Tyler Santosuosso Probability and Applied Statistics

Project 1 Accomplished Work

For this project I had to do a lot of research on some problems as well as a lot of brushing up on my programming skills. The initial formula sheet was very simple as I simply went through the textbook *Mathematical Statistics with Applications (7th Edition)*, and gathered all the formulas from chapter one, two, and three and then proceeded to efficiently and quickly insert those formulas with headers. It will work as a good reference sheet in the future for any homework problems I come across, as well as when I am creating my one-sided sheet for the midterm and final.

The stats library assignment was slightly harder as I was having trouble figuring out how to structure the file system. I ended up just putting them all into one file named *StatsLibrary.java* which I can simply call and access each individual function. I commented on every method to increase readability and explain each method. I initially thought making it a static class filled with static methods would be the best as I could just call it without constructing it, but I possibly vaguely remember being told not to do that, so I decided against it. I did a series of tests to make sure each of the functions work and then just left it for further modifications in the future.

The relative frequency histogram was relatively straight forward. We went over that in the first week or so of class, but I had trouble finding it initially. I ended redoing the problem and remaking the whole excel spreadsheet and histogram.

For the Monty Hall game I did a bit of outside research and found some things to help understand how the probability works. It’s rather fascinating how it all works out. I did a very simple and generic solve that got me the results I wanted. Over the course of 10000 runs, it seems that changing doors every time works out to about a 66%-win rate. Staying with the choice of door works out to about a 33%-win rate. These numbers are rather consistent as I saw with the few tests I ran of the program.

I didn’t quite understand at first how to write the birthday program and what exactly I was trying to output as I didn’t quite understand how the probability worked in this specific case. I think I figured it out in the end, however. It’s a simple problem overall I’d say, I just was having trouble working it out in terms of programming.

The fish market simulation was the most interesting to write in my opinion. This one I also had a little bit of trouble structuring because I didn’t want to have a ton of class files, but I ended up going that direction anyways. I feel like my method of making weighted probability could’ve been better, but it very obviously worked according to my data output. This one was also quite simple when I got into it. I had trouble with the CSV outputs and inputs as I didn’t know how to write that, so that required some research.

I believe I also needed to do the data salter for this project, which was a rather confusing part of this project to me, as I don’t fully grasp the point of what it does. This one is by far the most time consuming.

Overall, a rather extensive group of assignments, but very good practice to brush up on a lot of skills. It also has is rather convenient to have some of these things complete, like the *StatsLibrary.java* and the formula sheet.