1. (a) To estimate a noise model I used the scipy's Welch function to smooth out the power spectrum. I used a Blackman filter in the Welch because, after some experimentation, it seemed to preserve the signal the best. If I had just taken the power spectrum of the whole strain then a Tukey window would have been preferred because its flat portion would have preserved the signal. I did this originally but the Welch method worked better in the end. I also assumed that the noise model should be about the same for each detector so I further smoothed the noise model by taking an average of the four events. Figure 1 (fig1.png) shows the noise model I came up with.

   (b) Figure 2 (fig2.png) shows the outputs of the matched filter, for each event and detector.

   (c) See c.out.txt for max signal to noise ratios. First line is the events for the Hanford detector, second is the Livingston.

   (d) I wrote code for this section but the magnitudes were way off. I think there is some normalization bug in my code somewhere.

   (e) See e.out.txt for results. First line is the events for the Hanford detector, second is the Livingston.

   (f) See f.out.txt for arrival time results. First line is the events for the Hanford detector, second is the Livingston.