PHYS 160 - Homework #7

It's the economy stupid!

With all this talk of recession and failing economies, let's do some research for ourselves. An oft-quoted statistic in America is the joblessness rate, or unemployment. The US government keeps records of this economic indicator as far back as 1942. We will be using data pulled from the Bureau of Labor Statistics (www.bls.gov). Open the unemployment data and do the following:

- Import the data from the first file into Maple. Use the comma-separated format so that the data divides neatly.
- Chart the unemployment data. Include a proper x-axis and title.
- Calculate the average unemployment, add this into the title of your first chart.
- Subtract the average unemployment from the original data. Show that this new data has zero mean.
- Chart this new zero-mean data. Include a proper x-axis and title.
- Explain why it may be useful to subtract the mean from this data (as a comment in your sheet).

Sax-a-ma-phone!

While I've chosen a specific date range for your assignment, you'll find many other interesting items in this data set for political ammunition. The point is not to rely on others, but to learn the tools to validate conclusions yourselves.

- Import the data from the second data file. There are no x-axis values for this set, so let the X axis values go from 1 to `nops`(data).
- Calculate the mean of this data $\bar{y}$:

$$\bar{y} = \frac{1}{N}\sum_{i}^{N} y_i \tag{1}$$

- Fit a straight line function to the data, call it `fit1`.
- Read up on coefficient of determination, or the R^2 value online. Essentially it measures how good of a fit your model is to the real data.
- Calculate the R^2 value for `fit1`:

$$R^2 = 1 - \frac{\sum_i (y_i - f_i)^2}{\sum_i (y_i - \bar{y})^2} \tag{2}$$

- Explain what historical conclusions can be drawn from your charts about the Clinton administration and unemployment (as a comment in your sheet). Assuming the next president was exactly the same, could this have been kept up indefinitely?
- Find a second function `fit2` that has a larger R^2 value.
- Plot the data, `fit1`, and `fit2` on the same chart.