WRITEUP.pdf

Githika Annapureddy

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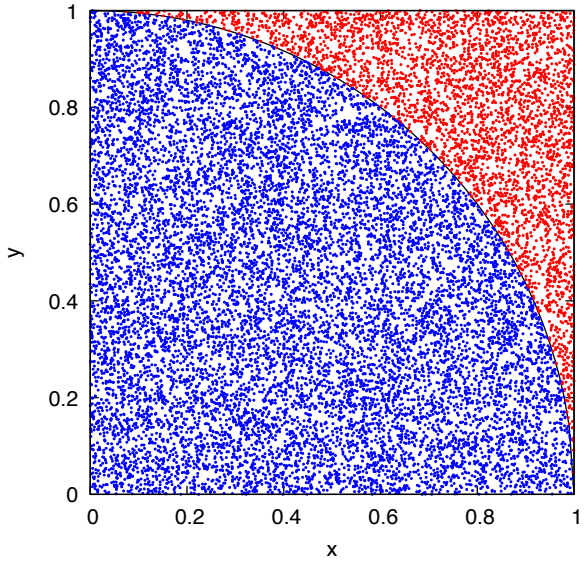
Figure 2



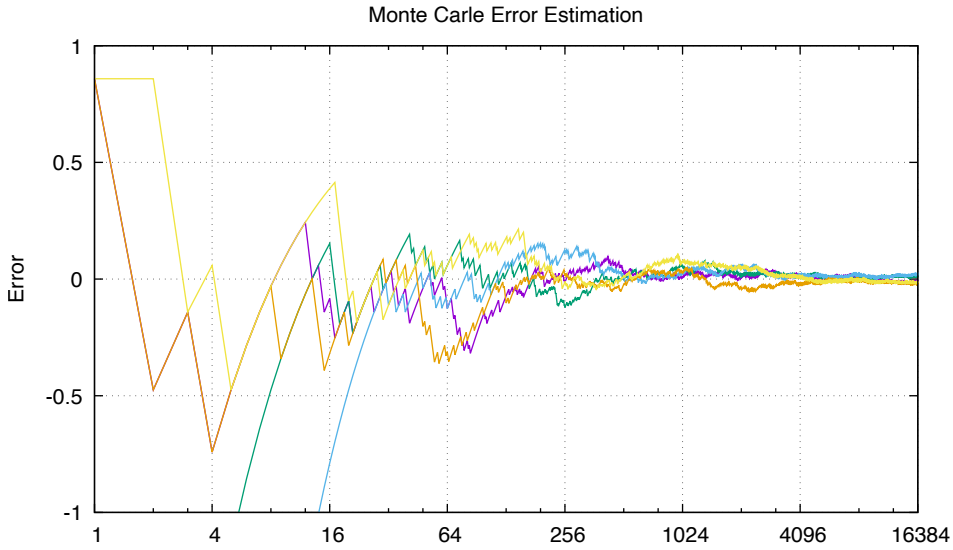
The first plot my program produces is similar to Figure 2 from asgn1.pdf. The blue points are the points inside the circle square(x) + square(y) = 1. The red points are the points outside of this circle. The purpose of this graph is to show an example of the points randomly generated in one executable.

I imported the gnuplot library. I used the commands xrange and yrange to set the range for each axsis. I used 'set size square' to make the graph a square shape. I used xlabel and ylabel to label each axis. I used 'set key autotitle columnhead' to make sure the first line of the .dat files, which were the names for each column, were not considered as data points. I used 'set palette defined (0 "red", 1 "blue")', 'unset key', and 'unset colorbox' so that I could color coordinate the plot. This command allows the points to be either red or blue depending on the value in the 5th column. This value is a 0 if the point is not in the circle and a 1 if the point is in the circle. Finally, I used 'plot f(x) linecolor 0, "/tmp/monte_carlo1.dat" using 3:4:5 with points palette ps .1 pt 7' in order to plot both the circle (which I saved in f(x) and the points. 'using 3:4:5' signifies

that the 3rd column of monte_carlo1.dat is plotted on the x-axis, the 4th column is plotted on the y-axis, and the 5th column is used to determine the color of the point. 'ps .1' determines the size of each point and 'pt 7' determines the circular shape of the points.

Changing the values of column 5
The 5th column of each .dat file contains the estimate for PI after each point is generated. I needed to change this value to the error between the estimaiton of PI and actual PI. I used 'awk '2 = (2 - 3.1415926535); print ;' oldfile ¿ temporary new file' to retrieve each estimation of PI which was stored in column 2 (hence why I used $2). $2 points to the value in the second column. I changed this to point to the value - PI. Then, I put this edited data into a temporary new file. Finally, I used 'mv' to move the content of the temporary file to the old file. I repeated these steps for each of the 5 .dat files.

Figure 3



The second plot my program produces is similar to Figure 3 from asgn1.pdf. It shows how close to PI the estimations of PI are. In the graph, it is clear that as more point estimations are created, the estimation of PI gets closer and closer to PI. On the graph, this is evident by the lines approaching 0 as x increases. Each different color is a different monte carlo excutable.

I imported the gnuplot library. I used 'set title' and 'set ylabel' to label the plot and the y-axis. I used 'set xrange[1:16384]' and 'set yrange[-1:1]' to the set the range for the x and y axis. Then, I used 'set logscale x 4' to set the tics of the x-axis to be at every 4 to the nth power, where n starts at 0 and goes to 8. Each tic had to be spaced the same distance from the previous tic. This creates the

effect of the beginning of the graph being exaggerated. This is helpful in visually understanding the data since the data is less dramatic (approaches 0) towards the end of the graph, and it is thus more important to observe the variability in the beginning of the graph. I used 'set grid xtics ytics' in order to create a grid in the background of the graph. This helps in visually understanding the data. Finally, I plotted every .dat file using 'plot "/tmp/monte_carlo1.dat" using 1:2 with lines'. The 'using 1:2' signifies that the values in the first column of the file are the x-values and the values in the seconds column are the y-values. I repeated this plotting command for each of the 5 .dat files.