DBMS ASSIGNMENT
ON
ONLINE AUCTION DATABASE SYSTEM

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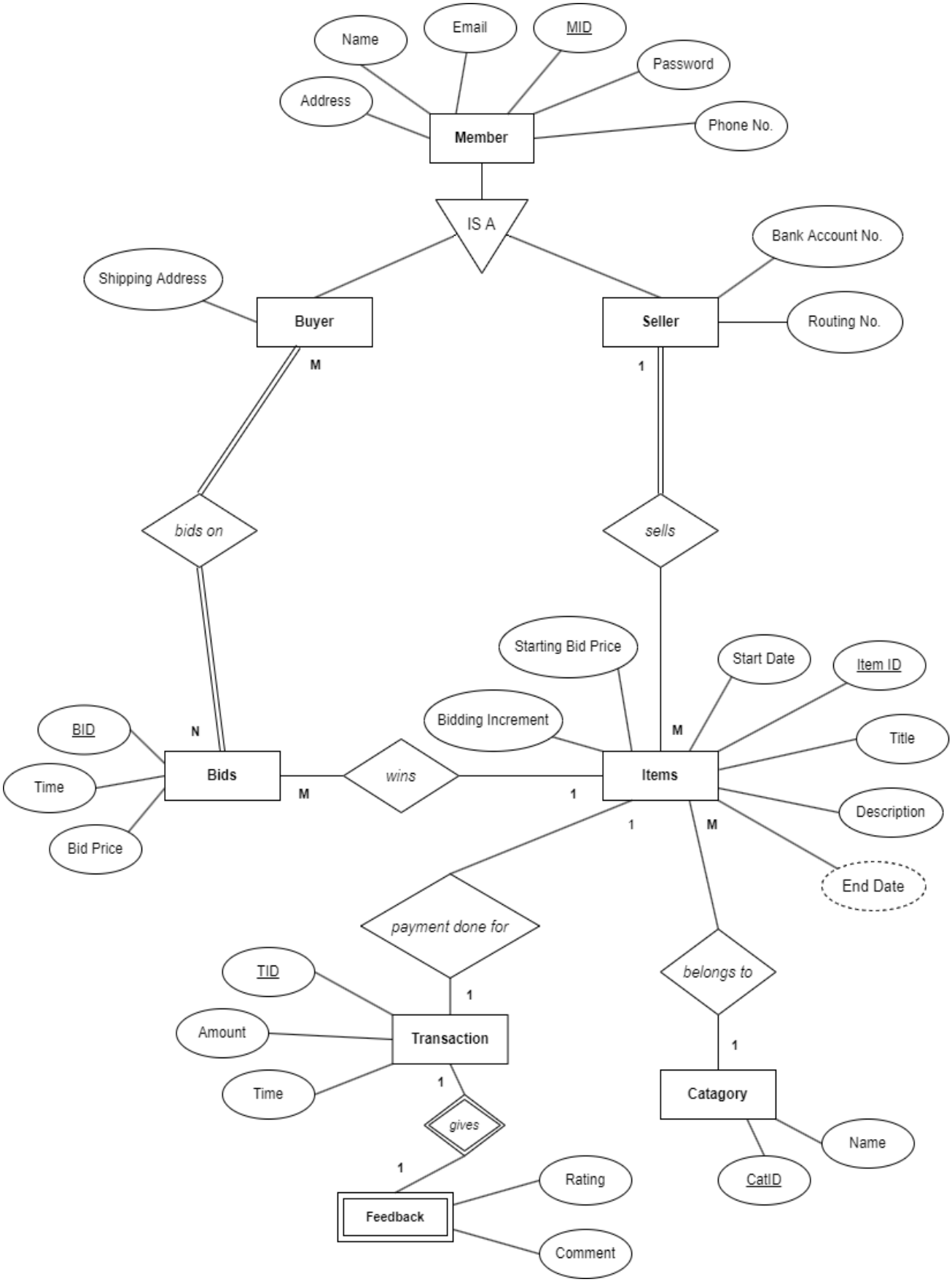
1. Problem Statement :

Consider an ONLINE AUCTION database system in which members (buyers and sellers) participate in the sale of items. The data requirements for this system are summarized as follows :

- The online site has members, each of whom is identified by a unique member number and is described by an e-mail address, name, password, home address, and phone number.
- A member may be a buyer or a seller. A buyer has a shipping address recorded in the database. A seller has a bank account number and routing number recorded in the database.
- 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 start date of the auction, and the end date of the auction.
- Items are also categorized based on a fixed classification hierarchy.
- Buyers make bids for items they are interested in. Bid price and time of bid is recorded. The bidder at the end of the auction with the highest bid price is declared the winner and a transaction between buyer and seller may then proceed.
- The buyer and seller may record feedback regarding their completed transactions. Feedback contains a rating of the other party participating in the transaction (1-10) and a comment.

2. Entity-Relationship Diagram :



3. Assumptions :

A. For 'Member' entity,

- 'MID' is the primary key.
- The attributes 'Address', 'Email' and 'Phone No.' are not multivalued attributes.
- The 'Member' entity is further specialised into two entities – 'Buyer' and 'Seller'.

B. For 'Buyer' entity,

- As 'Buyer' is specialised from 'Member' entity, we can use 'MID' as the primary key of 'Buyer'.
- The attribute 'Shipping Address' is not multivalued attribute.

C. For 'Seller' entity,

- As 'Seller' is specialised from 'Member' entity, we can use 'MID' as the primary key of 'Seller'.
- The attributes 'Bank Account No.' and 'Routing No.' are not multivalued attributes.

D. For 'Bids' entity,

- 'BID' is the primary key.
- The attribute 'Bid price' is not multivalued attribute.

E. For 'Item' entity,

- 'Item ID' is the primary key.
- The attributes 'Title' and 'Description' are not multivalued attributes.

F. For 'Transaction' entity,

- 'TID' is the primary key.

G. For 'Feedback' entity,

- As 'Feedback' is a weak entity and it forms a relationship with 'Transaction' entity, it does not have its own primary key and it depends on the entity 'Transaction'. It has total participation with 'Transaction' entity.
- The attributes 'Rating' and 'Comment' are not multivalued attributes.

H. For 'Catagory' entity,

- 'CatID' is the primary key.

4. Cardinality Mapping :

One-to-One Cardinality (1 : 1) :

- For relation '*gives*', *Transaction : Feedback* is of cardinality 1 : 1, that means one *Transaction* should have one *Feedback and vice versa.*
- For relation '*payment done for*', *Items : Transaction* is of cardinality 1 : 1, that means one *Transaction* is done for one *Item and vice versa.*

One-to-Many Cardinality (1 : M) :

- For relation '*sells*', *Seller : Items* is of cardinality 1 : M, that means one *Seller* can sell any number of *Items*, but one *Item* can be sold by a single *Seller*.

Many-to-One Cardinality (M : 1) :

- For relation '*wins*', *Bids : Items* is of cardinality M : 1, that means one single *Bid* as well as any number of *Bids* should belong to one single *Item.*
- For relation '*belongs to*', *Items : Catagory* is of cardinality M : 1, that means many *Items* should belong to one single *Category* and one *Catagory* can hold any number of *Items*.

Many-to-Many Cardinality (M : N) :

- For relation '*bids on*', *Buyer : Bids* is of cardinality M : N, that means any number of *Buyer* can bids on any number of *Bids*.

5. Schema Design :

The system consists of eight schemas. The schemas are listed below –

i. **member**(mid, name, address, phone_num, email, pass_word)
ii. **buyer**(mid, shipping_address)
iii. **seller**(mid, bank_account_num, routing_num)
iv. **bids**(bid, bid_price, _time, mid, item_id)
v. **items**(item_id, title, description, start_date, end_date, starting_bid_price, bidding_increment, buyer_mid, seller_mid, cat_id)
vi. **category**(cat_id, c_name)
vii. **_transaction**(tid, amount, _time, item_id)
viii. **feedback**(tid, rating, _comment)

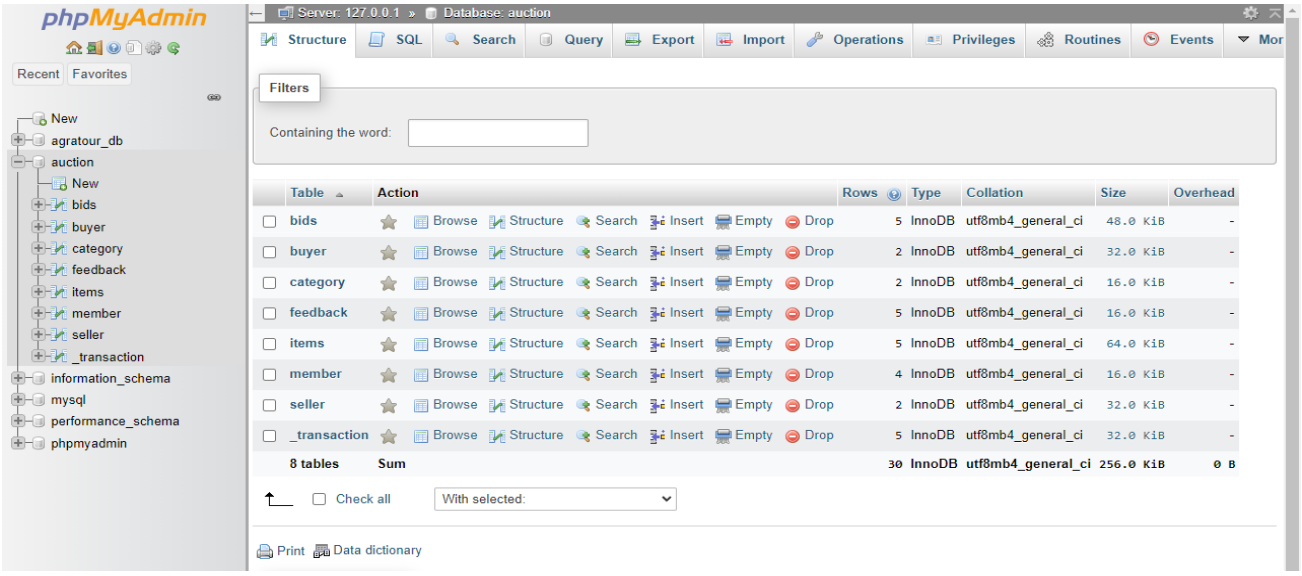
The normalized schemas are -

i. **member**(mid, name, address, phone_num, email, pass_word)
ii. **buyer**(mid, shipping_address)
iii. **seller**(mid, bank_account_num, routing_num)
iv. **bids01**(bid, bid_price, _time)
v. **bids02**(bid, mid)
vi. **bids03**(bid, item_id)
vii. **items01**(item_id, title, description, start_date, starting_bid_price, bidding_increment)
viii. **items02**(item_id, buyer_mid)
ix. **items03**(item_id, seller_mid)
x. **items04**(item_id, cat_id)
xi. **category**(cat_id, c_name)
xii. **_transaction01**(tid, amount, _time)
xiii. **_transaction02**(tid, item_id)
xiv. **feedback**(tid, rating, _comment)

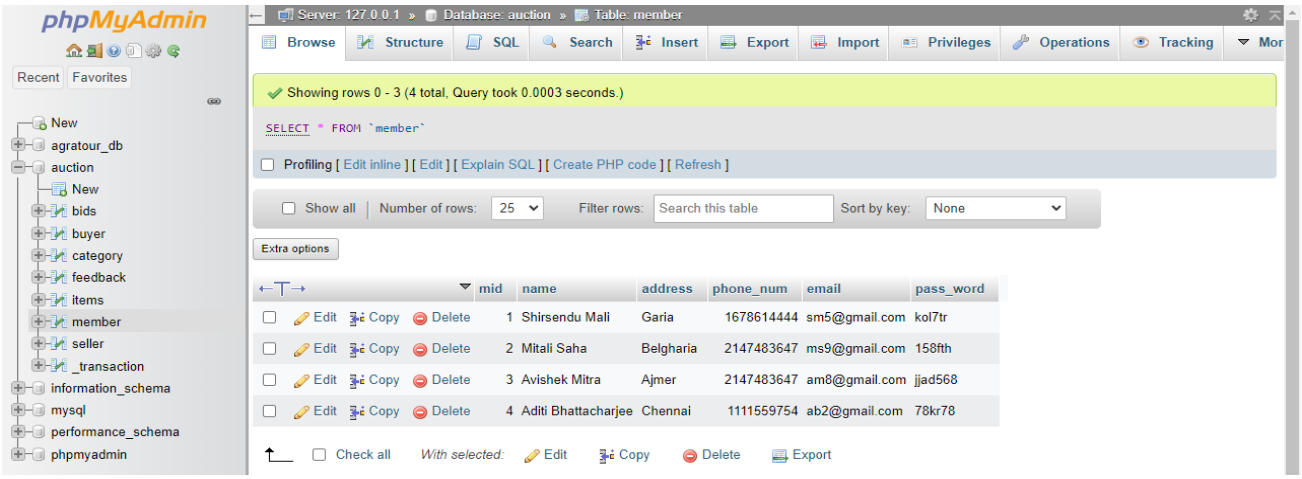
Here the database has no multivalued or derived attributes, so it is in **1NF**. And also there is no partial or transitive dependencies in the database, so it is also in **2NF** as well as in **3NF**. And here all the determinants are candidate keys, so we can claim that the database is also in **BCNF**.

6. Schema :

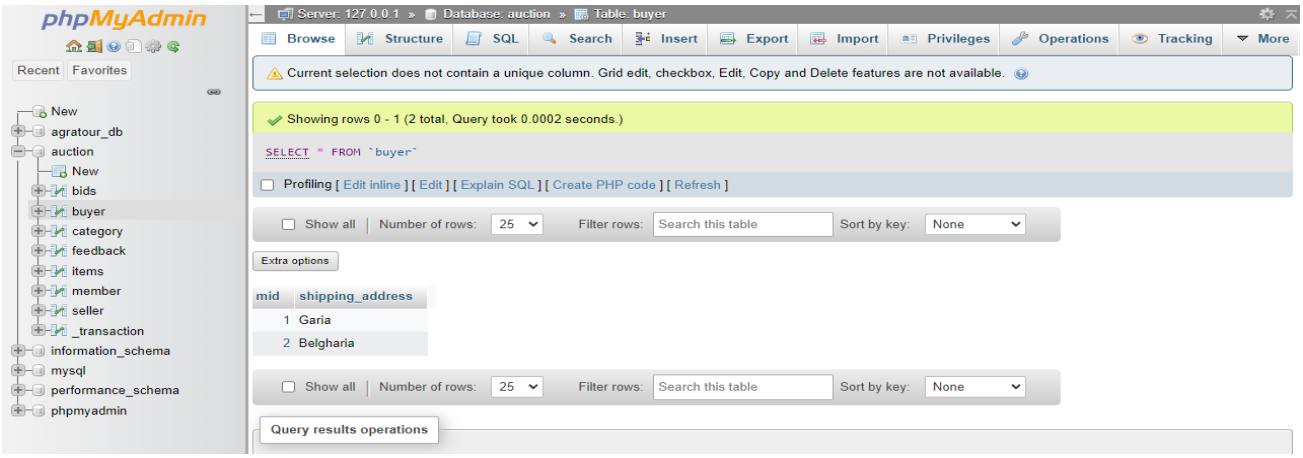
'auction' database :



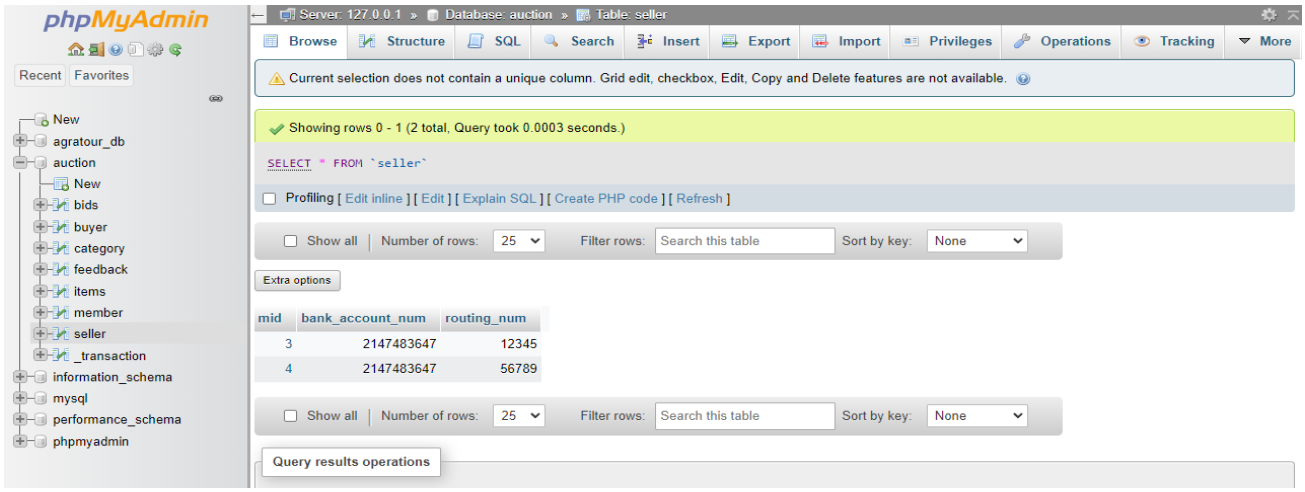
'member' table :



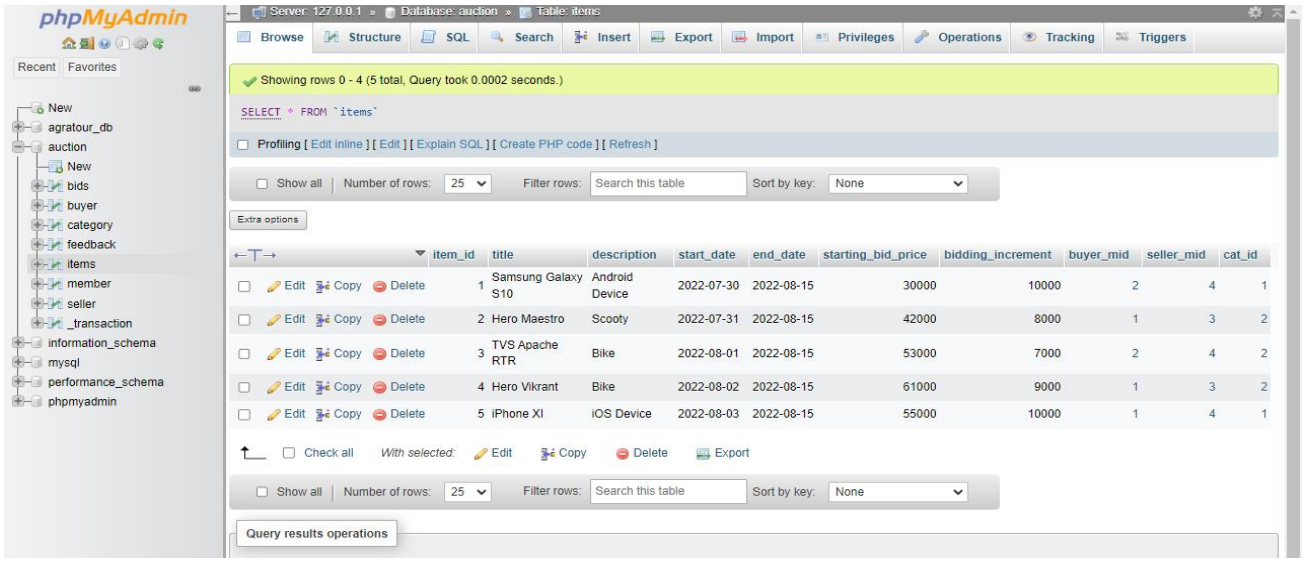
'buyer' table :



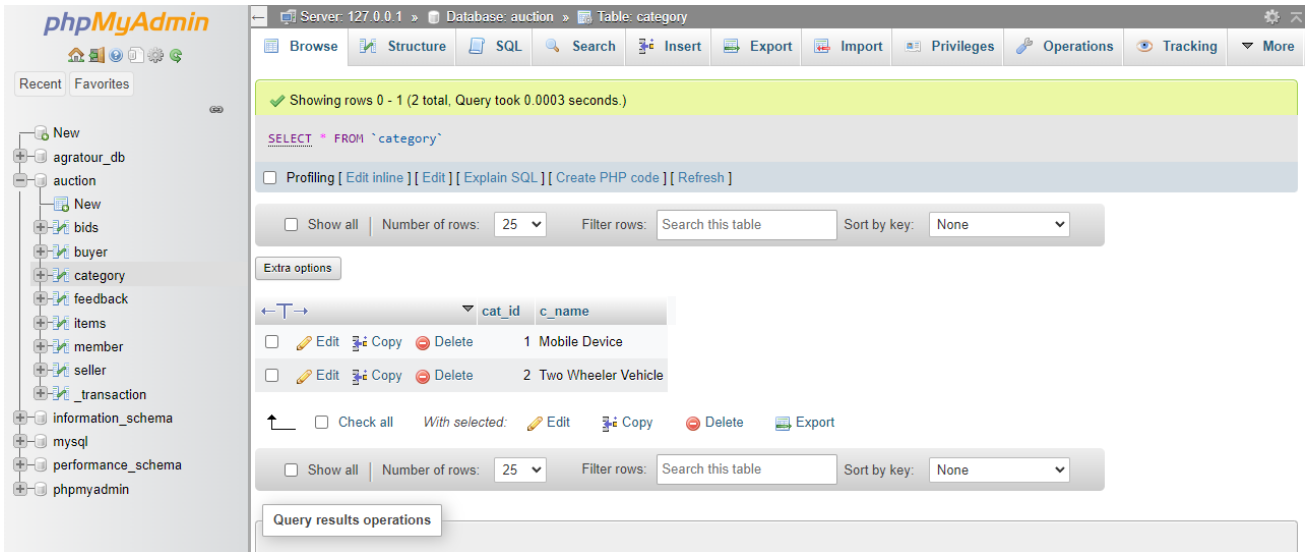
'seller' table :



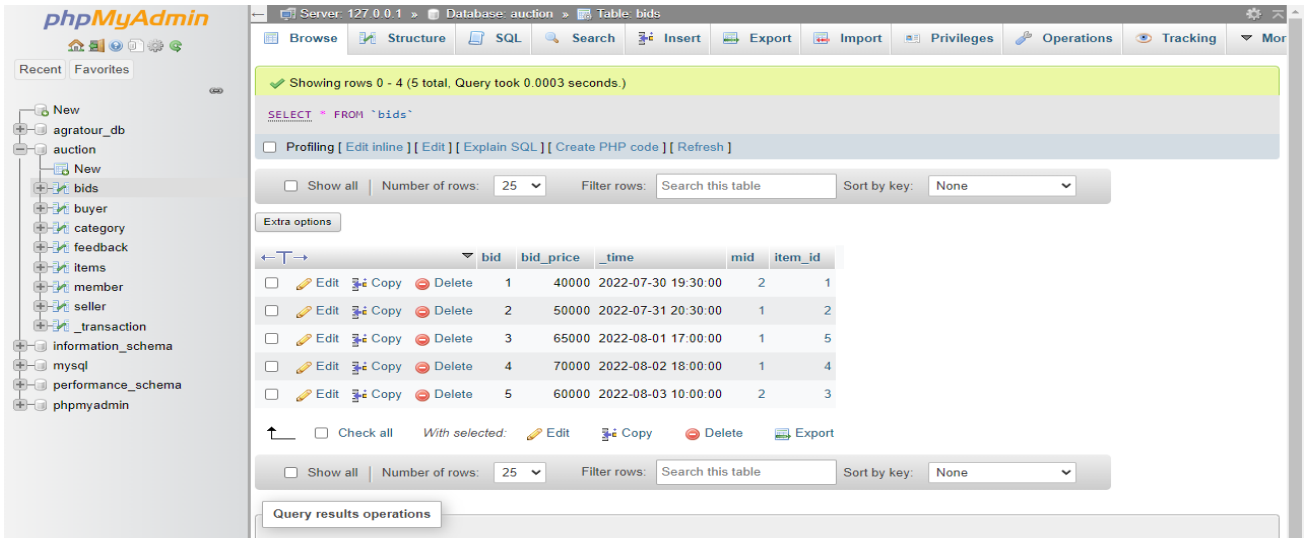
'items' table :



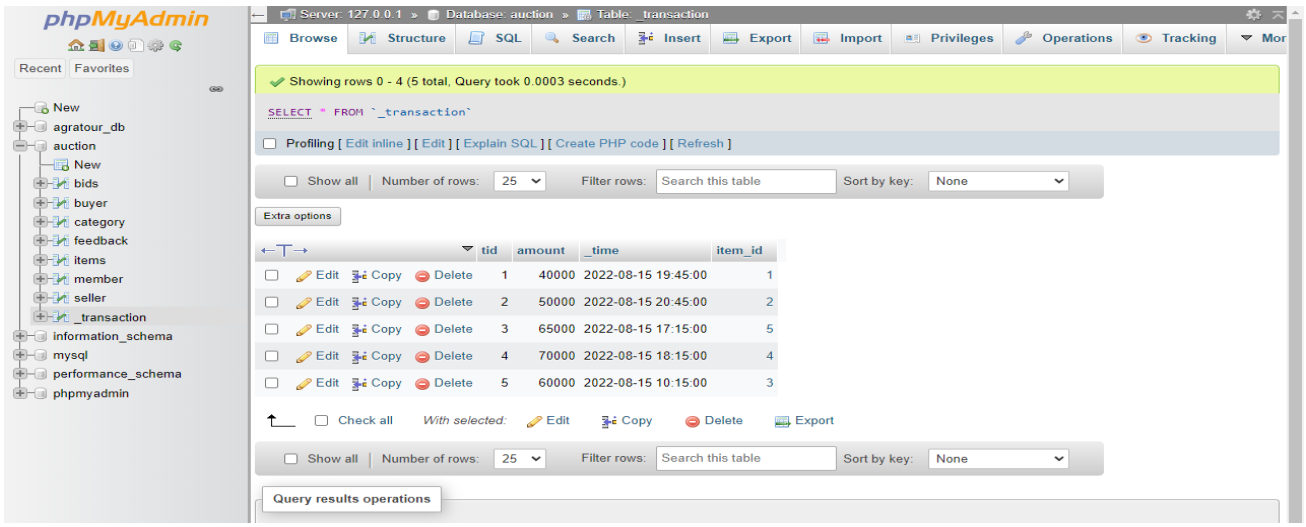
'category' table :



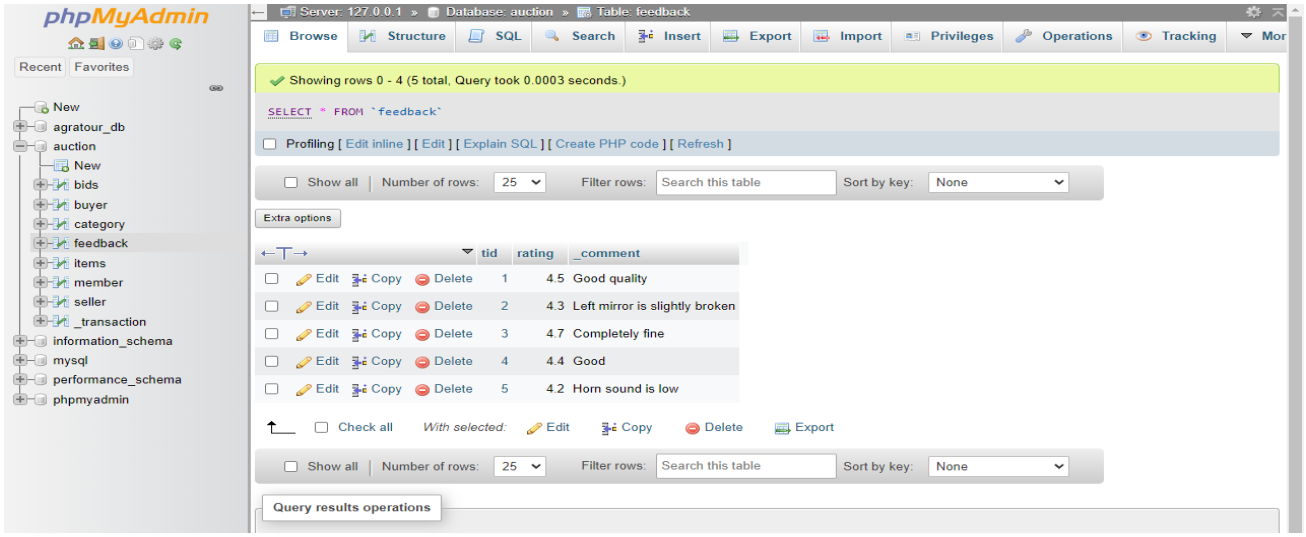
'bids' table :



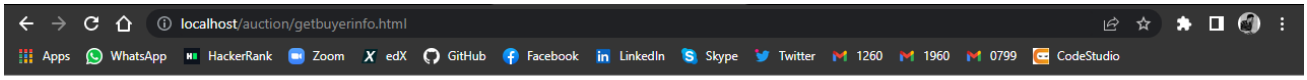
'_transaction' table :



'feedback' table :

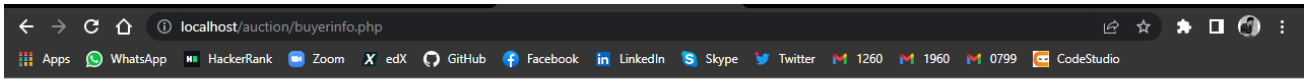


7. Output :



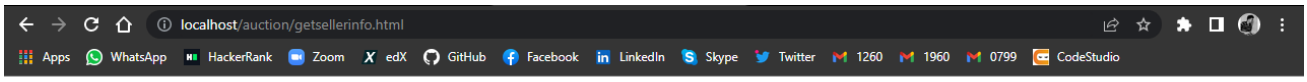
This webpage is used for retrieving all the information of a BUYER.

Enter name of a BUYER : Shirsendu Mali Submit



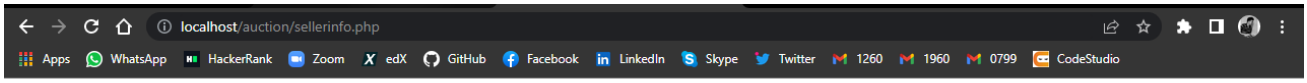
Here is the details of the BUYER you have asked about.

Name	Address	Phone No.	Email ID	Shipping Address	Item BOUGHT	Product Description	Product Category	Transaction ID	Amount	Date & Time	Product Rating	Product Feedback
Shirsendu Mali	Garia	1678614444	sm5@gmail.com	Garia	iPhone XI	iOS Device	Mobile Device	3	65000	2022-08-15 17:15:00	4.7	Completely fine
Shirsendu Mali	Garia	1678614444	sm5@gmail.com	Garia	Hero Maestro	Scooty	Two Wheeler Vehicle	2	50000	2022-08-15 20:45:00	4.3	Left mirror is slightly broken
Shirsendu Mali	Garia	1678614444	sm5@gmail.com	Garia	Hero Vikrant	Bike	Two Wheeler Vehicle	4	70000	2022-08-15 18:15:00	4.4	Good



This webpage is used for retrieving all the information of a SELLER.

Enter name of a SELLER : Avishek Mitra Submit



Here is the details of the SELLER you have asked about.

Name	Address	Phone No.	Email ID	Bank Account No.	Routing No.	Item SOLD	Product Description	Product Category	Transaction ID	Amount	Date & Time	Product Rating (Given by BUYER)	Product Feedback (Given by BUYER)
Avishek Mitra	Ajmer	2147483647	am8@gmail.com	2147483647	12345	Hero Maestro	Scooty	Two Wheeler Vehicle	2	50000	2022-08-15 20:45:00	4.3	Left mirror is slightly broken
Avishek Mitra	Ajmer	2147483647	am8@gmail.com	2147483647	12345	Hero Vikrant	Bike	Two Wheeler Vehicle	4	70000	2022-08-15 18:15:00	4.4	Good