

FlightFinder: Your Gateway to Seamless Air Travel

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Introduction:

Welcome to FlightFinder, your dedicated platform for discovering and booking flights with ease and precision. Whether you're planning a weekend escape or a business trip, FlightFinder empowers travelers to make smart, informed, and stress-free choices. Designed with a user-centric philosophy, the platform ensures every journey begins with a click and ends with a smile.

Description:

FlightFinder is not just a booking portal; it is a comprehensive ecosystem tailored for both occasional and frequent flyers. With access to a global network of airlines, advanced search filters, and real-time updates, users can explore the best flight options that match their needs. Welcome

The platform provides functionalities such as user profile management, search by date or destination, secure booking, itinerary tracking, and instant updates. It also incorporates features like seat selection, baggage guidelines, and promotional alerts to optimize the user experience.

Scenario Based Case Study:

Meet Riya, a travel enthusiast and event planner.

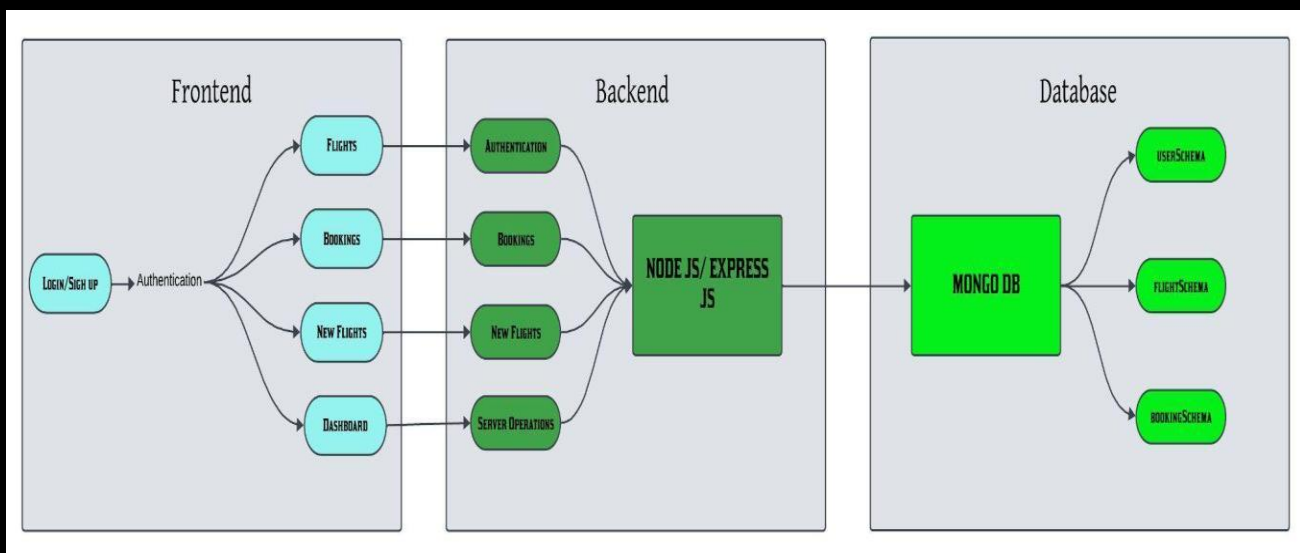
Riya is organizing an international event in Singapore and needs to book multiple tickets for attendees. She logs into FlightFinder and takes the **following steps:**

- **User Registration and Authentication:** Riya creates an account, verifies her email, and sets up her traveler profile with preferences.
- **Flight Browsing:** She enters city pairs, travel dates, and applies filters such as flight duration, airline preference, and class.

- **Smart Suggestions:** FlightFinder recommends flights based on lowest price, fastest duration, and travel history.
- **Group Booking:** Riya selects multiple passengers and proceeds with booking using the group reservation option.
- **Secure Payment:** She uses UPI to pay through the integrated gateway and receives confirmation instantly.
- **Real-time Notifications:** The platform sends reminders for check-in, gate changes, and weather alerts.

Thanks to FlightFinder, Riya efficiently manages her team's travel and receives timely updates to keep her plans on track.

Technical Architecture:

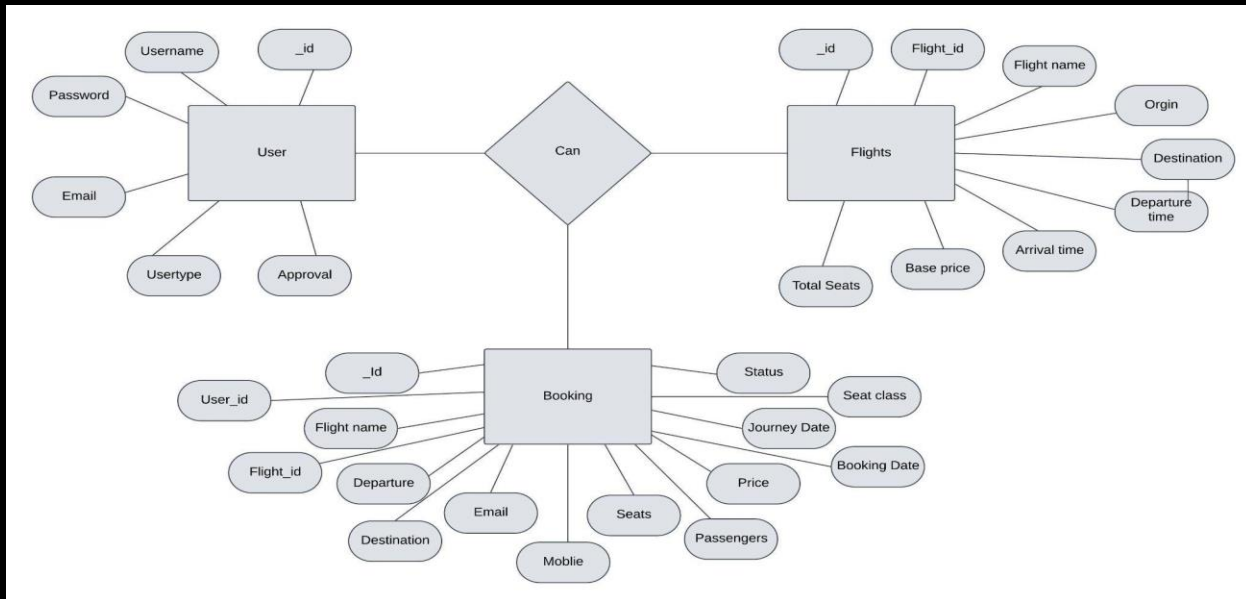


In this architecture diagram:

- The frontend is represented by the "Frontend" section, including user interface components such as User Authentication, Flight Search, and Booking.
- The backend is represented by the "Backend" section, consisting of API endpoints for Users, Flights, Admin and Bookings. It also includes Admin Authentication and an Admin Dashboard.

- The Database section represents the database that stores collections for Users, Flights, and Flight Bookings.

Er Diagram:



The flight booking ER-diagram represents the entities and relationships involved in a flight booking system. It illustrates how users, bookings, flights, passengers, and payments are interconnected. Here is a breakdown of the entities and their relationships:

- **USER:** Represents the individuals or entities who book flights. A customer can place multiple bookings and make multiple payments.
- **BOOKING:** Represents a specific flight booking made by a customer. A booking includes a particular flight details and passenger information. A customer can have multiple bookings.
- **FLIGHT:** Represents a flight that is available for booking. Here, the details of flight will be provided and the users can book them as much as the available seats.
- **ADMIN:** Admin is responsible for all the backend activities. Admin manages all the bookings, adds new flights, etc.

PREREQUISITES:

To develop a full-stack flight booking app using React JS, Node.js, and MongoDB, there are several prerequisites you should consider. Here are the key prerequisites for developing such an application:

- **Node.js and npm:** Install Node.js, which includes npm (Node Package Manager), on your development machine. Node.js is required to run JavaScript on the server side.
 - Download: <https://nodejs.org/en/download/>
 - Installation instructions: <https://nodejs.org/en/download/package-manager/>
- **MongoDB:** Set up a MongoDB database to store hotel and booking information. Install MongoDB locally using a cloud-based MongoDB service.
 - Download: <https://www.mongodb.com/try/download/community>
 - Installation instructions: <https://docs.mongodb.com/manual/installation/>
- **Express.js:** Express.js is a web application framework for Node.js. Install Express.js to handle server-side routing, middleware, and API development.

Installation: Open your command prompt or terminal and run the following command: `npm install express`
- **React.js:** React.js is a popular JavaScript library for building user interfaces. It enables developers to create interactive and reusable UI components, making it easier to build dynamic and responsive web applications. To install React.js, a JavaScript library for building user interfaces, follow the installation guide: <https://reactjs.org/docs/create-a-new-react-app.html>
- **HTML, CSS, and JavaScript:** Basic knowledge of HTML for creating the structure of your app, CSS for styling, and JavaScript for client-side interactivity is essential.
- **Database Connectivity:** Use a MongoDB driver or an Object-Document Mapping (ODM) library like Mongoose to connect your Node.js server with the MongoDB database and perform CRUD (Create, Read, Update, Delete) operations.

- **Front-end Framework:** Utilize Angular to build the user-facing part of the application, including product listings, booking forms, and user interfaces for the admin dashboard.
- **Version Control:** Use Git for version control, enabling collaboration and tracking changes throughout the development process. Platforms like GitHub or Bitbucket can host your repository.
 - Git: Download and installation instructions can be found at: <https://git-scm.com/downloads>
- **Development Environment:** Choose a code editor or Integrated Development Environment (IDE) that suits your preferences, such as Visual Studio Code, Sublime Text, or WebStorm.
 - Visual Studio Code: Download from <https://code.visualstudio.com/download>
 - Sublime Text: Download from <https://www.sublimetext.com/download>
 - WebStorm: Download from <https://www.jetbrains.com/webstorm/download>

To Connect the Database with Node JS go through the below provided link:

- <https://www.section.io/engineering-education/nodejs-mongoosejs-mongodb>

To run the existing Flight Booking App project downloaded from github:

Follow below steps:

Clone the repository:

- Open your terminal or command prompt.
- Navigate to the directory where you want to store the e-commerce app.
- Execute the following command to clone the repository:
- **Git clone:** <https://github.com/harsha-varadhan-reddy-07/Flight-Booking-App-MERN>

Install Dependencies:

- Navigate into the cloned repository directory:
- **cd Flight-Booking-App-MERN**
- Install the required dependencies by running the following command:

npm install

Start the Development Server:

- To start the development server, execute the following command:
- **npm run dev or npm run start**
- The e-commerce app will be accessible at <http://localhost:3000> by default. You can change the port configuration in the .env file if needed.

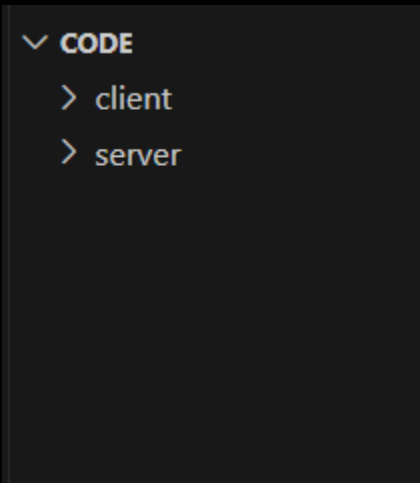
Access the App:

- Open your web browser and navigate to <http://localhost:3000>
- You should see the flight booking app's homepage, indicating that the installation and the setup was successful.

You have successfully installed and set up the flight booking app on your local machine. You can now proceed with further customization, development, and testing as needed.

Project Structure:

- Inside the Flight Booking app directory, we have the following folders



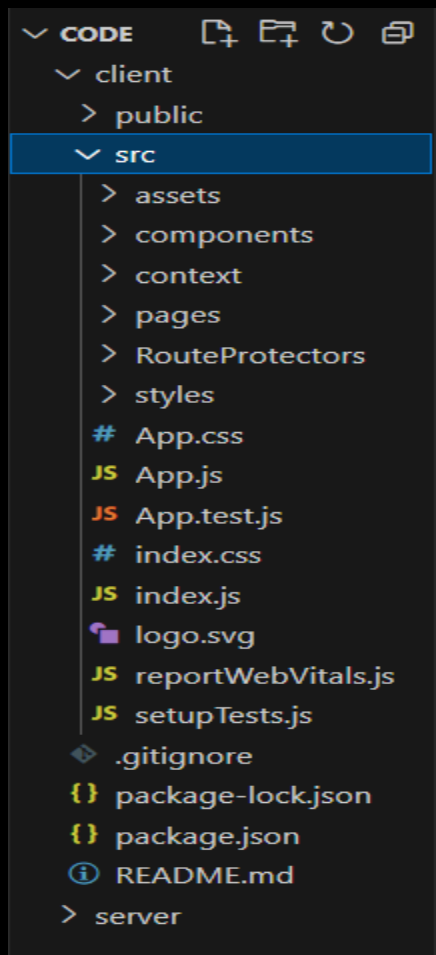
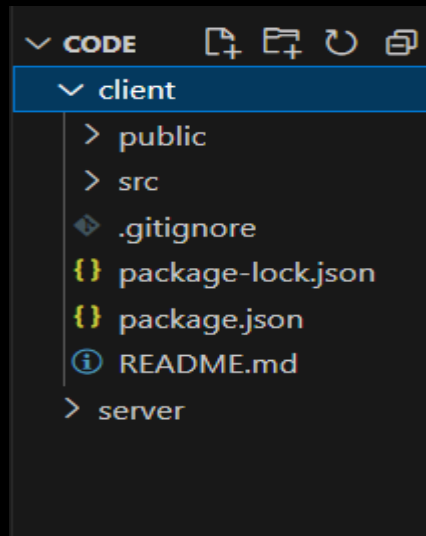
```

✓ CODE
  > client
  > server

```

Client Directory:

- The below directory structure represents the directories and files in the client folder (front end) where, react js is used along with Api's.



Server Directory:

The below directory structure represents the directories and files in the server folder (back end) where, node js, express js and mongodb are used along with Api.

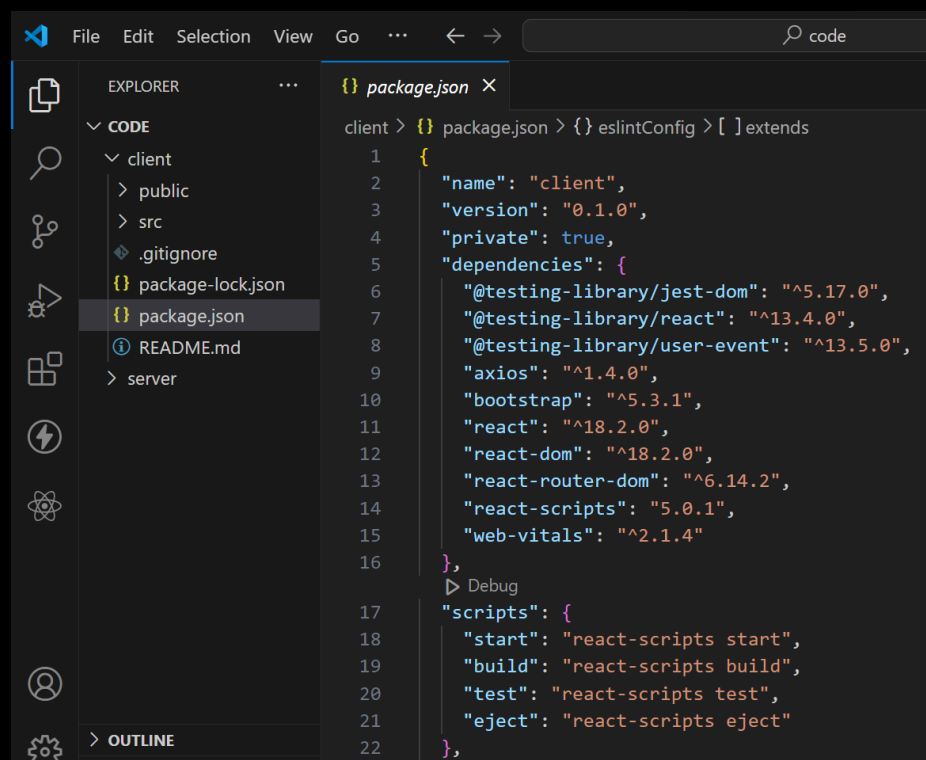
Installation of required tools:

Now, open the frontend folder to install all the necessary tools we use.

For frontend, we use:

- React Js
- Bootstrap
- Axios

After installing all the required libraries, we'll be seeing the package.json file similar to the one below.



The screenshot shows the Visual Studio Code interface with the Explorer sidebar on the left and the Code editor on the right. The Explorer sidebar shows a project structure with a 'client' folder expanded, containing 'public', 'src', '.gitignore', 'package-lock.json', 'package.json', 'README.md', and 'server'. The 'package.json' file is selected and its content is displayed in the Code editor. The code is as follows:

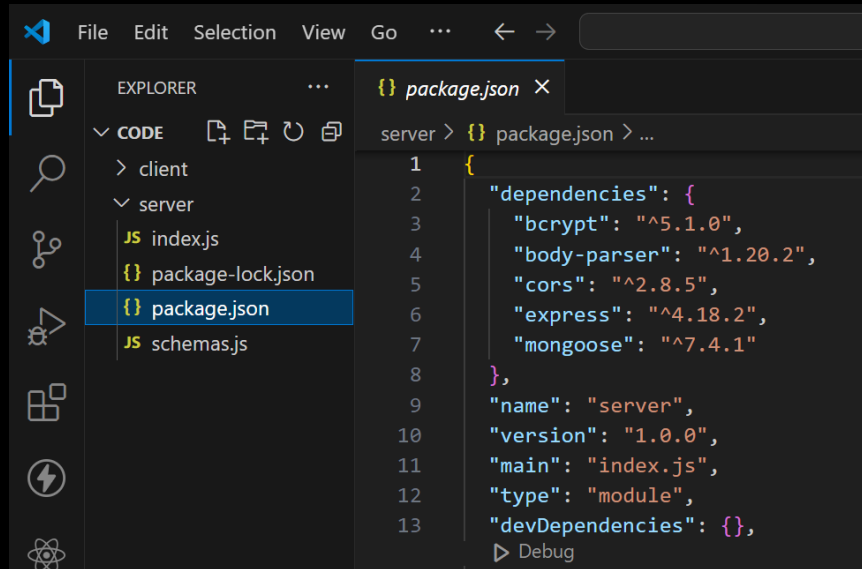
```
1  {
2    "name": "client",
3    "version": "0.1.0",
4    "private": true,
5    "dependencies": {
6      "@testing-library/jest-dom": "^5.17.0",
7      "@testing-library/react": "^13.4.0",
8      "@testing-library/user-event": "^13.5.0",
9      "axios": "^1.4.0",
10     "bootstrap": "^5.3.1",
11     "react": "^18.2.0",
12     "react-dom": "^18.2.0",
13     "react-router-dom": "^6.14.2",
14     "react-scripts": "5.0.1",
15     "web-vitals": "^2.1.4"
16   },
17   "scripts": {
18     "start": "react-scripts start",
19     "build": "react-scripts build",
20     "test": "react-scripts test",
21     "eject": "react-scripts eject"
22   },
```

- Now, open the backend folder to install all the necessary tools that we use in the backend.

For backend, we use:

- bcrypt
- body-parser
- cors
- express
- mongoose

After installing all the required libraries, we'll be seeing the package.json file similar to the one below.

A screenshot of the Visual Studio Code editor interface. The Explorer sidebar on the left shows a project structure with a 'server' directory containing 'index.js', 'package-lock.json', 'package.json', and 'schemas.js'. The 'package.json' file is selected and its content is displayed in the main editor. The content of 'package.json' is as follows:

```
1 {
2   "dependencies": {
3     "bcrypt": "^5.1.0",
4     "body-parser": "^1.20.2",
5     "cors": "^2.8.5",
6     "express": "^4.18.2",
7     "mongoose": "^7.4.1"
8   },
9   "name": "server",
10  "version": "1.0.0",
11  "main": "index.js",
12  "type": "module",
13  "devDependencies": {},
14 }
```

Milestone 2: Backend Development:

1. Database Configuration:

- Set up a MongoDB database either locally or using a cloud-based MongoDB service like MongoDB Atlas or use locally with MongoDB compass.
- Create a database and define the necessary collections for flights, users, bookings, and other relevant data.

2. Create Express.js Server:

- Set up an Express.js server to handle HTTP requests and serve API endpoints.
- Configure middleware such as body-parser for parsing request bodies and cors for handling cross-origin requests.

3. Define API Routes:

- Create separate route files for different API functionalities such as flights, users, bookings, and authentication.
- Define the necessary routes for listing flights, handling user registration and login managing bookings, etc.
- Implement route handlers using Express.js to handle requests and interact with the database.

4. Implement Data Models:

- Define Mongoose schemas for the different data entities like flights, users, and bookings.
- Create corresponding Mongoose models to interact with the MongoDB database. Implement CRUD operations (Create, Read, Update, Delete) for each model to perform database operations.

5. User Authentication:

- Create routes and middleware for user registration, login, and logout.
- Set up authentication middleware to protect routes that require user authentication.

6. Handle new Flights and Bookings:

- Create routes and controllers to handle new flight listings, including fetching flight data from the database and sending it as a response.
- Implement booking functionality by creating routes and controllers to handle booking requests, including validation and database updates.

7. Admin Functionality:

- Implement routes and controllers specific to admin functionalities such as adding flights, managing user bookings, etc.
- Add necessary authentication and authorization checks to ensure only authorized admins can access these routes.

8. Error Handling:

- Implement error handling middleware to catch and handle any errors that occur during the API requests.
- Return appropriate error responses with relevant error messages and HTTP status codes.

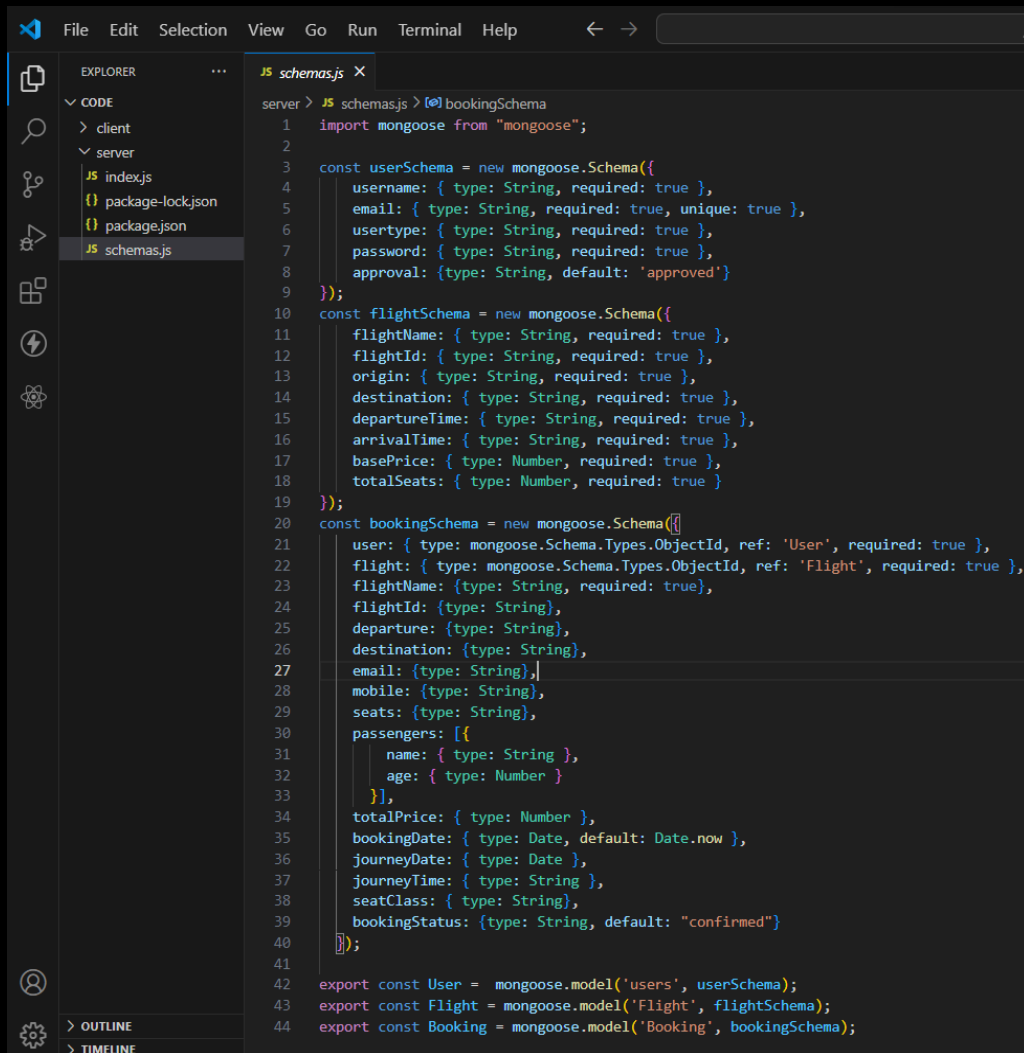
Reference video for backend code:

https://drive.google.com/file/d/11iNDCz0IJlv9zAS8nYbjrc1JXTPGtwsi/view?usp=drive_link

Milestone 3: Database development

• Configure schema:

Firstly, configure the Schemas for MongoDB database, to store the data in such a pattern. Use the data from the ER diagrams to create the schemas. The Schemas for this application look alike to the one provided below.



- **Connect database to backend:**

- Now, make sure the database is connected before performing any of the actions through the backend. The connection code looks similar to the one provided below.

```
//
const PORT = process.env.PORT || 6001;
mongoose.connect(process.env.MONGO_URL, {
  useNewUrlParser: true,
  useUnifiedTopology: true
}).then(()=>{

  server.listen(PORT, ()=>{
    console.log(`Running @ ${PORT}`);
  });

}).catch((err)=>{
  console.log("Error: ", err);
})
```

Milestone 4: Frontend Development.

1. Login/Register:

- Create a Component which contains a form for taking the username and password.
- If the given inputs matches the data of user or admin or flight operator then navigate it to their respective home page

2. Flight Booking (User):

- In the frontend, we implemented all the booking code in a modal. Initially, we need to implement flight searching feature with inputs of Departure city, Destination, etc.,
- Flight Searching code: With the given inputs, we need to fetch the available flights. With each flight, we add a button to book the flight, which redirects to the flight-Booking page.

3. Fetching user bookings:

- In the bookings page, along with displaying the past bookings, we will also provide an option to cancel that booking.

4. Add new flight(Admin):

- Now, in the admin dashboard, we provide functionality to add new flights.
- We create a html form with required inputs for the new flight and then send an httprequest to the server to add it to the database.

5. Update Flight:

- Here, in the admin dashboard, we will update the flight details in case if we want to make any edits to it
- Along with this, implement additional features to view all flights, bookings, and users in the admin dashboard.

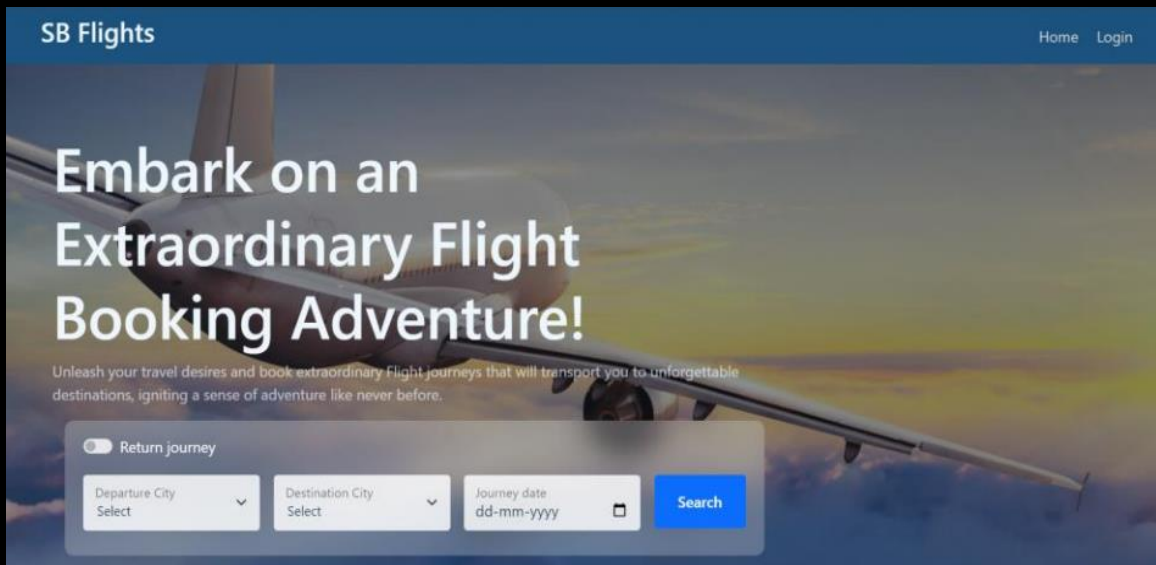
Reference video for frontend code:

https://drive.google.com/file/d/1PbNV785R9WenBKuoNHObHKmbApdTnBDx/view?usp=drive_link

Milestone 5: Project Implementation.

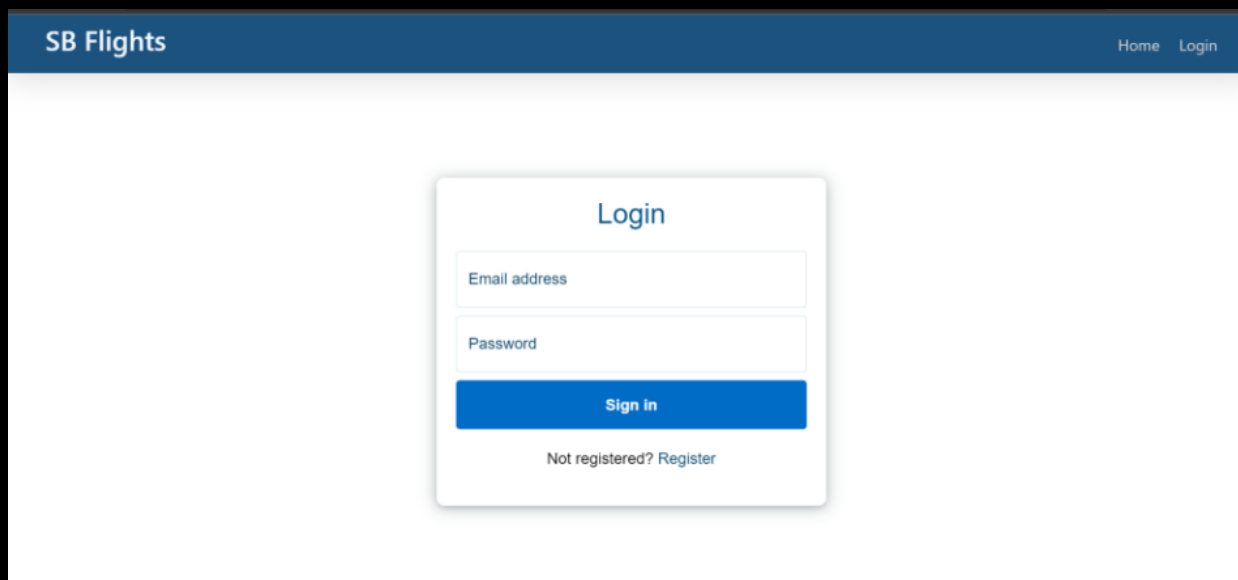
- Finally, after finishing coding the projects we run the whole project to test it's working process and look for bugs. Now, let's have a final look at the working of our video conference application.

- **Landing page UI:**



The landing page features a blue header with 'SB Flights' on the left and 'Home' and 'Login' links on the right. The main content area has a background image of an airplane wing against a sunset sky. The headline 'Embark on an Extraordinary Flight Booking Adventure!' is prominently displayed. Below it, a sub-headline reads: 'Unleash your travel desires and book extraordinary Flight journeys that will transport you to unforgettable destinations, igniting a sense of adventure like never before.' A search form is centered, including a 'Return journey' toggle, two dropdown menus for 'Departure City' and 'Destination City', a date input for 'Journey date' with a calendar icon, and a blue 'Search' button.

- **Authentication:**



The authentication page has a blue header with 'SB Flights' on the left and 'Home' and 'Login' links on the right. The main content area is white. A central white box with a blue shadow contains the 'Login' form. The form has the title 'Login' in blue, followed by two input fields labeled 'Email address' and 'Password'. Below these is a blue 'Sign in' button. At the bottom of the box, a link reads 'Not registered? Register'.

- **User Bookings:**

SB Flights

HomeBookingsLogout

Bookings

Booking ID: 64ec8c3c4622709484005484
Mobile: 7669678988 Email: harsha@gmail.com
Flight Id: cni2321 Flight name: Indigo
On-boarding: Chennai Destination: Bangalore
Passengers: Seats: B-1, B-2
1. Name: Alex, Age: 44
2. Name: Snyder, Age: 55
Booking date: 2023-08-28 Journey date: 2023-08-31
Journey Time: 18:40 Total price: 7200
Booking status: confirmed

Cancel Ticket

Booking ID: 64e608bb2c862c07fa865bca
Mobile: 7869868765 Email: simon@gmail.com
Flight Id: hyd239 Flight name: Spicejet
On-boarding: Hyderabad Destination: Bangalore
Passengers:
1. Name: Jack, Age: 23
2. Name: Alex, Age: 33
3. Name: John, Age: 43
Booking date: 2023-08-23 Journey date: 2023-08-31
Journey Time: 20:15 Total price: 17100
Booking status: cancelled

Booking ID: 64e607242c862c07fa865b8d

Booking ID: 64e604fa1b698133e1a38d19

- **Admin Dashboard:**

SB Flights (Admin)

HomeUsersBookingsFlightsLogout

Users
6
View all

Bookings
7
View all

Flights
6
View all

New Operator Applications

No new requests..

- All Users :

SB Flights (Admin)

HomeUsersBookingsFlightsLogout

All Users

User Id64e5fcb298f1c5aa0a36c2a7

Usernamehola

Emailhola@gmail.com

User Id64e9d2e0f7964122dbe8d098

Usernamealex

Emailalex@gmail.com

Flight Operators

Id64e8ce302bb50798fe630779

Flight Namespicejet

Emailspicejet@gmail.com

Id64e8d11154e48a90d1c0f26b

Flight Nameindigo

Emailindigo@gmail.com

Id64e9d38e5d17bcb51a27b36a

Flight NameAir Vistara

Emailvistara@gmail.com

- Flight Operator:

SB Flights (Operator)

HomeBookingsFlightsAdd FlightLogout

Bookings

4

View all

Flights

2

View all

New Flight

(new route)

Add now

- All Bookings:

SB Flights (Admin) Home Users Bookings Flights Logout

Bookings

Booking ID: 64ec8c3c4622709484005484
Mobile: 7669678988 Email: harsha@gmail.com
Flight Id: cni2321 Flight name: Indigo
On-boarding: Chennai Destination: Bangalore
Passengers: Seats: B-1, B-2
1. Name: Alex, Age: 44
2. Name: Snyder, Age: 55
Booking date: 2023-08-28 Journey date: 2023-08-31
Journey Time: 18:40 Total price: 7200
Booking status: confirmed
Cancel Ticket

Booking ID: 64e9d3fe5d17bcb51a27b3ca
Mobile: 9993478322 Email: user@gmail.com
Flight Id: dl4092 Flight name: Air Vistara
On-boarding: Delhi Destination: Kolkata
Passengers: Seats: P-1
1. Name: Alex, Age: 32
Booking date: 2023-08-26 Journey date: 2023-08-29
Journey Time: 18:00 Total price: 4200
Booking status: confirmed
Cancel Ticket

Booking ID: 64e9d313f7964122dbe8d0ae
Mobile: 9993478322 Email: user@gmail.com

Booking ID: 64e608bb2c862c07fa865bca
Mobile: 7869868765 Email: simon@gmail.com

- New Flight:

SB Flights (Operator) Home Bookings Flights Add Flight Logout

Add new Flight

Flight Name
Indigo

Flight Id

Departure City
Select

Departure Time
--:--

Destination City
Select

Arrival time
--:--

Total seats
0

Base price
0

Add now

The demo of the app is available at:

https://drive.google.com/file/d/1Q0XwKtAz7EkaKNJv3_gbo6mZE9nfuBTK/view?usp=sharing

*** Happy Coding ***