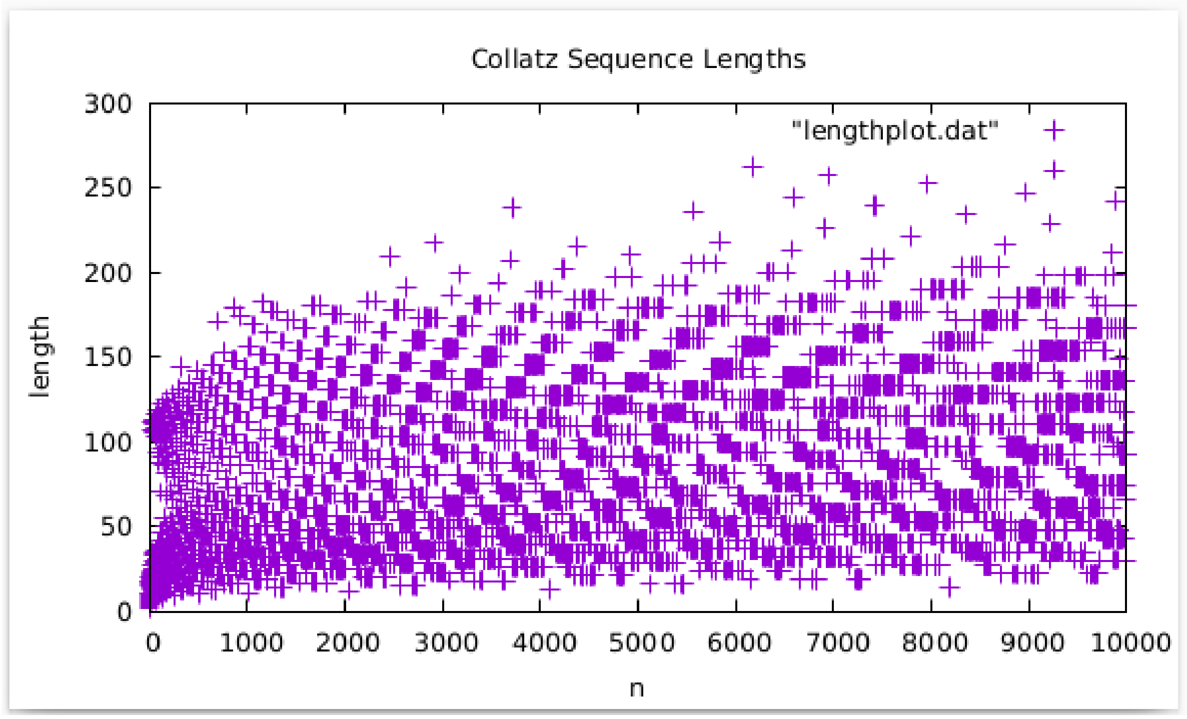
CSE13s WRITEUP:
Liam Murray
Lijamurr



This is the Collatz Sequence Lengths graph. This graph represents the total length of a given sequence (y) and the number on which that sequence started (x).

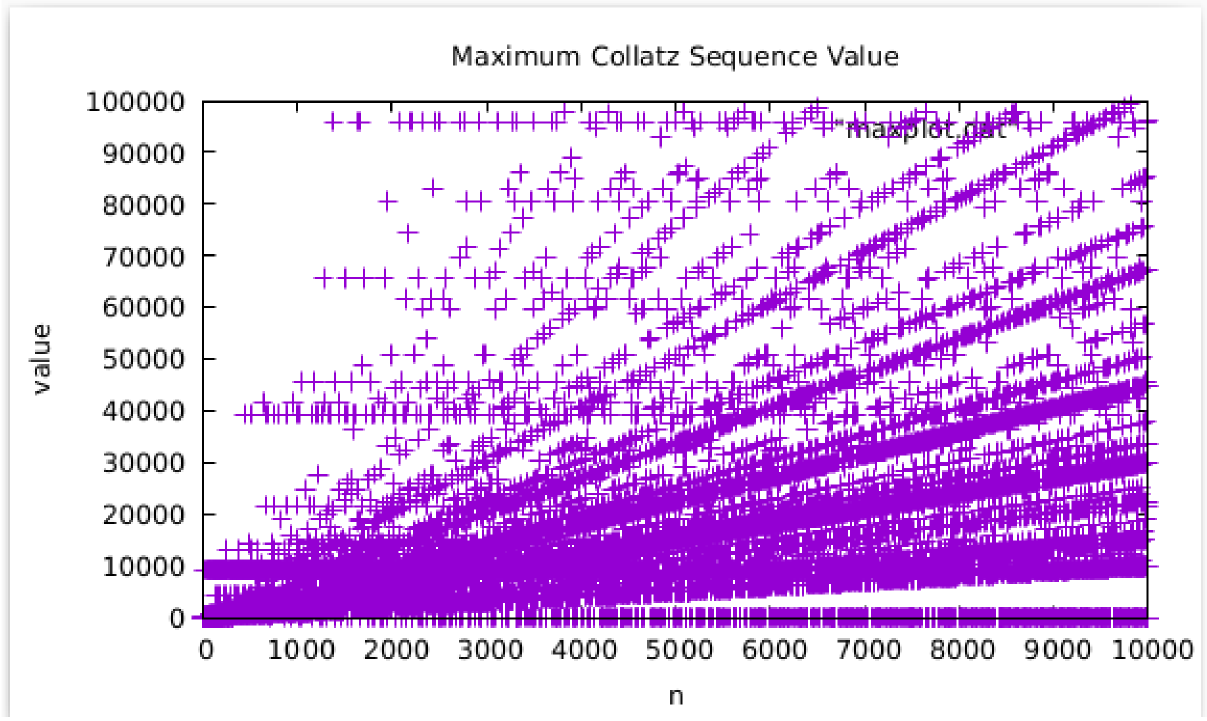
Commands Used:

Head: I selected to use the “head” function, as it allowed me to pipe the input of a file directly into the next command, allowing me to easily move data without having to rerun the “Collatz” executable.

Wc: I selected to use this command as it could determine the length of an imputed file, which would in turn produce the length of the Collatz sequence.

Echo: Echo allowed me to format the data in x y coordinate pairs to be inserted into the file used by gnuplot.

For loop: allowed me to iterate over the collatz sequence values.



This is the Collatz Sequence Maximum Value graph. This graph represents the maximum value of a given sequence (y) and the number on which that sequence started (x).

Commands Used:

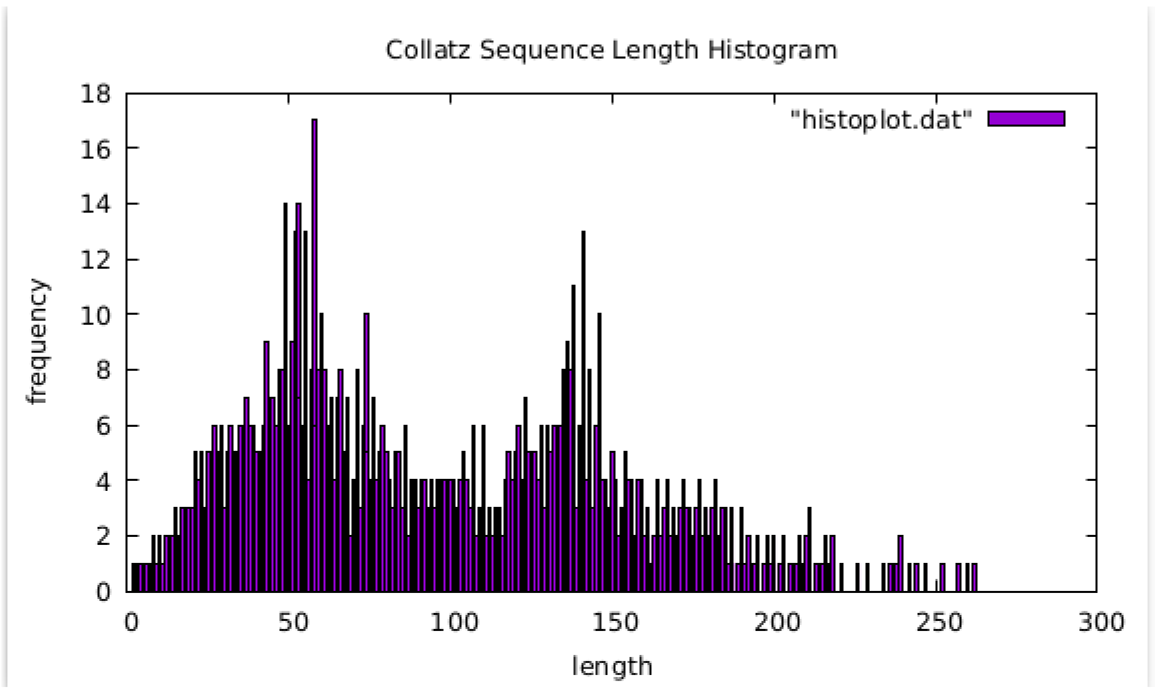
Sort: I selected to use the “sort” function, as it allowed me to organize the data numerically, which allowed me to skim the data for the largest number.

Head: this function allowed me to read the top number of a data file, which once sorted, was the largest number.

If, then: I selected to use this command as it could determine if the “maximum value” of a sequence was over a certain threshold. Oftentimes extreme outliers could skew data, and removing them allowed for a more meaningful graph.

Echo: Echo allowed me to format the data in x y coordinate pairs to be inserted into the file used by gnuplot.

For loop: allowed me to iterate over the collatz sequence values.



This is a histogram of how often certain lengths of collatz sequences appeared in a data set. It shows the length value being recorded (x) and the frequency with which that data point occurred (y).

Head: Allowed me to read the collatz sequence from a file into another command.

WC: Allowed me to determine the length of a file, and thus the length of the collatz sequence.

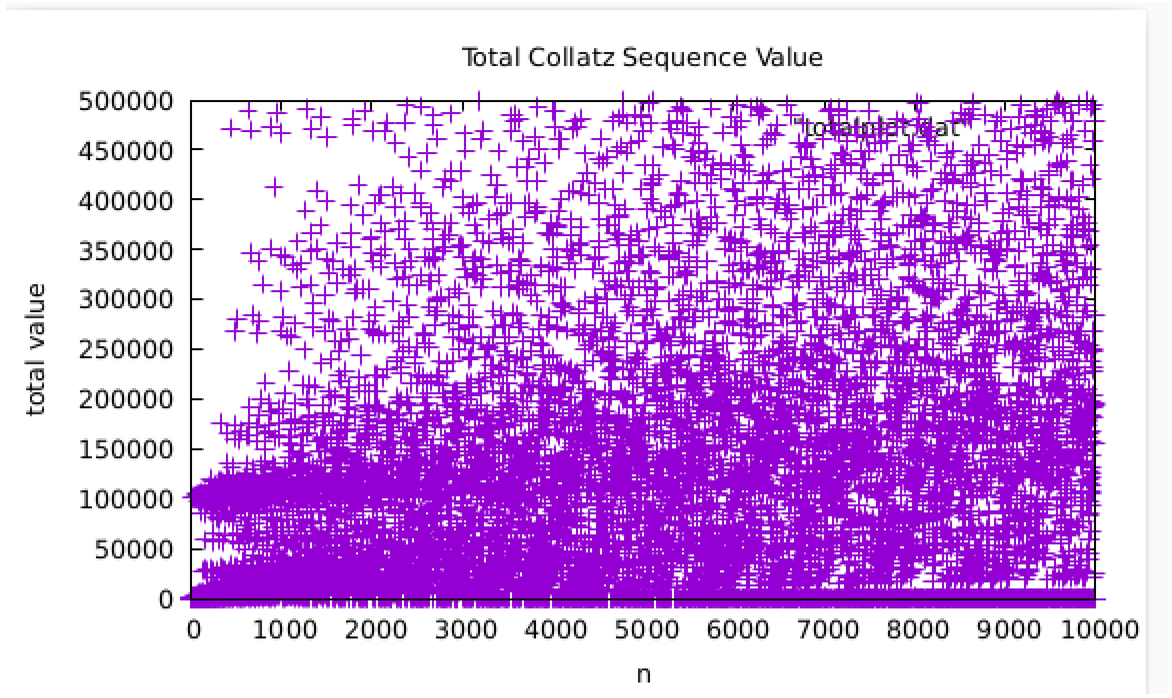
Echo: Allowed me to format the data into appropriate x, y coordinate pairs.

For loop: Allowed me to iterate through the required “n” (collatz sequence starting points) values.

Uniq: This function allowed me to discover how often data appeared in a file. It listed the data value, followed by the number of times it occurred. I was able to feed this data into gnuplot to produce the histogram.

Awk: I used this function to swap the data output of Uniq from (y, x) to (x, y). This allowed me to feed the appropriate data to gnuplot and not have a reversed histogram.

Sort: This function allowed me to make sure that the data was in numerical order, so that the x-axis would be more readable.



This is a graph of the total added value of every number in a collatz sequence and its starting "n" value. This graph is meant to show how many collatz sequences hover around the 50,000 and 100,000 total values, with many notable outliers.

Declare: This function allowed me to store data in a variable as explicitly numerical. This means that when I added a value to it, it would be treated as a math expression rather than a concatenation.

Head: Allowed me to read the collatz sequence from a file into another command.

For loop: Allowed me to iterate through the required "n" (collatz sequence starting points) values.

If, then: Allowed me to catch data that would skew my plot (such as values that added to be over 4,500,000) and remove it, leaving a more readable and useful graph.

Echo: Allowed me to format the data into x, y pairs to be sent to gnuplot.