FULL STACK DEVELOPMENT WITH MERN PROJECT DOCUMENTATION

1. Introduction

Project Title : ShopEZ – One-Stop Shop for Online Purchases

Team id : LTVIP2025TMID55709

Team Members:

1. **Team Leader:**

Vulli Yuthika – Full Stack Developer & Project Coordinator
Responsible for overall planning, coordination, GitHub management, and integration of frontend and backend.

2. **Team Member**:

Veeroji Kiran– Frontend Developer
Works on the React-based UI, handles component design, page routing, and user interactions.

3. **Team Member**:

Varshitha Talasila– Backend Developer
Builds RESTful APIs using Node.js and Express.js, manages authentication and server logic.

4. **Team Member:**

Velchuri Mahesh– Database Administrator
Designs and manages MongoDB schemas, handles CRUD operations and ensures data consistency.

2. Project Overview

• Purpose:

To provide a seamless online shopping experience where users can browse, search, and purchase products, with an intuitive interface and secure order handling.

• Features:

- Browse and filter products by category, price, and popularity
- Add items to cart and checkout securely
- User authentication and order tracking
- Admin dashboard to manage products, categories, and orders
- Email confirmation upon successful purchase

3. Architecture

• **Frontend:**

Developed using **React.js** with modular components and dynamic routing using **React Router**. Styled using **Tailwind CSS** or **Material-UI** for responsive design.

Components:

- **ProductList.js**: Displays product catalog with filters
- **ProductDetails.js**: Shows detailed view of a selected product
- **Cart.js**: Displays current items in the user's shopping cart
- **Checkout.js**: Collects payment and address details
- **AdminPanel.js**: Interface for managing products and orders

State Management:

- **Redux Toolkit** or **Context API** used for maintaining global state such as cart items, user session, and product data

• **Backend:**

Powered by **Node.js** and **Express.js**, exposing a RESTful API to manage users, products, carts, and orders.

API Routes:

javascript

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// Product Routes

app.get('/api/products', productController.getAll);

app.get('/api/products/:id', productController.getOne);

app.post('/api/products', adminMiddleware, productController.create);

// Cart & Order Routes

app.post('/api/cart', authMiddleware, cartController.addToCart);

app.post('/api/orders', authMiddleware, orderController.create);

Middleware:

- **JWT Authentication** for secure login and access control
- **Rate Limiting** and **CORS Handling** for security and performance
- **Validation** of input data using libraries like express-validator

• **Database:**

MongoDB is used to store user accounts, product details, orders, and cart data. Managed with **Mongoose** for schema modeling and validation.

Schemas:

javascript

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```
// User Schema
const UserSchema = new Schema({
  email: { type: String, unique: true },
  password: String,
  cart: [{ type: Schema.Types.ObjectId, ref: 'Product' }],
  orders: [{ type: Schema.Types.ObjectId, ref: 'Order' }]
});

// Product Schema
const ProductSchema = new Schema({
  name: String,
  category: String,
  price: Number,
  stock: Number,
  description: String,
  imageUrl: String
});

// Order Schema
const OrderSchema = new Schema({
```

```
  user: { type: Schema.Types.ObjectId, ref: 'User' },
  products: [{ product: Schema.Types.ObjectId, quantity: Number }],
  totalAmount: Number,
  status: { type: String, default: 'Pending' },
  createdAt: { type: Date, default: Date.now }
});
```

4. Setup Instructions

Prerequisites:

- Node.js >= 18
- MongoDB installed and running
- npm or yarn

Installation:

- git clone https://github.com/your-username/FlightFinder.git
- cd FlightFinder
- cd server
- npm install
- cd ../client
- npm install

Environment Variables:
Create a .env file in the /server folder with:

PORT=3000

MONGODB URI-
mongodb+srv://nehapriya:<db_password>@cluster0.zghkpqk.mongodb.net/?retryWrites=true&w=majority&appName=Cluster0

5. Folder Structure

- **Client:**

```
/client
  ├── /src
  |   ├── /components
  |   ├── /pages
```

| ├── /api

| ├── App.js

| └── index.js

- Server:

/server

├── /controllers

├── /routes

├── /models

├── server.js

└── .env

5.Running the Application

Frontend:

- cd client
- npm start

Backend:

- cd server
- npm start

7. API Documentation

• POST /api/auth/register

Registers a new user.

Request Body:

json

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{ "name": "John Doe", "email": "john@example.com", "password": "securePass123" }

Response:

json

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{ "success": true, "token": "<jwt-token>" }

- **POST /api/auth/login**

Logs in an existing user.
Request Body:

json

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{ "email": "john@example.com", "password": "securePass123" }

Response:

json

CopyEdit

{ "success": true, "token": "<jwt-token>" }

- **GET /api/products**

Retrieves a list of all available products.
Response:

json

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```
[
  {
    "_id": "1",
    "name": "Wireless Mouse",
    "price": 999,
    "category": "Electronics",
    "imageUrl": "/images/mouse.jpg"
  },
  ...
]
```

- **POST /api/cart**

Adds a product to the user's cart (requires login).
Request Body:

json

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{ "productId": "1", "quantity": 2 }

Response:

json

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{ "success": true, "message": "Product added to cart" }

• **POST /api/orders**

Places an order for the logged-in user.
Request Body:

json

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{ "cartItems": [{ "productId": "1", "quantity": 2 }] }

Response:

json

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{ "success": true, "orderId": "ORD123456" }

8. Authentication

- **JWT (JSON Web Token)** is used to authenticate users.
- Tokens are securely stored in **HTTP-only cookies** to prevent XSS attacks.
- Protected API routes (like /api/orders, /api/cart) **validate the JWT** on every request.
- Admin-specific routes require an **admin role** to access product management endpoints.

9. User Interface

• **Home Page:**

- Displays a featured product section and main categories
- Search bar for quickly locating items

- User login/register buttons in navbar

• **Product Listing Page:**

- Grid of products with filtering (category, price range, rating)
- Option to add items directly to cart

• **Cart Page:**

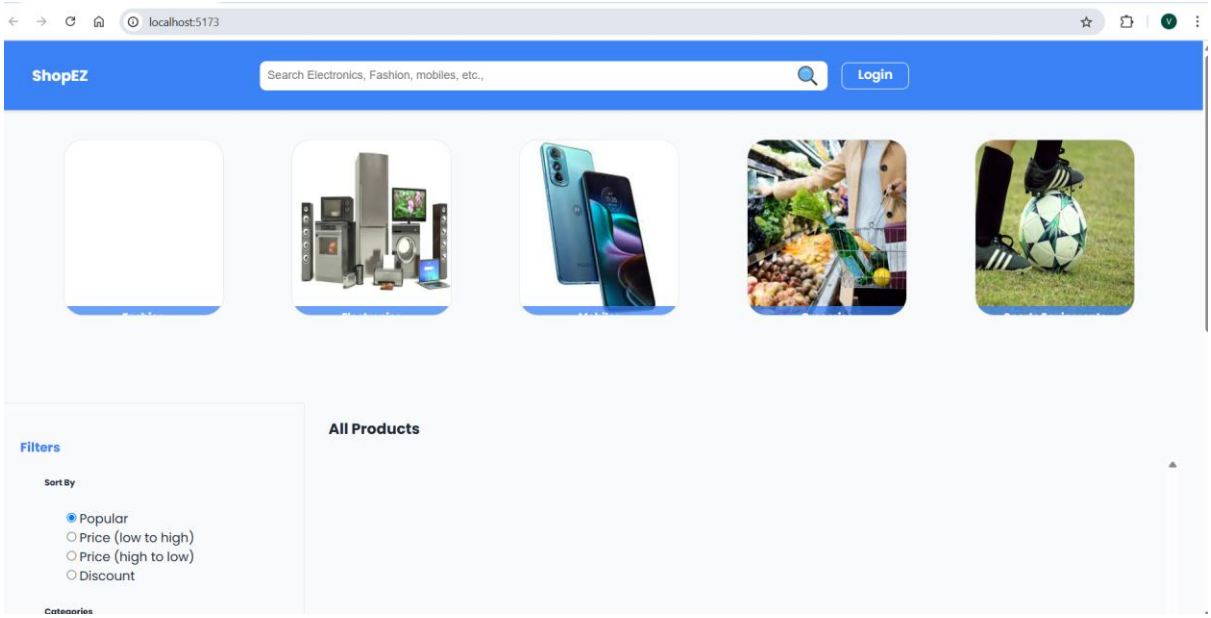
- Shows added items with quantity and price
- Options to update quantity or remove item

• **Checkout Page:**

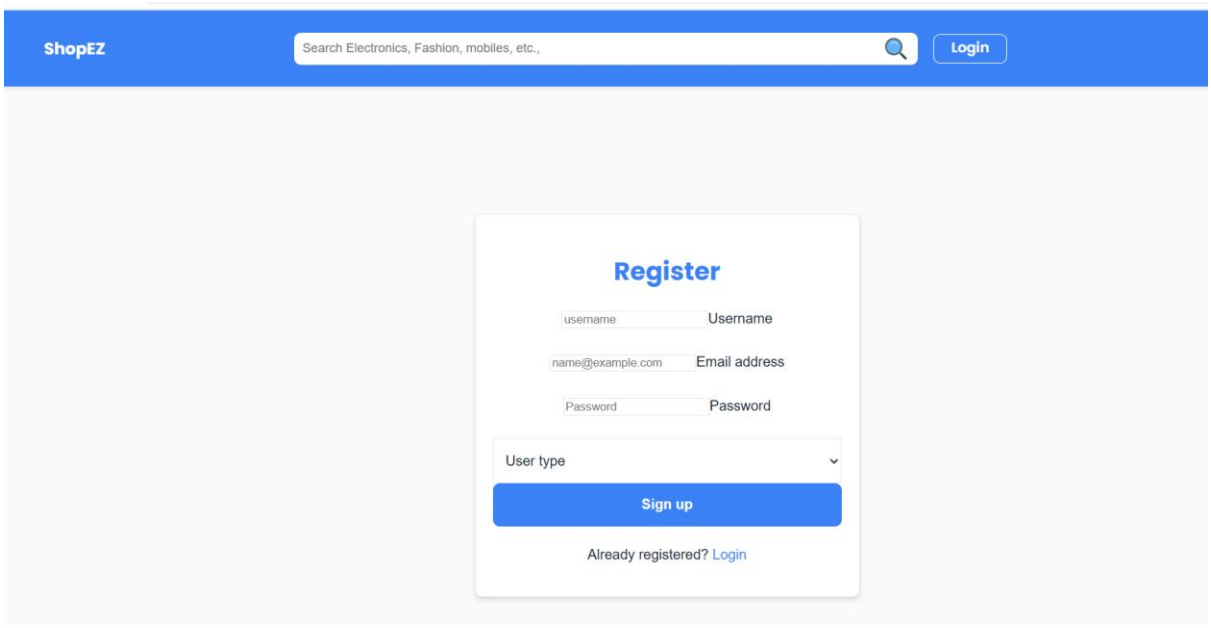
- Form for entering shipping and payment details
- Order summary and confirmation

• **Admin Panel:**

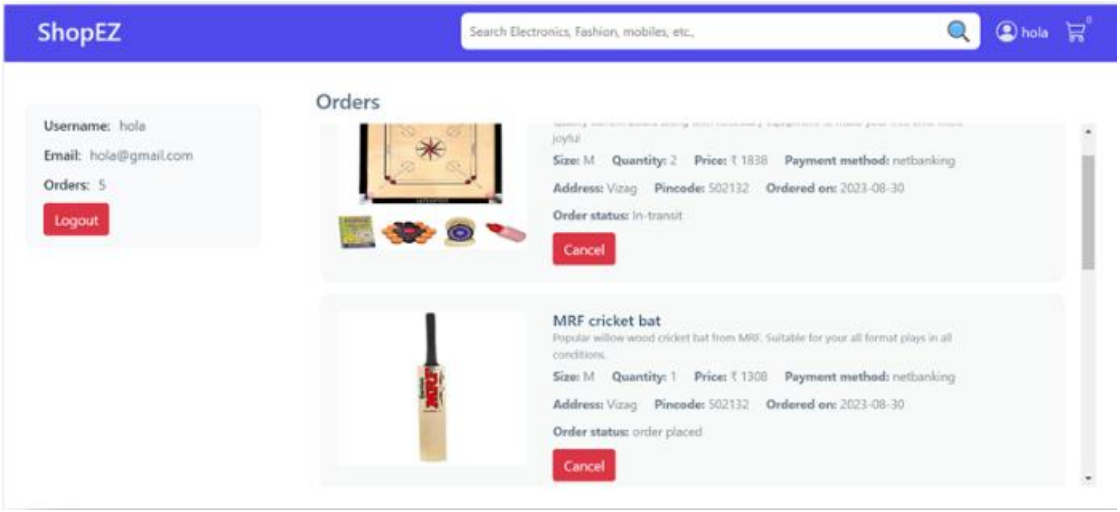
- Dashboard with total sales, order history, and product inventory
- Forms for adding/editing products



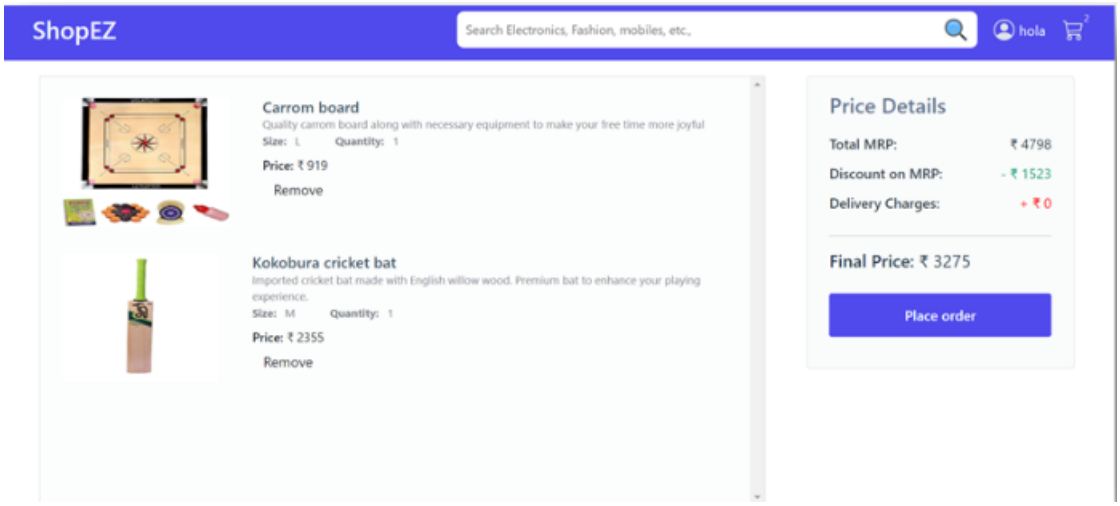
❖ Registration



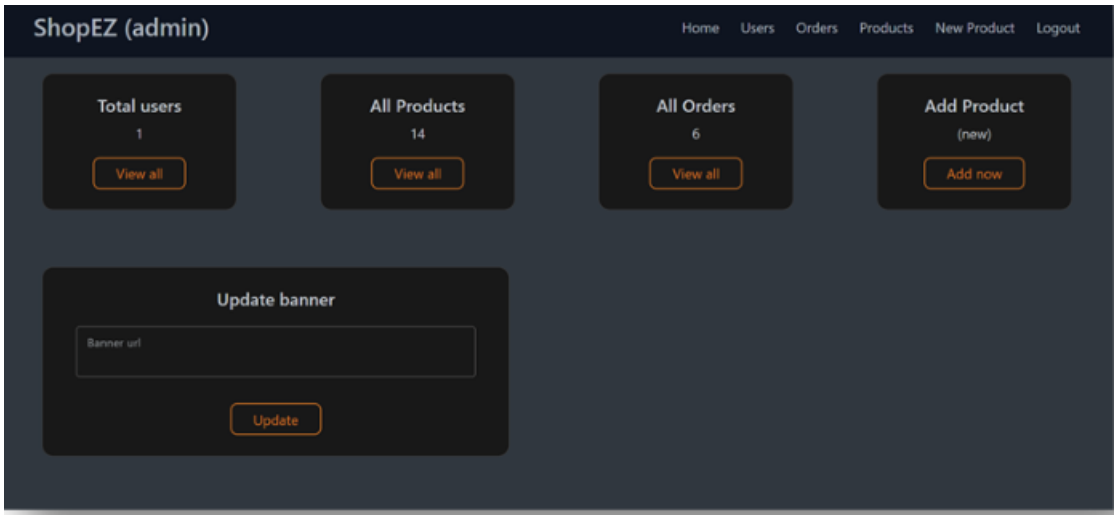
❖ Dashboard



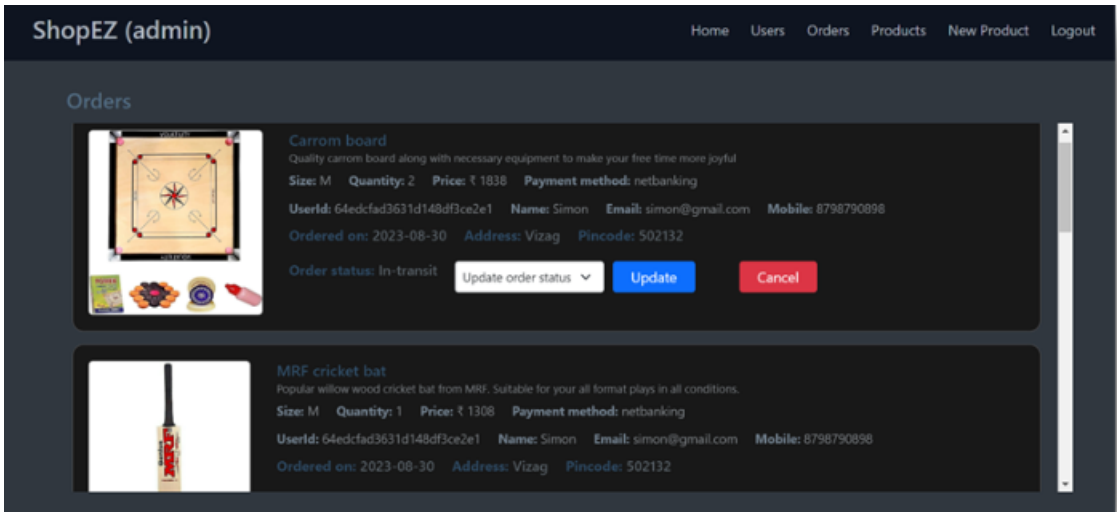
❖ Cat



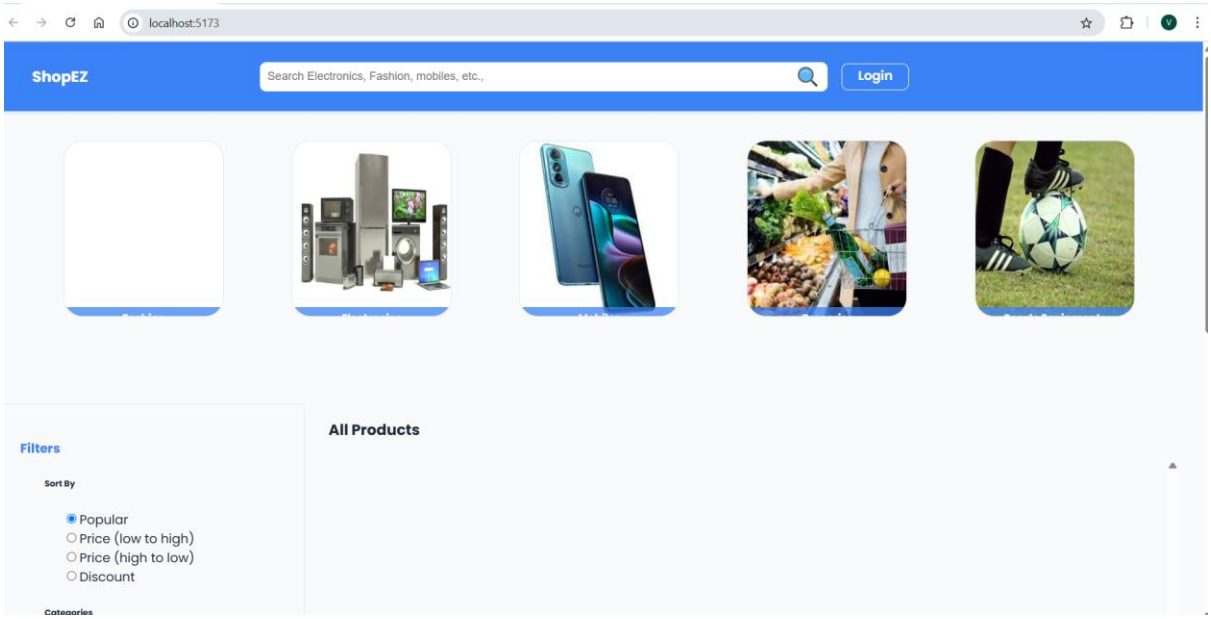
❖ Admin dashboard



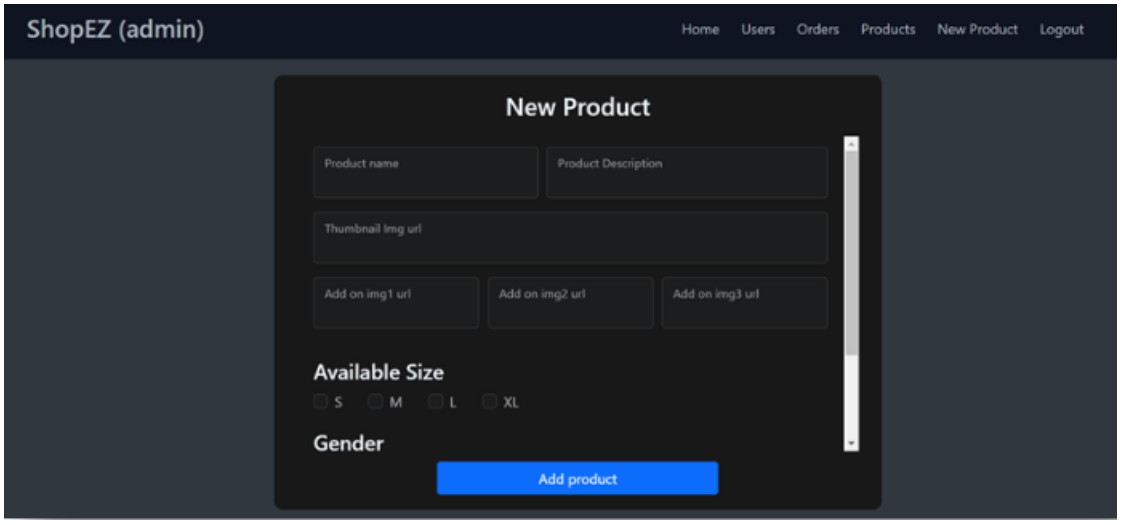
❖ All Orders



❖All Products



❖New Product Page



10. Testing

- **Manual Testing:**
  All backend API endpoints were tested using **Postman** to verify request/response structure, authorization, and error handling.
- **Frontend Testing:**
  Basic component-level testing implemented using **Jest** and **React Testing Library**. Tests cover form validations, cart interactions, and conditional rendering.

11. Github

Link

https://github.com/varshitha3121/shopesy

12. Known Issues

- **Password recovery** functionality is not yet implemented.
- **Mobile and tablet responsiveness** is inconsistent on certain screen sizes.
- **Product image compression** is not optimized for large uploads.

13. Future Enhancements

- **Online Payment Integration:**
  Integration with payment gateways like **Razorpay** or **Stripe** for smooth transaction handling.
- **Role-Based Access Control:**
  Differentiated admin and user permissions for better management and security.
- **Inventory Alerts & Notifications:**
  Real-time alerts for low stock or successful order placement via email/SMS.
- **Progressive Web App (PWA):**
  Offline capabilities and push notifications for improved user engagement.