



Online Auction System

Your Ultimate Online Auction Destination

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Project vision and mission

To create a dynamic and user-friendly online auction platform that revolutionizes the buying and selling experience by providing a seamless and secure environment for users to engage in bidding activities remotely.

01.


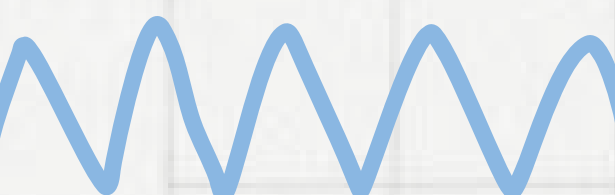
Develop a comprehensive database schema tailored to efficiently manage user profiles, item listings, bidding activities, auction events, and transaction records, ensuring seamless data integration and interaction throughout the auction process

02.

Implement real-time bidding functionality to enable users to track the latest bidding activity and ensure transparency and competitiveness in the auction process.

03.

Prioritize scalability, security, and user experience in the design and implementation of the online auction platform, aiming to accommodate a growing user base while safeguarding user data and providing an intuitive and engaging interface.



Ideation process

01

Problem Definition and Data Modelling:
Clearly define the problem statement and model the data using Entity-Relationship (ER) techniques.

02

Database Design, Data Dictionary, and Query Language:
Design the database schema, create a data dictionary, and generate Data Definition Language (DDL) commands.

03

Triggers and Procedure:
Implement triggers and procedures to enforce data integrity and streamline complex operations.

04

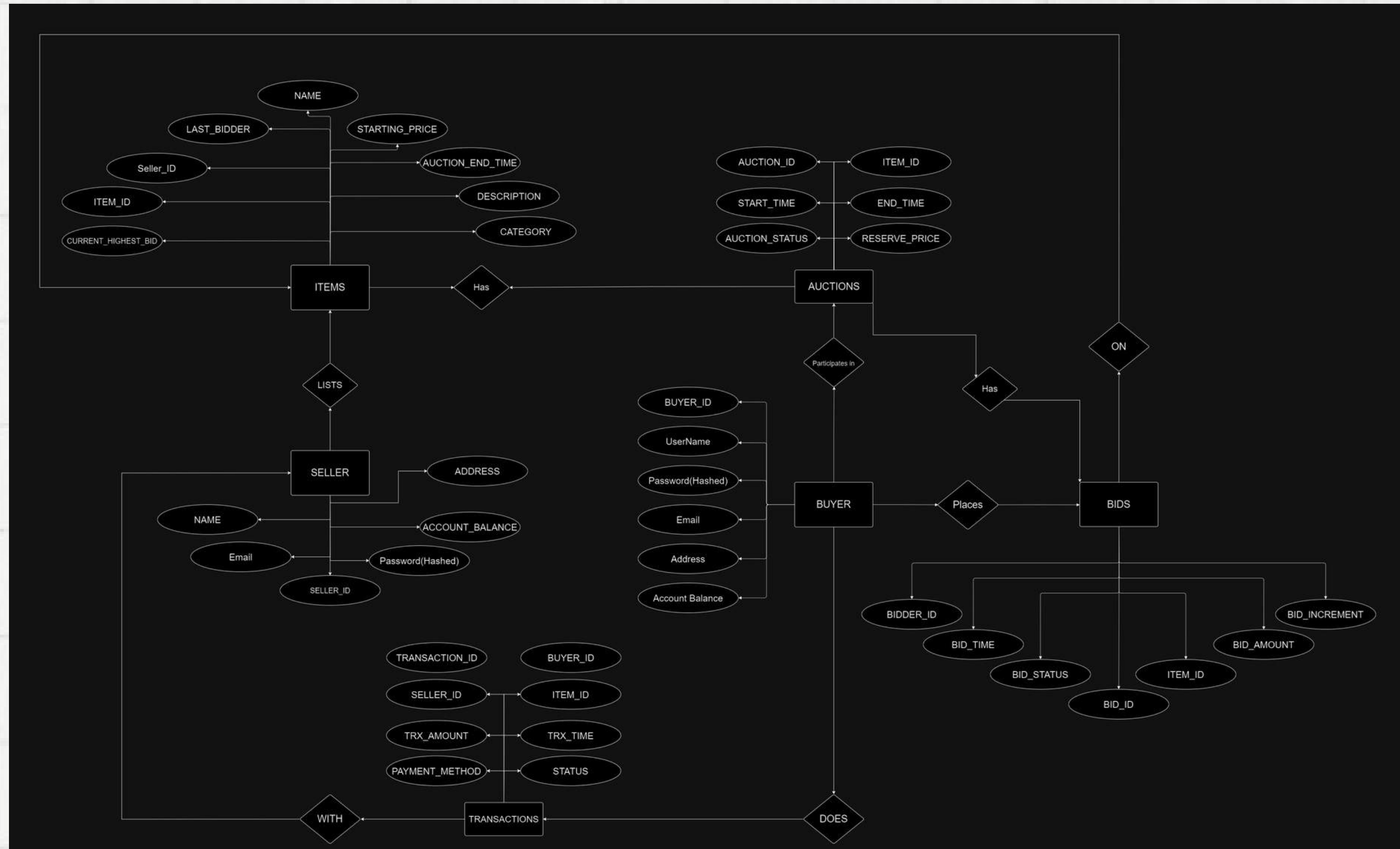
Database Connectivity, GUI & Reports:
Develop a user-friendly frontend interface and generate reports for enhanced user experience and analytical insights.



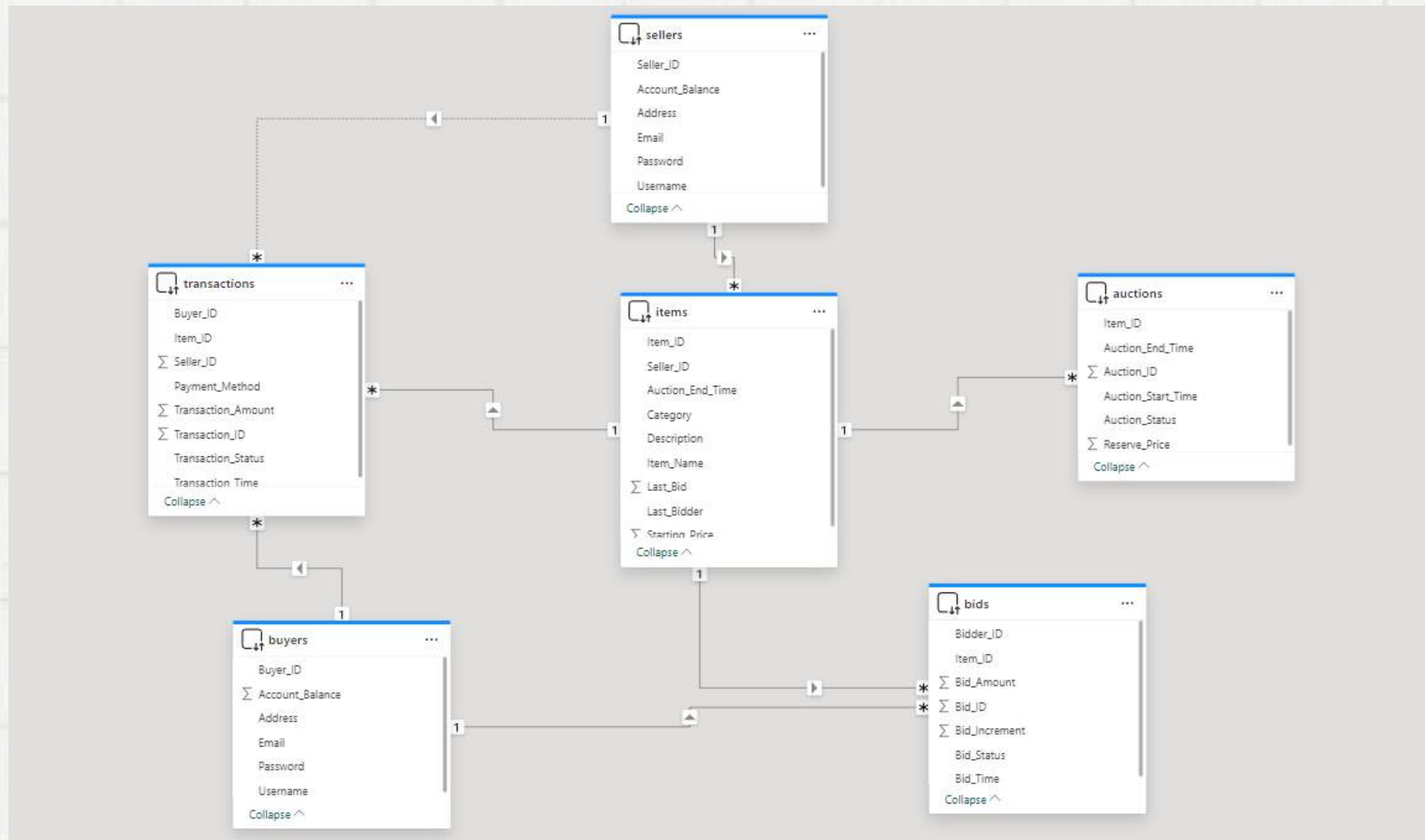
Creation process

In creating our online auction platform, we've opted for a straightforward approach, utilizing React for the frontend and Node.js for the backend, ensuring a user-friendly experience. Our choice of MariaDB as the database solution has allowed us to effectively store and manage user, item, bid, auction, and transaction data. The core of our database design revolves around key tables such as Users, Items, Bids, Auctions, and Transactions, meticulously crafted to ensure seamless interaction and data integration. Real-time bidding features have been integrated to keep users informed of the latest bids, fostering engagement and competitiveness. Through our platform, users can conveniently buy and sell goods remotely, marking a significant shift in the online auction experience towards simplicity and accessibility.

ER MODEL



Data Model



Database Design

```
CREATE TABLE Buyers (  
  Buyer_ID INT PRIMARY KEY,  
  Username VARCHAR(50) NOT NULL,  
  Password VARCHAR(255) NOT NULL,  
  Email VARCHAR(100) NOT NULL,  
  Address VARCHAR(255) NOT NULL,  
  Account_Balance DECIMAL(10, 2) DEFAULT 0  
);
```

```
CREATE TABLE Sellers (  
  Seller_ID INT PRIMARY KEY,  
  Username VARCHAR(50) NOT NULL,  
  Password VARCHAR(255) NOT NULL,  
  Email VARCHAR(100) NOT NULL,  
  Address VARCHAR(255) NOT NULL,  
  Account_Balance DECIMAL(10, 2) DEFAULT 0  
);
```

```
CREATE TABLE Items (  
  Item_ID INT PRIMARY KEY,  
  Seller_ID INT NOT NULL,  
  Item_Name VARCHAR(255) NOT NULL,  
  Description TEXT,  
  Starting_Price DECIMAL(10, 2) NOT NULL,  
  Auction_End_Time DATETIME NOT NULL,  
  Category VARCHAR(50) NOT NULL,  
  Last_Bidder VARCHAR(255) DEFAULT NULL,  
  Last_Bid DECIMAL(10, 2) DEFAULT NULL,  
  FOREIGN KEY (Seller_ID) REFERENCES Sellers(Seller_ID)  
);
```

```
CREATE TABLE Bids (  
  Bid_ID INT PRIMARY KEY,  
  Bidder_ID INT NOT NULL,  
  Item_ID INT NOT NULL,  
  Bid_Amount DECIMAL(10, 2) NOT NULL,  
  Bid_Time DATETIME NOT NULL,  
  Bid_Status VARCHAR(20) NOT NULL,  
  Bid_Increment DECIMAL(10, 2) DEFAULT 0,  
  FOREIGN KEY (Bidder_ID) REFERENCES Buyers(Buyer_ID),  
  FOREIGN KEY (Item_ID) REFERENCES Items(Item_ID)  
);
```

```
CREATE TABLE Auctions (  
  Auction_ID INT PRIMARY KEY,  
  Item_ID INT NOT NULL,  
  Auction_Start_Time DATETIME NOT NULL,  
  Auction_End_Time DATETIME NOT NULL,  
  Auction_Status VARCHAR(20) NOT NULL,  
  Reserve_Price DECIMAL(10, 2) DEFAULT 0,  
  FOREIGN KEY (Item_ID) REFERENCES Items(Item_ID)  
);
```

```
CREATE TABLE Transactions (  
  Transaction_ID INT PRIMARY KEY,  
  Buyer_ID INT NOT NULL,  
  Seller_ID INT NOT NULL,  
  Item_ID INT NOT NULL,  
  Transaction_Amount DECIMAL(10, 2) NOT NULL,  
  Transaction_Time DATETIME NOT NULL,  
  Payment_Method VARCHAR(50) NOT NULL,  
  Transaction_Status VARCHAR(20) NOT NULL,  
  FOREIGN KEY (Buyer_ID) REFERENCES Buyers(Buyer_ID),  
  FOREIGN KEY (Seller_ID) REFERENCES Sellers(Seller_ID),  
  FOREIGN KEY (Item_ID) REFERENCES Items(Item_ID)  
);
```


Normalization

The data has been normalized up to the third normal form (3NF) to ensure data integrity and reduce redundancy. In the initial stage, the Buyers and Sellers tables were created separately to store information specific to each entity, such as their unique IDs, usernames, passwords, emails, addresses, and account balances. This separation eliminates the need to duplicate buyer and seller information in other tables, minimizing data redundancy.

The Items table is designed to store information about each item listed for auction, including details such as the item's ID, seller ID, name, description, starting price, auction end time, category, last bidder, and last bid. The seller ID is included as a foreign key to establish a relationship with the Sellers table, ensuring referential integrity.

The Bids table maintains records of all bids made on items, storing information such as the bid ID, bidder ID, item ID, bid amount, bid time, bid status, and bid increment. Foreign key constraints are applied to the bidder ID and item ID columns, referencing the Buyers and Items tables, respectively, to maintain consistency and enforce data integrity.

The Auctions table tracks information related to auction events, including the auction ID, item ID, auction start time, auction end time, auction status, and reserve price. The item ID is linked as a foreign key to the Items table, establishing a connection between auctions and their corresponding items.

Finally, the Transactions table records completed transactions, capturing details such as the transaction ID, buyer ID, seller ID, item ID, transaction amount, transaction time, payment method, and transaction status. Foreign key references to the Buyers, Sellers, and Items tables ensure that transaction records are associated with the correct buyers, sellers, and items, respectively, maintaining data consistency across the database.

Data Queries

```
MariaDB [dbms]> SELECT Item_ID, AVG(Bid_Amount) AS Avg_Bid_Amount  
→ FROM Bids  
→ GROUP BY Item_ID;
```

Item_ID	Avg_Bid_Amount
1	675.000000
2	425.000000
3	1475.000000
4	25750.000000
5	975.000000
6	1550.000000
7	46500.000000
8	3200.000000
9	61500.000000
10	1850.000000
11	925.000000
12	4150.000000
13	56000.000000
14	8200.000000
15	7450.000000
16	11250.000000
17	14500.000000
18	2900.000000
19	5350.000000
20	36000.000000
21	2050.000000
22	18500.000000
23	3400.000000
24	1750.000000
25	40000.000000

25 rows in set (0.001 sec)

```
MariaDB [dbms]> SELECT Item_ID, MAX(Bid_Amount) AS Highest_Bid_Amount  
→ FROM Bids  
→ GROUP BY Item_ID;
```

Item_ID	Highest_Bid_Amount
1	700.00
2	450.00
3	1500.00
4	26000.00
5	1000.00
6	1600.00
7	47000.00
8	3300.00
9	62000.00
10	1900.00
11	950.00
12	4300.00
13	57000.00
14	8400.00
15	7700.00
16	11500.00
17	15000.00
18	3000.00
19	5500.00
20	37000.00
21	2100.00
22	19000.00
23	3500.00
24	1800.00
25	41000.00

25 rows in set (0.002 sec)

Data Queries

```
MariaDB [dbms]> SELECT Category, AVG(Starting_Price) AS Avg_Starting_Price  
→ FROM Items  
→ GROUP BY Category;
```

Category	Avg_Starting_Price
Appliances	7285.714286
Collectibles	1800.000000
Electronics	32769.230769
Fashion	4957.142857
Fitness	5000.000000
Furniture	8375.000000
Grocery	350.000000
Home & Decor	2200.000000
Sports & Outdoors	12000.000000
Travel & Outdoor	4125.000000

```
10 rows in set (0.000 sec)
```

Data Queries

```
MariaDB [dbms]> SELECT Username, Account_Balance  
→ FROM Buyers  
→ ORDER BY Account_Balance DESC  
→ LIMIT 5;
```

Username	Account_Balance
raj_sharma	7000.00
arnav.kapoor	6800.00
aditya31	6500.00
shreya.m	6200.00
harshit123	6200.00

```
5 rows in set (0.000 sec)
```

Triggers

1. **trg_unique_username**: Before inserting into the Buyers table, this trigger checks if the username already exists to maintain uniqueness, preventing duplicate entries.
2. **trg_unique_username_seller**: Similarly, before inserting into the Sellers table, this trigger ensures that the username is unique, maintaining data integrity.
3. **set_last_bid_default**: This trigger sets the Last_Bid column in the Items table to the Starting_Price if it is NULL, ensuring a default value is present.
4. **trg_update_last_bid**: After inserting a bid into the Bids table, this trigger updates the Last_Bidder and Last_Bid columns in the Items table with the latest bid information.
5. **trg_update_buyer_balance**: Upon inserting a transaction into the Transactions table, this trigger updates the buyer's account balance by subtracting the transaction amount, ensuring accurate balance tracking.

Triggers

6. **trg_update_seller_balance**: Similarly, after inserting a transaction, this trigger updates the seller's account balance by adding the transaction amount, maintaining balance accuracy.
7. **after_auction_update_set_winning_bid_trigger**: This trigger sets the winning bid for an item after the auction ends, updating the Bids table with the highest bid and marking it as 'Winning'.
8. **end_auction_insert_transactions_trigger**: Before updating the auction status to 'Closed', this trigger inserts a transaction into the Transactions table for the winning bid, updating buyer balances accordingly.
9. **update_auction_status**: Before inserting into the Auctions table, this trigger automatically sets the auction status to 'Closed' if the end time has passed.
10. **create_bid_entry_after_update**: After updating an item in the Items table, this trigger creates a new bid entry in the Bids table, reflecting any changes in the last bid amount and bidder.

Procedures

- 1. CalculateAverageTransaction:** Calculates the average transaction amount for a given seller ID and returns the result.
- 2. CountBidsForItem:** Counts the number of bids for a specific item ID and returns the count.
- 3. FindMaxBidAmountForItem:** Finds the maximum bid amount for a given item ID and returns the result.
- 4. CalculateTotalSalesAmount:** Calculates the total sales amount for a specified seller ID and returns the result.
- 5. CalculateAverageAuctionDuration:** Calculates the average duration of auctions for a given category and returns the result.
- 6. CountItemsSoldByBuyer:** Counts the number of items sold by a specified buyer ID and returns the count.

Login Page

Bid Items

Login

raj_sharma

Buyer

Login

View Products Page
















Bid Items

Logout

View Products

UserProfile

Product List

TITLE	BASE PRICE	LAST BIDDER	SELLER	LAST BID	COUNTDOWN	BID
DSLR Camera	60000.00	None	bookworm_books	60000.00	0d 8h 22m 22s	
Office Chair	8000.00	raj_sharma	garden_oasis	8000.00	0d 12h 22m 22s	
Tea Set	800.00	None	crafty_creations	800.00	1d 6h 22m 22s	
Antique Clock	1800.00	None	home_appliances	1800.00	2d 11h 22m 22s	
Air Purifier	10000.00	None	gadget_galaxy	10000.00	3d 10h 22m 22s	
Bicycle	12000.00	None	fitness_freaks	12000.00	4d 13h 22m 22s	
Smart Watch	35000.00	None	beauty_boutique	35000.00	6d 7h 22m 22s	
Backpack	2000.00	None	grocery_galore	2000.00	7d 9h 22m 22s	
Sofa Set	18000.00	None	gadget_hub	18000.00	8d 11h 22m 22s	
Smart Speaker	3000.00	None	fashionista	3000.00	9d 13h 22m 22s	
Sunglasses	4500.00	None	pet_paradise	4500.00	10d 7h 22m 22s	
Wall Art	1500.00	None	handmade_hub	1500.00	12d 15h 22m 22s	
Barbecue Grill	20000.00	None	stationary_stop	20000.00	13d 12h 22m 22s	
Laptop	85000.00	None	sports_corner	85000.00	14d 9h 22m 22s	
Yoga Mat	4000.00	None	fashion_fusion	4000.00	15d 6h 22m 22s	

Bid on Products Page

Bid Items

Logout

View Products

UserProfile

Place a Bid

DSLR Camera

Bidding Amount

SEND

User Profile Page

[Bid Items](#)

[Logout](#)

[View Products](#)

[UserProfile](#)

Profile

Username: raj_sharma

Email: raj.sharma@yahoo.com

Address: 456 MG Road, Banglore,India

Account Balance: ₹431,999.96

Seller Dashboard

[Bid Items](#)

[Logout](#)

[Seller Dashboard](#)

[Add Product](#)

[View Products](#)

Seller Admin Dashboard

[View Products](#)

[Add Product](#)

Products Listed by Seller

Bid Items

Logout

Seller Dashboard

Add Product

View Products

Product List

Product ID	Seller ID	Product Name	Description	Starting Price	Auction End Time	Category	Last Bidder	Last Bid
3	3	Designer Saree	Pure silk saree with zari work	1200.00	2024-05-11T11:07:00.000Z	Fashion	raj_sharma	
51	3	Atest	atest1	1.00	2024-05-25T00:01:00.000Z	Electronics	None	

< 1 >

List New Product

Bid Items

Logout

Seller Dashboard

Add Product

View Products

Add a new product

Name of the product

Description

Starting price

Auction Start Time

Auction End Time

Category

SEND

Admin Dashboard

Bid Items

Logout

Admin Dashboard

Auctions History

Transaction History

Bids Placed

Admin Dashboard

Auctions History

Transaction History

Bids Placed

Auctions History

Bid Items

Logout

Admin Dashboard

Auctions History

Transaction History

Bids Placed

Auctions History

ID	ITEM NAME	DESCRIPTION	START TIME	END TIME	STATUS	RESERVE PRICE
1	Handcrafted Pot	Handmade terracotta pot with floral motifs	2024-04-10T02:30:00.000Z	2024-05-10T12:30:00.000Z	Closed	600.00
2	Organic Spices	Assorted organic spices from Nilgiri farms	2024-04-11T04:30:00.000Z	2024-05-11T11:22:00.000Z	Closed	350.00
3	Designer Saree	Pure silk saree with zari work	2024-04-12T06:30:00.000Z	2024-05-11T11:07:00.000Z	Closed	1200.00
4	Smart LED TV	Samsung 55-inch QLED TV with 4K resolution	2024-04-13T08:30:00.000Z	2024-05-11T11:10:00.000Z	Closed	25000.00
5	Handloom Rug	Traditional Persian-style handwoven rug	2024-04-14T10:30:00.000Z	2024-05-14T04:30:00.000Z	Active	900.00
6	Kitchen Mixer	Bajaj GX7 500W mixer grinder	2024-04-15T12:30:00.000Z	2024-05-09T02:30:00.000Z	Closed	1500.00
7	Gaming Console	Sony PlayStation 5 gaming console	2024-04-16T14:30:00.000Z	2024-05-11T12:00:00.000Z	Closed	45000.00
8	Leather Jacket	Genuine leather jacket by Levi's	2024-04-17T16:30:00.000Z	2024-05-11T08:30:00.000Z	Closed	3000.00
9	DSLR Camera	Canon EOS 90D DSLR camera with kit lens	2024-04-18T02:30:00.000Z	2024-05-16T05:30:00.000Z	Active	60000.00
10	Antique Clock	Victorian-era mantel clock in mahogany	2024-04-19T04:30:00.000Z	2024-05-18T08:30:00.000Z	Active	1800.00
11	Tea Set	Bone china tea set with floral patterns	2024-04-20T08:30:00.000Z	2024-05-17T03:30:00.000Z	Active	800.00
12	Fitness Tracker	Fitbit Charge 4 fitness tracker	2024-04-21T08:30:00.000Z	2024-05-10T04:30:00.000Z	Closed	4000.00
13	Smartphone	OnePlus 9 Pro smartphone	2024-04-22T10:30:00.000Z	2024-05-14T06:30:00.000Z	Active	55000.00
14	Office Chair	Ergonomic mesh office chair by Herman Miller	2024-04-23T12:30:00.000Z	2024-05-16T09:30:00.000Z	Active	8000.00
15	Cocktail Dress	Black satin cocktail dress by Vera Wang	2024-04-24T14:30:00.000Z	2024-05-11T10:55:00.000Z	Closed	7000.00

Transaction History

[Bid Items](#)

[Logout](#)

[Admin Dashboard](#)

[Auctions History](#)

[Transaction History](#)

[Bids Placed](#)

Transactions History

TRANSACTION ID	BUYER	SELLER	AMOUNT (RUPEES)	TRANSACTION TIME	PAYMENT METHOD	STATUS
1	ananya_gupta	crafty_creations	900.00	2024-05-15T03:00:00.000Z	Cash	Completed
2	raj_sharma	wellness_corner	450.00	2024-05-16T05:00:00.000Z	Credit Card	Completed
3	rahulkumar	organic_beauty	1600.00	2024-05-17T07:00:00.000Z	UPI	Completed
4	sangeeta25	garden_oasis	25000.00	2024-05-18T09:00:00.000Z	Cash	Completed
5	vikram_singh	ethnic_attire	800.00	2024-05-19T11:00:00.000Z	Credit Card	Completed
6	sonali_89	gadget_galaxy	1200.00	2024-05-20T13:00:00.000Z	Debit Card	Completed
7	amit_patil	fitness_freaks	7000.00	2024-05-21T15:00:00.000Z	Net Banking	Completed
8	shreya.m	kitchen_king	3500.00	2024-05-22T17:00:00.000Z	Cash	Completed
9	nikhil_2000	home_decor	1800.00	2024-05-23T03:00:00.000Z	UPI	Completed
10	priya12	beauty_boutique	1900.00	2024-05-24T05:00:00.000Z	Credit Card	Completed
11	arnav.kapoor	grocery_galore	800.00	2024-05-25T07:00:00.000Z	Cash	Completed
12	megha.sen	gadget_hub	3000.00	2024-05-26T09:00:00.000Z	Debit Card	Completed
13	vishal32	fashionista	2500.00	2024-05-27T11:00:00.000Z	Net Banking	Completed
14	anjali_11	handmade_hub	900.00	2024-05-28T13:00:00.000Z	Cash	Completed
15	ritika.m	pet_paradise	1200.00	2024-05-29T15:00:00.000Z	UPI	Completed

Bids Placed

Bid Items

Logout

Admin Dashboard

Auctions History

Transaction History

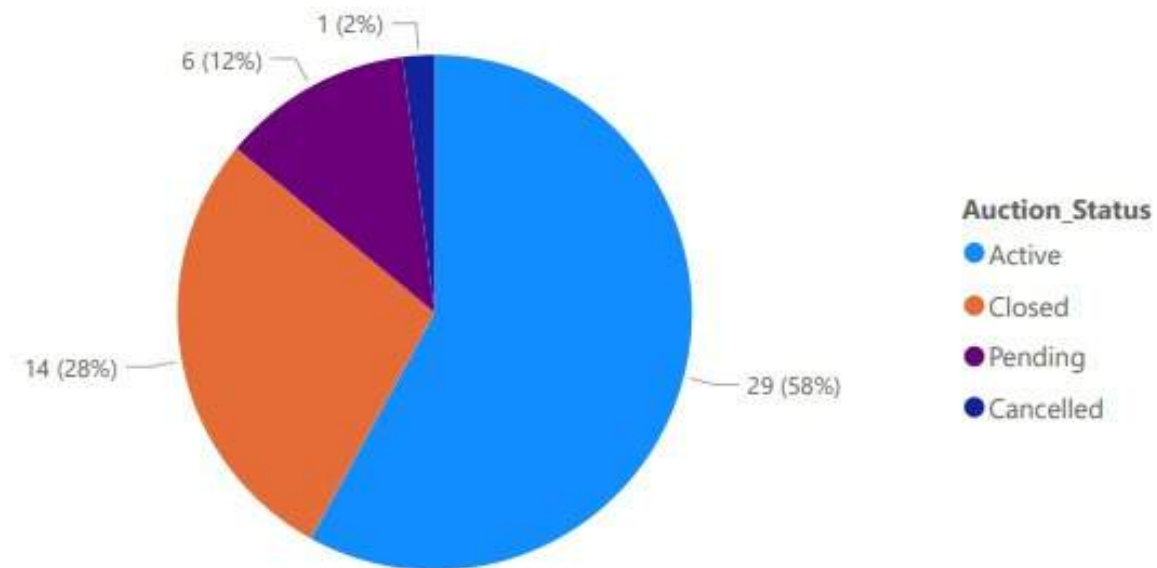
Bids Placed

Bids Placed

BID ID	BIDDER NAME	ITEM	BID AMOUNT	TIME OF BID	STATUS	BID INCREMENT
1	ananya_gupta	Handcrafted Pot	700.00	2024-05-09T09:00:00.000Z	Winning	100.00
2	raj_sharma	Handcrafted Pot	650.00	2024-05-09T10:15:00.000Z	Outbid	100.00
3	rahulkumar	Organic Spices	400.00	2024-05-09T10:50:00.000Z	Winning	50.00
4	sangeeta25	Organic Spices	450.00	2024-05-09T11:30:00.000Z	Outbid	50.00
5	vikram_singh	Designer Saree	1500.00	2024-05-09T13:00:00.000Z	Won	100.00
6	sonali_89	Designer Saree	1450.00	2024-05-09T13:30:00.000Z	Lost	100.00
7	amit_patil	Smart LED TV	26000.00	2024-05-09T14:30:00.000Z	Winning	1000.00
8	shreyam	Smart LED TV	25500.00	2024-05-09T15:30:00.000Z	Outbid	1000.00
9	nikhil_2000	Handloom Rug	1000.00	2024-05-09T16:30:00.000Z	Winning	100.00
10	priyal2	Handloom Rug	950.00	2024-05-09T17:30:00.000Z	Outbid	100.00
11	amav.kapoor	Kitchen Mixer	1600.00	2024-05-10T04:00:00.000Z	Winning	200.00
12	megha.sen	Kitchen Mixer	1500.00	2024-05-10T04:30:00.000Z	Outbid	200.00
13	vishal32	Gaming Console	47000.00	2024-05-10T06:00:00.000Z	Winning	2000.00
14	anjali_11	Gaming Console	46000.00	2024-05-10T06:30:00.000Z	Outbid	2000.00
15	ritika.m	Leather Jacket	3300.00	2024-05-10T08:00:00.000Z	Winning	300.00

Auction report

Split of Auction_Status



50

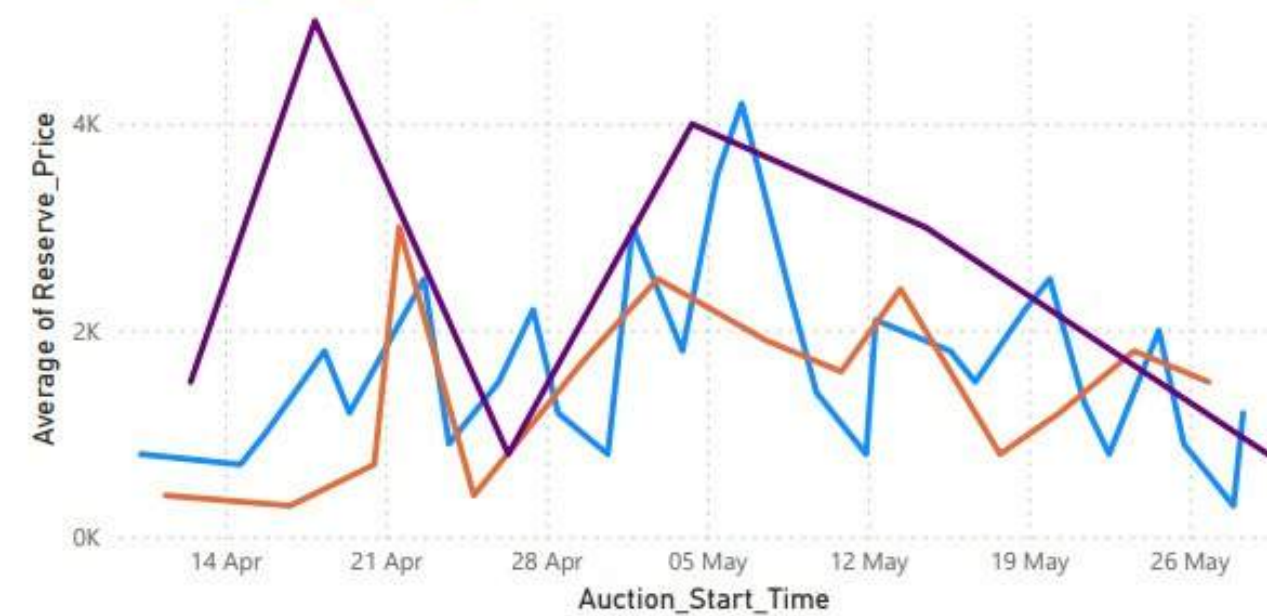
Count of Auction_ID

2.15K

Average of Reserve_Price

Average of Reserve_Price Over Time based on Auction_Status

Auction_Status ● Active ● Closed ● Pending



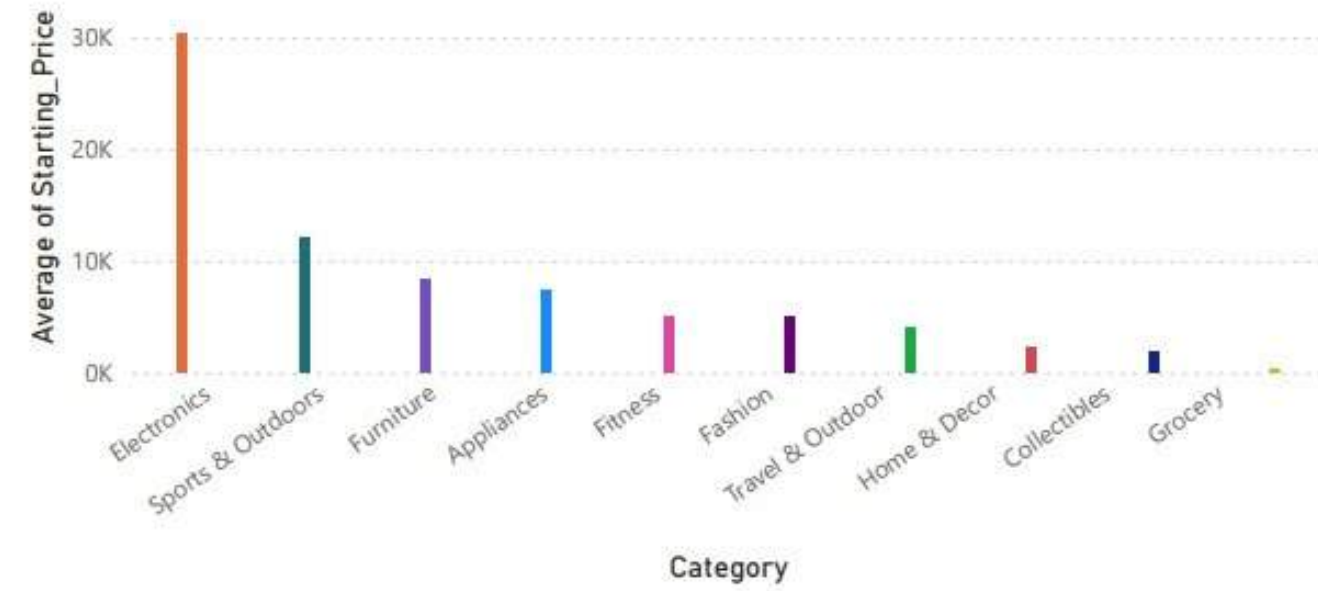
Item report

51

Count of Item_ID

Average of Starting_Price by Category

Category ● Electronics ● Sports & O... ● Furniture ● Appliances ● Fitness ● Fashion ● Travel & ... ● Home & Decor ● Grocery ● Collectibles



Count of Items By Category



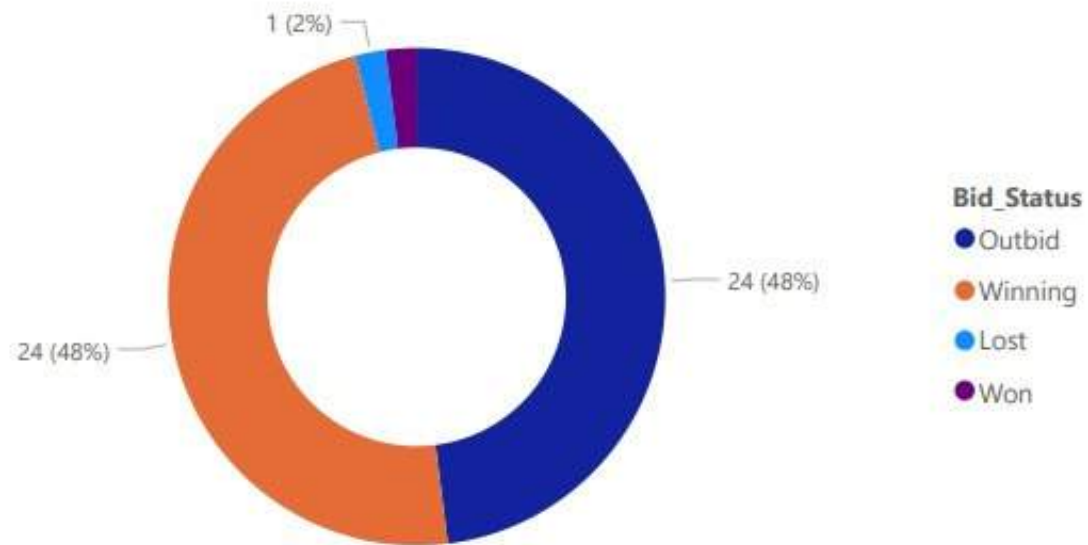
4.50K

Median of Starting_Price

Bids report

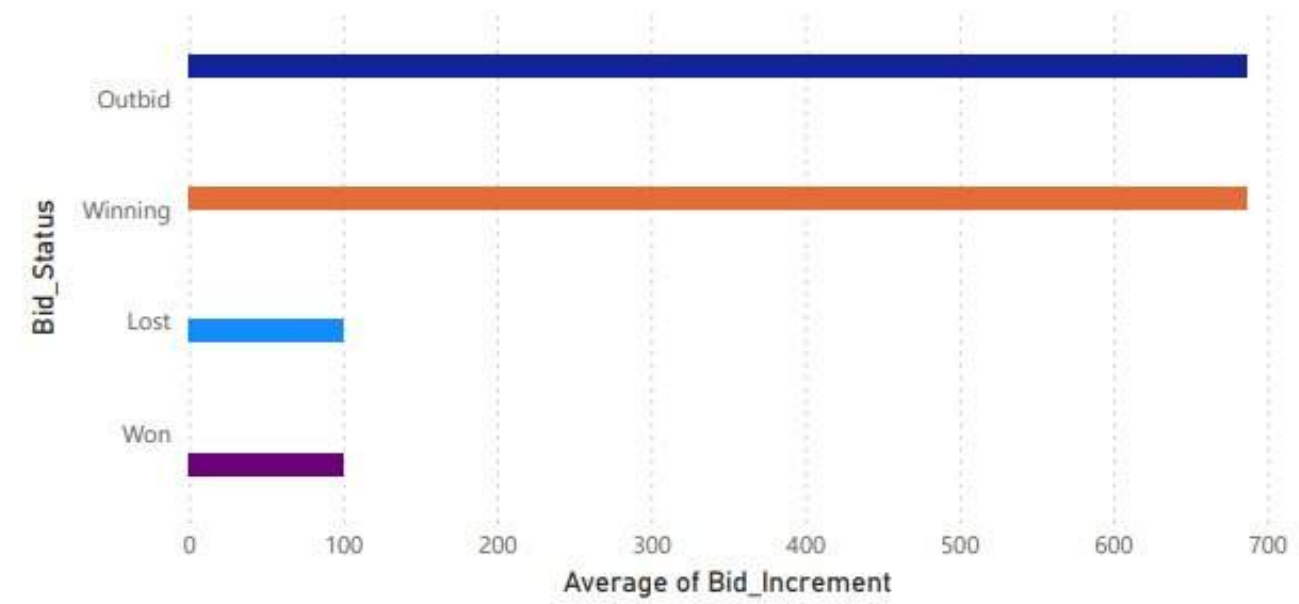
50
Count of Bid_ID

Split of Bid Status



Sum of Bid_Increment Over Time

Bid_Status ● Outbid ● Winning ● Lost ● Won

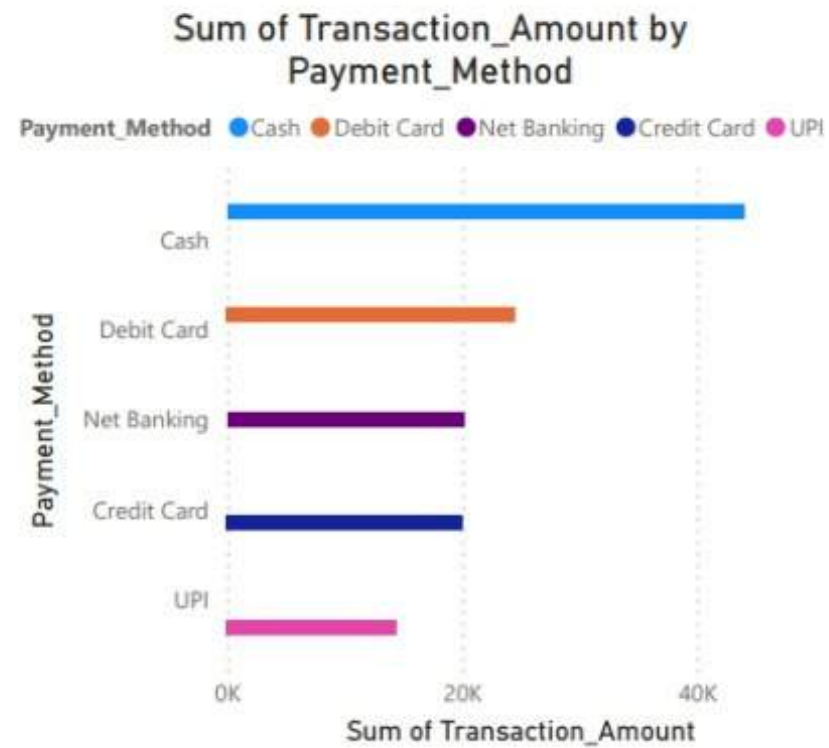


712.65K
Sum of Bid_Amount

Transactions report

123.05K

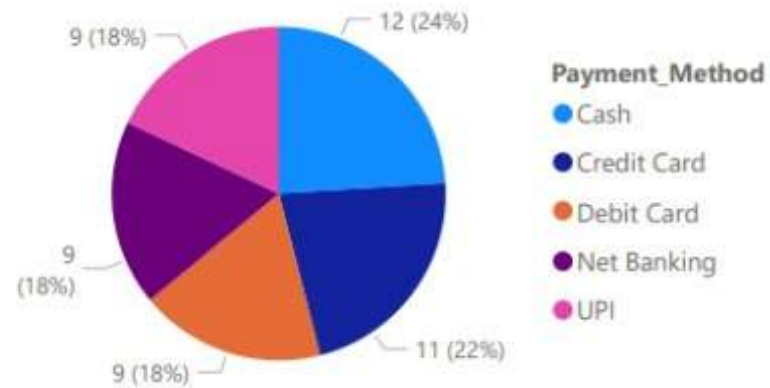
Sum of Transaction_Amount



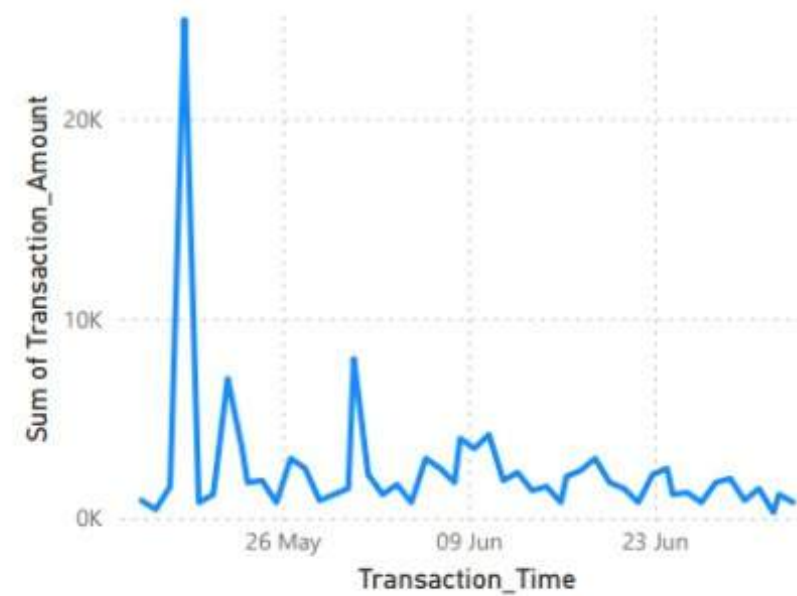
2.46K

Average of Transaction_Amount

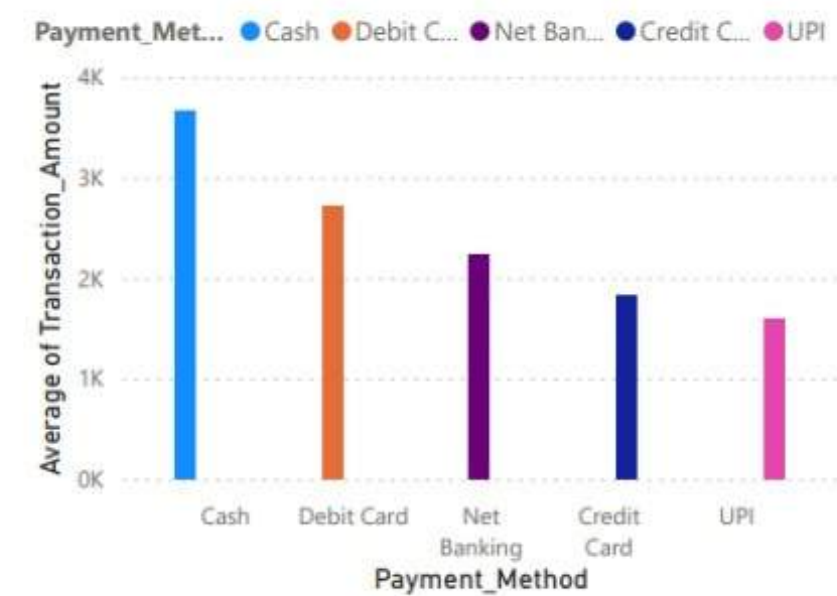
Count of Payment_Method by Payment_Method



Sum of Transaction_Amount Over Time



Average of Transaction_Amount by Payment_Method



The background is a light blue grid with various hand-drawn blue doodles. These include several overlapping circles and ovals, a large scribbled circle at the top center, a starburst shape on the right, a wavy line at the bottom center, and several checkmarks at the bottom right. The text is centered on the grid.

**Thank you
very much!**