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***Part 1***

The goal for part 1 was to write a csv reader/writer from scratch along with a salter and smoother to alter the data contained in the csv. The csvs were then graphed in Excel to check for accuracy. The function I chose to use was cube root, I thought it was simple enough that should anything be going wrong it would probably me my programming and not my understanding of math. Plus, curves are generally pleasant to look at.

***createFile()***

This method is used to create the File object that will be passed to the csv writer. It creates a new file at the specified path if the file does not already exist.

A screen shot of a computer program

Description automatically generated

***Methods Contained in Cube Root Class***

***graphSpecifics()***

Graph specifics gets the start point, end point, and interval of the graph from user Input then passed the information about the graph to cubeRootData().

A computer screen with many colorful lines

Description automatically generated with medium confidence

***cubeRootData(ArrayList<Double> Graph)***

Cube root data takes the information passed from graph specifics and runs Math.cbrt() to get the X and Y point data.

A screen shot of a computer program

Description automatically generated

***Methods contained in Manipulate Data Class***

***filePicker()***

Chooses a file based off user input in the Part 1 data files directory to be passed to other methods in the class that alter the data.

A screen shot of a computer program

Description automatically generated

***readData()***

Takes the csv file passed from filePicker and reads all the data into an ArrayList. Skips the csv header.

A computer screen with text and images

Description automatically generated

***formatCSV()***

Takes an ArrayList of csv values and formats the values correctly for placement back into csv format to be passed to writeCSV()

A screen shot of a computer code

Description automatically generated

***writeData()***

Uses FileWriter to write an ArrayList to an empty file. Adds the header back to the data.

A computer screen shot of a program

Description automatically generated

***Methods contained in Salter Class.***

***salter()***

Loops through csv values read from a chosen file, splits the values be “,” using regex and adds or subtracts the rng range from rngNumberChoose(). Writes the data a new file with the salted data.

A computer screen shot of a program code

Description automatically generated

***rngNumberChooser()***

Chooses the rng range to be passed to salter() based on user Input.

A computer screen shot of code

Description automatically generated

***Method contained in Main class.***

***main()***

Calls the run class executes the whole program. I wasn’t sure if I should include this or not.

A black background with white text

Description automatically generated

***Methods contained in Smoother Class.***

***windowValue()***

Chooses the moving window of values to be smoothed based on user input, passes it to smoothData().

A screen shot of a computer program

Description automatically generated

***smoothData()***

Takes the moving window from the previous method and iterates through the ArrayList of Y values until the moving window is reached, then the combined values are averaged and passed to another array to be written to a csv file.

A computer screen shot of a program code

Description automatically generated

***Methods contained in the Run Class.***

***graph()***

Calls the createFile() method to specify what file the graph data will be written to, calls the previously mentioned methods graphSpecifics() and writeData()

A computer screen with white text

Description automatically generated

***run()***

Provides a very simple user interface when the program is running.

A computer screen with many white and green text

Description automatically generated

***Part 1 Program in Action***

Program startup.

A black screen with white text

Description automatically generated

Naming the file.

A screen shot of a computer

Description automatically generated

Base Cube Root Graph written.

A screen shot of a computer

Description automatically generated

Choosing the csv file to salt.

A computer screen shot of a computer code

Description automatically generated

File successfully salted with range 5.

A screenshot of a computer screen

Description automatically generated

File successfully smoothed with range 10.

A screen shot of a computer

Description automatically generated

***Cube Root Documentation Graph***

A graph with a line

Description automatically generated

***Cube Root Salt Range 5***

A graph with blue lines

Description automatically generated

***Cube Root Salt Range 5 and Smooth Range 10***

A graph of a graph

Description automatically generated

It’s smoothed but with a small number of values I am not sure if it could correctly be identified as cube root. To see if this problem can be rectified there are graphs with significantly more values below.

***Cube Root Salt Range 10 with 20000 Data Points***

A graph with a blue line

Description automatically generated

***Cube Root Salt Range 10 Smooth Range 50 with 20000 Data Points***

A graph of a salt range

Description automatically generated with medium confidence

This is way smoother and can clearly be identified as cube root, so I think it is safe to say that smoothing is significantly more accurate with more data to work with.