CSSE 132 – Introduction to Systems Programming
Rose-Hulman Institute of Technology

Worksheet 02 Binary/Hexadecimal

Name (Print):_____ RHIT Username:_____

1. Complete the following number representation table.

Decimal		Binary	Hexadecimal	Decimal		Binary	Hexadecimal
Unsigned	Signed			Unsigned	Signed		
0		0000	0x			1000	0x
1		0001	0x			1001	0x
2		0010	0x			1010	0x
3		0011	0x			1011	0x
4			0x			1100	0x
5			0x	13			0x
6			0x	14			0x
7			0x	15			0x

2. Convert the decimal number **14** into binary.

3. Convert `0xA7F8` to binary.

4. Convert `0x28` to decimal.

5. Convert `500` (decimal) to hexadecimal. (*Hint: Use the same approach in Problem 2 but with a different base.*)

6. Complete the conversions of binary units below.

   1 binary number = 1 [ ] or [ ] 1 **Byte** or **B** = [ ]

7. How to use *two's complement* to represent signed numbers in binary?

   It assigns the [ ] *bit with the corresponding negative weight. Namely, given a n-bit signed binary number, the leftmost bit carries a weight of* [ ].

8. Convert a 8-bit **signed** number `0xDA` to binary and decimal (using the shortcut).

   Binary: [ ]

   Decimal: *(using the shortcut:)*
   Calculate the its negative value first: $a \xrightarrow[\text{Negate}]{} -a$

   [ ] $\xrightarrow[\text{Flip all bits}]{\text{Step 1}}$ [ ] $\xrightarrow[\text{Add one}]{\text{Step 2}}$ [ ]

9. Circle the following binary numbers that represent **-5** in decimal. *(HINT: Use the shortcut.)*

   (a) 4-bit signed number `1011`
   (b) 8-bit signed number `1111 1011`
   (c) 8-bit signed number `0000 1011`
   (d) 8-bit signed number `1011 1001`

10. **Reflection:** What is one thing from this topic that you found interesting, OR what is one question you are now curious to learn more about?