Class Project: Part 2

Developing your program structure and components

As part of your next step towards developing your code, it is important to think about critical steps that your program needs to perform and how to catch possible errors. Evaluation of the project is performed surrounding how successful you achieve the following components for your program. We understand that each program will be different with different data sets and each project will be evaluated as an isolated unit given the constraints of the data set used.

Fill in the following information for your project and upload to your google folder. Inform your point-person when you have completed it and are ready to receive reviews and comments. Keep in mind, your code should have exhaustive inline comments to guide an untrained eye to understand what steps are being performed.

1. **Input Data**: Where is the data coming from: Local/Server? How is the data stored (file format, …). How will you read in the data: user interface / hard coding? In what format should the data be stored within the program: lists, floats, complex, 1/D/2D/3D/nD, etc.. Does the user select which data set/column corresponds to what or is provided within the file as headers. Units?

2. **Validate Data**: What types of data are you expecting? Did you confirm no information is provided that is not within the expected range that is physically possible? How do you resolve errors in reading in information: for example, a letter is accidentally present within an otherwise numeric data set. Are units appropriate for anticipated data set?

3. **Manipulate/Analyze Data**: What operations need to be performed to analyze the data set and obtain the desired results. Are reference values needed which also need to be read into the script as a separate file? Is the analysis properly translated into an algorithm? Does the algorithm fail gracefully if an error is encountered (unphysical output)?

4. **Statistical Analysis**: What statistical analysis can be performed on the data set to evaluate errors, correlations, etc.? Do you need to fit a function to a data set?

5. **Visualize Results**: How do you best represent your results? What type of visualization are appropriate and effective? Show the raw data to the user along with your analyzed data. If you took a class on data visualization, make sure to adhere to best practices for colors, plotting style, labeling, etc.

6. **Export Results**: How will you export the data? What should be exported? What file formats are appropriate for the user to perform additional analysis or incorporate the

data in an effective way in a presentation or paper? How do you ensure the user knows how to link your calculated errors with the original data set? Where will you export the results? Make sure to export both numeric/text information **and** your visualizations (images, plots, etc.).