Assignment 4  
COP-1000C

1 – Binary to Decimal  
2 – Decimal to Binary  
3 – Largest Value in Bytes  
4 – Binary to Hexadecimal

1. A: 1101

(1 × 20) + (0 × 21) + (1 × 22) + (1 × 23) = x  
1 + 0 + 4 + 8 = x  
13 = x

B: 0101 0100

(0 × 20) + (0 × 21) + (1 × 22) + (0 × 23) +   
(1 × 24) + (0 × 25) + (1 × 26) + (0 × 27) = x  
(0 + 0 + 4 + 0) + (16 + 0 + 64 + 0) = x  
84 = x

C: 1011 1110

(0 × 20) + (1 × 21) + (1 × 22) + (1 × 23) +   
(1 × 24) + (1 × 25) + (0 × 26) + (1 × 27) = x  
(0 + 2 + 4 + 8) + (16 + 32 + 0 + 128) = x  
190 = x

D: 1100 0001  
  
(1 × 20) + (0 × 21) + (0 × 22) + (0 × 23) +  
(0 × 24) + (0 × 25) + (1 × 26) + (1 × 27) = x  
(1 + 0 + 0 + 0) + (0 + 0 + 64 + 128) = x  
193 = x  
  
E: 0011 1011  
  
(1 × 20) + (1 × 21) + (0 × 22) + (1 × 23) +  
(1 × 24) + (1 × 25) + (0 × 26) + (0 × 27) = x  
(1 + 2 + 0 + 8) + (16 + 32 + 0 + 0) = X  
59 = X

2) A: 67  
 67 / 2 = 33 (1)  
 33 / 2 = 16 (1)  
 16 / 2 = 8 (0)  
 8 / 2 = 4 (0)  
 4 / 2 = 2 (0)  
 2 / 2 = 1 (0)  
 1 / 2 = 0 (1)  
 x = 0100 0011  
  
B: 97  
  
 97 / 2 = 48 (1)  
 48 / 2 = 24 (0)  
 24 / 2 = 12 (0)  
 12 / 2 = 6 (0)  
 6 / 2 = 3 (0)  
 3 /2 = 1 (1)  
 1 /2 = 0 (1)  
 x = 0110 0001  
  
C: 183  
  
 183 / 2 = 91 (1)  
 91 / 2 = 45 (1)  
 45 / 2 = 22 (1)  
 22 / 2 = 11 (0)  
 11 / 2 = 5 (1)  
 5 / 2 = 2 (1)  
 2 /2 = 1 (0)  
 1 /2 = 0 (1)  
 X = 1011 0111  
  
D: 42  
  
 42 / 2 = 21 (0)  
 21 / 2 = 10 (1)  
 10 / 2 = 5 (0)  
 5 / 2 = 2 (1)  
 2 / 2 = 1 (0)  
 1 / 2 = 0 (1)  
 x = 0010 1010

E: 101  
  
 101 / 2 = 50 (1)  
 50 / 2 = 25 (0)  
 25 /2 = 12 (1)  
 12 /2 = 6 (0)  
 6 / 2 = 3 (0)  
 3 / 2 = 1 (1)  
 1 /2 = 0 (1)  
 x = 0110 0101

3) A: 15 bits

b = 215 - 1  
 b = 32767

B: 4 bytes

b = 2(8\*4) -1  
 b = 16777215

C: 1 byte

b = 28 -1  
 b = 255

D: 7 bits

b = 27 -1  
 b = 127

E: 25 bits

b = 225 -1   
 b = 33554432

4) A: 0011 1010

(0 × 20) + (1 × 21) + (0 × 22) + (1 × 23) +   
 (1 × 24) + (1 × 25) + (0 × 26) + (0 × 27) = x  
 (0 + 2 + 0 + 8) + (16 + 32 + 0 + 0) = x  
 10 + 48 = x  
 58 = x  
   
 58 / 16 = 48 (10)(A)  
 48 / 16 = 3 (0)  
 3 / 16 = 0 (3)  
 x = 3A

B: 1101 1111 0101 0011

(1 × 20) + (1 × 21) + (0 × 22) + (0 × 23) = 3  
 (1 × 24) + (0 × 25) + (1 × 26) + (0 × 27) = 80  
 (1 × 28) + (1 × 29) + (1 × 210) + (1 × 211) = 3840  
 (1 × 212) + (0 × 213) + (1 × 214) + (1 × 215) = 53248  
 3 + 80 + 3840 + 53248 = x  
 57171 = x

57171 / 16 = 3573 (3)  
 3573 / 16 = 223 (5)  
 223 / 16 = 13 (15)(F)  
 13 / 16 = 0 (13)(D)  
 x = DF53

C:  0101 0001 1110

(0 × 20) + (1 × 21) + (1 × 22) + (1 × 23) = 14  
 (1 × 24) + (0 × 25) + (0 × 26) + (0 × 27) = 16  
 (1 × 28) + (0 × 29) + (1 × 210) + (0 × 211) = 1280  
 14 + 16 + 1280 = x  
 1310 = x

1310 / 16 = 81 (14)(E)  
 81 / 16 = 5 (1)  
 5 / 16 = 0 (5)  
 x = 51E

D: 1011 0000

(0 × 20) + (0 × 21) + (0 × 22) + (0 × 23) = 0  
 (1 × 24) + (1 × 25) + (0 × 26) + (1 × 27) = 176  
 0 + 176 = x  
 176 = x

176 / 16 = 11(0)  
 11 / 16 = 0 (11)(B)  
 x = B0

E:  1100 0011  
  
 (1 × 20) + (1 × 21) + (0 × 22) + (0 × 23) = 3  
 (0 × 24) + (0 × 25) + (1 × 26) + (1 × 27) = 192  
 3 + 192 = x  
 195 = x

|  |  |  |
| --- | --- | --- |
| **Binary** |  | **Hex** |
| 0000 |  | 0 |
| 0001 |  | 1 |
| 0010 |  | 2 |
| 0011 |  | 3 |
| 0100 |  | 4 |
| 0101 |  | 5 |
| 0110 |  | 6 |
| 0111 |  | 7 |
| 1000 |  | 8 |
| 1001 |  | 9 |
| 1010 |  | A |
| 1011 |  | B |
| 1100 |  | C |
| 1101 |  | D |
| 1110 |  | E |
| 1111 |  | F |

195 / 16 = 12 (3)  
 12 / 16 = 0 (12)(C)  
 x = C3