ShopEZ: E-commerce Application Project Report

1. Title and Abstract

Title: ShopEZ: E-commerce Application

Abstract:
This project is a web-based e-commerce application named "ShopEZ," designed to streamline online shopping experiences. It allows users to browse products, add items to a cart, and complete purchases, while an admin panel manages inventory and orders. Built using React for the frontend, Express for the backend, and MongoDB for the database, this application incorporates features like user authentication, cart management, and order processing, aiming to deliver a seamless online shopping experience.

2. Introduction

Objective:
The primary objective of the ShopEZ project is to create an efficient, user-friendly e-commerce platform that simplifies online shopping. The application focuses on intuitive navigation, responsive design, and secure payment processing to enhance user experience and simplify product and order management for admins.

3. Literature Review

Existing Solutions:
There are several established e-commerce platforms, such as Amazon, Flipkart, and Shopify, known for their extensive product listings, user-friendly interfaces, and efficient logistics. ShopEZ draws inspiration from these platforms, implementing best practices in user experience design and backend optimization, while focusing on providing a lightweight, resource-efficient solution suitable for small to medium-sized businesses.

4. System Requirements

Hardware Requirements:
- Processor: Intel i3 or above
- RAM: 4GB minimum
- Storage: 1GB for application data

Software Requirements:
- Frontend: React, Axios
- Backend: Node.js, Express
- Database: MongoDB
- Additional Tools: NPM, Postman (for API testing), GitHub (for version control)

5. Methodology

Modules:
1. User Module: Handles user registration, login, profile management, and authentication.
2. Admin Module: Manages products, categories, and orders.

3. Product Catalog: Displays products with categories, search, and filtering options.
4. Cart Management: Allows users to add, update, or remove items from the cart.
5. Order Processing: Handles checkout, payment, and order tracking.
6. Payment Integration: Supports secure payment via Stripe (in test mode).

Tools and Technologies Used:
- Frontend: React with Context API, React Router for navigation
- Backend: Node.js, Express, REST APIs, JWT for authentication
- Database: MongoDB for managing users, products, and orders
- Payment Integration: Stripe for handling secure payments

6. System Design

Architecture:
The application uses a client-server architecture, where the frontend handles the user interface, while the backend manages API endpoints, user authentication, and database interactions. MongoDB is used for storing product details, user information, and orders.

Database Schema:
- Users: `_id`, `username`, `email`, `password`, `address`, `phone`
- Products: `_id`, `name`, `description`, `price`, `category`, `stock`, `image`
- Orders: `_id`, `userId`, `items`, `totalAmount`, `orderStatus`, `paymentStatus`, `orderDate`

Flowchart:
Illustrate the flow: User Login → Browse Products → Add to Cart → Checkout → Payment → Order Confirmation → Admin Manages Products & Orders.

7. Implementation

Frontend Implementation:
The frontend uses React components for product listings, cart functionality, and user authentication. React Router handles different views (Home, Product Details, Cart, Checkout). Axios is utilized for making API requests to the backend.

Backend Implementation:
Node.js with Express is used to set up RESTful APIs for managing users, products, and orders. Authentication is managed with JWT, while Mongoose handles MongoDB interactions.

Admin Panel Implementation:
A dedicated admin panel is developed for managing products, categories, and orders. It includes CRUD operations for products and real-time order status updates.

8. Key Functionalities

User Features:
- User Registration & Login: Users can create an account or log in with existing credentials.
- Product Catalog: View available products with filtering and sorting options.

- Cart Management: Add, remove, or update products in the cart.
- Checkout & Payment: Secure checkout process with payment gateway integration.
- Order Tracking: Users can view their order history and track order status.

Admin Features:
- Product Management: Add, update, or delete products from the inventory.
- Order Management: View, update, and track customer orders.

9. Testing

Testing Types:
- Unit Testing: Testing individual components and backend APIs.
- Integration Testing: Ensuring smooth interaction between frontend, backend, and database.
- User Acceptance Testing (UAT): Validating that the application meets user requirements.

Testing Tools:
- Jest for frontend tests, Postman for API testing, and manual testing for UI validation.

10. Results

Performance Metrics:
The application demonstrates efficient performance under typical user loads, with an average response time of around 150ms for API requests.

User Feedback:
Initial users found the application easy to navigate, with a smooth and hassle-free shopping experience.

11. Challenges and Solutions

- Challenge: Implementing secure payment processing.
  - Solution: Integrated Stripe for secure payment processing with tokenization.
- Challenge: Optimizing database queries for faster performance.
  - Solution: Implemented indexing on frequently queried fields in MongoDB.

12. Future Enhancements

- Add real-time notifications for order status updates.
- Integrate AI-based product recommendations.
- Introduce a delivery partner module for real-time order tracking.

13. Conclusion

The ShopEZ project successfully delivers a robust e-commerce platform with features like user authentication, product management, and secure payment processing. Built using modern web technologies such as React, Node.js, and MongoDB, the application is scalable and provides a seamless shopping experience.

14. Project Setup for GitHub

Project Setup Instructions

Frontend

1. Navigate to the frontend directory:
   cd frontend
2. Install dependencies:
   npm install
3. Start the frontend server:
   npm start

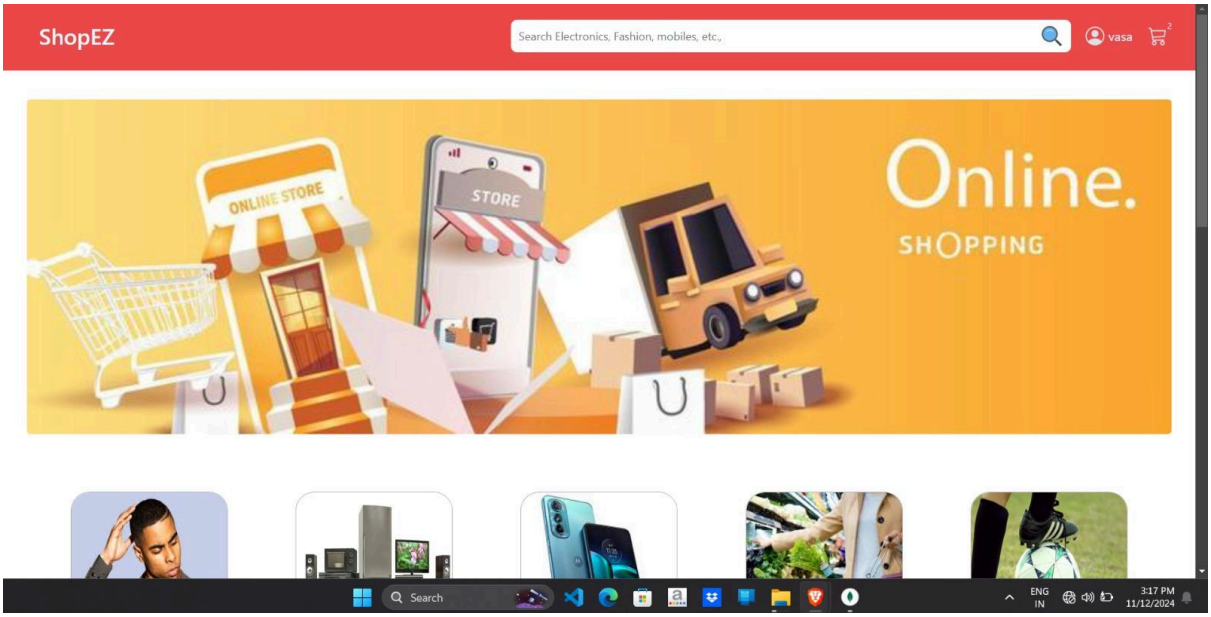
Backend

1. Navigate to the backend directory:
   cd backend
2. Install dependencies:
   npm install
3. Start the backend server:
   npm run server
4. Additional Dependencies:
   npm install express mongoose cors dotenv bcryptjs jsonwebtoken stripe
   npm install --save-dev nodemon

Admin Panel

1. Navigate to the admin panel directory:
   cd admin
2. Install dependencies:
   npm install
3. Start the admin panel server:
   npm run dev

Project output


ShopEZ
Search Electronics, Fashion, mobiles, etc.,
vasa
ONLINE STORE
STORE
Online.
SHOPPING
Search
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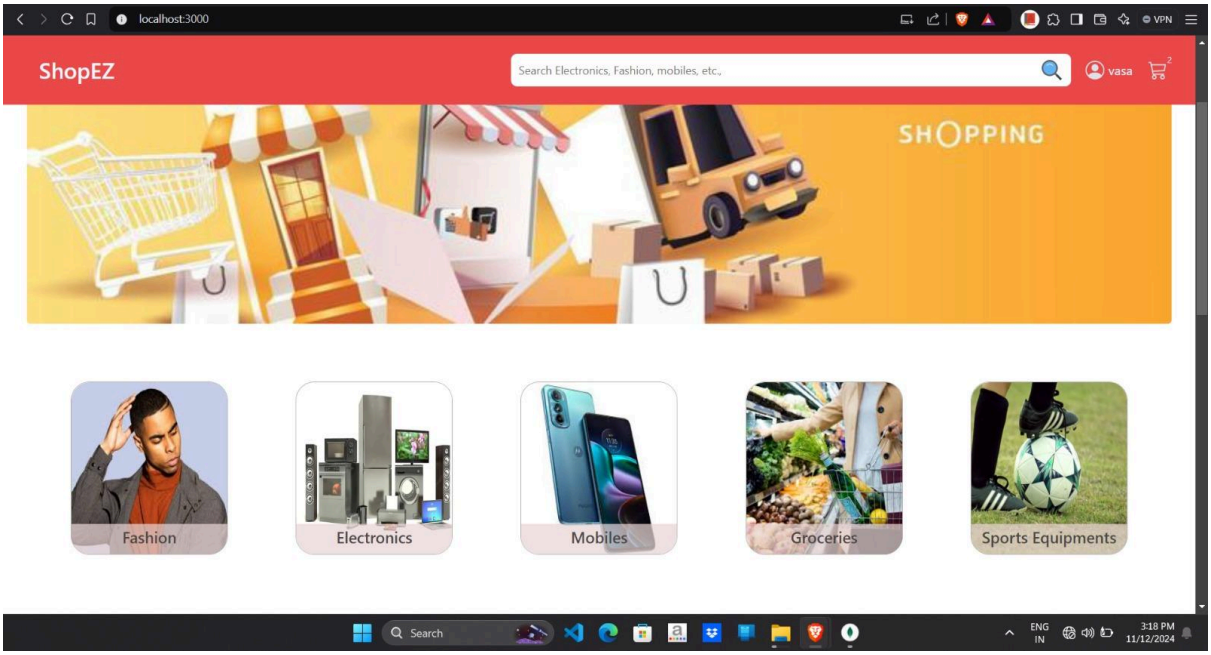
11/12/2024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VPN
ShopEZ
Search Electronics, Fashion, mobiles, etc.,
vasa
SHOPPING
Fashion
Electronics
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Groceries
Sports Equipments
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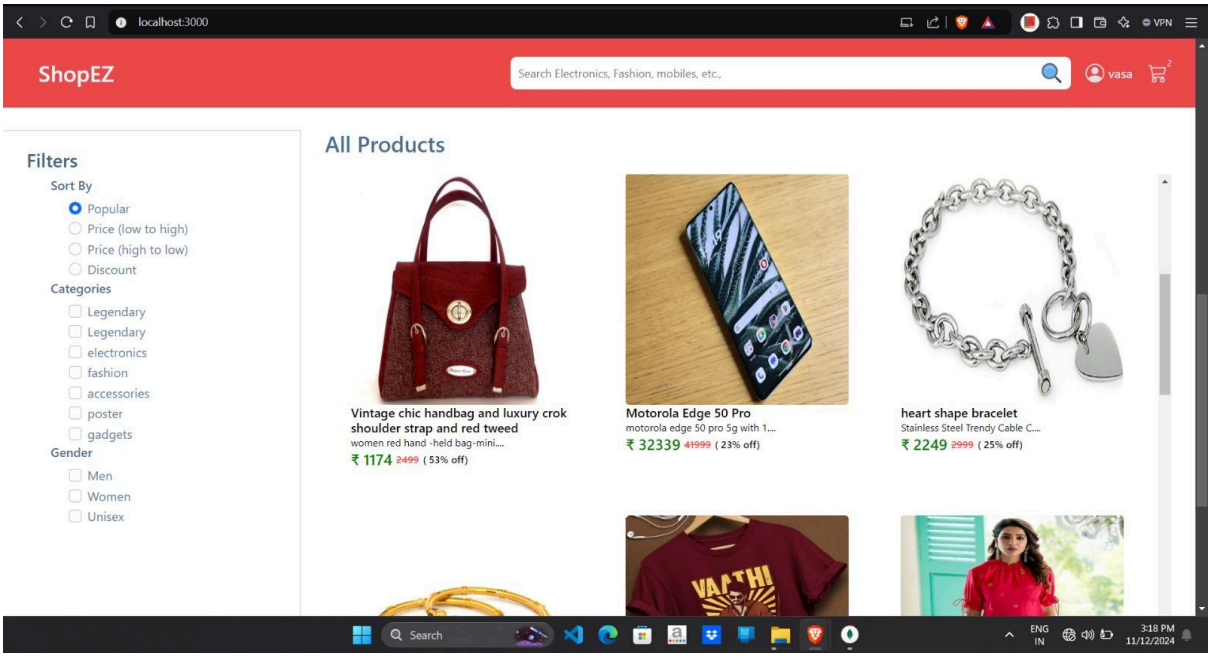
localhost:3000
ShopEZ
Search Electronics, Fashion, mobiles, etc.,
vasa
Filters
Sort By
Popular
Price (low to high)
Price (high to low)
Discount
Categories
Legendary
Legendary
electronics
fashion
accessories
poster
gadgets
Gender
Men
Women
Unisex
All Products
Vintage chic handbag and luxury crok shoulder strap and red tweed
women red hand -held bag-mini....
₹ 1174 2499 (53% off)
Motorola Edge 50 Pro
motorola edge 50 pro 5g with 1....
₹ 32339 41999 (23% off)
heart shape bracelet
Stainless Steel Trendy Cable C....
₹ 2249 2999 (25% off)
Search
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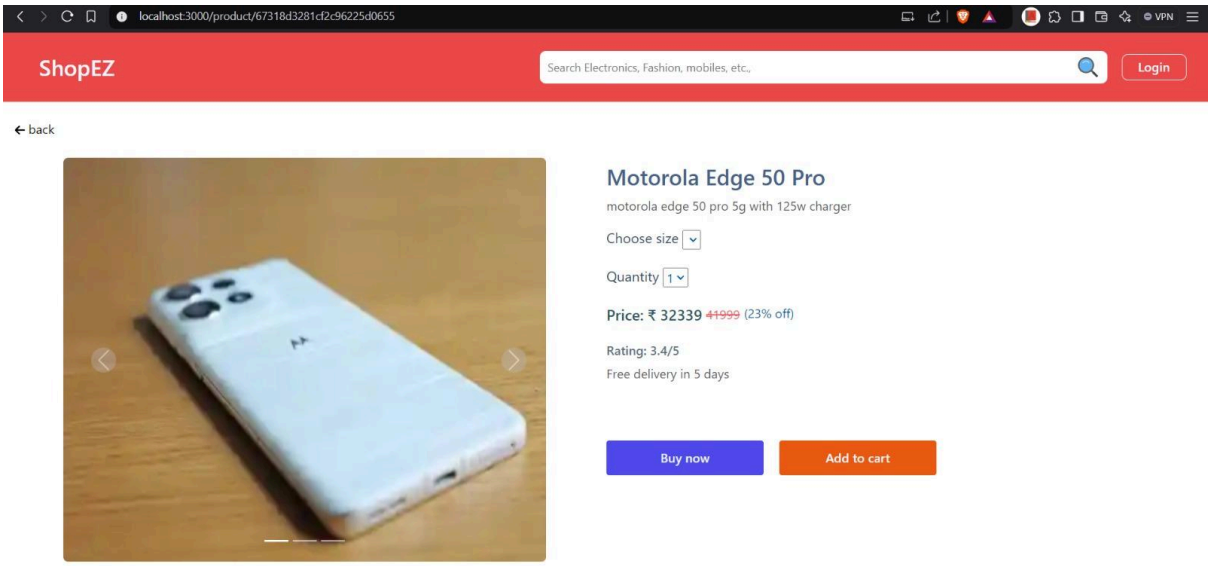
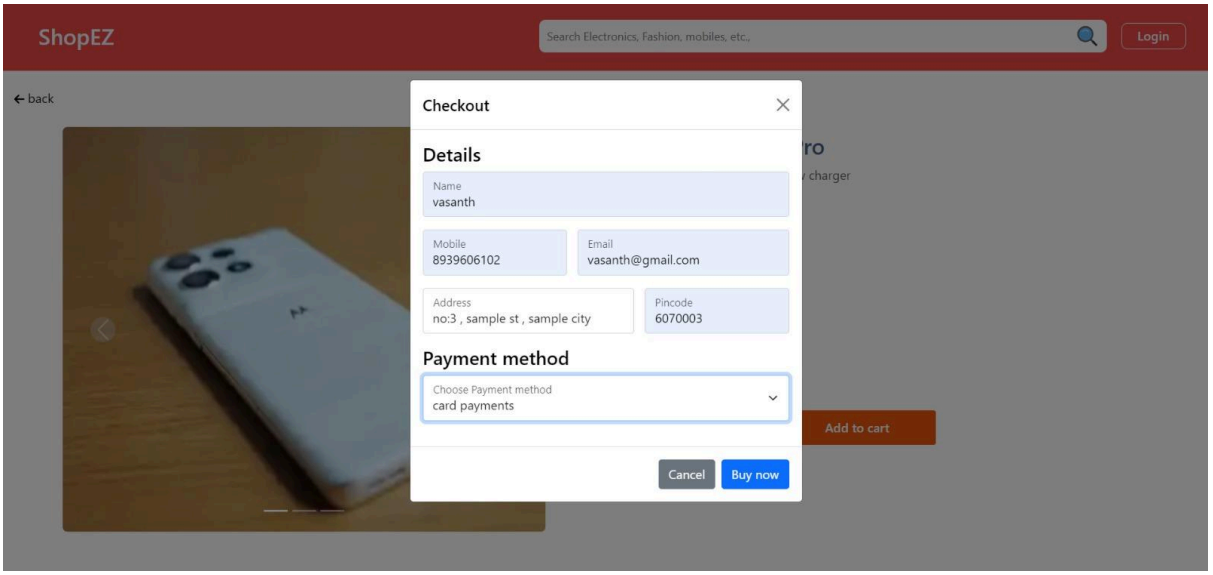
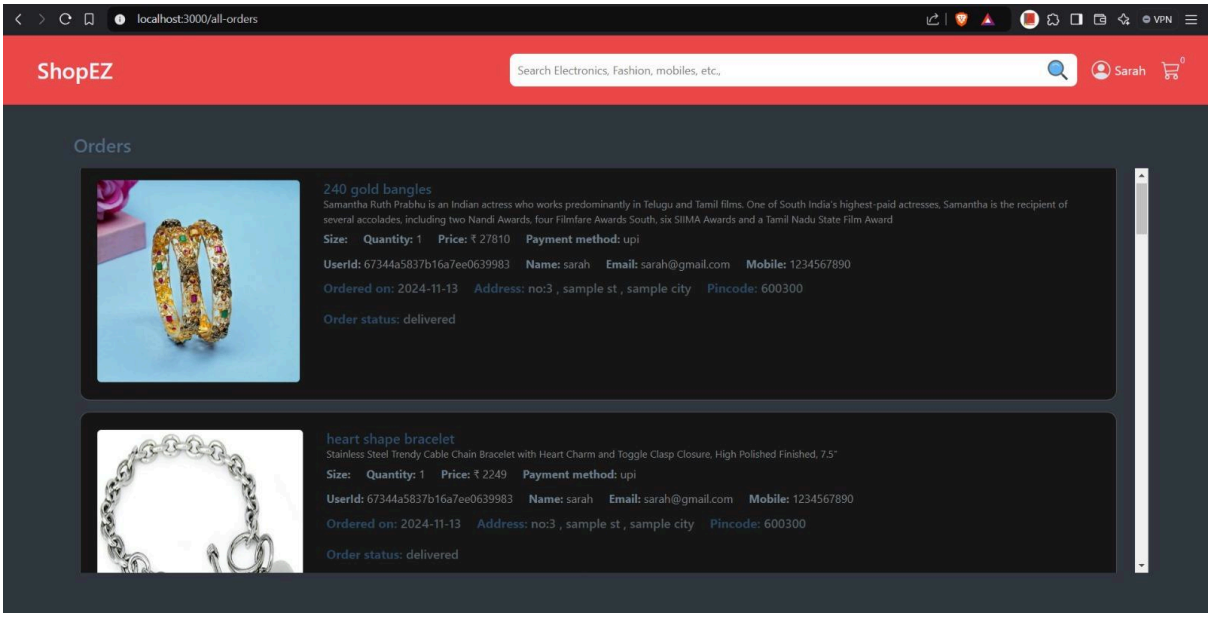
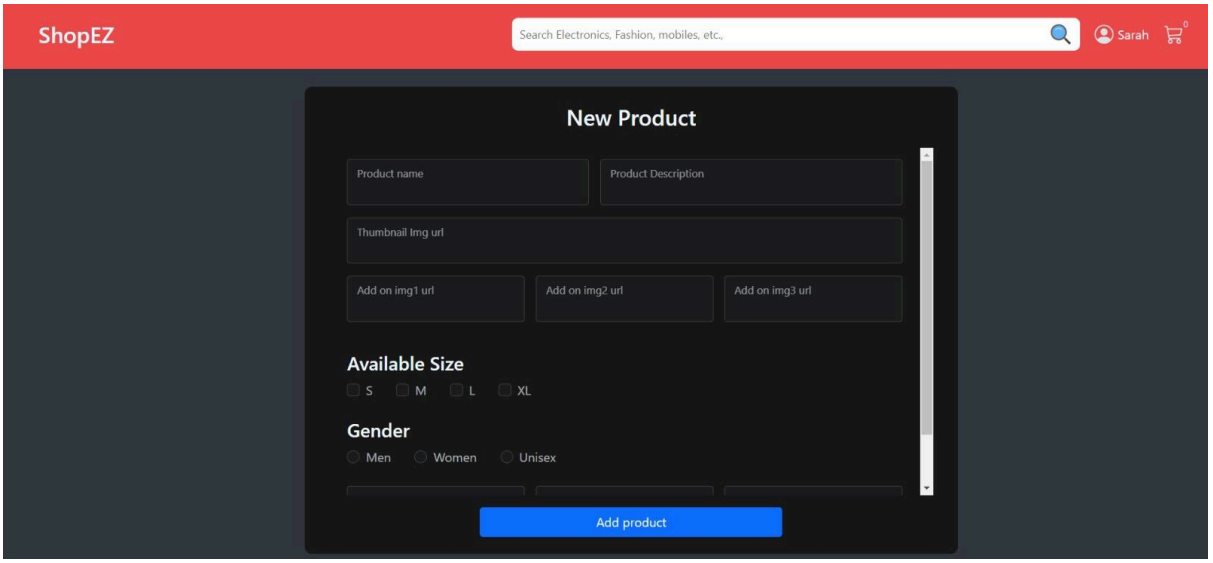
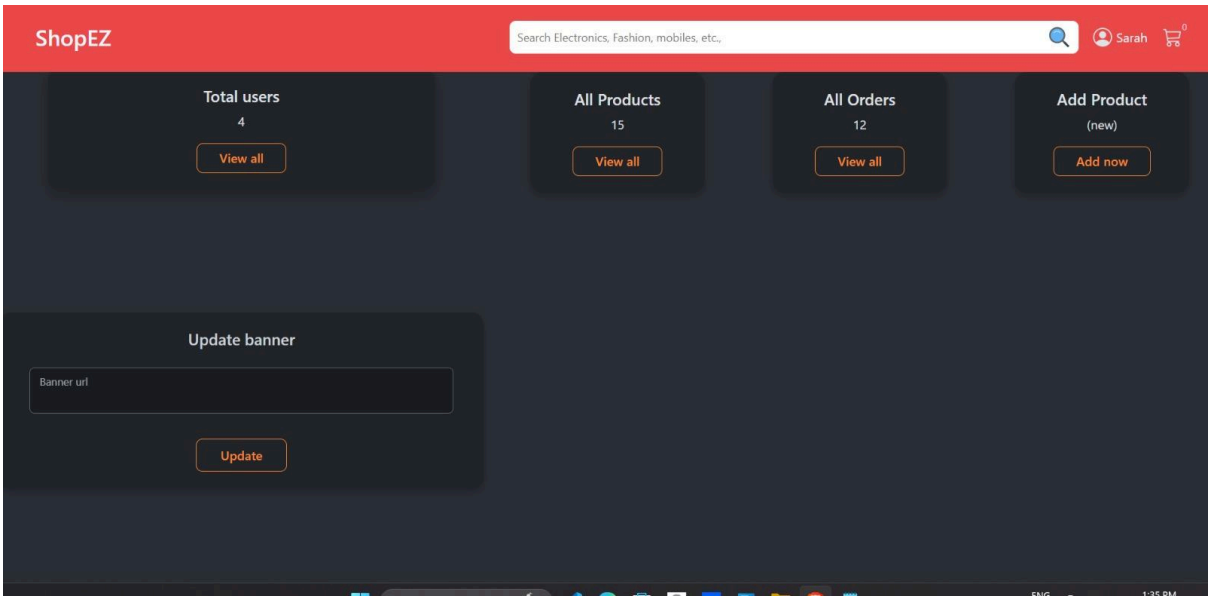

localhost:3000/product/67318d3281cf2c96225d0655
ShopEZ
Search Electronics, Fashion, mobiles, etc.,
Login
back
Motorola Edge 50 Pro
motorola edge 50 pro 5g with 125w charger
Choose size
Quantity 1
Price: ₹ 32339 41999 (23% off)
Rating: 3.4/5
Free delivery in 5 days
Buy now
Add to cart


ShopEZ
Search Electronics, Fashion, mobiles, etc.,
Login
back
Checkout
Details
Name
vasanth
Mobile
8939606102
Email
vasanth@gmail.com
Address
no:3 , sample st , sample city
Pincode
6070003
Payment method
Choose Payment method
card payments
Cancel
Buy now
Add to cart


localhost:3000/all-orders
ShopEZ
Search Electronics, Fashion, mobiles, etc.,
Sarah
Orders
240 gold bangles
Samantha Ruth Prabhu is an Indian actress who works predominantly in Telugu and Tamil films. One of South India's highest-paid actresses, Samantha is the recipient of several accolades, including two Nandi Awards, four Filmfare Awards South, six SIIMA Awards and a Tamil Nadu State Film Award
Size: Quantity: 1 Price: ₹ 27810 Payment method: upi
UserId: 67344a5837b16a7ee0639983 Name: sarah Email: sarah@gmail.com Mobile: 1234567890
Ordered on: 2024-11-13 Address: no:3 , sample st , sample city Pincode: 600300
Order status: delivered
heart shape bracelet
Stainless Steel Trendy Cable Chain Bracelet with Heart Charm and Toggle Clasp Closure, High Polished Finished, 7.5"
Size: Quantity: 1 Price: ₹ 2249 Payment method: upi
UserId: 67344a5837b16a7ee0639983 Name: sarah Email: sarah@gmail.com Mobile: 1234567890
Ordered on: 2024-11-13 Address: no:3 , sample st , sample city Pincode: 600300
Order status: delivered


ShopEZ
Search Electronics, Fashion, mobiles, etc.,
Sarah
New Product
Product name
Product Description
Thumbnail Img url
Add on img1 url
Add on img2 url
Add on img3 url
Available Size
S
M
L
XL
Gender
Men
Women
Unisex
Add product


ShopEZ
Search Electronics, Fashion, mobiles, etc.,
Sarah
Total users
4
View all
All Products
15
View all
All Orders
12
View all
Add Product
(new)
Add now
Update banner
Banner url
Update