

## Final Project Report for Trackify

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Our final project, **Trackify**, is a user-friendly finance tracking application designed to help users monitor their spending habits, manage transactions, and visualize their financial behavior using an interactive pie chart. Upon launching the application, users can sign up or log in via Firebase Authentication using their email and username. Once logged in, users can connect their bank accounts through Teller Connect under the Profile section, which fetches transaction data from their respective bank accounts. Users can also add manual transactions, which will appear as individual categories on the pie chart. The pie chart allows users to tap or hover over a particular segment to view the expenses associated with that specific category. This interactive pie chart was built using Compose Canvas, leveraging precise angles and the "drawArc" function for a customized design. The Report Section provides detailed insights into monthly and weekly spending habits, as well as a total summary listing the all-time total income and expenses.

In terms of technical implementation, we used Compose Canvas to create the interactive pie chart and Firebase to authenticate users into the application. Firebase Firestore was used to store access tokens generated by the Teller Connect SDK, while the Room database was utilized to store transaction data locally, enabling offline functionality. All transactions were integrated into the Room database to ensure seamless offline access. Despite these technical achievements, we encountered several challenges that prevented us from fully implementing our original proposal.

One of our initial plans was to gamify the app by rewarding users with points for meeting monthly budget goals. These points would allow comparisons with other users, enabling participation in a simplified game system. Unfortunately, our Firebase Firestore calls to store points in the cloud were invalid, making this feature impossible to implement. Another significant challenge was integrating the Teller API. Generating the access token and securely storing the certificate and private\_key required extensive debugging. Fetching transaction data from the Teller API in the Sandbox environment—which provides fake data—was a time-consuming process. Actual bank account linkage would require approval from the API's provider, which takes several days, adding to the complexity of integration.

Syncing transaction data across devices was another hurdle. Firebase Firestore failed to properly sync transaction data, so when users logged in from a different device with the same Firebase account, the transaction data was either missing or inconsistent. Furthermore, different transactions were displayed even when using the same Firebase account. Additional features, such as receipt scanning using Google Cloud Vision API, were deprioritized due to the complexity of integrating Teller API and limited time. Push notifications, which were initially planned, were also not implemented because debugging one feature often caused issues in other parts of the app, delaying overall progress.

Ultimately, our original vision for Trackify as a budgeting app evolved into a financial management system that helps users track and visualize their spending. The final product successfully implemented core functionalities such as transaction tracking, interactive pie chart visualizations, and bank account linkage. However, the absence of some advanced features highlighted the importance of time management and proper planning.

In conclusion, although we achieved the foundational goals of a financial tracking system, there is significant room for improvement. This project taught us valuable lessons about the complexities of building an Android application, especially when integrating third-party APIs and managing data synchronization. For future projects, we plan to allocate more time for debugging and testing complex integrations to ensure a more refined and feature-complete product.