

# Instructions on how to Plot Collatz Sequences Using the C Programming Language on the Unix System

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Step 1. Write a bash file:

1. Create a bash file called plot.sh
2. Open the document and write `#!/bin/bash` so that the kernel interprets the script as an bash executable.
3. Using the "make" commands and the `-r [OPTION]` argument from collatz.c, you can tell the bash file to construct (and then remove) collatz executables where you can determine the starting number "n".
4. Next for each executable redirect the output to a .dat file where the data can then be sorted through.  
ex: pick the highest value in the set or the length of the set. And the desired value will be appended to a preformatted .dat file specified for what its purpose is ex: maximum\_values.dat for all of  $n < 100000$ .
5. This formatted data can then be fed to a heredoc which will be appended through "`<<`" to gnuplot  
5.a The format of the .dat file and the information in the heredoc are going to contain all the specifications for gnuplot such as the title of the document, the dimension labels and size, the file ending etc. and lastly a command to plot data from the file of directory `~/collatz.dat`.
6. This last step plotting the formatted: `*maximum_values.dat for all of  $n < 100000$ *` will occur for each specific plot.