Major Changes:
We started to work on generalizing Cartesian Products.

What I have accomplished so far:
Currently, I have moved completely off of working on the CRD algorithm. In experimenting with the tree-cross-line example, Gary and I realized that we needed some way to benchmark what classical algorithms did with the tree-cross-line. With that thought, we eventually started to work on a separate question, which is how Local Page Rank (Random Walks with Resets) works with Cartesian Product Graphs.

Specifically, it is intuitively clear that given the Cartesian product of $G$ and $H$, we can simulate diffusion on $G \times H$ by simulating diffusion on $G$ and $H$ separately. However, it’s not so clear if there’s a method that we can do something similar for random walks with resets. During my work on this during the last 2 weeks, I couldn’t find a clean way to do model random walks on $G \times H$ through simulating random walks on $G$ and $H$. There’s a couple of obstacles behind the math that I believe just won’t get resolved; for example, there just isn’t a good expression of what matrix multiplication is like when there is a Kroenecker product/sum involved.

Meeting my Milestone
Here are the tasks that I set out to do:

- Explore Gary’s thought on diffusion

So this turned out to be more than what I initially thought it would be; it kind of changed the direction in which I was working on in the research. It turns out that diffusion on Cartesian Products are not very complicated so we turned our attention to Local Page Rank. So the milestone really should’ve been ”explore random walks on Cartesian product graphs”.

In terms of that, we figured out that the result won’t be clean and probably not feasible/interesting so now we are looking for more experimental results.

Surprises:
None.

Revisions to Milestones For the next report, I would like to have the following accomplished

- Finish Poster (on Cartesian Products)
- Finish Report
- Continue with exploring random walks on Cartesian products.

Resources Needed
No changes.