

## Release Notes – HabitFlow Mobile Application

Date: 18 November 2025

Module: PROG7314 – Mobile Application Development

### 1. Overview

This document provides a detailed summary of all updates made to the HabitFlow mobile application since the original prototype submitted in Part 1.

The updates include UI improvements, backend integration, offline capabilities, synchronisation mechanisms, user authentication updates, and several stability fixes.

These release notes also clearly indicate which innovative features were implemented for Part 3 of the POE, as required by the rubric.

### 2. Updates Since Prototype (Part 1 → Part 3)

#### 2.1 Authentication Updates

##### Added

- Google Single Sign-On (SSO) using Firebase Authentication.
- Improved LoginActivity and RegisterActivity to handle Google tokens.

##### Improved

- Updated login flow to automatically redirect authenticated users.
- Added error handling and user feedback for failed authentication attempts.

#### 2.2 REST API + Database Connection

##### Added

- Full backend integration using Node.js + Express + MongoDB Atlas.

- Created REST endpoints for:
  - GET /tasks
  - POST /tasks
  - PUT /tasks/:id
  - DELETE /tasks/:id
- Connected the app to API using Retrofit.
- Added automatic logging for API responses and failures.

#### Improved

- Replaced mock data from prototype with live API data.
- Implemented consistent DTOs (CreateTaskRequest, UpdateTaskRequest, ApiTask).

### 2.3 Offline Mode With Synchronisation (✓ POE Part 3 Innovation)

#### Added

- Local caching of tasks using Room Database.
- Offline-first task creation using:
  - Local task insert
  - Remote sync when internet returns
- Added remoteId field and sync flags to maintain consistency.
- NetworkUtils added to detect online/offline state.

- Sync logic that:
  - Uploads unsynced tasks
  - Updates synced tasks
  - Prevents duplicates

## 2.4 UI/UX Enhancements

### Added

- Material Design 3 UI components.
- New placeholder illustrations and modern layout.
- Updated Rewards screen with smoother animations.
- Settings screen redesigned for clarity and navigation.

### Improved

- All screens now use consistent colours, spacing, and icons.
- Better error handling and UI messages.
- More responsive RecyclerViews and TaskAdapter updates.

## 2.5 Rewards & Gamification Improvements

### Added

- Coins system improved to support:
  - +5 coins for adding tasks

- +10 coins for completing tasks
- Updated UI progress bars (Health, XP, Mana).
- Rewards screen now updates live using LiveData.

## 2.6 Synchronised State Management

### Added

- Enhanced TaskViewModel with:
  - LiveData for task lists
  - Coin tracking and updates
  - Local + cloud merged view of tasks
- Repository rewritten to:
  - Manage offline queue
  - Perform safe API sync
  - Reduce crashes from inconsistent states

## 2.7 Stability & Code Quality Improvements

### Fixed

- Crash when reopening the app after deleting tasks.
- Duplicate task entries caused by API delay now resolved.

- Remote + local conflicting IDs corrected using sync logic.
- Build errors caused by KSP, Room annotation processor, and lifecycle issues.
- Improved error logs to assist debugging.

#### Improved

- Repository modularity
- Retrofit client timeouts
- ViewModel instantiation using factories
- Clean MVVM structure
- Detailed comments added throughout codebase

### 2.8 New Features Added for Final POE (Part 3)

#### ★ Feature 1: REST API + Cloud Database Integration

Full connection to a self-hosted API with persistent cloud storage.

#### ★ Feature 2: Offline Mode With Automatic Sync

Tasks can now be created offline and sync later when internet returns.

#### ★ Feature 3: UI Improvements + Professional Design

Complete modernisation of the interface to meet POE quality.

### 3. Removed or Deprecated

- Removed temporary placeholder task list used in prototype.

- Removed old adapters and unused fragments.
- Removed unused fields in Task model after data model rewrite.

#### 4. Known Issues (Minor)

- Sync delay up to 1–2 seconds on weak networks.
- MongoDB Atlas can occasionally throttle if free tier is overloaded.

#### 5. Final Notes

The app is now stable, scalable, and aligned with the rubric for Part 3.

All major features requested in the updated POE brief have been completed.