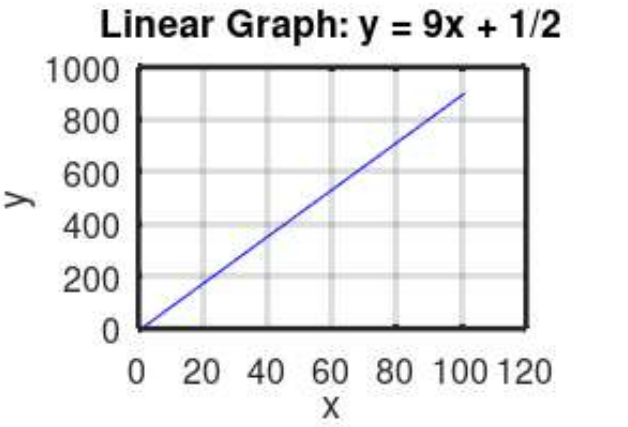
Piece 3

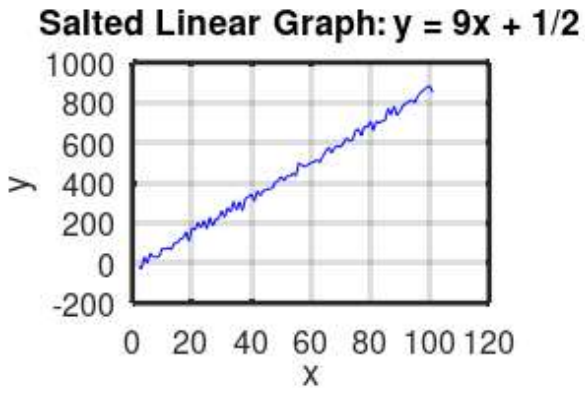
Octave Tutorial - Plot, Salt, Smooth Data

The tutorial that I decided to use so that I can learn about Octave/Matlab is the one and a half hour video by Mr. STEM EDU TV. It is titled "Octave Tutorial for Absolute Beginners: Learn Octave in 1hr and 30 min". During this video, it taught me the bare basics regarding the programming language ranging from how to install octave on my desktop to writing functions in octave. What was interesting to me was that since I already learned a few different programming languages, this one was a lot easier to learn and grasp the concepts of.

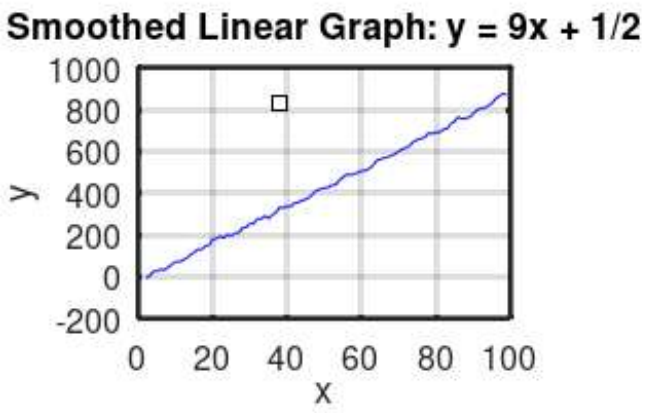
For this piece of the project, we had to pick a function and then plot, salt, and smooth the data. When I was deciding what function to plot, I decided to pick a more interesting function rather than the traditional y=mx+b. In my program, I plotted the function y=9x+1/2. To create the first graph, we can plot the function. The simple way to plot the function would be to set two variables. We would set x to x = 0:10. This would populate the x variable with [0 1 2 3 4 5 6 7 8 9 10]. For us to create the y variable, we would have y = 9*x + ½. Therefore, if we are plotting the point x = 4, we would have y(4) = 9*4 + ½.



I wrote a function named createPlot() that would create empty vertices (e.g. x = []). For x, I wrote a for loop that you populate x with numbers from 0 to 100. You can write this as x = 0:100. For y values, we would have a y = (9*x) + ½. This would populate all the variable in y with the corresponding values to the x values. Once those two variables are created and populated with values, we can run a few lines of code that will add things such as x-axis labels, y-axis labels, displaying the x values and the y values, turning on the grid, and altering the linewidth and the fontsize so that the graph is easier to read. There is also a plot title. Once the graph is created, towards the end of the function I would call the saltData(x,y) function.



The next function that I wrote was so that I can salt the data. We would have the data x values populate in the same way and then we would have the y values populate by creating a for loop for all the variables in x. Therefore, the y values would be populated by random values on the y axis. This graph also has similar code to the one above other than populating the x and y variables. This graph has code to display y, plot the salted x and y variables, add a title to the graph, add a x label on the x-axis, add a y label on the y-axis, turn the grid on, and then it calls the smoothData(x,y) function.



The final function that I wrote is a smoothData(x,y) function that will create a variable s and have it equal to an empty vertices []. I then would create a loop that will input values into s that is (y(i) + y(i+1) + y(i+2))/2. That creates the values that is required for s so that the smoothData function works properly. Then, the same lines of code would be written for the graph title, the x-axis label, the y-axis label, turning on the grid, and changing the linewidth and the fontsize.

Overall, my thoughts on this portion of the project was that this was an interesting and relatively easier piece of the final project. I believe that this is a piece that should be kept for the future because although I may not even specifically use octave or matlab again, I was able to learn a new programming language easier than any of the previous languages that I have used. I believe that it also gives me a great insight to what matlab/octave really are because in my previous classes such as discrete math, foundations, and calculus my professors have always demonstrated graphs to us using this programming language.

I did find that learning Octave was more enjoyable than other programming languages. I wish that more programming languages used similar syntax because I believe that this language was very self-explanatory and beginner friendly. If you were to do this project again for the next semester, I think that your future students would benefit from learning this language and watching a tutorial.

```
function createPlot()
  x = 0:100
  for i = 1:length(x)
    y = (9*(i) + 1/2)
  endfor

  subplot(2,2,1)
  plot(x,y,"b")
  title("Linear Graph=9x+1/2")
  hold on
  disp(x)
  disp(y)
  xlabel('x');
  ylabel('y');
```

```
function saltData(x,y)
  counter = 1
  for i = 1:length(x)
    a = randi(15,1)
    b = randi(50,1)
    if(mod(counter,2) == 1)
    y(i) += (a-b)
  else
    y(i) -= (a+b)
  endif
  counter++
  endfor
    disp(y)
```

```
function smoothData(x,y)
  s = []
  for i = 1.length(x)-2
    s = (y(i) + y(i+1) + y(i+2))/3
  endfor

  x(end) = [];
  y(end) = [];
  disp(s)
  subplot(2,2,3)
  plot(x,s,'b')
  title('Smoothed Linear Graph: y=9x+1/2')
  xlabel('x');
  ylabel('y');
```