

Project Report on Courier Management System

For the partial fulfillment of Database Management System Laboratory

Submitted by

Adarsh Srivastava

B180001CS

Under the supervision of

Dr. Sangram Ray



Department of Computer Science and Engineering

National Institute of Technology, Sikkim

Ravangla-737139, Sikkim, India

December 2020

CERTIFICATE



This is to certify that the project report entitled “**Courier Management System**”, submitted by **Mr. Adarsh Srivastava** bearing RollNo. **B180001CS** is an authentic report for the work carried out under my supervision as a part of Database Management System Laboratory during the Monsoon semester, 2020 at National Institute of Technology Sikkim, Ravangla-737139, Sikkim.

Dr. Sangram Ray

Dean of Student Affairs & Assistant Professor

Department of Computer Science and Engineering

National Institute of Technology Sikkim

Ravangla-737139, Sikkim, India

ACKNOWLEDGEMENT

First and foremost, I would like to express my deepest gratitude to my supervisor, **Dr. Sangram Ray**. It has been an honor for me to do a project under his supervision and sincerely thank him for his excellent guidance, support, and motivation in every step throughout the whole period of my project.

I am indeed grateful to all the faculties and staff of the National Institute of Technology Sikkim for providing an environment conducive to my project.

Finally, I would like to thank God Almighty for giving me the strength, knowledge, ability, and opportunity to undertake this project study and to persevere and complete it satisfactorily.

Adarsh Srivastava

B180001CS

5th semester, 3rd-year undergraduate

Department of Computer Science and Engineering

APPENDIX

1) Abstract

2) Introduction

- a. Why the Courier Management Services?
- b. Problem Definition
- c. Motivation behind this project
- d. Scope of the Project

3) Requirement Analysis

- a. Requirement Gathering
- b. Requirement Specifications
 - i. Hardware
 - ii. Software
 - iii. Language and Framework

4) System Design

- a. UML Diagram
 - i. E-R Diagram
 - ii. Use-Case Diagram
 - iii. Sequence Diagram
- b. Database Schema

5) Snapshots of Project

6) Conclusion

7) Reference

ABSTRACT

Courier Management System(CMS) is an application based service, which satisfies, handles and manages the courier services efficiently and smoothly for the business and to the customer. This project deals with the '**Courier Management System**'. Courier Management System is the simplest solution for Courier & Logistics Tracking Business. The courier management software allows users to book orders, handle scheduling, process client details, track and monitor status courier, maintain employee details and admin details. Regardless of whether the business is a small courier firm or a major courier company with various branches, a courier management software/system suits every business perfectly.

This Courier Management System project offers variety of features which are differentiated by different modules:

- The **Onboarding and Authentication Section** has an onboarding facility, which provides a platform for users to select the facility they wish to access from the options of entering into the application as Admin, Employee and Customer. Then, it leads to an interface for a secure authentication page for users and finally lands them on a welcome page.
- The **Shipment Creation Section** allows customers to create a shipment/courier taking each and every necessary details such as details of customer (one creating shipment), recipient and courier.
- The **Details Section** is provided for each user (admin, employee and customer) which includes the list of employees and couriers for admin, list of assigned couriers for employee, and list of addresses and created shipments for customers.

- In the **Tracking Section**, provides an interface for the customers to track their placed orders/couriers with the help of tracking id provided after the creation of the courier.

INTRODUCTION

This Courier Management System Project offers a variety of services to its users and contains different modules. The **Onboarding and Authentication Section** provides a smooth and efficient onboarding and authentication facility, and finally lands them on a welcome page. The **Shipment Creation** facility creates a new order or courier for the customer which is managed by Admins. It provides accurate delivery details and low costs delivery charges. The **Details Section** provides all the necessary details which are required by the user using the platform hence, leading to a smoothening user experience of the application. The **Tracking Section, helps customers in tracking their orders in real time.** This Courier Management System Project will provide information **recipient** with following details: - where the current consignment is, till when it will reach its final destination, the status of the courier placed, date of placing consignment, final date to reach its destination.

Why Courier Management Services?

With the rise of Internet and Technologies, requirements of the person have been increased in a significant way. They want more facilities & try to do their task quickly & within time. But they cannot get all the things at the nearest market or area, so they have to buy/order or import things from anywhere in the world. Within the country, the things can be imported through post service. But it consumes the time & sometimes problems of damage or missing occur. Whereas in the international market, the one way is shipping. But it also requires more time.

The courier management service is one of the solutions of these problems. It is used to send goods from one place to another place of the world within time. The courier company has a number of branches, which are spread over the country or the world. So, when a person wants to send things then he has to contact the nearest courier service branch. The courier company creates the schedule & gives internal/external services. The courier service works as a destination office or source office. The source office branch receives the order means consignments & sends it to the destination courier branch. The company has certain rules according to the weight. These courier companies mostly use an automated system to make the whole process smooth and efficient. Hence, the role of Courier Management System comes into play. The use of courier management software helps the business in many ways, such as Time Efficiency, Cost Effectiveness, Real-time Tracking, Minimum Paperwork, Enhanced Security, Ease of Warehouse Management, Smoother Supply Chain Management, Effective Fleet Management, Better Inventory Management, Improved User Experience, Improved and Automated Customer Service, Reduced Administrative Work, Optimized Dispatch, Pick-up and Transmission Process, Centralized Real-time Information(Database), Automated Bill Generation System, Self-service portals for customers and Business Expansion.

Problem Definition

Customers when transferring/shipping their products using any courier management service want to know whether their product has been shifted to their right place or not, if not then the expected delivery date and what is its current status. Gaining all the information requires them to visit the Courier Office for the enquiry which results from the expense of time and money. The employees and Managing Person of a Courier Company face many difficulties while maintaining and sharing a detailed record of all the transactions and happenings of the company and their couriers. This results in lots of manual working and waste of time and labour. To handle all these activities, a system

needs to be developed to easily manage all the activities related to couriers and to assign employees for the courier delivery in an efficient manner.

Motivation behind this project

To gain maximum business region and to provide real-time tracking, minimum paperwork, enhanced security, ease of warehouse management, smoother supply chain management, effective fleet management, better inventory management, improved user experience, improved and automated Customer Service, reduced administrative work to their employees, staff and customers the administration of a business must have such an automated Courier Management System thus eliminating manual labor, wastage of time and money, and engaging more customers or clients.

Scope of the Project

With the latest outbreak of coronavirus, “Global courier management software market is expected to grow at a compound annual growth rate (CAGR) of almost 11% until 2021”. The burden on courier services have increased. The top three emerging trends driving the global courier management software market are rising demand for integrated courier management solutions, growing introduction of courier management mobile apps and rising cases of supply chain inefficiencies and need for transparency.

The inception of the automation and real-time concept in this industry has opened a new set of opportunities for the businesses. It has encouraged them to look beyond their premises and see what and how introducing new technologies into their business process can enhance their productivity and profitability. Because of such benefits, various entrepreneurs have already started consulting a reputed online courier management system/software development company to get familiar with trending statistics, cost to develop a courier management system/software, business and revenue model for their business to prefer, and determine how this facility will help them to excel and expand

their business. Hence, this management system has an overall positive impact on society by helping them manage and organize their business related problems in a proper way and leaving a good embark to their business growth.

REQUIREMENT ANALYSIS

Requirement Gathering

Requirement Analysis is the first and important step in the Software development activity for building robust and user-friendly applications. I have started working on determining the functionalities that the application should provide. I have done a good amount of research on existing systems and the disadvantages of those. Once the functional requirements were finalized, I researched on the current technologies that are widely used in the industry.

With the increasing market of Mobile Phones, the need of application based Courier Management System is beneficial for each and every user of a system. A mobile application which could provide all the required facilities without the need of a computer or PC could substantially grow the chances of the system to be used by users.

Requirement Specifications

Hardware:

- CPU – Intel Core i5(min)
- RAM – 4GB (min)
- Hard Disk – 4GB (min)

Software:

- IDE (Android Studio and Visual Studio Code) for App Development.
- Cloud Firestore (NoSQL Database)
- Firebase (Google's Mobile Platform)
- Android and Flutter SDK

Language and Framework:

- Flutter (Mobile UI Framework)
- Dart (Programming Language)

SYSTEM DESIGN

UML Diagram

I) USE CASE DIAGRAM:

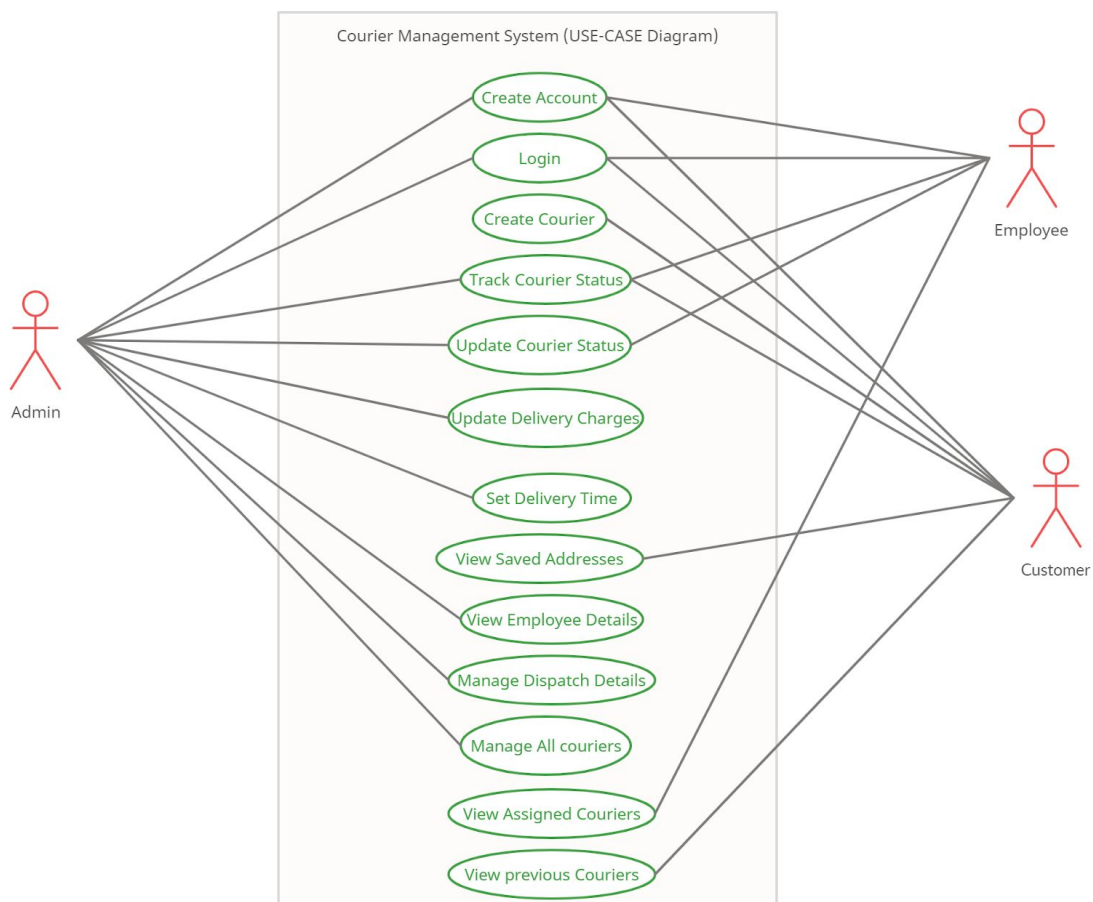


Fig: Use Case diagram of Courier Management System

II) SEQUENCE DIAGRAM:

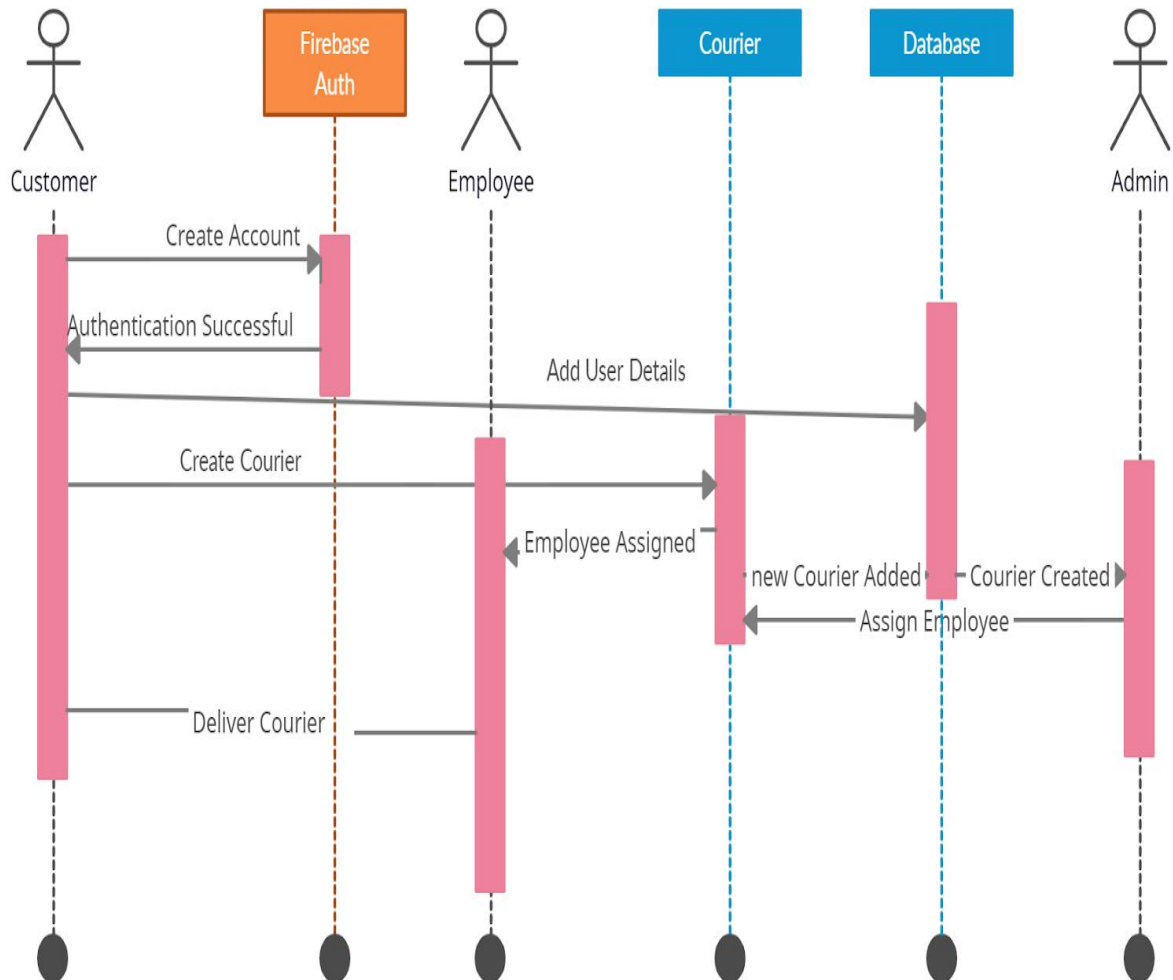


Fig: Sequence diagram of Courier Management System

III) ER DIAGRAM:

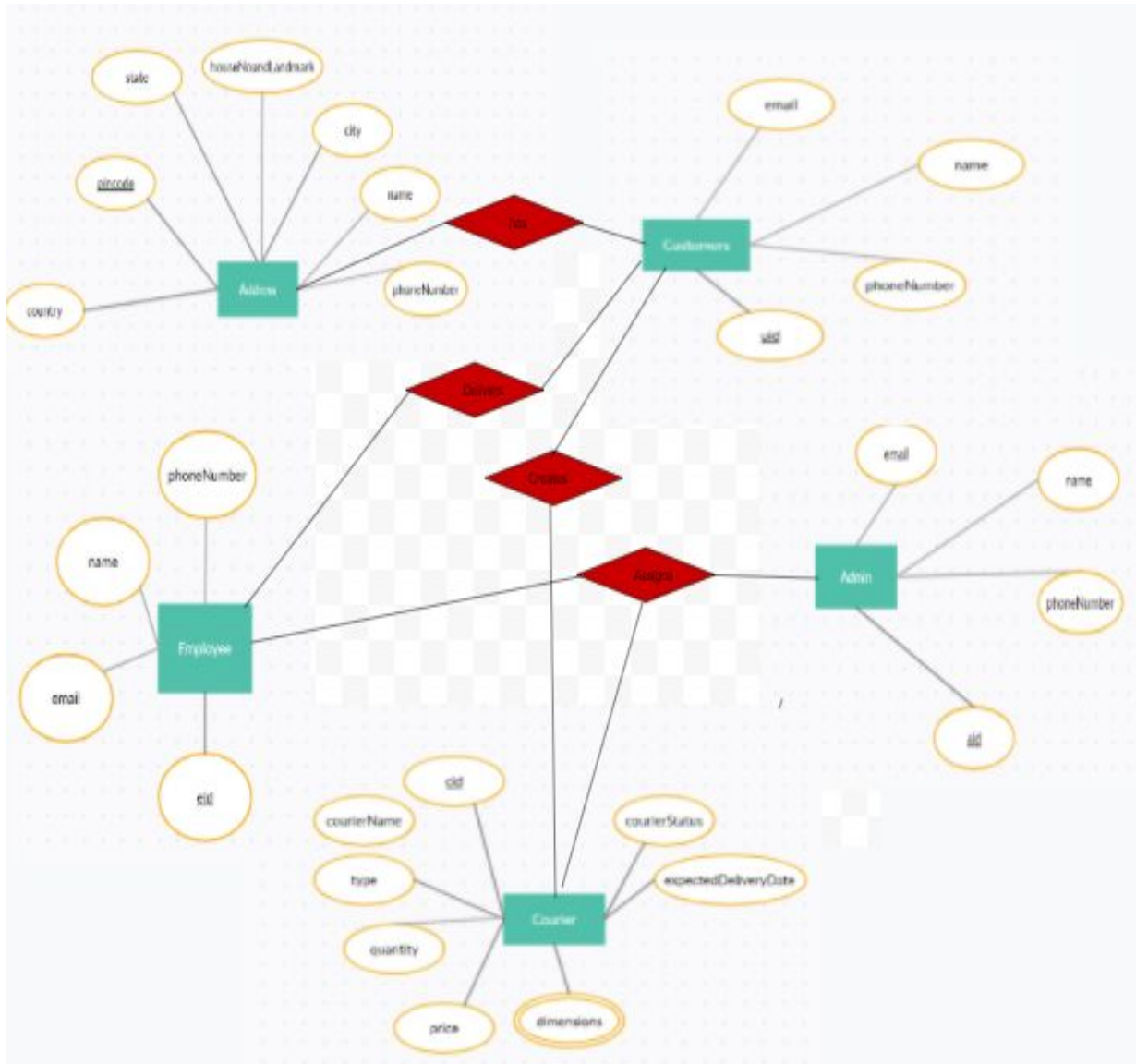


Fig: ER Diagram of Courier Management System

DATABASE SCHEMA

We have used Cloud Firestore Database, which is a NoSQL, document-oriented database. Unlike a SQL database, there are no tables or rows. Instead, data is stored in documents, which are organized into collections. Each document contains a set of

key-value pairs. Cloud Firestore is optimized for storing large collections of small documents. All documents must be stored in collections. Documents can contain subcollections and nested objects, both of which can include primitive fields like strings or complex objects like lists. Collections and documents are created implicitly in Cloud Firestore. Simply assign data to a document within a collection. If either the collection or document does not exist, Cloud Firestore creates it.

Collections used in this Project are:

- a) **userAddresses**(a collection) : The primary key of this document is the document id of the respective document stored inside the collection, i.e. **aid**(String). The schema or data model of documents under this collection is:

```
{
  'name': (String),
  "address": (String),
  "country": (String),
  "mobile": (String),
  'city': (String),
  'pincode': (String),
  'state': (String),
  'addressTag': (String),
};
```

- b) **customers** (a collection) : The primary key of this document is the document id of the respective document stored inside the collection, i.e. **uid**(String). The schema or data model of documents under this collection is:

```
{
  "name": (String),
  "email": (String),
  "phoneNumber": (String),
  "userAddresses": [ //List of Address Object
    {
      //Address Object: this structure will same as mentioned above
    },
    {
```

```

    // ....
    // ....
},
{
    // ....
    // ....
},
], // userAddressesToJson,
};

```

- c) **couriers** (a collection) : The primary key of this document is the document id of the respective document stored inside the collection, i.e. **cid**(String). The schema or data model of documents under this collection is:

```

{
  "courierName": (String),
  "type": (String),
  "length": (double),
  "breadth": (double),
  "height": (double),
  "weight": (double),
  "unitPrice": (double),
  "deliveryCharges": (double),
  "totalPrice": (double),
  "origin": {
    //Address Object: this structure will same as mentioned above
    //...
  }, // pickup Address
  "destination": {
    //Address Object: this structure will same as mentioned above
    //...
  }, // destination Address
  "quantity": (int),
  "expectedDeliveryDate": (String),
  "deliveryMan": {
    //Employee Object: this structure will same as mentioned above
    //...
  }, //
  "status": (String),
}

```

```
};
```

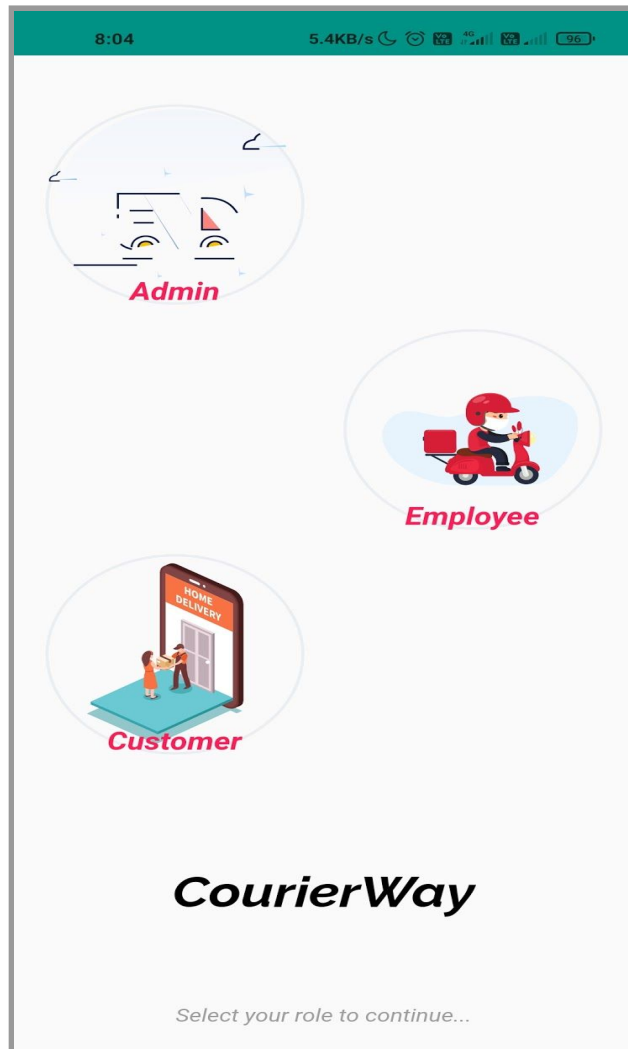
- d) **employees**(a collection) : The primary key of this document is the document id of the respective document stored inside the collection, i.e.**eid**(String). The schema or data model of documents under this collection is:

```
{
  "name": (String),
  "email": (String),
  "phoneNumber": (String),
  "assignedCouriers": [
    //List of Couriers Object
    {
      //Couriers Object: this structure will same as mentioned above
    },
    {
      // ....
      // ....
    },
    {
      // ....
      // ....
    },
  ], // assignedCouriersToJson,
};
```

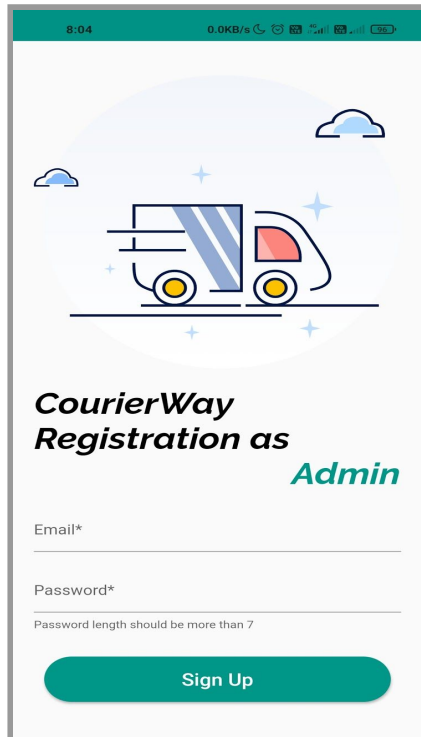
SNAPSHOTS OF THE PROJECT

Screenshots of some of the modules of the applications are as follows:


I. Onboarding Page:



II. Sign Up Page:



8:04 0.0KB/s



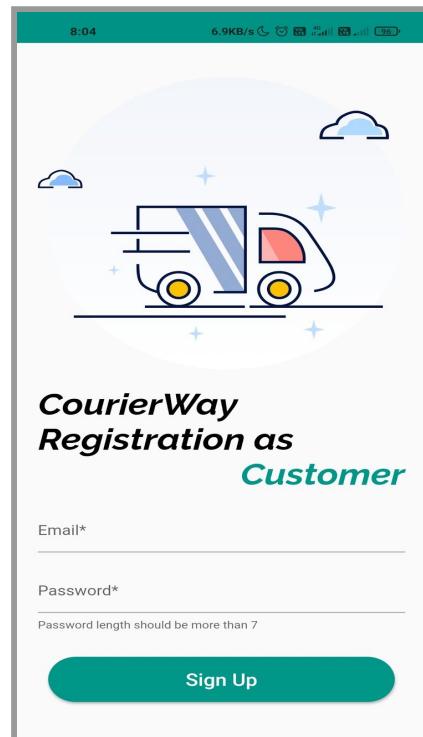
CourierWay
Registration as
Admin

Email*


Password*

Password length should be more than 7

Sign Up



8:04 6.9KB/s



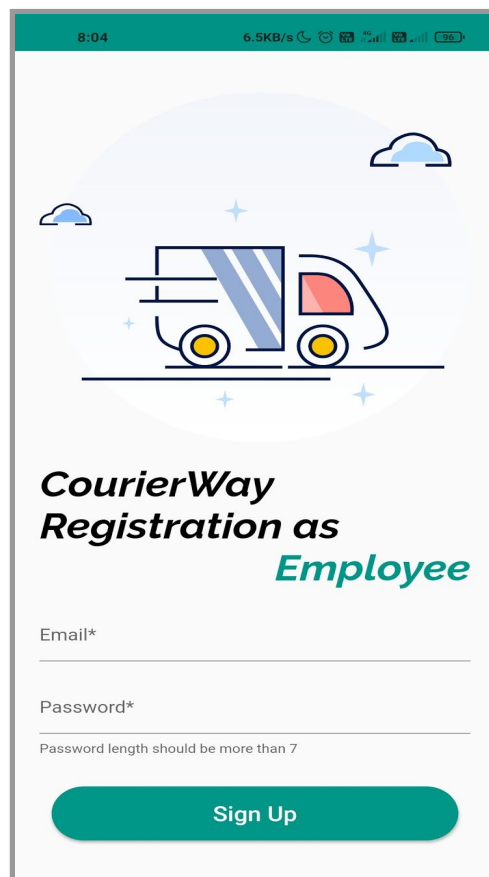
CourierWay
Registration as
Customer

Email*


Password*

Password length should be more than 7

Sign Up



8:04 6.5KB/s



CourierWay
Registration as
Employee

Email*

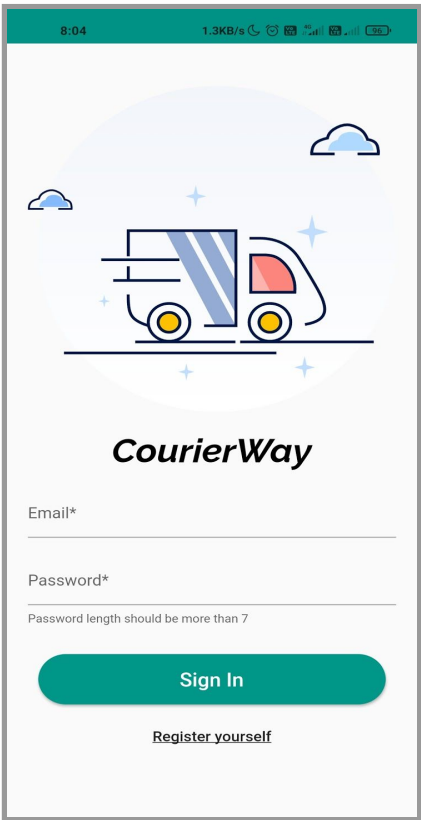
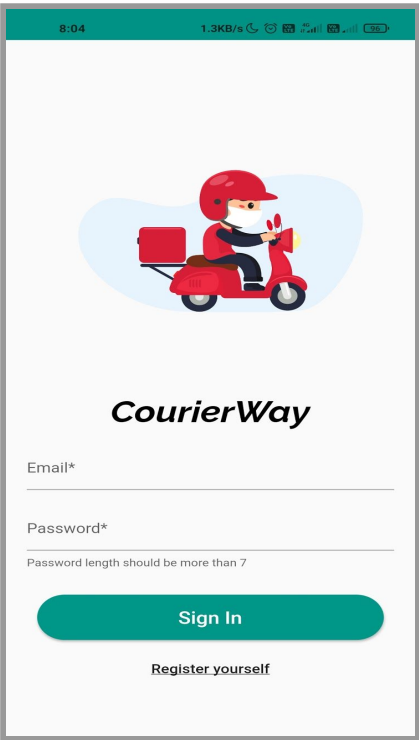
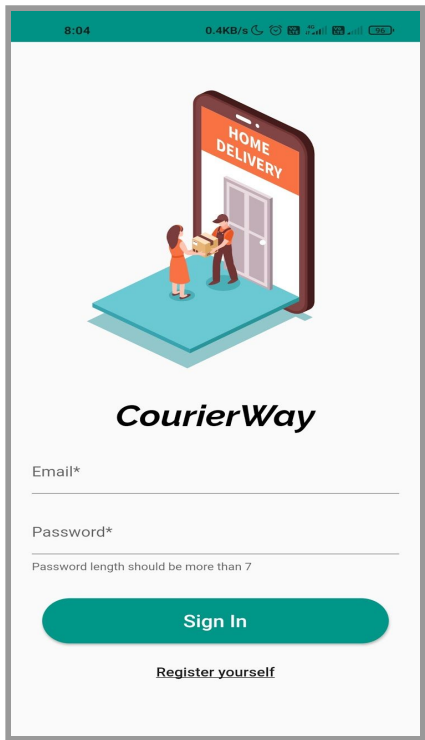
Password*

Password length should be more than 7

Sign Up

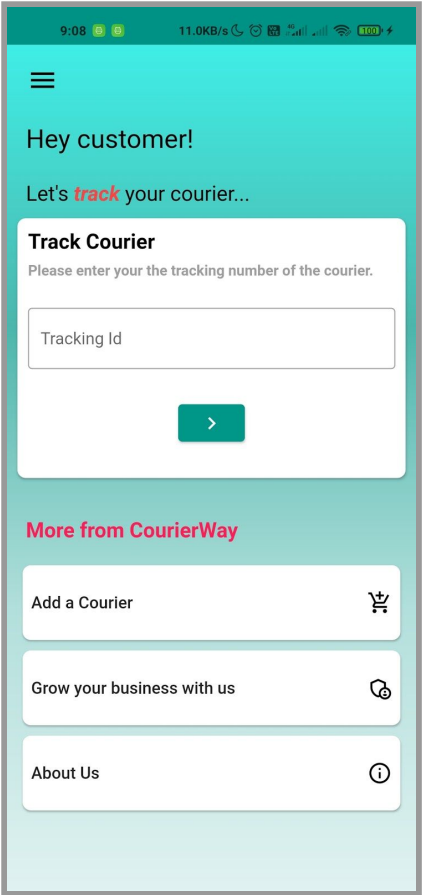
Signup Pages for all the three roles of an user

III. Login Page:

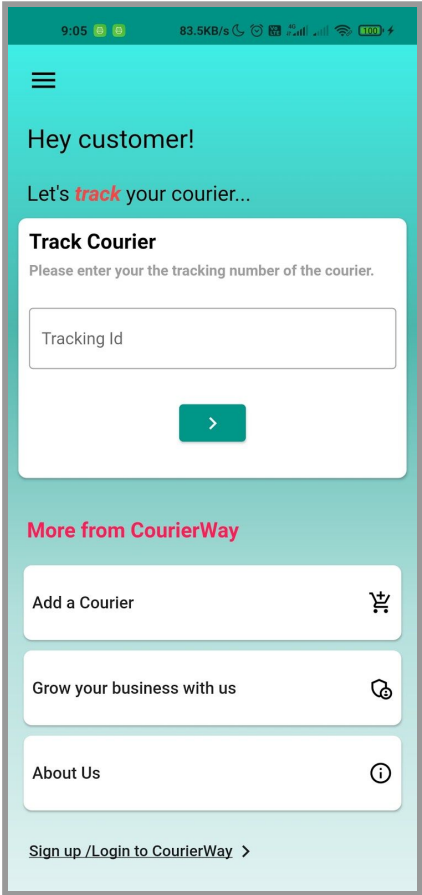


Login Pages for all the three roles of an user

IV. Welcome Page (Customer) :




Welcome Page (for logged in customers)



Welcome Page (for anonymous)

V. Welcome Page (Admin) :




Hey admin!

Let's **track** your courier...

Track Courier

Please enter your the tracking number of the courier.



Your Employees

Ramesh
Email: emp1@test.com
Couriers Assigned: 5

Suresh
Email: emp2@test.com
Couriers Assigned: 5

Brijesh

Brijesh
Email: emp3@test.com
Couriers Assigned: 5

Kamlesh
Email: emp4@test.com
Couriers Assigned: 5

Rajesh
Email: emp5@test.com
Couriers Assigned: 5

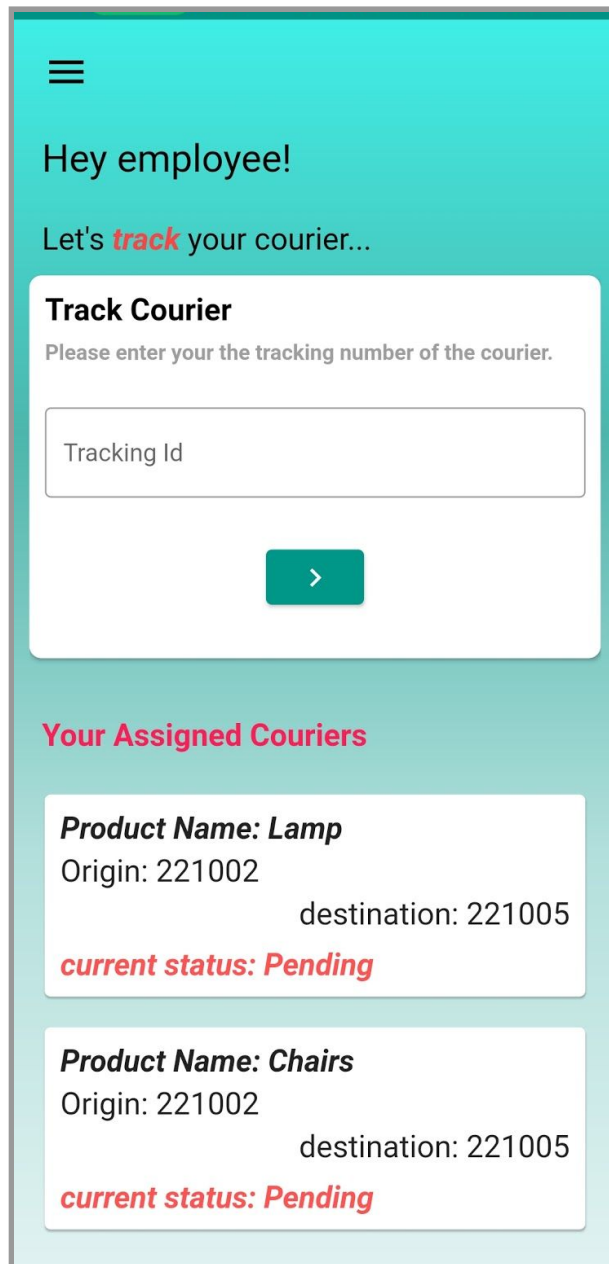
Available Couriers

Product Name: Lamp
Origin: 221002 destination: 221005
current status: Pending

Product Name: Chairs
Origin: 221002 destination: 221005
current status: Pending

Home Screen for Admin with options like Employee Lists, Available Couriers and Check courier status

VI. Welcome Page (Employee) :



The image shows a mobile app interface for an employee's welcome page. It features a teal header with a hamburger menu icon. Below the header, there's a greeting 'Hey employee!' and a prompt 'Let's track your courier...'. A white card titled 'Track Courier' contains a text input field for 'Tracking Id' and a green button with a right arrow. Below this, a section titled 'Your Assigned Couriers' lists two items: 'Lamp' and 'Chairs'. Each item shows its origin (221002), destination (221005), and a 'current status: Pending'.

☰

Hey employee!

Let's **track** your courier...

Track Courier

Please enter your the tracking number of the courier.

Tracking Id

>

Your Assigned Couriers

Product Name: Lamp
Origin: 221002
destination: 221005
current status: Pending

Product Name: Chairs
Origin: 221002
destination: 221005
current status: Pending

Home Screen for Employees with options like Assigned Couriers and Check courier status

VII. Add Courier:

9:06 11.7KB/s

Create Shipment

+ Add Address

Pickup Address**
Primary

Delivery Address

Reciever's Name*

Phone Number*

House No.*

Street No. and Landmark*

Pincode* City*

State* Country*

Courier Details

Add Product/Courier Name*

Add Unit Price* Add Quantity*

Weight* (cm)

Dimensions*
L X B X H (cm)

9:06 14.7KB/s

Create Shipment

Phone Number*

House No.*

Street No. and Landmark*

Pincode* City*

State* Country*

Courier Details

Add Product/Courier Name*

Add Unit Price* Add Quantity*

Weight* (cm)

Dimensions*
L X B X H (cm)

Courier Type*

Document Non-Document

Total:

Create an Shipment

Shipment Creation Section showing the form to fill for creating a new courier shipment. Details of Seller, Buyer and Product needs to be mentioned in given format. (To add the pickup address we show the user his/her saved list of Addresses to pick from along with the “Add Address” option to add a new one too if required..

VIII. Assigned Couriers (for Employee):

Assigned Couriers

Product Name: Lamp
Origin: 221002
destination: 221005
current status: Pending

Product Name: Chairs
Origin: 221002
destination: 221005
current status: Pending

Assigned Couriers Screens of Employees

IX. Available Couriers (for Admin):

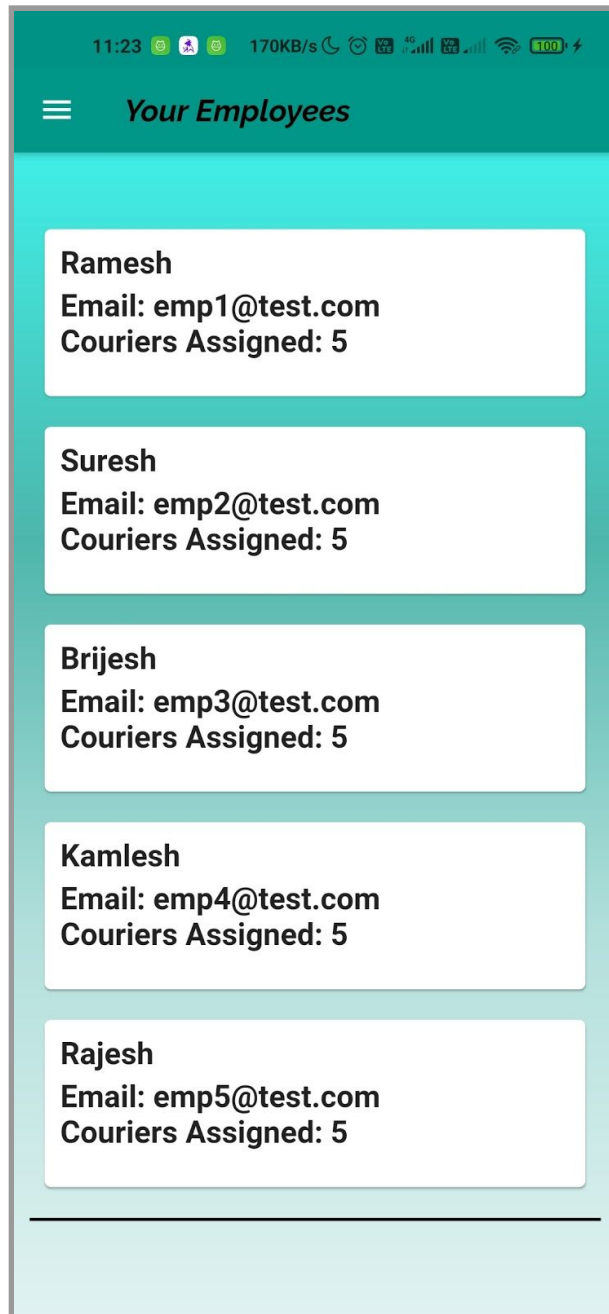
☰ Available Couriers

Product Name: Lamp
Origin: 221002
destination: 221005
current status: Pending

Product Name: Chairs
Origin: 221002
destination: 221005
current status: Pending

Available Couriers Screens for Admins

X. View Employee List (for Admin):

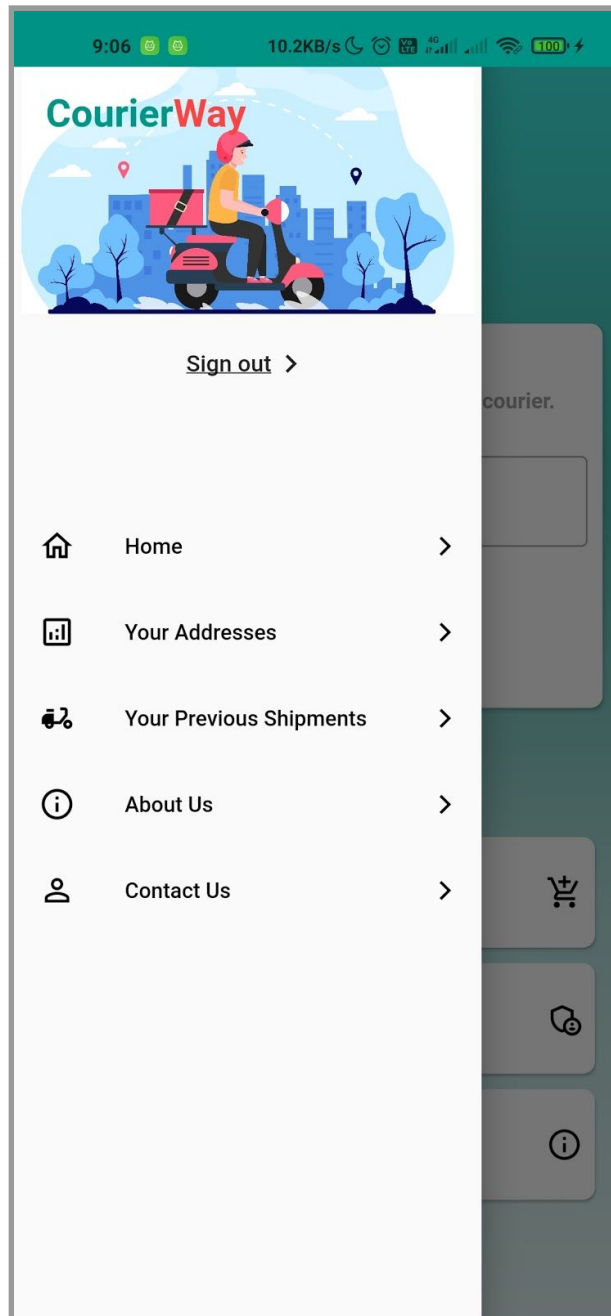


XI. View Courier Status:

Mobile app interface for a customer. The screen has a teal header with a hamburger menu icon. Below the header, it says "Hey customer!" and "Let's **track** your courier...". A white card titled "Track Courier" contains the text "Please enter your the tracking number of the courier." and a text input field labeled "Tracking Id" with the placeholder "e.g. xSaowAnsa1312AA". A green button with a right arrow is below the input field. Below the card, there is a section titled "More from CourierWay" with a white rounded rectangle underneath. At the bottom, a mobile keyboard is visible.

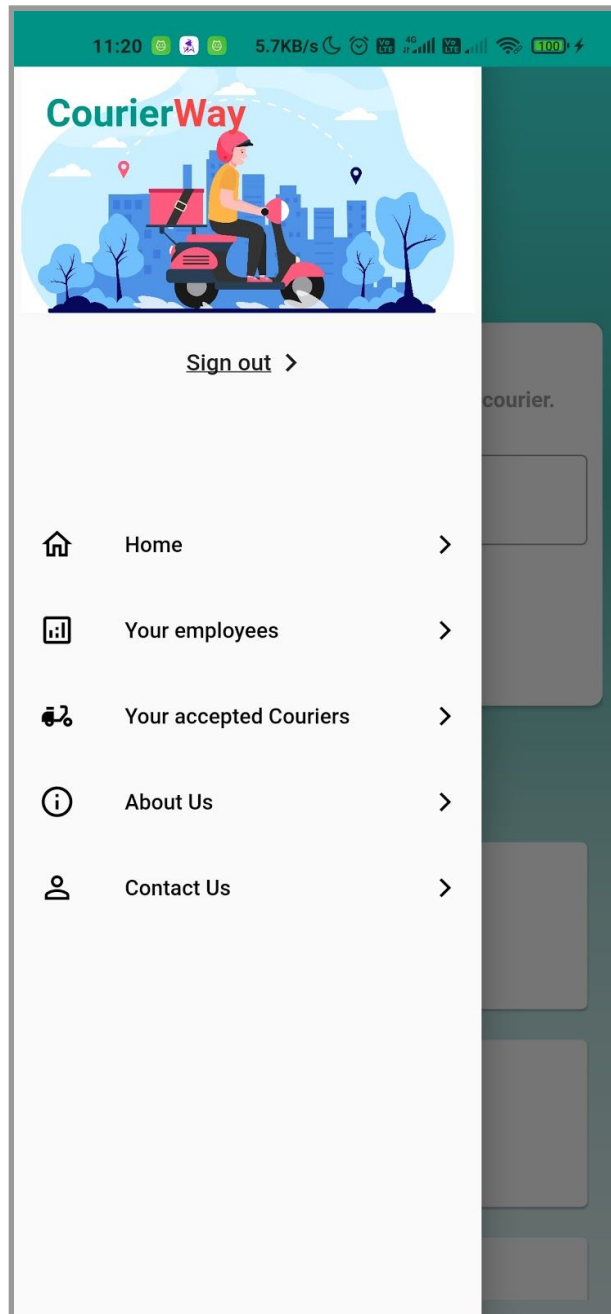
Mobile app interface for an admin. The screen has a dark teal header with a hamburger menu icon. Below the header, it says "Hey admin!" and "Let's **track** your courier...". A grey card titled "Track Courier" contains the text "Please enter your the tracking number of the courier." and a grey text input field labeled "Tracking Id". A green button with a right arrow is below the input field. Below the card, there is a section titled "Your Employees" with a grey rounded rectangle underneath. At the bottom, a white card displays the "Courier Status of id: xSaowAnsa1312AA". It shows "Product Name: Lamp", "Origin: 221002", and "Destination: 221005". The "current status: Dispathced" is highlighted in red. A green "Ok" button is at the bottom of this card.

XII. Menu (Customers):



Menu with options of going back to home screen, checking the saved addresses list, checking previously booked couriers and the About Us and Contact Us page.

XIII. Menu (Admin):



Menu with options of going back to home screen, checking the employees list, checking previously accepted or managed couriers and the About Us and Contact Us page.

CONCLUSION

The Courier Management System will provide a simple user interface for placing a courier and tracking it from any location. Courier management systems can be personalized to fit your business and can either be used as a complete system or as separate modules.

The system is being used for day to day actions such as maintaining employee details, courier details which are placed, tracking the courier and many things.

- The main aim of this project is to computerize the maintenance of courier management.
- The objective of the project is to deliver an efficient Courier Management System whose main functionality is to provide a simple and user friendly interface with all the facilities mentioned above.

REFERENCE

Book used:

1. Henry F Korth, Abraham Silberschatz, "Database system concepts", McGraw-Hill International editions, Computer Science Series (1991). Second Ed.

Sites Referred:

- i) www.google.com
- ii) <https://www.flutter.dev>
- iii) <https://firebase.google.com/docs/>
- iv) www.scribd.com
- v) www.lucidchart.com