EE 251: Project 3

All programs must be emailed. Please follow the following steps

1. It is probably easier if you create a directory for the project.
2. Zip all the files (or the directory for that project if you made one) using the following command

   ```
   tar -czvf lastname_firstname_project3.tar.gz project3.m
   ```

   or if you put all the files in a directory

   ```
   tar -czvf lastname_firstname_project3.tar.gz project3
   ```

   Don't forget to change `lastname_firstname` with your last and first name
3. Email me you .tar.gz file with EXACTLY the following as the subject

   ```
   spring 2015 ee251 project3
   ```

Often times data collected from sensors are corrupted with noise due to a variety of reasons. These could be due to electronic noise, the nature of the signals themselves or the process they went through, etc. In this project you will analyze a noise signal and attempt to clean it, i.e., filter it.

A primitive but effective for many applications is to perform a moving average. This may be accomplished with the following formula:

$$y(n) = \frac{1}{N}\left[x(n) + x(n-1) + \cdots + x(n-N)\right]$$

where $x(n)$ is the noise signal to be filtered, $y(n)$ is the output, n is the current time step, and N is the length of the filter.

Write a MATLAB code to filter the signal provided in the following file:
http://www.ee.nmt.edu/~elosery/spring_2015/ee251/data3.txt
The first column of the file is the clean data, while the second column is the data corrupted with noise. You will need to filter the second column.

In your report, compare your filtered signal with the actual signal present in the first column of the file. You need to discuss:

1. the approach you have used,
2. the effect of N on the result, and
3. what is the effect of N on the phase shift

Use figures to demonstrate your findings.