

## Project Timeline && Updates

### Feb. 17th, 2019

Began work on the project, took my time going through the specs making sure that I understood everything. After going through the specs I began generating an outline of my code. I decided to implement the project using the Java programming language and creating three classes:

**Driver.java** which serves as the program driver, where the main function is located. This is where the threads will begin execution. **Metropolis.java**, this class contains all the methods such as Magnetization Per Spin, Pair Correlation Per Spin, Energy Difference function and finally the Metropolis algorithm. **Multithreading.java** is where the functionality of each thread is defined. Each thread will be calling the Metropolis algorithm  $N_M$  times.

### Feb. 18th, 2019

I spent the day implementing the Metropolis algorithm and the functions Magnetization Per Spin, Pair Correlation Per Spin and Energy Difference. Once these function were written I tested them to make sure they were working and then I called it a day. I implemented everything up to section 1.5 in the specs.

### Feb. 20th, 2019

I spent this day fully implementing the Driver.java and getting Multithreading to work. I designed my Driver to instantiate an array of  $N_T$  threads where each element in the array would be a thread that instantiates my own Multithreading class. I ran into a bug where The threads were running asynchronously and I soon realized that it was because I hadn't synchronized them and so I did. After completing all my classes, I ran into a problem of storing the global means in an array. After taking some time and thinking I decided to write the global mean results of the threads in Multithreading.java to a file which would be created for both  $\langle M \rangle$  and  $\langle CP \rangle$  and in my driver class I was able to read the files that were created after thread execution to compute relative error and variance.

### Feb. 23rd, 2019

I used this day to finish up all the tasks in the specs up to section 1.9 then I began to solve the challenge problems. Most of my day was spent using my program to answer and find the correct graphs for the challenge problems. I also finished up the project report.

### Feb. 24th, 2019

I submitted my project, but forgot to do my cover document, so here it is. I will be submitting my project with the updated cover document. Also I got feedback from Professor Mane that my answers to the challenge questions 4 & 5 were wrong and so I will find some time later this week to attempt to find the correct answer.