

ISE 503 Final Group Project

ONLINE AUCTION PLATFORM DATABASE

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ABSTRACT

An online auction is conducted over the internet, providing a popular platform for buying and selling various products and services. Online auction systems facilitate customers in acquiring and selling products at competitive prices. The system is designed with the aim of ensuring reliability, simplicity, and efficiency. This application allows users to list and sell items ranging from household goods to other commodities directly on a website. It is created to be as user-friendly as browsing any typical website, making it accessible even to non-technical individuals who can easily engage with the platform's functionalities.

Acknowledgment

We extend our heartfelt gratitude to Professor Praveen Tripathi and our Teaching Assistant Aditya Patwardhan for their invaluable guidance, mentorship, and unwavering support throughout this journey. Their expertise and encouragement have been instrumental in shaping our project's success. Additionally, we acknowledge the Stony Brook University for providing us with the platform and resources to pursue our academic and professional aspirations.

This project not only reinforces our technical competencies but also underscores the transformative impact of innovative database solutions in modern-day applications.

INTRODUCTION

We are developing a database system for online auctions, where users can list items for auctioning through our website. Online auctioning is a platform dedicated to facilitating the sale of products through competitive bidding. In this project, users have the capability to place bids on specific items listed for auction. The primary goal of the e-auction process is to secure the optimal value and highest possible price for listed items. Achieving the best value involves more than

just focusing on the price; it encompasses factors that enhance the overall value proposition.

Our platform accommodates two categories of users: buyers and sellers. Sellers utilize the website to list their products for auction, while buyers participate in bidding to purchase these items. The product is awarded to the buyer with the highest bid. Users have the flexibility to place multiple bids on various products of interest.

Both buyers and sellers have distinct registration processes tailored to their roles within the auctioning system. Sellers register to list their products for auction, whereas buyers register to participate in bidding and purchase items. This dual registration framework ensures efficient management of user roles and facilitates seamless engagement within the auctioning ecosystem.

Our project is dedicated to developing an advanced online auction system, meticulously crafted to streamline the buying and selling processes of diverse items through an intuitive web interface. This report offers a detailed exploration of our system's architecture, database schema, essential functionalities, and the valuable insights garnered from its implementation.

Domain and System Overview

Our project resides within the domain of e-commerce and online auctions, aiming to provide a user-friendly platform where individuals can effortlessly navigate our website, procure paintings, artworks, or any desired items, and also list their own items for sale. This comprehensive platform encompasses crucial functionalities such as seamless item listing, robust bidding mechanisms, secure payment handling, interactive user engagement features, and extensive reporting capabilities.

Database Design and Utilization

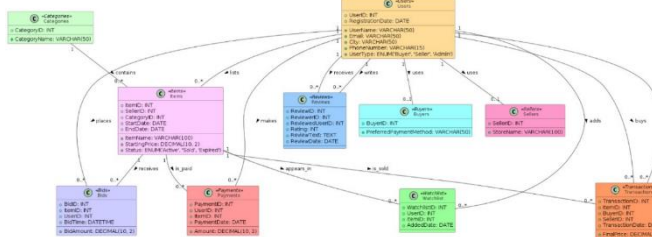
In implementing our system, we selected MySQL as the relational database management system of choice. MySQL was preferred for its proven reliability, scalability to manage complex queries and transactions, and seamless integration capabilities with web applications. It serves as the robust backbone for storing and managing various entities, their attributes, and intricate relationships within our auction platform. This choice ensures data integrity, rapid access to information, and efficient management of user interactions and transactional activities.

UML Diagram and Relationships

Central to our database architecture is the Unified Modeling Language (UML) diagram, meticulously designed to depict the intricate relationships and interactions among entities. Crafted by Priyanshu, the UML diagram illustrates vital relationships:

- **Users to Items:** Facilitating one-to-many relationships where users can list multiple items for auction, ensuring effective tracking of item ownership and activity.
- **Users to Bids, Payments, Reviews, and Transactions:** Highlighting various one-to-many relationships that track user engagement in bidding, payment transactions, reviews written and received, and transaction history as buyers and sellers.
- **Items to Categories:** Demonstrating a one-to-many relationship where each category can contain multiple items, enhancing organizational efficiency and searchability based on item categories.

These relationships are pivotal in defining the system's functionality and supporting its seamless operation, ensuring clarity in data flow and user interactions.



Use Case and Introduction

Our project's aim is to address the complexities and challenges inherent in traditional auction processes by offering a modern, digital solution that simplifies transactional experiences for both buyers and sellers. By leveraging advanced technologies and a robust database infrastructure, we empower users to engage in secure, transparent transactions while enjoying enhanced accessibility to a diverse array of items.

SQL Expertise and Learning

Throughout the project lifecycle, we extensively explored SQL queries ranging from foundational

concepts to advanced functionalities. We covered various SQL clauses and statements including joins, group by, order by, window functions, and aggregate functions. This comprehensive exposure not only enriched our technical proficiency but also deepened our understanding of relational databases and their practical applications in real-world scenarios.

Implementation of UI Design with XAMPP, PHP, HTML, CSS, and JavaScript

For the UI design, we utilized XAMPP, a cross-platform web server solution consisting of Apache, MySQL, PHP, and Perl. This combination allowed us to develop dynamic web pages using PHP for server-side scripting, ensuring robust connectivity between the frontend and backend components. HTML and CSS were employed for structuring and styling the user interface, providing a visually appealing and responsive design. JavaScript was integrated to enhance interactivity and user experience, ensuring seamless form submissions and data handling. The integration of XAMPP with PHP enabled the processing of user-submitted details such as name, last name, reference number, store name, buyer or seller status, gender, and other personal information, ensuring efficient data transfer and storage on the server upon form submission.

The screenshot shows the phpMyAdmin interface with a table named 'entry_details' containing the following data:

first_name	last_name	gender	buyer/seller	email	phone	review	store_name	registrationdate	city	it
John	Doe	male	buyer	john.doe@gmail.com	4989	excellent	Alexander Art Gallery	15-01-2024	São José dos Campos	2
Michael	Brown	male	buyer	michael.brown@gmail.com	4043	Excellent	Alexander Art Gallery	05-03-2024	Munich	2
Emily	Davis	female	seller	emily.davis@gmail.com	47	nice	Mia's Art Supplies	12-03-2024	Oelo	4
Matthew	Wilson	male	buyer	matthew.wilson@gmail.com	420	great work	Mia's Art Supplies	01-04-2024	Prague	1
Olivia	Taylor	female	seller	olivia.taylor@gmail.com	-1108	good work	Alexander Art Gallery	17-04-2024	Prague	6
James	Anderson	male	buyer	james.anderson@gmail.com	-2344	Nice work	Mia's Art Supplies	21-05-2024	Vienna	2
Sophia	Marinez	female	seller	sophia.marinez@gmail.com	-7104	well done, excellent work	Mia's Art Supplies	10-06-2024	Brussels	9
Benjamin	Thomas	male	buyer	benjamin.thomas@gmail.com	99033	nice work	Alexander Art Gallery	25-07-2024	Copenhagen	1
Isabella	Garcia	female	seller	isabella.garcia@gmail.com	96765	amazing work	Mia's Art Supplies	15-08-2024	São Paulo	9
William	Clark	male	buyer	william.clark@gmail.com	-13042	Outstanding product and excellent customer service	Olivia's Bookstore	30-09-2024	São José dos Campos	9

HTML and CSS

HTML (HyperText Markup Language) and CSS (Cascading Style Sheets) are fundamental technologies for structuring and styling web content. HTML defines the structure and elements of web pages, while CSS enhances their visual presentation and responsiveness, ensuring a user-friendly experience.

Enter First Name	
Enter Last Name	
Gender	<input type="radio"/> Male <input type="radio"/> Female
Buyer or Seller	<input type="radio"/> Buyer <input type="radio"/> Seller
Enter Email	
Enter Phone	
Review	
Store Name	
Registration Date	
City	
Registration No.	
<input type="button" value="Submit"/>	

Critical Setup Instructions for PHP Script Execution in XAMPP

In our XAMPP environment, the PHP script details_entry.php plays a pivotal role in storing user inputs into the MySQL database "database_1234". It is imperative that details_entry.php is placed within the C:\xampp\htdocs directory on the C drive to ensure proper functionality. This setup is essential for seamless data processing and integrity within our project's backend infrastructure.

first_name	last_name	gender	buyer/seller	email	phone	review	store_name	registrationdate	city
Mia	Levin	male	seller	mia.levin@gmail.com	-10830	top-notch quality!	Olivia's Bookstore	10-10-2024	Rio de Janeiro
Alexander	Lee	female	buyer	alexander.lee@gmail.com	934946670	Outstanding product	Olivia's Bookstore	22-11-2024	Brasilia
Amelia	Walker	female	seller	amelia.walker@gmail.com	-3431	great product and superb customer support	Isabella's Toy Store	05-12-2024	Edmonton
Daniel	Young	male	buyer	daniel.young@gmail.com	-2133	great product	Isabella's Toy Store	15-12-2024	Vancouver
Charlotte	King	male	seller	charlotte.king@gmail.com	-1957	Highly impressed	Isabella's Toy Store	10-01-2024	Mountain View
Elijah	Scott	male	buyer	elijah.scott@gmail.com	4732111	Highly impressed with the product's quality	Isabella's Toy Store	25-01-2024	Redmond
Harper	Adams	male	seller	harper.adams@gmail.com	-5297	Absolutely thrilled with the product!! Amazing product.	Sophia's Fashion	08-02-2024	New York

Future Implications

Looking ahead, our project's demonstration and implementation serve as a benchmark for future endeavors in similar domains. Its scalability, robustness, and user-centric design pave the way for enhanced functionalities, expanded feature sets, and potential integration with emerging technologies. The experience gained from this project has equipped us with invaluable insights into database management, system architecture, and collaborative project development.

Mock Dataset Overview

Our database schema encompasses several essential entities to support the functionalities of the auction system. Key entities include:

- **Users:** Store user information such as UserID, UserName, Email, Password, UserType, and RegistrationDate.
- **Categories:** Define different item categories with attributes like CategoryID and CategoryName.
- **Items:** Represent items listed for auction, detailing attributes like ItemID, SellerID, CategoryID, ItemName, StartingPrice, StartDate, EndDate, and Status.
- **Bids:** Capture bid data with BidID, ItemID, UserID, BidAmount, and BidTime.
- **Payments:** Record payment details including PaymentID, UserID, ItemID, Amount, and PaymentDate.
- **Reviews:** Manage user reviews with attributes like ReviewID, ReviewerID, ReviewedUserID, Rating, ReviewText, and ReviewDate.
- **Watchlist:** Track items added to user watchlists using attributes such as WatchlistID, UserID, ItemID, and AddedDate.
- **Transactions:** Log transactional data including TransactionID, ItemID, BuyerID, SellerID, TransactionDate, and FinalPrice.
- **Buyers and Sellers:** Profiles linked to Users table, distinguishing between buyers and sellers with additional details.

Interesting Questions and Queries

Throughout our project, we explored several intriguing questions and formulated complex queries to extract valuable insights from the dataset:

Top 5 items with the highest average bid amount

```
SELECT i.ItemName, AVG(b.BidAmount) AS AverageBid
FROM Items i
JOIN Bids b ON i.ItemID = b.ItemID
GROUP BY i.ItemName
ORDER BY AverageBid DESC
LIMIT 5;
```

Sellers with the highest average rating from buyers

```
SELECT s.StoreName, AVG(r.Rating) AS  
AverageRating  
FROM Sellers s  
JOIN Users u ON s.SellerID = u.UserID  
JOIN Reviews r ON u.UserID =  
r.ReviewedUserID  
GROUP BY s.StoreName  
ORDER BY AverageRating DESC  
LIMIT 5;
```

Categories generating the most revenue

```
SELECT c.CategoryName,  
SUM(t.FinalPrice) AS TotalRevenue  
FROM Categories c  
JOIN Items i ON c.CategoryID =  
i.CategoryID  
JOIN Transactions t ON i.ItemID = t.ItemID  
GROUP BY c.CategoryName  
ORDER BY TotalRevenue DESC;
```

These queries exemplify our capability to derive meaningful insights from the dataset, providing actionable information for decision-making and system optimization.

Outcome

The implementation of our online auction system has yielded a robust platform that effectively meets the needs of users engaging in e-commerce activities. We have successfully integrated database management principles with web development technologies, resulting in a functional and user-friendly interface.

Conclusion

In conclusion, our project has demonstrated a cohesive approach to database design, system architecture, and web development in creating an innovative online auction platform. Through collaborative efforts and leveraging diverse skills, we have achieved a scalable solution capable of supporting varied user interactions and business operations within the domain of e-commerce.

This report encapsulates our journey starting from conceptualization to implementation, highlighting the challenges overcome, lessons learned, and the impactful insights generated through our database-driven approach to online auction management.

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