Software Requirements Specification (SRS) for Online Bidding Platform

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1. Introduction

This Software Requirements Specification (SRS) outlines the core software requirements for an Online Bidding Platform. The platform facilitates real-time and proxy bidding, with additional options like 'Buy It Now,' notifications, bid history, and shipping integration.

2. Scope

This document defines the requirements for an **Online Bidding Platform** with the following features:

- Auction types: Supports real-time, proxy bidding, and 'Buy It Now' options.

- User roles:

- **Sellers:** Can post products with images and detailed descriptions for auction.
- **Buyers:** Select and bid on products.
- **Administrators**: Manage the auction system, allowing products to be sold and bought securely.

- Core functionalities:

- Real-time bidding with live updates.
- Automatic bidding (proxy bidding) with a maximum bid limit.
- Sellers set specific auction time limits for bidding.
- Secure payment processing and escrow options.
- Shipping and delivery management.
- Notifications and alerts for auction events.
- The product is sold to the buyer with the highest bid once the auction ends.

- Application: Used for conducting online auctions across different industries (e.g., retail, collectibles).

- Goals:

- Provide a secure, user-friendly platform for online auctions.
- Ensure transparent and real-time auction processes.
- Facilitate secure transactions with fraud prevention mechanisms.

3. Functional Requirements: -

3.1. Bidder Use Cases:

3.1.1 Registration:

Preconditions:

- The user has not yet created an account.

Basic Flow:

1. The user navigates to the platform's homepage.
2. The user selects the "Register" option.
3. The user enters the required registration information (refer to Bidder/Seller Data Dictionary) and submits the form.
4. The system validates the provided details.
5. The system creates a new account for the user.

Alternative Flows: (**Step 4**)

- **Invalid Registration Details**: If incorrect or incomplete information is provided, the system will prompt the user to rectify the errors and return to **Step 3** to resubmit.

Postconditions:

- The user is successfully registered and can access the platform.

3.1.2 Login:

Preconditions:

- The user or admin has an existing account.

Basic Flow:

1. The user or admin navigates to the platform's homepage.
2. The user selects the "Login" option.
3. The user enters their registered email and password.
4. The system verifies the entered credentials.
5. The system grants the user or admin access to their account.

Alternative Flows: (**Step 3**)

- **Invalid Login Details**: If the login credentials are incorrect, the system displays an error message and allows the user to attempt logging in again by returning to **Step 3**.

Postconditions:

- The user or admin is successfully authenticated and logged into the system.

3.1.3 Search for Items:

Preconditions:

- The user is logged in.
- Items are listed on the platform.

Basic Flow:

1. The user navigates to the search bar.
2. The user enters relevant keywords to search for an item.
3. The system processes the search request.
4. The system displays a list of items that match the search criteria.

Alternative Flows: (**Step 3**)

- **No Matching Results**: If no items match the entered keywords, the system will display a "No Results Found" message.

Postconditions:

- The user views a list of items that match the search criteria.

3.1.4 View Item Details:

Preconditions:

- The user is logged in.
- The user has searched for items.

Basic Flow:

1. The user selects an item from the displayed search results.
2. The system retrieves and shows detailed information about the selected item (refer to Item Data Dictionary).

Alternative Flows: (**Step 1**)

- **Item Unavailable**: If the item is no longer available (due to removal or auction ending), the system will notify the user and redirect them to the previous page or search results.

Postconditions:

- The user successfully views the detailed information of the selected item.

3.1.5 Place Bid:

Preconditions:

- The user is logged in.
- The user has selected an item listed in an active auction.

Basic Flow:

1. The user selects an active auction item.
2. The system displays the item's details and the **remaining time** for bidding.
3. The user enters their bid amount.

4. The system checks if the bid amount is higher than the current highest bid.
5. The system accepts the bid if valid and updates the highest bid.
6. The system notifies the user of the successful bid placement and updates the **time remaining** for the auction.
7. When the timer reaches **0**, the system announces the **winner** and closes the auction.

Alternative Flows:

- **Invalid Bid Amount**(**Step 4**): If the entered bid is lower than the current highest bid or below the minimum bid increment, the system will prompt the user to enter a valid bid.

- The user's bid is placed, the auction continues with an updated highest bid, and a timer is displayed until closure.

Postconditions:

- The user’s bid is successfully placed, and the auction’s highest bid is updated.

3.1.6 Real-Time Bidding:

Preconditions:

- The user is logged in and participating in an active auction.

Basic Flow:

1. The user navigates to the live auction page.
2. The system displays real-time auction updates and the current highest bid.
3. The user enters a bid amount higher than the current highest bid.
4. The system validates and processes the bid instantly.
5. The system updates the current highest bid and informs all participants in real-time.
6. The system continuously displays the countdown timer showing the time left for the auction.
7. When the timer reaches **0**, the auction is closed, and no further bids are allowed.

8. The system announces the **highest bidder as the winner**.

Alternative Flows:

- **Bid Rejected**(**Step 3**): If the bid is lower than the current highest bid or invalid, the system will reject the bid and notify the user to adjust their bid amount.
- If the bid is lower than the current highest bid, the system rejects the bid and prompts the user to adjust.

Postconditions:

- The user's bid is placed, and the auction continues with the updated highest bid until the time expires, announcing the winner at the end.

3.1.7 Automatic Bidding (Proxy Bidding):

Preconditions:

- The user is logged in and has selected an auction item.
- The user has set a maximum bid amount.

Basic Flow:

1. The user sets a maximum bid for the item.
2. The system automatically bids on the user's behalf in increments until the set maximum is reached.
3. The system notifies the user if their maximum bid is exceeded by other participants.

Alternative Flows: (**Step 3**)

- **Maximum Limit Reached**: The system will notify the user that their maximum bid limit has been reached and prompt them to increase it if they wish to continue participating.

Postconditions:

- The system places bids automatically until the maximum limit is reached or until the user wins the auction.

3.1.8 Buy It Now:

Preconditions:

- The user is logged in.
- The item has a “Buy It Now” price set.

Basic Flow:

1. The user selects the “Buy It Now” option for an auction item.
2. The system processes the transaction at the fixed price.
3. The auction is closed, and no further bids are allowed on that item.

Alternative Flows: (**Step 2**)

- **Payment Failure**: If the payment process fails, the system will prompt the user to retry using another payment method.

Postconditions:

- The user successfully purchases the item at the “Buy It Now” price, and the auction is closed.

3.1.9 Make Payment:

Preconditions:

- The user has won an auction.

Basic Flow:

1. The system notifies the user that they have won the auction.
2. The user navigates to the payment section.
3. The user selects a payment method and enters payment details (refer to Payment Data Dictionary).
4. The system processes the payment.
5. The system confirms the payment and updates the order status.

Alternative Flows: (**Step 4**)

- **Payment Rejected**: If the payment fails, the system will notify the user to retry using a different payment method.

Postconditions:

- The user's payment is successfully processed, and the transaction is completed.

3.1.10 Auction Closing:

Preconditions:

- The user (bidder) is logged in.
- The auction has reached the end of the bidding period (timer has expired).
- The user has placed one or more bids on the auction item.

Basic Flow:

1. The auction reaches its end time as defined by the system's countdown timer.
2. The system checks all bids placed during the auction.
3. The system compares the bids and determines the highest bidder.
4. The system automatically closes the auction and announces the highest bidder as the winner.
5. The system sends a notification to the winning bidder confirming that they have won the auction.
6. The system also notifies the seller of the auction's result, informing them of the winning bid.
7. The system transitions the auction to the payment phase, where the winning bidder must proceed to complete the payment.
8. The user (winning bidder) can now navigate to the payment section to finalize the transaction.

Alternative Flows: (**Step 4**)

- **No Bids Placed:** If no bids were placed during the auction, the system automatically closes the auction and notifies the seller that the item was not sold.

- **Payment Failure (Post-Auction):** If the winning bidder fails to complete payment within the given timeframe, the system may either:

    - Notify the seller of the failure and relist the item for auction, or
    - Notify the second-highest bidder (if available) to proceed with the purchase.

Postconditions:

- The auction is successfully closed, and the highest bidder is declared the winner.
- Notifications are sent to both the bidder and the seller.
- The winning bidder is prompted to proceed with payment to complete the transaction.

3.2. Seller Use Cases:

3.2.1. List Item for Auction:

Preconditions:

- The seller is logged in.

Basic Flow:

1. The seller navigates to the "List Item" section.
2. The seller fills in the item details (refer to the Item Data Dictionary), including item description, starting bid, and auction duration.
3. The seller uploads images of the item.
4. The system validates the entered details.
5. The system creates the auction listing and confirms its successful creation to the seller.

Alternative Flows: (**Step 4**)

- **Invalid Item Details**: If the details are incomplete or invalid, the system prompts the seller to correct the errors and return to **Step 2** to resubmit.

Postconditions:

- The item is successfully listed for auction on the platform.

3.2.2. Monitor Bids on Listed Items:

Preconditions:

- The seller is logged in.
- The seller has active auctions on the platform.

Basic Flow:

1. The seller navigates to the "My Listings" section.
2. The system displays a list of all active auction listings created by the seller.
3. The seller selects an auction to monitor.
4. The system shows the current highest bid, bid history, and remaining auction time in real-time.

Alternative Flows: (**Step 4**)

- **No Bids Yet**: If no bids have been placed, the system displays "No Bids Yet" for that listing.

Postconditions:

- The seller can view the current status of their auction, including bids and auction progress.

3.2.3. Confirm Sale and Prepare for Shipment:

Preconditions:

- The auction has ended, and the seller's item has been sold.

Basic Flow:

1. The system notifies the seller that the item has been sold to the highest bidder.
2. The seller navigates to the "Sold Items" section.

3. The seller reviews the transaction details, including the buyer's shipping information.
4. The seller prepares the item for shipment.
5. The seller updates the system with the shipping tracking number and marks the item as "Shipped."

Alternative Flows: (**Step 3**)

- **Buyer Fails to Pay**: If the buyer fails to complete the payment, the system prompts the seller to hold shipment until payment is confirmed.

Postconditions:

- The seller successfully ships the item to the buyer and updates the system with shipment details.

3.2.4. CReceive Payment:

Preconditions:

- The item has been successfully sold, and the buyer has completed payment.

Basic Flow:

1. The system processes the buyer's payment and confirms the transaction.
2. The system notifies the seller that payment has been received.
3. The seller views the payment details in the "Transactions" section.
4. The seller receives the payment for the item.

Alternative Flows: (**Step 1**)

- **Payment Failure**: If the payment fails, the system notifies both the seller and the buyer and requests that the buyer retry payment.

Postconditions:

- The seller successfully receives payment for the sold item.

3.3. Admin Use Cases:

3.2.1. User Management:

Preconditions:

- The admin is logged in with valid credentials.

Basic Flow:

1. The admin navigates to the "User Management" section.
2. The system displays a list of registered users (buyers and sellers).
3. The admin selects a user account to view its details.
4. The admin can take actions such as editing the user profile, resetting passwords, or locking/unlocking accounts.
5. The system updates the user account based on the admin's actions.

Alternative Flows: (**Step 4**)

- **Invalid User Action**: If the admin attempts to perform an invalid action, the system will display an error message and require the admin to reselect the action.

Postconditions:

- The user account is updated according to the admin's changes, and the system confirms the action.

3.2.2. Auction Monitoring:

Preconditions:

- The admin is logged in.
- There are active auctions running on the platform.

Basic Flow:

1. The admin navigates to the "Auction Monitoring" section.
2. The system displays a list of ongoing auctions.
3. The admin selects an auction to view its details, including current bids and auction time remaining.
4. The admin monitors real-time bidding activity and overall auction progress.

Alternative Flows: (**Step 3**)

- **No Active Bids**: If no bids have been placed on the selected auction, the system will display "No Bids Yet."

Postconditions:

- The admin successfully monitors the auction, viewing real-time updates and bidding activity.

3.2.3. Auction Monitoring:

Preconditions:

- The admin is logged in.

Basic Flow:

1. The admin navigates to the "Database Management" section.
2. The admin selects the option to perform a database backup.
3. The system creates a backup of the current auction data, user data, and transaction history.
4. The system confirms that the backup was successfully created.

Alternative Flows: (**Step 3**)

- **Backup Failure**: If the backup process fails, the system displays an error message and prompts the admin to retry.

Postconditions:

- The system completes a successful database backup, ensuring data integrity.

4. Non-Functional Requirements

4.1 Performance Requirements :-

- The system must support at least 500 concurrent auctions.
- Bid processing time should be under 1 second to ensure real-time bidding.

- Stable internet access is required for both the server and user devices to connect to the central database.
- All user input will be done using standard devices (keyboard and mouse); no external hardware like barcode scanners is needed.
- Users must have internet access to participate in auctions, as all data will be stored on a server.

4.2 Security Requirements :-

- Secure authentication (login ID and password) is required for all users (buyers, sellers, and administrators).
- Financial transactions must be encrypted to protect sensitive user information.
- No competitor bidding details will be displayed to prevent fraud and ensure fairness.
- The administrator will be responsible for managing system security and overseeing the authentication process.

4.3 Usability Requirements :-

- The user interface must be intuitive and responsive, optimized for both desktop and mobile devices.
- Users should be able to easily register, place bids, and manage their profiles without technical expertise.
- The platform should ensure smooth navigation, enabling both novice and experienced users to interact with ease.
- The registration, bidding, and payment processes should be straightforward and user-friendly.

4.4 Reliability Requirements :-

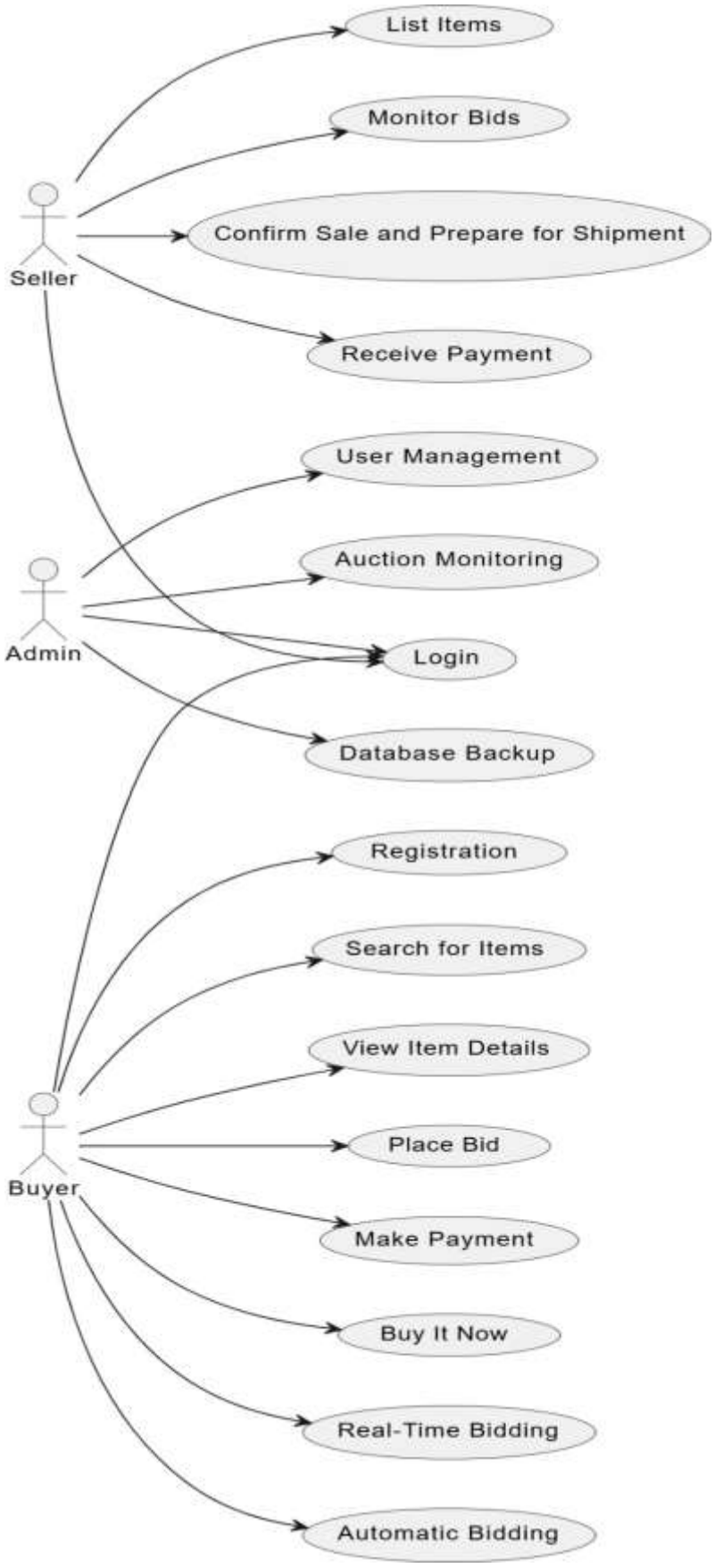
- The system must ensure 99.9% uptime, providing continuous access to auctions and other services.
- Daily data backups must be performed to protect against data loss.
- In the event of system failure, the backup system should ensure full recovery.
- The database must store all auction-related data, including bids, users, and transactions, with automatic synchronization to ensure consistency across devices.

4.5 Business Rules :-

- After an auction ends, both the buyer and seller must pay a 2% commission.
- The commission can be paid either via cash to the administrator or through an online payment method.

- The transaction is not considered final until the administrator confirms the commission payment.
- If the commission is not paid, the system will mark the transaction as incomplete, and ownership of the item will not be transferred.
- Post-auction requirements (such as meetings or documentation) must be communicated through the platform.

5. Process Models and UML Diagrams



6. Integration Tables

6.1 Payment Gateway Integration

Trigger	Data Sent	Data Received	Description
Initiate Payment	User ID, Item ID, Payment Method, Amount	Payment Confirmation (Success/Failure), Transaction ID	Triggered when the user initiates payment after winning an auction or using "Buy It Now".
Retry Payment	User ID, Item ID, New Payment Details	Payment Confirmation (Success/Failure)	Triggered if the initial payment attempt fails, and the user retries with a new method.

6.2. Shipping System Integration Table

Trigger	Data Sent	Data Received	Description
Submit Shipping Request	User ID, Item ID, Shipping Address, Tracking Number	Confirmation of Shipment Request	Triggered when a seller submits the shipping details for an item sold.
Track Shipment	Tracking Number	Real-time Shipment Status	Triggered when the buyer or seller tracks the item delivery status.
Confirm Delivery	Tracking Number, Delivery Status	Delivery Confirmation	Triggered when the item is marked as delivered and the buyer receives it.

7. Data Dictionary

7.1 User

Attribute	Type	Description
UserID	Integer	Unique identifier for each user
Name	String	User's full name
Email	String	User's email address
Password	String	Encrypted user password
UserRole	String	Role of the user (e.g., Buyer, Seller, Admin).
Rating	Float	User rating based on transactions (0.0 - 5.0)
Address	String	Shipping address for buyers and sellers.
PhoneNumber	String	Contact number for communication purposes.

7.2 Auction

Attribute	Type	Description
AuctionID	Integer	Unique identifier for each auction
ItemID	Integer	Unique identifier for the auctioned item
SellerID	Integer	Unique identifier for the seller who listed the item.
StartTime	DateTime	Auction start time
EndTime	DateTime	Auction end time
StartingBid	Float	Initial bid amount set by the seller.
CurrentBid	Float	Current highest bid amount
BidIncrement	Float	The minimum increment required for the next bid.
AuctionStatus	String	Status of the auction (e.g., Active, Closed, Sold).

7.3 Item

Attribute	Type	Description
ItemID	Integer	Unique identifier for each item
ItemName	String	Name of the item.
Description	String	Description of the item being auctioned
Category	String	Category to which the item belongs (e.g., electronics, art).
StartingBid	Float	Initial bid amount for the item
BuyItNowPrice	Float	Buy It Now price if available
ItemCondition	String	Description of the item's condition (e.g., New, Used).
Images	String[]	URLs or file paths of item images.
SellerID	Integer	Unique identifier for the seller who listed the item.

7.4 Bid

Attribute	Type	Description
BidID	Integer	Unique identifier for each bid
AuctionID	Integer	Unique identifier for the associated auction
UserID	Integer	Identifier for the bidder
BidAmount	Float	Amount of the bid
BidTime	DateTime	Timestamp when the bid was placed

7.5 Transaction

Attribute	Type	Description
TransactionID	Integer	Unique identifier for each transaction
UserID	Integer	Identifier for the bidder involved
ItemID	Integer	Identifier for the item purchased
PaymentMethod	String	Method used for payment (e.g., PayPal, Credit Card)
Amount	Float	Amount paid in the transaction.
TransactionDate	DateTime	Date and time of the transaction.
Status	String	Transaction status (Pending, Completed, Failed)