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Bocko

**EAS 103 Lab #4**

Q1

As I lower the sampling rate of the file, the upper frequencies of the sound file fall away. It makes the sound seem much more muffled. It is reminiscent of the quality of sound that coms from a telephone.

Q2

The quantization effects are noticeable once the bit resolution drops to 12 bits. There is an increase in noise in the background that takes away from the quality of the recording and slowly over powers it. At 4 bits, the sound is still recognizable if close attention is given, but anything less than that sounds like static.

Q3

|  |  |  |
| --- | --- | --- |
| Bit Resolution | Signal dB | Noise dB (Max) |
| 16 | 53 udB | 26.5 udB |
| 15 | 106 udB | 53 udB |
| 14 | 212 udB | 106 udB |
| 13 | 424 udB | 212 udB |
| 12 | 848 udB | 424 udB |
| 11 | 1.6 mdB | 848 udB |
| 10 | 3.2 mdB | 1.6 mdB |
| 9 | 6.4 mdB | 3.2 mdB |
| 8 | 12.8 mdB | 6.4 mdB |
| 7 | 25.6 mdB | 12.8 mdB |
| 6 | 51.2 mdB | 25.6 mdB |
| 5 | 102.4 mdB | 51.2 mdB |
| 4 | 204.8 mdB | 102.4 mdB |
| 3 | 409.6 mdB | 204.8 mdB |
| 2 | 819.2 mdB | 409.6 mdB |
| 1 | 1.6 dB | 819.2 mdB |

Q4

The signal to noise ratio is different at every bit resolution, and the bit drop needed to double the noise volume at each bit resolution is different for each bit resolution as well. At 12 bits, a drop to 8 bits makes it sound like the noise level has doubled in the sounds file. The ratio for the noise level in the 12 bits to 8 bits is slightly more then 6 db in reality.

Q5

There aren’t many ways to achieve better data compression and retain quality, though one technique involves averaging values of samples together and recording at a high sampling rate. This would require a 1-bit sample resolution, but at a sampling rate that is hundreds of times faster then normal. This allows for higher frequencies to get captured because of the high sampling rate and keeps the integrity of the recorded sound.