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# 1. Stakeholders

- **Auction House:** Employer of auction house staff. Funds and inspects system development process and maintenance. Monitors auctions and authorised to collect payments for purchased lots.
- **Staff:** Cooperate with a seller on providing a description of the lots, including high and low estimates of the hammer price and inserts this information in the system.
- **Auctioneers:** Responsible for deciding initial bidding price, opening the bidding and declaring the auction closed.
- **Registered users (Buyers/Sellers):** Users can register with their personal information and bank account details.

Buyer: Browses the online catalogue and can declare their interest in a lot within the system. The system collects payment from the buyer if they are the bidder of the hammer price.

Seller: Delivers objects at the auction house, creates a description of the lot so that it can be added in the online catalogue and sets a secret reserve price. If the sale goes through, the system transfers an amount to the seller.

- **Unregistered users (Viewers):** Can only view the online catalogue, without having to register. These users are unable to buy or sell lots.

## 2. The System State

1. The initial state. How to proceed depends on user choice between:
  - a) Login as existing user.
  - b) Register as a new user.
  - c) View catalogue as guest.
2. System should be able to store and retrieve information regarding registered users (buyers/sellers) are:
  - a) Personal information.
  - b) Bank account details
  - c) Proof of authorisation for auction house to collect payments for lots purchased. (Buyer)(A)

3. System must store information about the lots and be able to retrieve it like:
  - a) Description of lot including pictures and text.
  - b) High and low estimates of the hammer price.
  - c) Status of the lot can be one of the following:
    - i. Available for auction.
    - ii. Currently in auction.
    - iii. Sold.
    - iv. Already auctioned but not sold(A)
  - d) Which buyers noted interest in specific lot.
  - e) Secret reserve price kept hidden.
4. When an auction has opened or closed, system must notify all interested buyers and the seller.
5. During an auction the system must:
  - a. Give the buyer the option to bid:
    - i. An incremental bid where they bid a bid increment above the current bid price. The bid increment is a fixed amount set by the auction house for all auctions.
    - ii. A jump bid where they also explicitly specify a bid amount at least that of an incremental bid.
  - b. Display the current bidder and value of bid to auctioneer and buyers participating.
  - c. Record the time passed since auction started.
  - d. Notify other buyers and auctioneer when a new bid is made.

### 3. Use Cases

1) **Register Buyer:**

*Primary actor:* Buyer

*Supplementary actor:* Auction House

*Description:* Buyer will access the system and enter personal information and bank account details required. Then give the Auction House authorisation to collect payments for lots purchased.

2) **Note Interest in Lot:**

*Primary actor:* Buyer

*Description:* When a buyer browses through the catalogue, they can find a desired lot and note their interest within the system.

### 3) **Open bidding**

*Primary actor:* Auctioneer

*Supplementary actors:* Buyers, Seller

*Description:* When the auctioneer opens bidding on the lot, the seller of the lot and all interested buyers are notified.

### 4) **Bid on lot**

*Primary actor:* Buyer

*Supplementary actors:* Auctioneer

*Description:* During an auction, a buyer has the option to bid on a lot, but also system notifies them when other buyers bid on the lot.

*Precondition:* Buyer is registered in the system and has noted their interest in the specific lot.

*Trigger:* Auctioneer opens bidding on the lot.

*Guarantee:* The bid has been placed in the system.

*Main Success Scenario:*

1. Buyer places a bid through the system.
2. System notifies auctioneer and buyer, when a bid has been placed by another buyer, stating its value.

*Extensions:*

1. a) Buyer makes an incremental bid above the current bid price.
  - i. System returns to step 2.
- b) Buyer makes a jump bid, specifying a bid amount at least that of an incremental bid.
  - i. System returns to step 2.

*Stakeholders & Interests:*

- *Buyers:* Must acknowledge when another buyer places a bid, in case they want to bid over it.
- *Auctioneer:* Needs to know the current bid price.

### 5) **Close lot auction**

*Primary actor:* Auctioneer

*Supplementary actor:* Buyers, Seller

*Description:* Auctioneer declares the auction closed and the system performs the appropriate transactions.

*Precondition:* No more bids appear to be made(A).

*Trigger:* Auctioneer taps a hammer on a block.

*Guarantee:* Transactions go through correctly and successfully.

*Main Success Scenario:*

1. System identifies highest bidder.
2. System informs all buyers who noted interest, that the auction is closed and the value of the hammer price.
3. System calculates final price by adding the buyer's premium(A) to the hammer price.
4. System collects total amount from buyer.

5. System calculates the price to be paid to the seller, by subtracting the seller's commission(A) from the hammer price.
6. System pays the seller.

*Extensions:*

2. a) Hammer price is lower than reserve price.
  - i. System informs relevant parties that the sale did not go through. (A)

*Stakeholders & Interests:*

- *Auction house:* Collects commission from transactions.
- *Buyers:* Need to acknowledge that auction is closed, and bidding is not allowed anymore. Ensure that correct final amount is withdrawn from the bank account of the highest bidder.
- *Sellers:* Ensure that correct final amount is transferred to their bank account.

#### **6) Deposit lot**

*Primary actor:* Seller

*Supplementary actors:* Staff

*Description:* Seller deposits lot at the Auction house premises, and they insert a description consisting of text and pictures into the system, with the help of staff. They also decide on a reserve price which is entered in the system and is kept secret. (A)

#### **7) View catalogue**

*Primary actor:* Buyer, Unregistered user

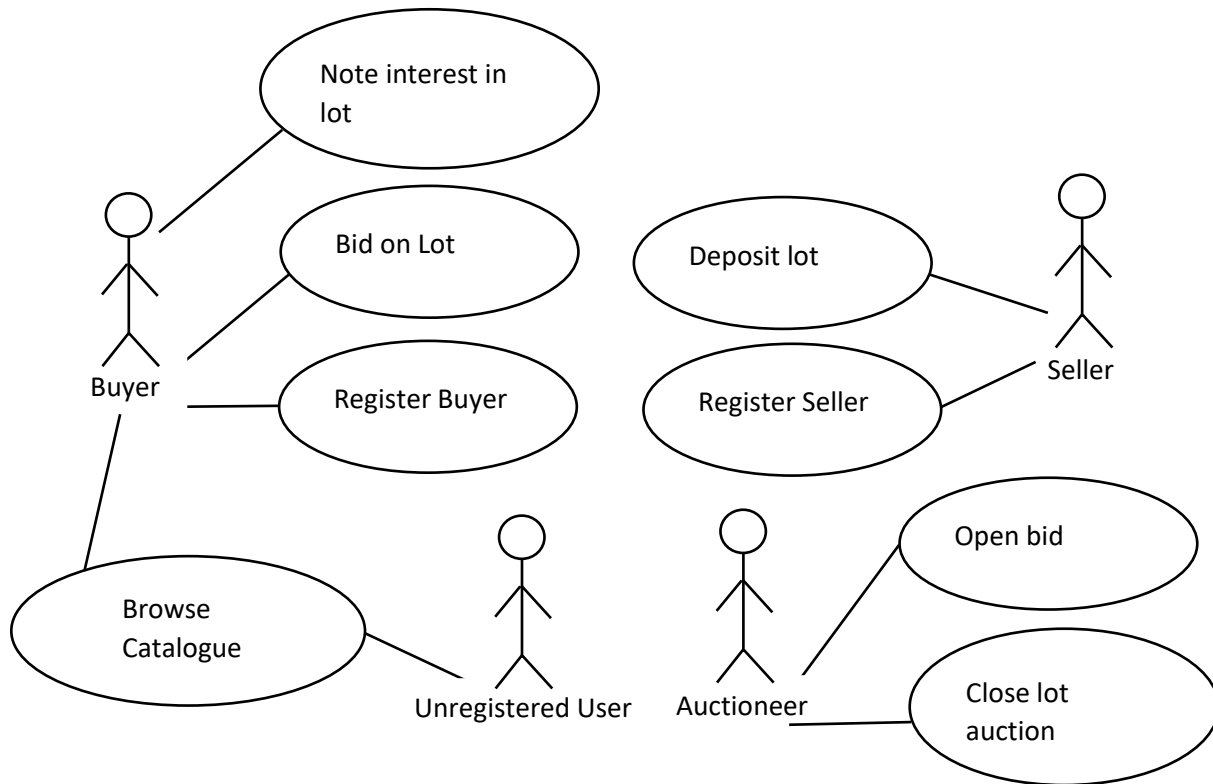
*Description:* The user can browse for available lots and their description through the online catalogue.

#### **8) Register Seller**

*Primary actor:* Seller

*Description:* Seller will access the system and enter personal information and bank account details required.

## 4. Use Case Diagram



## 5. Non-functional requirements

### 1. Security

- Transactions must occur through a secure platform and only after confirmation through the bank.
- Personal and bank account details of users should not be visible to everyone. The Auction House needs access to that information, while other users can only view the full name of each other.
- Access to the lot should only be granted to the buyer, after payment is confirmed.

## **2. Usability**

- a. System should be easy to use and navigate for any user, without specific expertise.
- b. Buyers should be able to access the lots they noted interest. (A)

## **3. Performance**

- a. During an auction, bidding should be placed in the system and appear to others as soon as possible, since an auction is time critical.
- b. System correctly calculates and withdraws/deposits amounts of money.
- c. System must not mismatch lots with wrong descriptions or send incorrect notifications for opening of a lot.

## **4. Reliability**

- a. In case the system crashes during an auction or the device of a buyer is disconnected from the system, it should ensure that the bid is still valid. (despite the device of the buyer being shut down or disconnected from network)
- b. System should require a strong internet connection before a user participates in an auction.

## **5. Maintainability**

- a. System should be adaptable to any change that the Auction House decides to make to the selling and buying process in the future.

# **6. Ambiguities, subtleties, incompletenesses**

- 1) How is an auctioneer supposed to determine when to close an auction? Is there a predefined time limit after a bid is placed?
- 2) Who gets to decide the actual fixed percentage for the buyer's premium (range 15%-25%) of the hammer price. Does that commission belong to the Auction House?
- 3) Who gets to decide the actual fixed percentage for the seller's commission (range 10%-15%) of the hammer price. Does that commission belong to the Auction House?
- 4) Who is aware of the secret reserve price? How does the auctioneer or buyer know that the hammer price was lower than reserve price? Does the system notify them?
- 5) What happens when a buyer has insufficient funds for payment? Should the system give them an option to add more funds to their account, or does the sale not go through?
- 6) If a buyer does not give authorisation to the Auction House to collect payments for the lot purchased, or if their bank account details are incorrect, how does the registration process proceed?

- 7) If the sale does not go through, is the auction reopened or permanently closed?  
Should the seller have this option?
- 8) If after the sale, the buyer finds that the objects in the lot do not match the description and/or photographs provided in the system by the seller, what are their options? Should they be entitled for a return and refund?
- 9) Are the buyers able to undo their interest in a lot?
- 10) Should a seller be notified when an auction is opened for their lot, and when bids are placed on it?