

# CSC 314 Assignment 1

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Perform the following conversions (you must show your work to get full credit)

- 32 decimal to binary

$$\begin{array}{l}
 32/2 = 16 (0) \\
 16/2 = 8 (0) \\
 8/2 = 4 (0) \\
 4/2 = 2 (0) \\
 2/2 = 1 (0) \\
 1/2 = 0 (1)
 \end{array}$$

$$\boxed{32_{10} = \phi\phi\phi\phi\phi\phi_2} = 20_{16}$$

$\downarrow \quad \downarrow$   
 2    0    (Hex)

- C5 hex to decimal

Decimal

$$\begin{array}{l}
 C_{16} \rightarrow 11\phi\phi_2 \\
 5_{16} \rightarrow \phi1\phi1_2
 \end{array}$$

$$\boxed{C5_{16} = 11\phi\phi\phi1\phi1_2}$$

1 → 1  
 ϕ → 0  
 1 → 4  
 ϕ → 0  
 ϕ → 0  
 ϕ → 0  
 1 → 64  
 1 → 128  
 / 197

= 197<sub>10</sub>

- E8 hex to binary

$$\begin{array}{l}
 E_{16} \rightarrow 111\phi_2 \\
 8_{16} \rightarrow 1\phi\phi\phi_2
 \end{array}$$

$$\boxed{E8_{16} \rightarrow 111\phi1\phi\phi\phi_2}$$

Decimal

$$\begin{array}{l}
 1 \rightarrow 128 \\
 1 \rightarrow 64 \\
 1 \rightarrow 32 \\
 \phi \rightarrow 0 \\
 1 \rightarrow 8 \quad 4 \\
 \phi \rightarrow 0 \\
 \phi \rightarrow 0 \\
 \phi \rightarrow 0 \\
 \phi \rightarrow 0
 \end{array}$$

/ 232<sub>10</sub>

- 75 to 8bit sign magnitude (show binary and hex)

$$\begin{array}{l}
 75/2 = 37 (1) \\
 37/2 = 18 (1) \\
 18/2 = 9 (0) \\
 9/2 = 4 (1) \\
 4/2 = 2 (0) \\
 2/2 = 1 (0) \\
 1/2 = 0 (1)
 \end{array}$$

$$75_{10} = \underbrace{\phi}_{\text{positive sign}} \underbrace{1\phi\phi1\phi\phi1}_{75}$$

$$\boxed{\phi1\phi\phi1\phi\phi1_2 = 49_{16}}$$

# Assignment 1, pg2

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- -43 to 8bit sign magnitude (show binary and hex)

$$\left. \begin{array}{l} 43/2 = 21 (1) \\ 21/2 = 10 (1) \\ 10/2 = 5 (0) \\ 5/2 = 2 (1) \\ 2/2 = 1 (0) \\ 1/2 = 0 (1) \end{array} \right\} \begin{array}{l} \phi \\ \phi \end{array}$$

$$\begin{aligned} 43_{10} &= \underbrace{\phi\phi 1\phi}_{\text{positive}} \underbrace{1\phi 11}_2 \\ -43_{10} &= \underbrace{1\phi 1\phi}_{\text{negative sign}} \underbrace{1\phi 11}_2 \\ 1\phi 1\phi \ 1\phi 11_2 &= AB_{16} \end{aligned}$$

- 79 to 8 bit 1's complement (binary and hex)

$$\begin{aligned} [2^8 - 1] - 79 \\ 255 - 79 = 176 \\ 255_{10} &= 1111 \ 1111_2 \\ 79_{10} &= \phi 1 \phi \phi \ 1111_2 \end{aligned}$$

$$\begin{array}{r} 1111 \ 1111 \\ - \phi 1 \phi \phi \ 1111 \\ \hline 1\phi 11 \phi \phi \phi \phi \end{array}$$

$$176_{10} = 1\phi 11 \ \phi \phi \phi \phi_2$$

$$\boxed{\begin{array}{c} 1\phi 11 \ \phi \phi \phi \phi_2 \\ \text{B} \quad \phi \end{array}} = B\phi_{16}$$

- -79 to 8 bit 1's complement (binary and hex)

79<sub>10</sub> with 1's comp:

$$\begin{array}{r} 1\phi 11 \ \phi \phi \phi \phi_2 \\ \hline -79 = \phi 1 \phi \phi \ 1111_2 \end{array} \quad \leftarrow \text{flip 1's and 0's}$$

$$\boxed{\begin{array}{c} \phi 1 \phi \phi \ 1111 = 4F_{16} \\ \downarrow \quad \downarrow \\ 4 \quad F \end{array}}$$

# Assignment 1, pg3

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- 127 to 8 bit 2's complement (binary and hex)
- -127 to 8 bit 2's complement (binary and hex)

$$127_{10} = 01111111_2 = 7F_{16}$$

$$-127_{10} = 10000001_2 = 81_{16}$$

128	64	32	16	8	4	2	1
0	1	1	1	1	1	1	1

2's comp

$$\begin{array}{r}
 +127 \quad 01111111 \\
 \hline
 10000000 \quad \leftarrow \text{flip} \\
 -127 + \quad \quad \quad 1 \\
 \hline
 10000001_2
 \end{array}$$

# Assignment 1, pg4

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Find the ASCII values for the characters that are your two initials

- Show your initials

GS

- Show the ASCII code in each of their binary, hex, and decimal values

Char	Decimal	Hex	Binary
G	71	47	0100 0111
S	83	53	0101 0011

GS  $\rightarrow$  47 53<sub>16</sub>  
GS  $\rightarrow$  71 83<sub>10</sub>  
GS  $\rightarrow$  01000111 01010011<sub>2</sub>

gs  $\rightarrow$  67 73<sub>16</sub>

gs  $\rightarrow$  103 115<sub>10</sub>

gs  $\rightarrow$  01100111 01110111<sub>2</sub>

For the number 349<sub>10</sub> find the following representations:

- A Hex number (convert to base sixteen)

$$349/16 = 21.8125$$

$$21/16 = 1.3125$$

$$1/16 = 0$$

$$0.8125 \times 16 = 13 \leftarrow \text{least significant}$$

$$0.3125 \times 16 = 5$$

$$1 \leftarrow \text{most significant}$$

Hex  
13  $\rightarrow$  D  
5  $\rightarrow$  5  
1  $\rightarrow$  1

$$349_{10} = 15D_{16}$$

# Assignment 1, pg5

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- An ASCII string of characters (convert each digit to its ASCII value) (HINT: '0' is  $30_{16}$ )

15D<sub>16</sub>

1<sub>16</sub> → ASCII char



5<sub>16</sub> →



D<sub>16</sub> →



Hex	ASCII char
15D	😊♣🎵