

Database Systems

Digital Art Gallery and Auction Platform

Andrew Bala Abhilash Polisetty (001138913)

Siri Yellu (001165833)

Keerthana Mandava (001138885)

Baby Naga Venkata Uttara Mekala (001142228)

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Executive Overview

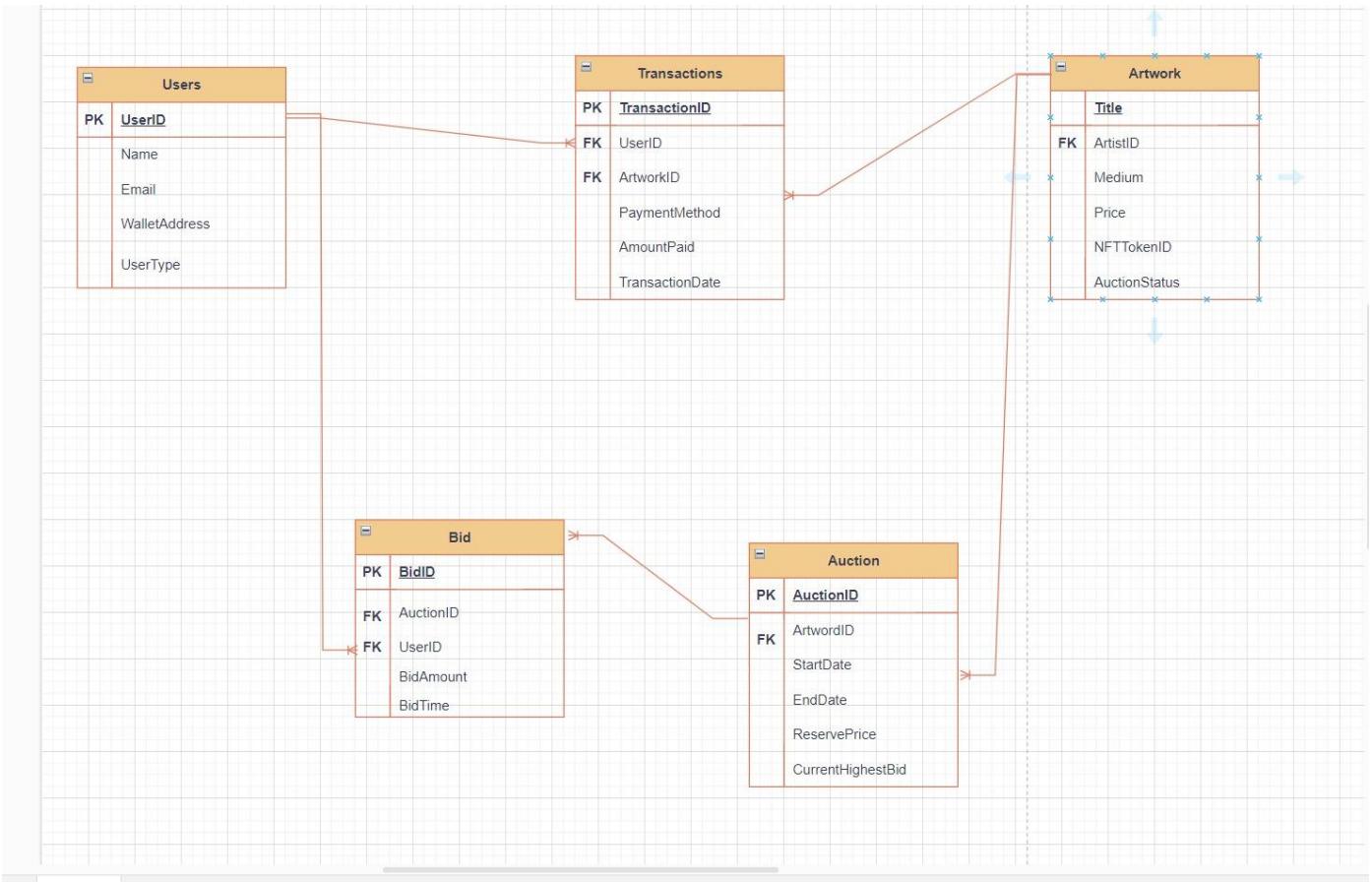
Primary Objective: The objective of our project is to develop a **Digital Art Gallery and Auction Platform** that manages digital artwork inventory, bids, auctions, transactions, and user information. Our system allows artists to easily upload their artwork, buyers to place bids in auctions, administrators to manage transactions, and users. This system provides an efficient way to manage artwork, track bids, and process sales.

Client: Digital Art Gallery And Auction Platform

Overview: An ER Diagram is drawn with the usage of IE Crow's Foot symbols, defining the relation between the entities, **Transactions, Auctions, Users, Bids, and Artwork**. Relational Schema is implemented with the help of MS Access, making sure Primary keys and Foreign keys are present and maintaining data consistency. Records will be subjected to CRUD, allowing users to create, read, update, or delete records within each table.

These features provide efficient management of digital art and auctions, providing real-time reports on artwork, auctions, and transactions. Our system enhances customer experience and supports the growth of the digital art marketplace

Entity-Relationship Diagram



Relational Schema

- **Users** (UserID [PK], Name, Email, WalletAddress, UserType)
- **Artwork** (ArtworkID [PK], Title, ArtistID [FK], Medium, Price, NFTTokenID, AuctionStatus)
- **Auction** (AuctionID [PK], ArtworkID [FK], StartDate, EndDate, ReservePrice, CurrentHighestBid)
- **Bid** (BidID [PK], AuctionID [FK], UserID [FK], BidAmount, BidTime)
- **Transactions** (TransactionID [PK], UserID [FK], ArtworkID [FK], PaymentMethod, AmountPaid, TransactionDate)
- Primary Keys (PK) and Foreign Keys (FK) are used to ensure referential integrity between tables.

Data Dictionary

Attribute	Table	Null	Unique	Foreign Key	Primary Key	Ref Table	Data Type
UserID	Users	N	Y	N	Y	N/A	AutoNumber
Name	Users	N	N	N	N	N/A	Short Text
Email	Users	N	Y	N	N	N/A	Short Text
WalletAddress	Users	N	Y	N	N	N/A	Short Text
UserType	Users	N	N	N	N	N/A	Short Text
ArtworkID	Artwork	N	Y	N	Y	N/A	AutoNumber
Title	Artwork	N	N	N	N	N/A	Short Text
ArtistID	Artwork	N	N	Y	N	Users	Number
Medium	Artwork	N	N	N	N	N/A	Short Text
Price	Artwork	N	N	N	N	N/A	Currency
NFTTokenID	Artwork	N	N	N	N	N/A	Short Text
AuctionStatus	Artwork	N	N	N	N	N/A	Yes/No
AuctionID	Auction	N	Y	N	Y	N/A	AutoNumber
ArtworkID	Auction	N	N	Y	N	Artwork	Number
StartDate	Auction	N	N	N	N	N/A	Date/Time
EndDate	Auction	N	N	N	N	N/A	Date/Time
ReservePrice	Auction	N	N	N	N	N/A	Currency
CurrentHighestBid	Auction	N	N	N	N	N/A	Currency
BidID	Bid	N	Y	N	Y	N/A	AutoNumber
AuctionID	Bid	N	N	Y	N	Auction	Number
UserID	Bid	N	N	Y	N	Users	Number
BidAmount	Bid	N	N	N	N	N/A	Currency
BidTime	Bid	N	N	N	N	N/A	Date/Time
TransactionID	Transactions	N	Y	N	Y	N/A	AutoNumber
UserID	Transactions	N	N	Y	N	Users	Number
ArtworkID	Transactions	N	N	Y	N	Artwork	Number
PaymentMethod	Transactions	N	N	N	N	N/A	Short Text
AmountPaid	Transactions	N	N	N	N	N/A	Currency
TransactionDate	Transactions	N	N	N	N	N/A	Date/Time

CRUD Matrix

CRUD Matrix for Your Entities:					
	Users	Artwork	Auction	Bid	Transactions
Users	CRUD	R	R	R	CRUD
Artwork	R	CRUD	CRUD	R	R
Auction	R	R	CRUD	CRUD	R
Bid	R	R	R	CRUD	R
Transactions	R	R	R	R	CRUD

Legend:

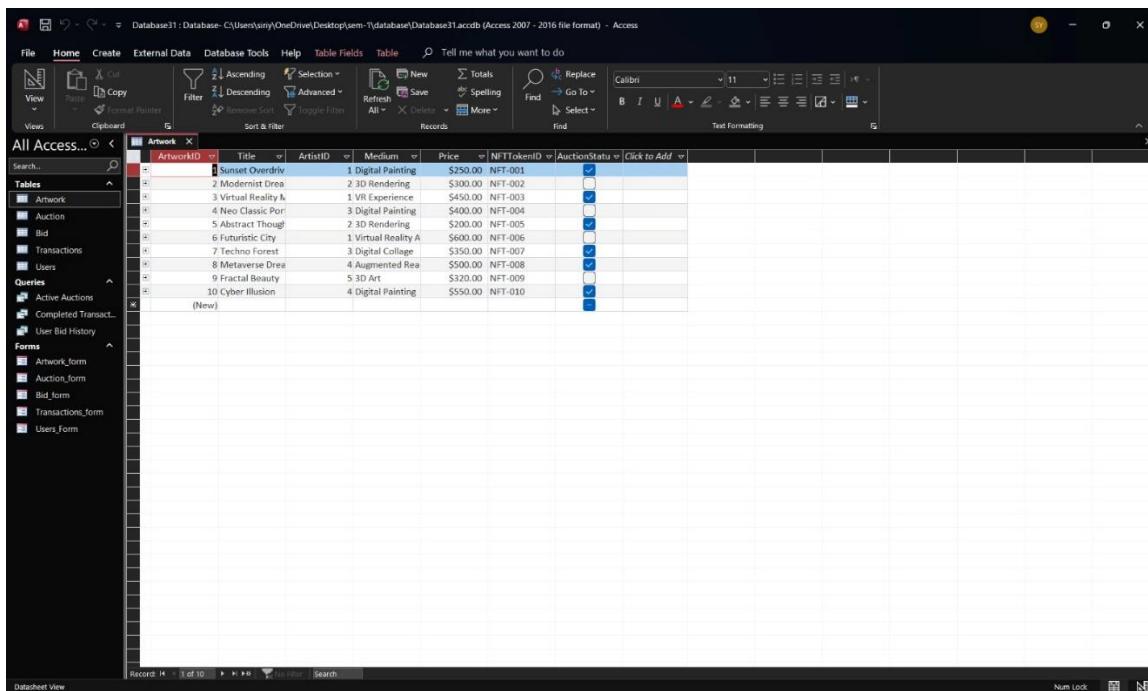
C = Create or Insert a record.
R = Read or Select a record.
U = Update or Modify a record.
D = Delete a record.

Table Description

1. User Table: Contains 10 records, which include artists, buyers, and administrators. It has attributes such as Name, Email, WalletAddress, and UserType.
2. Artwork Table: It has 10 entries of digital artwork. Each ArtworkID has a unique ArtworkID and other attributes like Title, ArtistID, Medium, Price, NFTTokenID, and AuctionStatus.
3. Auction Table: It has 10 entries of auctions, each tied to a specific artwork. Each AuctionID is unique for each auction and other attributes like StartDate, EndDate, ReservePrice, and CurrentHighestBid.
4. Bid Table: It links the AuctionID from the auction table and UserID from the Users table with the BidAmount and BidTime. This particular table has 10 records showcasing bids placed by users.
5. Transactions Table: Contains 10 records of transactions completed for the sale of artwork. Each transaction is uniquely identified by TransactionID and includes references to the UserID (buyer), ArtworkID, PaymentMethod, AmountPaid, and TransactionDate.

Database Tables

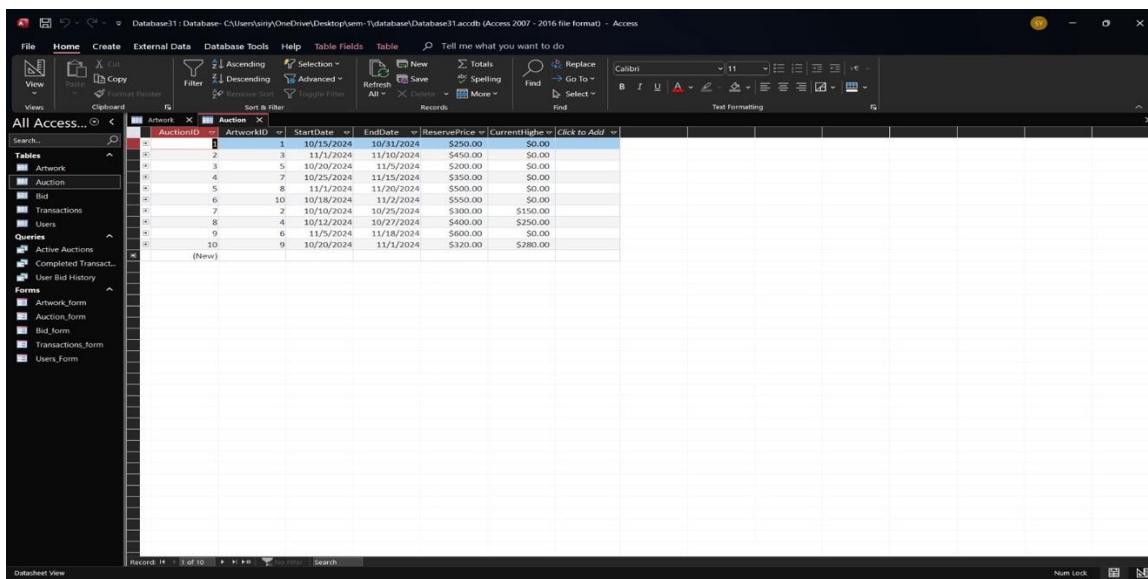
Artwork Datasheet:



The screenshot shows the Microsoft Access application interface with the 'Artwork' table selected in the 'Datasheet View'. The table contains 10 records of artwork information, including title, artist ID, medium, price, NFT token ID, auction status, and a checkbox column.

ArtworkID	Title	ArtistID	Medium	Price	NFTTokenID	AuctionStatus	Click to Add
1	Sunset Overdriv	1	Digital Painting	\$250.00	NFT-001	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	Modemist Drea	2	3D Rendering	\$300.00	NFT-002	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	Virtual Reality A	3	VR Experience	\$450.00	NFT-003	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4	Neo Classic Por	4	Digital Painting	\$400.00	NFT-004	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5	Abstract Thought	5	3D Rendering	\$200.00	NFT-005	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6	Futuristic City	6	Virtual Reality A	\$600.00	NFT-006	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7	Techno Forest	7	Digital Collage	\$350.00	NFT-007	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8	Metaverse Drea	8	Augmented Rea	\$500.00	NFT-008	<input checked="" type="checkbox"/>	<input type="checkbox"/>
9	Fractal Beauty	9	3D Art	\$320.00	NFT-009	<input type="checkbox"/>	<input checked="" type="checkbox"/>
10	Cyber Illusion	10	Digital Painting	\$550.00	NFT-010	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Auction Datasheet:



The screenshot shows the Microsoft Access application interface with the 'Auction' table selected in the 'Datasheet View'. The table contains 10 records of auction information, including start date, end date, reserve price, current high bid, and auction ID.

AuctionID	ArtworkID	Start Date	End Date	Reserve Price	Current High Bid	Click to Add
1	1	10/15/2024	10/31/2024	\$250.00	\$0.00	<input type="checkbox"/>
2	3	11/1/2024	11/10/2024	\$450.00	\$0.00	<input type="checkbox"/>
3	5	10/20/2024	10/29/2024	\$300.00	\$0.00	<input type="checkbox"/>
4	7	10/25/2024	11/15/2024	\$350.00	\$0.00	<input type="checkbox"/>
5	8	11/1/2024	11/20/2024	\$500.00	\$0.00	<input type="checkbox"/>
6	10	10/18/2024	11/2/2024	\$550.00	\$0.00	<input type="checkbox"/>
7	2	10/10/2024	10/25/2024	\$300.00	\$150.00	<input type="checkbox"/>
8	4	10/12/2024	10/27/2024	\$400.00	\$300.00	<input type="checkbox"/>
9	6	11/5/2024	11/18/2024	\$600.00	\$0.00	<input type="checkbox"/>
10	9	10/20/2024	11/7/2024	\$320.00	\$280.00	<input type="checkbox"/>

Bid Datasheet:

The screenshot shows the Microsoft Access application interface with the 'Bid' table selected in the datasheet view. The table has columns: BidID, AuctionID, UserID, BidAmount, and BidTime. The data shows 10 records of bids placed on various auctions by different users.

BidID	AuctionID	UserID	BidAmount	BidTime
1	2	3	\$260.00	#####
2	1	3	\$270.00	#####
3	3	4	\$460.00	#####
4	5	5	\$210.00	#####
5	7	2	\$355.00	#####
6	8	3	\$510.00	#####
7	9	2	\$320.00	#####
8	10	4	\$560.00	#####
9	2	3	\$310.00	#####
10	4	2	\$420.00	#####

Transactions Datasheet:

The screenshot shows the Microsoft Access application interface with the 'Transactions' table selected in the datasheet view. The table has columns: TransactionID, UserID, ArtworkID, PaymentMethod, AmountPaid, and TransactionDate. The data shows 10 transactions involving different users, artwork items, payment methods, and amounts.

TransactionID	UserID	ArtworkID	PaymentMethod	AmountPaid	TransactionDate
1	2	1	Crypto	\$270.00	11/1/2024
2	3	3	Credit Card	\$460.00	11/1/2024
3	5	5	Crypto	\$210.00	11/5/2024
4	2	7	Credit Card	\$355.00	11/20/2024
5	3	8	Crypto	\$510.00	11/2/2024
6	2	9	Credit Card	\$320.00	11/7/2024
7	4	10	Crypto	\$560.00	11/7/2024
8	3	2	Credit Card	\$210.00	10/27/2024
9	2	4	Crypto	\$420.00	10/30/2024
10	3	6	Credit Card	\$600.00	11/16/2024

Users Datasheet:

The screenshot shows the Microsoft Access application interface in Datasheet View. The title bar reads "Database31: Database - C:\Users\sinan\OneDrive\Desktop\sem-1\database\Database31.accdb (Access 2007 - 2016 file format) - Access". The ribbon menu is visible at the top. On the left, the navigation pane lists tables, queries, forms, and reports. The "Tables" section is expanded, showing "Artwork", "Auction", "Bid", "Transactions", and "Users". The "Users" table is selected and displayed in the main area. The table has columns: UserID, Name, Email, WalletAddress, and UserType. A new row is being added, indicated by the "(New)" entry in the first column. The data in the table is as follows:

UserID	Name	Email	WalletAddress	UserType
1	Alice Artist	alice@art.com	0x123456789abArtist	Artist
2	Bob Buyer	bob@buy.com	0x987654321deBuyer	Buyer
3	Cathy Collector	cathy@collect.cc	0xABCD123456gb	Buyer
4	David Digital	david@digital.co	0xDEFE654321jk	Artist
5	Eva Expert	eva@expert.co	0xFED321654mi	Admin
6	Frank Fine	frank@fineart.cc	0xBAAC987654qr	Buyer
7	Grace Gallery	grace@gallery.cc	0xAD123456121n	Artist
8	Helen High	helen@highend.cc	0x072123456oe	Buyer
9	Ivy Investor	ivy@investor.cc	0xX7937654kv	Buyer
10	Jake Judge	jake@judge.com	0xQWE123456c	Admin
(New)				

Design Tables

Artwork Table

The screenshot shows the Microsoft Access Table Design view for the 'Artwork' table. The table has six fields:

Field Name	Data Type
ArtworkID	AutoNumber
Name	Short Text
ArtistID	Number
Medium	Medium
Price	Currency

The 'ArtworkID' field is set as the Primary Key. The 'ArtistID' field has a General lookup relationship with the 'Artist' table, defined by the following properties:

General Lookup	
Field Size	Long Integer
New Values	Increment
Format	
Caption	
Indexed	Yes (No Duplicates)
Text Align	General

A field name can be up to 64 characters long, including spaces. Press F1 for help on field names.

Auction Table

The screenshot shows the Microsoft Access Table Design view for the 'Auction' table. The table has six fields:

Field Name	Data Type
AuctionID	AutoNumber
ArtworkID	Number
StartDate	Date/Time
EndDate	Date/Time
ReservePrice	Currency

The 'AuctionID' field is set as the Primary Key. The 'ArtworkID' field has a General lookup relationship with the 'Artwork' table, defined by the following properties:

General Lookup	
Field Size	Long Integer
New Values	Increment
Format	
Caption	
Indexed	Yes (No Duplicates)
Text Align	General

A field name can be up to 64 characters long, including spaces. Press F1 for help on field names.

Bid Table

The screenshot shows the Microsoft Access Table Design View for the 'Bid' table. The ribbon at the top is set to 'Table Design'. The left pane shows the database structure with 'Tables' expanded, showing 'Artwork', 'Auction', and 'Bid'. The 'Bid' table is selected. The main area displays the table structure:

Field Name	Data Type	Description (Optional)
AuditID	AutoNumber	
AuctionID	Number	
UserID	Number	
BidAmount	Currency	
BidTime	Date/Time	

Below the table structure, the 'Field Properties' pane is open for the 'AuditID' field, showing the following properties:

General	Lookup
Field Size	Long Integer
New Value	Increment
Start	
Caption	
Indexed	Yes (No Duplicates)
Text Align	General

A note at the bottom right of the properties pane states: "A field name can be up to 64 characters long, including spaces. Press F1 for help on field names."

Transaction Table

The screenshot shows the Microsoft Access Table Design View for the 'Transactions' table. The ribbon at the top is set to 'Table Design'. The left pane shows the database structure with 'Tables' expanded, showing 'Artwork', 'Auction', and 'Transactions'. The 'Transactions' table is selected. The main area displays the table structure:

Field Name	Data Type	Description (Optional)
TransactionID	AutoNumber	
UserID	Number	
ArtworkID	Number	
PaymentMethod	Short Text	
AmountPaid	Currency	
TransactionDate	Date/Time	

Below the table structure, the 'Field Properties' pane is open for the 'TransactionID' field, showing the following properties:

General	Lookup
Field Size	Long Integer
New Value	Increment
Start	
Caption	
Indexed	Yes (No Duplicates)
Text Align	General

A note at the bottom right of the properties pane states: "A field name can be up to 64 characters long, including spaces. Press F1 for help on field names."

Users Table

The screenshot shows the Microsoft Access Table Design view for the 'Users' table. The table has four fields: UserID (AutoNumber), Name (Short Text), Email (Short Text), and WalletAddress (Short Text). The UserID field is designated as the Primary Key. The 'Field Properties' pane is open for the UserID field, showing its data type as 'AutoNumber' with options like 'Allow Zero Length' and 'Allow Nulls'.

Field Name	Data Type
UserID	AutoNumber
Name	Short Text
Email	Short Text
WalletAddress	Short Text
UserType	Short Text

Field Properties (UserID):

- General: Allow Zero Length, Allow Nulls
- Lookup: Field Size: Long Integer, Step Values: Increment
- Format:
- Action:
- Indexed: Yes (No Duplicates)
- Validation Rule:
- Validation Text:
- Default Value: General

A field name can be up to 64 characters long, including spaces. Press F1 for help on field names.

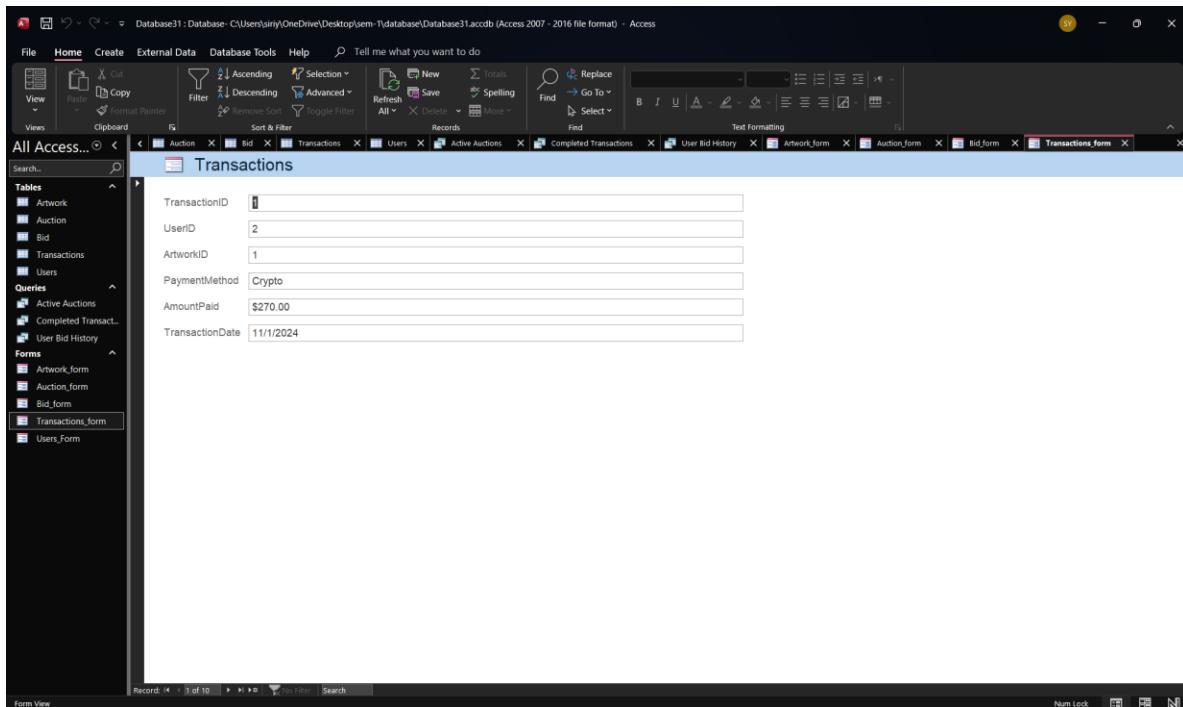
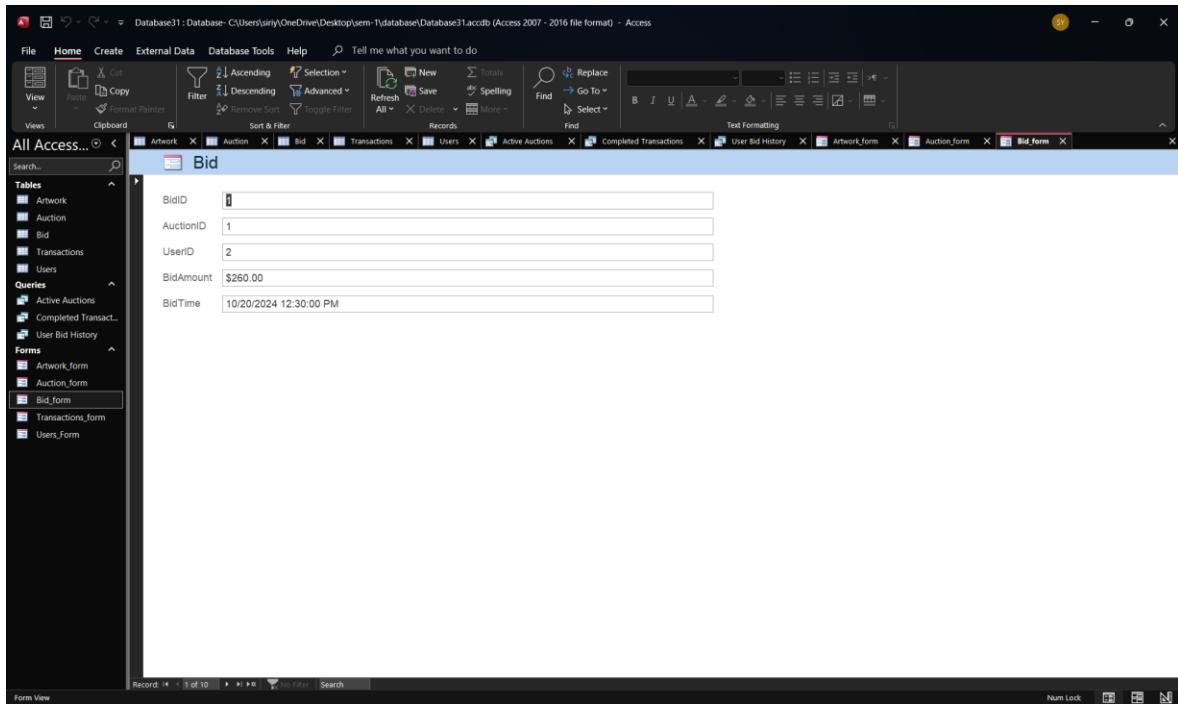
Forms

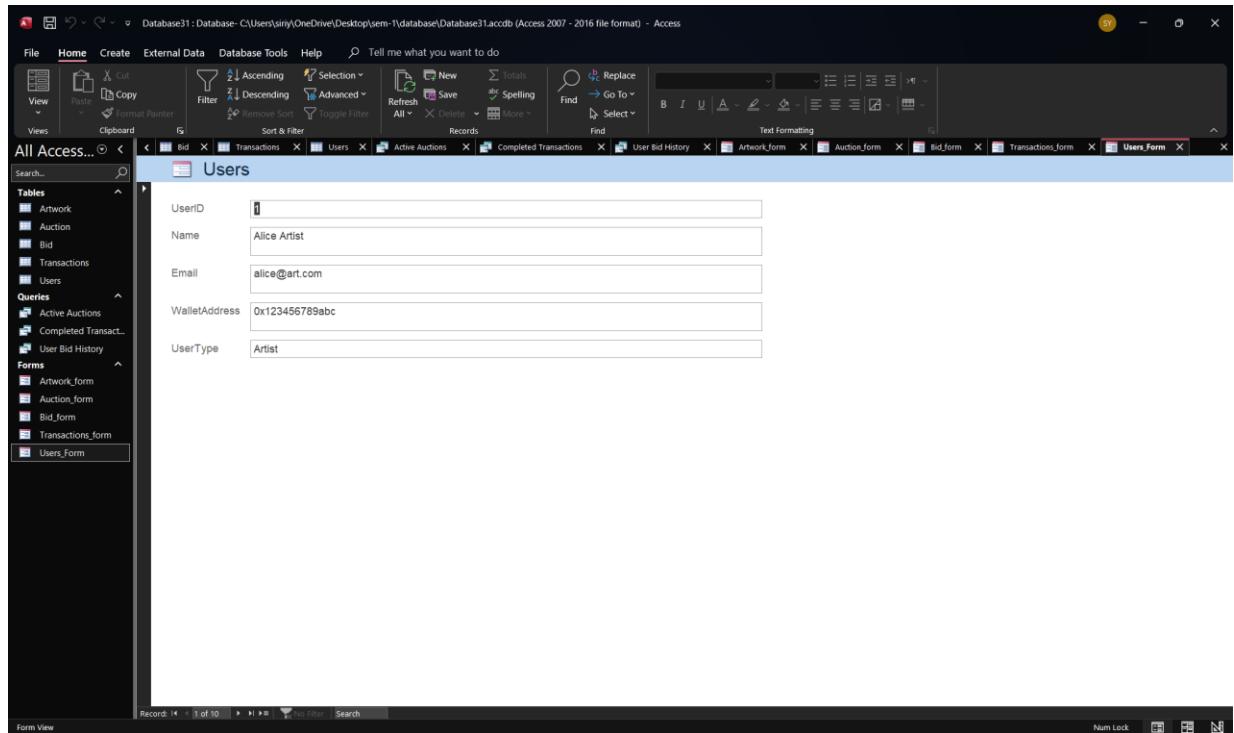
The screenshot shows the Microsoft Access application interface with the "Artwork" form open. The title bar reads "Database31 : Database - C:\Users\sliry\OneDrive\Desktop\sem-1\database\Database31.accdb (Access 2007 - 2016 file format) - Access". The ribbon tabs include File, Home, Create, External Data, Database Tools, and Help. The "Home" tab is selected. The left pane displays the navigation pane with tables like Artwork, Auction, Bid, Transactions, and Users, and forms like Artwork_form, Auction_form, Bid_form, Transactions_form, and Users_form. The main area shows the "Artwork" form with fields: ArtworkID (1), Title (Sunset Overdrive), ArtistID (1), Medium (Digital Painting), Price (\$250.00), NFTTokenID (NFT-001), and AuctionStatus (True). The status bar at the bottom indicates "Record: 1 of 10" and "Num Lock".

The screenshot shows the Microsoft Access application interface with the "Auction" form open. The title bar reads "Database31 : Database - C:\Users\sliry\OneDrive\Desktop\sem-1\database\Database31.accdb (Access 2007 - 2016 file format) - Access". The ribbon tabs include File, Home, Create, External Data, Database Tools, and Help. The "Home" tab is selected. The left pane displays the navigation pane with tables like Artwork, Auction, Bid, Transactions, and Users, and forms like Artwork_form, Auction_form, Bid_form, Transactions_form, and Users_form. The main area shows the "Auction" form with fields: AuctionID (1), ArtworkID (1), StartDate (10/15/2024), EndDate (10/31/2024), ReservePrice (\$250.00), and CurrentHighestBid (\$0.00). Below these fields is a grid table showing bids:

BidID	UserID	BidAmount	BidTime
1	2	\$260.00	#####
2	3	\$270.00	#####
(New)			

The status bar at the bottom indicates "Record: 1 of 10" and "Num Lock".





Queries

- **SELECT Auction.AuctionID, Artwork.ArtworkID, Artwork.Title, Auction.StartDate, Auction.EndDate, Auction.CurrentHighestBid FROM Artwork INNER JOIN Auction ON Artwork.ArtworkID = Auction.ArtworkID;**

The screenshot shows a Microsoft Access window with the title "Database31 : Database - C:\Users\simy\OneDrive\Desktop\user\Tudatabase\Database31.accdb (Access 2007 - 2016 file format) - Access". The query results are displayed in a table titled "Active Auctions". The table has columns: AuctionID, ArtworkID, Title, StartDate, EndDate, and CurrentHighestBid. The data shows 10 rows of auction records.

AuctionID	ArtworkID	Title	StartDate	EndDate	CurrentHighestBid
1	3	Sunset Overdrive	10/15/2024	10/31/2024	\$0.00
7	2	Modernist Drea	10/10/2024	10/25/2024	\$150.00
2	3	Virtual Reality A.	11/1/2024	11/10/2024	\$0.00
8	4	Abstract Illusion	10/20/2024	10/28/2024	\$200.00
3	5	Abstract Thought	10/20/2024	11/5/2024	\$0.00
9	6	Futuristic City	11/5/2024	11/18/2024	\$0.00
4	7	Techno Forest	10/25/2024	11/15/2024	\$0.00
5	8	Abstract Drama	11/1/2024	11/20/2024	\$100.00
10	9	Fractal Beauty	10/20/2024	11/1/2024	\$280.00
6	10	Cyber Illusion	10/18/2024	11/3/2024	\$0.00

- **SELECT Transactions.TransactionID, Transactions.UserID, Artwork.ArtworkID, Transactions.AmountPaid, Transactions.TransactionDate FROM Artwork INNER JOIN Transactions ON Artwork.ArtworkID = Transactions.ArtworkID**

The screenshot shows a Microsoft Access window with the title "Database31 : Database - C:\Users\simy\OneDrive\Desktop\user\Tudatabase\Database31.accdb (Access 2007 - 2016 file format) - Access". The query results are displayed in a table titled "Completed Transactions". The table has columns: TransactionID, UserID, ArtworkID, AmountPaid, and TransactionDate. The data shows 10 rows of transaction records.

TransactionID	UserID	ArtworkID	AmountPaid	TransactionDate
1	2	1	\$270.00	11/1/2024
8	3	2	\$310.00	10/27/2024
2	3	3	\$460.00	11/12/2024
9	2	4	\$420.00	10/30/2024
3	5	5	\$280.00	11/1/2024
10	3	6	\$600.00	11/18/2024
4	2	7	\$355.00	11/20/2024
5	3	8	\$510.00	11/25/2024
6	2	9	\$330.00	11/3/2024
7	4	10	\$560.00	11/2/2024

- **SELECT Bid.BidID, Bid.AuctionID, Bid.BidAmount, Bid.BidTime, Bid.UserID, Auction.ArtworkID FROM Auction INNER JOIN (Users INNER JOIN Bid ON Users.UserID = Bid.UserID) ON Auction.AuctionID = Bid.AuctionID**

The screenshot shows a Microsoft Access 2016 window with the following details:

- Window Title:** Database31 : Database - C:\Users\univ\OneDrive\Desktop\sem-1\database\Database31.accdb (Access 2007 - 2016 file format) - Access
- Ribbon:** File, Home, Create, External Data, Database Tools, Help.
- Left Sidebar:** Shows the navigation pane with 'All Access...' expanded, listing Tables (Artwork, Auction, Bid, Transactions, Users), Queries (Active Auctions, Completed Transact...), and Forms (Artwork_form, Auction_form, Bid_form, Transactions_form, Users_form).
- Current View:** Datasheet View.
- Grid Content:** A table titled 'User Bid History' with 10 records. The columns are: BidID, AuctionID, BidAmount, BidTime, UserID, and ArtworkID. The data is as follows:

BidID	AuctionID	BidAmount	BidTime	UserID	ArtworkID
1	1	\$260.00	#####	2	1
2	1	\$270.00	#####	3	1
3	3	\$460.00	#####	4	5
4	5	\$210.00	#####	5	8
5	7	\$355.00	#####	2	2
6	8	\$510.00	#####	3	4
7	9	\$330.00	#####	2	6
8	10	\$560.00	#####	4	9
9	2	\$310.00	#####	3	3
10	4	\$420.00	#####	2	7

- Status Bar:** Shows 'Record 1 of 10' and various system icons.

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