CSCI 255 – Fall 2011 Name _____
Lab #1
Number systems
DUE: Start of class Wed 9/7/11

1. Convert these binary numbers to decimal and hexadecimal.

Binary	Decimal	Hexadecimal
1 0 1 1		
0 1 1 1 1 0 0 0		
1 0 1 1 0 0 0 0 1		

2. Convert these decimal numbers to 16-bit binary. Separate each nibble by a space.

Decimal	Binary (separate nibbles)
42	
124	
1023	

3. Convert these binary numbers to octal.

Binary	Octal
0 1 1 1 1 1 1 1 0	
0 0 1 1 0 1 0 1 0	
1 0 1 0 0 1 0 1 1 1 1	

4. Convert these hexadecimal numbers to decimal and binary.

Hexadecimal	Decimal	Binary (separate nibbles)
0xD5		
0xF0		
0x321		

5. Convert these decimal numbers to hexadecimal.

Decimal	Hexadecimal
107	
324	
170	

6. Convert the following numbers from 16-bit two's complement to decimal.

Binary	Decimal
1111 1111 1011 0000	
0000 0001 0000 0011	
1111 1110 1110 0110	

7. Convert the following decimal numbers to 8-bit two's complement.

Decimal	Binary (separate nibbles)
-17	
-120	
120	

8. **Calculate the decimal result of the following C bit operations. Assume numbers are stored as 32-bit two's complement.**

Operation	Decimal
157 & 46	
157 | 46	
~157	
157 ^ 46	

157 << 2	
157 >> 7	
157 & 0x0F	
(157 & 0xF0) >> 4	
(1 | 2 | 8 | 32)	

9. How many lines of output does the following C program produce? Explain why. Assume an `int` is a 32-bit data type in two's complement.

```
for (int i = 0; i >=0; i++)
{
   printf("%d\n", i);
}
```

10. How many lines of output does the following C program produce? Explain why.

```
unsigned char i = 255;
while (i >= 0)
{
   printf("%d\n", i);
   i = i - 2;
}
```