**Title of the course:** CS 6360.003 Database Design

**Title of the project:** Online Auction Database system

**Name of the instructor:** Dr. Jalal Omer

**Name of the Teammates:** Abhishek Mekala mxa210040

Ananya Reddy Katpally axk210053

Pavan Kumar Dandamudi pxd200034

Poojitha Bijjam pxb190029

Rushmitha Aluka rxa200038

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1. **INTRODUCTION**

Online Auction Database system is an application which is developed in which members (buyers and sellers) participate in the sale of items. Admin manages the application.

1. **System requirements:**

**Context Diagram**

Diagram

Description automatically generated

**Interface Requirements**

Graphical User Interface Requirements Online Auction is a web-based application. The application GUI is programmed with HTML and Java. When you browse the Web, you use your web browser to request resources from a web server and the web server responds with the resources. You make these requests by filling in and submitting forms, clicking on links, or typing URLs into your browser.

Website Welcome Page: New users Can view the welcome page which display the features of the online auction site. New users can browse through all categories for details of items such as the seller and the current bidding price.

Login Page: If the user wants to bid on or buy an item, the visitor will be redirected to the login/registration page. The registration page is for new users to create an account using Email and password. Existing users can use the login page to access their accounts.

Admin Page: Admin can control all the operations of the online Auction application and database Hardware Interface Requirements

Processor: 2 x 1,6 GHz CPU RAM: 8-16 GB

RAM

storage: 1 GB

Software Interface Requirements

1. Windows/ Mac/ Android Server

2. SQL Server

3. Java and PHP

4. Front-end web server

The system consists of the login module which verifies and authenticates the data of both the user and seller. The system has administrator who cross checks the login details of the users, let the users to create accounts, let the users to logout and the system will be able to store the data of buyer and products well who has registered to this online auction system. The system should keep all the information about the users and product secure without letting anyone to access it other than the data administrator.

**Functional requirements:**

Buyer: User logins into system and can view different products posted in the system and can join the bid for the product and participate. If he wins a transaction takes place between the buyer and seller and products gets delivered to the shipping address given by buyer.

Seller: User logins into system and can add multiple products and their details for auction and views the auction and seller can ship the product to the auction winner after transaction with buyer. Admin: Admin manages login of the users and details of products, transactions. generates unique number to the products and checks with the feedback from users. Admin can manipulate the data in the database based on the requirements.

**Non-Functional Requirements:**

Performance: As the optimized database will be used so that there will not be any delay in the user view (i.e the User Interface taking time to retrieve the records).

Scalability: When the users increase, the system will be able to make any changes following the data Independences (Physical Data Independence, Logical Data Independence).

Compatibility: This application will not interrupt other applications or processes within these environments.

Reliability: This system will not show any discrepancies with the actual data, when a bid is already expired, then the respective one will not be shown as active.

Usability: The User Interface will be self-explanatory so that the users need not go through manuals to use this application. Security: This application takes security as its priority with proper authentication, authorization, and data being protected from intruders.

Availability: This system will be up all the time unless a short maintenance window is scheduled before the hand.

1. **Conceptual Design of Database**

Diagram

Description automatically generated

**Business rules and integrity constraints:**

Business rule and integrity constraints are obtained from users when gathering requirements. The requirements-gathering process is very important, and its results should be verified by the user before the database design is built. If the business rules are incorrect, the design will be incorrect, and ultimately the application built will not function as expected by the users.

**Business rules:**

* Only the admin can manipulate the data in the database.
* Only the database administrator maintains and can access the information about the users and products.
* Base price of the product is decided only by the seller.
* Only sellers have accounts where they will receive the customer orders and respond to them.

**Integrity constraints:**

* Restrictions on actual values in a database.

There are 4 integrity constraints:

1. Domain
2. Key
3. Entity integrity
4. Referential integrity

* E-mail address, name, password, home address, and phone number field cannot be null while registering the user.
* The email and phone number must be unique.
* Feedback or rating must be provided by the customer.

**4. Logical Database Schema:**

USERS (`id`, `name`, `username`, `password`, `email`, `contact`, `address`, `type`, `date\_created`)

PRODUCTS (`id`, `category\_id`, `name`, `description`, `start\_bid`, `regular\_price`, `bid\_end\_datetime`, `img\_fname`, `date\_created`)

CATEGORY (‘id`, `name`) (1, 'Sample Category')

SYSTEM\_SETTINGS (`id`, `name`, `email`, `contact`, `cover\_img`, `about\_content`)

BIDS (`id`, `user\_id`, `product\_id`, `bid\_amount`, `status`, `date\_created`)

**SQL statements:**

CREATE TABLE `bids` (

`id` int(30) NOT NULL,

`user\_id` int(30) NOT NULL,

`product\_id` int(30) NOT NULL,

`bid\_amount` float NOT NULL,

`status` tinyint(1) NOT NULL DEFAULT 1 COMMENT '1=bid,2=confirmed,3=cancelled',

`date\_created` datetime NOT NULL DEFAULT current\_timestamp() ON UPDATE current\_timestamp()

) ;

INSERT INTO `bids` (`id`, `user\_id`, `product\_id`, `bid\_amount`, `status`, `date\_created`) VALUES

(2, 5, 1, 7500, 1, '2020-10-27 14:18:50'),

(4, 5, 3, 155000, 1, '2020-10-27 16:37:29');

CREATE TABLE `categories` (

`id` int(30) NOT NULL,

`name` varchar(200) NOT NULL

) ;

INSERT INTO `categories` (`id`, `name`) VALUES

(1, 'Sample Category'),

(2, 'Appliances'),

(3, 'Desktop Computers'),

(4, 'Laptop'),

(5, 'Mobile Phone');

CREATE TABLE `products` (

`id` int(30) NOT NULL,

`category\_id` int(30) NOT NULL,

`name` varchar(200) NOT NULL,

`description` text NOT NULL,

`start\_bid` float NOT NULL,

`regular\_price` float NOT NULL,

`bid\_end\_datetime` datetime NOT NULL,

`img\_fname` text NOT NULL,

`date\_created` datetime NOT NULL DEFAULT current\_timestamp()

) ;

INSERT INTO `products` (`id`, `category\_id`, `name`, `description`, `start\_bid`, `regular\_price`, `bid\_end\_datetime`, `img\_fname`, `date\_created`) VALUES

CREATE TABLE `system\_settings` (

`id` int(30) NOT NULL,

`name` text NOT NULL,

`email` varchar(200) NOT NULL,

`contact` varchar(20) NOT NULL,

`cover\_img` text NOT NULL,

`about\_content` text NOT NULL

);

INSERT INTO `system\_settings` (`id`, `name`, `email`, `contact`, `cover\_img`, `about\_content`) VALUES

CREATE TABLE `users` (

`id` int(30) NOT NULL,

`name` text NOT NULL,

`username` varchar(200) NOT NULL,

`password` text NOT NULL,

`email` varchar(200) NOT NULL,

`contact` varchar(100) NOT NULL,

`address` text NOT NULL,

`type` tinyint(1) NOT NULL DEFAULT 2 COMMENT '1=Admin,2=Subscriber',

`date\_created` datetime NOT NULL DEFAULT current\_timestamp()

) ;

INSERT INTO `users` (`id`, `name`, `username`, `password`, `email`, `contact`, `address`, `type`, `date\_created`) VALUES

**7.Functional Dependencies and Normalization**

Functional Dependencies(FD’s):  
Functional dependency plays a vital role to differentiate a good or bad database design. A functional dependency is a type of constraint the that is a generalisation in the notion of key. Functional dependencies are the constraints on the set of legal relations. It depicts relationships between attributes

For any relation R containing attributes A and B and if for every valid instance of A determines uniquely values of B. It is expressed as - A—>B, A is determinant  
- A determines B  
- B is determined by A

The functional dependencies for the attributes involved in the above relation scheme is shown below

Attributes: user\_number: phone\_number: Home\_address: PID: Pname: Email:  
session\_id: transaction\_id: item\_id: Bid\_id:

Name:  
Functional Dependencies:  
user\_number—>phone\_number, name, home\_addres, Zipcode, streetno, privilege\_id, rating, comment, email, city, purchase\_history, description  
phone\_number—> user\_number, name, home\_addres, city, zip code, streetno, rating, comment,  
email  
Home\_address—> city, zipcode, streetno  
Pname—> description, price, item\_id, start\_price\_bid, bid rate, session\_id, purchase\_history, transaction\_id, transaction\_type, start\_date\_of\_auction, end\_date, time of bid, bid\_id Pname—> price, description  
Email—> user\_number, phone\_number, name,  
address, city, zipcode, streetno, rating, comment, privilege\_id, purchase\_history session\_id—> bidding\_process, purchase history transaction\_id—> transaction\_type, user\_number, phone\_number, name, home\_address, city, zipcode,  
streetno, PID, Pname, email, privilage\_id, session\_id, Bid\_id,Bid\_rate  
item\_id—> start\_dateof\_auction, description, price,  
title, start\_price\_bid, increase\_bid, end\_date, time\_of\_bid, PID, Pname  
Bid\_id—> PID, Pname, session\_id, bidding process, start\_of\_auction, price, description, title, item\_id, start\_price\_bid, increase\_bid, end\_date, time\_of\_bid, bid\_rate  
name—> description

**9. User application interface**

**Admin side**

**Login Page**

The page where system administrators and management employees enter their system credentials to gain access to the system's data and functions.

**Home Page**

When logging into the system, the system admin is automatically forwarded to this page.

**Category Page**

The product categories are listed and controlled on this page.

**Products Page**

The page where the system administrator or personnel manages the auction or bidding list.

**Bids Page**

The page where you will see a list of bids and their status.

**User Page**

The system administrator handles the list of system users on this page.

**System Settings Page**

This is the page where the system administrator handles the system's data.

**Subscribers or User Page**

**Home page**

When users or subscribers visit the bidding system website, they will be forwarded to this page by default.

**About Page**

The page where the website’s about page shown.

**Login Modal**

The popup modal on the website where the user enters their system credentials to use the website's bidding feature.

**Signup Modal**

The new subscriber or user's account is created in this popup modal.

**Product View Modal**

The modal that shows all the product's info for bidding. This is where the subscriber or user places their bid for the product they want.

**10.**

1. Create view user\_details as  
Selectuser.user\_num,member.name,user.city,member.zipcode,user.street\_no,user.phone\_number,account.email,feedback.rating,feedback.comment from user, account, feedback where user.user\_num=account.user\_num and user.user\_num=feedback.user\_num;

mysql> select \* from user\_details; +------------+-----------+---------+---------+-----------+--------------+-----------------------+-------- +-------------------+  
| member\_num | name | city | zipcode | street\_no | phone\_number | email | rating | comment | +------------+-----------+---------+---------+-----------+--------------+-----------------------+-------- +-------------------+  
| 123 | Rushmitha | Atlanta | 30305 |  
4 | Very fair bidding |  
| 125 | Abhishek | Chicago | 75080 |  
5 | Got a good deal |  
| 127 | Pavan | dallas | 12899 |  
3 | could be improved | +------------+-----------+---------+---------+-----------+--------------+-----------------------+-------- +-------------------+  
3 rows in set (0.01 sec)

2521 | 1234567890 | rushmitha12@gmail.com | 2324 | 4994567897 | abhishek12@gmail.com |

1236 | 1234567899 | pavan12@gmail.com |

2.  
Create view search\_details as  
Select search.session\_id,search.bidding\_process,search.purchase\_history,product.p\_id,product.p\_na me from search, product where search.session\_id=product.session\_id;

mysql> select \* from search\_details; +------------+----------------------+--------------------+------+--------------+ | session\_id | bidding\_process | purchase\_history | p\_id | p\_name +------------+----------------------+--------------------+------+--------------+

|

|

* |  122 | online
* |  212 | online
* |  312 | in-person
* |  412 | online and in-person | 21 items purchased | 12 | necklace +------------+----------------------+--------------------+------+--------------+ 4 rows in set (0.01 sec)

| 4 items purchased | 89 | sword |  
| 0 items purchased | 31 | antique gold |

| 2 items purchased | 39 | Book |

3.  
mysql> Create view item\_details as Select items.item\_id,items.title,items.price,items.description,items.start\_date,items.end\_date,items.s tart\_price,items.increase\_bid,items.member\_num,items.unique\_id,category.cat\_description,bi ds.time\_of\_bids,bids.bid\_rate from items, bids, category where bids.unique\_id=items.unique\_id and items.item\_id=category.item\_id;  
Query OK, 0 rows affected (0.01 sec)

mysql> select \* from item\_details; +---------+-----------+-------+-----------------------------------------------+------------+------------+--- ----------+--------------+------------+-----------+-------------------------------------+--------------+---- ------+  
| item\_id | title | price | description | start\_date | end\_date | start\_price | increase\_bid | member\_num | unique\_id | cat\_description | time\_of\_bids | bid\_rate | +---------+-----------+-------+-----------------------------------------------+------------+------------+--- ----------+--------------+------------+-----------+-------------------------------------+--------------+---- ------+  
| 111 | jewellery | 12 | diamond set which includes the antique design | 2020-11-11 | 2020- 12-11 | 10000 | 15000 | 123 | 1234 | Ancient Jewellery, Antique... | 05:15:02 | 5|

| 222 | Paintings | 29038 | Picasso famous art- the weeping woman | 2021-09-11 |

2021-10-11 | 06:15:02 | | 333 | Car 145600 |

282846 | 29032890 | 124 | 1235 | Arts includes paintings... | 10 |

| 10000 | ancient car from 11st century | 2021-12-11 | 2022-01-11 | 178900 | 125 | 1236 | Moving objects like cars, trucks... | 07:15:34 |

45 | +---------+-----------+-------+-----------------------------------------------+------------+------------+--- ----------+--------------+------------+-----------+-------------------------------------+--------------+---- ------+  
3 rows in set (0.01 sec)

**11. User application interface:**

The Online Bidding System is developed using HTML, CSS, PHP/MySQLi, JavaScript (Ajax/jQuery) and Bootstrap for the styling. The system has two sides. One is the user interface, one is for the subscriber or the possible buyer side and one is the admin side which is the side where the management will manage the data in the project. Buyers make bids for items they are interested in. Bid price and time of bid is recorded.

Admin side: The main dashboard page, about us, login page are main three components. The login page is where system administrators and management employees enter their system credentials to gain access to the system's data and functions. The main home page gives us various options like category page, products page, bids page, user page, system settings page. When we click on the color the details of the item are displayed.

User side: Home page, login page, sign up page. The user will have to login first before being able to access the homepage to bid for items.

Various functions are offered to the user like a member can be a buyer or a seller. A buyer can login and bid for items. Each buyer has a shipping address recorded in the database. A seller has a bank account number and routing number recorded in the database to where the payment is sent. All the items are recorded in the database that are put up for bidding. Items are placed by a seller for sale and are identified by a unique item number assigned by the system. Items are also described by an item title, a description, starting bid price, bidding increment. The highest bid price is declared the winner and a transaction between buyer and seller may then proceed.

**12.Conclusions and Future work:**

Online auction research has seen a remarkable growth in the last several years. This project categorizes it within an online auction research framework. Online auction design that shows how technology can be incorporated into auction design to affect the price paid by bidders. Also, more seller-level analysis, especially in the context of marketing research, could be performed to show how seller-level effects, such as promotion, market presence, etc., can affect the price paid in online auctions.

The online auction portal works very well in all of its functionality. However, some future works can be done on the existing system:

• Add an security system. Since a registered user can post new auctions, place bids, send messages etc., username and password are sensible data. So, it could be useful to protect these data from being intercepted by a third party.

• Add a chat room to the portal.

• Add a more attractive graphics to the web pages of the portal.

• Add a credit card payment system. It would be nice for users to make payments using their own credit card to exchange money with the help of the website.

**13. References:**

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