For our final enhancement, I have continued to expand upon my CS 360 Android Studio App. I thought this would be a great example to show off my ability to adopt a new tool with Cloud sync (utilizing Firebase) as well as test my ability to create more scalable software. To tell it truthfully, this was an exhausting artifact to implement; it required a lot of reading, learning, and experimenting.

I am feeling a bit under accomplished for this augment – not only is it the first late assignment I'll be submitting in the entire curriculum, but I also feel like I've rushed out a minimum requirement product – it's not something I find myself being proud of, like the line graph from the second augment.

Initially, my artifact relied solely on a local SQLite database. To prepare for a migration to a Cloud Firestore database, I created a helper class FirebaseWeightHelper to encapsulate Firestore operations. I also needed to properly set up the Firebase console with proper authentication, deciding to use only email for now, and properly set up the Firestore Database structures for users/uid/weights. I also needed to modify my existing WeightDatabaseHelper to include a firebaseHelper so it could interact with the cloud.

My first iteration of the enhancement on Sunday failed miserably. I was trying to replace all of the SQLite code as I went, but I was also rushing to meet the deadline, and with only 30min to go, my app was unusable – crashing on any actions taken, not syncing properly, and more. So, I decided I would need a few more days to figure this out – I abandoned the app, and

used the .zip from the Milestone Three submission to 'roll back' my changes, and start the augment fresh. This time, I decided I would keep the SQLite database, and have the Firestore as a back-up of sorts. There was a bit of difficulty in the beginning, where deleting a single entry in the app would clear the entire Firestore – I was originally using the date as the identifier for the weight entries, so I needed to create logic for firebase_id instead. Everything seemed to break in sequence, like trying to plug a dam – once I fixed the delete issue, my added entries seemed to only allow me to add one entry a day. Once I fixed that issue, my update method seemed to no longer communicate with the Firestore. I started experiencing every error under the sun: issues with Lambda scope, compilation errors…even getting the dependencies for Firebase imported successfully caused more of a headache than I bargained for. Oh, also, at one point my RecyclerView wouldn't populate entries until I relogged, and in trying to fix that, I made it so that the information wasn't retained in the SQLite database at all. That may have been in the iteration that I scrapped.

At the end of the day – the local and cloud data seem to be appropriately synchronized. Modifying the data in the cloud doesn't reflect in the app, but the user won't be interfacing with the cloud itself so it's not something I worried about remedying for now. Any changes to the app are immediately reflected in the Firestore, however. All of my pre-existing functionalities have also been preserved, including my CRUD operations and allowing for multiple entries in a day. The operations *should* be scoped per user.