

## Assignment #1

Perform the following base and/or code conversions:

1.  $915_{10} = ?_2 = ?_8 = ?_{16} = ?_{\text{BCD}}$
2.  $10100101_2 = ?_{10} = ?_8 = ?_{16} = ?_{\text{BCD}}$
3.  $\text{DB}_{16} = ?_{10} = ?_2 = ?_8 = ?_{\text{BCD}}$
4.  $127_8 = ?_{10} = ?_2 = ?_{16} = ?_{\text{BCD}}$
5.  $000100100110_{\text{BCD}} = ?_{10} = ?_2 = ?_8 = ?_{16}$

## Solutions to Assignment #1

1.  $915_{10}$   
 converting to BCD:  
           9      1      5  
       1001 0001 0101  
 **$915_{10} = 1001\ 0001\ 0101_{BCD}$**   
 converting decimal to binary:  
    $915/2 = 457$  remainder = 1 (LSB)  
    $457/2 = 228$  remainder = 1  
    $228/2 = 114$  remainder = 0  
    $114/2 = 57$  remainder = 0  
    $57/2 = 28$  remainder = 1  
    $28/2 = 14$  remainder = 0  
    $14/2 = 7$  remainder = 0  
    $7/2 = 3$  remainder = 1  
    $3/2 = 1$  remainder = 1  
    $1/2 = 0$  remainder = 1 (MSB)  
 **$915_{10} = 1110010011_2$**   
 converting binary to octal:  
       001 110 010 011  
       1   6   2   3  
 **$915_{10} = 1623_8$**   
 converting binary to hex:  
       011 1001 0011  
       3   9   3  
 **$915_{10} = 393_{16}$**
2.  $10100101_2$   
 converting binary to octal:  
       010 100 101  
       2   4   5  
 **$10100101_2 = 245_8$**   
 converting binary to hex:  
       1010 0101  
       A     5  
 **$10100101_2 = A5_{16}$**   
 converting binary to decimal:  
 $10100101_2 = 1 \times 2^7 + 0 \times 2^6 + 1 \times 2^5 + 0 \times 2^4 + 0 \times 2^3$   
 $+ 1 \times 2^2 + 0 \times 2^1 + 1 \times 2^0 = 128 + 32 + 4 + 1 = 165_{10}$   
 **$10100101_2 = 165_{10}$**   
 converting decimal to BCD:  
           1      6      5  
       0001 0110 0101  
 **$10100101_2 = 000101100101_{BCD}$**
3.  $DB_{16}$   
 converting hex to binary:  
       D      B  
       1101 1011  
 **$DB_{16} = 11011011_2$**   
 converting binary to octal:  
       011 011 011  
       3   3   3  
 **$DB_{16} = 333_8$**
- converting binary to decimal:  
 $11011011_2 = 1 \times 2^7 + 1 \times 2^6 + 0 \times 2^5 + 1 \times 2^4 + 1 \times 2^3$   
 $+ 0 \times 2^2 + 1 \times 2^1 + 1 \times 2^0 = 128 + 64 + 16 + 8 + 2 + 1 = 219_{10}$   
 **$DB_{16} = 219_{10}$**   
 converting decimal to BCD:  
           2      1      9  
       0010 0001 1001  
 **$DB_{16} = 001000011001_{BCD}$**
4.  $127_8$   
 converting octal to binary:  
       1   2   7  
       001 010 111  
 **$127_8 = 1010111_2$**   
 converting binary to hex:  
       0101 0111  
       5     7  
 **$127_8 = 57_{16}$**   
 converting binary to decimal:  
 $1010111_2 = 1 \times 2^6 + 0 \times 2^5 + 1 \times 2^4 + 0 \times 2^3 + 1 \times 2^2$   
 $+ 1 \times 2^1 + 1 \times 2^0 = 64 + 16 + 4 + 2 + 1 = 87_{10}$   
 **$127_8 = 87_{10}$**   
 converting decimal to BCD:  
           8      9  
       1000 1001  
 **$127_8 = 89_{BCD}$**
5.  $000100100110_{BCD}$   
 converting BCD to decimal:  
       0001 0010 0110  
       1   2   6  
 **$000100100110_{BCD} = 126_{10}$**   
 converting decimal to binary:  
    $126/2 = 63$  remainder = 0 (LSB)  
    $63/2 = 31$  remainder = 1  
    $31/2 = 15$  remainder = 1  
    $15/2 = 7$  remainder = 1  
    $7/2 = 3$  remainder = 1  
    $3/2 = 1$  remainder = 1  
    $1/2 = 0$  remainder = 1 (MSB)  
 **$000100100110_{BCD} = 111110_2$**   
 converting binary to octal:  
       001 111 110  
       1   7   6  
 **$000100100110_{BCD} = 176_8$**   
 converting binary to hex:  
       0111 1110  
       7     E  
 **$000100100110_{BCD} = 7E_{16}$**