Note: You will need to download the file `aotj1.wav` from the course webpage. Although not absolutely necessary, it will help if you have earphones.

1. Read the audio file `aotj1.wav`. From the signal, figure out the number of quantization levels (bits/sample) and the quantization levels (this is a uniformly quantized sound signal, with values between +1 and -1, i.e., $V_p = 1$). Convert this signal into a binary NRZ-L PCM signal $x(t)$ of pulse width $T = 1$ secs, sampled at $dt = 0.1$ sec, with $s_1(t) = A, 0 \le t \le T$ and $s_2(t) = -A, 0 \le t \le T$. You might find the function `dec2bin` useful.

2. Ignoring Inter-symbol interference, add zero-mean Gaussian noise with different variances (as in the previous lab) to simulate channel noise. From this noisy signal, detect the transmitted bit stream using matched filters followed by the detection process.

3. Convert the detected bit stream back into the amplitude signal, and see (listen) if the audio signal is a faithful copy of the original audio signal using the `soundfile.read` function from `soundfile` library, and `sounddevice` library. Try this for various amounts of noise added.