Mid Lab Report

Course: Software Design and Architecture

Project Title: Auction Management System

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Date:

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1. Introduction

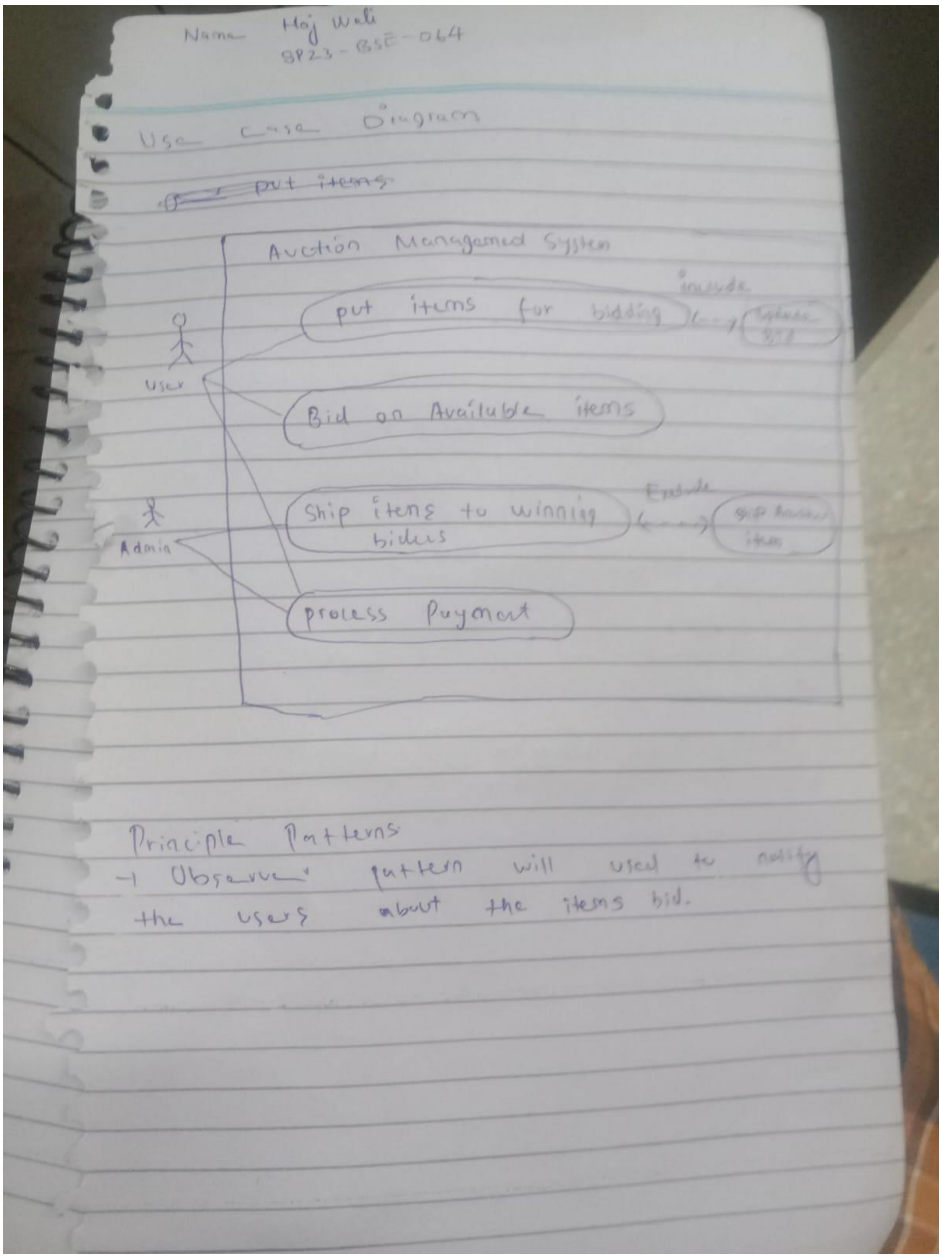
This report presents the design of a simplified Auction Management System using object-oriented principles and the Observer Design Pattern. The main functionality implemented is the submission of bids by users (bidders), where all interested parties are notified if a new highest bid is placed. The system promotes loose coupling and high cohesion by clearly separating responsibilities between classes.

2. Use Case Diagram

The use case diagram below represents the primary interactions between the system and the actors.

📌 **Actors:**

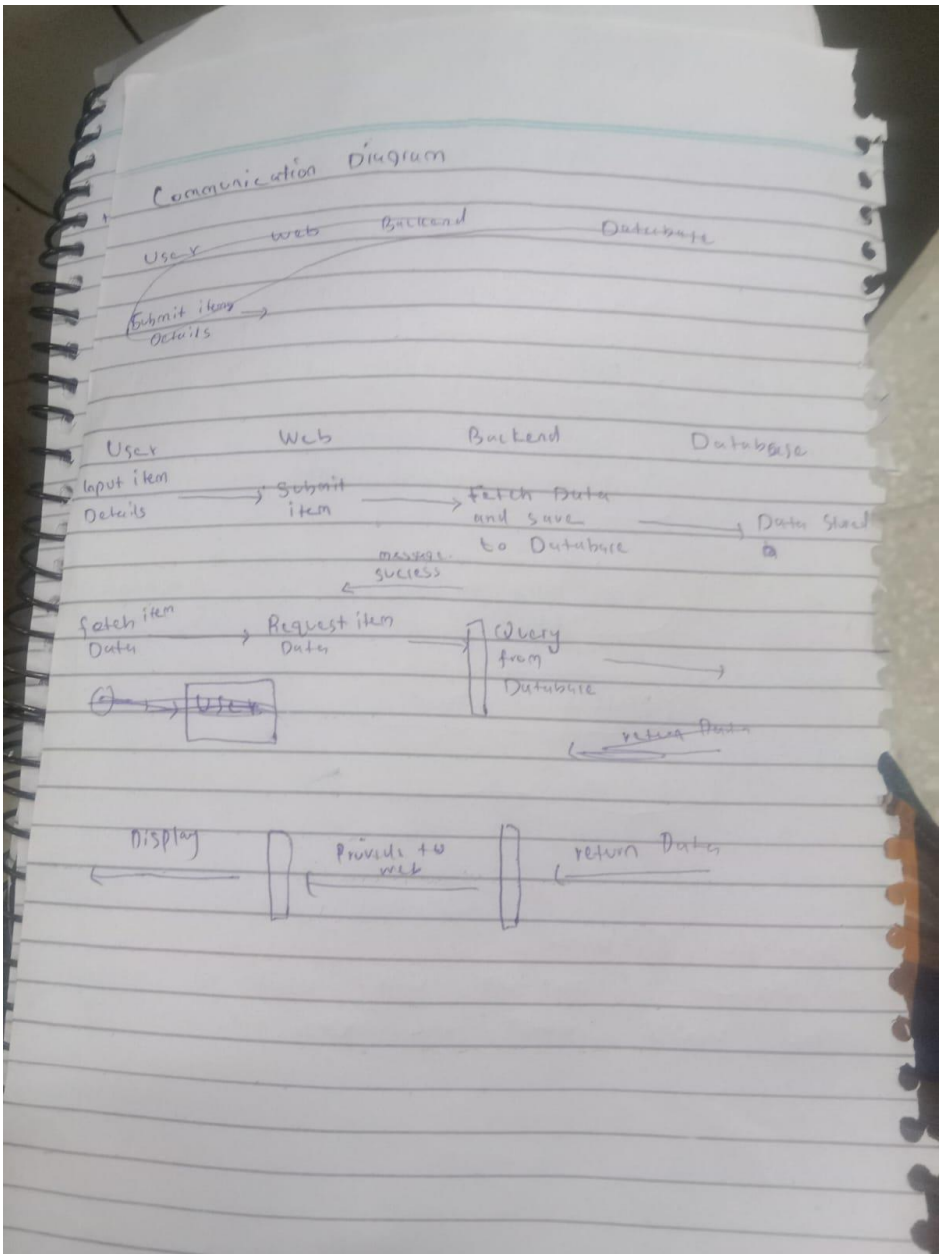
- **Admin**: Manages auctions.
- **Bidder**: Participates in bidding.



This diagram illustrates how bidders interact with the system to submit bids, and how the admin oversees auction management.

4. Communication Diagram: Submit Bid

This diagram shows how system components interact when a user submits a bid.



5. Observer Pattern Implementation

Design Pattern Used: Observer Pattern

Why?

To notify all registered bidders automatically when the highest bid changes.

Core Classes:

- **AuctionSubject**: Maintains a list of registered Bidder observers and handles bid submission.
- **Bidder (Interface)**: Declares the update() method.
- **ConcreteBidder**: Implements Bidder and defines how the observer responds to notifications.

6. Conclusion

This lab report demonstrates how the Observer Pattern can be applied to real-world scenarios like auction systems to enhance flexibility and maintainability. The system is designed to be scalable, allowing for future enhancements such as auction timers, auto-bidding, or admin analytics. The combination of use case and communication diagrams helped visualize object interactions clearly, aligning well with core software design principles.