

Assignment 1 DESIGN.pdf

Yash Sharma

Description of Program:

This program prints the Collatz sequence starting from some positive integer n . Once the integer n is printed, it will create a sequence of integers S starting with some positive integer n . In other words, the program begins looping its next term based on the previous term of the sequence.

The Collatz Sequence creates a sequence of integers with some positive integers. These integers are then iterated through a for loop based on the previous term of the sequence. This collatz sequence data also helps us produce interesting plots using GnuPlot, which is all automated through the means of a bash script.

Files to be included in directory “asgn1”:

1. collatz.c:

- The source file holds main() and the remaining content which allows the program to run via an executable.

2. plot.sh:

- A bash script that allows the program to generate values based on the x and y values set by the collatz.c file.

3. Makefile:

- A file that formats program into clang-format and compiles it into program executable “collatz.c” with make/make all from Makefile
- Additionally, make clean from Makefile must remove compiler-generated files (such as the executable collatz.c)

4. README.md:

- Text file in Markdown format that describes how to build and run the program, how the program handles erroneous inputs, and any problems encountered while developing the program.

5. DESIGN.pdf

- This describes the design for the program thoroughly with pseudocode and descriptions.

Pseudocode / Structure:

Remove temporarily length.dat

Rebuild the sincos executable

Place data points into a file

Graph 1

For all values of n beginning at 2 and are less than or equal to 10000,

Echo their values to produce the output on a new line.

Loop through all integers from 2 and 10000

Print a new line for each byte and count for each file

Send data to a file and plot graph

Graph 2

For all values of n beginning at 2 and are less than or equal to 10000,

Echo their max values to produce the output on a new line.

Loop all through a file and sort them in numeric order with the last value being first

Send data to a file and plot graph

Graph 3

For all values of n beginning at 2 and are less than or equal to 10000,

Echo their length values to produce the output on a new line.

Loop through any integer between 2 and 10000

Send all values into a data file after sorting in numeric order and counting iterations

Plot data and graph

Credit:

- I attended Eugene's section on 1/7/21, which helped give me general guidance on how to approach this lab, as well as sketch out how the program runs.