Journal Report 7
10/14/19-10/28/19
Michael Huang
Computer Systems Research Lab
Period 1, White

Daily Log

Tuesday October 15

Looked into Greedy Algorithm for MIS. Found nothing very impressive, the error ratio is too large.

Thursday October 17

Looked to see if Greedy was better under any special conditions

Monday October 21

Found that Greedy Algorithm was better for maximum hyperplanar graphs and studied those.

Tuesday October 22

Tried it out and tested it, however, was not accurate enough. The data was off by several factors, and we're playing in a space where every single one matters.

Thursday October 24

Looked into finalizing a proof for -1,0,1 in 26 variables rather than from a basis cubed. Played around with the large equation, but couldn't find anything.

Timeline

Date	Goal	Met
10/7	Find an answer for asymmetric amounts of 1s and -1s.	Yes, the answer is intuitively the same as above, and I found a proof showing that.
10/14	Find the correlation coefficient between the density of the graph and the maximum independent vertex set for different sets using $\{-1, 0, 1\}$	Yes, however the data was not great.
10/28	Find an effective approximation algorithm for MIS	No, I found algorithms but their error was way too large to be efficient in our case.
11/4	Verify if 100/316 is beatable when the 26 variables are not linked to a basis cubed.	
11/11	Prove a lower bound for the result for the 26 variable inequality	

Reflection

My goal over these two weeks was to find some effective approximation algorithm. In my search, I only really found the greedy algorithm. The greedy algorithm has an error ratio of $d + 1$ where d is the max degree. This was simply WAY too large when we're dealing with a range of between 0.293 and 0.316. Moving forward, I'm going to see if specifying on Mathematica will solve my problems of not having a good MIS set.

I hope to finish -1,0,1 as well. I will try to prove this, not only for non-symmetric basis sets but also for asymmetry over all 26 variables.