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My plotter, salter, and smoother program has made use of numerous ranges when it comes to the x-coordinate. More specifically, the range always starts out at 0 but the end parameter varies from either 10, 20, or 40. Along with trying out different end bounds regarding this program, different values for the smoothing and salting portion of the program were implemented in order to see how different the data is with each different set of values. A basic rule of thumb that I followed was that I didn't try to maximize the salting values since the data would have looked very skewed and instead opted to stick with going half of the maximum and compared it to a either 20% of the maximum salted value or a quarter of the maximum salted value allowed. Throughout this writing, I will be discussing more in detail on what I found using these different values and will also be comparing it compared to the normal set of output before it went through salting or smoothing.

Before I go into detail, the function that was made use of when experimenting with different parameters and values regarding salting and smoothing is the following: **x^2 + 0.5x**. First, looking at the 0-10 set of values, the graph forms almost a half U like shape when the data is at its normal state before alterations are made. Looking at the different smoothing options, a window value of 3 leads to almost a linear line being formed however it is not completely linear. Now, when it comes to the maximum window value (5), the line appears to be linear, making this line the smoothest it can possibly be for this range. As for the different salting options, the maximum salting value for this was 20, however I made use of the values 5 and 10. For the salting value 10, the line goes through small but noticeable bumps, showing a little salting occurring. When it comes to the salting value 10, the data takes more noticeable drops, more specifically toward the second half of the data. So the salting values have been shown to be more significant the higher the value, proving that the salting function is doing its job effectively.

Moving onto the next set of graphs for the function **x^2 + 0.5x**, which is on a range from 0-20, we can see that the normal data set is similar to the other normal data set that ranged from 0-10. The main difference is that even though they appear similar, the 0-20 data set appears to be more like half of a U compared to the 0-10 data set. This shows that the larger the range is the more the graph appears to form the U like shape. This will be confirmed once I examine the last graph of normal data with the range 0-40. Moving onto the smoothed data, the values that were used for the window were 2 and 5 in order to see the differences in smoothing. Surprisingly, the graph has a more linear appearance using the value 2. That leads me to the conclusion that the higher the data set, the harder it is to achieve a smooth line with the highest possible values. The smooth graph with the window value 5 has a close to linear appearance but the first half of the X values almost begins to form a U-shape. When it comes to the salting values, which are 20 and 40, with the maximum salt value being 90, both data sets follow the salting pattern of appearing more up and down the higher value, holding up with the previous salt values that were used for the 0-10 graphs.

Onto the last data set, which is ranging from 0-40, we can see the normal data set still assembles half of a U-shape but it's not as visible compared to the 0-20 graph for the normal data set. An interesting observation that contradicts the previous smooth graphs is that regardless of the values used, which are 1 and 5, they still hold an appearance of half of a U-shape, showing that the larger the data set, the harder it is to smooth the lines for the graphs. As for the salted graphs, it follows the same pattern as before, with higher values showing more salted lines. The values that were used here are 50 and 140, with the maximum salt value being 190. The 140 value was used here in order to see how different the data would look with a value closer to the maximum. After analyzing these findings, the smoothing values are not as consistent as the salting values. A possible reason for this is the data set getting larger overtime that can lead to inconsistency, mainly for the smoothing graphs.