Digital Data Quest

Exploring CS, Garfield HS, Mr. Bergquist

Name: _____ Period: _____

We've learned that all computer devices (i.e. cell phones, game consoles, tablets & PC's) store their information digitally in binary – a numerical system with only two states, which we generally think of as a sequence of '0's and '1's.

In this webquest, you'll use some websites as well as your favorite search engine to answer a series of questions related to digital data storage and representation. You should come away with a better understanding of how information is used by our devices. Write your answers below or save them in a Word file on the computer in our Classroom Shared folder.

A. Data Storage:

1. To represent the number 5634, how many bits do I need? (try search for '5634 in binary' using Google - each position in a binary number is one "bit")

__ __ __ __ __ __ __ __ __ __ __ __ __   **How many Bit positions? _____**

2. The largest harddrives currently on the market have a capacity of <u>approaching 60 terabytes</u> . **How many bits are in one terabyte?** (Remember: 8 bits are in 1 byte - that might be on a test some day.)

_____ Bytes in 1 TeraByte **X** 8 Bits in 1 Byte = _____

3. **Roughly how many MP3s can be stored in a Terabyte of space? How many hours of music is this?**
    NOTE: An MP3 has about 1 megabyte (MB) per minute (according to <u>eHow</u>).

_____ Megabytes in a Terabyte **X** <u>1 Minute MP3</u> **X**   <u>1 Hour</u>   **= _____ Hours.**
                                                                          1 MegaByte   60 Minutes

4. **How are the bits (1's and 0's) encoded on a CD?** Hint: check out <u>how CDs work</u>. <u>Please write /draw your explanation in your own words – do not just copy - thanks.</u>

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B. Digital images

1. As we discussed, colors in digital pictures are represented numerically. Designers and web developers often describe colors in hexadecimal. **What is hexadecimal and how is it related to binary?** Why do you think that they use Hexadecimal instead of Binary numbers?

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2. Use a color chart (http://www.allprofitallfree.com/color-wheel2.html) and **write how your favorite color is represented both in hexadecimal** (HTML code) **AND in decimal** (three values for red, green and blue).

Your Color: _____

HTML Code (in Hexadecimal) : _____

Decimal Color Values: Red: _____

                                  Green: _____

                                  Blue: _____

3. Search to find **what is "lossless" compression and give two examples** of common image formats that are lossless.

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4. Search to find **what is what is "lossy" compression? and give determine what common image file format** is lossy?

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