15-400 Project Milestone Report 3

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1 Milestone outlined in report

Make observations about difficult instances and easy instances: what characterizes them, can we adapt the algorithms we already have for easy instances to work for harder ones?

2 Current Progress

2.1 Accomplishments:

We're continuing to look at how we can generalize our argument based on the size of the vertex cover. As we consider larger graphs with larger vertex covers, this become harder to generalize. This is especially true in the case where a graph has a minimum vertex cover of size n, but also has vertex covers that aren't significantly larger than n, since we relied on a larger jump to distinguish between graphs.

We looked at what type of graphs have this property, and are now trying to generalize this argument for cliques.

2.2 Meeting my milestone:

We've made progress on characterizing these instances in the way explained above. While it seems like we can adapt this algorithm for very specific graphs, it seems to be much harder on other types of graphs. We're looking at a potentially different approach now.

2.3 Looking Ahead:

Next milestone: Work on improving the basic algorithm for difficult instances with different variations based on what we learned.

We are most likely going to continue to try to make progress on the current milestone, and try to explore this different route to see if there is something more promising there.

2.4 Changes/Surprises/Revisions/Resources Needed:

The next milestone should be revised to focus on continuing to characterize these instances and generalize our current algorithm.