WRITTEN RESPONSE

2. FILE COMPRESSION

a.

File compression is any method of encoding and decoding a piece or set of data to 'take up less space' in terms of file size. First used to free used space on computer mainframes, it is more noticeably useful as a means for more efficient internet communication, by compressing photos and videos as to necessitate less bandwidth and take less time to download and upload.

b.

I used Google Drawings to create my artifact, the general scheme the result of research of targeted search of the subject. The two images I included on the artefact are to demonstrate lossy image compression (left image), and a simplistic but illustrative diagram of how compression generally works (right image, for text and data rather than photos), both found by google image search of terms like "data compression" or "data compression diagrams".

c.

The benefits of data compression are brutally simple, being reduced space occupied by the storage (or digital transfer) of the file. Thus with a given restricted space, one has the ability to store greater volumes of information within the same constraints, the burden being moved to the CPU or processing means for the possibly difficult effort of compression and decompression. Genome sequencing is an example with tremendous importance, as it is at the vanguard, if not the bleeding edge of biological sciences/genealogy, and even with stable funding the required storage space for millions of combinations of DNA necessitates data compression (Pavlichin).. Economically and more individually compression allows for images to be used in social media without being an unhealthy burden on accessible bandwidth, and is responsible for allowing modems to dramatically increase baud rate in the earlier days of the World Wide Web.Text is reducible to ⅓ its size in idealistic conditions, but even so reduces a few kilobytes of text to a few less kilobytes, so the criticality of compression lies in video and image compression which consumes many megabytes and certainly gigabytes

total in many cases, critical to the end-user and to internet service providers.

The Harms of data compression are illustrated in legal issues over the definition of what comprises compression as it pertains to the issuance of patents. Considering it is possible to patent compression schemes even as mere algorithms, there is skepticism as to the mutual benefit of a data standard which uses a patented method, as it is legally thus restricted (Chang). The sale of physical storage devices, (ie the common hard drive and removable disks) is reduced in volume by compression, as non-lossy data compression schemes with error correction are of little risk to the actual data, with multiple copies being made as backup being made easier.

d.

Particular compression schemes often used for images segregate an image into a grid of individual squares, with pixels of similar color shifted together to create a uniform color, which could for instance reduce the otherwise minor, subtle contrast of a photo of overcast into a photo with a uniform white sky, with tremendous data saving in file size. This is known as “lossy” compression, since aspects of detail in the image are permanently lost and unretrievable at least for the compressed copy of the image (common example given of lossy image format is the .jpeg file extension). Generation lost seen in analog video formats such as VHS is comparable to image compression of this manner, with overall details blurred and the image reduced and degraded, especially if multiple copies are made sequentially after each other, the original details completely removed and the quality of image reduced greatly. Audio compression often manifests as a reduction of sampling rate, from a higher studio rate to a lower rate which while noticeable does not significantly degrade quality, and is more appropriate for dictatory applications and speech than music, which often necessitates high fidelity for many people. As with image compression, chief concerns are about the generation loss in the quality of the audio file compared to the original fidelity.

e.

Beedham, Matthew. “Blockchain Can't Compress Files from 2GB to 20KB – That's Impossible.” *The Next Web*, The Next Web, 21 Sept. 2018, thenextweb.com/hardfork/2018/09/21/dotplay-blockchain-file-compression/.

Chang, Ellen, et al. “Data Compression: Social and Legal Implications.” *Data Compression*, Stanford, cs.stanford.edu/people/eroberts/courses/soco/projects/data-compression/fuzz/social/index.htm.

“Is 7z The Best File Compression Format?” *Innovation & Tech Today*, Innovation & Tech Today, 2 Sept. 2018, innotechtoday.com/7z-compression-format/.

Pavlichin, Dmitri, and Tsachy Weissman. “The Desperate Quest for Genomic Compression Algorithms.” *IEEE Spectrum: Technology, Engineering, and Science News*, IEEE Spectrum, 22 Aug. 2018, spectrum.ieee.org/computing/software/the-desperate-quest-for-genomic-compression-algorithms.