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Part 1:

It is clear that the encoding of the message is altered by compression. For, when a lossy file format is used to save the image containing the encoded information (jpg), the encoded information is lost and cannot be decoded. The result of decoding is nonsense. With a non-lossy file format (png), the message is preserved and can be decoded. Interestingly, the message is also preserved by a compressed png.

Additionally, I summed the differences between the n least significant bits of the lossy and non-lossy images containing encoded information. I found these differences to be greater with higher compression (lower quality JPEGs). At 100% image quality, the message decoded consisted of varying symbols and the summed differences equaled 960. At 90% image quality, the message decoded consisted of many repeated symbols and the summed differences equaled 1196. At 80% image quality, the message decoded consisted of a single repeated symbol and the summed differences equaled 1244. At 70% image quality no message was decoded.

Part 2:

As the value of n increases, more information is encoded in each pixel. Thus, fewer pixels are required to encode the hidden message, but the discoloration of each pixel becomes greater. With a value of n=2, nearly half the pixels in the 32x32 image are discolored, however the discoloration is barely noticeable. With a value of n=8, very few pixels encode information, however each of those pixels has completely changed color (their bits have completely changed).

File name	Value of n	Observation
hide_in_image.png	1	Almost identical to the original image.
hide_in_image2.png	2	A large number of pixels have slight discoloration.
hide_in_image3.png	3	Compared to n=2, fewer pixels are discolored. However, the pixels are now grey-ish shades of other colors.
hide_in_image4.png	4	Compared to n=3, fewer pixels are discolored, however the discoloration is more extreme.

hide_in_image5.png	5	Again, compared to n=4, fewer pixels are discolored. However, the pixels no longer appear grey. They are muted colors.
hide_in_image6.png	6	The pixels are now bright non-grey colors.
hide_in_image7.png	7	The pixels are even brighter colors.
hide_in_image8.png	8	The pixels have completely changed color.

Part 3:

The amount of data you imbed per sample produces noticeable modifications in the audio file. These modifications manifest audibly as a static sound at the beginning of the audio file. With shorter encoded messages (< 500 bytes) this static is barely noticeable. However, with an encoded message of size 10000 bytes there is a clearly audibly static period when the audio begins to play.