10)_2 = (2)_8 = (2)_{16} \\
 (3)_{10} &= (11)_2 = (3)_8 = (3)_{16} \\
 (4)_{10} &= (100)_2 = (4)_8 = (4)_{16} \\
 (5)_{10} &= (101)_2 = (5)_8 = (5)_{16} \\
 (6)_{10} &= (110)_2 = (6)_8 = (6)_{16} \\
 (7)_{10} &= (111)_2 = (7)_8 = (7)_{16} \\
 (8)_{10} &= (1000)_2 = (10)_8 = (8)_{16} \\
 (9)_{10} &= (1001)_2 = (11)_8 = (9)_{16} \\
 (10)_{10} &= (1010)_2 = (12)_8 = (A)_{16} \\
 (11)_{10} &= (1011)_2 = (13)_8 = (B)_{16} \\
 (12)_{10} &= (1100)_2 = (14)_8 = (C)_{16} \\
 (13)_{10} &= (1101)_2 = (15)_8 = (D)_{16} \\
 (14)_{10} &= (1110)_2 = (16)_8 = (E)_{16} \\
 (15)_{10} &= (1111)_2 = (17)_8 = (F)_{16}
 \end{aligned}$$

① We need the wire jumper kit and the bread board.

$$③ (10110110)_2$$

$$= (B6)_{16}$$

$$11 \times 16^1 + 6 \times 16^0 = (182)_{10}$$

$$\begin{array}{r} 010110110 \\ \hline 2 \quad 6 \quad 6 \end{array}$$

$$(266)_8$$

$$\begin{array}{r} 16 \\ \hline 11 \\ \hline 16 \end{array}$$

$$\begin{array}{r} 16 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 16 \\ \hline 176 + 6 = 182 \end{array}$$

$$④ (1001)_2$$

$$= (9)_{16}$$

$$= 9 \times 16^0 = (94)_{10}$$

$$\begin{array}{r} 16 \\ \hline 9 \\ \hline 144 \end{array}$$

$$\begin{array}{r} 001001 \\ \hline (1 \quad 1)_8 \end{array}$$

$$(1001010110)_2$$

$$= (256)_{16} = 2 \times 16^2 + 5 \times 16^1 + 6 \times 16^0$$

$$2 \times 256 + 80 + 6 =$$

$$= 512 + 80 + 6 = (598)_{10}$$

$$\begin{array}{r} 3 \\ 16 \\ \hline 16 \\ \hline 192 \\ \hline 16 \\ \hline 256 \end{array}$$

$$\begin{array}{r} 16 \\ \hline 5 \\ \hline 80 \end{array}$$

$$\begin{array}{r} 1001010110 \\ \hline 1 \quad 1 \quad 2 \quad 6 \end{array}$$

$$(1126)_4$$

$$\textcircled{4} (A6F3)_{16} = 10 \times 16^3 + 6 \times 16^2 + 15 \times 16^1 + 3 \times 16^0$$

$$= (40960) + (6 \times 256) + (1536) + 240 + 3 = (42749)_{10}$$

$$(101001101110011)_2 = (123363)_8$$

$$\begin{array}{r} 256 \\ 16 \\ \hline 1536 \\ 256 \\ \hline 1792 \\ 16 \\ \hline 2816 \\ 16 \\ \hline 2832 \\ 16 \\ \hline 2848 \\ 16 \\ \hline 2864 \\ 16 \\ \hline 2880 \\ 16 \\ \hline 2896 \\ 16 \\ \hline 2912 \\ 16 \\ \hline 2928 \\ 16 \\ \hline 2944 \\ 16 \\ \hline 2960 \\ 16 \\ \hline 2976 \\ 16 \\ \hline 2992 \\ 16 \\ \hline 3008 \\ 16 \\ \hline 3024 \\ 16 \\ \hline 3040 \\ 16 \\ \hline 3056 \\ 16 \\ \hline 3072 \\ 16 \\ \hline 3088 \\ 16 \\ \hline 3104 \\ 16 \\ \hline 3120 \\ 16 \\ \hline 3136 \\ 16 \\ \hline 3152 \\ 16 \\ \hline 3168 \\ 16 \\ \hline 3184 \\ 16 \\ \hline 3200 \\ 16 \\ \hline 3216 \\ 16 \\ \hline 3232 \\ 16 \\ \hline 3248 \\ 16 \\ \hline 3264 \\ 16 \\ \hline 3280 \\ 16 \\ \hline 3296 \\ 16 \\ \hline 3312 \\ 16 \\ \hline 3328 \\ 16 \\ \hline 3344 \\ 16 \\ \hline 3360 \\ 16 \\ \hline 3376 \\ 16 \\ \hline 3392 \\ 16 \\ \hline 3408 \\ 16 \\ \hline 3424 \\ 16 \\ \hline 3440 \\ 16 \\ \hline 3456 \\ 16 \\ \hline 3472 \\ 16 \\ \hline 3488 \\ 16 \\ \hline 3504 \\ 16 \\ \hline 3520 \\ 16 \\ \hline 3536 \\ 16 \\ \hline 3552 \\ 16 \\ \hline 3568 \\ 16 \\ \hline 3584 \\ 16 \\ \hline 3600 \\ 16 \\ \hline 3616 \\ 16 \\ \hline 3632 \\ 16 \\ \hline 3648 \\ 16 \\ \hline 3664 \\ 16 \\ \hline 3680 \\ 16 \\ \hline 3696 \\ 16 \\ \hline 3712 \\ 16 \\ \hline 3728 \\ 16 \\ \hline 3744 \\ 16 \\ \hline 3760 \\ 16 \\ \hline 3776 \\ 16 \\ \hline 3792 \\ 16 \\ \hline 3808 \\ 16 \\ \hline 3824 \\ 16 \\ \hline 3840 \\ 16 \\ \hline 3856 \\ 16 \\ \hline 3872 \\ 16 \\ \hline 3888 \\ 16 \\ \hline 3904 \\ 16 \\ \hline 3920 \\ 16 \\ \hline 3936 \\ 16 \\ \hline 3952 \\ 16 \\ \hline 3968 \\ 16 \\ \hline 3984 \\ 16 \\ \hline 4000 \end{array}$$

$$(D3)_{16} = (11010011)_2 = (323)_8$$

$$= 13 \times 16 + 3 \times 16^0 = (208 + 3) = (211)_{10}$$

$$\textcircled{5} \textcircled{A} (1011010)_2 + (100111)_2$$

$$\begin{array}{r} 1011010 \\ + 0100111 \\ \hline 10000001 \end{array}_2$$

$$\textcircled{B} (1001.01101)_2 + (1001.01101)_2$$

$$(0101.10100)_2 + (101.10100)_2 = (1111.00001)_2$$

$$\textcircled{C} (101.1001)_2 + (1011.1101)_2$$

$$\begin{array}{r} 0101.1001 \\ + 1011.1101 \\ \hline 10001.0110 \end{array}_2$$

$$\textcircled{D} (111.01011)_2 + (10101.10101)_2$$

$$\begin{array}{r} 00111.01011 \\ + 10101.10101 \\ \hline 11101.00000 \end{array}_2$$

$$\textcircled{6} \textcircled{a} (1001110)_2 \xrightarrow{\text{bit flip}} (0110001)_2$$

$$\textcircled{b} (10101101)_2 \xrightarrow{\text{bit flip}} (01010010)_2$$

$$\textcircled{7} \textcircled{a} (1001110)_2 \xrightarrow{\text{bit flip}} (0110001)_2 \xrightarrow{\text{add 1}} (0110010)_2$$

$$\textcircled{b} (10101101)_2 \xrightarrow{\text{bit flip}} (01010010)_2 \xrightarrow{\text{add 1}} (01010011)_2$$