

WebAuctionApp

Application Design Document

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Introduction

The application will be a platform for a Web Auction System. It will allow users to act as either buyers or sellers on the platform. Any individual can register as a buyer or seller to take part in auctions. As a buyer, the user can browse the application for interesting items put for auction and place bids on items – following all the rules of engagement put forth by the admin and the seller. Buyers can also check their bid status.

As a seller, the user can put up items for auction specifying auction details such as minimum bid amount, minimum bid increment amount, etc.

In the case where an item is successfully auctioned, an automated confirmation email will be sent to the buyer and seller with each other's contact information to work out the payment and delivery of the item.

Scope

The Web Auction System will act as a means of auctioning antiques, historical artifacts, furniture, jewelry, limited edition products of interest, and other valuables by sellers to the highest bidder. Three types of users are expected to be interacting with the application –

1. Buyer: Someone looking to bid on products.
2. Seller: Someone looking to auction products.
3. Admin: System administrator with the highest privileges to manage system.

System Level Architecture

The system will follow a simple and straightforward client-server architecture: the three-tier architecture; consisting of the presentation tier (user interface), logic tier (functional business logic), and the data tier (relational database management).

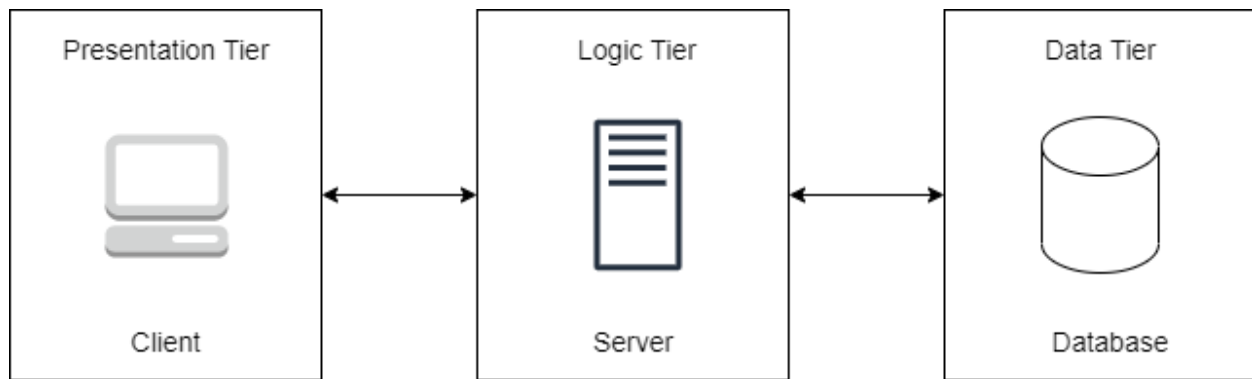


Figure 1. System Architecture

Presentation Tier

This is the front-end layer and the interface with which users will interact directly. It resides on the topmost level of the three-tier architecture and displays information related to all the services. The users interact with this layer using a web browser. This layer communicates back and forth with the application layer.

Application Tier

This is the processing and logic layer. It sits in the middle of the three-tier architecture. It controls all the core functionality and processes of the application. This is where the logic is implemented. This layer communicates back and forth with the presentation layer and data layer.

Data Tier

This is the backend layer and resides on the lowest level of the three-tier architecture. This is where the database is housed, and this layer provides access to stored data. This layer communicates back and forth with the application layer.

System Architecture Design

The following class diagram shows how the system requirements will be translated to implementation, and how different objects relate to each other on an architecture level.

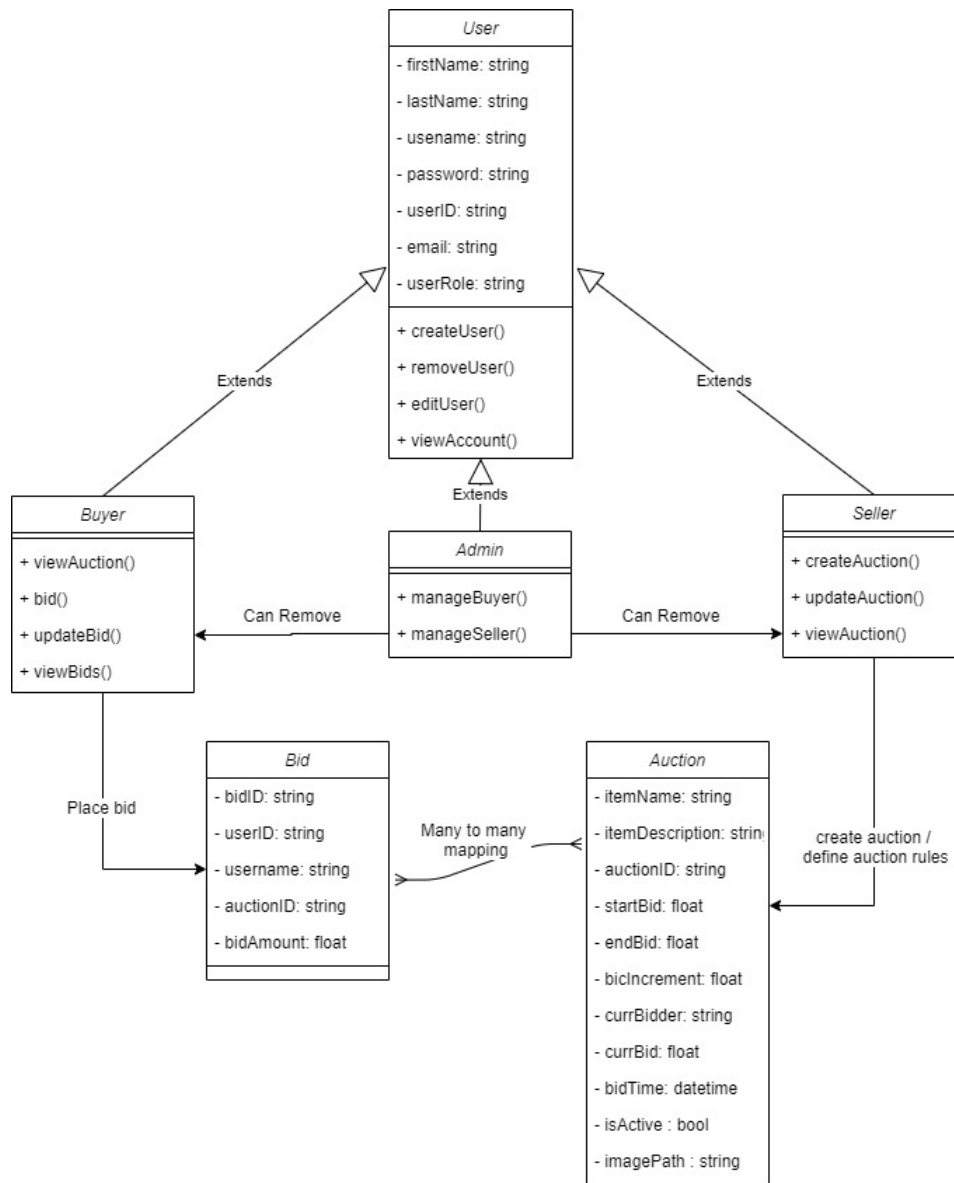


Figure 2. System Class Diagram

Data Level Architecture

Database Design

Data will be stored as shown in the following relational database model.

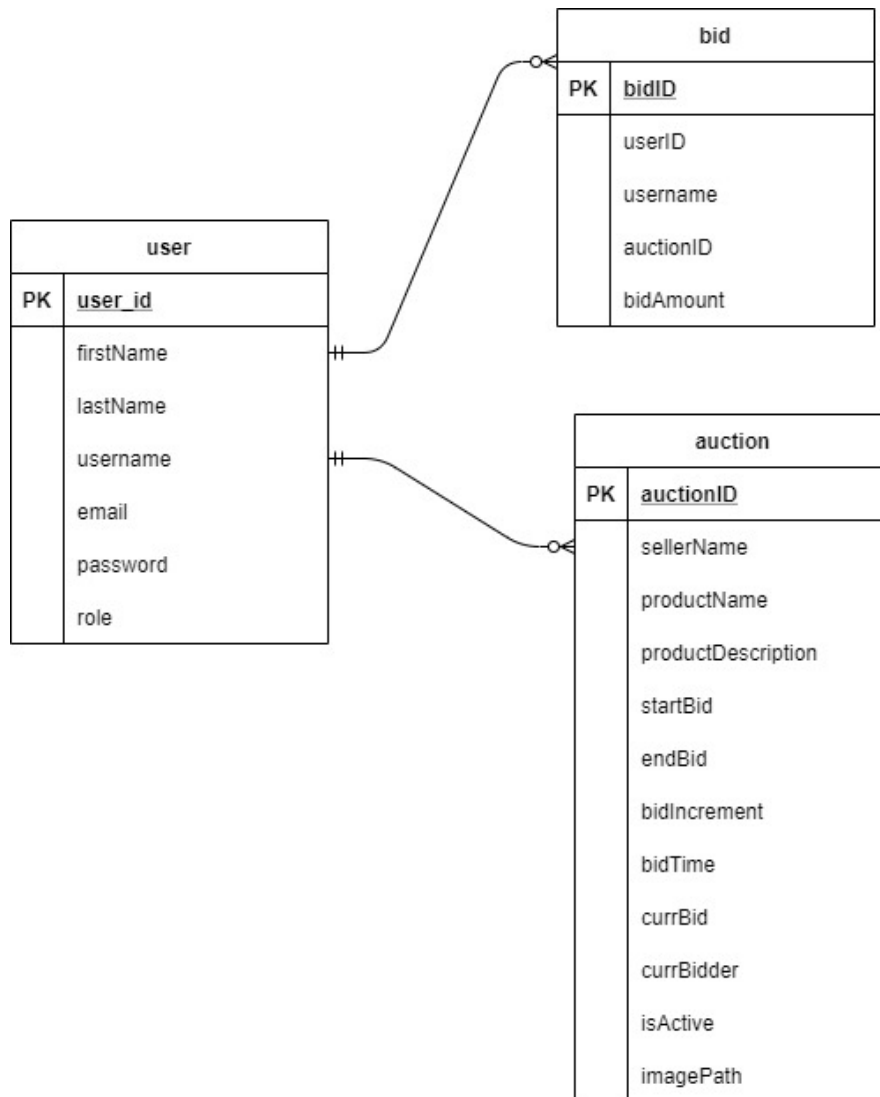


Figure 3. Database Model Diagram

UI and Use Cases Design

The following GUI designs represent how the users will be interacting with the application and how all use cases specified in the Application Requirements Document will be fulfilled.

Login/Registration

Login Page

The following page lets existing users log into their accounts, and new users sign up and create their accounts.

Log in - WebAuctionApp x +

https://localhost:44330/identity/Account/Login

WebAuctionApp Home About Us Register Login

Log in

Username

ratangupta

Password

.....

☐ Remember me?

Log in

[Forgot your password?](#)

[Register as a new user](#)

Figure 4. Login/Signup Page

Registration Page

The following page lets new users sign up as buyers or sellers.

Register - WebAuctionApp x +

https://localhost:44330/identity/Account/Register

WebAuctionApp Home About Us Register Login

Register

Create a new account.

First Name

Ratan

Last Name

Gupta

Email

ratan10@outlook.com

Username

ratangupta

Password

.....

Confirm password

.....

Roles ☒ Buyer ☐ Seller

Register

Figure 5. Registration Page

Buyer Use Cases

Buyer – Dashboard

The following page represents the buyer's homepage. It shows the latest items up for auction, the buyers can click on the "Create Bid" button to place their bids. Buyers also have the functionality to update their bids, view auctions, and manage their accounts.

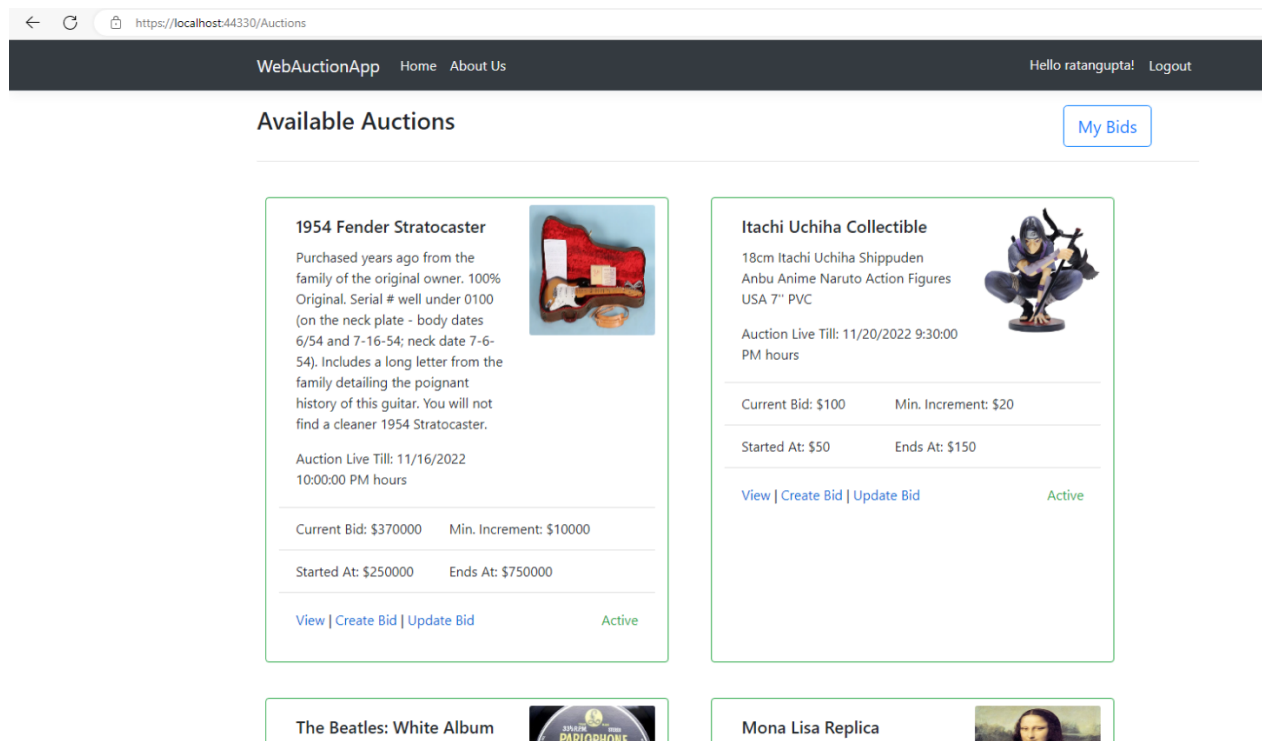


Figure 6. Buyer Dashboard

Buyer – Create Bid

The following page opens when a buyer clicks on the "Create Bid" button on an auction. The buyer can place bids on products through this page.

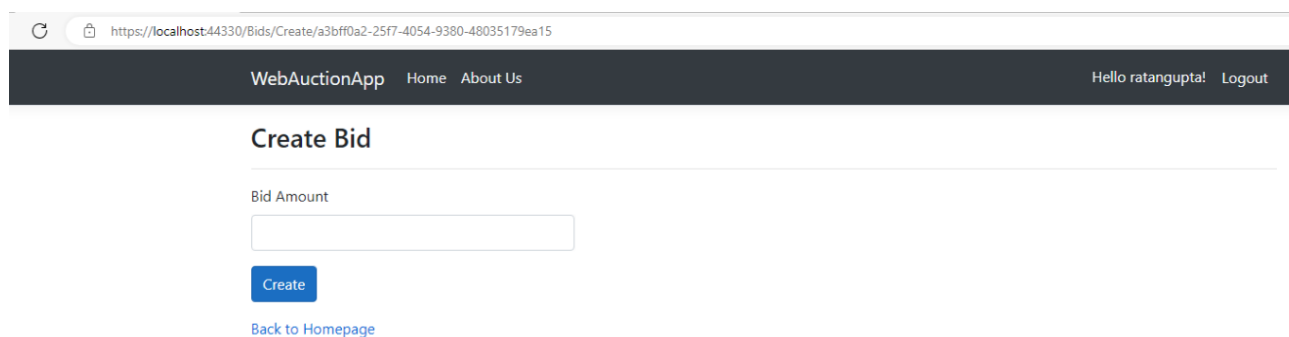


Figure 7. Buyer – Create Bid Page

Buyer – My Bids

The following page opens when a buyer clicks on the “My Bids” button on their homepage. The buyer can check their bid statuses this way.

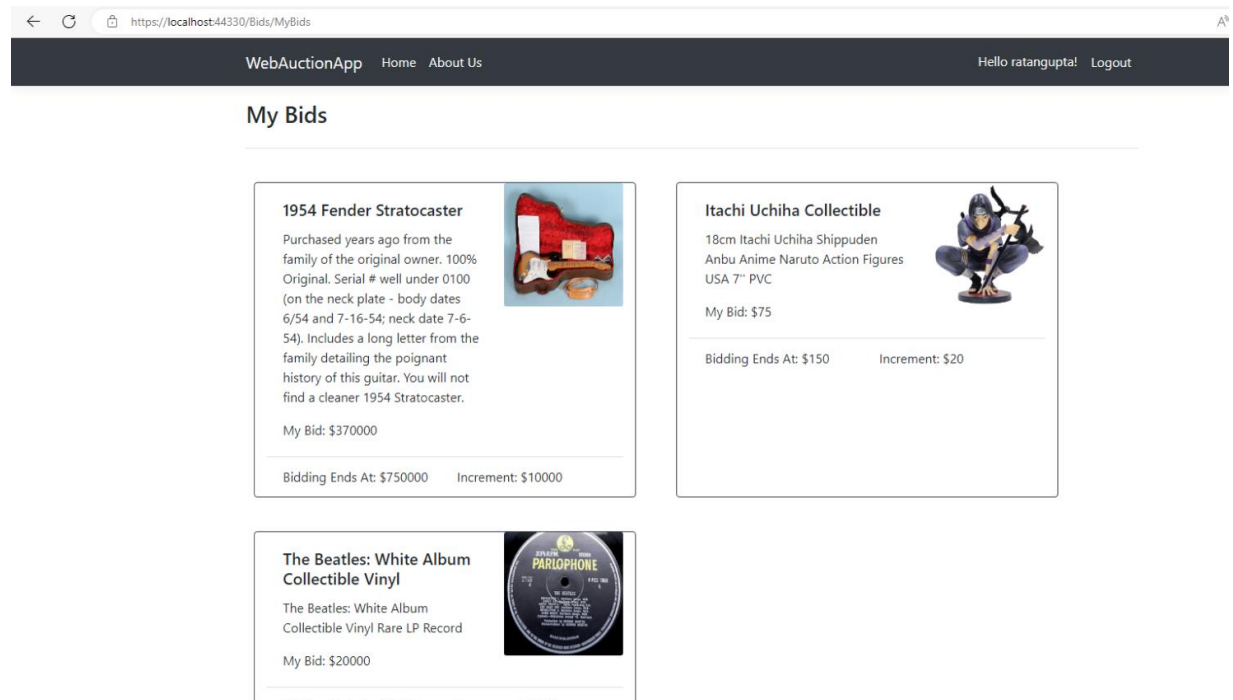


Figure 8. Buyer – My Bids Page

Buyer – Update Bid

The following page lets a buyer update their bid on an auction. It opens when a buyer clicks the “Update Bid” button on an auction.

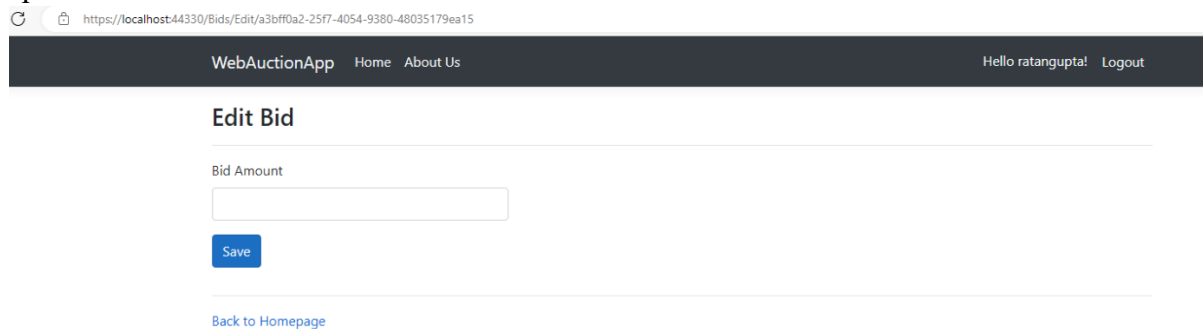


Figure 9. Buyer – Update Bid Page

Buyer – Manage Account

The following page opens when a buyer clicks on the “Hello <username>!” button on their homepage. The buyer can manage their account this way.



Figure 10. Buyer – Account Page

Seller Use Cases

Seller – Dashboard

The following page represents the seller’s homepage. It shows the auctions created by the seller. Active auctions are shown first in green borders and closed auctions are further down below in red borders. The sellers can click on the “View” button to view their auctions and on “Edit” button to edit their auctions. Sellers have the functionality to delete auctions as well, and they can manage their accounts.

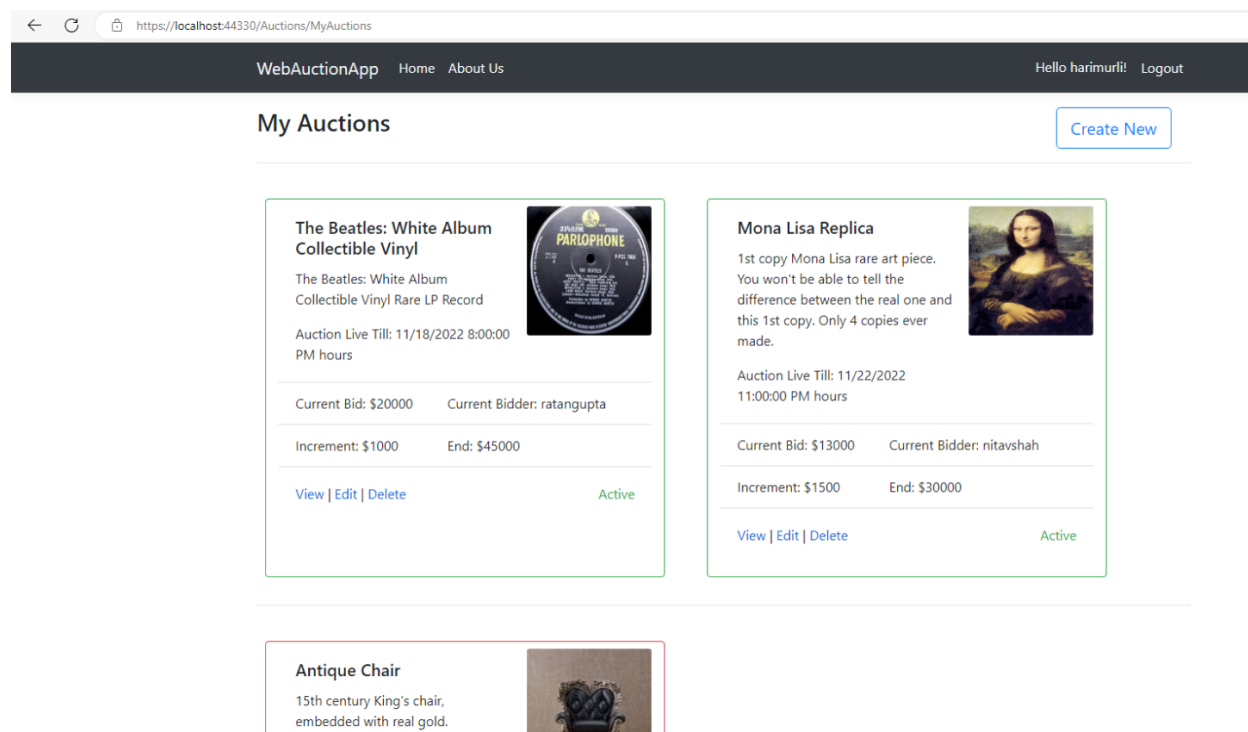


Figure 11. Seller Dashboard

Seller – View

The following page opens when a seller clicks on the “View” button on an auction. The seller can view their auction through this page.

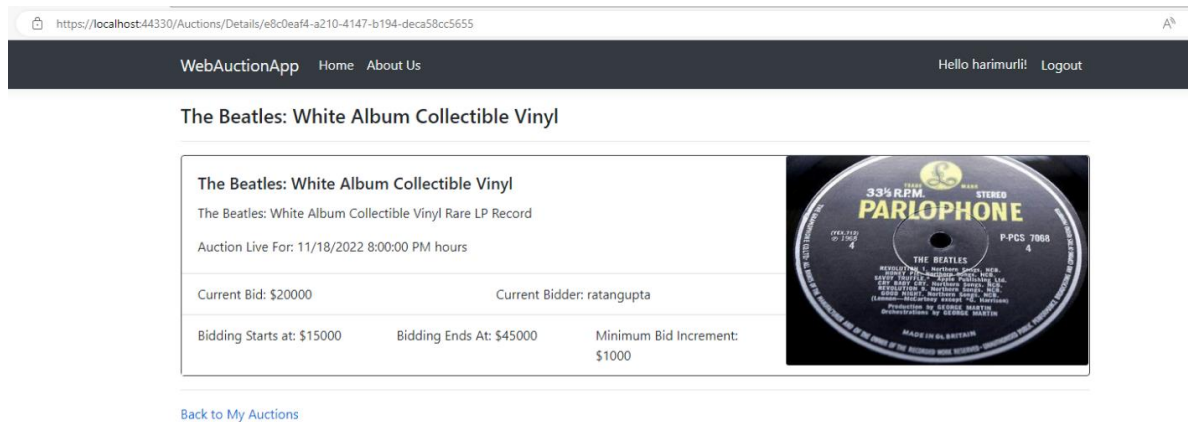


Figure 12. Seller – View Auction Page

Seller – Create Auction

The following page opens when a seller clicks “Create New” on their homepage. They can add product details and upload an image of the product to set up the auction.

The screenshot shows a web browser window with the URL 'https://localhost:44330/Auctions/Create'. The page header is identical to Figure 12. The main heading is 'Create Auction'. The form contains the following fields: 'Product Name' (text input), 'Product Description' (text input), 'Starting Bid' (text input), 'End Bid' (text input), 'Bid Increment' (text input), 'Auction Close Time' (datetime picker showing 'mm/dd/yyyy --:-- --'), and 'Upload Product Image' (file upload button labeled 'Choose File' with the text 'No file chosen'). At the bottom of the form is a blue 'Create' button. Below the form is a link 'Back to My Auctions'.

Figure 13. Seller – Create Auction Page

Seller – Edit Auction

The following page opens when a seller clicks “Edit” on an auction. They can edit auctions this way.

https://localhost:44330/Auctions/Edit/e8c0eaf4-a210-4147-b194-deca58cc5655

WebAuctionApp Home About Us Hello harimurli! Logout

Auction

Product Name
The Beatles: White Album Collectible Vinyl

Product Description
The Beatles: White Album Collectible Vinyl Rare

Starting Bid
15000

End Bid
45000

Bid Increment
1000

Auction Close Time
11/18/2022 08:00 PM

Upload Product Image
Choose File No file chosen

Save

Figure 14. Seller – Edit Auction Page

Seller – Delete Auction


The following page opens when a seller clicks “Delete” on an auction. They can delete auctions this way.

https://localhost:44330/Auctions/Delete/e8c0eaf4-a210-4147-b194-deca58cc5655

WebAuctionApp Home About Us Hello harimurli! Logout

Are you sure you want to delete this auction?

The Beatles: White Album Collectible Vinyl

<p>The Beatles: White Album Collectible Vinyl</p> <p>The Beatles: White Album Collectible Vinyl Rare LP Record</p> <p>Auction Live For: 11/18/2022 8:00:00 PM hours</p>			
<p>Current Bid: \$20000</p> <p>Current Bidder: ratangupta</p>			
<p>Bidding Starts at: \$15000</p>	<p>Bidding Ends At: \$45000</p>	<p>Minimum Bid Increment: \$1000</p>	

Delete

[Back to My Auctions](#)

Figure 15. Seller – Delete Auction Page

Seller – Manage Account

The following page opens when a seller clicks on the “Hello <username>!” button on their homepage. The seller can manage their account this way.

https://localhost:44330/Identity/Account/Manage

WebAuctionApp Home About Us Hello harimurli! Logout

Manage your account

Change your account settings

Profile

Email

Password

Two-factor authentication

Personal data

Profile

Username

Phone number

Save

Figure 16. Seller – Account Page

Admin Use Cases

Admin – Dashboard

The following page represents the admin’s homepage. The admin can manage all buyers and sellers from this admin console.

https://localhost:44330/Admin

WebAuctionApp Home About Us Hello admin! Logout

Hello Admin!

Manage Buyers

Manage Sellers

Figure 17. Admin Dashboard

Admin – Manage Buyers

The following page lets the admin delete buyers. It opens when admin clicks on the “Manage Buyers” button on their homepage. Deleting a buyer deletes all related bids too.

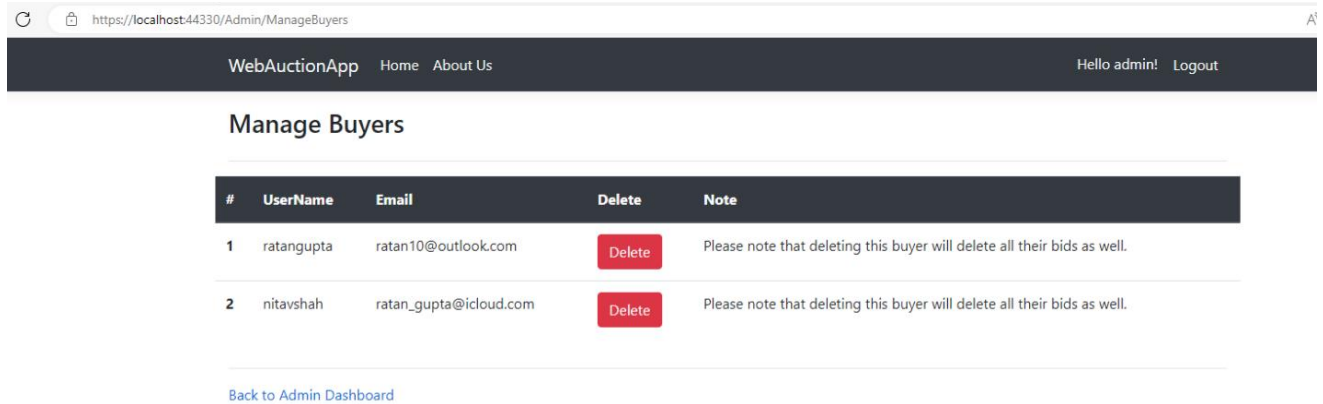


Figure 18. Admin – Manage Buyers Page

Admin – Manage Sellers

The following page lets the admin manage sellers. It opens when admin clicks on the “Manage Sellers” button on their homepage. Deleting a seller deletes all related auctions and bids.

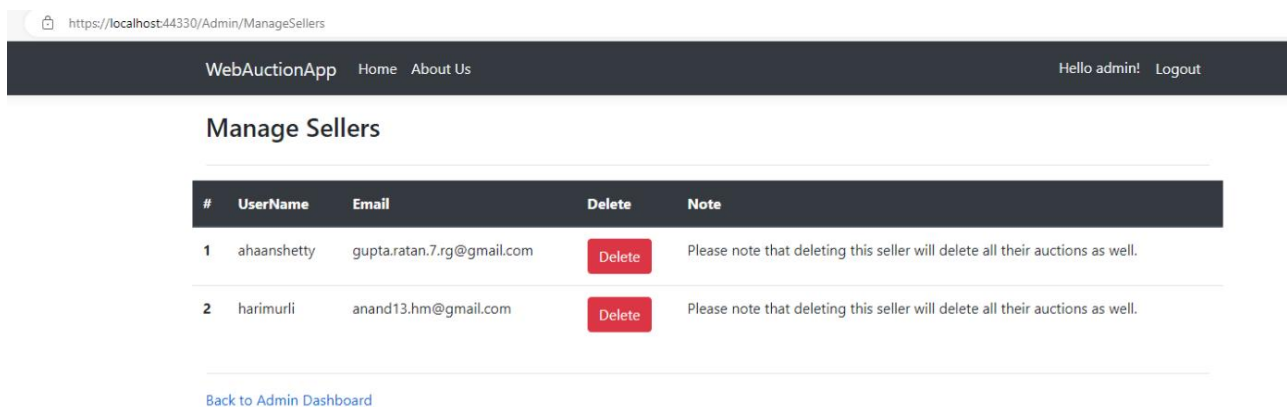


Figure 19. Admin – Manage Sellers Page

Security Countermeasures

1. All input must be validated, and all user inputs must always be assumed to be malicious.
2. Any data that the application obtains from outside its trust boundary must also be assumed to be malicious.
3. All communications between clients, server, system, and objects must be encrypted. Ensure that all network traffic is encrypted.
4. All credentials and other sensitive information must be stored securely in the database using salted hashes.
5. System admin must be the only one with access to the system’s stored data.

6. All three actors – admin, seller, and buyer – must have different privileges and permissions, with the admin having the highest privilege and permissions. These access controls must be solely managed by the admin.
7. Log files must be kept and maintained regularly. The admin must regularly peruse the log files to identify suspicious behaviors in the system or any unintended actions performed by users.
8. Events such as browser shutting down, user logout, etc. must lead to a session end.
9. Sessions should be timed-out after a certain duration of inactivity from any user's end.
10. If, while developing the system, any third-party libraries are used, care must be taken that only the latest and most stable version of the library is used.
11. Any frameworks or libraries used during software development must not have any known vulnerabilities and must be patched software.
12. Security must be considered during every phase of the Software Development Life Cycle.
13. Software must be tested extensively and iteratively throughout the SDLC.

References

- <https://www.mockplus.com/free-wireframing-tool/>
- <https://docs.aws.amazon.com/whitepapers/latest/serverless-multi-tier-architectures-api-gateway-lambda/three-tier-architecture-overview.html>
- https://www.ripublication.com/ijaer18/ijaerv13n10_102.pdf