A

Report

On Project

VichaarShala

Submitted for Partial Fulfillment of the Award of Bachelor of Technology (B.Tech) in CSE Kurukshetra University Kurukshetra

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Declaration

We hereby certify that the work which is being presented in the Project III Report entitled, "**VichaarShala**" by us, **Piyush Kumar 1220262** and **Jagriti Sharma 1220218** in partial fulfillment of the requirements for the award of degree of **Bachelor of Technology in Computer Science Engineering** submitted in the **Department of Computer Science and Engineering at JMIT Radaur** (Affiliated to **Kurukshetra University Kurukshetra, Haryana (India)**) is an authentic record of our own work carried out under the supervision of **Er. Pinki**. The matter presented in the report has not been submitted in any other University/Institute for the award of any degree.

Piyush Kumar, Jagriti Sharma

This is to certify that the above statement made by the candidate is correct to the best of our knowledge.

Er. Pinki.

Countersigned By: Dr. Gaurav Sharma

The B.Tech Project III Viva-voce examination of Candidate Piyush Kumar (1220262) and Jagriti Sharma (1220218) was held on 23 May 2023 and was accepted.

Er. Pinki (Examiner)

(Supervisor)

Acknowledgement

The writing of this project report has been assisted by the generous help of many people. We feel that we were very fortunate to receive assistance from them. We wish to express our sincere appreciation to them.

First and foremost, we are indebted to our principal **supervisor, Er. Pinki** Department of Computer Science and Engineering) of JMIT Radaur, who has been very supportive at every stage of our project completion. We wish to express our utmost gratitude to her for the invaluable advice and patience in reading, correcting and commenting on the drafts of this report and, more importantly, for his generosity which we have received throughout our project completion.

We would like to acknowledge and extend our heartfelt gratitude to Ms. Er. Pinki who helped and encouraged us throughout this journey. We wish to express our thanks to all staff members of JMIT Radaur, who also helped us in conducting this study. Finally, we are particularly indebted to our dearest parents/guardians as without their generous assistance and love; this project could never have been completed.

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Chapter-1 : Overview

1.1 Problem Background and Research

Our objective was to make a fully functional Ecommerce website targeted at products purchased by men Specifically. We approached this problem by researching what Men buy in general. i.e. Hair Care, Face Care, Beard Care.

We built this website targeted at those categories of products.

1.2 System Objective

to make a fully functional Ecommerce website with complete pages, Admin panel, Payment Gateway using Razorpay payment gateway, NodeJS, ExpressJS, and EmbeddedJS.

1.3 Functionality

- This website comes with 4 different categories of products.
- products can be added or deleted by the admin.
- There is a fully functional cart.
- Fully secure and flawless Razorpay payment Gateway.
- User have a user profile showing recent orders and personal data
- Admin panel has orders section, add new product section, Inventory section.
- Coupons are implemented in the website and are created and deleted by the admin
- Comprehensive product Description Page

1.4 Technical & Economic Feasibility

The project requires:-

- A virtual private server from the cloud to run the server. Since this is a single server application it will not require complex network structure.
- The cost for a t2.micro instance on AWS is 1 vCPU, 2GB RAM, and on demand linux base pricing is 0.0152 USD per hour. it comes out to 950 INR per month.

- A domain name to the IP where the server is hosted. in development phase it was hosted on http://localhost:8080/
- the server is easy to deploy and the pages are easy to upgrade since it uses HTML5 based Embedded JS framework to host them.

1.5 Risk Factors and their Mitigation

The risk Factor of hackers exploiting the server still remains. to fix this we are using several libraries such as JsonWebToken to encrypt data and express-session and middleware to mitigate such threats

Chapter-2 Research

2.1 Primary Research and Analysis

Famous E-Commerce websites like Amazon and Flipcart use Hotloading in their websites to directly store session data on their servers for security purposes.

These websites include Pages:

- Admin panel
- Home Page
- A cart
- item page
- item category page
- item search page
- best sellers page
- new launches page
- User profile
- A payment gateway
- a receipt on email
- an order schema
- User feed back page

all these pages are crucial to building a Ecommerce website. the admin panel contains many comprehensive statistics and crucial functions such as:-

- User statistics
- Product sates statistics
- Search engine Optimization
- Page visits
- CRUD for products
- CRUD for coupons
- status updation or orders
- Sales volume statistics

these features are a must to build a Admin panel

2.2 Secondary Research

Amazon:

Market Presence:

Amazon is one of the world's largest and most influential e-commerce platforms, operating in various countries.

It offers a wide range of products, including electronics, books, clothing, and more.

The company's customer-centric approach and efficient logistics contribute to its popularity.

Fulfillment Services:

Amazon has a robust fulfillment network, including Fulfillment by Amazon (FBA), allowing sellers to store their products in Amazon's fulfillment centers.

FBA handles order processing, shipping, and customer service, easing the burden on sellers.

Technology and Innovation:

Amazon invests heavily in technology and innovation, utilizing artificial intelligence (AI) and machine learning for personalized recommendations, efficient logistics, and customer service.

Amazon Web Services (AWS):

Besides e-commerce, Amazon is a leader in cloud computing through AWS, providing scalable and reliable infrastructure services.

Flipkart:

Indian E-commerce Giant:

Flipkart is one of the leading e-commerce platforms in India, competing with Amazon for market share.

The company offers a diverse range of products, from electronics to fashion, and has expanded into areas like grocery delivery.

Acquisition by Walmart:

In 2018, Walmart acquired a significant stake in Flipkart, indicating the attractiveness of the Indian e-commerce market.

Supply Chain and Logistics:

Like Amazon, Flipkart focuses on building a robust supply chain and logistics network to ensure timely deliveries.

The company has introduced initiatives like "Flipkart Assured" to guarantee quality and faster shipping.

Private Labels and Partnerships:

Flipkart has ventured into creating private labels and forming partnerships with various brands to offer exclusive products, enhancing its product catalog.

Common Trends and Considerations:

Mobile Commerce:

Both Amazon and Flipkart have recognized the importance of mobile commerce, with dedicated apps and mobile-friendly websites.

User Experience:

A seamless and user-friendly interface is crucial for the success of an e-commerce platform. Both Amazon and Flipkart prioritize user experience and invest in website design and functionality.

Payment Options:

Offering a variety of secure payment options is essential. Both platforms support multiple payment methods, including credit/debit cards, net banking, and cash on delivery.

Customer Reviews and Ratings:

Customer reviews and ratings play a significant role in influencing purchasing decisions. Integrating a review system can build trust among potential customers.

Security and Data Privacy:

Given the sensitivity of personal and financial information, ensuring robust security measures and complying with data privacy regulations is crucial for any e-commerce platform.

Chapter-3 Specification and design

3.1 Requirement Specification

This Website requires

- A Virtual Private Server : to host the website
- Domain Name : to show to website on google search engine and other engines
- A cloud DataBase : Specifically MongoDB Atlas
- Razorpay : the API keys and merchant id provided by razorpay payment gateway
- knowledge on NPM and NodeJS
- Active Network Connection

3.2 Design Analysis

This website is Built using the following Tech Stack:

- NodeJS - Interpreter
- ExpressJS - Backend JS Framework
- EmbeddedJS - Frontend Library
- MongooseJS - MongoDB data base connector
- Multer JS - Middleware to handle image data

Directory Structure

```
.
├── assets
│   ├── Beard_Care.jpeg
│   ├── black-friday.jpg
│   └── spray4.jpg
├── controllers
│   ├── admin_controllers.js
│   ├── order_controllers.js
│   ├── product_controllers.js
│   └── user_controllers.js
├── MAJOR PROJECT FINAL HUMARI.docx
├── middlewares
│   └── multer.js
```

```
├── notes.md
├── package.json
├── package-lock.json
├── public
│   ├── css
│   │   ├── adminstyle.css
│   │   ├── Home.css
│   │   ├── HomeNew.css
│   │   ├── Product_Desc.css
│   │   ├── ProductListing.css
│   │   ├── ProductStyle.css
│   │   └── slidercss.css
│   └── js
│       ├── AdminS.js
│       ├── script.js
│       └── slider.js
├── routes
│   ├── admin_routes.js
│   ├── order_routes.js
│   ├── page_routes.js
│   ├── product_routes.js
│   └── user_routes.js
├── schemas
│   ├── coupons_schema.js
│   ├── order_schema.js
│   ├── product_schema.js
│   └── user_schema.js
```

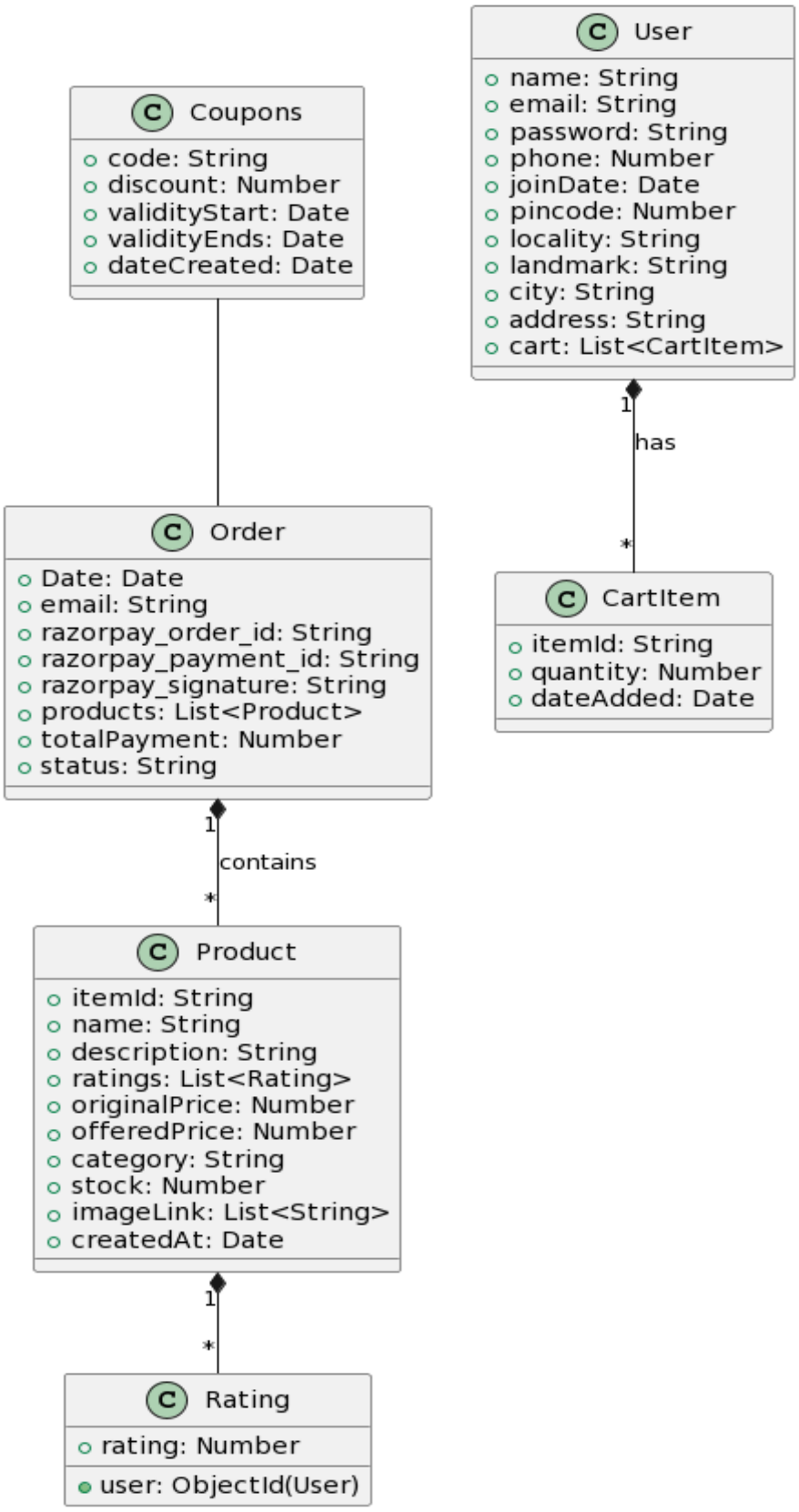
```
├── server.js
├── uploads
└── views
    ├── Admin_page.ejs
    ├── Auth_page.ejs
    ├── Beard_Care_page.ejs
    ├── Body_Care_page.ejs
    ├── Face_Care_page.ejs
    ├── Hair_Care_page.ejs
    ├── Home_page.ejs
    ├── Order_Confirm_page.ejs
    ├── Order_failed.ejs
    ├── partials
    │   ├── cart.ejs
    │   ├── footer_page.ejs
    │   └── nav.ejs
    ├── Product_Description_page.ejs
    ├── Product_Listing_page.ejs
    ├── thank_you_page.ejs
    └── User_Profile_page.ejs
11 directories, 81 files
```

.env Structure

```
MongoDB_URL=
PORT=
Secret_KEY=
RAZORPAY_ID_KEY=
RAZORPAY_SECRET_KEY=
```

Chapter-4 System Implementation

Schema Plant UML Diagram



Chapter-5 Project Details

Completion

as of now most of the project is been implemented

Small components and logic is left such as toasts, and some pages such as product listing.

As of now the features implemented are

- home page
- add to cart
- payment gateway
- profile
- checkout
- thank you page
- payment failure page
- Admin panel : add new products, viewing products, viewing users, adding coupons.

Technology used in the project

- NodeJS - Interpreter
- ExpressJS - Backend JS Framework
- EmbeddedJS - Frontend Library
- MongooseJS - MongoDB data base connector
- Multer JS - Middleware to handle image data

Chapter-6 Future Scopes and Limitations

6.1 Future Scopes:

Global Expansion:

Scope: Expanding the e-commerce website to target international markets can significantly increase the customer base and revenue.
Consideration: Understand the regulations, logistics, and cultural nuances of the new markets to ensure a successful expansion.

Mobile Commerce Enhancement:

Scope: Invest in optimizing the website for mobile devices and explore mobile app development to tap into the growing trend of mobile commerce.
Consideration: Ensure a seamless and user-friendly mobile experience to capture a broader audience.

Personalization and AI Integration:

Scope: Implement advanced personalization features using artificial intelligence (AI) to provide tailored product recommendations and enhance user experience.
Consideration: Prioritize data security and privacy when leveraging customer data for personalization.

Diversification of Product Catalog:

Scope: Expand the range of products or services offered to cater to a broader audience and capitalize on emerging trends.
Consideration: Assess market demand and competitor offerings before diversifying the product catalog.

Enhanced Customer Engagement:

Scope: Implement interactive features, live chat support, and community-building tools to enhance customer engagement and loyalty.
Consideration: Provide robust customer support and monitor customer feedback for continuous improvement.

Integration with Emerging Technologies:

Scope: Explore emerging technologies such as augmented reality (AR) for virtual try-ons, blockchain for secure transactions, and voice commerce.
Consideration: Assess the feasibility and potential impact of integrating new technologies on the user experience and business operations.

6.2 Limitations:

Technical Challenges:

Limitation: Technical glitches, server downtime, and cybersecurity threats can impact the website's functionality and compromise user data.
Mitigation: Regularly update and maintain the website, invest in robust cybersecurity measures, and have contingency plans for technical issues.

Logistics and Fulfillment:

Limitation: Efficient logistics and fulfillment are critical, and challenges such as delayed deliveries or inventory management issues can impact customer satisfaction.
Mitigation: Partner with reliable logistics providers, implement inventory management systems, and provide transparent communication on shipping times.

Market Competition:

Limitation: Intense competition in the e-commerce sector can make it challenging to stand out and attract and retain customers.
Mitigation: Focus on unique selling propositions, customer service, and marketing strategies to differentiate the brand from competitors.

Regulatory Compliance:

Limitation: Adhering to various regulations related to data privacy, consumer protection, and e-commerce laws can be complex.
Mitigation: Stay informed about relevant regulations, implement compliance measures, and seek legal advice to ensure adherence.

Changing Consumer Behavior:

Limitation: Rapid shifts in consumer behavior and preferences may require constant adaptation to meet evolving market demands.
Mitigation: Stay attuned to market trends, conduct regular market research, and be agile in adjusting strategies based on changing consumer behavior.

Scalability Challenges:

Limitation: Rapid growth may lead to scalability challenges, affecting website performance and customer service.
Mitigation: Invest in scalable infrastructure, regularly assess performance metrics, and plan for scalability in advance.

Chapter-7 Test Cases

Server Deployment and Infrastructure:

1. Server Deployment:

1.1 Verify that the server is successfully deployed on the chosen virtual private server (AWS).

result: the website was deployed successfully

1.2 Check server specifications (CPU, RAM) to ensure they meet the project requirements.

result: the project was able to run on minimal possible requirements

1.3 Confirm that the website is accessible via the assigned domain name.

result: the website is accessible via http:// ip link. the DNS is not implemented

2. Database Interaction:

2.1 Test the connection between the web server and the database.

result: the connection is established

2.2 Verify that database operations (read, write, update, delete) are functioning as expected.

result: working as expected

2.3 Ensure that the database schema aligns with the defined models (e.g., Coupons, Order, Product, User).

result: working correctly

2.4 Test database indexing for performance optimization.

result: yet to be optimised

3. Server-Side Technologies:

3.1 Confirm the use of NodeJS for server-side development.

result: NodeJS is working

3.2 Verify that ExpressJS is used for handling HTTP requests.

result: all the routes are tested and are working correctly

3.3 Check the integration of EmbeddedJS (EJS) for rendering dynamic pages.

result: EJS is working bug free till now.

Security Testing:

4. Encryption and Authentication:

result: Encryption is implemented

4.1 Test the encryption mechanism, especially for sensitive data such as passwords and payment information.

result: Working correctly.

4.2 Verify that user authentication is implemented securely.

result: user authentication is working

4.3 Test the effectiveness of JsonWebToken (JWT) in securing data.

result: the passwords are hashed successfully

5. Session Management:

5.1 Confirm the use of express-session for managing user sessions.

result: session data is correctly working

5.2 Test session creation, expiration, and deletion.

result: express-session is working correctly

5.3 Simulate concurrent user sessions and check for conflicts.

result: no conflicts till now

6. Payment Gateway Security:

6.1 Test the security of the Razorpay payment gateway integration.

result: is implemented, yet to be tested.

6.2 Verify that payment transactions are encrypted and secure.

result: positive

6.3 Ensure that sensitive payment data is not stored on the server.

result: the data is store separately with the razorpay

Performance Testing:

7. Load Testing:

the website performs on load

7.1 Conduct load testing to assess the website's performance under normal and peak traffic conditions.

result: yet to be tested

7.2 Measure server response times and identify any performance bottlenecks.

results: no performance bottlenecks found

7.3 Verify that the website can handle the expected number of concurrent users.

result: yet to be tested.

8. Scalability:

8.1 Test the website's scalability by gradually increasing the load.

result: yet to be tested.

8.2 Verify that the website can scale horizontally with multiple instances if needed.

result: yet to be tested.

8.3 Confirm that the website performance remains stable during scalability tests.

result: yet to be tested.

Compatibility Testing:

9. Cross-Browser Compatibility:

result: positive.

9.1 Test the website on different browsers (Chrome, Firefox, Safari, Edge) to ensure consistent rendering and functionality.

result: positive.

9.2 Check responsiveness on various screen sizes and resolutions.

result: positive.

10. Mobile Compatibility:

result: positive.

10.1 Test the website on different mobile devices (iOS, Android) to ensure a mobile-friendly experience.

result: positive.

10.2 Verify that all features, including the shopping cart and payment gateway, work seamlessly on mobile.

result: positive.

Error Handling:

11. Error Pages and Messages:

result: positive.

11.1 Verify that appropriate error pages (404, 500) are displayed for different types of errors.

result: positive.

11.2 Test error messages for user-friendly and informative content.

result: positive.

11.3 Ensure that error messages do not reveal sensitive information.

result: positive.

Network Security:

12. Firewall and Network Configuration:

result: positive.

12.1 Verify that a firewall is configured to restrict unauthorized access.

result: positive.

12.2 Test network configurations to ensure secure communication between server and client.

result: positive.

Chapter-8 Conclusion

Conclusion:

The comprehensive testing of the server deployment and infrastructure, database interaction, security features, performance, compatibility, error handling, and network security has provided valuable insights into the robustness and reliability of the web application. Here are the key takeaways from the testing process:

Server Deployment and Infrastructure:

The deployment on the chosen virtual private server (AWS) was successful.

Server specifications were found to meet project requirements, running efficiently on minimal resources.

Website accessibility through the assigned domain is confirmed, though DNS implementation is pending.

Database Interaction:

The connection between the web server and the database is established and operational.

Database operations (read, write, update, delete) are functioning as expected.

The database schema aligns with the defined models.

Server-Side Technologies:

NodeJS for server-side development and ExpressJS for handling HTTP requests are confirmed.

EmbeddedJS (EJS) for rendering dynamic pages is working bug-free.

Security Testing:

Encryption mechanisms, especially for sensitive data, are working correctly.

User authentication is implemented securely, and JsonWebToken (JWT) is effective in securing data.

Session management is secure, and sensitive payment data is stored separately with Razorpay.

Performance Testing:

Load testing, server response time measurement, and identification of performance bottlenecks are pending.

Scalability testing, including the ability to scale horizontally and maintain performance stability, is yet to be conducted.

Compatibility Testing:

Positive results are obtained for cross-browser compatibility and responsiveness on various screen sizes.

Mobile compatibility testing yielded positive results, ensuring a seamless experience across iOS and Android devices.

Error Handling:

Appropriate error pages for different types of errors are displayed.

Error messages are user-friendly, informative, and do not reveal sensitive information.

Network Security:

Firewall configuration is in place to restrict unauthorized access.

Network configurations ensure secure communication between the server and client.

Chapter-9 Bibliography

Node.js:

Title: Node.js Documentation

URL: https://nodejs.org/en/docs/

Express.js:

Title: Express.js Documentation

URL: https://expressjs.com/

EmbeddedJS (EJS):

Title: EJS - Embedded JavaScript templates

URL: https://ejs.co/

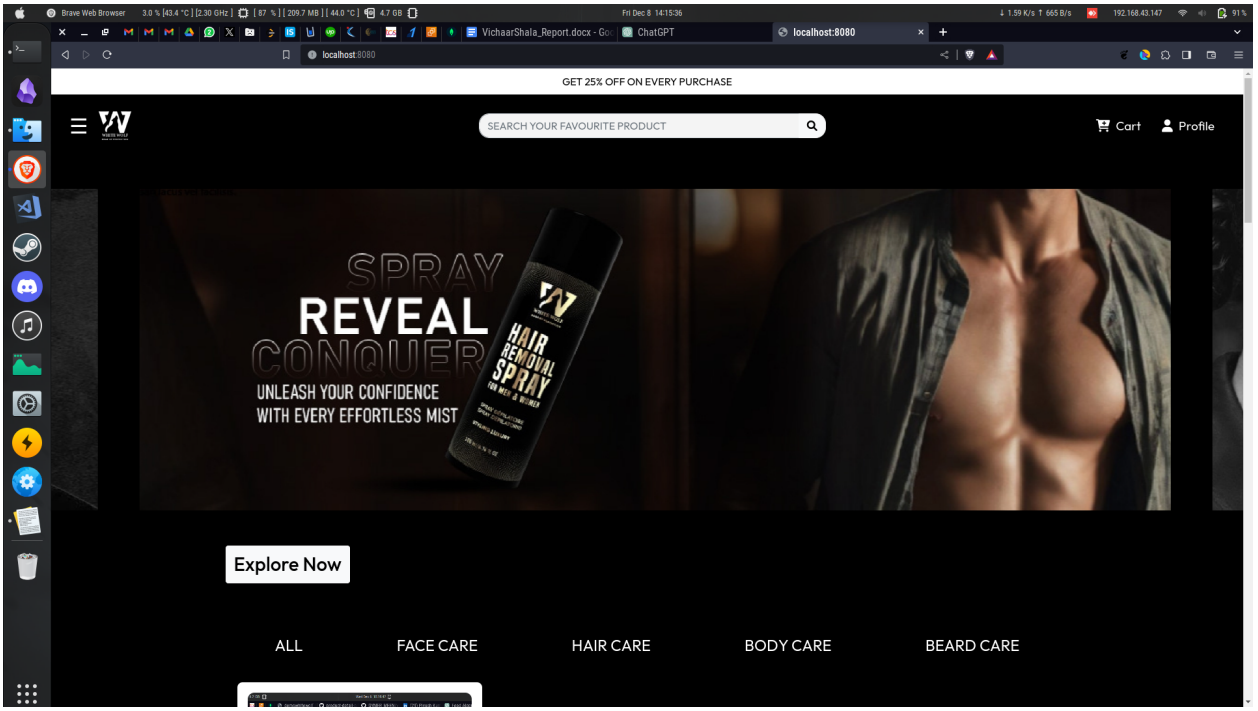
MongoDB:

Title: MongoDB Documentation

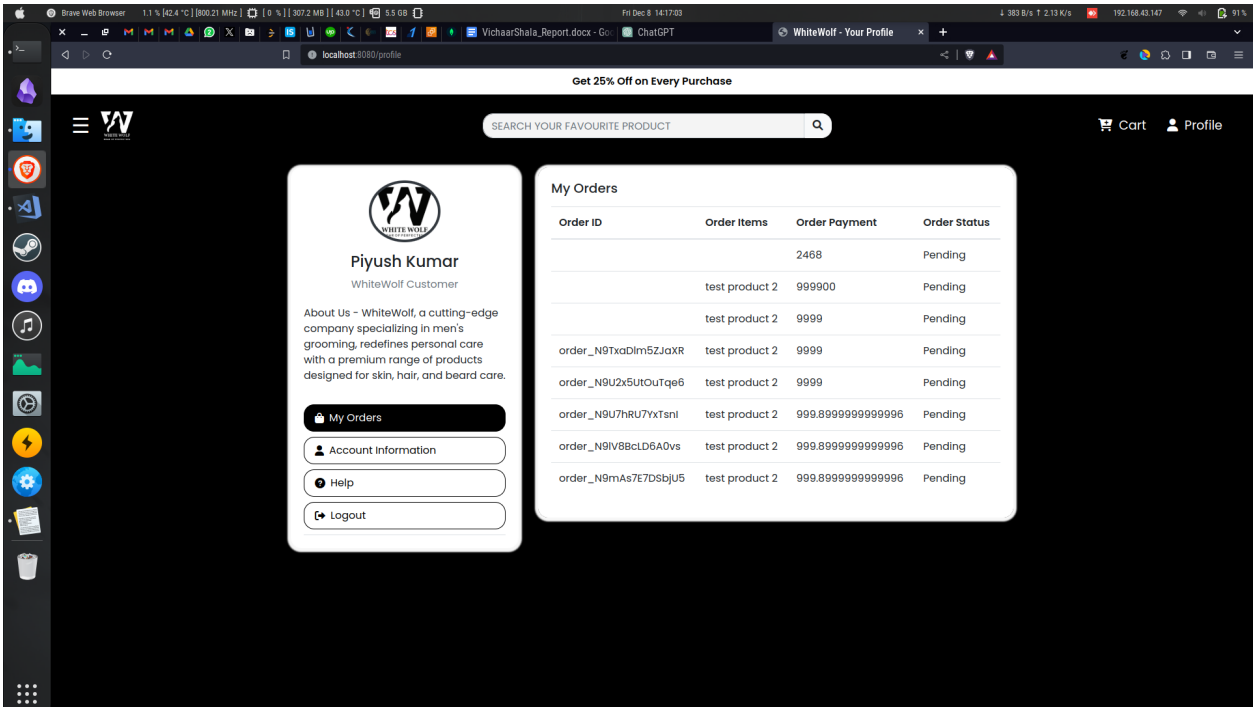
URL: https://docs.mongodb.com/

Chapter-10 Project Images

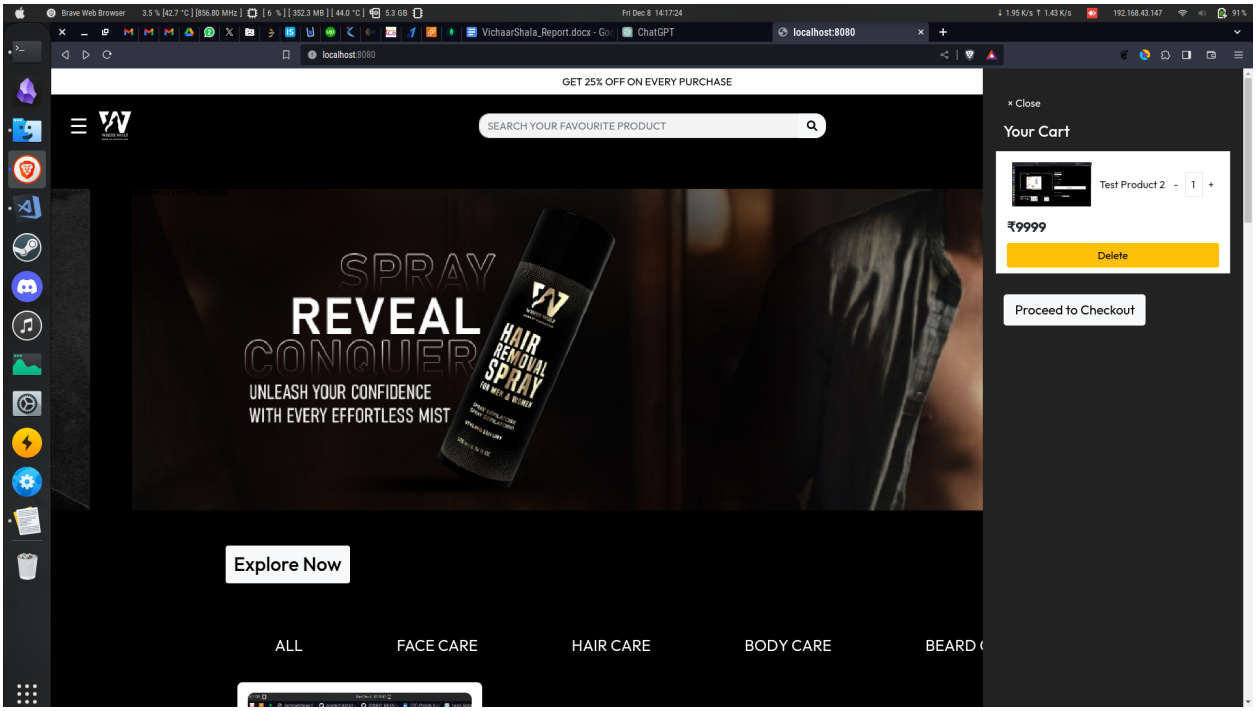
Home page



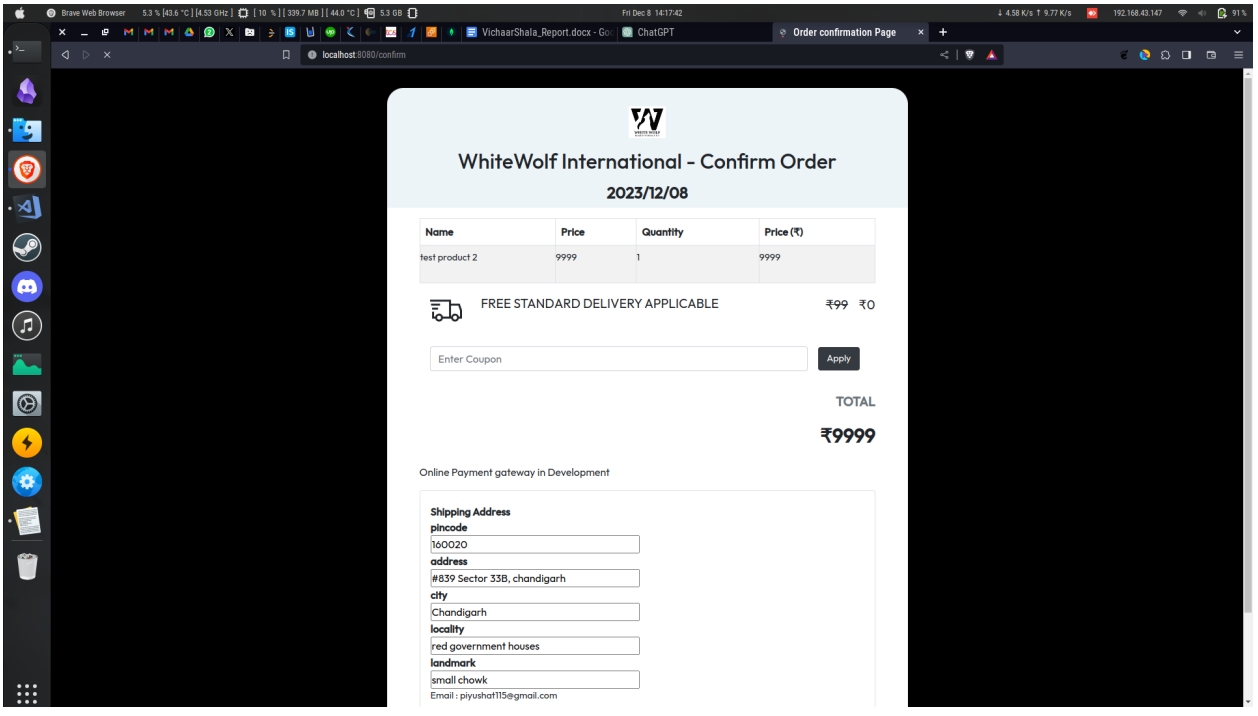
Profile page



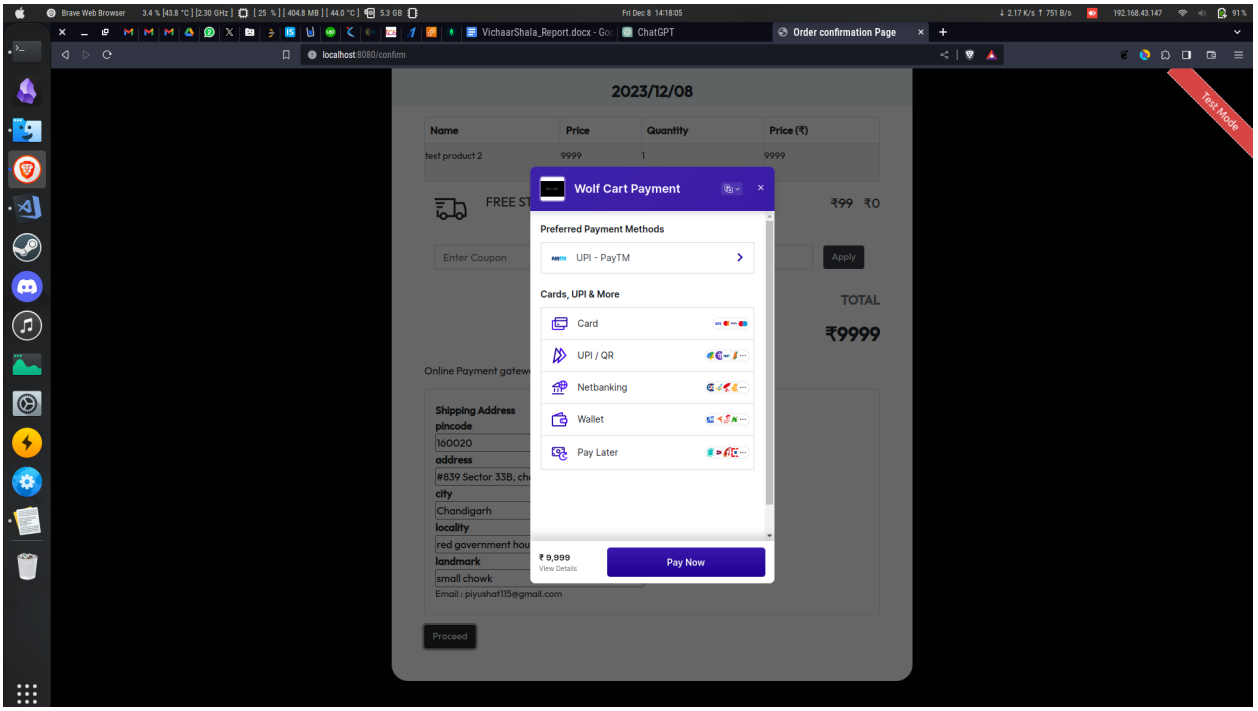
Cart



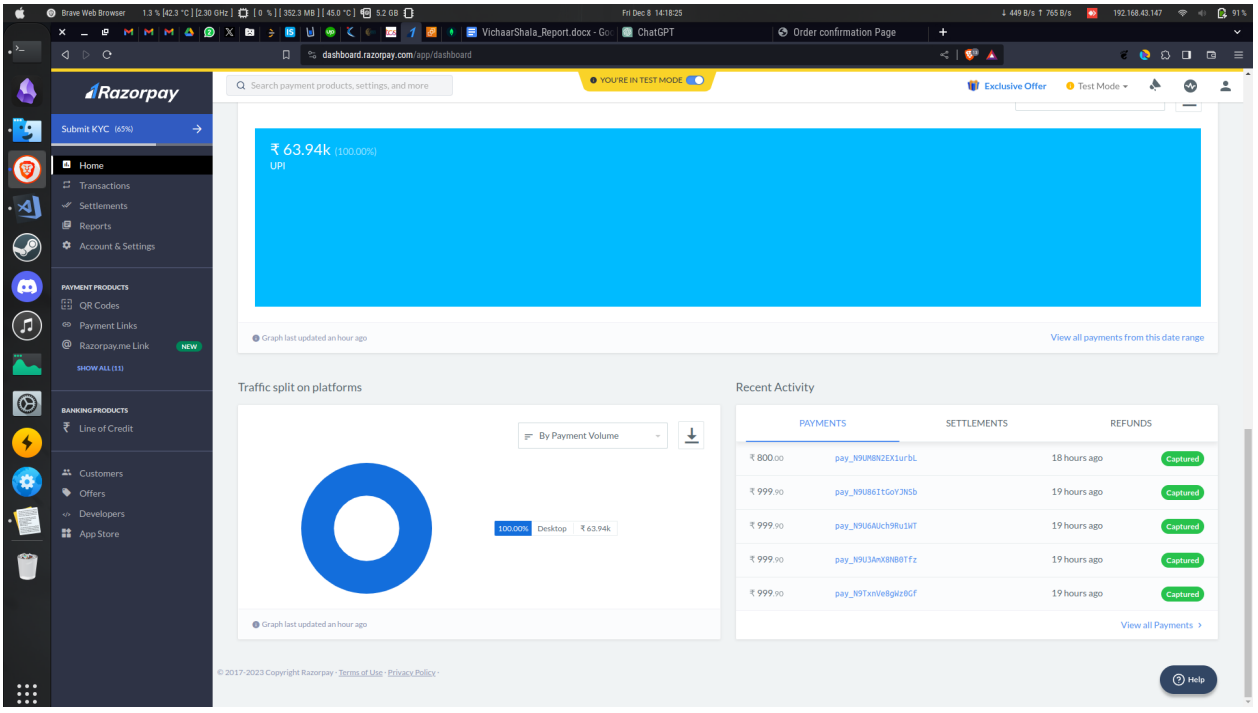
Checkout



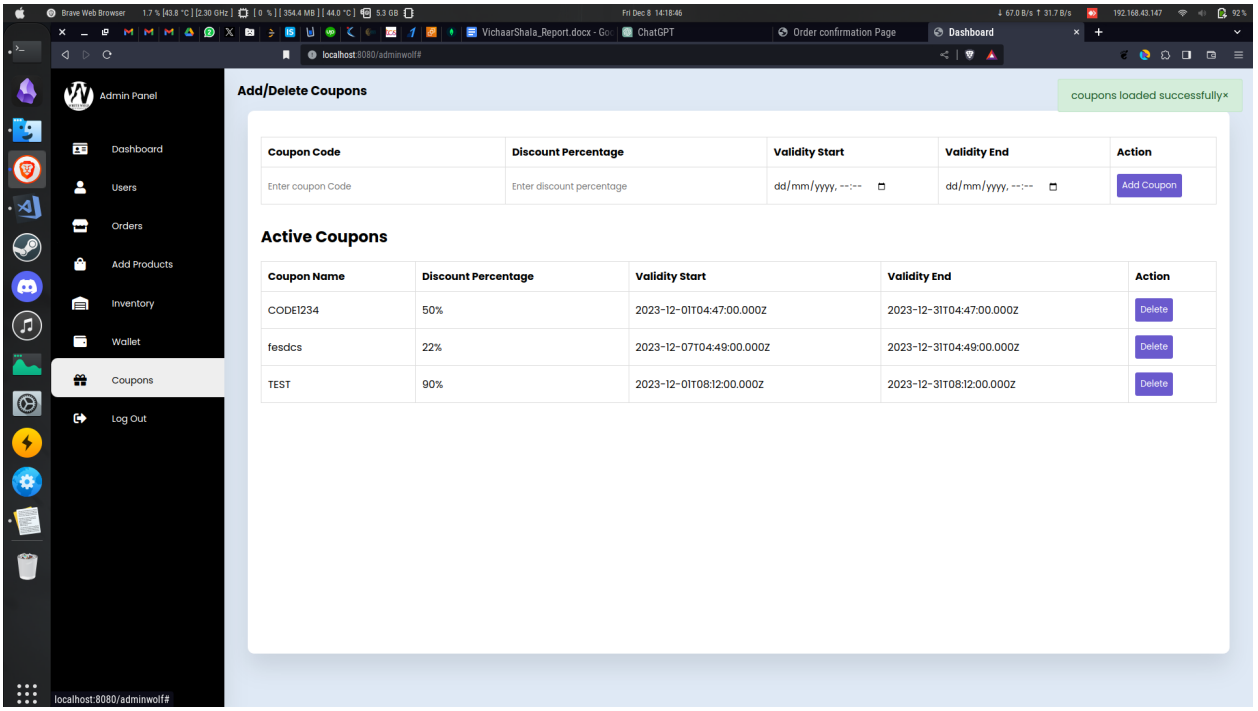
Razorpay Portal



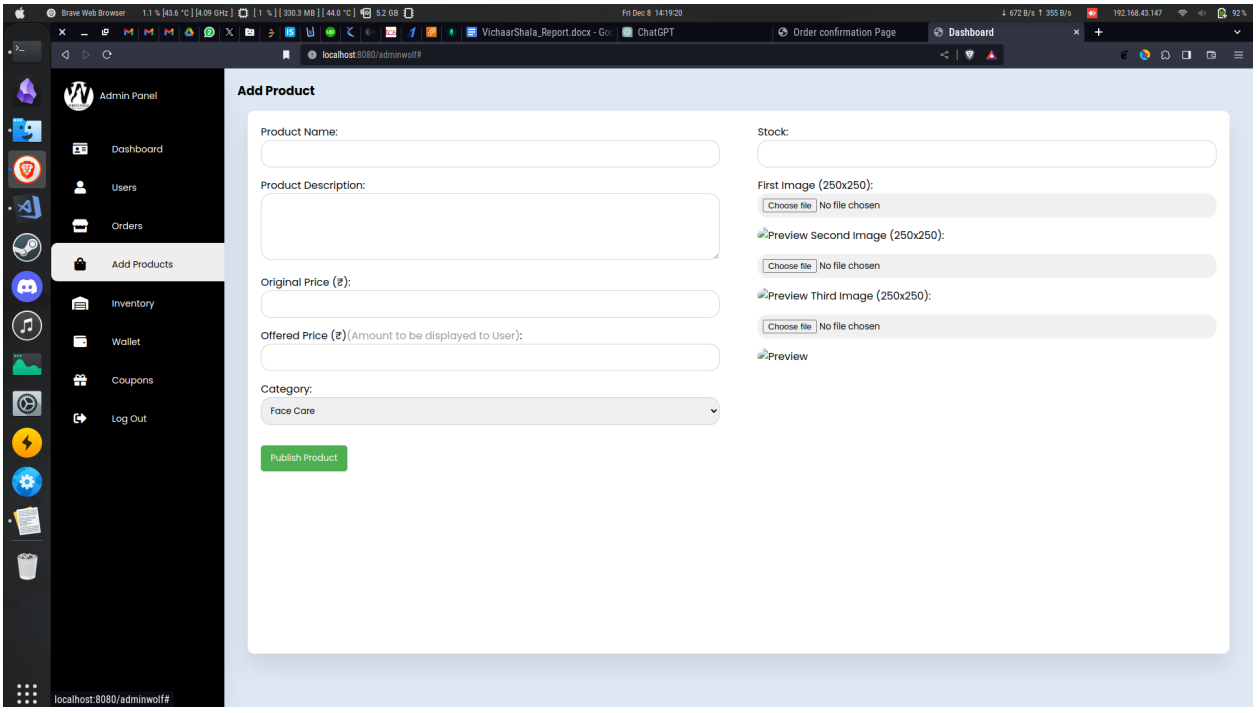
Razorpay Dashboard



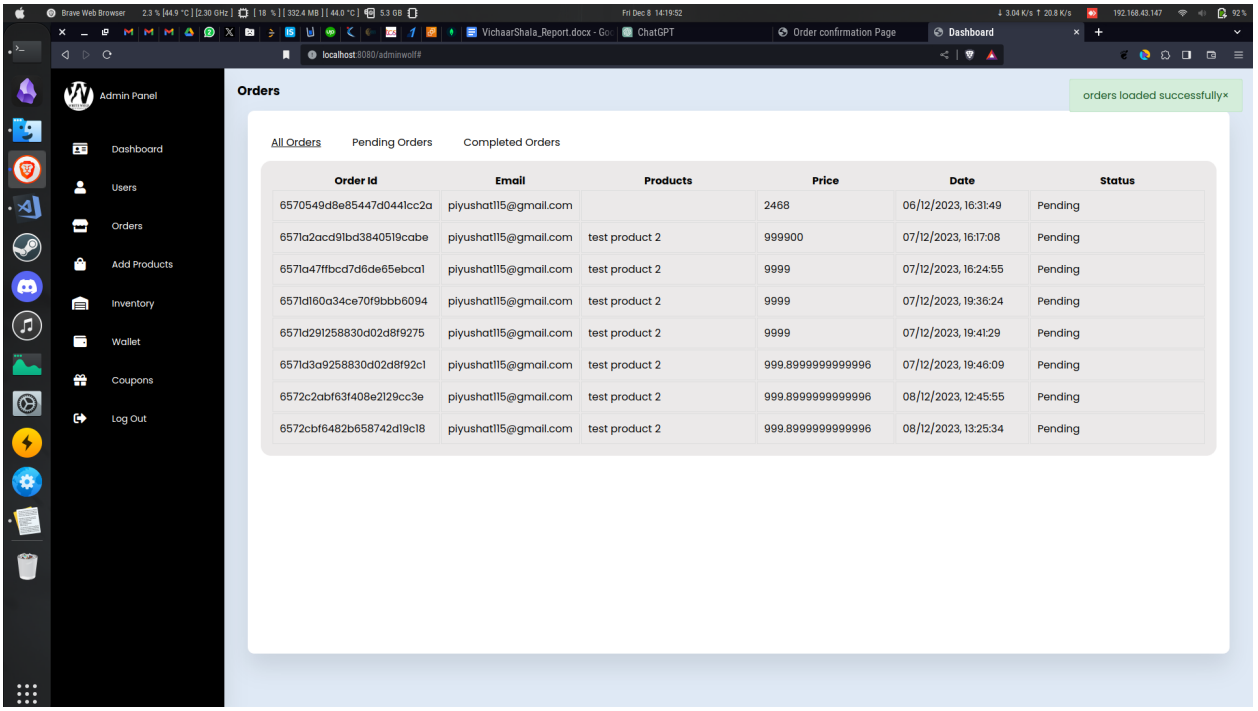
Admin page coupons



Admin Page add new products



Admin Page Orders



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