

## CIS7 Unit 1 Lab 1

In this lab, we will continue to complete the exercises in binary arithmetic, hexadecimal conversions and twos' complement.

### 1. Binary Multiplication:

#### Binary Multiplication Rules

$0 \times 0 = 0$	$0 \times 1 = 0$
$1 \times 0 = 0$	$1 \times 1 = 1$

Example:

$$\begin{array}{r}
 \times \quad 100 \\
 \quad 011 \\
 \hline
 \quad 100 \\
 100 \phantom{00} + \\
 \hline
 1100
 \end{array}$$

A.  $1011110 \times 1100010 \rightarrow$

$1000011111100_2$

B.  $110001 \times 111000 \rightarrow$

$1101010111000$

### 2. Convert the following hexadecimal to decimal values.

A.  $21B_{16}$

$2 \quad 1 \quad B$

$10010 \quad 0001 \quad 1011$

$= 10010011011_2 = 512 + 16 + 8 + 2 + 1 = 539_{10}$

B.  $A93D_{16}$

$A \quad 9 \quad 3 \quad D$

$1010 \quad 1001 \quad 0011 \quad 1101$

$1010100100111101_2 = 43325_{10}$

A 10  
B 11  
C 12  
D 13

### 3. Convert decimal values $801_{10}$ to a hexadecimal value.

$801$

$512 \quad 256 \quad 128 \quad 64 \quad 32 \quad 16 \quad 8 \quad 4 \quad 2 \quad 1$

$1 \quad 0 \quad 1 \quad 1 \quad 0 \quad 1 \quad 1 \quad 0 \quad 0 \quad 1$

$321 = 322_{16}$

### 4. Convert $B61_{16}$ to binary values.

$B \quad 6 \quad 1$

$8 \quad 4 \quad 2 \quad 1 \quad 8 \quad 4 \quad 2 \quad 1 \quad 8 \quad 4 \quad 2 \quad 1$

$1 \quad 0 \quad 1 \quad 1 \quad 0 \quad 1 \quad 1 \quad 0 \quad 0 \quad 0 \quad 1$

$= 10110110001_2$

5. Convert  $95C2_{16}$  to binary values.

$$\begin{array}{cccc} 9 & 5 & C & 2 \\ 1001 & 0101 & 1100 & 0010 = 1001010111000010_2 \end{array}$$

6. Find the octal values for the following values:

A.  $124_{10}$

$$\begin{array}{r} 128 \quad 64 \quad 32 \quad 16 \quad 8 \quad 4 \quad 2 \quad 1 \\ 0 \quad 1 \quad 1 \quad 1 \quad 1 \quad 0 \quad 0 \\ 1 \quad 7 \quad 4 = 174_8 \end{array}$$

B.  $62_{10}$

$$\begin{array}{r} 32 \quad 16 \quad 8 \quad 4 \quad 2 \quad 1 \\ 1 \quad 1 \quad 1 \quad 1 \quad 0 \\ 7 \quad 6 = 76_8 \end{array}$$

C.  $011111101_2 = 375_8$

7. Find the twos' complement of the following values:

A.  $89_{10}$

$$\begin{array}{r} 64 \quad 32 \quad 16 \quad 8 \quad 4 \quad 2 \quad 1 \rightarrow 10011001 \\ 1 \quad 0 \quad 1 \quad 1 \quad 0 \quad 0 \quad 1 \\ + 0100110 \\ \hline 1001111 \end{array} \quad \text{A.}$$

B.  $161_{10}$

$$\begin{array}{r} 128 \quad 64 \quad 32 \quad 16 \quad 8 \quad 4 \quad 2 \quad 1 \\ 1 \quad 0 \quad 1 \quad 0 \quad 0 \quad 0 \quad 1 \\ + 0101111 \\ \hline 0101111 \end{array} \quad \text{B.}$$

C.  $10011000$

$$\begin{array}{r} 10011000 \\ + 01101111 \\ \hline 01101111 \end{array} \quad \text{C.}$$

D.  $11001011$

$$\begin{array}{r} 11001011 \\ + 00110100 \\ \hline 00110101 \end{array} \quad \text{D.}$$