SI110 Introduction to Cyber Security
Technical Foundations

Name: _____

Alpha _____

Homework: /SI110/The Cyber Battlefield/Digital Data

b	b	b	b	b	b	b	b
|	|	|	|	|	|	|	|
|	|	|	|	|	|	|	|
128	64	32	16	8	4	2	1

1. What non-negative integer does bit pattern 01100101 represent?

2. What 8-bit pattern represents the value 187 ?

3. Exactly how many bits are in a 13 KB (kilobyte) file?

4. How many bytes would be needed for an ASCII text file containing only these characters **Howdy Partner!**

5. What string is represented by this sequence of ASCII values:
40 81 66 101 114 116 41

6. All files contain 1's and 0's (binary). What causes the binary in some files to be interpreted as text (ascii characters), the binary in some files to be interpreted as sound, others to be interpreted as programs, etc.

7. What would happen if you open a file with header: ff_{16} $f8_{16}$ in notepad? What type of file is this?

8. a. Convert the following to decimal: 10110011_2

b. Convert the following to decimal: $b3_{16}$

c. The same numbers/information can be represented using binary (base 2), decimal (base 10), hexadecimal (base 16) or any other base. Computers use binary. Why do humans prefer using hex editors (like Frhed) to look at the contents of a file in hexadecimal, vice viewing the information in binary form?

9. Consider the file
http://www.usna.edu/Users/cs/sschall/SI110/l01/hw/tiger.mp3

a. The file extension leads you to believe it is what type of file?

b. What type of file is it, really?

c. How did you determine your answer to part b?

10. a. Convert the following to ASCII: $4E_{16}$ 41_{16} 56_{16} 59_{16}

b. Why are letters a necessary part of the hexadecimal number system?

c. You are examining a file using Frhed and looking at the hex pane. You notice there are some letters in the hexadecimal. Does that mean that the 1's and 0's in the file were meant to represent text? Why or why not?