ASSIGNMENT 1 DESIGN DOCUMENT

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1 Goal

Write a shell script that graphs plots of the monte carlo method of estimating PI

Graphs include estimation error and point coordinates.

2 Pseudocode

GRAPH ESTIMATION ERROR

Run the Monte Carlo program.

Use the tail command to remove the headers in the output, since they can't be graphed

The value for tail is the number of points dropped in the Monte Carlo program, minus one

Pipeline the headerless output into the awk command, using the awk command to isolate only the index value and the pi estimation value from Monte Carlo's output

These values are the first and second columns in the output

Get the estimation error by subtracting the estimation value from the actual value of pi

append the index and estimation error into a file

graph the file using gnuplot

GRAPH COORDINATES

Run Monte Carlo with a large number of points

as before, cut out the header using tail

Use the awk command to check the values of column 5 in the Monte Carlo output, which tracks if a point falls within the circle or not

if the value is 1 (inside the circle) append coordinates to an "inside the circle" file

else, append coordinates to an "outside the circle" file

graph both files using gnuplot, with different colors per file.

GRAPH ESTIMATE VS INDEX

Run Monte Carlo

cut the header

using awk, append the index and the pi estimate values of the output to a file

graph the file using gnuplot