Daily Log

Monday October 28

Played around with the assymetrical positions. Tried to find counter examples, like expected could not find any.

Tuesday October 29

Tried to see if it was possible to group any of the numbers together, or how we would achieve a strange number like 100/316.

Thursday October 31

Played around with extreme cases, but found that those were too easy to get. Realized that certain sub inequalities had to be true.

Wednesday November 6

Took a small tangent, a started playing around with basis sets when 2s were involved. Didn't get far, but will likely be more promising than when working with 1s.

Thursday November 7

Analyzed the graph of 124 vectors under -2,-1,0,1,2. Didn't finish my analysis. I don't quite understand whats going on but I'm trying to understand it better.

Timeline

Date	Goal	Met
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.
11/11	Prove a lower bound for the result for the 26 variable inequality	No, I realized that in most cases this would not be necessary. It was too large a problem with a very unlikely chance of having meaningful results
11/18	Hand-draw and analyze the symmetries for -2,-1,0,1,2. This is a graph with 124 vertices.	
11/25	See what happens when we add more 0s to this set.	

Reflection

I spent the first week attempting to find something for completely assymetric -1,0,1s. This was like proving the Maximum Independent Vertex Set on a graph of size 26 with weighted vertices. There were just way too many vertex weights for me to analyze by hand and chances are, I would not find any improvement on my numbers. Instead, I decided to begin my jump to including 2s. I think that we may be able to have very good results here because the most basic case $-2, -1, 0, 1, 2$ already gives a decent result. The graph size, however, begins at 124 vertices so this will be a difficult graph to analyze and optimize, however, I believe even some suboptimal solutions may be okay.