Test Case Report

for

Fasttrack

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1 Introduction

The Fasttrack Delivery system is designed to streamline package delivery operations through following integrated components:

- A Flutter-based mobile application for delivery personnel.
- A comprehensive website for company management and administrative tasks.
- A Flask-based backend API for processing package data and assignments.
- A Firebase Firestore for real-time data updates, secure authentication, and data storage.
- A Google Maps API for displaying map data and routes.

1.1 System Overview

The Fasttrack Delivery system comprises three main components:

1.1.1 Flutter Mobile Application

- **User Authentication:** Secure login using Firebase Authentication.
- **Employee Assignment & Package Tracking:** Delivery personnel can view assigned packages, scan their assigned packages, and monitor real-time progress.
- **Google Maps Integration:** Provides dynamic, real-time navigation and route optimization.
- **Notifications:** Firebase Cloud Messaging alerts employees about new assignments and status changes.

1.1.2 Website

The website serves as the control center for companies and administrators:

- **Company Registration and Management:**
  - `register.html`, `login.html`, and `forgot.html` enable secure user registration and login.
  - `CompanyD.html`, `AfterReg.html`, and `dashboard.html` provide interfaces for companies to manage their profiles and view key metrics.
- **Package Upload and Assignment:**
  - `UploadPack.html` and `package.html` facilitate the upload of daily package details and trigger assignment algorithms.
- **Administrative Functions:**
  - Admin pages such as `AdminApp.html`, `AdminCD.html`, `AdminComplaints.html`, `AdminCV.html`, `Admindashboard.html`, `AdminRC.html`, `AdminReport.html`, and `AdminV.html` allow administrators to verify new company registrations, manage complaints, generate reports, and oversee system operations.
- **Employee Management:**
  - Pages like `EmployeeD.html`, `EmployeePD.html`, `EmployeeR.html`, `Edit_SelectE.html`, `SelectBE.html`, and `SelectTE.html` help companies manage employee records and assign delivery tasks.
- **General Information:**
  - Additional pages (`about.html`, `contact.html`, `privacy.html`, `Terms.html`, etc.) provide information about the project, contact details, and legal policies.

1.1.3 Backend (Flask API)

- **Data Processing:** Fetches package data from Firebase, processes assignments, and updates records.
- **QR Code Generation:** Generates QR codes for tracking packages.
- **Real-Time Updates:** Ensures synchronization between the mobile application and the website using Firebase Firestore.

1.2 Modules

The Fasttrack Delivery system is organized into the following key modules:

1. **User Authentication:** Secure login and registration for both employees and companies.
2. **Employee Management:** Registration, management, and assignment of delivery personnel.
3. **Package Upload and Assignment:** Upload of package details and automatic assignment based on workload.
4. **Google Maps Integration and Route Optimization:** Real-time navigation with dynamic route optimization.

2 Test Case Report

2.1 Introduction

This section details the test cases for the Fasttrack Delivery application. The test cases cover following modules: Admin, Company, Employee, Package Assignment, Route Optimization and Guest. Testing is performed in the following areas:

- **Functional Testing:** Verifies that each feature works as intended.
- **UI Testing:** Ensures the interface is user-friendly and pages load correctly.
- **Performance Testing:** Checks system responsiveness under various conditions.
- **Security Testing:** Confirms that sensitive functionalities are restricted to authorized users.

2.2 Admin Module

2.2.1 Scope of Testing

- **Functional Testing:**
  - Admin login and authentication.
  - Approving or rejecting company registration requests.
  - Monitoring package assignments.
  - Managing admin and employee profiles.
- **UI Testing:**
  - Proper layout and navigation in the admin panel.
  - Consistent page loading and responsive design.
- **Performance Testing:**
  - Quick data retrieval and update speeds.
- **Security Testing:**
  - Ensuring that admin functionalities are accessible only to authorized personnel.

2.2.2 Testing Environment

- **Hardware:** Desktop or Laptop.
- **Software:** Web browser, Firebase, Supabase.
- **Network:** Internet connection required.

2.2.3 Test Cases

Test Case ID	Test Scenario	Test Steps	Expected Output	Actual Output	Status
TC01	Admin Login	Open website → Enter credentials → Login	Admin logs in successfully	Admin logged in successfully	Pass
TC02	Update Profile Details	Log in as Admin → Navigate to Profile → Modify details	Profile updated successfully	Profile updated successfully	Pass
TC03	Approve/Reject Company Registration	Log in as Admin → Navigate to Company Registration Requests → Approve/Reject	Registration status updated correctly	Status updated correctly	Pass

2.2.4 Bug Report

- No critical bugs found during testing.

2.3 Company Module

2.3.1 Scope of Testing

- **Functional Testing:**
  - Company registration and login.
  - Managing employee records.
  - Uploading daily package details.
  - Assigning employees to package deliveries.
- **UI Testing:**
  - Intuitive forms and dashboards for company users.
- **Performance Testing:**
  - Fast loading times for package details and employee data.
- **Security Testing:**
  - Secure handling of company information and package data.

2.3.2 Testing Environment

- **Hardware:** Desktop or laptop.
- **Software:** Web browser, Flutter, Firebase.
- **Network:** Internet connection required.

2.3.3 Test Cases

Test Case ID	Test Scenario	Test Steps	Expected Output	Actual Output	Status
TC01	Company Registration	Open website → Navigate to Registration → Enter details → Submit	Company account created successfully	Account created successfully	Pass
TC02	Company Login	Open website → Enter credentials → Login	Company dashboard displayed	Dashboard displayed correctly	Pass
TC03	Upload Package Details	Log in as Company → Navigate to Package Upload → Upload Excel file	Packages uploaded successfully	Packages uploaded successfully	Pass
TC04	Employee Registration	Log in as Company → Register Employee → Enter the details and submit	Employee Registered Successfully	Employee Registered Successfully	Pass

2.3.4 Bug Report

- No critical bugs found during testing.

2.4 Employee Module

2.4.1 Scope of Testing

- **Functional Testing:**
  - Employee login and authentication.
  - Viewing assigned package details.
  - Scanning QR Codes.
  - Notifications for new assignments.
- **UI Testing:**
  - Clear display of package information and intuitive navigation.
- **Performance Testing:**
  - Fast loading times for package data and navigation maps.
- **Security Testing:**
  - Secure access to delivery details and profile information.

2.4.2 Testing Environment

- **Hardware:** Android/iOS device.
- **Software:** Flutter, Firebase.
- **Network:** Internet connection required.

2.4.3 Test Cases

Test Case ID	Test Scenario	Test Steps	Expected Output	Actual Output	Status
TC01	Employee Login	Open app → Enter credentials → Login	Employee dashboard displayed	Dashboard displayed correctly	Pass
TC02	View Assigned Packages	Log in as Employee → Navigate to My Deliveries	List of assigned packages displayed	Packages displayed correctly	Pass
TC03	Scan QR Codes	Log in as Employee → Select package → Scan QR Code	Package status updated successfully	Package Status updated successfully	Pass
TC04	Notifications	Log in as Employee → Wait for notifications	Notifications received for new assignments	Notifications received	Pass

2.4.4 Bug Report

- Pickup location were not considered during route generation. This issue was resolved later

2.5 Package Assignment Module

2.5.1 Scope of Testing

- **Functional Testing:**
  - Uploading package details.
  - Automatic employee assignment based on workload.
  - Real-time updates of package status.
- **UI Testing:**
  - Clear display of package information and assignment status.
- **Performance Testing:**
  - Quick processing of package details and assignment logic.
- **Security Testing:**
  - Secure synchronization with Firebase Firestore.

2.5.2 Testing Environment

- **Hardware:** Desktop/laptop.
- **Software:** Web browser, Flutter, Firebase.
- **Network:** Internet connection required.

2.5.3 Test Cases

Test Case ID	Test Scenario	Test Steps	Expected Output	Actual Output	Status
TC01	Upload Package Details	Log in as Company → Navigate to Package Upload → Upload Excel file	Packages uploaded successfully	Packages uploaded successfully	Pass
TC02	Assign Employees	Log in as Company → Navigate to Employee Assignment → Select available employees → Assign packages	Employees assigned based on workload	Assignments updated incorrectly	Fail
TC03	Assign Employees	Log in as Company → Navigate to Employee Assignment → Select available employees → Assign packages	Employees assigned based on workload	Assignments updated correctly	Pass
TC04	Real-Time Package Updates	Log in as Company → Navigate to Package Assignment → Monitor package status	Package statuses updated in real-time	Statuses updated correctly	Pass

2.5.4 Bug Report

- Wrong Packets were assigned to the delivery personnel. The cause of the problem was identified. Later, the issue was resolved successfully.

2.6 Route Optimization Module

2.6.1 Scope of Testing

- **Functional Testing:**
  - Optimized route calculation for delivery personnel.
  - Dynamic route adjustments based on traffic conditions.
  - Real-time updates of route changes and estimated delivery times.
- **UI Testing:**
  - Clear display of optimized routes on the map.
- **Performance Testing:**
  - Fast computation of optimized routes.
  - Efficient handling of multiple deliveries per route.
- **Security Testing:**
  - Secure API integration with Google Maps for route optimization.

2.6.2 Testing Environment

- **Hardware:** Android Device
- **Software:** Web browser, Flutter app, Google Maps API.
- **Network:** Internet connection required.

2.6.3 Test Cases

Test Case ID	Test Scenario	Test Steps	Expected Output	Actual Output	Status
TC01	Route Calculation	Log in as Employee → Navigate to Assigned Deliveries → View optimized route	Route calculated based on shortest time and distance	Route displayed correctly	Pass
TC02	Real-Time ETA Update	Log in as Employee → Start navigation → Monitor ETA changes based on real-time traffic	ETA updates dynamically as conditions change	ETA updated incorrectly	Fail
TC03	Real-Time ETA Update	Log in as Employee → Start navigation → Monitor ETA changes based on real-time traffic	ETA updates dynamically as conditions change	ETA updated correctly	Pass
TC04	Multiple Deliveries Optimization	Log in as Employee → View assigned deliveries → System optimizes stops for efficiency	Deliveries arranged in the most time-efficient order	Stops optimized correctly	Pass

2.6.4 Bug Report

- Some routes were not optimized correctly due to API misconfiguration. The issue was resolved by adjusting route preferences.

2.7 Guest Route Optimization Module

2.7.1 Scope of Testing

- **Functional Testing:**
  - User inputs multiple locations.
  - System calculates the optimized route for the shortest travel time.
- **UI Testing:**
  - Clear display of input fields for locations.
  - Optimized route visualization on the map.
- **Performance Testing:**
  - Fast computation of optimized routes.
  - Efficient handling of multiple waypoints.
- **Security Testing:**
  - Secure API integration with Google Maps for route optimization.

2.7.2 Testing Environment

- **Hardware:** Android device.
- **Software:** Flutter app, Google Maps API.
- **Network:** Internet connection required.

2.7.3 Test Cases

Test Case ID	Test Scenario	Test Steps	Expected Output	Actual Output	Status
TC01	Location Input	Open application as Guest → Enter multiple locations → Submit for route optimization	Locations accepted and displayed on map	Locations displayed correctly	Pass
TC02	Route Calculation	Enter multiple locations → Request optimized path	Optimized route calculated with shortest distance	Route displayed correctly	Pass
TC043	Real-Time ETA Update	Start navigation → Monitor ETA changes based on real-time traffic	ETA updates dynamically as conditions change	ETA updated correctly	Pass
TC04	Multiple Waypoint Optimization	Enter multiple destinations → System optimizes stop sequence	Destinations arranged in the nearest neighbour approach	Stops optimized correctly	Pass

2.7.4 Bug Report

- No critical bugs found during testing.

3 Conclusion

The Fasttrack Delivery system efficiently manages Package Assignment and Route Optimization through the seamless integration of Flutter, Firebase, Google Maps and Flask. All core functionalities have been rigorously tested, and the system meets the design specifications. Future enhancements include AI-based route optimization and automated package sorting to further improve operational efficiency.