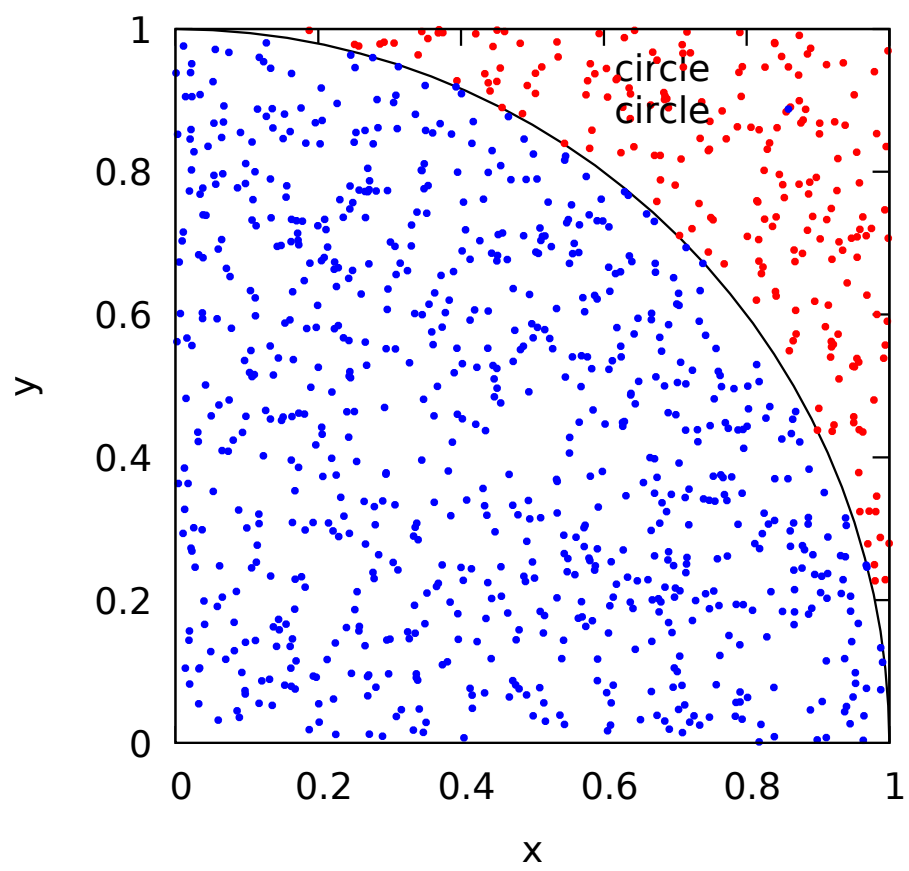# WRITEUP - ASGN1

Viveka Agrawal

CSE13S, Winter 2023

In this assignment, I learned how to code in bash/shell scripting and how to store data from a c file into a temporary file and use that data to make graphs using gnuplot. I also learned how to use Latex in order to write the WRITEUP.pdf (this file).

Here is my Figure 2 pdf (next page):

Figure 2

For Figure 2, I had to graph a circle with a radius of 1 inside of a square. In order to create this graph, I used columns 3, 4, and 5 of the monte carlo c file output. Columns 3 and 4 are the x and y coordinates, and those points are plotted on the graph. The dots on the graph are red if column 5 equals 0 where 0 means that the point is outside the circle. The dots on the graph are blue if column 5 equals 1 where 1 means that the point is inside the circle.

I am not sure why, but in the top right corner of my graph, I also have circle written twice and I am not sure why that is happening since I did not code anything in my plot.sh which would cause that to happen. I talked to Apostolos, one of the TA's, and he said not to worry about it since he could not find why "circle circle" was showing up after looking at my code. I also have a single blue dot outside of the circle, but that is because of an outlier in the monte carlo data.

Here is my Figure 3 pdf (next page):

Monte Carlo Error Estimation
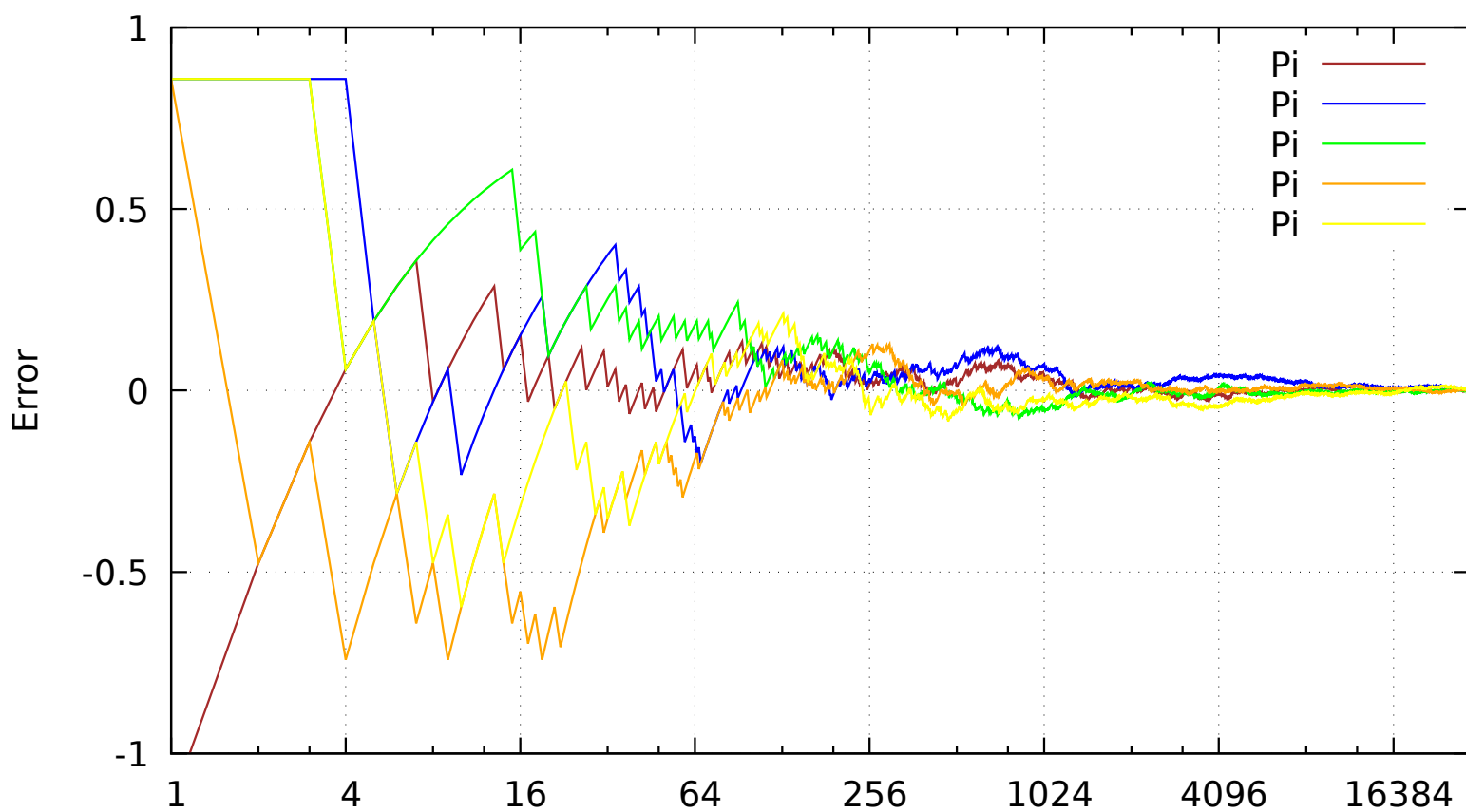
For Figure 3, I graphed the difference between the estimated value of pi and pi. As shown in the graph, the difference will be large initially but with more iterations the difference will eventually decrease and either reach or almost reach 0. For this graph, I used columns 1 and 2 of the monte carlo c file output. Column 1 is the number of iterations of the monte carlo program and column 2 is the estimated value of pi. Column 1 acts as the x value and column 2 minus pi acts as the y value, and those points are plotted on the graph. There needs to be 5 different lines, so 5 different monte carlo data files must be created. The lines are also different colors to represent the different plotted points for each of the 5 different data files.

Every time I run plot.sh, a different graph is generated which should happen because of the random seed generator. However, in my code, the 5 different data files were generating the same exact data points, so I had to use the sleep command in order to delay the time for when the data files were being generated with data so that the files would have different data. For my Figure 3, in the upper right corner I also have a chart which shows the colors of the graphs with pi written next to them. Again, I did not code this - it just shows up everytime I run plot.sh. I did not ask a TA about this since as I stated earlier I had a similar problem with my Figure 2 and since the TA told me that it is ok and that I will not lose points for it, I assume that that would be the case with Figure 3 as well.

The only UNIX command used in this assignment in order to obtain data points was -n which allows the user to choose how many iterations the monte carlo program will run. For Figure 2, I chose 1,000 as it does not make the graph look too empty and also does not overfill the graph. For Figure 3, I chose 30,000 since I needed a large amount of data points in order for the x-axis on the graph to reach 16,384 since that is how the example Figure 3 looks like in the assignment 1 file.