EECS16A: Homework 1

Problem 2: Filtering Out The Troll

In [1]:
```
import warnings
import wave as wv

import matplotlib.pyplot as plt
import numpy as np
import scipy
import scipy.io.wavfile
from IPython.display import Audio
from scipy import io
from scipy.io.wavfile import read

# For this to work make sure to download m1.wav and m2.wav to the same l
ocation as this jupyter notebook
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). Run the cell below, then press the play button to listen.

In [3]:
```
Audio(url="m1.wav", autoplay=False)
```

Out[3]:

0:00 / 0:00

And this is the recording of the second microphone (it can take some time to load the sound file). Run the cell below, then press the play button to listen.

In [4]:
```
Audio(url="m2.wav", autoplay=False)
```

Out[4]:

0:00 / 0:00

We read the first recording to the variable `corrupt1` and the second recording to `corrupt2`. Treat `corrupt1` and `corrupt2` as the two sound recordings picked up by microphone 1 and microphone 2 respectively.

In [5]:
```
rate1, corrupt1 = scipy.io.wavfile.read("m1.wav")
rate2, corrupt2 = scipy.io.wavfile.read("m2.wav")
```

Enter the weights 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 [6]:
```
# enter the weights u (recording 1) and v (recording 2)
u = 2/(np.sqrt(6)+np.sqrt(2))
v = (2*np.sqrt(3))/(np.sqrt(6)+np.sqrt(2))
```

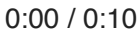
Weighted combination of the two recordings:

In [7]:
```
a = 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 [8]:
```
Audio(data=a, rate=rate1)
```

Out[8]:



In [ ]:
```

```