Sri Lanka Institute of Information Technology

Project Proposal

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1 Client Background

Our client for this project is Mrs. O.S Amarasinghe, a vintage item collector and auction enthusiast based in Uppsala, Sweden. Mrs. Amarasinghe is also a newcomer to online auctions, willing to launch a startup by catering to the problems she has experienced.

As a newcomer to the vintage auction scene, her vision for this platform aligns with the growing demand among vintage enthusiasts globally, making her the ideal client for bringing this promising solution to fruition.

We are thrilled to collaborate with Mrs. Amarasinghe and help her passion and vision to deliver a refined, user-friendly web application connecting vintage enthusiasts worldwide. This project presents an exciting opportunity to explore and address the unique needs and challenges of vintage item auctions in the digital age.

Contact Information:

- Email address: amarasinghe.eranga@gmail.com

2 Problem and Motivation

Problem Statement:

- **Lack of Specialized Online vintage Platforms**: The current landscape lacks efficient online platforms tailored specifically for vintage item auctions, which fail to connect all relevant stakeholders - auctioneers, bidders, vintage item experts, and repair specialists - in one convenient marketplace.
- **The limitations of General Auction Sites**: Existing general auction sites lack the specialized features and services required to facilitate smooth transactions and interactions within the niche vintage market.
- **Challenges Faced by Vintage Enthusiasts**: Vintage item enthusiasts encounter difficulties in finding suitable platforms, expertise, and services tailored to their unique needs, hindering their ability to engage effectively in the auction process.
- **Lack of Education for New Entrants**: When newcomers enter the vintage market without sufficient education about vintage items, there is a notable absence of platforms that provide them with the necessary knowledge and resources to understand and navigate the intricacies of vintage item auctions effectively.

- **Lack of Well-Developed Bidding Mechanisms**: Many existing platforms suffer from defects in their bidding mechanisms, leading to inefficiencies and frustrations among users during the auction process.
- **Difficulty in Finding Repair Specialists**: Vintage item owners struggle to locate qualified repair specialists who possess the necessary expertise to restore these valuable artifacts to their former glory.

Motivation:

- **Development of All-in-One Solution**: Our motivation lies in developing an all-in-one online vintage item auction management system to address the identified gap in the market.
- **Comprehensive Education Platform**: By providing a comprehensive education platform within our auction management system, empowering newcomers with the knowledge and understanding of vintage items necessary to participate confidently in auctions.

- **Enhanced Bidding Mechanisms**: By implementing well-developed bidding mechanisms, we aim to streamline the bidding process and improve the overall user experience, making it more accessible and intuitive for both experienced collectors and newcomers alike.
- **Integration of Repair Services**: We are committed to addressing the challenge of finding repair specialists by integrating a network of trusted professionals within our platform, enabling users to easily access the expertise needed to maintain and restore their vintage items.
- **Empowering Vintage Enthusiasts**: Ultimately, our motivation is to empower vintage enthusiasts with the resources, support, and expertise they need to fully immerse themselves in the world of vintage item auctions, fostering a thriving ecosystem of passionate collectors and experts.

3 Aims and Objectives

3.1 Aim:

To become the premier online platform for vintage item auctions, fostering a vibrant community by connecting auctioneers, bidders, vintage items experts, and repair specialists in a seamless, healthy, and user-friendly environment for vintage item auctions.

3.2 Objectives:

- **Build a dedicated platform:**
  - Develop features and functionalities specifically tailored for vintage items and their unique characteristics.
  - Facilitate seamless interaction and communication between all stakeholder groups (auctioneers, bidders, experts, specialists).
  - Offer comprehensive user profiles, listing management, and bidding functionalities.
- **Empower newcomers:**
  - Create an educational platform within the system, offering resources and guides on vintage items, auctions, and best practices.
  - Implement intuitive user interfaces and clear instructions to encourage confident participation.
  - Facilitate mentorship opportunities connecting newcomers with experienced collectors and experts.
- **Enhance bidding experiences:**
  - Design transparent and secure bidding mechanisms, preventing manipulation and ensuring fair competition.
  - Offer multiple bidding options and real-time updates to improve user engagement and satisfaction.
  - Provide clear auction rules and dispute resolution mechanisms for a secure and trusted environment.
- **Integrate repair services:**
  - Establish a network of vetted and qualified repair specialists with diverse expertise in various vintage item categories.
  - Develop a user-friendly interface for users to easily connect with and request repair services.

- Ensure transparency and trust by showcasing specialists' qualifications, reviews, and ratings.

- **Comprehensive Auctioneer and Bidder Profiles:**

  - Implement **comprehensive and customizable auctioneer profiles**, showcasing experience, reputation, and past auction history.
  - Provide **detailed bidder profiles**, including bidding history and interests.
  - Allow both auctioneers and bidders to personalize their profiles to build trust and credibility within the community.

- **Additional Focus:**
  - Develop a **comprehensive administrative management dashboard** to grant administrators full control over platform functionalities, user management, data analysis, and security settings.
  - Implement a **customer care portal** to handle user inquiries, resolve issues and offer support resources efficiently.

4 System Overview

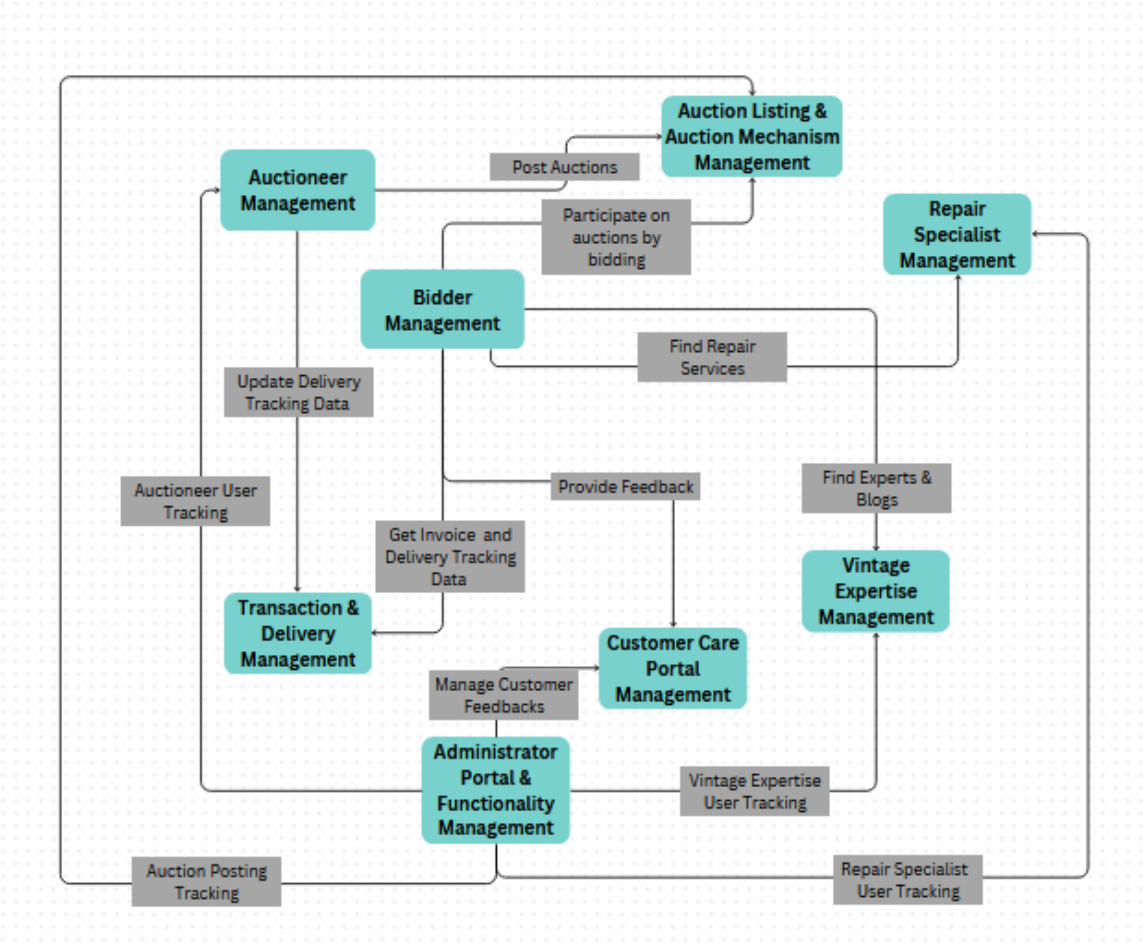


Figure 4 1- System Overview Diagram

4.1 Primary Stakeholder's Access to the System

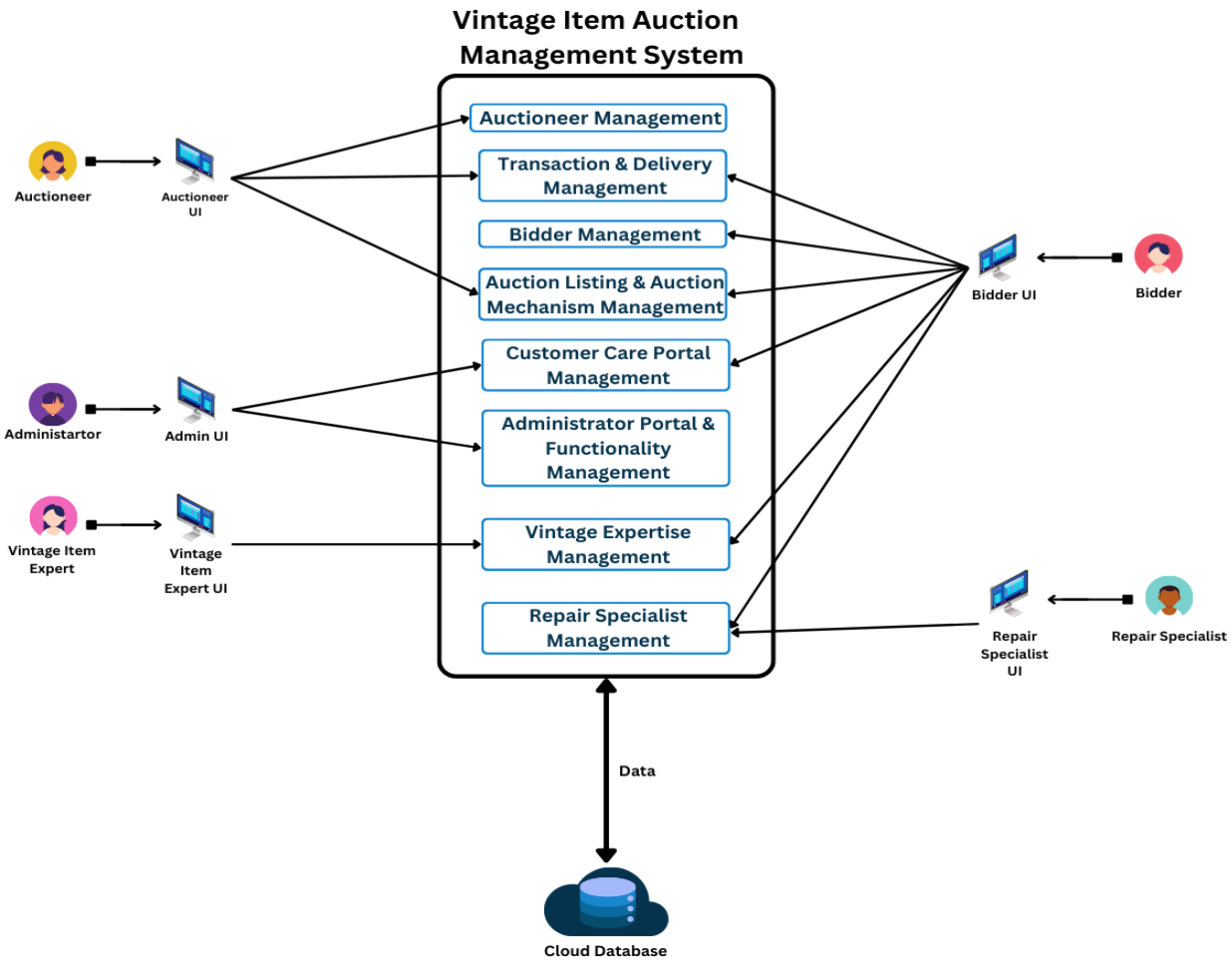


Figure 4 2 – primary stakeholders

4.2 Administrator Portal & Functionality Management

The admin portal in this system is the only platform for managing and tracking the operations of the platform. It is Designed for administrators to get interacted with auction & user management in an efficient way, furthermore this portal provides administrators tools to ensure the authenticity, security, and efficiency of the auction platform. Admins will be able to review and terminate auctions, analyze user engagement and financial metrics by generating reports, user data tracking & the admin account creation for scaling purposes. The admin portal plays one of the most critical roles in managing a fair and trustworthy auction environment for bidders.

4.2.a Functional Requirements:

Review and Termination of Auctions:

1. **Auction Review:**
    - Administrators can view all posted auctions in a designated "ongoing Auctions" section.
    - The system displays auction details like titles, descriptions and starting and ending dates.
    - Administrators can flag auctions for further review based on pre-defined criteria (e.g., prohibited items, inappropriate content, missing key information).
2. **Auction Termination:**
    - Administrators can terminate flagged auctions after review and determination of violation.
    - Terminated auctions will be deleted to maintain authentic auction listing.

User Account Management:

1. **User Search and Filtering:**
    - Administrators can search and filter users across all categories (Auctioneers, Bidders, Vintage Experts, Repair Specialists) using various criteria (e.g., username, email, activity level).
2. **User Account View and Modification:**
    - Administrators can view individual user profiles including contact information.
    - Administrators can modify user account status.

3. **Account Termination and Deletion:**
    - Administrators can permanently terminate and delete user accounts across all categories for reasons like rule violations, inactivity, or suspected fraudulent activity.
    - Deleted accounts are inaccessible and data may be anonymized or purged based on data privacy regulations.

Financial and User Analytics:

1. **Financial Reporting:**
    - The system generates reports on financial metrics such as revenue from and 5% of platform commission.
    - Data can be exported in pdf format for further analysis.
2. **User Engagement Reporting:**
    - The system provides reports on user metrics such as user counts and categories.
    - Data can be exported in pdf format for further analysis.

Administrator Account Management:

1. **Multiple Administrator Accounts:**
    - The system allows creation of multiple administrator accounts.
2. **Secure Account Creation:**
    - Administrator accounts can only be created through a secure backend dashboard interface, not publicly accessible.
    - Strong password policies and multi-factor authentication are enforced to ensure account security.

4.2.b Related Non-functional Requirements:

Performance:

- **Response time:** System should load on-going auction details and search results in real time.
- **Throughput:** The system should handle high volumes of concurrent requests from administrators without performance degradation.

Maintainability:

- **Modular design:** System should be modular and well-documented for easier code updates and maintenance.
- **Configuration management:** Tools and processes for managing system configuration changes.

Data Privacy:

- **Compliance with regulations:** System should comply with relevant data privacy regulations.
- **Data deletion:** Procedures for deleting user data when accounts are terminated.

Security:

- **Access control:** Only administrators can create another administrator account.

Reliability:

- **System uptime:** The system should achieve highest availability since it is the only management access for the whole system.

4.2.c Technical Requirements:

- **Frontend Framework:** This framework will manage the administration interface and enhance user experience within the system.
- **Backend Framework:** This framework will be responsible for handling backend logic through APIs.
- **User data encryption:** Passwords will be hashed and salted prior to storage for enhanced security.
- **Cloud Database:** The cloud infrastructure will manage data accessibility securely from anywhere.

4.3 The Customer care Portal Management

The customer care portal management system facilitates efficient handing of customer feedback and FAQ management. It allows bidders to provide feedback regarding their auction experience, item quality or any customer suggestion or complaints via a user-friendly interface. Admin is provided an interface to manage all feedback submissions and to solve problems quickly. Admin generate the feedback report using bidder submitted feedback and create FAQ section using generated feedback report. For that, a search bar is implemented to facilitate quick retrieval of relevant FAQs. Admin should review, create, update, and delete FAQs in the resulting admin portal. This solution streamlines bidder support operation improves user experience and empowers usage admin to manage customer feedback and FAQs.

4.3.a Functional Requirements:

- **Submit feedback.**
  feedback may be their suggestion, their complains or their reviews. System provides separate feedback submission forms for them. Bidder should be submitting feedback easily capturing necessary details such as bidder's name, email, a contact number.
- **Allow admin to review and manage all submitted feedback.**
  After the bidder submit the feedback form, that form is displayed with a dedicated . Admin should be managing all feedback submissions and timely resolution of disputes or issues.
- **Generate feedback report.**
  Admins generate the feedback report, using all the submitted feedback. This report is useful for facilitate system improvements and update the FAQ section.
- **Offer bidder access to a FAQ section.**
  The system provides bidder to access to a FAQ section. With that reducing the need for direct support interactions and improving bidder satisfaction. And admin include the search bar within the FAQ section to bidder to quickly find relevant details based on their specific queries.
- **Provide the admin portal for managing FAQs.**
  FAQ section should be able to change accordingly feedback report. provide an administrative interface within the admin portal for manage the FAQs. Admin should create, delete, update as want them.

4.3.b Related Non-functional Requirements:

- **Usability**

Provide a user-friendly interface for customers to submit feedback offer users easy access to a well-organized FAQ section.

- **Performance**

Ensure the feedback submission process is efficient and responsive, minimizing load times and delays. Ensuring quick retrial of FAQ information through efficient database.

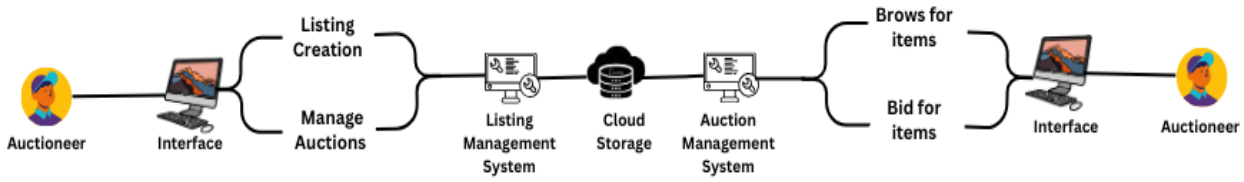
4.3.c Technical Requirements:

- **Database**
  Implementation of a robust database system capable of efficiently storing and managing customer feedback submissions and FAQ entries.
- **Reporting tool**
  Use PDF format to generate and reports based on feedback data analysis.
- **Frontend Technologies**
  Includes validation for the feedback form to ensure data accuracy and completeness.
- **Backend**
  It throws API endpoints, enables communication between front-ends, facilitates data exchange and functionality implementation.

4.4 Listing and Auction system management

The Listing and auction management function is a system that is designed to manage the listings and the listed auctions between the auction creators and the bidders. It empowers auction creators to showcase their prized vintage items through detailed listings to attract potential buyers and enhance the overall bidding experience. Meanwhile this function provides bidders with a transparent and engaging platform to discover and bid on the items they desire. Within the Auction and Listing Management system, the Auction System performs a crucial role in automating the closure of auctions once their designated durations have elapsed.

Function Overview Diagram



Function Overview

4.4.a Functional Requirements:

- **Listing Creation** - Provide auction creators with the ability to create detailed listings for their vintage items using input of essential information such as item title, description, category, condition, starting price, auction duration, and upload high-quality images and multiple images of their vintage items to showcase the item from various angles.

- **Manage Listed Auctions** - Provide dashboard for auction creators to manage them. auctions, including editing listing details, updating auction status, and closing auctions. When if necessary. Allow to monitoring bid activity including tracking current bid. Amounts and bidder information.

- **Bidding Functionality** - Provide bidders with the ability to place bids on listed items and display real-time updates on current bid amounts, the leading bidder, and remaining time.

- **Auction Management** - Automatically concludes the bidding process when the

designated time expires, removes the items, and marks them as sold out. When an auction concludes, send immediate notifications to the winning bidder, detailing the item won, final bid amount. And the system stores the details of the three highest bidders as potential fallbacks in case the winning bidder declines the payment confirmation.

- **Report Generation** - The system should generate reports on auction activities, including bid information, bid prices and winning bidders' information and auction item associated. With it.

4.4.b Related Non-functional Requirements:

- **Performance** - The system should be responsive and able to handle concurrent user interactions efficiently, even during peak times of activity. Page load times for listing creation, viewing, and bidding should be optimized to ensure a seamless user experience.
- **Usability** - The system should have an intuitive and user-friendly interface for both auction creators and bidders, ensuring ease of navigation and efficient access to functionalities.
- **Scalability** - The system should be scalable to accommodate growth in the number of users and listings over time without sacrificing performance.
- **Reliability** - Users can rely on the Listing and Auction Management function to access and interact with auction listings and participate in bidding activities. this ensures that the system is available and accessible whenever users need it.
- **Security** - The system should use encryption techniques to secure data transmission and storage, preventing unauthorized access or data breaches.

4.4.c Technical Requirements:

- **Frontend Technologies** - Implement modern frontend technologies to create an interactive and user-friendly interface for auction creators and bidder. Responsive design for seamless experience on various devices.
- **Backend Framework** - Select a secure backend framework to handle server-side logic, request processing, and database interactions.
- **Authentication and Authorization** - Implement secure authentication mechanisms to verify user identities and manage access control to listing and auction management functionalities.

4.5 Auctioneer Management.

In this auctioneer management functionality, it refers to the overall coordination of activities related to vintage items auctioned by the auctioneer. The auctioneer management functionality includes everything related to the account creation of the auctioneer. After registered auctioneers log into their auctioneer portal, they can view their profile data and information about their auction history such as highest bid received or the highest number of bidders using search and filter methods. And they can modify or delete their respective accounts if necessary. Lastly, auctioneers can generate auction summary reports using information such as winning bid prices for the respective auctions and details about winning bidders. This will supply informative data and analysis on the trends and outcomes of past auctions to the auctioneers.

4.5.a Functional requirements:

- **Auctioneer Account Creation**

When a new auctioneer wants to join our system, they need to provide important information. This includes their company name, the industry they work in, descriptions of the items they want to sell, their first name, last name, email addresses, password, mobile phone numbers, address, and country. Once they register, they can start posting their auctions.

- **Auctioneer User Profile Management**

Once auctioneers are verified, the system must let auctioneers log into their auctioneer portal. In this portal, they must have the ability to view their profile data. This portal must empower them to actively manage their profiles, facilitating the process of updating their information and the deletion of their respective accounts.

- **Auction History Management**

Verified auctioneers should have access and retrieve their historical auction data. The system must provide access to auctioneers to analyze their past auction history information such as the highest bid received or the highest number of bidders using search and filter methods.

- **Generate Auction Summary Report**

Auctioneers must be empowered to generate a summary report using specific details related to the items they have auctioned. This report includes information

such as winning bid prices for the auctions conducted and details about successful bidders for those specific auction events.

4.5.b Related Non-Functional Requirements:

- **Security**-This system should ensure the confidentiality of the employee data like personal information of the auctioneers by preventing unauthorized access or modifications by validating the user authentication.
- **Usability** -The system should be easy to use with a user-friendly interface with efficient performance.
- **Accuracy and Data Integrity** – To minimize errors and inconsistencies that could affect the auction system, the accuracy of all data submitted to it like the details of winning bids and bidders, personal details of auctioneers.
- **Scalability** – The system should handle an increasing number of auctioneers at the same time without generating any errors and as we use cloud-based data base the auctioneers can access their portals from anywhere, any device.

4.5.c Technical Requirements

- **User Authentication and Data Validation -** ensuring that only authorized auctioneers can access the auctioneer portal by adding user authentications to the system. And Implementing data validation points which help to ensure the data which entered to the system.
- **Front End Framework** – Compatible with all browsers which provide seamless user experience.
- **Back End Framework -** Using a secure backend framework to handle the logic of the system and database interactions.

  Cloud and Backup Storage - Auctioneers can access their portal from anywhere, any device and the system should have backup plans so that the Auctioneers' data can be safe

4.6 Bidder Management System

A bidder management system that will incorporate the ability to create user accounts, allowing bidders to sign up and save products to their Wishlist for later usage. The solution will also make it easier to view bidder user accounts and past bidding activity, giving users insightful information about their auction activity. To ensure data accuracy and personalized experiences, users will be able to change their information and choices. To further increase user control and flexibility, the system will include Wishlist item removal and account closure. Lastly, the system will have the ability to produce bid summary reports, which will provide stakeholders with insightful data and analysis on bidding patterns and results.

4.6.a Functional requirements:

- **Create bidder user accounts**

With the use of this feature, users must be able to create customized profiles with their email address, password, and username, among other important details. Users that successfully register must have access to extra services on the platform, such as managing their preferences, tracking bidding activity, and participating in auctions.

- **Add an item to the Wishlist.**

This functionality must let users bookmark items they are interested to bid on or revisit later. When browsing auctions, users must have the option to add their favorite items to their Wishlist.

- **View respective bidder user accounts**

With the help of this feature, users must be able to view information about them, including usernames, email addresses, and account preferences.

- **View previous bidding history.**

This functionality must enable users to access a comprehensive record of their past bidding activity, including details such as auction IDs, bid amounts.

- **Update respective user information or preferences**

This feature must empower users to modify details such as their username, email address, password, and communication preferences as needed.

- **Close respective bidder user accounts**

This functionality must enable users to delete their account to discontinue their participation and remove their personal information from the system.

- **Remove an item from Wishlist.**

This functionality must allow users to manage their Wishlist by removing items they no longer wish to track or bid on. Users must have the option to easily remove items from their Wishlist with a simple click or tap.

• Generate bid summary report.

This feature must allow bidders to generate bid summary reports, based on key information such as their bidding history, winning bids, and details of auctioneers who placed auctions.

4.6.b Related Non-functional requirements:

• User friendliness

Bidding history will be presented in a user-friendly manner, with the option of filtering to help users quickly find and review their past bids.

• Performance

The user experience should be smooth and responsive with short responses for all interactions regarding Wishlist and user profile management.

• Reliability

There will be no errors or inconsistencies between the most recent user activities and auction outcomes as shown in the bid history and bid summary reports, which will be accurate and updated.

• Maintainability

Users will have the ability to maintain their respective user profiles easily.

• Security

The system will encrypt sensitive user information, secure authentication mechanisms for user profiles, and restrict user permissions appropriately.

4.6.c Technical requirements:

• User authentication

This facility will be implemented to verify the identity of users during account creation and login processes. This ensures that only authorized users can access the system and perform actions.

• User information or preferences management

This functionality will provide users to manage their personal information and preferences such as viewing, updating profile details and account deletion.

• Front-end framework

This framework will create responsive and interactive user interfaces that align with modern designs and enhance the overall user experience.

• Back -end framework

This back-end framework will develop the server-side components and logic of the system. Furthermore, this framework will handle tasks such as user authentication.

4.7 Vintage Expertise Management

Vintage expertise management special and unique service supplies from our website when compared to the other similar competitive vintage auction websites. It is built up to enhance the user experience when interacting with vintage experts. Therefore, the main purpose of this function is to facilitate appropriate communication between bidders who are looking for advice or guidance on vintage items and vintage experts in the vintage industry.

To have a robust profile management system vintage experts can create their user account by providing the necessary information to register and can establish their bios that showcase their qualifications according to the path of the expertise. Expertise categorization such as furniture, jewelry, clothing, and arts has been supported to users to find blogs easily. Within the search bar, they can find blogs about their preferred field of vintage items.

Moreover, vintage experts have a blogging section to display their research guides, articles, and educational resources according to the areas they have expertise. It helps to attract potential clients, engage with bidders, and maintain vintage expert's credibility for our website. mainly .it encourages the bidders to seek knowledge by contacting vintage experts providing an attractive blogging space. Also, here after making a booking, they can directly communicate with vintage experts through email. All these functionalities give the outcome of a perfect vintage expertise management system.

4.7.a Functional Requirements:

- **User Account Creation:** Users should be able to register an account on the platform as Vintage Experts. This involves providing necessary information such as name, contact details, expertise areas, etc.

- **Profile Creation**: Once registered, experts should be able to create and customize their profiles. This includes adding details such as bio, profile picture, areas of expertise, experience and certifications.
- **Profile Editing**: Experts should have the ability to edit and update their profiles as needed to reflect changes in their expertise or contact information.
- **Search and Filter Functionality**: Bidders should be able to search for experts based on these specified expertise categories. The system should allow filtering of experts based on user requirements.
- **Blogging Platform Integration:** The system should allow a blogging platform where vintage experts can create and publish articles and bidders can view those blogs.
- **Content Management**: Experts should have the ability to manage their blog content, including creating, editing, and deleting posts.
- **Making bookings for consultations**: When clicking the "make an appointment" button, the system should facilitate communication between the expert and the bidder. This could be directly connected to the email of the expert.
- **Invoice generation**: Vintage experts should send an invoice of the booking including the scheduled time, name, and email to the bidder.

4.7.b Related Non - Functional Requirements:

- **Performance:** The system should allow for fast registration and profile creation to provide a seamless user experience.
- **Scalability:** The platform should be capable of handling a large number of expert profiles as the user base grows over time.
- **Security:** Ensure strong security measures are in place to protect user data, including encryption of sensitive information.
- **Usability:** The categorization interface in blog space should be easy to use, allowing experts to easily specify their areas of expertise without confusion.
- **Flexibility:** To ensure that it can adjust to changes in the vintage expertise field over time, the system should allow the inclusion of new expertise updates as needed.
- **Accuracy:** Ensure that the system accurately reflects the expertise of experts to facilitate relevant adjustments to the bidder's needs.
- **Content Management**: Make sure the platform has strong content management capabilities that make it simple for experts to write, modify, and arrange blog entries.

- **Reliability:** To enable seamless interactions between bidders and experts, communication must be dependable, guaranteeing that messages are delivered on time and consistently.

4.7.c Technical Requirements:

- **Search Engine Optimization (SEO):** To increase the exposure of knowledgeable material and draw in more prospective bidders, optimize the blogging platform for search engines.
- **Database:** Store user account information including username, email, and password. The necessary tables support function within the vintage expertise management system. They provide a structured approach to storing and managing data related to user profiles, expertise categorization, blog posts, and bookings.
- **Frontend Technologies:** User registration form including name, email, and password for an expert's profile. Search functionality for users to find experts based on expertise categories. Blog post creation interface with content, and images and display booking button to bidders
- **Backend:** User authentication API endpoints for registration, login, and logout. API endpoints for creating, editing, and retrieving blog posts.
- **Reporting tool: Use** PDF format to generate the inquiries of bidders after making a booking.

4.8 Payment and Delivery Handling System

The payment and delivering handling system is a designed to manage financial transactions between our bidder and our auctioneer. The payment processing such as Credit cards and Debit cards handled in this system. After the bidder makes the payment, he can download his payment details pdf. The delivery system may use the Wins bidder email address and send each delivery process. such as your item on the way and item delivered.

4.8.a Functional Requirements:

Winner Notification: Selected the final three bidders using the bidding system. then auctioneer should be able to inform the winning bidder of the item 's details, such as name price description, wins data and time payment instructions.

Winner Confirmation: The winning bidder should have access to the item 's details the dashboard under the winning item record section. there displays item name, description, winning date winning price and payment button.

Payment Processing: winning bidder should have the option to make payment clicking payment button. using popup window show their details. and click the button payment button change to the processing.

Payment Record: After successful payment, previous pop-up window has a download button after payment. he can download his details include pdf and that record should be displayed in the Delivery dashboard.

Delivery Dashboard: The auctioneer should have access to a delivery dashboard the payment recodes and he can view, delete, edit, and update payment records. after informed the winner.

Delivery Process: The auctioneer must be able to change previously mentioned processing button status to the delivered. send emails for the delivery process and notify the winner of each process. such as your item on the way and item delivered.

4.8.b Related Non-Functional Requirements

Security: All payment transactions and bidder details name address, phone number, should be encrypted using strong encryption algorithms. Example (AES (Advanced Encryption Standard) standard encryption protocols (e.g., SSL/TLS))

User Experience: The bidder and auctioneer interfaces should be easy to navigate, also facilitating e client communication and transaction management.

Reliability: The system should be reliable, ensuring that all transactions and communication processes occur without errors or interruptions.

Scalability: The system should be designed to handle a potentially large number of wins bidders, and wining items.

4.8.c Technical Requirements

Payment Gateway Integration: Integrate with a reliable and secure payment gateway to facilitate seamless payment processing, ensuring the safety of financial transactions.

Database Structure: Design and implement a robust database structure to store winning bidder and item details, bidder information, payment records, and auctioneer dashboard data. Then the data will be stored using MongoDB. MongoDB is a NoSQL database. it is document oriented database.it stores the data in the form of the JSON structure. we store these documents in a collection. reason for the use that it is uses a flexible document-based data model.

Frontend and Backend Integration: Develop frontend interfaces for bidders and auctioneers, and integrate them with backend systems to enable seamless data exchange

and functionality. Frontend build using Reacts and tailwind CSS for styling. The backend build using Node.js. Then middleware support I will use express.

Dashboard Functionality: Develop the Delivery dashboard with features for viewing, editing, updating, and deleting payment records after inform the wins bidder, as well as change the processing button status to the delivered and using wins bidder email address auctioneer can informed each delivery process.

Email Notifications: after successful payment auctioneer can change payment button status to the (processing or delivered) and inform each items delivery process. I use the bidder system register email address. I inform every process. I can use NodeJS related nodemailer package.

4.1 Repair Specialist Management

4.1.a Functional Requirement

1.**Register function** – Provide a registration mechanism for repair specialists to sign up on the platform. Collect necessary information during registration such as name, email, contact number.

3.**Login function** – Repair specialist login to the system by using his/her username and password.

4.**Create a listing** – After registering to the system repair specialist can create a special list specifying their specialization, experiences, and skills about the vintage items. This feature allows specialists to input detailed information about their areas of expertise. By creating a list, specialists can effectively showcase their qualifications and capabilities within the system.

5.**Search function** – Implement a search function to the customer to search a specialist by specialization or a name. When customer search something system will filtering out the details according to the searched keyword and display the matching specialists.

4.1.b Non – Functional Requirements

1.**User experience** – The platform should provide a user-friendly interface for repair specialists for login, register and create a list. Page should load quickly, and navigation should be intuitive.

2**.Secuirity** – User data including personal information should be encrypted and secure. Authentication and authorization mechanisms should be in place to prevent unauthorized access to user profiles and data.

3.**Scalability** – The platform should be able to handle a growing number of repair specialists and users without compromising performance.

4.1.c Technical requirements

1.**Frontend technologies** – The user interface allowing repair specialists and user to interact. It includes web pages, forms, and menus. Designed for easy navigation and access across different devices, ensuring a seamless user experience.
2.**Backend** – The server-side component handling user requests, and data management. Responsible for user authentication, profile management, and communication between frontend and database.
3.**Database** – System must include a database handling for store and manages data such as user profiles, specialist information, and consultation details.
4.**Commucation channel** – Facilitates interaction between users and repair specialists through email, phone, ensure secure and reliable communication while protecting user privacy.

5 Literature review

5.1 Traditional Auctions

Traditional vintage auctions have more restrictions online vintage auctions. The bidder or auctioneer must be attending physically at the traditional vintage auction. Therefor only people limited to one area can participate in this. But Online auction platform able to access all global sellers and buyers. Online auction platform is the least expensive in terms of cost. Because all work is done online and there is to nothing to maintain. But offline vintage auctions have staffing requirements and need for physical venues. Therefore, they require a lot of money to maintain. Online auction platform provide convenience to participate at any time from virtually anywhere. It eliminates the need for travel. In the traditional vintage auction, those with busy schedules or who cannot easily travel to the auction venue have difficulty participating. Traditional vintage auction takes more time than online auction platform. Because when the seller or buyer involve a longer process has to be done in the traditional vintage auction. Accordingly, this we can recommend online auction platforms are more useful than traditional vintage auction.

Online Action platform	Traditional vintage auction
Expanded Reach: Online auction platform enable access to all global sellers and buyers.	**Limited Reach:** Traditional auctions are limited because who can only physically attend to them.
Time efficiency: In the online auction platform, those process can be done online and in their own home easily.	**Time consuming:** When the auctioneer or bidder involve, a longer process has to be done. Including registration, viewing periods and live bidding. For that, it takes a lot of time.
Enhanced convenience: Online auction platform provide convenience to participate at any time from virtually anywhere. Eliminating the need for travel.	**Lack of convenience:** Those with busy schedules or who cannot easily travel to the auction venue have differently participating.
Lower costs:	**Higher costs:**

In the online auction platform, all work is done online. In that case, it has lower overhead costs.	Traditional vintage auction has staffing requirements, need for physical venues etc. They require a lot of money to maintain.

There are several ways to stand out as an online operation and make our website stand out from other websites when considering online auction platform and traditional auction. Firstly, our website provides the extra knowledge, instruction and guiding for bidder to make bidding easier about the vintage items. For that, there is vintage expertise on our website separately. We have different blogs on our website regarding their experience. Bidders can look at them and contact relevant vintage expertise. And we have a repair specialist to repair the vintage items on our website. Repair specialists have a repair list. It contains the vintage items they repaired and their experience. If the bidder wants to repair the vintage item, he & she can see them and contact relevant repair specialist.

5.2 LiveAuctioneers.com

In the item's domain, online vintage auction websites provide a unique interconnection of tradition, offering bidders unparalleled entry to a wide range of items from around the world with a seamless experience.
The literature review focuses on identifying key features and pros & cons of similar systems and considering implementing these systems to enhance operations and customer satisfaction. The review will include the details and comparison between our website & LiveAuctioneers which is a Similar system, the Advantages and disadvantages of that system, and a conclusion.
The art, antiques, jewelry, types of furniture, and whole vintage domain have transformed thanks to the rise of vintage auction websites which are reconsidering how individuals interact with the vintage auction domain marketplace specifying their needs and challenges. Considering the advantages of the LiveAuctioneers website,

- Global reach- Allow collectors to find unusual vintage items that they might not find nearby easily. It increases the range of collectibles that collectors can purchase while it accesses the availability of the scope of the vintage domain.

- Convenience: The main convenience of these online vintage websites is the ability to participate in auctions from anywhere around the world regardless of their location or time zone through internet-enabled devices.

- Real-Time Bidding: This is the unprecedented and immersive experience of online auction sites compared to attending live traditional auctions. With the competitiveness of bidding, the feeling of winning and defeating their coveted items can engage with the spirit of bidding wars. It also gives an equal chance to auction and submit all bidders to give the items to the owner who deserves it.

Disadvantages of this LiveAuctioneers website are,

- Authenticity concerns - Authenticity concerns are a major problem of most online websites. In LiveAuctioneers website also has this danger related to the authenticity of purchasing items.

- Shipping costs and logistics - Foreign payment transactions on vintage websites may include extra costs and logistical challenges, especially regarding the responsibility of shipping and handling.

- Technical issues - Bidding procedures may be sometimes negatively affected because of technological issues and connectivity problems. When a bidder faces these difficulties while they bid, it might hinder bidding and annoy consumers.

Considering the pros & cons of similar competitive websites, we can identify the differences between the systems and how to build our system by avoiding their shortcomings. With a seamless bidding system and specific modules for monitoring auctioneers, bidders, experts in vintage items, and repair specialists, it offers an all-in-one administration platform. When comparing other vintage auction websites and our website, there are some strategies to differentiate and set our website apart from other competitors like LiveAuctioneers.

As one of the special functionalities, we create a vintage expertise management system to contact vintage experts and get guidance for bidders to the best bidding experience. If there is a new person who would like to bid but never has experience, they also can take the knowledge and guidance from any vintage experts by making a booking for consultations. Also on our website, there is a blogging space integration for vintage experts, and vintage experts can share educational knowledge about vintage items including articles, research, and blogs related to vintage domains. After reading them bidders can choose a vintage expert according to their preferences. On the other hand, it is like targeting to attract potential clients and encourage them. Secondly, repair specialist management is another highlighted function when compared to the other websites. This function supplies a service to people or current bidders who need to repair their vintage items from a knowledgeable repair specialist who is in touch with this field. Users can search for them and contact them directly through

a dedicated section of repair specialists based on their area of expertise. The platform ensures an improved user experience from bidding to item delivery with high-quality integrated customer care feedback systems, FAQs, and administrative features. Therefore, this website mainly focuses on being one of the best places for consumers of vintage items, providing one location for all their requirements and interests.

6 Methodology

6.1 Software Development Life Cycle

A Software Development Lifecycle (SDLC) consists of different phases or models that guides the development process from planning to deployment. Each SDLC model represents a different approach to software development, with its own set of methodologies, processes, and best practices. [1]

6.1.a Method – Agile Software Development Methodology

Agile software development is a software development approach that emphasizes flexibility, feedback-driven development, customer satisfaction and collaboration. This agile software development methodology is focused on a short iterative software release cycle. [2]

We have chosen to use Agile software development to ensure the success of our project due to several compelling reasons such as Continuous Feedback Loop, Timely Delivery of Key Features .Agile enables us to engage with users and stakeholders throughout the development process by regularly delivering increments of functionality This approach facilitates continuous feedback, ensuring that the auction platform meets the unique needs and expectations of vintage collectors, sellers, and administrators. By prioritizing features based on their value to users, Agile allows us to focus on delivering the most critical aspects of the auction platform early in the development process. As a summary and justification, we have adopted Agile software development for our online vintage auction management system project to leverage its flexibility, feedback-driven approach, and emphasis on delivering value to users efficiently.

6.1.b Requirement Gathering and Analysis

Requirement Gathering and Analysis is a process of identifying, understanding, and documenting the specific needs and expectations of all stakeholders involved in the project. Getting the right requirements in the development process is one of the most important tasks. [3]

Requirements Gathering and Analysis methods.

1. **Surveys and Questionnaires** - Distribute surveys or questionnaires to an audience of vintage enthusiasts, Auctioneers, and bidders and collect data on user preferences, expectations, and desired features for the auction system.
2. **Observational Research -** Observe and interact with existing vintage auction platforms to understand their system behavior, preferences, and weak points. Use observed results to build the design and functionality of the new auction management system.
3. **Brainstorming -** Brainstorming sessions with stakeholders, development team members, and experts of these systems.

Justification – Using surveys, observational research, and brainstorming sessions in our project offers an excellent approach to gathering requirements and analysis them. Surveys and questionnaires enable us to collect quantitative data on user preferences efficiently, ensuring that our system aligns with the needs of users of the system. Observational research provides us to understand real-world user behaviors and challenges, guiding us in designing a user-friendly and intuitive platform. Also brainstorming sessions with gathered requirements improve collaboration and creativity among stakeholders, leading to the generation of innovative ideas and solutions.

6.1.c Design

The design phase includes a detailed analysis of the system which we have collected in the requirement phase. This is one of the most essential phases in the development life cycle of a system because here the logical designing of the system is converted into detailed blueprint. This includes defining the software architecture, data structures, user interfaces, and other technical specifications.

Design Methods -

1. User Interface Design
   - Wireframing - Creating wireframes allows us to create design visual elements of the auction system such as layout, color schemes and graphical elements.
   - Prototyping -This helps to simulate the functionality and flow of the system efficiently allowing users of the system to check the system before implementation.
   - Responsive design - This helps to implement responsive design principles ensuring that the platform is accessible and usable across a variety of devices and screen size

2. Use Case Modeling - This method involves identifying, documenting, and modeling the various use cases that represent the interactions between users and the system. Use case modeling helps to capture the functional requirements of the system and define its behavior in terms of user goals and actions.

Justification - In our online vintage auction management system, we use various UI design methods and Use Case Modeling to ensure a user-friendly, responsive, and functional platform. Wireframing helps to visualize layout and graphical elements, while prototyping allows us to test functionality before implementation. Responsive design ensures accessibility across devices. Additionally, Use Case Modeling captures system interactions, guiding design decisions and validating requirements. Together, these methods enhance communication, foster collaboration, and ensure the platform meets user needs effectively.

6.1.d Deployment (Integration methods)

Deployment (Integration methods)

The objective of the deployment phase in the software development life cycle is delivering the final product to the customer in a live production environment. After the product deploys, the product is ready for the customers to use [4]

Deployment methods

- Continuous Integration (CI)
  Continuous Integration is a process of integrating the changes of the code frequently and automatically. [4]
- Continuous Deployment (CD)
  Continuous Deployment refers to delivering the system to a production environment automatically. [4]

Continuous Integration and Continuous Deployment (CI/CD)

It is a process which helps to avoid integration conflicts, detect and fix bugs early, improve feedback loop and by that we can accelerate the delivery of the SDLC cycle and deploy it to the production without errors. [4]

- Implement a version control system.
  A version control system is used to manage the code. It helps to manage the team members, track changes, and revert to previous versions. [5]

Justification

As we are collaborating with 8 members in our ITP project, we have a high chance of getting conflicts. Therefore, we use CI/CD deployment method in our system by that we can detect issues early, improve collaboration among team members and improve the

quality of the code as we can get rapid feedback if the code changes. Then we can reduce the risk of deployment and it helps in delivering our system to the client on time, within budget. Also, as we are using GitHub Version control systems in our system, we can reduce the chance of getting conflicts while in development. By using GitHub, we can keep track of every modification done by each member including creation of deletion of files. Also, by branching the project each member can work simultaneously and independently from each other on the same project. [4] [5]

6.1.e Maintenance

The maintenance phase can be called as the most important part of the software development lifecycle of every system. After the installation of a system, the tasks of maintaining, improving, and maintaining the system with maximum efficiency are included. The maintenance phase of SDLC is a very important phase as our system is used by users in large numbers and updates in real time. In this proposal we emphasize the importance of SDLC and explain how critical it is to ensure the robustness, lifetime and efficiency of the system being developed.

Methods

1. Corrective maintenance - The standard, traditional type of maintenance is corrective software maintenance. When a piece of system malfunctions, especially through bugs and defects, corrective software maintenance is required. These need to be fixed right away since they may have a significant effect on the system's overall functionality.

2. Adaptive maintenance - Adaptive software maintenance addresses evolving technology as well as software-related norms and guidelines. These consist of hardware, cloud storage, operating system updates, etc. Our system needs to adjust when these modifications are made in order to correctly satisfy the new specifications and keep functioning effectively.

3. Perfective maintenance - The goal of perfective software maintenance is to make essential adjustments to the program by deleting or adding elements that are superfluous or ineffective. System is kept current through this technique even when user needs and the market shifts.

4. Preventive maintenance - Anticipating future needs to extend the desired life of your software is known as preventative software maintenance. This includes implementing the required updates, modifications, adaptations, and more. Preventative software maintenance can take care of minor problems that might not seem important now but could eventually grow into more serious difficulties. These are referred to as latent faults, and to prevent them from becoming effective faults, they must be found and fixed. The chosen techniques

for SDLC maintenance are supported by academic research and empirical data, and they are in line with industry best practices. Using these approaches, we hope to create a strong maintenance architecture that guarantees our system's continued dependability, performance, and flexibility over the course of its lifetime.

6.1.f Testing

Testing is a major aspect of the software development lifecycle that ensures the quality, reliability, and functionality of a software product. It involves systematically examining and evaluating a system to identify faults, errors, or inconsistencies between expected and actual results. Testing includes unit, system, acceptance and integration types of testing and we use all the types except integration testing. [6]

1. Unit testing

   Unit testing is a software testing method that concentrates on examining individual units or elements within a software system.

2. System testing

   System testing is a subset of software testing that checks the overall performance and functionality of a whole software solution that is fully integrated.

3. Acceptance testing

   Acceptance testing is a way of testing software to determine if it's acceptable.

Justification

Testing makes sure that our auction management system's functions and capabilities operate as planned. This contains functions including item listing, bidding, and payment processing. Testing makes our system free of errors, inconsistencies, and defects. This could include minor issues like display lags or larger faults that interact with the system’s essential operations.

6.1.g Tools & Technologies

Tools	Technologies
Redux- Global state management	**React JS** - JavaScript (JS) Library for building Frontend
Figma- UI/ Prototyping & Wireframes	**Node.js** - JS runtime environment
Postman- API testing & Deployment	**Express.js**- Framework for web applications using Node.js
VsCode- Integrated Development Environment	**MongoDB Atlas** - The fully managed cloud database service MongoDB Atlas is offered by MongoDB and provides a scalable and adaptable way to store and query data without having to worry about maintaining infrastructure.
Vite- React Application build tool	
Heroku- Application Deployment	

GitHub: GitHub is a web-based version control system that allows for collaboration, code review, and project management. it is popular for hosting repositories and sharing code. The reason for using GitHub is GitHub is a provides the student resource pack for student developers.

Redux: Redux is an open-source JavaScript library primarily used for managing application state in complex web applications. It is commonly associated with React applications. It is particularly popular in large-scale applications where managing state across multiple components and complex interactions becomes challenging. While it introduces some overhead due to its setup and boilerplate code, it provides significant benefits in terms of state management and predictability.

Postman: Postman is an API development tool that use to design, test, and debug APIs more efficiently. It provides an interface for sending HTTP requests to a server, receiving responses, and inspecting the results without a frontend. This ultimately help developers to save time and ensure the quality of their APIs.

Vite: Vite offers a modern and efficient development experience for building web applications, with a focus on speed, simplicity, and extensibility.

Figma: Figma is a cloud-based, versatile and collaborative design tool that is widely used by designers and design teams for creating user interfaces, prototypes, and interactive designs.

VsCode: Visual Studio Code is a versatile and powerful code editor that caters to the needs of individual developers, teams, and organizations across various programming languages

and platforms. Its extensive features, customizability, and strong community support make it our choice for development.

Heroku: Heroku provides a powerful platform for deploying and managing web applications, offering ease of use, scalability, flexibility, and a wide range of features to support modern development workflows.

MERN (Mongo DB, Express, React, Node): MongoDB, Express.js, React.js, and Node.js form the MERN stack, providing a comprehensive solution for building full-stack web applications. The MERN stack is known for its flexibility, performance, and scalability. Since we are a group of beginner developers who are focusing on building a real-time application, MERN stack is the best choice for us because of its supportive community and Realtime nature.

6.1.h Gantt Chart

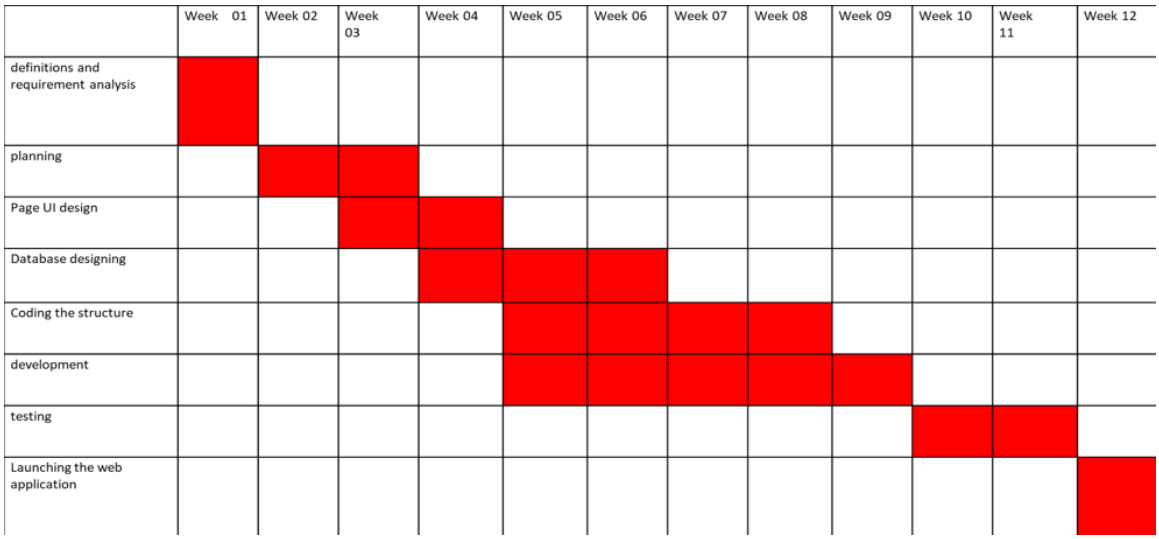


Figure 6 1-Gantt chart

6.1.i Work Breakdown Structure

Student Id	Tasks
IT22305350 - Rajapakse P.H.Y. L	• Listed single auction page with Bidding mechanism User interface development and report generation functionality. • Listed single auction page Back-End development. • Home page User Interface development.

	• Listed Auction items page Front-End development with search functionality. • Listed Auction items page Back-End development. • Creating database. • Implementing the create, update, read, delete Functions for the Auctioneer and the Bidder with search functionality. • Methodology introduction • Requirement gathering and analysis in methodology. • Design in methodology. • Function overview diagram. • Listing and Auction management system
IT22886354- Nirasha F	• Vintage expert's portal user interface development. • Vintage expert's back-end development. • Implementing the create, update, read, and delete Functions for the Vintage experts with search and invoice-generating functionality. • Creating database. • LiveAuctioneers.com website in literature review. • Vintage expertise management.
IT22306418- Madinu V.G.A	• Customer care portal User Interface Development • Customer care portal Back-End Development • Implementing the create, Update, Read, Delete Functions for the admin and bidder with search and report generating functionality.

	• Traditional Auctions in Literature review. • Customer care portal management. • Creating database
IT20633004- L.R.S.L Nissanka	• Notify the items detail to winning bidder. • Winning bidder can check the details and access the payment method. • Generate the payment details report. • Auctioneer can manage that data. Implementing the create, Update, Read, Delete Functions. • Creating database. • Winners inform and winners notify user interface development.
IT22005144-Tharuka R.M.S	• Repair Specialist portal user interface development. • Repair Specialist back-end development • Implementing the create, update, read, delete Functions for the Repair specialist with search and invoice generating functionality • Maintenance in methodology • Repair specialist management
IT22326522- Perera W.P.M.A.N	• Auctioneer portal user interface development. • Auctioneer portal back-end development. • Implementing the create, delete, update and read functions for the auctioneer with search and report generating functionality. • Creating database. • Deployment in methodology. • Auctioneer Management.
IT22320582- Jayasundara D.W.S	• Bidder portal user interface management.

	• Bidder portal Back-End development. • Implementing the create, delete, update and read functions for the bidder with search and report generating functionality. • Creating the database. • Testing in methodology. • Bidder management.
IT22332608 - Liyanage M.I.H	• Admin portal User Interface Development • Admin portal Back-End Development • Implementing the create, Update, Read, Delete Functions for all the users and Auctions & provide relevant charts & Reports. • Creating the database. • Client Background • Problems and Motivations • Tools & Technologies • Aims & Objectives • System Overview Diagrams • Administrator Portal & Functionality Management

7 Evaluation Criteria

The main objective of the system is to facilitate smooth user experience of vintage item auctions. Many measurements will be taken to test the usability, functionality and effectiveness of this system. The goal of the evaluation methodology is to find any issues by testing functionality, usability, security and user acceptance.

Feasibility of proposed solution: We have checked the outlined system overview and technical specifications should demonstrate the feasibility of the proposed platform within the timeframe and resources. Attention will be paid to whether the scope aligns with team capabilities.

Completeness and clarity of requirements: The functional and non-functional requirements must capture the capabilities needed for the system. They should be detailed, clear, avoiding ambiguity.

Appropriate technical specifications: The technical specifications should outline appropriate technologies and architectures for implementing the required functionalities and meeting the non-functional needs like functionality, usability etc.

1. Functionality Testing

- System and integration testing will verify all user stories and requirements are correctly implemented.

2. Usability Testing

- User interface and UX will be evaluated through heuristic analysis and user testing. Issues like complexity, consistency, navigation will be assessed.

4. Security Testing

- Comprehensive security checking will be done for logins and securer routing.

5. Browser & Device Testing

- Cross-browser compatibility will be ensured across modern browsers like Chrome, Firefox, Safari. Responsiveness will be validated on mobile and desktop form factors.

6. User Acceptance Testing

- Key user requirements will be tested on a staging environment. Feedback from test users will be incorporated iteratively until acceptance criteria are met.

Project planning and timelines: A high-level project plan and timelines will be used to showcase effective planning for delivery within constraints. Milestones and deliverables should be defined.

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