EE16A: Homework 1

Problem 4: Filtering Out The Troll

```
In [4]:  import numpy as np
         import matplotlib.pyplot as plt
         import wave as wv
         import scipy
         from scipy import io
         import scipy.io.wavfile
         from scipy.io.wavfile import read
         from IPython.display import Audio
         import warnings
         warnings.filterwarnings('ignore')
         sound_file_1 = 'm1.wav'
         sound_file_2 = 'm2.wav'
```

Let's listen to the recording of the first microphone (it can take some time to load the sound file).

```
In [5]:  Audio(url='m1.wav', autoplay=False)
```

Out[5]:   0:00   -0:10

And this is the recording of the second microphone (it can take some time to load the sound file).

```
In [6]:  Audio(url='m2.wav', autoplay=False)
```

Out[6]:   0:00   -0:10

We read the first recording to the variable `corrupt1` and the second recording to `corrupt2`.

```
In [7]:  rate1,corrupt1 = scipy.io.wavfile.read('m1.wav')
         rate2,corrupt2 = scipy.io.wavfile.read('m2.wav')
```

Enter the gains of the two recordings to get the clean speech.

Note: The square root of a number a can be written as `np.sqrt(a)` in IPython.

```
In [8]:  # enter the gains u (recording 1) and v (recording 2)
         u = (np.sqrt(6) - np.sqrt(2)) / 2
         v = (3 * np.sqrt(2) - np.sqrt(6)) / 2
```

Weighted combination of the two recordings:

```
In [9]:  s1 = u*corrupt1 + v*corrupt2
```

Let's listen to the resulting sound file (make sure your speaker's volume is not very high, the sound may be loud if things go wrong).

```
In [10]:  Audio(data=s1, rate=rate1)
```

```
Out[10]:
```

0:00   -0:10