

# Laboratory Worksheet #01

## Number Systems Exercise

$$\begin{aligned} 257/2 &= 128 \text{ rem } 1 \\ 128/2 &= 64 \text{ rem } 0 \\ 64/2 &= 32 \text{ rem } 0 \\ 32/2 &= 16 \text{ rem } 0 \\ 16/2 &= 8 \text{ rem } 0 \\ 8/2 &= 4 \text{ rem } 0 \end{aligned}$$

Convert the following decimal numbers to binary:

1) 14

2) 189

3) 257

4) 472

$$1110$$

$$011 \quad 1101$$

$$0001 \quad 0000 \quad 0001$$

$$0001 \quad 1101 \quad 1000$$

Convert the following decimal numbers to hex:

5) 14

6) 189

7) 257

8) 472

$$0 \times E$$

$$0 \times BD$$

$$0 \times 101$$

$$0 \times 1D8$$

Convert the following hex numbers to decimal:

9) 0x37

10) 0xAB

11) 0x0147

12) 0x2AE1

$$55$$

$$171$$

$$327$$

$$10977$$

Convert the following hex numbers to binary:

13) 0x37

14) 0xAB

15) 0x0147

16) 0x2AE1

$$0011 \quad 0111$$

$$1010 \quad 1011$$

$$0000 \quad 0001 \quad 0100 \quad 0111$$

$$0010 \quad 1010 \quad 1110 \quad 0001$$

$$8 + 4 + 1 = 13$$

Convert the following binary numbers to hex:

17) 0010 1101

18) 1010 1010

19) 1110 0011

20) 0010 1001 1011 0101

$$0 \times 2D$$

$$0 \times AA$$

$$0 \times E3$$

$$0 \times 29B5$$

Convert the following binary numbers to decimal:

21) 0010 1101

22) 1010 1010

23) 1110 0011

24) 0010 1001 1011 0101

$$45$$

$$170$$

$$227$$

$$10677$$

When complete, include Worksheet 1 with your Laboratory 1-1 Pre-lab submission.

$$1 \times 2^{13} + 1 \times 2^{11} + 2^8 + 2^7 + 2^5 + 2^4 + 2^1 + 1$$

$$472/2 = 236 \text{ rem } 0$$

$$236/2 = 118 \text{ rem } 0$$

$$118/2 = 59 \text{ rem } 0$$

$$59/2 = 29 \text{ rem } 1$$

$$29/2 = 14 \text{ rem } 1$$

$$14/2 = 7 \text{ rem } 0$$

$$7/2 = 3 \text{ rem } 1$$

$$3/2 = 1 \text{ rem } 1$$

$$1/2 = 0 \text{ rem } 1$$

$$14/2 = 7 \text{ rem } 0$$

$$7/2 = 3 \text{ rem } 1$$

$$3/2 = 1 \text{ rem } 1$$

$$1/2 = 0 \text{ rem } 1$$

$$189/2 = 94 \text{ rem } 1$$

$$94/2 = 47 \text{ rem } 0$$

$$47/2 = 23 \text{ rem } 1$$

$$23/2 = 11 \text{ rem } 1$$

$$11/2 = 5 \text{ rem } 1$$

$$5/2 = 2 \text{ rem } 1$$

$$2/2 = 1 \text{ rem } 0$$

$$1/2 = 0 \text{ rem } 1$$

$$472 = 29 \text{ rem } 8$$

$$29/16 = 1 \text{ rem } 13$$

$$13/16 = 0 \text{ rem } 13$$

$$128$$

$$32$$

$$152$$

$$3 \times 16^1 + 7$$

$$48 + 7$$

$$55$$

$$10 \times 16^1 + 11 \times 1$$

$$160 + 11$$

$$171$$

$$1 \times 16^2 + 4 \times 16^1 + 7$$

$$256 + 4 \times 16 + 7$$

$$256 + 64 + 7$$

$$320$$

$$2 \times 16^3 + 10 \times 16^2 + 14 \times 16 + 1$$

$$2 \times 4096 + 2560 + 224 + 1$$

$$10977$$

$$128 + 42$$

$$170$$

$$128 + 64 + 32 + 2 + 1$$

$$128 + 64 + 32 + 3$$

$$128 + 64 + 35$$

