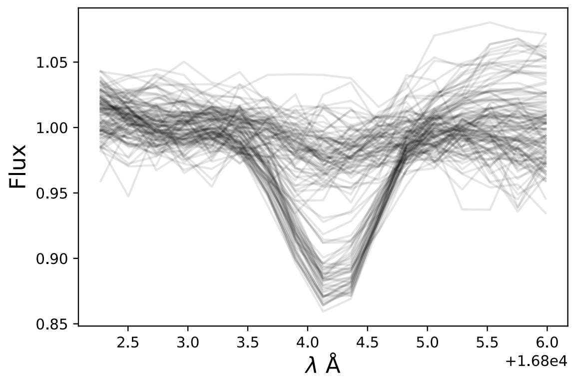
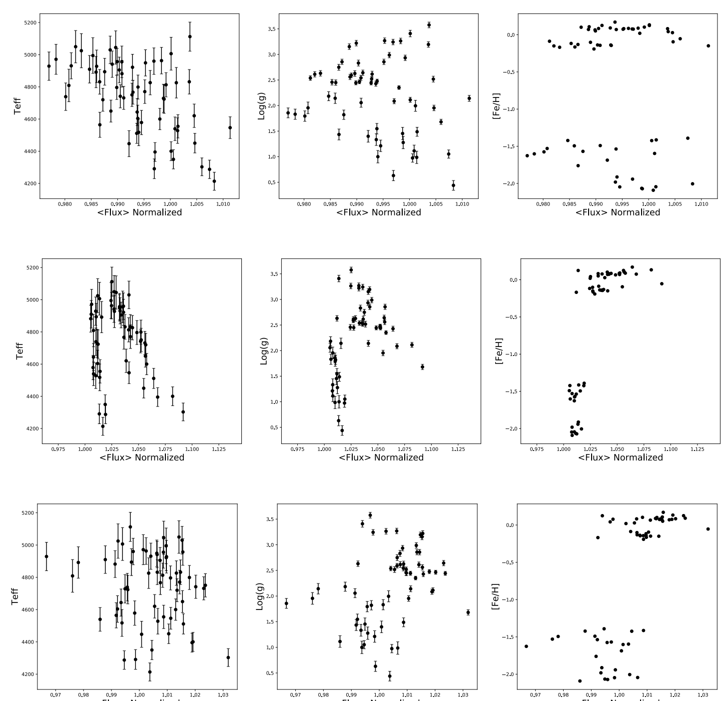
Problem 2
b, c and d)

Given the series of spectra, we first stack all of the stellar spectra centered on the absorption feature ~16804 Å. Seen in the figure below, we plot the Flux as a function of wavelength centered around that region. As expected, we note that for different stellar parameters, the absorption feature will increase or decrease in intensity depending on those parameters.



For each spectrum, we trim the lightcurve centered on our desired absorption feature and take the median flux for each spectrum. Finally, crossmatching the position of each source, we find the Teff, Log(g) and [Fe/H] parameter of each star. We repeat the process for absorption feature centered at ~15339.2 Å and non-absorption part of the spectrum at 15492 Å, and finally clean the data from outliers such as nan values, high errors and -999 values. For each region, we plot the Teff, Log(g) and [Fe/H] as functions of the normalized median flux. Seen in the adjacent figures, we order the rows by the absorption features respectively.



For the first absorption feature (centered at ~16804 Å), we note that there exist a inverse correlation between the temperature and normalized flux of the absorption feature. For high temperatures, the flux will decrease and for lower temperatures the flux will increase. This suggest, as expected, that the intensity of the absorption feature is correlated with the temperature of the star. The correlation also exists in the 2nd row, for the temperature flux. Compared to the 3rd row, where no absorption feature was present, we notice a random scatter in the data. For stellar parameters log(g) and [Fe/H], we notice that the correlations do not seem to obey and obvious known correlations (i.e linear, polynomial). However, we note that all three parameters should have some level of correlation, but given our quality cuts, the effective temperature seems to be most correlated with the flux.

One method for automatic the quality of the pixels would to fit the data to a known model. Let's say for example a linear model for the Flux-Temperature relation. For each spectrum and pixel row, we would repeat the following process and assuming the data would fall in a 2-sigma cut-off, we would accept that the pixel is good.