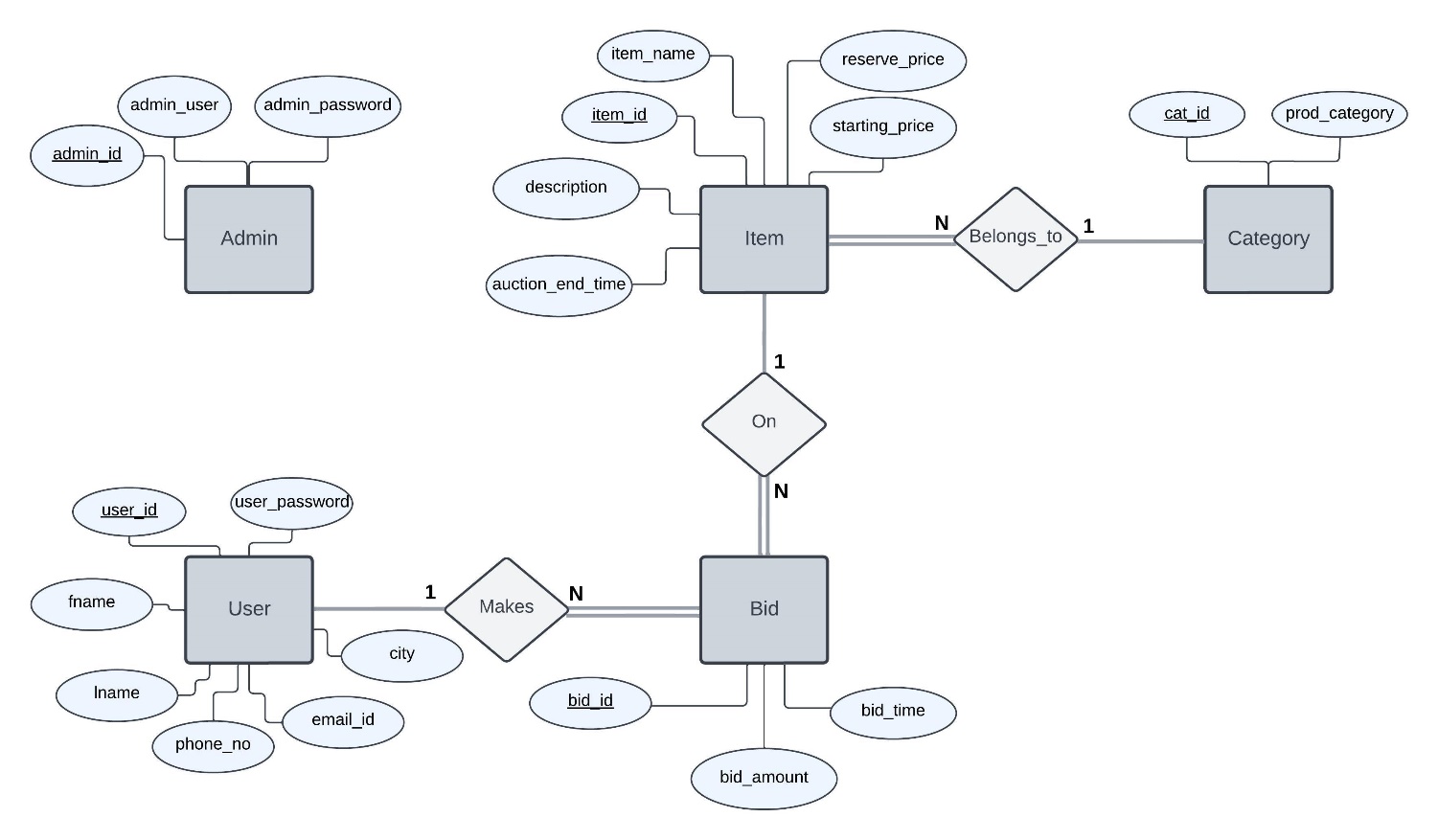
Auction Database Schema

Project-3

Students:

|  |  |  |
| --- | --- | --- |
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For the Live Auction Database schema, the ER Diagram is as follows:



*The Entity Relationship Diagram*

The ER Diagram contains the following

Entities

* Admin
* User
* Item
* Category
* Bid

Relationships

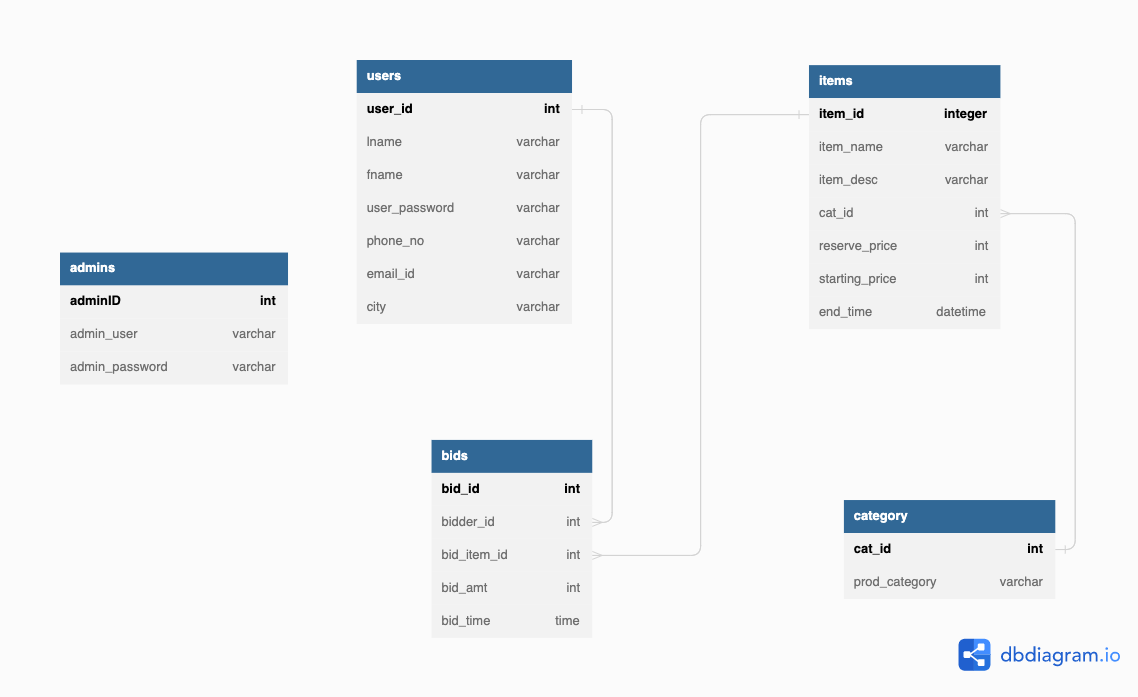
* Makes: User Makes A Bid
* On: A Bid is On Item
* Belongs To: An Item Belongs to a Category

Relational Cardinalities:

* *Makes:* 1:N (from User to Bid)
  + *A user can make multiple bids but a bid can be made by only one user.*
* *On:* 1:N (from Item to Bid)
  + *An item can have multiple bids on it but a bid can be made on only one item.*
* *Belongs To:* 1:N (from Category to Item)
  + *An item can belong to only one category and a category can have multiple items listed.*

Resolving the ER Diagram into Relational Schema,

* The Entity Sets have been resolved into respective schemas
* The relational table for Belongs to Relation would contains two attributes: item\_id and cat\_id.
  + On(*item\_id,cat\_id)*
  + *Item\_id is the primary key since relationship is many to one from item to category*
  + *Since only two attributes exist and item\_id is the primary key, the cat\_id has been included in the table for items.*
* The relational table for On Relation would contains two attributes: item\_id and bid\_id.
  + On(*bid\_id,item\_id)*
  + *Bid\_id is the primary key since relationship is many to one from bid to item*
  + *Since only two attributes exist and bid\_id is the primary key, the item\_id has been included in the table for bids.*
* The relational table for Makes Relation would contains two attributes: user\_id and bid\_id.
  + On(*bid\_id,user\_id)*
  + *Bid\_id is the primary key since relationship is many to one from bid to user.*
  + *Since only two attributes exist and bid\_id is the primary key, the user\_id has been included in the table for bids.*



Keys:

* Admins: adminID (primary key)
* Users: user\_id (primary key)
* Items: item\_id (primay key)
* Category: cat\_id (primary key)
* Bids: bid\_id (primary key), (bid\_item\_id, bid\_amt) is a candidate key

The following Functional Dependencies exist in the tables

* Users:
  + user\_id -> (fname, lname, user\_password, phone\_no, email\_id, city)
* Items:
  + item\_id -> (item\_id, item\_name, item\_desc, cat\_id, reerve\_price, starting\_price, end\_time)
* Bids:
  + bidder\_id -> (bidder\_id, bid\_item\_id, bid\_amt, bid\_time)
  + (bid\_item\_id, bid\_amt) -> (bid\_id, bid\_time, bidder\_id)
* Admins:
  + adminId -> (admin\_user, admin\_password)
* Category:
  + cat\_id -> (prod\_category)

The foreign key constraints are as follows:

* items.cat\_id references the primary key of Categories, category.cat\_id
* bids.bid\_item\_id references the primary key of Items, items.item\_id
* bids.bidder\_id references the primary key of Users, users.\_id

Normalisation

Condition for 1NF

For 1NF, all attributes in a relation have an atomic value (no multivalued attributes). This is done by creating a new relation with the primary key and the multivalued attributes.

Since all attributes are atomic in the schema, the schema is in 1NF

Condition for 2NF

All non-prime attributes of a relation have to be fully functionally dependent on every candidate key.

The candidate keys in this schema cannot be minimalised any further for any dependency. Thus the relations are in 2NF.

Condition for 3NF

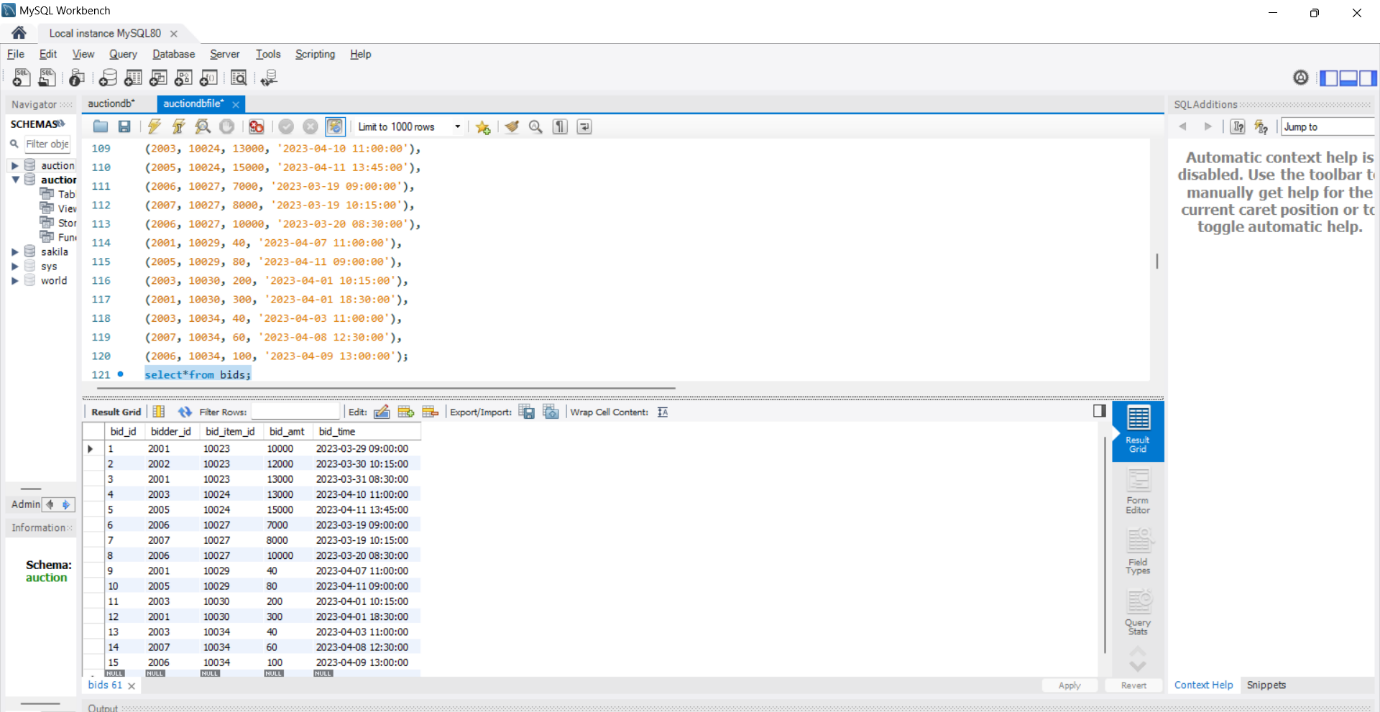
For 3NF, either of the two conditions must hold in dependency X->Y

* X is a superkey
* Y is a prime attribute

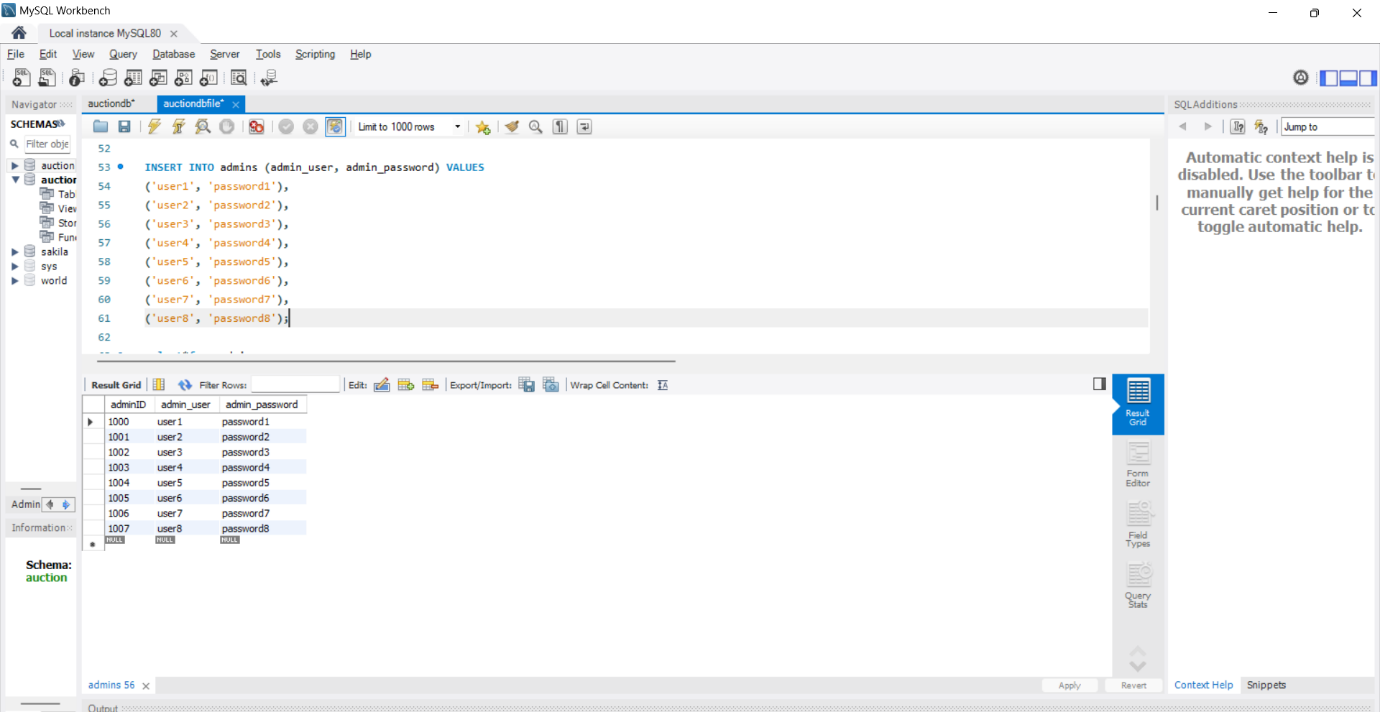
Since all functional dependencies involve the primary key in the Left Hand Side, the relations are in 3NF.

Instances of the Tables

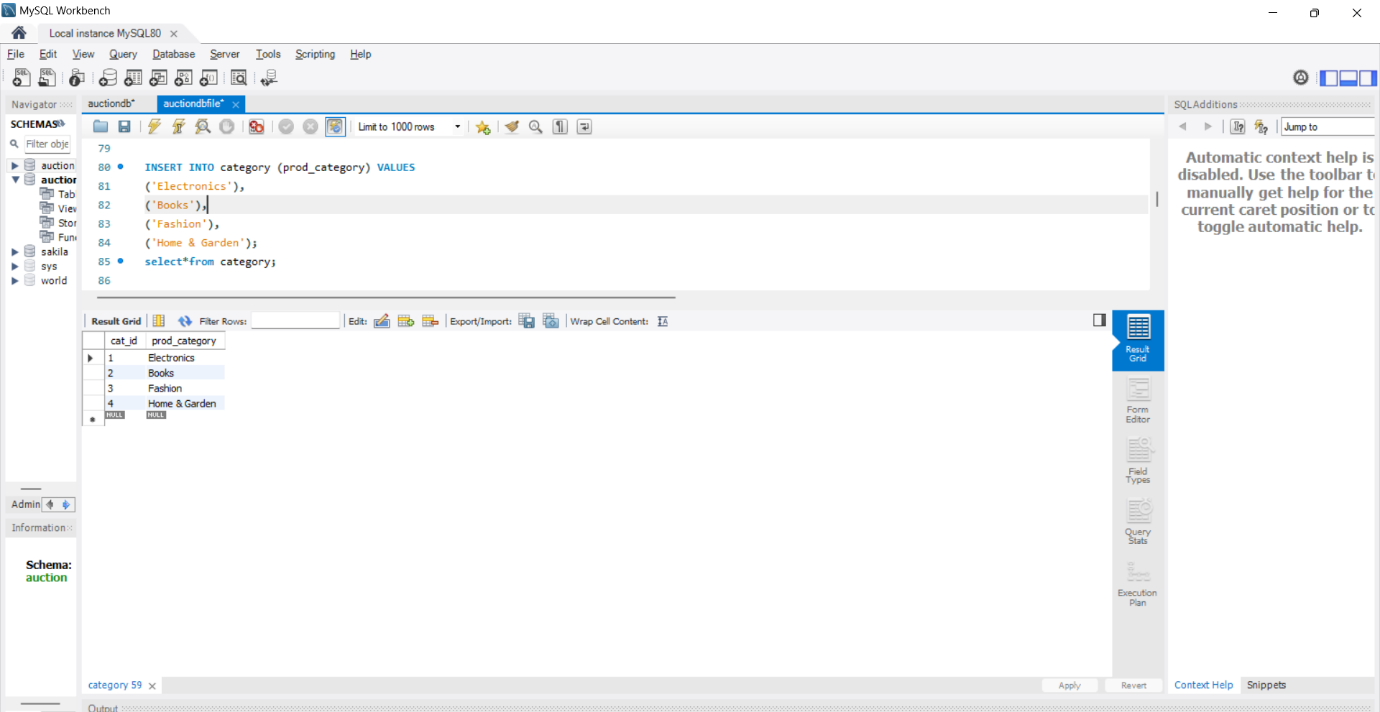
Bids



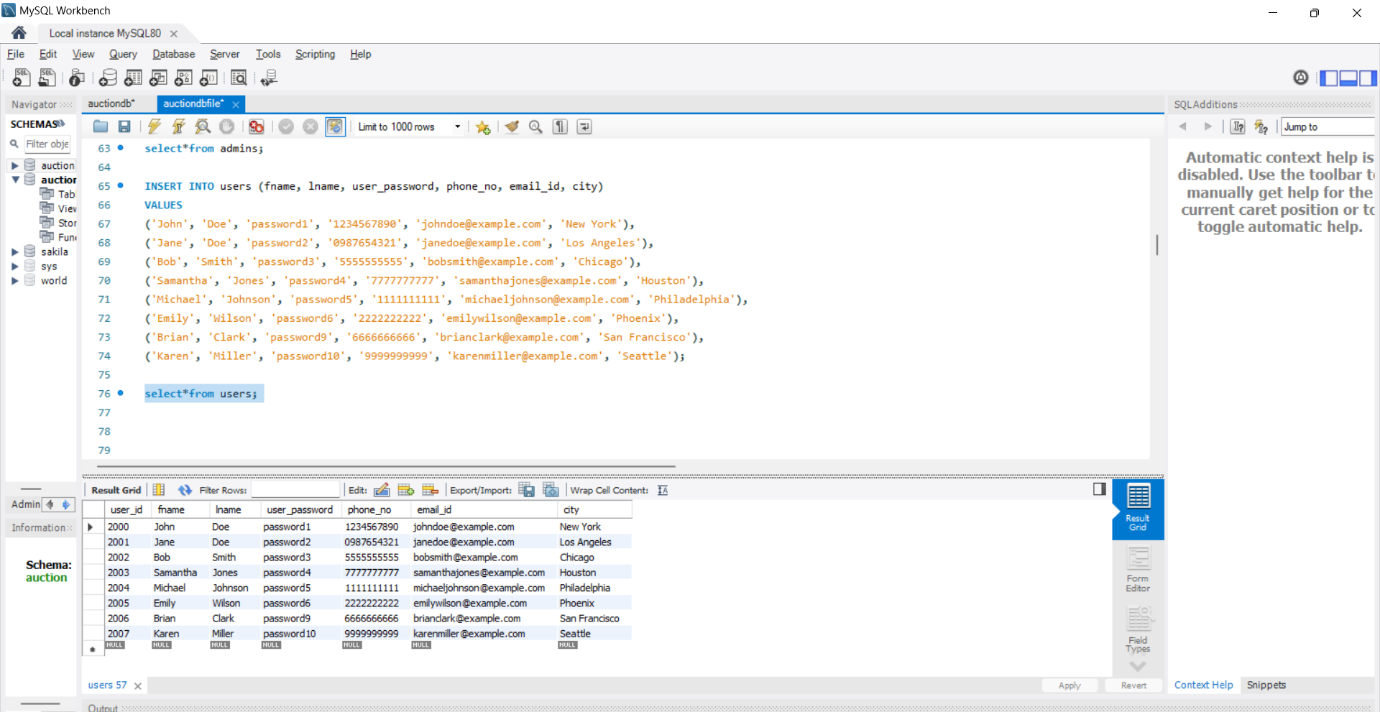
Admins



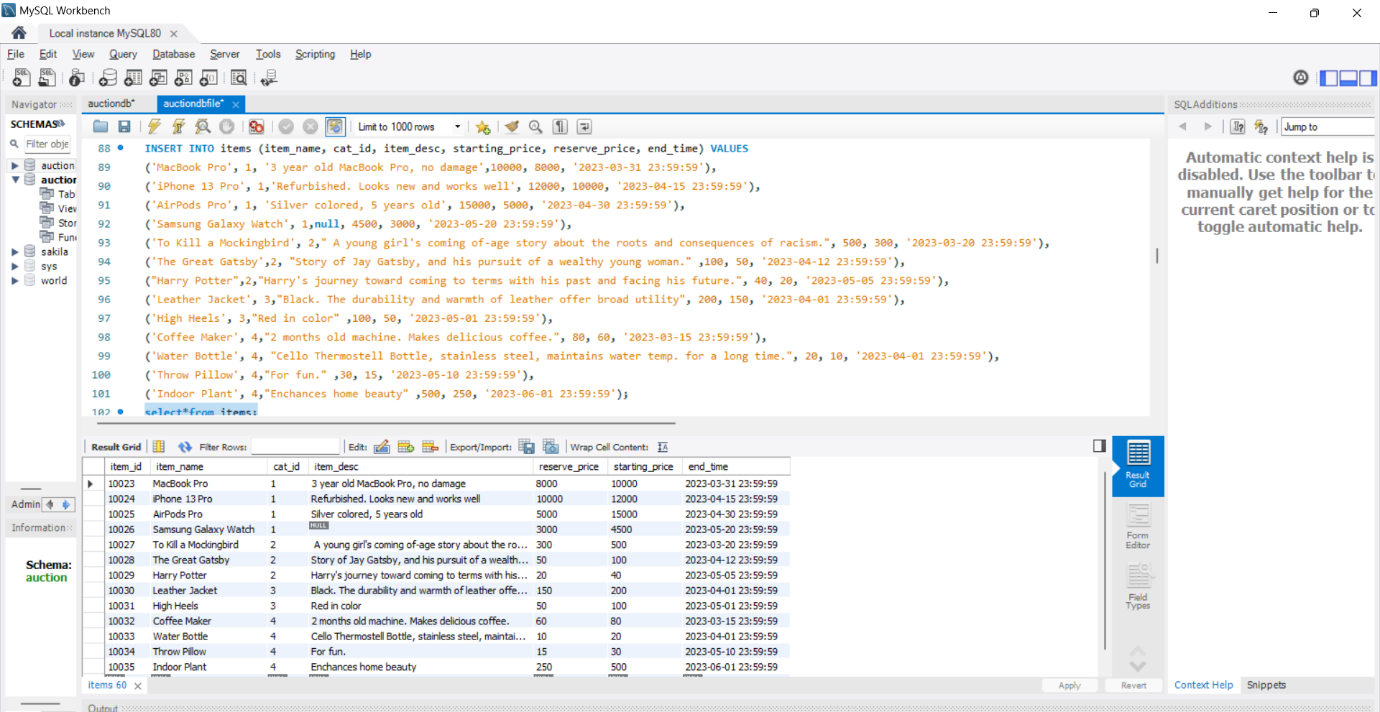
Category



Users



Items



Screenshots of Queries

1. What is the highest bid amount for a specific item in the current auction?

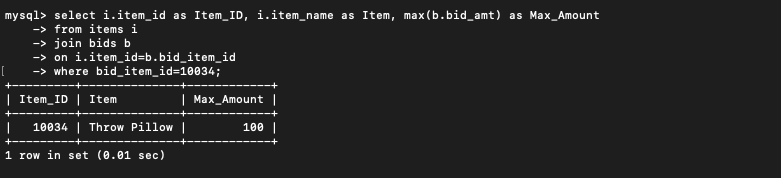
select i.item\_id as Item\_ID, i.item\_name as Item, max(b.bid\_amt) as Max\_Amount

from items i

join bids b

on i.item\_id=b.bid\_item\_id

where bid\_item\_id=10034;



1. How many bids have been placed on a specific item so far?

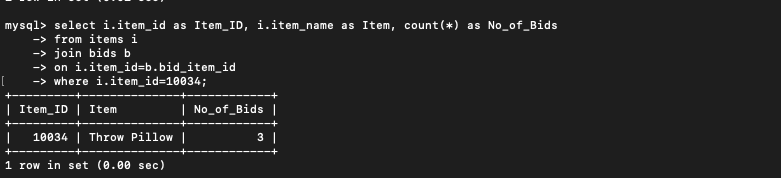
select i.item\_id as Item\_ID, i.item\_name as Item, count(\*) as No\_of\_Bids

from items i

join bids b

on i.item\_id=b.bid\_item\_id

where i.item\_id=10034;



1. Who is the current highest bidder for a specific item?

select i.item\_id as Item\_ID, i.item\_name as Item, concat(u.fname,' ',u.lname) as 'Highest Bidder'

from (items i

join bids b

on i.item\_id=b.bid\_item\_id

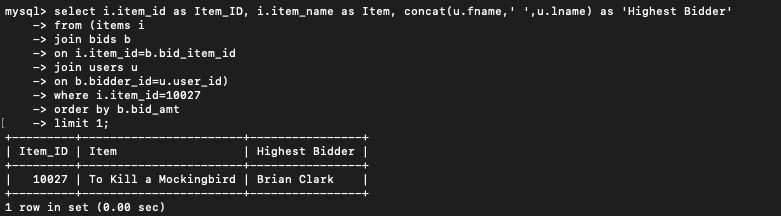
join users u

on b.bidder\_id=u.user\_id)

where i.item\_id=10027

order by b.bid\_amt

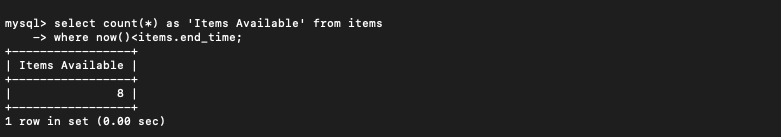
limit 1;



1. How many items are currently available for auction?

select count(\*) as 'Items Available' from items

where now()<items.end\_time;



1. What is the bidding history for a specific user?

select u.user\_id,concat(u.fname,' ',u.lname) as 'Bidder', i.item\_name as 'Item', bid\_amt as 'Bid', b.bid\_time as 'Time'

from (users u

join bids b

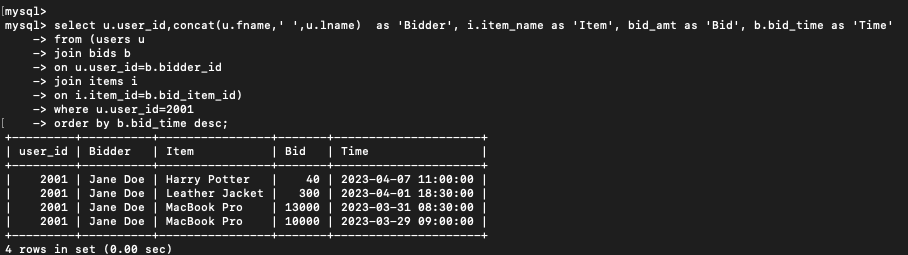
on u.user\_id=b.bidder\_id

join items i

on i.item\_id=b.bid\_item\_id)

where u.user\_id=2001

order by b.bid\_time desc;



1. How many users have placed bids on a specific item?

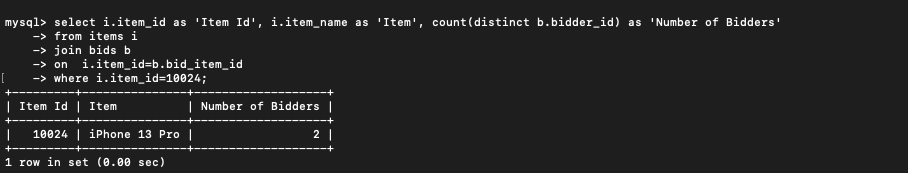
select i.item\_id as 'Item Id', i.item\_name as 'Item', count(distinct b.bidder\_id) as 'Number of Bidders'

from items i

join bids b

on i.item\_id=b.bid\_item\_id

where i.item\_id=10024;



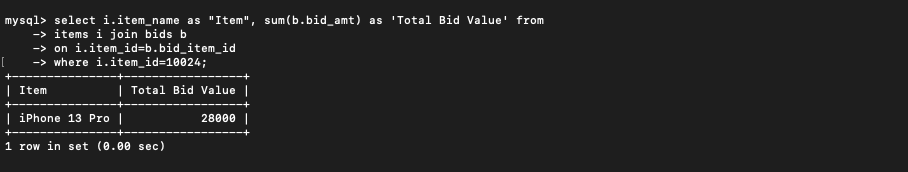
1. What is the total amount of all the bids placed on a specific item?

select i.item\_name as "Item", sum(b.bid\_amt) as 'Total Bid Value' from

items i join bids b

on i.item\_id=b.bid\_item\_id

where i.item\_id=10024;



1. 8. What is the status of a specific bid (i.e., winning or losing)?

select b1.bid\_id as 'Bid Id', (case

when b1.bid\_amt=(select max(b2.bid\_amt)

from bids b2

where b2.bid\_item\_id=b1.bid\_item\_id)

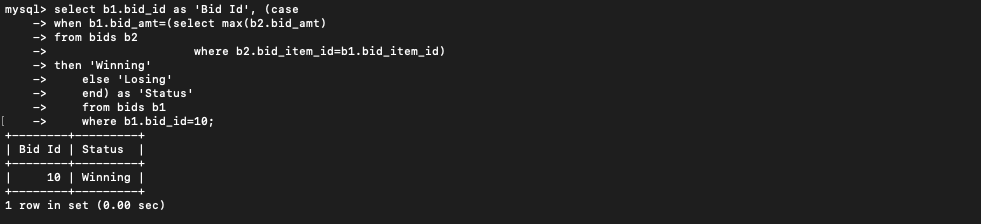
then 'Winning'

else 'Losing'

end) as 'Status'

from bids b1

where b1.bid\_id=10;



1. 9. How many items has a specific user bid on in the current auction?

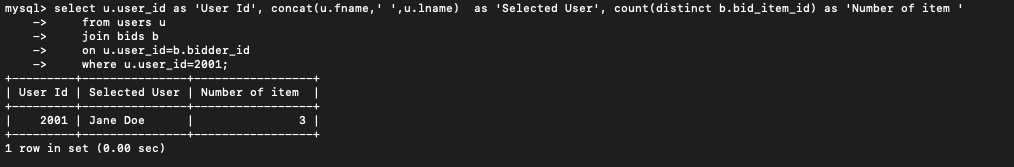
select u .user\_id as 'User Id', concat(u.fname,' ',u.lname) as 'Selected User', count(distinct b.bid\_item\_id) as 'Number of items'

from users u

join bids b

on u.user\_id=b.bidder\_id

where u.user\_id=2001;



1. What is the total amount of all the bids placed by a specific user in the current auction?

select u .user\_id as 'User Id', concat(u.fname,' ',u.lname) as 'Selected User',sum(b.bid\_amt) as 'Total Bid Value'

from users u

join bids b

on u.user\_id=b.bidder\_id

where b.bidder\_id=2001;

