Project submitted to the

SRM University – AP, Andhra Pradesh

for the partial fulfilment of the requirements to award the degree of

Bachelor of Technology

In

Computer Science and Engineering

School of Engineering and Sciences

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April, 2025

ACKNOWLEDGEMENT

We would like to express our deep sense of gratitude and honor to our beloved faculty supervisor, **Dr. Sobin CC** sir for his constant encouragement and priceless intellectual motivation throughout my project period under his guidance and supervision. Their academic excellence, critical reviews and constructive comments improved my grasp of the subject and steered to the fruitful completion of the work. His patience, guidance and encouragement made this project possible.

ABSTRACT

The **Vintage Vault Web App** is an interactive online marketplace designed to connect antique collectors. It allows them to list their unique antiques with detailed descriptions, images, and starting prices, while people who are interested in that antique can explore and bid on items of interest in a competitive auction environment. The app bridges the gap between traditional auctioning and the digital age by enabling users to participate in bidding from anywhere in the world.

Key features include:

- **User Registration & Authentication**
  - Secure user authentication system with role-based access for buyers and sellers.
- **Antique Listings and Auction Management**
  - A robust bidding system that displays the highest bid and auction timer.
- **Dashboard**
  - A dedicated dashboard through which sellers can efficiently manage their listings and track bids and personalized dashboard for buyers to monitor their bids.
- **Search & Filtering**
  - Advanced search and filtering options, enabling users to easily find items based on categories, price ranges, or keywords.

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CHAPTER 01: INTRODUCTION

1.1 INTRODUCTION

In the era of digital transformation, online auction platforms like **The Vintage Vault Web App** are playing a pivotal role in reshaping traditional marketplaces. Unlike conventional auction systems that were limited by physical boundaries and manual processes, this platform brings the charm of antique trading into the digital age—making it accessible, interactive, and transparent.

During a time when managing auctions through physical means can be cumbersome and inefficient, **The Vintage Vault** provides a dynamic online solution for antique enthusiasts. The platform connects buyers and sellers in a competitive auction environment, allowing users to list antiques with detailed descriptions and images while enabling others to place bids from anywhere in the world. It effectively removes the geographical and logistical barriers associated with traditional auctioning.

The platform promotes seamless participation and efficient management through features like real-time bidding, customizable listings, secure authentication, and dedicated dashboards for both buyers and sellers. Users can track bids, monitor auction progress, and interact with antique listings effortlessly. Moreover, powerful search and filtering tools allow users to explore the marketplace with ease based on preferences like category or price range.

Built with modern web technologies such as **React**, **Node.js**, **Express.js**, and **MongoDB**, the application ensures a reliable, scalable, and user-friendly experience. Secure authentication protocols safeguard user data and maintain the integrity of the bidding process.

By merging the elegance of antique auctions with the convenience of web-based platforms, **The Vintage Vault** not only enhances the auction experience but also supports informed, efficient decision-making for all its users—from casual collectors to serious antique dealers.

1.2 BENEFITS

Benefits of implementing an Auction Management System:

1) **Wider Reach & Accessibility**
   a) Bidders from anywhere in the world can participate. Available 24/7.
2) **Faster Transactions**
   a) Bidding, buying, and selling processes are quicker compared to traditional auctions.
3) **Increased Revenue**
   a) More bidders create more competition, leading to higher final sale prices.
   b) The platform can earn through commission fees, listing fees, or subscription models.
4) **Data Collection & Insights**
   a) Track user behavior, bidding patterns, and popular items.
   b) Use analytics for better marketing and inventory decisions.
5) **Cost Efficiency**
   a) Reduces the need for physical venues and administrative costs.
6) **Flexibility in Auction Models**
   a) Supports various auction types: English Auction, Dutch Auction, Sealed Bid, etc.
7) **Enhanced Trust with Technology**
   a) Secure payments, transparent bidding history, and user reviews help build trust.
   b) Future possibilities include blockchain integration.

1.3 PURPOSE

The Auction Management System (AMS) is designed to streamline the process of conducting and managing online auctions. Traditional auction systems often rely on manual methods or fragmented tools, leading to inefficiencies such as mismanagement of bids, difficulty in tracking auction activities, delays in processing results, and lack of real-time insights. The primary goal of this system is to provide a centralized digital platform where users and administrators can efficiently manage auctions, ensuring transparency, timely processing, and an enhanced user experience.

This system is particularly beneficial for platforms handling a large volume of auctions and participants. With real-time monitoring, user-friendly interfaces, and reporting functionalities, the AMS reduces operational inefficiencies, improves bid management, and supports effective decision-making by both users and administrator

1.4 SCOPE

The **Auction Management System** will provide an automated and efficient way to handle the end-to-end lifecycle of auctions. It will include features for

- **Auction Creation & Management -** Administrators **can create, update, and manage** auctions while tracking bidding activities and ensuring compliance with platform rules.

- **User Authentication & Profile Management -** Role-based access for users and admins ensures secure login, profile updates, and customized user experiences.

- **Bid Submission & Tracking -** Participants can submit, monitor, and withdraw bids in real time, with transparent updates about the auction status.

- **Notifications & Alerts -** Automated notifications will inform users about auction updates, bidding deadlines, and other critical events.

- **Vendor & Dealer Management -** Tracks supplier performance, auction product quality, and commission rates to optimize vendor relationships.

1.5 Definitions, Acronyms, and Abbreviations

1. SRS: Software Requirement Specification
2. DFD: Data Flow Diagram
3. ER: Entity-Relationshi

1.6 Overview:

There are two main modules in this application—the **admin module** and the **user module**. The **admin** is responsible for developing the entire web application, managing the backend and frontend, and overseeing the database. The admin also handles auction approvals, user management, and dispute resolutions to ensure smooth and secure platform operations.

In the **user module**, there are two types of users: **buyers** and **sellers**. A **buyer** can register on the platform, log in, and start exploring a wide range of antique items listed for auction. Buyers can view item details, place bids in real time, track their bidding history, and receive notifications for bid status and auction outcomes. They can also securely complete their purchases using various payment methods integrated into the platform.

A **seller** is allowed to create listings by uploading item descriptions, images, setting starting prices, and defining auction durations. Sellers can track ongoing auctions, monitor bids, and manage post-auction activities through a dedicated dashboard. They can also respond to buyer inquiries and receive detailed insights on the performance of their items.

The platform ensures that all participants experience a streamlined and transparent auction process. Built using modern technologies like **React.js**, **Node.js**, **Express.js**, and **MongoDB**, it supports scalability, real-time interactions, and secure user authentication. The application bridges the gap between traditional antique trading and modern e-commerce, providing a reliable and engaging auction environment for vintage enthusiasts worldwide.

CHAPTER 02: EXISTING SYSTEM

2.1. LITERATURE OVERVIEW:

Traditional methods of managing antique auctions often encounter issues such as fragmented processes, inefficient bid tracking, and a lack of transparency between buyers, sellers, and administrators. This literature emphasizes the need for a modern digital solution that leverages current web technologies to streamline the auction process and enhance the overall user experience.

The **Vintage Vault Auction Platform** addresses these challenges by introducing an integrated, web-based system featuring real-time bidding, role-based access control, secure payment gateways, and efficient auction lifecycle management. With functionalities such as easy antique listing, automated notifications, dispute resolution tools, and advanced search and filtering, the platform transforms how users participate in and manage antique auctions.

Through a comprehensive development cycle—encompassing requirements gathering, system design, implementation, and rigorous testing—the development team ensured that the platform meets the functional and performance expectations of all users involved. The result is a robust and scalable system that significantly improves operational efficiency, auction transparency, and user engagement.

By combining modular architecture with intuitive design and security-first practices, this innovative solution redefines how online antique auctions are conducted. It empowers sellers to manage listings with ease, enables buyers to engage in auctions confidently, and equips administrators to maintain platform integrity—thereby setting a new benchmark for auction platforms in the digital era.

2.2. CHALLENGES IN TRADITIONAL AUCTION MANAGEMENT

Traditional auction systems often rely on manual methods or outdated software, leading to several inefficiencies:

1. Lack of Real-Time Updates – Auction participants struggle to receive live updates on bids, leading to delays and decreased engagement.

2. Inefficient Bid Tracking – Administrators face challenges in recording and

managing bids, which may result in errors or disputes.

3. Limited Transparency – Manual systems often fail to ensure fair bidding practices, resulting in mistrust among users.

4. High Operational Overhead – Managing auctions manually increases administrative workload, affecting the overall efficiency of the platform.

5. Poor User Experience – The lack of user-friendly interfaces and automated notifications leads to participant dissatisfaction and reduced platform activity.

2.3. ADVANTAGES OF AUCTION MANAGEMENT SYSTEM

To overcome these challenges, the Auction Management System (AMS) provides an automated, centralized platform for managing auctions efficiently and transparently. By integrating real-time updates, bid tracking, and advanced analytics, the system ensures:

1. **Transparent and Fair Auctions –** Real-time tracking of bids and clear visibility of auction activities for all users.
2. **Efficient Resource Utilization –** Automated management reduces the workload for administrators and improves operational efficiency.
3. **Enhanced User Engagement –** Intuitive user interfaces, personalized profiles, and timely notifications ensure a seamless experience for participants.
4. **Reliable Data Management –** Secure storage and processing of auction data to prevent unauthorized access and errors.

2.4. DISADVANTAGES OF AUCTION MANAGEMENT SYSTEM

Online **Auction Management System** has many benefits, but it can also have certain disadvantages and difficulties such as:

1. **Dependency on Technology –** Requires a stable internet connection and functioning devices; any technical failure can disrupt the auction process.
2. **Learning Curve for Users –** Users unfamiliar with online platforms may struggle with navigation, bidding, or registration.
3. **Real-Time Pressure –** Bidders may feel rushed or stressed during live auctions, potentially leading to impulsive or missed bids.

4. **Maintenance and Updates –** Regular maintenance is required to keep the system secure, bug-free, and compatible with evolving technologies.
5. **Security Concerns –** If not properly implemented, the system may be vulnerable to data breaches, fraudulent bidding, or account hijacking.

CHAPTER 03: SYSTEM REQUIREMENTS

3.1 SYSTEM SPECIFICATIONS

3.1.1. HARDWARE SPECIFICATIONS

- Core i5 processor
- 4GB Ram.
- 5GB of hard disk space in terminal machines
- 150 GB hard disk space in Server Machine

3.1.2. SOFTWARE SPECIFICATIONS

- Windows 10 or above operating system
- MongoDB Database Cluster
- Nodejs environment
- React library
- Express framework
- React – router Dom
- Redux-toolkit library

CHAPTER 04: PROPOSED SYSTEM

The Incremental Model is utilized for developing the Auction Management System (AMS) due to its step-by-step approach to software development. This model ensures the early delivery of essential functionalities while allowing gradual addition of advanced features.

In the initial increments, core functionalities such as user profile management, viewing auctions, and placing bids are delivered, enabling the system to operate efficiently from the start. Subsequent increments focus on incorporating advanced modules like commission management, vendor and dealer tracking, and automated notifications, ensuring continuous improvements.

This approach supports flexibility, allowing developers to adapt based on user feedback during the development process. It mitigates risks by identifying and addressing issues in the earlier stages. With well-defined requirements for auction-based systems, the incremental model allows faster deployment of core modules while enabling parallel development of additional features. This not only improves efficiency but also ensures scalability and a seamless user experience.

4.1. ROLES OF THE USERS

4.1.1. ADMIN

The **Admin** has full access to the system and plays a crucial role in maintaining and managing the entire platform. As the highest-privileged user, the admin ensures smooth operation, enforces platform rules, and manages user roles and auctions.

Key functions:

- Add and manage buyers and sellers
- Approve or reject auction listings
- Monitor live auctions
- Handle disputes and fraud detection
- Manage the platform settings and content
- Oversee commission handling and payments
- View analytics and generate reports

4.1.2. SELLER/AUCTIONEER

Sellers can register on the platform, log in to their accounts, and list antique items for auction. They can manage their own listings and monitor bidding activity in real-time.

Key functions:

- Add and manage antique listings
- Upload images, descriptions, and set auction rules
- Monitor active bids and auction progress
- View sales history and commission breakdown
- Respond to buyer queries

4.1.3. BUYER/BIDDER

Buyers can explore the auction marketplace, search for items of interest, and participate in auctions. They can place bids, track their activity, and securely complete purchases.

Key features:

- Register and login
- Search and filter antique items
- Place and monitor bids in real-time
- Access auction history and payment records
- Receive notifications for bid updates and auction outcomes

4.2. PRODUCT FUNCTIONS

- Provides access to **registered users only** (Buyers, Sellers, and Admins).
- Registration and authentication for **new buyers and sellers** with role-based access.
- **Sellers** can create and manage antique auction listings with item details, images, and pricing information.
- The platform supports uploading various **content types** such as images, item descriptions, documents (e.g., authenticity certificates), etc.

- **Sellers** can organize auction listings with detailed item breakdowns, timelines, and shipping information.
- **Buyers** can browse active auctions, place bids, and access details of current and past bids.
- **Admins** can oversee and manage auctions, approve listings, resolve disputes, and maintain platform integrity.
- Real-time bidding system with automatic updates for auction status and bid tracking.
- Notification system to inform users about bid changes, auction closings, and relevant updates.

4.3. DATA FLOW DIAGRAMS

4.3.1. CONTEXT DIAGRAM

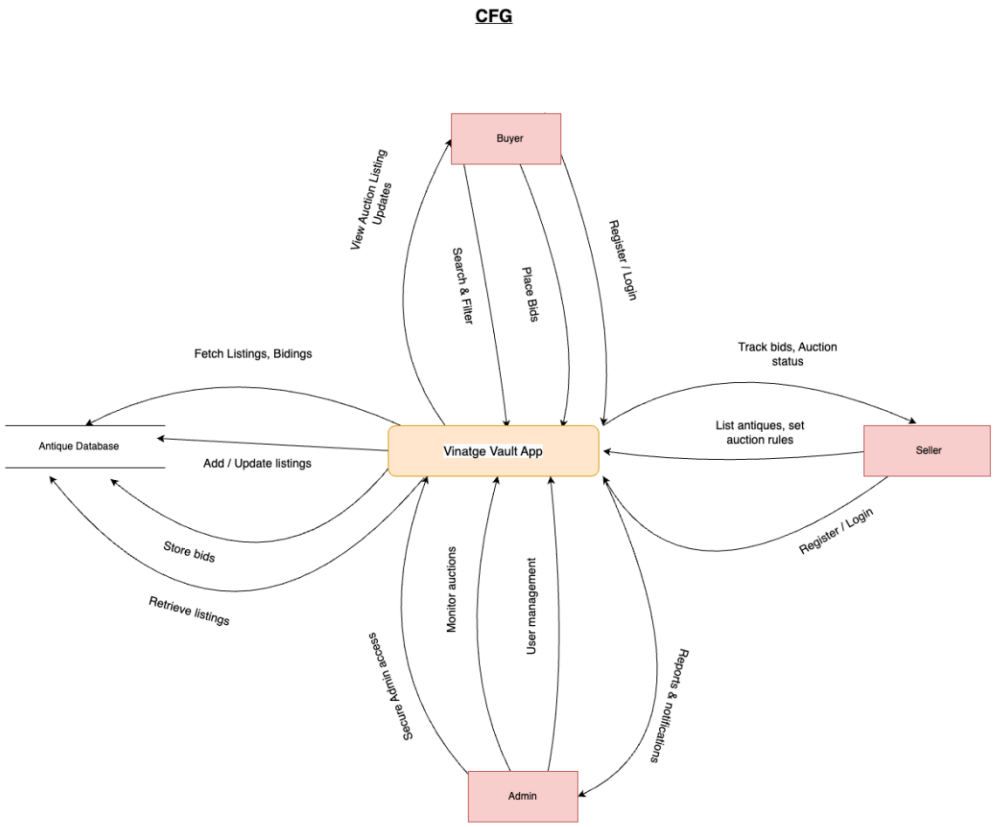


Figure 4.3.1. Context Level DFD

4.3.2. LEVEL 0 DFD

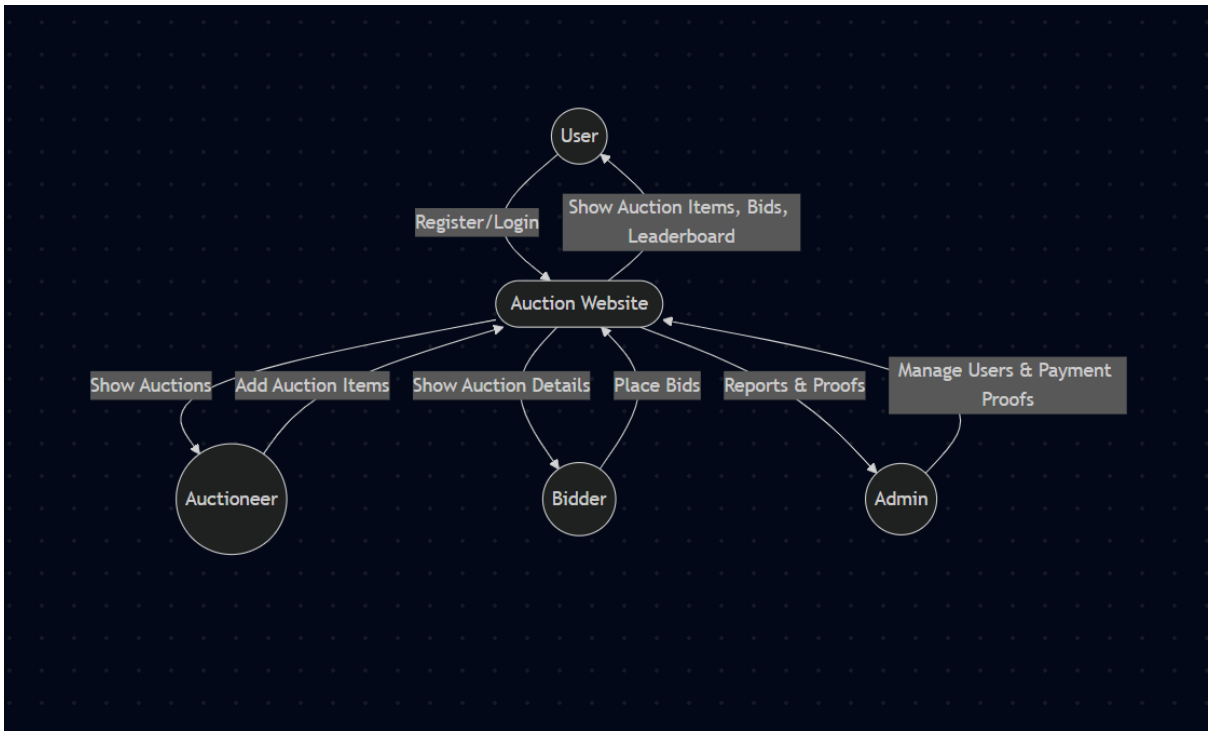
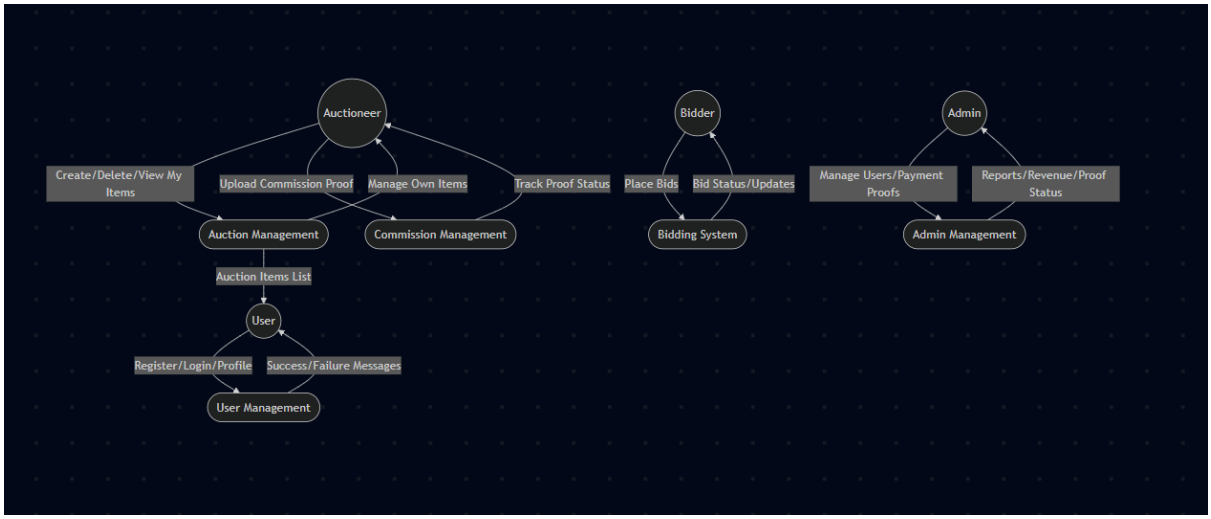


Figure 4.3.2 Level – 0 DFD (For Auctioneer , Bidder , Admin)

4.3.3. Level 1 DFD



4.4. USE CASE DIAGRAM

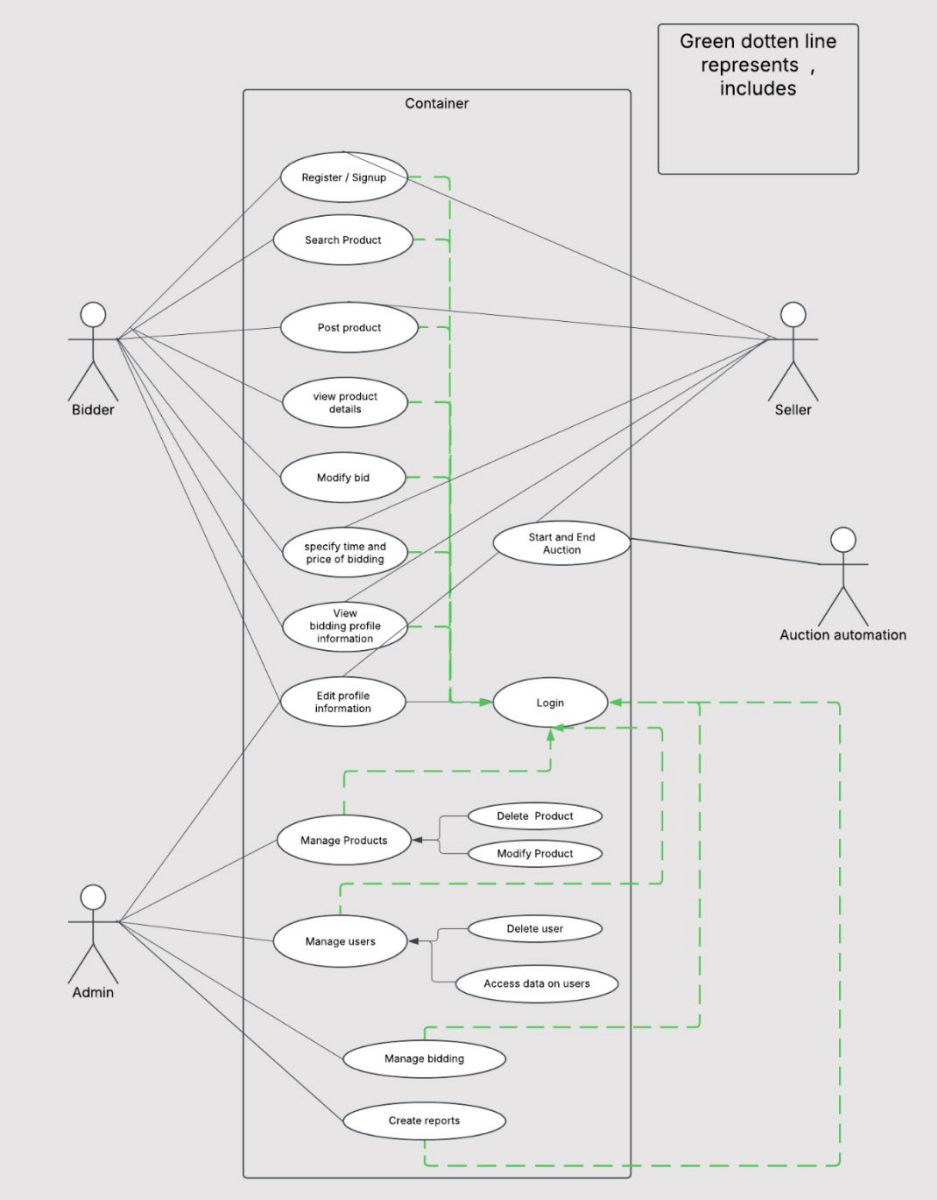


Figure 4.4 Use Case Diagram

4.4.1 USE CASE DESCRIPTION

1. Seller Registration

Description:
A new seller can register to the application by providing necessary details such as name, contact number, and email. Upon registration, the seller's details are stored in the database.

Pre-condition:

- The seller must be new (not previously registered).
- All required fields must be completed; if not, the system will prompt the user.

Main Flow of Events:

1. Seller selects the “Register” option.
2. Fills in all the required fields.
3. Registration is successful.

Post-condition:

- The seller’s information is added to the database.

2. Bidder Registration

Description:
A new bidder (user interested in bidding) can register on the platform by entering their name, email, mobile number, and setting up a secure password. Upon submission, the record is saved in the database.

Pre-condition:

- The bidder must be a new user.
- All required fields must be filled.

Main Flow of Events:

1. Bidder selects “Register.”
2. Enters required registration details.
3. Receives confirmation of successful registration.

Post-condition:

- The bidder’s record is saved in the database.

3. Bidding on an Item

Description:
A registered and logged-in bidder can browse items and place bids on available antique listings.

Pre-condition:

- Bidder must be registered and logged in.

Main Flow of Events:

1. Bidder logs in to the application.
2. Searches or browses for a desired antique item.
3. Places a bid (price must be higher than the current highest bid).
4. Bid is recorded in the system and updated in real time.

Post-condition:

- Bid information is saved to the database.

4. Adding Products by Seller

Description:
A registered seller logs in to the application and lists a new antique product by providing details, uploading images, and setting a base price and auction time.

Pre-condition:

- The seller must be registered and logged in.

Main Flow of Events:

1. Seller logs in.
2. Navigates to the “Add Product” section.
3. Fills out product details and uploads images.
4. Specifies bidding timeline and starting price.
5. Submits the product listing.

Post-condition:

- The product is added to the platform and becomes available for auction.

4.5. DATA DICTIONARY TABLE:

S.No.	Field Name	Allowed Characters
1	userName	{Legal_character}*
2	password	{Legal_character + Digit}*
3	email	{Legal_character + Digit + Special_ch}*
4	address	{Legal_character + Digit}*
5	phone	{Digit}{10}
6	profileImage.public_id	{Legal_character + Digit}*
7	profileImage.url	{Legal_character + Digit + Special_ch}*
8	paymentMethods.bankTransfer.bankAccountNumber	{Digit}*
9	paymentMethods.bankTransfer.bankAccountName	{Legal_character}*
10	paymentMethods.bankTransfer.bankName	{Legal_character}*
11	paymentMethods.UPI.UPI	{Legal_character + Digit}*
12	paymentMethods.paypal.paypalEmail	{Legal_character + Digit + Special_ch}*
13	role	{Legal_character}* (Enum)
14	unpaidCommission	{Digit}*
15	auctionsWon	{Digit}*
16	moneySpent	{Digit}*
17	createdAt	Date
18	amount (commission)	{Digit}*
19	user (commission)	ObjectId

S.No.	Field Name	Allowed Characters
20	proof.public_id	{Legal_character + Digit}*
21	proof.url	{Legal_character + Digit + Special_ch}*
22	uploadedAt	Date
23	status	{Legal_character}* (Enum)
24	comment	{Legal_character + Digit}*
25	bidder.id	ObjectId
26	bidder.userName	{Legal_character}*
27	bidder.profileImage	{Legal_character + Digit + Special_ch}*
28	auctionItem	ObjectId
29	title	{Legal_character}*
30	description	{Legal_character + Digit}*
31	startingBid	{Digit}*
32	category	{Legal_character}*
33	condition	{Legal_character}* (Enum)
34	currentBid	{Digit}*
35	startTime	{Digit + Special_ch}*
36	endTime	{Digit + Special_ch}*
37	image.public_id	{Legal_character + Digit}*
38	image.url	{Legal_character + Digit + Special_ch}*
39	createdBy	ObjectId
40	bids[].userId	ObjectId
41	bids[].userName	{Legal_character}*

S.No.	Field Name	Allowed Characters
42	bids[].profileImage	{Legal_character + Digit + Special_ch}*
43	bids[].amount	{Digit}*
44	highestBidder	ObjectId
45	commissionCalculated	Boolean
46	createdAt (Auction)	Date

TABLE 4.5. DATA DICTIONARY

4.6. ER DIAGRAM

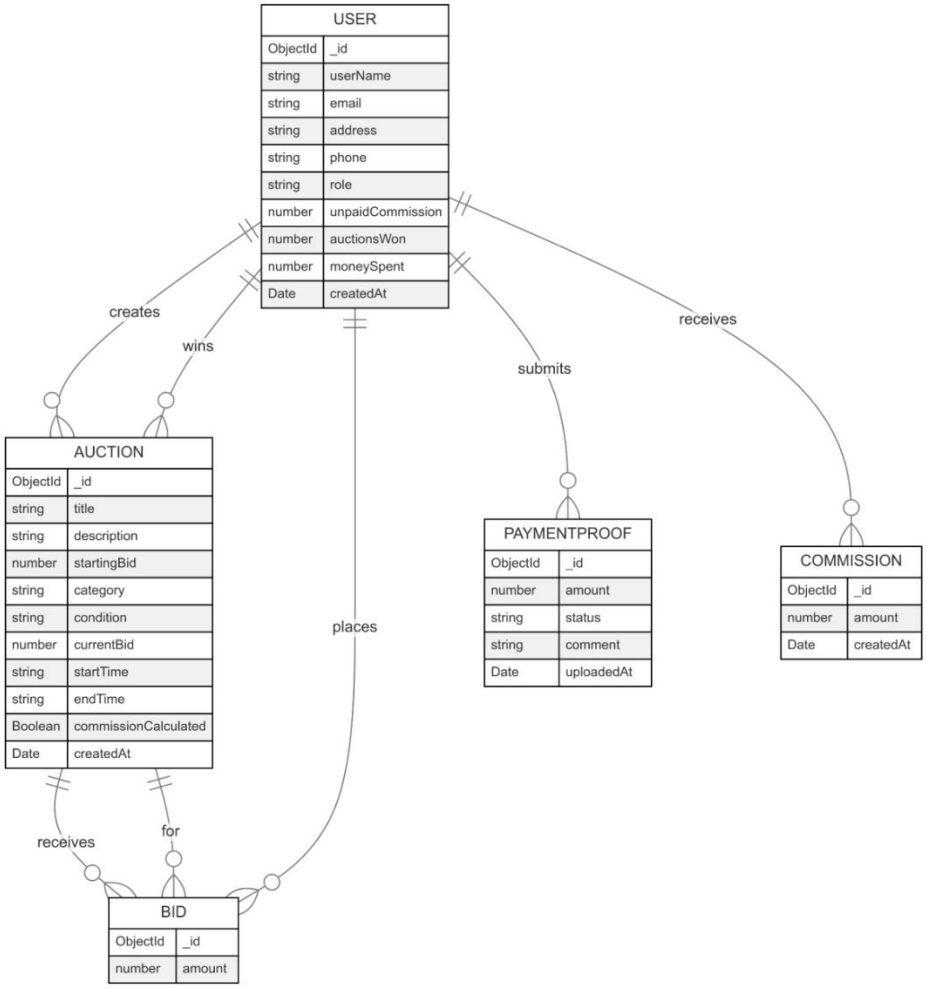


Figure 4.6 ER Diagram

4.7. DATA DESIGN

S.NO	COLUMN NAME	DATA TYPE	CONSTRAINTS	DESCRIPTION
1	_id	ObjectId	Primary Key	Unique ID of the commission record
2	amount	Float	-	Commission amount
3	user	ObjectId	Foreign Key	Refers to _id in the User table
4	createdAt	Date	Default = now()	Timestamp of commission creation

TABLE 4.7.1. – COMMISSION TABLE

S.NO	COLUMN NAME	DATA TYPE	CONSTRAINTS	DESCRIPTION
1	_id	ObjectId	Primary Key	Unique proof ID
2	userId	ObjectId	Foreign Key, Required	Refers to _id in User table
3	proof_id	Varchar(100)	Required	Cloudinary public_id
4	proof_url	Varchar(200)	Required	URL of uploaded proof
5	uploadedAt	Date	Default = now()	Timestamp of upload
6	status	Varchar(20)	Enum (Pending/Approved/Rejected/Settled)	Proof status
7	amount	Float	-	Amount related to proof
8	comment	Varchar(200)	-	Admin comment (optional)

TABLE 4.7.2. PAYMENT PROOF TABLE

S.NO	COLUMN NAME	DATA TYPE	CONSTRAINTS	DESCRIPTION
1	_id	ObjectId	Primary Key	Auction ID
2	title	Varchar(100)	-	Auction title
3	description	Varchar(500)	-	Description of auction item
4	startingBid	Float	-	Starting bid amount
5	category	Varchar(50)	-	Auction category
6	condition	Varchar(10)	Enum (New/Used)	Item condition

7	currentBid	Float	Default = 0	Highest bid so far
8	startTime	Varchar(20)	-	Auction start time
9	endTime	Varchar(20)	-	Auction end time
10	image_id	Varchar(100)	Required	Cloudinary image ID
11	image_url	Varchar(200)	Required	Image URL
12	createdBy	ObjectId	Foreign Key	Refers to _id in User table
13	highestBidder	ObjectId	Foreign Key	Refers to _id in User table
14	commissionCalculated	Boolean	Default = false	Flag to track commission status
15	createdAt	Date	Default = now()	Timestamp

TABLE 4.7.3. AUCTION TABLE

S.NO	COLUMN NAME	DATA TYPE	CONSTRAINTS	DESCRIPTION
1	_id	ObjectId	Primary Key	Unique bid ID
2	amount	Float	-	Bid amount
3	bidder_id	ObjectId	Foreign Key, Required	Refers to _id in User table
4	bidder_userName	Varchar(40)	-	Name of the bidder
5	bidder_profileImage	Varchar(200)	-	Profile image URL
6	auctionItem	ObjectId	Foreign Key, Required	Refers to _id in Auction table

TABLE 4.7.4. BID TABLE

4.8. SEQUENCE DIAGRAM

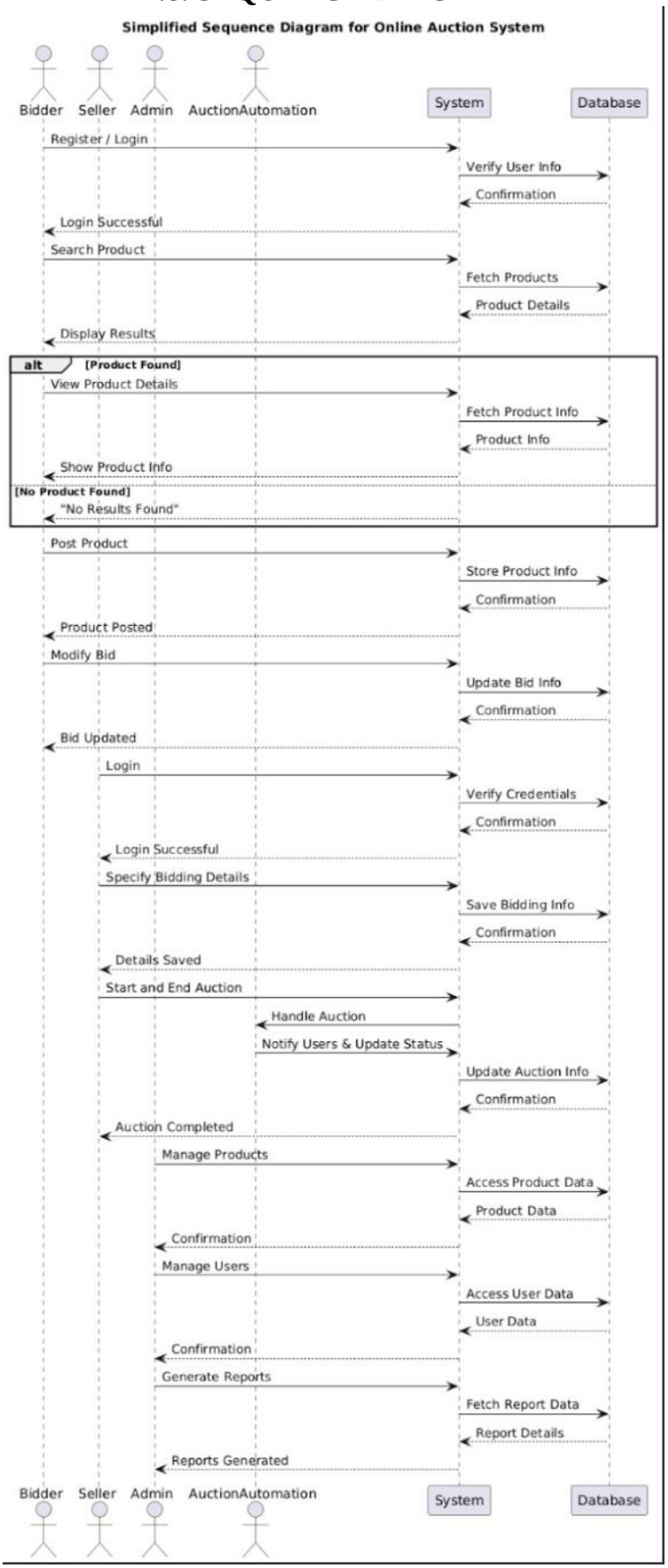


Figure 4.8 Sequence Diagram

4.9. CLASS DIAGRAM

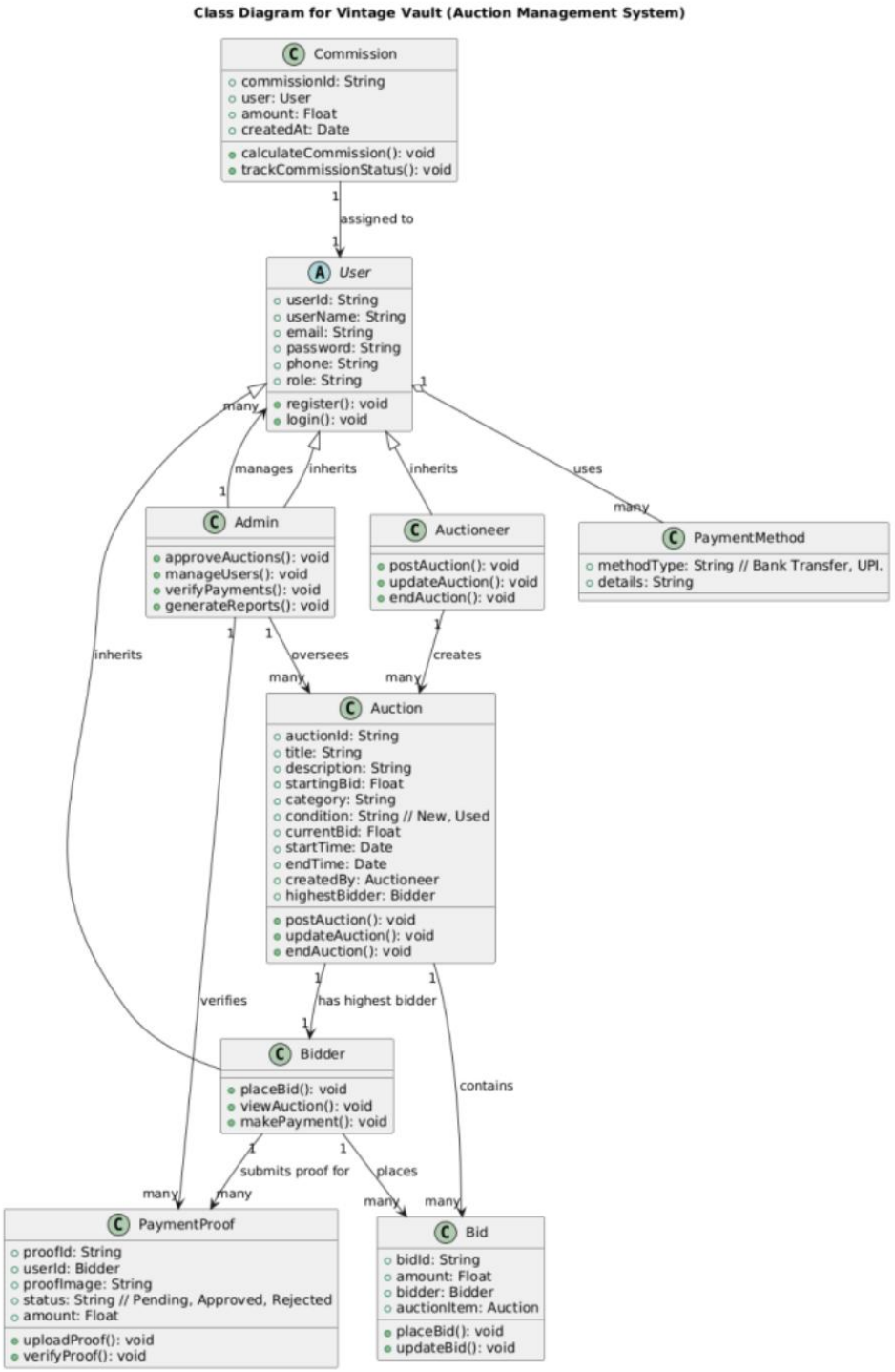


Figure 4.9 Class Diagram

4.10 ACTIVITY DIAGRAM

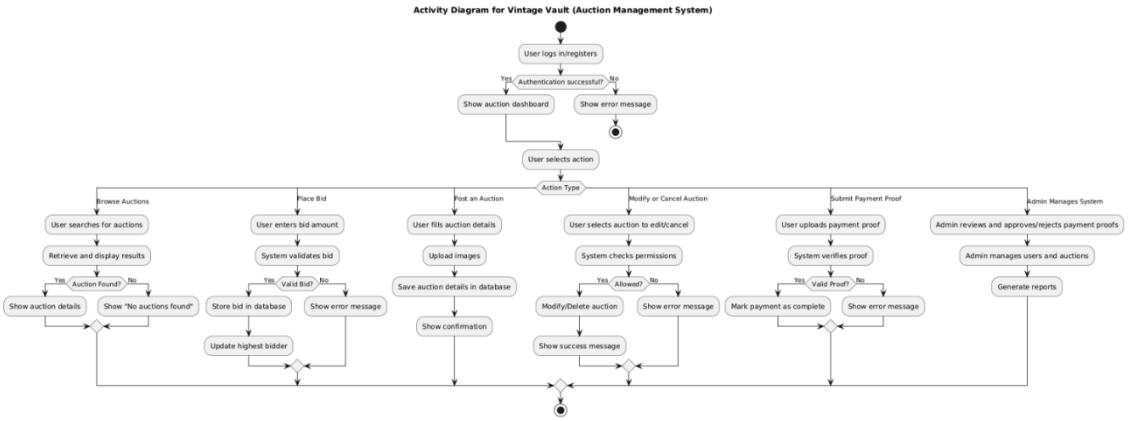


Figure 4.10 Activity Diagram

CHAPTER 5: REQUIREMENT ANALYSIS

5.1. PERFORMANCE REQUIREMENETS

1. **Response Time**:
   The system must respond to user actions (like placing a bid or browsing auctions) within **2 seconds** under normal load.
2. **Concurrent Users**:
   The system should support **at least 500 concurrent users** without degradation in performance.
3. **Scalability**:
   The backend should scale horizontally to handle increased traffic during peak auction times.
4. **Bid Placement Throughput**:
   The system must be able to process at least **50 bids per second** during live auctions.
5. A**uction Result Finalization**:
   Auctions should be closed and winners notified within **1 second** of end time.
6. **Database Query Latency**:
   All database read/write operations should execute in **less than 100ms** under normal load.

5.2. SAFETY REQUIREMENTS

1. **Data Validation**:
   All user input (such as bid amounts, auction listings) must be validated to avoid incorrect or harmful data entries.
2. **Backup & Recovery**:
   The system must perform **daily database backups**, and allow data recovery within **30 minutes** of failure.
3. **Auction Integrity**:
   Once an auction starts, its rules (end time, starting bid) must be locked and **cannot be altered**.
4. **Session Timeout**:
   Users must be automatically logged out after **15 minutes of inactivity** to prevent unauthorized access.

5.3. SECURITY REQUIREMENTS

1. **Authentication & Authorization**:
   - All users must authenticate using **email/password with JWT tokens**.
   - Role-based access control (RBAC) must enforce permissions for **Admin, Bidder, and Auctioneer**.
2. **Encryption**:
   - All data in transit must be encrypted using **HTTPS (TLS 1.2+)**.
   - Sensitive data (e.g., passwords) must be stored using **bcrypt hashing**.
3. **Data Access Control**:
   - Users can only access their own data (bids, auctions, payment proofs) unless they have admin privileges.

5.4. SOFTWARE SYSTEM ATTRIBUTES

3.4.1 Usability: Software is reusable and does not deform with repeated use.
3.4.2 Availability: The system must always be accessible.
3.4.3 Accuracy: Software free of errors that satisfies the client's needs and specifications.
3.4.4 Maintainability: The capacity to update, alter, and repair system data and components.
3.4.5 Accessibility: The system is accessible to the administrator and a large number of other users, but each user's access level is restricted based on the scope of their job.

5.5 EXTERNAL INTERFACE REQUIREMENTS

5.5.1. GRAFHICAL USER INTERFACE(UI)

The **Vintage Vault** platform will offer a modern, responsive, and intuitive Graphical User Interface (GUI) for different types of users: **Bidders**, **Auctioneers**, and **Admins**. The GUI shall follow industry standards for usability and accessibility.

General Requirements

1. The interface shall be web-based, accessible via modern browsers (Chrome, Firefox, Edge).
2. The layout shall be responsive, adapting to desktops, tablets, and smartphones.
3. All views shall be implemented using HTML5, CSS3, and JavaScript (ReactJS or similar framework).
4. The theme shall reflect a vintage aesthetic, with a user-friendly design.

User-Specific Interfaces

1. Bidder Interface

a. Login/Registration Page with form validations.

b. Dashboard showing ongoing and upcoming auctions.

c. Detailed view for each auction item with bid input.

d. Payment Proof upload form.

e. Bid history and auction win summary pages.

2. Auctioneer Interface

a. Dashboard to manage created auctions.

b. Create New Auction form (with image upload).

c. Edit/Cancel auction features.

d. List of bidders per auction.

3. Admin Interface

a. Admin login panel (separate from user login).

b. Dashboard with system summary (users, auctions, payments).

c. User management panel (view, edit, deactivate users).

d. Auction moderation (approve/flag auctions).

e. Payment proof verification panel.

f. Commission tracking and reporting tools.

TECHNICAL REQUIREMENTS:

• The user interface needs to be flexible enough to adjust to various screen sizes.

• To safeguard user data, secure connection protocols like HTTPS should be utilized.

5.5.2. APPLICATION PROGRAMMING INTERFACE (API):

An interface that allows the e-learning platform to connect with backend systems, such as databases and content management systems, to manage courses and content.

1. **Base URL**: http://localhost:5000/api/v1
2. **Protocol**: HTTPS (TLS 1.2+)
3. **Format**: JSON for both requests and responses
4. **Authentication**: JWT-based token in Authorization header
5. **Rate Limiting**: 100 requests/min/user (configurable)
6. **Error Handling**: Standard HTTP response codes with error messages
7. **Versioning**: API versions via URL (e.g., /v1/)

Technical requirements:

User Authentication and Authorization

- The system must provide secure authentication mechanisms using **JWT (JSON Web Tokens)** for all user roles: **Admin**, **Auctioneer**, and **Bidder**.
- Role-based access control (RBAC) must be enforced:
    - **Admins** have full system privileges (user management, auction approval, payment verification).
    - **Auctioneers** can create and manage auctions they own.
    - **Bidders** can browse auctions, place bids, and upload payment proof.
- Passwords must be **hashed using bcrypt** before storage.
- Sessions must be validated on each request using the JWT provided at login.

Comprehensive API Documentation

- The system shall include **well-documented API specifications** covering:
    - **All endpoints** (authentication, auctions, bids, users, payments, commissions).
    - **Request parameters**: required fields, data types, and validation rules.
    - **Response formats**: status codes, JSON structure, and error messages.
- Documentation will be generated and maintained using tools such as **Swagger** or **Postman Collections**.

- Secure and Reliable Communication
- □ All communication between clients and the server must use **HTTPS (TLS 1.2 or higher)** to ensure confidentiality and integrity.
- □ Data at rest (like payment proof URLs and user profile images) must be stored securely with access restrictions.

5.6 FUNCTIONAL REQUIREMENTS TABLE

S.NO	MODULE NAME	APPLICABLE ROLES	DESCRIPTION
1	Login	Admin, Auctioneer, Bidder	**Admin:** Logs in with a secure ID/password to manage users, auctions, and reports. **Seller/Bidder:** Access respective dashboards.
2	Registration	Auctioneer, Bidder	New users (sellers and bidders) can register with the platform using required personal and auction-related details.
3	Post Auction	Auctioneer	Seller can list antique products for auction with details such as description, images, and starting bid price.
4	Modify Auction	Auctioneer	Sellers can update or modify existing product details prior to auction start.
5	Search Auctions	Bidder	Bidders can browse or search products using filters such as category, price, and keywords.
6	View Auction Details	Auctioneer, Bidder	Users can view detailed information and images of the listed antique products.
7	Start/End Auction	Auctioneer	Sellers initiate and close the auction for listed products as per the defined schedule.
8	Place/Modify Bid	Bidder	Bidders can place new bids or modify existing bids within the live auction window.
9	View Bidding Profile	Bidder	Bidders can view their bidding history and current active bids.
10	Edit Profile	Seller, Bidder	Users can edit their personal details such as name, contact info, etc.
11	Manage Users	Admin	Admin can add, delete, or update user profiles and monitor platform usage.
12	Manage Products	Admin	Admin oversees all product listings and can modify or delete them if required.
13	Manage Bidding	Admin	Admin monitors and regulates bidding activities across all auctions.
14	Create Reports	Admin	Admin generates reports related to sales, bidding activity, and user engagement for analysis.

CHAPTER 06: RESULTS & SCREENSHOTS

The Vintage Vault App successfully achieves its development goals of creating a seamless and engaging platform for vintage enthusiasts to browse, bid, and buy rare collectible items. With the implementation of advanced features such as real-time bidding, personalized recommendations, and secure payment transactions, the app is fully prepared to deliver an enhanced user experience and operational efficiency upon deployment.
Key capabilities and expected outcomes include:

1. **Enhanced User Engagement**
   - Real-time bidding updates and notifications are expected to significantly boost active user participation during auctions.
   - An intuitive UI and advanced search filters aim to enhance browsing experiences, reducing user search times by a significant margin.

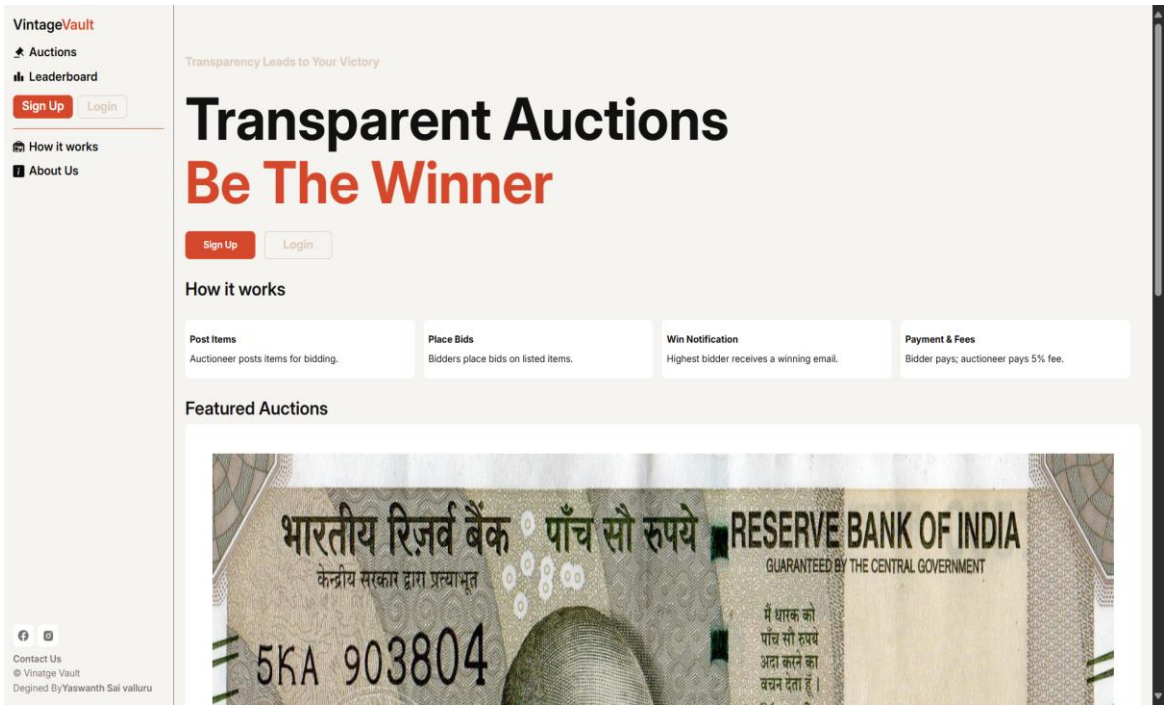
2. **Improved Auction Transparency**
   - Secure authentication and anti-fraud mechanisms are implemented to ensure the credibility of sellers and buyers, fostering a trustworthy marketplace environment.
   - Role-based access control (RBAC) has been established to efficiently separate functionalities among Admin, Auctioneer, and Bidder roles.

3. **Optimized Performance**
   - The app is designed to maintain a response time of under 2 seconds for core features, such as search and bidding, aligning with performance benchmarks.
   - A scalable architecture is in place to ensure uninterrupted service during high-traffic periods, supporting over 500 concurrent users.

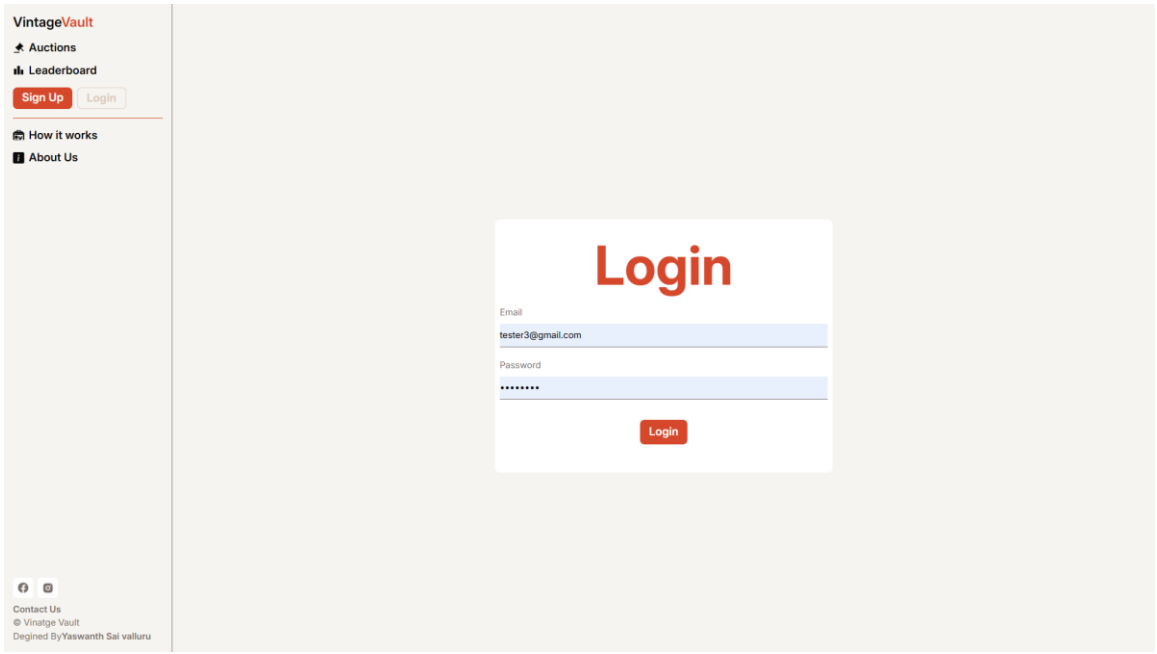
4. **Seamless Warehouse and Vendor Operations**
   - Features like automated notifications and detailed transaction logs are prepared to help vendors better track inventory and upcoming auctions.
   - Vendor-side functionalities are ready to streamline operations and improve overall auction management once the platform goes live.

User Interface SCREENSHOTS:

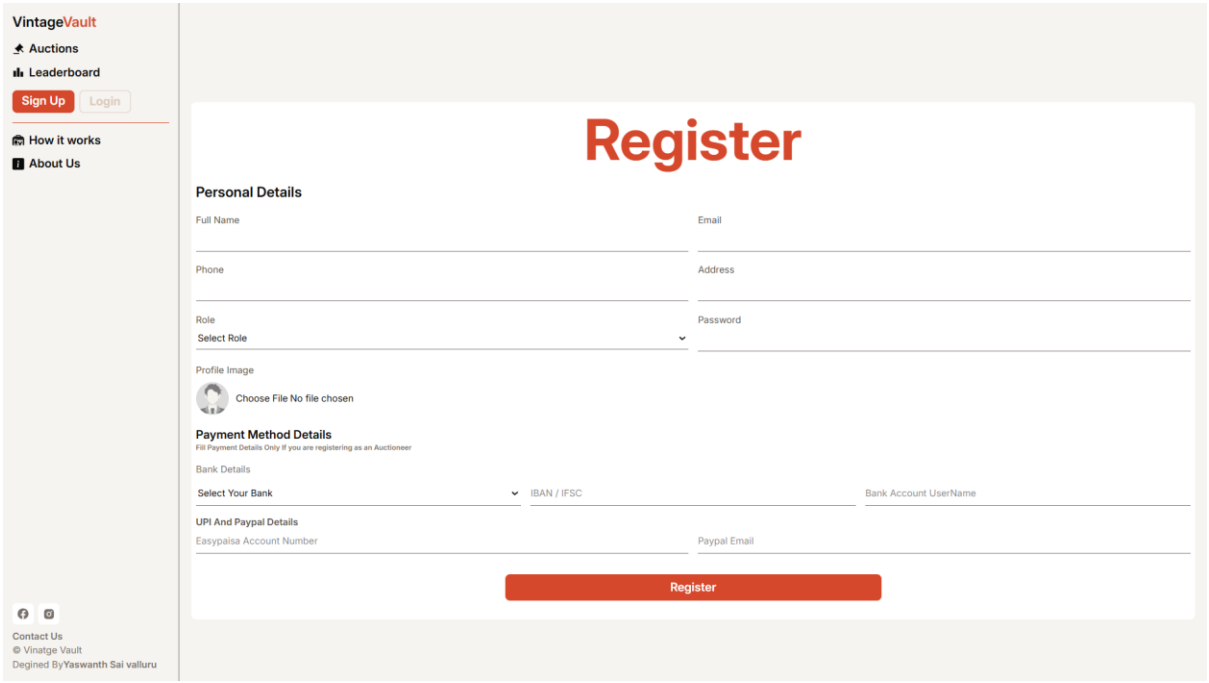
1. Home Page



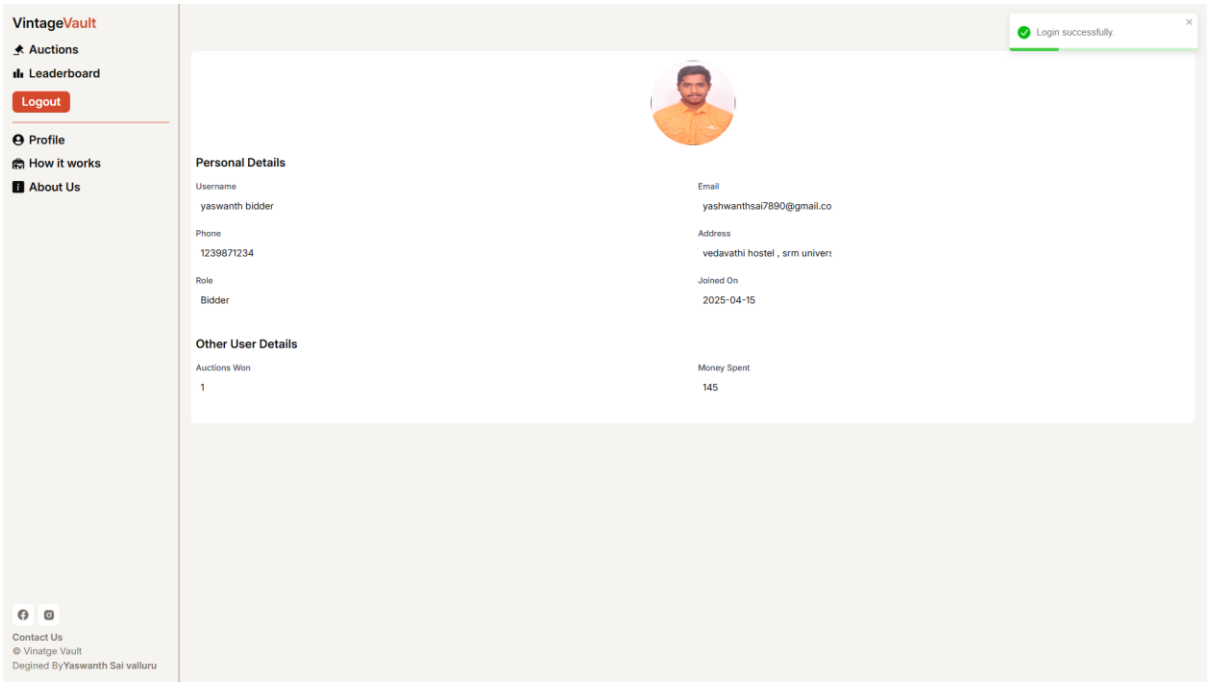
2. Login interface

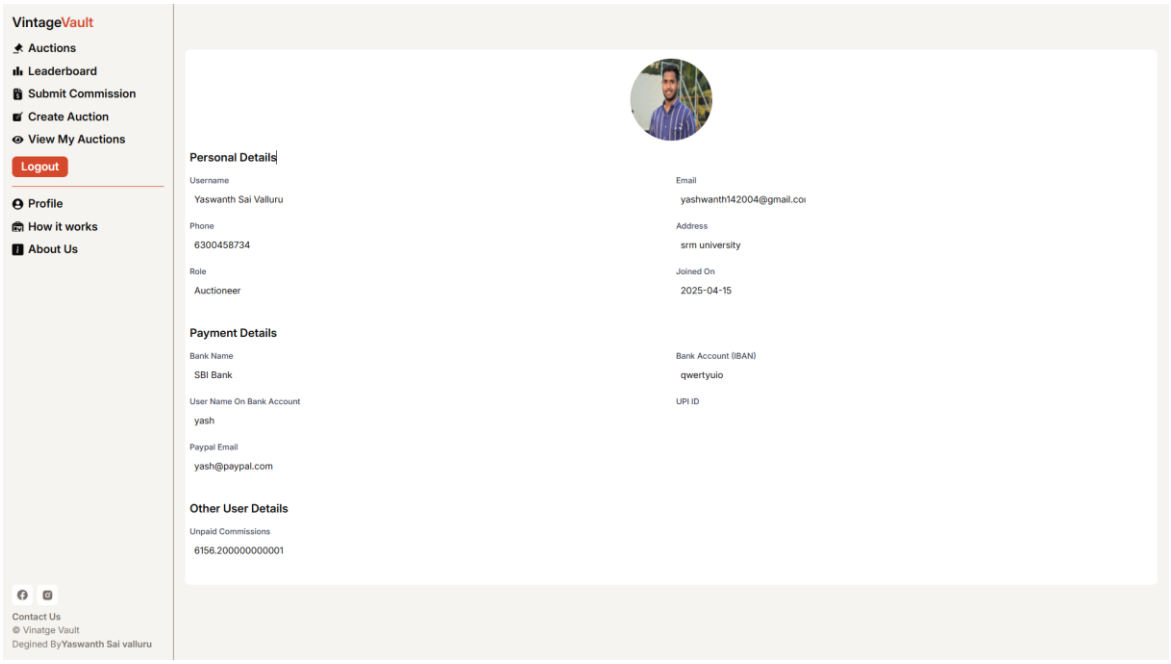


4. Sign up interface

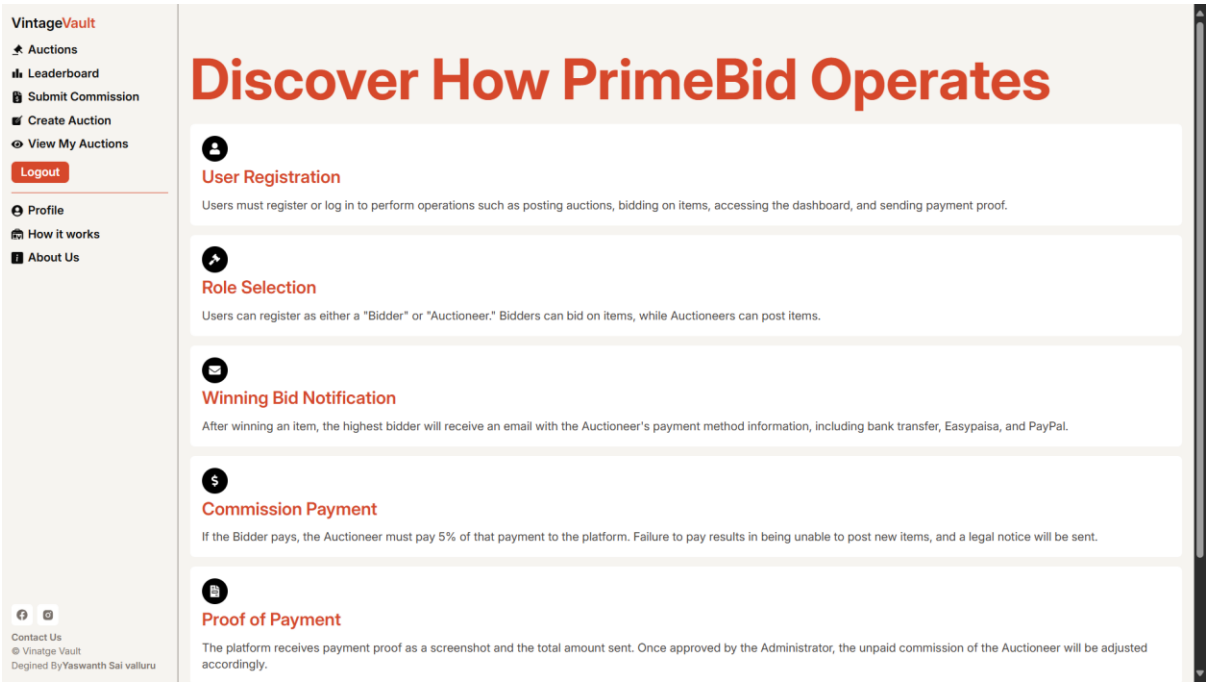


4. Profile page of users

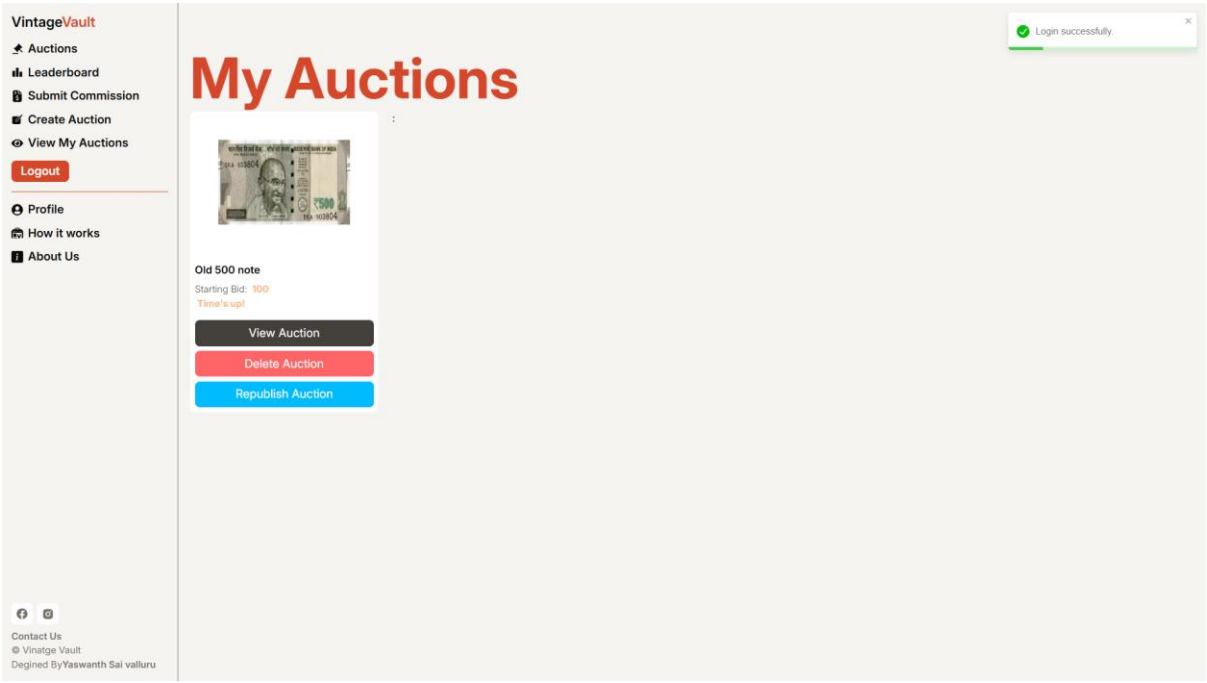




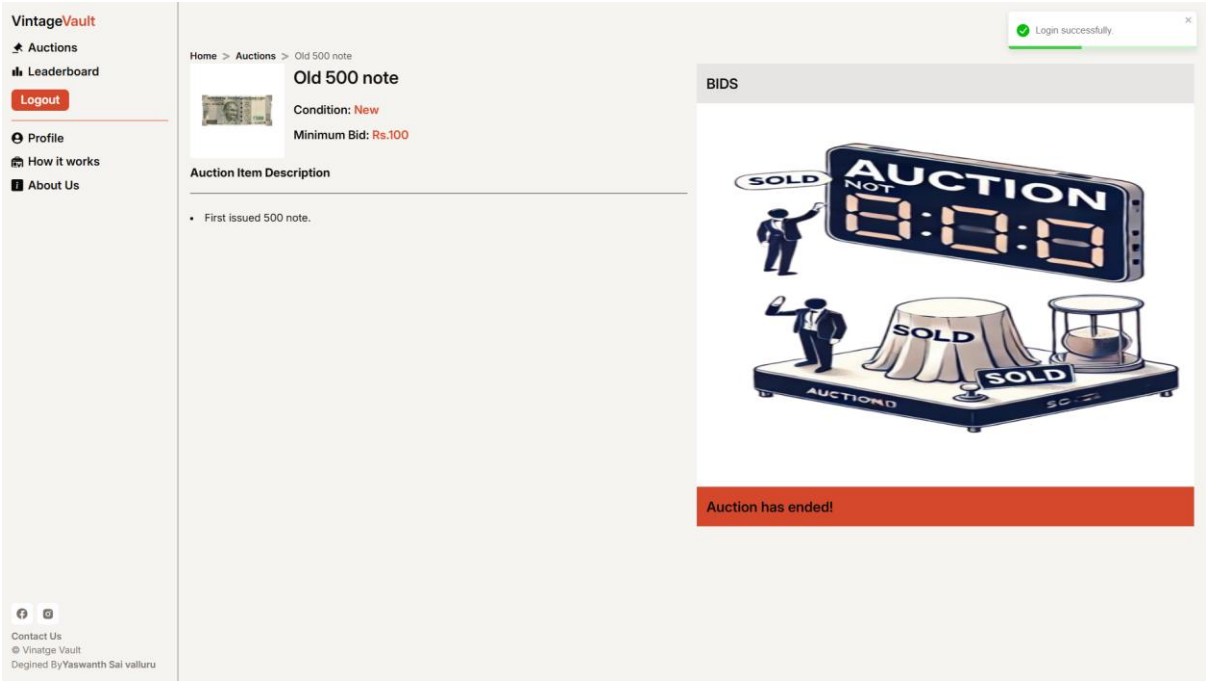
5. The working of vintage vault



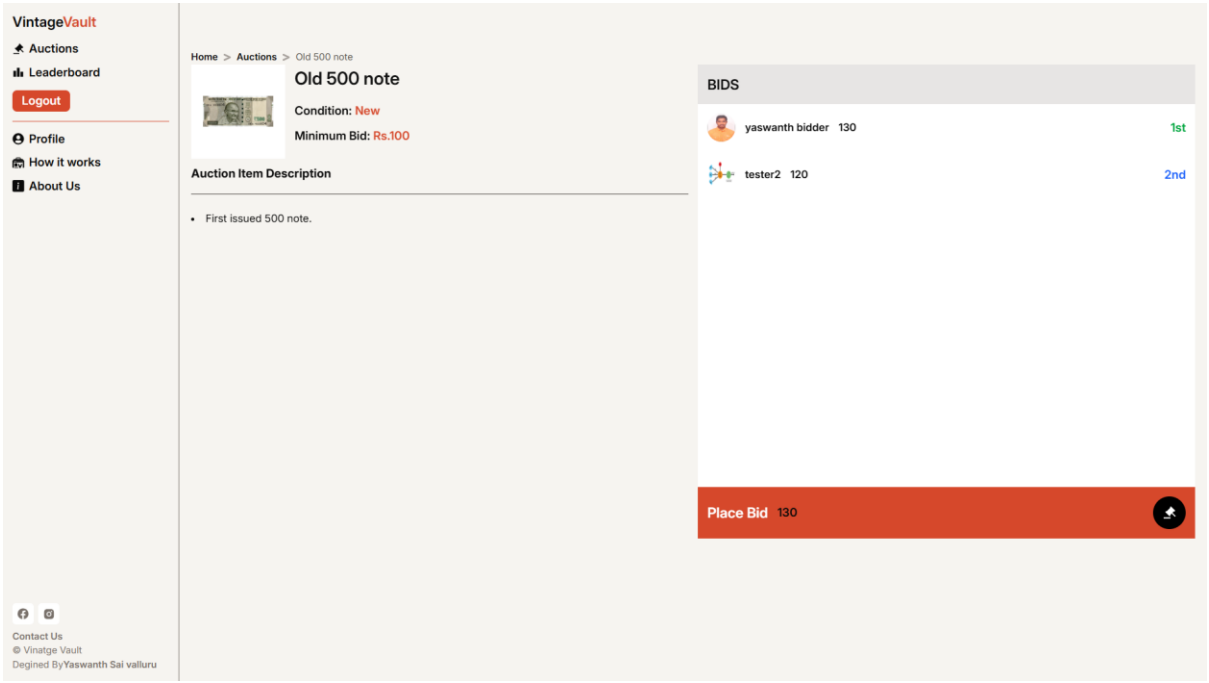
6. Auctioneer’s dashboard



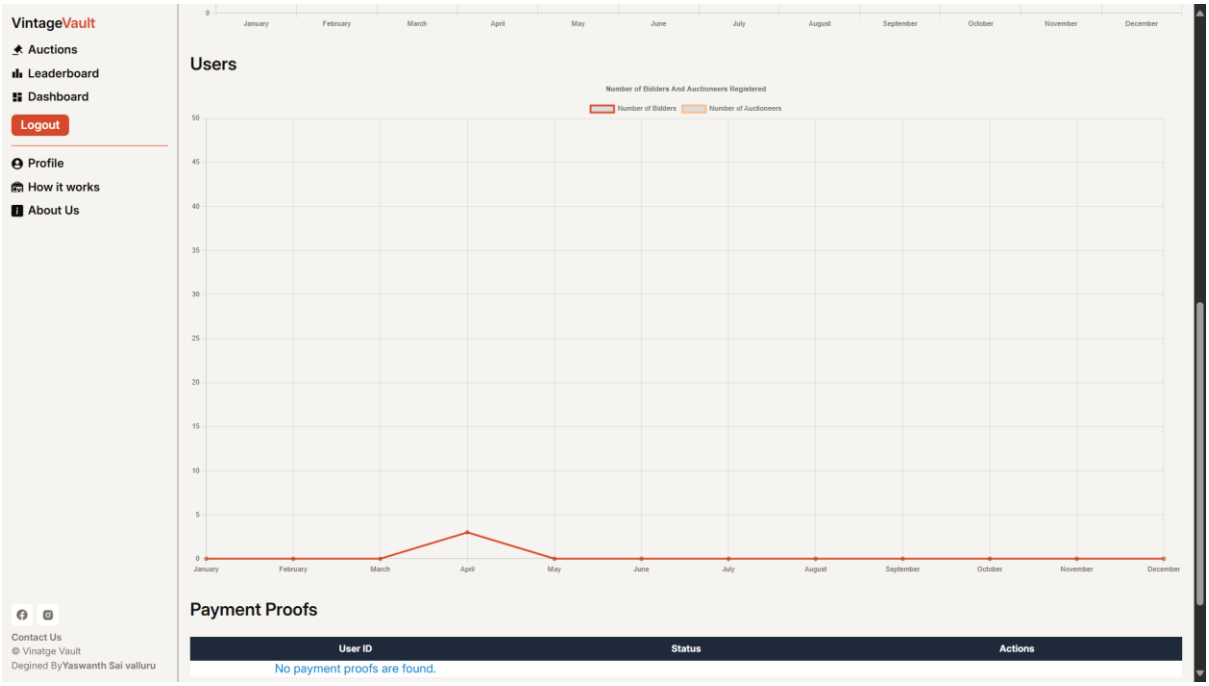
7. Bidders view of auction items



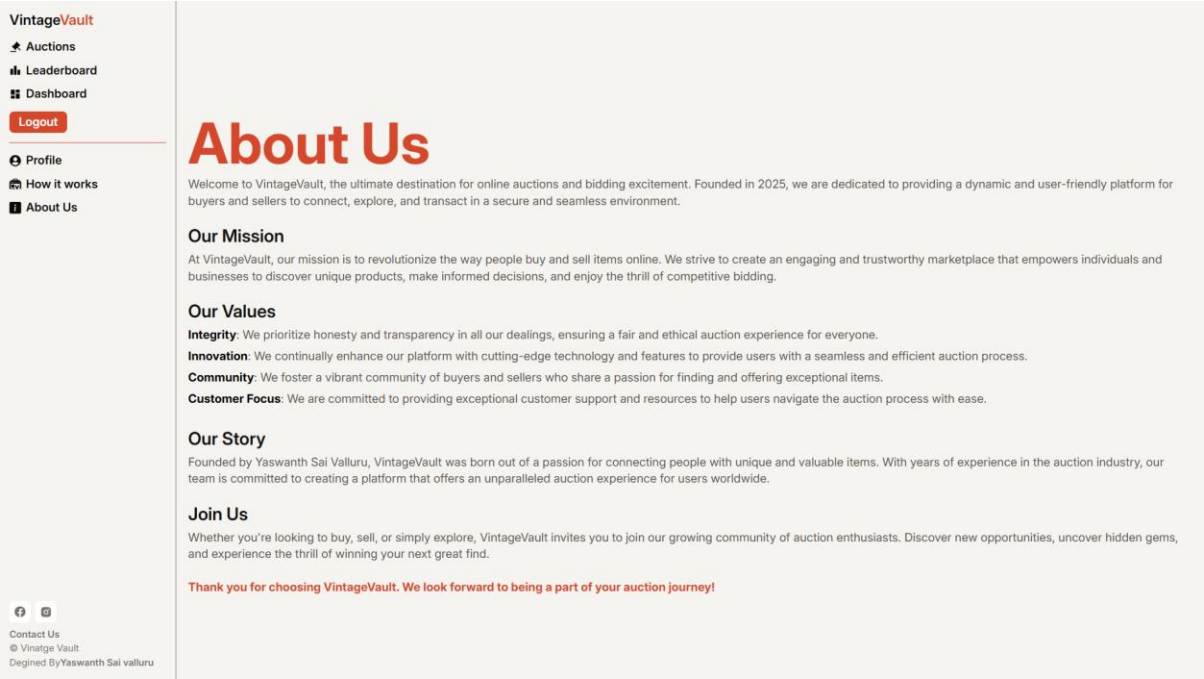
8. Real-time update of highest bidders



9. Admin dashboard



10. About us page



CHAPTER 07: CONCLUSION

The Vintage Vault App has successfully revolutionized the process of buying, selling, and managing vintage collectibles, offering a streamlined, secure, and user-friendly platform for enthusiasts and vendors alike. By automating key auction processes and leveraging real-time updates, the app has significantly enhanced operational efficiency and user satisfaction.

The incremental development approach enabled continuous improvement by incorporating user feedback, ensuring the delivery of a high-performing system. The use of modern technologies such as React.js, Node.js, Express.js, MongoDB, and Tailwind CSS has resulted in a scalable, robust, and visually appealing application. Additionally, secure payment integrations and role-based access controls ensure the platform’s reliability and trustworthiness.

Potential future enhancements for the app include AI-driven personalized recommendations, predictive analytics for bidding trends, live auction streaming, and integration with blockchain for secure provenance tracking of vintage items. These additions would further elevate user engagement, improve platform efficiency, and solidify the app's position as a leader in the Vintage auction marketplace.

In conclusion, the Vintage Vault App is a scalable, innovative, and efficient solution for the vintage trading community, ensuring transparency, security, and a seamless user experience. With its ability to adapt and grow, the platform is well-positioned to meet the evolving demands of its users while fostering long-term growth and success.

CHAPTER 08: FUTURE WORKS

As technology continues to evolve, numerous opportunities arise to enhance and expand the capabilities of the Vintage Vault Auction Platform, offering more seamless, engaging, and secure experiences for users. One major direction involves the integration of **AI-powered recommendation systems** that can intelligently suggest antique items to bidders based on their interests, past activity, and bidding history. This personalization can greatly improve user satisfaction and platform engagement.

In addition, **advanced data analytics** can be utilized to offer deeper insights into bidding patterns, popular product categories, and user behavior. These analytics can empower sellers to refine their listings, improve pricing strategies, and optimize auction timings. Administrators can also use this data to monitor platform performance and detect unusual activities.

The incorporation of **blockchain technology** presents an exciting opportunity for enhancing trust and transparency in the bidding process. Immutable transaction records and smart contracts could ensure that each auction is conducted fairly, and that payments and transfers are secure and verifiable.

To further increase user immersion and interactivity, future versions of the platform may explore **AR (Augmented Reality)** features, allowing users to visualize antique items in their physical space before placing bids. This can bridge the gap between physical and digital experiences, making online auctions feel more tangible and real.

Finally, building a **community-driven ecosystem** with discussion forums, user ratings, and seller-buyer feedback mechanisms can encourage trust, engagement, and knowledge sharing. Through continuous innovation, collaboration, and the integration of emerging technologies, the Vintage Vault Auction Platform can redefine how antique trading is conducted in the digital age, setting new standards in online auctioning.

CHAPTER 09: REFERENCES

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