**Homework 3: Number Base Conversions**

**CS 200 • 10 Points Total  
Due Wednesday, February 27, 2013**

**Assignment**

Perform the following number base conversions. All necessary steps to convert by hand should be shown - any conversion without accompanying work will be counted wrong. (1 pt each)

1. Convert 4057 to base 10.

4\*72 + 0\*71 + 5\*70 =

196 + 0 + 5

= 20110

1. Convert 17210 to base 16.

172 % 16 = 10 R12 - C

10 % 16 = 0 R10 - A

= AC16

1. Convert 18710 to base 2.

187 % 2 = 93 R1 ->1

93 % 2 = 46 R1 ->1

46 % 2 = 23 R0 ->0

23 % 2 = 11 R1 ->1

11 % 2 = 5 R1 ->1

5 % 2 = 2 R1 ->1

2 % 2 = 1 R0 -> 10

= 101110112

1. Convert B02F616 to base 2.

B = 1011

0 = 0000

2 = 0010

F = 1111

6 = 0110

= 1011 0000 0010 1111 01102

1. Convert 10101010012 (unsigned) to base 10.

1\*512 + 1\*128 + 1\*32 + 1\*8 + 1\*1 = 68110

1. Convert 10101010012 (1s Complement) to base 10.

Flipped base 2 = 01010101102 =

1\*256 + 1\*64 + 1\*16 + 1\*4 + 1\*2 = 34210

= -34210

1. Convert 10101010012 (2s Complement) to base 10.

Original base 2 = 01010101112 =

1\*256 + 1\*64 + 1\*16 + 1\*4 + 1\*2 + 1\*1 = 34310

= -34310

1. Convert 142078 to base 16.

1 = 001

4 = 100

2 = 010

0 = 000

7 = 111

* (0)001 1000 1000 0111
* 1 8 8 7

= 188716

1. Convert D36A16 to base 10.

D = 13

A = 10

13(163) + 3(162) + 6(161) + 10(160) = 5412210

1. Convert -120310 to a 12-bit 2s Complement.

1203 % 2 = 601 R1

601 % 2 = 300 R1

300 % 2 = 150 R0

150 % 2 = 75 R0

75 % 2 = 37 R1

37 % 2 = 18 R1

18 % 2 = 9 R0

9 % 2 = 4 R1

4 % 2 = 2 R0

2 % 2 = 1 R0

* 0100 1011 0011
* 1011 0100 1100 (flipped)

+1

= 1011 0100 11012