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Throughout this brief report, I will be examining the observations I made when looking at the graphs using the PSS (plotting, salting, and smoothing) program that makes use of JFreeCharts for plotting and Apache for the data statistics. The ranges that I used for the graphs are the same ones I used when making my observations for the PSS in Octave. Specifically, the ranges that were used are 0-25 and 0-50. As for the salted and smoothed values we will be observing, the values are the maximum or half of the maximum, a little more different than the values used for the other two PSS programs. A note to be made is that the new PSS that was made with JFreeCharts and Apache generates the salted and smoothed graphs without asking for user input, getting both graphs simultaneously. Compared to the Octave PSS, there is more room for potential file names since already made file names can't be salted or smoothed after it is made when it is run initially. When discussing the maximum and half of the maximum, I have default values setup when going through the code, so 5 is the maximum I placed for the data to not make the line completely linear. The same is done when using salted values since the maximum I placed was the default value the program tells you about.

The normal graphs for the data points stay consistent with the other PSS programs when it comes to the shape of the line, half of a U-shape. This shows how the function used for the PSS programs, **x^2 + 0.5x**, holds up regardless of the different ways it could be coded and used with different graph options. Along with the normal graphs, the smoothed graphs remain consistent with the values used since the smoothed graph with the maximum value continues to be closer to a linear line over the one with half of the maximum smooth window value. The salted graphs follow the same consistency, with the higher values showing more salted data compared to the ones lower than it.

Since the Apache Stats Library was imported and implemented, I will now be examining the mean and standard deviation for the normal, salted, and smoothed data. The normal data has a mean of 227.50 and a standard deviation of 200.70 on the 0-25 range. Compared to the salted and smoothed data for the maximum values allowed on each, the mean for the salted values is 168.89 and the standard deviation is 283.64. For the smoothed data, the mean is 225.71 and the standard deviation is 185.43. The statistics for the salted values is understandable because of the extreme changes the values take in salted data. The smoothed values do the same in consistency since the smoothed data is meant to make the graph appear more linear and consistent, which is what can be seen from the values being less than the normal data but not too far off, like the salted values. The salted data statistics for half of the maximum values allowed are as follows: the mean is 226.32 and the standard deviation is 230.58. The smoothed data statistics for half of the maximum values allowed are: the mean is 226.68 and the standard deviation 193.71. These values remain closer to the normal data statistics because of the values used for salting and smoothing, showing the efficiency of the salting and smoothing methods for the program.

Looking at the graphs for the 0-50 range, the normal graph reaches above the 2500 for the y-values. Compared to the smooth graphs, these hit below 2500 at different ranges due to the value of the smoothing window. The graph with half of the maximum for smoothing goes below 2500 and remains above 2400, while the maximum for smoothing goes below 2400 and above 2300. For the salting graphs, the values used to make the value changes extreme to a certain measure remain consistent due to the maximum salted graph being less bunched together compared to half of the maximum. Comparing the two sets of graphs for the different ranges, they both parallel each other's results showing the consistency of the program when working

with these ranges and with the certain smoothing and salting values. After looking at all forms of doing the PSS program, the more efficient and organized one is this option since the graphs generate without going into Excel and appear more professional compared to the Octave options.

The normal data with the range 0-50 has a mean of 871.25 and a standard deviation of 773.93. The screenshot for both sets of statistics regarding what the salting and smoothing values show the same mean and standard deviation for the normal set of data. For the maximum salt value data, the mean is 748.43 and the standard deviation is 832.91. As for the maximum smooth window value data, the mean is 869.18 and the standard deviation is 757.36. Looking at the statistics for half of the maximum, the mean for the salted data is 850.40 and the standard deviation is 782.58. For half of the maximum when it comes to smoothed window values, the mean is 870.35 and the standard deviation is 766.59. Comparing the sets of statistics to range 0-25, the values parallel each other since the mean and standard deviation remains consistent with the rule of thumb. That rule being the higher the value used, the more spread out the numbers get such as the higher smoothing window values lowering the mean. Also, the higher the salted value the lower the mean gets while the standard deviation gets higher.