asgn1 design

Ryan Hui

rhui1

Design

The monte carlo .c program is a program that generates randomly estimated pi values and gives x and y values for it, and decides if it is in the circle or Using gnuplot, replicate graph figures 2 and 3 from asgn1.pdf using a plot.sh bash script and the Monte Carlo simulation program.

Files

-plot.sh
-monte-carlo.c
-Makefile
-README.md
-DESIGN.pdf
-WRITEUP.pdf

Pseudocode

Figure 2 plot

code should plot figure 2 from asgn1.pdf by sorting monte carlo output values based on not in circle (red points) and in circle (blue points).

create red.dat
create blue.dat

run monte carlo program 1001 times and ignore 1st line of output store the program output into a variable

using the monte carlo output (5th column)
if the value is not in circle (value equal to 0)
direct x and y values for that row into red.dat file

if the values is in circle (value equal to 1)
direct x and y values for that row into blue.dat file

gnuplot
set terminal to pdf
set pdf output
set plot title set x axis
set y axis
set x range to 0-1
set y range to 0-1
set x tics to 0.2
set y tics to 0.2
plot plot1.dat with red points for red.dat, blue points for blue.dat, and the black circle line

delete red.dat
delete blue.dat

Figure 3 plot

create plot1.dat
create plot2.dat
create plot3.dat
create plot4.dat

code should plot figure 3 from asgn1.pdf which shows multiple carlo estimation lines that show that estimation error decreases as iteration increases.

run monte carlo program 65536 times and remove 1st line of output (table title)
store the program output into a variable
set pi variable equal to pi value

for loop for 4 files to be plotted
run monte carlo program 65536 times and ignore 1st line of output (table title)
direct the first column and pi minus second column values into plot.dat file

gnuplot
set terminal pdf
set pdf output
set key off
set plot title
set x axis
set y axis
set x range 1-65000

set y range -1-1
set x tics 4x values
set y tics 0.5
set logscale x 2
set zeroaxis
plot plot1.dat with lines, plot2.dat with lines, plot3.dat with lines, plot4.dat with lines

delete plot1.dat
delete plot2.dat
delete plot3.dat
delete plot4.dat

Pseudocode Structure

Plot 1

create red.dat, blue.dat = creates the data files for red or blue points
monte carlo program output = values generated by the program
ignore 1st line of output = only outputting the values and not the table title
direct x and y values = channeling values into the file as columns

Plot 2

create plot1-4.dat files = create the data files for iterations and error values
ignore 1st line of output = only outputting the values and not the table title
directing values = isolating iterations and calculating error values into

Credit

cse13s discord (no code)
-obtained gnuplot information
piazza (no code)
https://linuxhandbook.com/awk-if-else/