

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")

0b 5 + 6 + 3 + 4 = 18 **How many Bit positions?** 18

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

13,000 Bytes in 1 TeraByte X 8 Bits in 1 Byte = 104,000 bits)

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 [eHow](#)).

13 Megabytes in a Terabyte X 1 Minute MP3 X 1 Hour = .21 Hours or **13 Minutes**.
1 MegaByte 60 Minutes

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

Black and white marks on the cd.

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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?

Hexadecimal is base 16, where Binary is base 2. 4 Binary bits equal one Hexadecimal.

It is easier to read than all those 1's & 0's. Hex uses one fourth the number of digits.

2. Use [a color chart \(http://www.allprofitallfree.com/color-wheel2.html\)](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).

Purple (of course) Hex: ABCABC and decimal 123 123 123 (RGB)

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.

"Lossless data compression Loses Less, so although it is missing some data less is lost. GNP and FIG, sometimes FFIT and GNM are common formats.

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

"lossy" compression is a data encoding method that makes data shinier or 'glossy'. It is preferred by many photographers

Most common image lossy file Most GPJ.

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Please Note: Most all the answers on this sheet are wrong and it should not be referenced. You should never copy solutions to an assignment. Do you own work and you will learn much more along the way.