

# **Edenic Stock Market App - Project Report**

## **Introduction**

### **App Overview**

Edenic is an Android-based stock market simulation app that gamifies trading experiences. The app provides a realistic trading environment using real-time market data while eliminating actual financial risk. Users can buy and sell virtual stocks, track their portfolio performance, and compete with other users on a leaderboard. The app consists of:

- Home Activity
  - Displays user's portfolio value and daily change percentage
  - Shows scrollable list of popular stocks with current prices
  - Features a leaderboard showing top-performing users
  - Offers quick access to all app features via the bottom navigation
- Portfolio Management
  - Comprehensive view of user's holdings and performance metrics
  - Real-time price updates from Yahoo Finance API
  - Profit/loss calculations for each position
  - Search functionality to filter holdings
- Trading System
  - Allows users to buy and sell virtual stocks at real-time market prices
  - Transaction validation to prevent invalid trades
  - Trade confirmation with visual feedback
  - Records all transactions in the history section
- Social Features
  - User-to-user messaging capabilities
  - Stock recommendation sharing
  - Connection system with requests and approvals
  - User discovery functionality

### **Technical Details**

- SDK Used: Android SDK 35 (Target), 26 (Minimum)
- Programming Language: Java
- IDE: Android Studio

- Database: Firebase Realtime Database
- Authentication: Firebase Authentication with Google Sign-In
- External APIs: Yahoo Finance API, Google Sheets API
- Libraries: Retrofit, Glide, SwipeRefreshLayout
- Devices Tested On:
  - Emulator: Pixel 7 Pro (API 35)
  - Real Device: Moto Edge 30

## **Architecture & Implementation**

### Data Management

- Firebase Realtime Database
  - User data (profile, portfolio, balance)
  - Leaderboard rankings
  - Transaction history
  - Chat and social connections
- Stock Data Retrieval
  - Yahoo Finance API for real-time stock prices
  - Google Sheets integration for reliable previous closing price data
  - In-memory caching to reduce API calls

### **Key Components**

- Authentication System
  - Google Sign-In integration
  - User profile management
  - Session persistence
- Portfolio Tracking
  - Automatic portfolio value calculation
  - Profit/loss percentage visualization
  - Periodic price updates
- Trading Engine
  - Buy/sell logic with balance validation
  - Position management (average price, quantity adjustment)
  - Transaction recording with timestamps

- Social Framework
  - User search and discovery
  - Friend connections management
  - Real-time messaging with stock sharing
  - Message read receipts
- Notification System
  - Firebase Cloud Messaging integration
  - Transaction notifications
  - Price alert capabilities
  - Social interaction notifications

## **Reflection**

### **What I Learned**

- Firebase Integration: Implementing and optimizing Firebase Realtime Database for dynamic user data
- API Integration: Working with external APIs for real-time market data
- Social Features: Building a complete social system with connections and messaging
- UI/UX Design: Creating an engaging and intuitive interface for financial data
- Background Services: Managing background tasks for regular data updates
- Push Notifications: Implementing a comprehensive notification system

### **Challenges Overcome**

- Data Synchronization: Ensuring consistent data across different screens and activities
- Performance Optimization: Reducing unnecessary API calls and database writes
- UI Responsiveness: Maintaining smooth performance while displaying real-time updates
- Network Issues: Handling intermittent connectivity with graceful degradation
- Firebase Rules: Configuring proper security rules to protect user data

## **Extensions**

### **Features Implemented**

- Google Sheets Integration: Using Google Sheets as a reliable source for historical stock data
- Customizable Portfolios: Allowing users to build and manage their investment portfolios
- Social Stock Sharing: Enabling users to share stock recommendations with connections
- Comprehensive Transaction History: Detailed record-keeping with filtering options

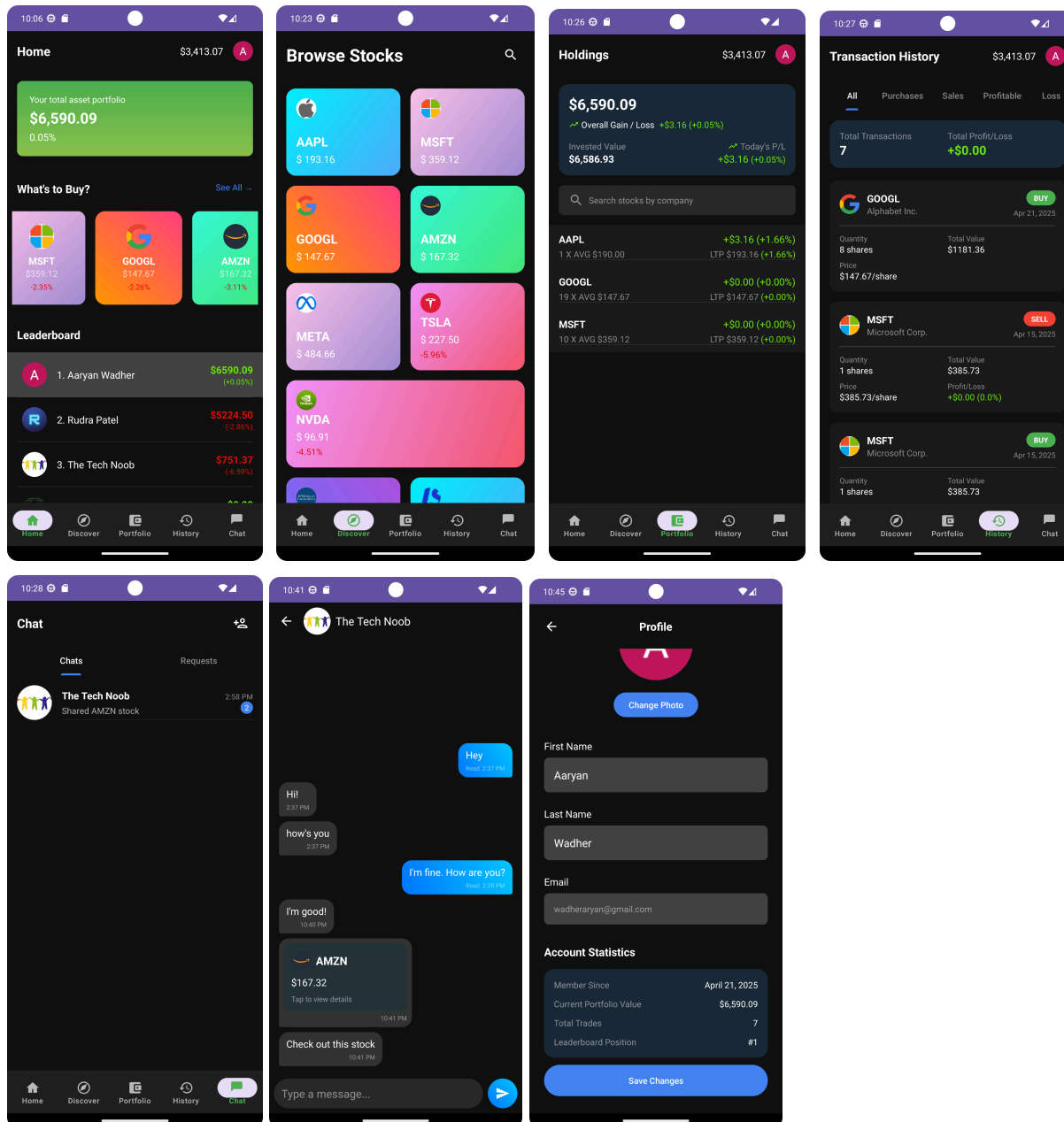
- User Profiles: Personalized profiles with performance statistics
- Onboarding Screens: Informative introduction for new users

### **UI/UX Enhancements**

- Dark Theme: Implemented a dark theme optimized for financial data visualization
- Dynamic Color Schemes: Color-coded profit/loss indicators and stock cards
- Gradient Backgrounds: Visual differentiation of stocks and portfolio performance
- Responsive Layouts: Support for various screen sizes and orientations
- Pull-to-Refresh: Intuitive gesture for data updates
- Bottom Navigation: Efficient navigation between main app sections

### **Testing**

### **Screenshots**



## Testing Notes

- **Firestore Integration:** Verified data persistence and synchronization across devices
- **Trading System:** Ensured buy/sell operations correctly update portfolio and balance
- **Real-time Updates:** Confirmed that stock prices update correctly at regular intervals
- **Social Features:** Tested messaging, connection requests, and stock sharing functionality
- **Notification System:** Validated that notifications are delivered for relevant events
- **Authentication Flow:** Verified the Google sign-in process and session management
- **Performance:** Monitored app responsiveness under various network conditions

## **Future Enhancements**

- **Advanced Analytics:** Technical indicators and trend analysis
- **Achievements System:** Badges and rewards for trading milestones
- **Educational Content:** Trading tutorials and financial literacy resources
- **Portfolio Comparison:** Head-to-head performance comparison with friends
- **Customizable Watchlists:** Personalized lists of stocks to monitor
- **Advanced Notification Rules:** User-defined price alerts and conditions