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1. Introduction

As the volume of data grows, it becomes more important to preserve and maintain it.

Databases are one of the most important tools developed to process and preserve the data found in each system.

At present, more than 100k visitors enter "Haraj" Saudi system every day, resulting in significant pressure and potential responsibilities on system owners.

In this report, a proposal is made to design a database with more than one table to save and maintain the data to become useful information including: Suppliers, Items, Purchaser etc.

2. Objective

- Suggest a solution to System owners who concern in developing similar apps .
-Enhance our knowledge and strengthening our background to the database for real world apps.

3. Conceptual EER Model

3.1 Assumptions

- *Assume a client should be a purchaser or supplier .*
- *Assume a supplier may place many items , each item should place by one supplier.*
- *Assume a client may generate many auctions to open many bids and each bid should be opened by one auction ,also each auction should be generated by one client.*
- *Assume a bids should be on one or more items , also each item may have many bids .*
- *Assume a purchaser may make many bids , each bid should made by one purchaser .*
- *Assume after the purchaser made bids and won the highest price it became the winner, then transaction may proceed only with one supplier and one winner.*
- *Assume a client may record many comments , each comment recorded by one client , knowing that the comments will not record without client .*
  (Note: comment identify by combination of Client_ID and Comment_description)
- *Assume after transaction have been proceed , the winner may has one or more bills and each bill owned by one winner .*
  (Note: bill identify by combination of Winner_ID and Bill_ID)

3.2 Additional Entities

3.2.1 Entity Role

We added three Entities in order to enhance our EER , and three relationship to activate those Entities

Driver

Driver is a regular entity that eHaraj needs to deliver the items to the Winners that wins the bids So we needed a ternary relationship that include (Item, Winner , Driver).
a driver is supported with his (ID , Name , license , Car_number) will take the ordered item and deliver to the Winner's Shipping address.

Discount

Discount is a regular entity that eHaraj needs to apply discounts on the bills So we needed a binary relationship between (Discount ,Bill). a Discount with (Code , Amount) is applied to each bill by discount code and a specific discount amount applied depends on the code .

Client_Care

Client Care is a regular entity that eHaraj needs to serve their customers about any problem they faced whether during purchase of deliver or bids…etc.
So we needed a binary relationship between (Client_Care , Client).

a Client Care Department is supported with (Service_ID ,Service_Description) therefore , a client will served by client_care and can also track the service by the Service ID associated with the detailed service description.

3.2.2 Assumptions

- *Assume that a Driver will deliver items to Winner unless the winner paid the money to the supplier(on his bank account number) by transaction relationship, there is not pay on receipt process.*
- *Assume that a winner has two choices to receive his items after purchase process , either he goes by himself to pick it up from supplier or choose delivery to get it delivered to his Shipping address .*
- *Assume that a Discount may apply to many bills, each bill may be applied by only one Discount code.*
- *Assume that a Client_Care must serve many clients, each client may serve by many client_care employees***.**

3.3 Scenario

-scenario as supplier:
A client opened the online site and register as a supplier and fills the client information beside the bank account number to sale a Hard drive as a hardware and a mobile phone as an operating system items and fill the item's information , a supplier generate an auction to start selling the items with start price and other auction's information , after many bids a supplier decided to sell the items to the highest price bidder ,then start to transaction with the winner, a supplier could record his/her comments about their completed sale transaction **-Scenario as purchaser:**
A client opened the online site and register as a purchaser and fills the client information beside the shipping address to buy items , a purchaser made bids on the hard drive and mobile phone he was interested on , if his bids are the highest price he became a winner and then start to transaction with the supplier of those items , then may had a bill for the items he bought , a winner could the record his comments about their completed sale transaction . on the other hand, if his bids

were not the highest price he will not become the winner and the sale transaction not completed.

-Scenario for additional entities:

A client opened the online site and register as a purchaser and fills the client information beside the shipping address to buy items , a purchaser made bids on the hard drive and mobile phone he was interested on , if his bids are the highest price he became a winner and then start to transaction with the supplier of those items , then may had a bill for the items he bought then he may apply a discount for his items by using discount code and the associated amount will apply the on the bill, after a bill extracted he has choice to choose delivery to deliver his items rather than he take it by himself , a winner could record his comments about their completed sale transaction, if he faced any problem with the purchase or late delivery …etc , and want help he will contact with client care to solve it, on the other hand , if his bids were not the highest price he will not become the winner and the sale transaction not completed.

3.4 Description: ER Data Model Components

3.4.1 Entities with its attributes:

- **Client** (Client_ID , E-mail , First_name , Last_name , Password , Address , phone_number)
- **Purchaser** (shipping_address) + all attributes of Client
- **Winner** (all attributes of Purchaser and Client)
- **Supplier** (bank_account_number) + all attributes of Client
- **Item** (Item_ID , title , item_description , starting_bid_price)
- **Hardware** (memory , storage , speed) + all attributes of Item
- **Operating_system** (cost , manufacturer , Is_system_software

, Year_of_manufacturing , version , author) + all attributes of Item

- **Auction** (Auction_ID , start_price , Auction_description , expiration , increment , reserve)
- **Comment** (rating , comment_description)
- **Bill** (Bill_ID , order_date , quantity)
- **Bid** (Bid_ID , price , timestamp , Highest_price)
- **Driver** (ID , Name , license , Car_number)
- **Discount** (Code , Amount)
- **Client_Care** (Service_ID ,Service_Description)

*Other additional attributes and keys that they obtain from relationships will be explained in the schema.

3.4.2 Relationship with its cardinality and participation :

- Auction (1,1) **generated by** client (0,N)
- Auction (0,N) **open** bid (1,1)
- Client (0,N) **record** comment (1,1) → it is a weak relationship
- Purchaser (0,N) **make** bid (1,1)
- Bid (1,N) **on** item (0,M)
- Supplier (0,N) **place** item (1,1)
- Winner has (0,1) **transaction** with supplier (0,1)
- Winner (0,N) **has** bill (1,1) → it is a weak relationship
- Client (0,N) **serverd by** client_care (1,M)
- Bill (0,1) **Appply** discount (0,N)
- We have ternary relationship **deliver** between driver and winner, item
    - The driver delivers items to winner
    - The winner will be received by driver the items
    - The items will be delivered by driver to winner

3.5 Conceptual Data Model

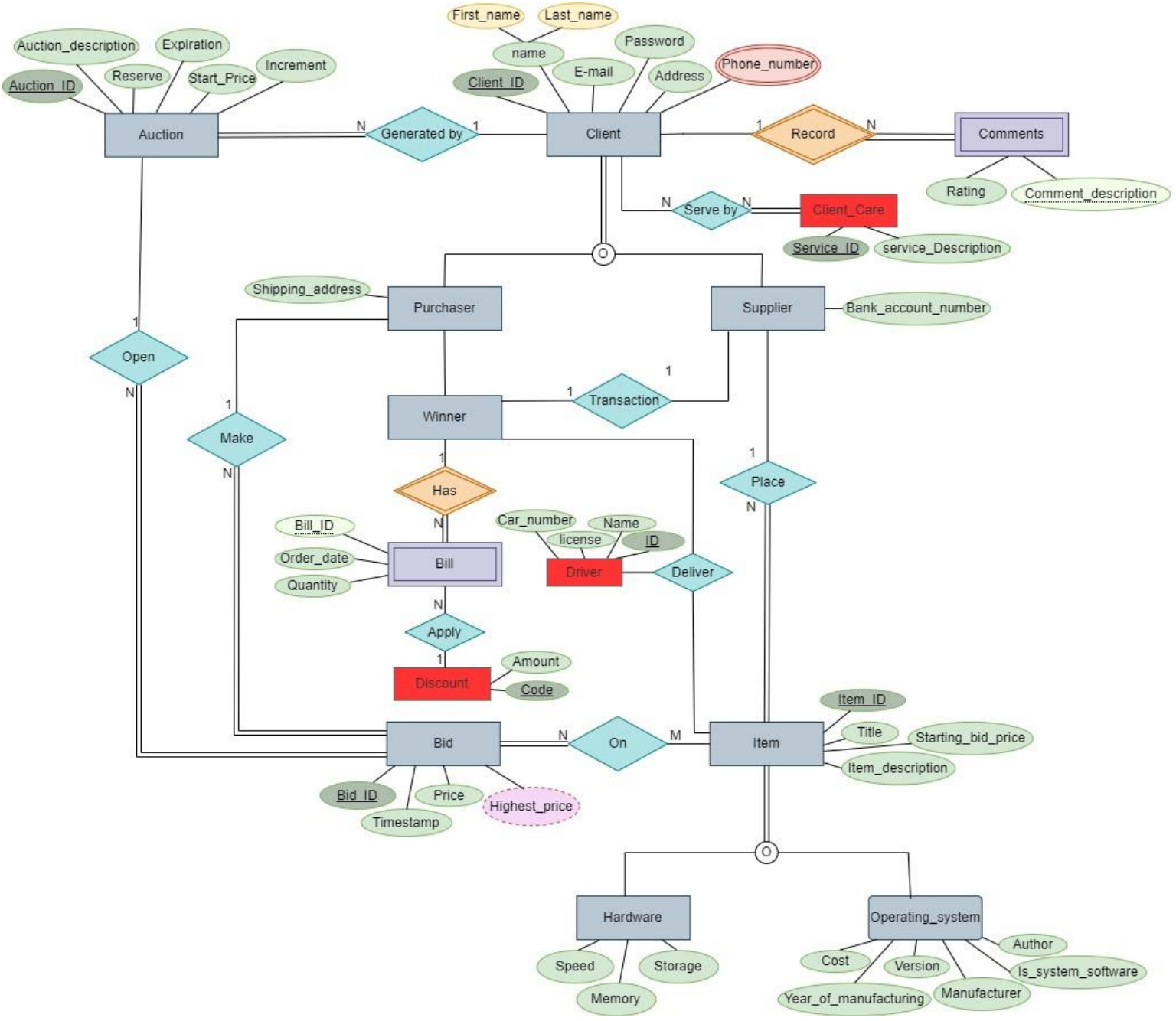

Figure 1-EER Diagram

4 Relational Database Schema

4.4 Assumptions

We use option **8A:** multiple relation-super/sub classes to mapping specialization/generation in schema .

- *Assume Client_ID of inherited will be changed depended on their names to be clearer for the relation they participate on*
  - *Purchaser → Purchaser_ID*
  - *Supplier → supplier_ID*
  - *Winner → Winner_ID*
  - *And each one will point to his direct parent who related to .*
- *Assume Item_ID of inherited will be changed depended on their names*
  - *Hardware → Hardware_ID*
  - *Operating_system → Operating_system_ID*

- Red color table indicate to additional entities .

2.2 Relational Database Schema

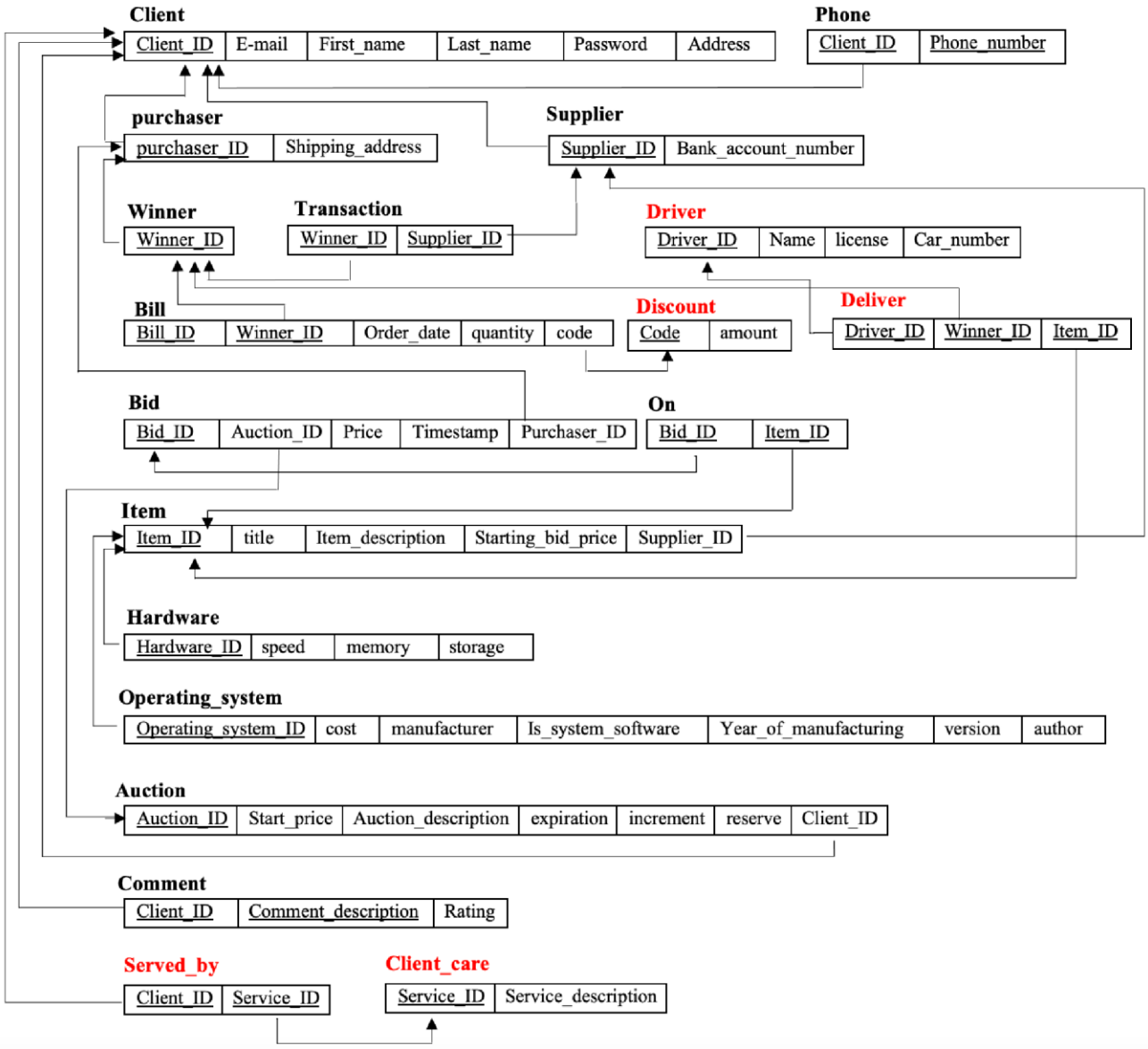

Figure 2-Database Schema using 8A:Multiple Relation Superclass and Subclass

3 SQL Implementation

3.1 Table Creation

Note: You may notice a different names from sql and schema, because of some platform restrictions

```
----------CREATING OUR SCHEMA----------
CREATE SCHEMA EHaraj identified by Group2;

----------CREATING TABLES---------- ----------
---Creating eClient Table----------

CREATE TABLE    eClient (
Client_ID               CHAR(9)             PRIMARY KEY,
Email                   VARCHAR(30)         NOT NULL,
First_Name              VARCHAR(10)         NOT NULL,
Last_Name               VARCHAR(10)         NOT NULL,
Client_Password         VARCHAR(10)          NOT NULL,
Address                 VARCHAR(20)         NOT NULL DEFAULT Ryiadh,
UNIQUE(Client_Password)
);
----------Creating Phone Attributes---------- CREATE
TABLE Phone (
Client_ID               CHAR(9)             PRIMARY KEY,
Phone_Number            INTEGER               PRIMARY KEY,
FOREIGN KEY (`Client_ID`) REFERENCES `eclient` (`Client_ID`) ON DELETE CASCADE ON UPDATE CASCADE
);
----------Creating Purchaser Table---------- CREATE
TABLE Purchaser (
Purchaser_ID            CHAR(9)             PRIMARY KEY,
Shipping Address        VARCHAR(20)          NOT NULL
FOREIGN KEY (`Purchaser_ID`) REFERENCES `eclient` (`Client_ID`) ON DELETE CASCADE ON UPDATE
CASCADE
);
```

```
---------------------------------Creating Supplier Table----------------


CREATE TABLE Supplier (
Supplier_ID                    CHAR(9)                    PRIMARY KEY,
Bank_Account_Number            INTEGER                      NOT NULL
UNIQUE(Bank_Account_Number)
CONSTRAINT `Supplier_ID` FOREIGN KEY (`Supplier_ID`) REFERENCES `eclient` (`Client_ID`) ON DELETE
CASCADE ON UPDATE CASCADE
);
---------------------------------Creating Hardware Table---------------- CREATE
TABLE Hardware (
Hardware_ID              CHAR(9)                  PRIMARY KEY,
HW_Speed                 VARCHAR(5)                 NOT NULL,
HW_Memory                VARCHAR(5)                 NOT NULL,
HW_Storage               VARCHAR(5)
FOREIGN KEY (Hardware_ID) REFERENCES Supplier (Item_ID)
ON DELETE RESTRICT ON UPDATE CASCADE
);
---------------------------------Creating Operating_System Table---------------- CREATE
TABLE Operating_System (
Operating_System_ID            CHAR(9)                    PRIMARY KEY,
OS_Cost                        INTEGER                      NOT NULL,
OS_Manufacturer                VARCHAR(7)                 NOT NULL,
Is_System_Software     TINYINT          NOT NULL,     --NOTE: TINYINT = BOLLEAN type in MySQL
Year_of_ Manufacturing         INTEGER                    NOT NULL,
Version                      INTEGER                  NOT NULL,
 FOREIGN KEY (`Operating_System_ID`)
 REFERENCES `ehaaraj`.`item` (`Item_ID`)
 ON DELETE RESTRICT
 ON UPDATE CASCADE
);
---------------------------------Creating Auction Table----------------
CREATE TABLE Auction (
Auctio_ID                CHAR(9)             PRIMARY KEY,
```

```
Start_Price                    INTEGER              NOT NULL,
Auction_Description    VARCHAR(50)        ,
Expiration             DATE               ,


Increament             INTEGER                     ,
Reserve                INTEGER             NOT NULL,
Client_ID              CHAR(9)             NOT NULL,
FOREIGN KEY (Client_ID) REFERENCES eClient(Client_ID)   ON DELETE SET NULL ON UPDATE CASCADE
);
---------------------------------Creating Bid Table----------------
CREATE TABLE Bid (
Bid_ID                 CHAR(9)             PRIMARY KEY,
Price                  INTEGER             NOT NULL,
Bid_Timestamp          TIMESTAMP           NOT NULL,
Purchaser_ID     CHAR(9)               NOT NULL,
Auction_ID             CHAR(9)             NOT NULL,

 FOREIGN KEY (`Bid_Purchaser`)
  REFERENCES `ehaaraj`.`purchaser` (`Purchaser_ID`)
  ON DELETE CASCADE
  ON UPDATE CASCADE,
FOREIGN KEY (`Bid_Auction`)
 REFERENCES `ehaaraj`.`auction` (`Auctio_ID`)
 ON DELETE CASCADE
 ON UPDATE CASCADE
);

---------------------------------Creating Bid_On_Item Relation----------------
CREATE TABLE Bid_On_Item (
Item_ID                CHAR(9)             PRIMARY KEY,
Bid_ID                 CHAR(9)             PRIMARY KEY,
FOREIGN KEY (`BItem_ID`)
   REFERENCES `ehaaraj`.`item` (`Item_ID`)
   ON DELETE CASCADE
```

```
   ON UPDATE CASCADE,
FOREIGN KEY (`Bid_Item`)
   REFERENCES `ehaaraj`.`bid` (`Bid_ID`)
   ON DELETE CASCADE
   ON UPDATE CASCADE


);
---------------------------------Creating Winner Table---------------- CREATE
TABLE Winner (
Winner_ID                          CHAR(9)                    PRIMARY KEY,
 FOREIGN KEY (`Winner_ID`)
 REFERENCES `ehaaraj`.`purchaser` (`Purchaser_ID`)
 ON DELETE CASCADE
 ON UPDATE CASCADE
);
---------------------------------Creating eTransaction Relation----------------
CREATE TABLE eTransaction (
Winner_ID                    CHAR(9)                PRIMARY KEY,
Supplier_ID                CHAR(9)                    PRIMARY KEY ,
FOREIGN KEY (`Tran_Winner`)
 REFERENCES `ehaaraj`.`winner` (`Winner_ID`)
 ON DELETE CASCADE
 ON UPDATE CASCADE,
FOREIGN KEY (`Tran_Supplier`)
 REFERENCES `ehaaraj`.`supplier` (`Supplier_ID`)
 ON DELETE CASCADE
 ON UPDATE CASCADE
);



---------------------------------Creating Bill Table----------------
CREATE TABLE Bill (
```

```
Bill_ID                 CHAR(9)                 PRIMARY KEY,
Winner_ID               CHAR(9)                 PRIMARY KEY,
Order_Date              DATE                                ,
Quantity                INTEGER

FOREIGN KEY (`Winner_Bill`)
  REFERENCES `ehaaraj`.`winner` (`Winner_ID`)
  ON DELETE NO ACTION                           //I want the history of the bills
  ON UPDATE CASCADE


);
ALTER TABLE `ehaaraj`.`bill`
ADD COLUMN `code` VARCHAR(10) NULL AFTER `Quantity`;
//After adding bonus data to the original data
---------------------------------Creating Client_Comment Table---------------- CREATE
TABLE Client_Comment (
Client_CommID                   CHAR(9)                 PRIMARY KEY,
Comment_Description             VARCHAR(50)         PRIMARY KEY,
Rating                          INTEGER             CHECK (`Rating` >=1 AND `Rating` <= 5),
FOREIGN KEY (`Client_CommID `)
  REFERENCES `ehaaraj`.`eclient` (`Client_ID`)
  ON DELETE NO ACTION
  ON UPDATE CASCADE
);
---------------------------------Creating client_care Table---------------- CREATE
TABLE `client_care` (
  `Service_ID` char(9) NOT NULL,
  `Service_Description` varchar(50) NOT NULL,
  PRIMARY KEY (`Service_ID`));
---------------------------------Creating served_by Relation---------------- CREATE
TABLE `served_by` (
  `Client_Served` char(9) NOT NULL,
  `Service_id` char(9) NOT NULL,
  PRIMARY KEY (`Client_Served`,`Service_id`),
```


```
 FOREIGN KEY (`Service_id`) REFERENCES `client_care` (`Service_ID`) ON DELETE CASCADE ON UPDATE
CASCADE,
  FOREIGN KEY (`Client_Served `) REFERENCES `eclient` (`Client_ID`) ON DELETE CASCADE ON UPDATE
CASCADE,
);
---------------------------------Creating Driver Table---------------- CREATE
TABLE `driver` (
 `Driver_ID` char(9) NOT NULL,
 `Name` varchar(7) NOT NULL,
 `License` char(10) NOT NULL,
 `Care Number` char(4) NOT NULL,


 PRIMARY KEY (`Driver_ID`) );
---------------------------------Creating Deliver Table----------------
CREATE TABLE `deliver` (
 `Driver_id` char(9) NOT NULL,
 `winner_deliver` char(9) NOT NULL,
 `Item_id` char(9) NOT NULL,
 PRIMARY KEY (`Driver_id`,`winner_deliver`,`Item_id`),
  FOREIGN KEY (`Driver_id`) REFERENCES `driver` (`Driver_ID`) ON DELETE CASCADE ON UPDATE
CASCADE,
 FOREIGN KEY (`Item_id`) REFERENCES `item` (`Item_ID`) ON DELETE CASCADE ON UPDATE CASCADE,
 FOREIGN KEY (`winner_deliver`) REFERENCES `winner` (`Winner_ID`) ON DELETE CASCADE ON UPDATE
CASCADE);
---------------------------------Creating Discount Table----------------
CREATE TABLE `discount` (
  `code#` varchar(10) NOT NULL,
  `amont` char(4) NOT NULL,
  PRIMARY KEY (`code#`)
 FOREIGN KEY (`code#`) REFERENCES `Bill` (`code`) ON DELETE CASCADE ON UPDATE CASCADE);
```

1.2 Database State

1.2.1 Insert Implementation

```
-----------------------------------INSERTING INTO TABLES-------------------------
----------------------INSERT INTO Client Table----------------------
INSERT INTO `ehaaraj`.`eclient` (`Client_ID`, `Email`, `First_Name`, `Last_Name`, `Client_Password`,
`Address`) VALUES ('1', 'a@haraj.com', 'Fahad', 'Ahmad', '123', 'Riyadh');
INSERT INTO `ehaaraj`.`eclient` (`Client_ID`, `Email`, `First_Name`, `Last_Name`, `Client_Password`,
`Address`) VALUES ('2', 'M@haraj.com', 'Mohammad', 'Ali', '321', 'Jeddah');
INSERT INTO `ehaaraj`.`eclient` (`Client_ID`, `Email`, `First_Name`, `Last_Name`, `Client_Password`,
`Address`) VALUES ('3', 'J@haraj.com', 'Turki', 'Salem', '852..', 'Makkah');
INSERT INTO `ehaaraj`.`eclient` (`Client_ID`, `Email`, `First_Name`, `Last_Name`, `Client_Password`,
`Address`) VALUES ('4', 'F@haraj.com', 'Fahad', 'Abdullah', 'xvx', 'Riyadh');


INSERT INTO `ehaaraj`.`eclient` (`Client_ID`, `Email`, `First_Name`, `Last_Name`, `Client_Password`,
`Address`) VALUES ('5', 'a@haraj.com', 'Ali', 'Fahad', '654', 'Riyadh');
INSERT INTO `ehaaraj`.`eclient` (`Client_ID`, `Email`, `First_Name`, `Last_Name`, `Client_Password`,
`Address`) VALUES ('6', 'M@haraj.com', 'Saud', 'Ali', 'i_x00', 'Jeddah');
INSERT INTO `ehaaraj`.`eclient` (`Client_ID`, `Email`, `First_Name`, `Last_Name`, `Client_Password`,
`Address`) VALUES ('7', 'a@haraj.com', 'Khalid', 'Ali', 'poo', 'Makkah');
INSERT INTO `ehaaraj`.`eclient` (`Client_ID`, `Email`, `First_Name`, `Last_Name`, `Client_Password`,
`Address`) VALUES ('8', 'F@haraj.com', 'Nasser', 'Abdullah', '141', 'KHOBAR');
INSERT INTO `ehaaraj`.`eclient` (`Client_ID`, `Email`, `First_Name`, `Last_Name`, `Client_Password`,
`Address`) VALUES ('9', 'i@haraj.com', 'Mansoor', 'Nasser', '852', 'Madinah');
INSERT INTO `ehaaraj`.`eclient` (`Client_ID`, `Email`, `First_Name`, `Last_Name`, `Client_Password`,
`Address`) VALUES ('10', 'A@haraj.com', 'Abdullah', 'Ali', 'nn-987', 'Makkah');
INSERT INTO `ehaaraj`.`eclient` (`Client_ID`, `Email`, `First_Name`, `Last_Name`, `Client_Password`,
`Address`) VALUES ('11', 'k@haraj.com', 'Omar', 'Waleed', '325', 'Riyadh');
INSERT INTO `ehaaraj`.`eclient` (`Client_ID`, `Email`, `First_Name`, `Last_Name`, `Client_Password`,
`Address`) VALUES ('12', 'l@haraj.com', 'Saad', 'Abdullah', '785', 'Riyadh');
INSERT INTO `ehaaraj`.`eclient` (`Client_ID`, `Email`, `First_Name`, `Last_Name`, `Client_Password`,
`Address`) VALUES ('13', 'M@haraj.com', 'Adel', 'Abdullah', '963', 'Jeddah');
```

INSERT INTO `ehaaraj`.`eclient` (`Client_ID`, `Email`, `First_Name`, `Last_Name`, `Client_Password`, `Address`) VALUES ('14', 'p@haraj.com', 'Saleh', 'Mansoor', '\'0ii0\' ', 'KHOBAR');

----------INSERT INTO Client's Phone Table----------

INSERT INTO `ehaaraj`.`phone` (`Client_ID`, `Phone_Number`) VALUES ('1', '0501478963');
INSERT INTO `ehaaraj`.`phone` (`Client_ID`, `Phone_Number`) VALUES ('2', '0501478936');
INSERT INTO `ehaaraj`.`phone` (`Client_ID`, `Phone_Number`) VALUES ('3', '057896321');
INSERT INTO `ehaaraj`.`phone` (`Client_ID`, `Phone_Number`) VALUES ('4', '050789632');
INSERT INTO `ehaaraj`.`phone` (`Client_ID`, `Phone_Number`) VALUES ('5', '055478963');
INSERT INTO `ehaaraj`.`phone` (`Client_ID`, `Phone_Number`) VALUES ('6', '058789632');
INSERT INTO `ehaaraj`.`phone` (`Client_ID`, `Phone_Number`) VALUES ('7', '053214528');
INSERT INTO `ehaaraj`.`phone` (`Client_ID`, `Phone_Number`) VALUES ('8', '052525252');
INSERT INTO `ehaaraj`.`phone` (`Client_ID`, `Phone_Number`) VALUES ('9', '058963256');
INSERT INTO `ehaaraj`.`phone` (`Client_ID`, `Phone_Number`) VALUES ('10', '050505050');
INSERT INTO `ehaaraj`.`phone` (`Client_ID`, `Phone_Number`) VALUES ('11', '050707070');
INSERT INTO `ehaaraj`.`phone` (`Client_ID`, `Phone_Number`) VALUES ('12', '050808080');
INSERT INTO `ehaaraj`.`phone` (`Client_ID`, `Phone_Number`) VALUES ('13', '050909090'); INSERT INTO `ehaaraj`.`phone` (`Client_ID`, `Phone_Number`) VALUES ('14', '050101010'); ----------

INSERT INTO Supplier Table----------

INSERT INTO `ehaaraj`.`supplier` (`Supplier_ID`, `Bank_Account_Number`) VALUES ('1', '987654321');
INSERT INTO `ehaaraj`.`supplier` (`Supplier_ID`, `Bank_Account_Number`) VALUES ('2', '2589');
--since INTEGER HAS A VARIABLE SIZE
INSERT INTO `ehaaraj`.`supplier` (`Supplier_ID`, `Bank_Account_Number`) VALUES ('3', '147852369');
INSERT INTO `ehaaraj`.`supplier` (`Supplier_ID`, `Bank_Account_Number`) VALUES ('9', '345677');
INSERT INTO `ehaaraj`.`supplier` (`Supplier_ID`, `Bank_Account_Number`) VALUES ('10', '98765');
INSERT INTO `ehaaraj`.`supplier` (`Supplier_ID`, `Bank_Account_Number`) VALUES ('11', '2523876');

----------INSERT INTO Purchaser Table----------

INSERT INTO `ehaaraj`.`purchaser` (`Purchaser_ID`, `Shipping Address`) VALUES ('4', 'Saudi-Arabia');
INSERT INTO `ehaaraj`.`purchaser` (`Purchaser_ID`, `Shipping Address`) VALUES ('5', 'USA');
INSERT INTO `ehaaraj`.`purchaser` (`Purchaser_ID`, `Shipping Address`) VALUES ('2', 'Saudi-Arabia');
--The same supplier become a purchaser
INSERT INTO `ehaaraj`.`purchaser` (`Purchaser_ID`, `Shipping Address`) VALUES ('6', 'UAE');
INSERT INTO `ehaaraj`.`purchaser` (`Purchaser_ID`, `Shipping Address`) VALUES ('7', 'Saudi-Arabia');
INSERT INTO `ehaaraj`.`purchaser` (`Purchaser_ID`, `Shipping Address`) VALUES ('8', 'UK');

INSERT INTO `ehaaraj`.`purchaser` (`Purchaser_ID`, `Shipping Address`) VALUES ('12', 'Saudi-Arabia');
INSERT INTO `ehaaraj`.`purchaser` (`Purchaser_ID`, `Shipping Address`) VALUES ('13', 'Bahreen');
INSERT INTO `ehaaraj`.`purchaser` (`Purchaser_ID`, `Shipping Address`) VALUES ('14', 'Saudi-Arabia');

----------INSERT INTO Winner Table----------
INSERT INTO `ehaaraj`.`winner` (`Winner_ID`) VALUES ('7');
INSERT INTO `ehaaraj`.`winner` (`Winner_ID`) VALUES ('4');
INSERT INTO `ehaaraj`.`winner` (`Winner_ID`) VALUES ('13');
INSERT INTO `ehaaraj`.`winner` (`Winner_ID`) VALUES ('5');
INSERT INTO `ehaaraj`.`winner` (`Winner_ID`) VALUES ('2');
INSERT INTO `ehaaraj`.`winner` (`Winner_ID`) VALUES ('8');

----------INSERT INTO Item Table----------
INSERT INTO `ehaaraj`.`item` (`Item_ID`, `Title`, `Item_Description`, `Starting_Bid_Price`,
`Item_Supplier`) VALUES ('I0', 'WALL PAINTING', 'flowers ', '1000', '1');
INSERT INTO `ehaaraj`.`item` (`Item_ID`, `Title`, `Item_Description`, `Starting_Bid_Price`,
`Item_Supplier`) VALUES ('I1', 'CAR', 'Unused c-class 2014', '500000', '2');

INSERT INTO `ehaaraj`.`item` (`Item_ID`, `Title`, `Item_Description`, `Starting_Bid_Price`,
`Item_Supplier`) VALUES ('I2', 'LAND', 'Located in N-Riyadh 1200 SQ.M', '1000000', '3');
INSERT INTO `ehaaraj`.`item` (`Item_ID`, `Title`, `Item_Description`, `Starting_Bid_Price`,
`Item_Supplier`) VALUES ('I3', 'FARM', ', Located in ALkharj 700 SQ.M', '250000', '9');
INSERT INTO `ehaaraj`.`item` (`Item_ID`, `Title`, `Item_Description`, `Starting_Bid_Price`,
`Item_Supplier`) VALUES ('I4', 'APATMENT', 'Furnished Apartment ', '60000', '10');
INSERT INTO `ehaaraj`.`item` (`Item_ID`, `Title`, `Item_Description`, `Starting_Bid_Price`,
`Item_Supplier`) VALUES ('I5', 'IPAD', 'Unused', '3000', '11');
INSERT INTO `ehaaraj`.`item` (`Item_ID`, `Title`, `Item_Description`, `Starting_Bid_Price`,
`Item_Supplier`) VALUES ('I6', 'PC', 'Unused', '90000', '1');
INSERT INTO `ehaaraj`.`item` (`Item_ID`, `Title`, `Item_Description`, `Starting_Bid_Price`,
`Item_Supplier`) VALUES ('I7', 'MAC-LAP', 'Unused', '4000', '11');
INSERT INTO `ehaaraj`.`item` (`Item_ID`, `Title`, `Item_Description`, `Starting_Bid_Price`,
`Item_Supplier`) VALUES ('I8', 'HUAWEI-LAP', 'Unused', '3000', '9');

INSERT INTO `ehaaraj`.`item` (`Item_ID`, `Title`, `Item_Description`, `Starting_Bid_Price`, `Item_Supplier`) VALUES ('I9', 'DELL-LAP', 'Unused', '3500', '1');
INSERT INTO `ehaaraj`.`item` (`Item_ID`, `Title`, `Item_Description`, `Starting_Bid_Price`, `Item_Supplier`) VALUES ('I10', 'TOSHEBA-LAP', 'Unused', '2500', '1');
INSERT INTO `ehaaraj`.`item` (`Item_ID`, `Title`, `Item_Description`, `Starting_Bid_Price`, `Item_Supplier`) VALUES ('I11', 'WINDOWS-10', 'Last version', '700', '3');
INSERT INTO `ehaaraj`.`item` (`Item_ID`, `Title`, `Item_Description`, `Starting_Bid_Price`, `Item_Supplier`) VALUES ('I12', 'MAC', 'Unused', '2000', '2');
INSERT INTO `ehaaraj`.`item` (`Item_ID`, `Title`, `Item_Description`, `Starting_Bid_Price`, `Item_Supplier`) VALUES ('I13', 'McAfee', 'Last version', '900', '1');
INSERT INTO `ehaaraj`.`item` (`Item_ID`, `Title`, `Item_Description`, `Starting_Bid_Price`, `Item_Supplier`) VALUES ('I14', 'WORD', 'Last version', '5000', '9');
INSERT INTO `ehaaraj`.`item` (`Item_ID`, `Title`, `Item_Description`, `Starting_Bid_Price`, `Item_Supplier`) VALUES ('I15', 'EXCEL', 'Last version', '500', '11');
INSERT INTO `ehaaraj`.`item` (`Item_ID`, `Title`, `Item_Description`, `Starting_Bid_Price`, `Item_Supplier`) VALUES ('I16', 'WINDOWS-7', 'previous version', '500', '10');
INSERT INTO `ehaaraj`.`item` (`Item_ID`, `Title`, `Item_Description`, `Starting_Bid_Price`, `Item_Supplier`) VALUES ('I17', 'MySQL', 'Last version', '800', '11');

----------INSERT INTO Hardware Table----------

INSERT INTO `ehaaraj`.`hardware` (`Hardware_ID`, `HW_Speed`, `HW_Memory`, `HW_Storage`) VALUES ('I6', '2.9GH', '64GB', '64GB');
INSERT INTO `ehaaraj`.`hardware` (`Hardware_ID`, `HW_Speed`, `HW_Memory`, `HW_Storage`) VALUES ('I7', '2.9GH', '1TB', '16GB');
INSERT INTO `ehaaraj`.`hardware` (`Hardware_ID`, `HW_Speed`, `HW_Memory`, `HW_Storage`) VALUES ('I8', '1.5GH', '10MB', '16GB');
INSERT INTO `ehaaraj`.`hardware` (`Hardware_ID`, `HW_Speed`, `HW_Memory`, `HW_Storage`) VALUES ('I9', '2.9GH', '2GB', '32GB');
INSERT INTO `ehaaraj`.`hardware` (`Hardware_ID`, `HW_Speed`, `HW_Memory`, `HW_Storage`) VALUES ('I10', '1GH', '3GB', '16GB');
INSERT INTO `ehaaraj`.`hardware` (`Hardware_ID`, `HW_Speed`, `HW_Memory`, `HW_Storage`) VALUES ('I11', '2GH', '10GB', '8GB');

----------INSERT INTO Operating_System Table----------
INSERT INTO `ehaaraj`.`operating_system` (`Operating_System_ID`, `OS_Cost`, `OS_Manufacturer`, `Is_System_Software`, `Year_of_ Manufacturing`, `Version`) VALUES ('I12', '1000', 'Microsoft', '0', '2021', '1');
INSERT INTO `ehaaraj`.`operating_system` (`Operating_System_ID`, `OS_Cost`, `OS_Manufacturer`, `Is_System_Software`, `Year_of_ Manufacturing`, `Version`) VALUES ('I13', '1000', 'Anti-Virous', '1', '2009', '8');
INSERT INTO `ehaaraj`.`operating_system` (`Operating_System_ID`, `OS_Cost`, `OS_Manufacturer`, `Is_System_Software`, `Year_of_ Manufacturing`, `Version`) VALUES ('I14', '1000', 'SQL', '1', '2019', '5');
INSERT INTO `ehaaraj`.`operating_system` (`Operating_System_ID`, `OS_Cost`, `OS_Manufacturer`, `Is_System_Software`, `Year_of_ Manufacturing`, `Version`) VALUES ('I15', '1000', 'Android-Studio', '1', '2021', '1');
INSERT INTO `ehaaraj`.`operating_system` (`Operating_System_ID`, `OS_Cost`, `OS_Manufacturer`, `Is_System_Software`, `Year_of_ Manufacturing`, `Version`) VALUES ('I16', '1000', 'VS-Code', '1', '2021', '2');
INSERT INTO `ehaaraj`.`operating_system` (`Operating_System_ID`, `OS_Cost`, `OS_Manufacturer`, `Is_System_Software`, `Year_of_ Manufacturing`, `Version`) VALUES ('I17', '1000', 'CMD', '1', '2020', '0');

----------INSERT INTO Auction Table----------
INSERT INTO `ehaaraj`.`auction` (`Auctio_ID`, `Start_Price`, `Auction_Description`, `Expiration`, `Increament`, `Reserve`, `Auction_Client`) VALUES ('A1', '600000', 'Auction For a Furnished Apartment', '2021-12-30', '1000', '50000', '2');

INSERT INTO `ehaaraj`.`auction` (`Auctio_ID`, `Start_Price`, `Auction_Description`, `Expiration`, `Increament`, `Reserve`, `Auction_Client`) VALUES ('A2', '2000', 'AUCTION FOR AN IPAD', '2021-12-14', '500', '500', '3');
INSERT INTO `ehaaraj`.`auction` (`Auctio_ID`, `Start_Price`, `Auction_Description`, `Expiration`, `Increament`, `Reserve`, `Auction_Client`) VALUES ('A3', '30000', 'AUCTION FOR MAC-LAP', '2022-01-01', '800', '500', '9');
INSERT INTO `ehaaraj`.`auction` (`Auctio_ID`, `Start_Price`, `Auction_Description`, `Expiration`, `Increament`, `Reserve`, `Auction_Client`) VALUES ('A4', '100', 'AUCTION FOR McAfee', '2022-01-03', '200', '100', '10');
INSERT INTO `ehaaraj`.`auction` (`Auctio_ID`, `Start_Price`, `Auction_Description`, `Expiration`,


`Increament`, `Reserve`, `Auction_Client`) VALUES ('A5', '500000', 'AUCTION FOR A CAR', '2022-01-09', '10000', '700', '11');

----------INSERT INTO Bid Table----------

INSERT INTO `ehaaraj`.`bid` (`Bid_ID`, `Bid_item`, `Price`, `Bid_Timestamp`, `Bid_Purchaser`, `Bid_Auction`) VALUES ('B0', 'I0', '30000', '2021-11-26 00:00:01', '7', 'A0');
INSERT INTO `ehaaraj`.`bid` (`Bid_ID`, `Bid_item`, `Price`, `Bid_Timestamp`, `Bid_Purchaser`, `Bid_Auction`) VALUES ('B1', 'I1', '4000', '2021-11-26 00:00:01', '4', 'A1');
INSERT INTO `ehaaraj`.`bid` (`Bid_ID`, `Bid_item`, `Price`, `Bid_Timestamp`, `Bid_Purchaser`, `Bid_Auction`) VALUES ('B2', 'I2', '5000', '2021-11-26 00:00:01', '13', 'A2');
INSERT INTO `ehaaraj`.`bid` (`Bid_ID`, `Bid_item`, `Price`, `Bid_Timestamp`, `Bid_Purchaser`, `Bid_Auction`) VALUES ('B3', 'I3', '6000', '2021-11-26 00:00:01', '5', 'A3');
INSERT INTO `ehaaraj`.`bid` (`Bid_ID`, `Bid_item`, `Price`, `Bid_Timestamp`, `Bid_Purchaser`, `Bid_Auction`) VALUES ('B4', 'I4', '7000', '2021-11-26 00:00:01', '2', 'A4');
INSERT INTO `ehaaraj`.`bid` (`Bid_ID`, `Bid_item`, `Price`, `Bid_Timestamp`, `Bid_Purchaser`, `Bid_Auction`) VALUES ('B5', 'I5', '8000', '2021-11-26 00:00:01', '8', 'A5');

----------INSERT INTO Bid_On_Item Table----------

INSERT INTO `ehaaraj`.`bid_on_item` (`BItem_ID`, `Item's_Bid`) VALUES ('I0', 'B0');
INSERT INTO `ehaaraj`.`bid_on_item` (`BItem_ID`, `Item's_Bid`) VALUES ('I4', 'B1');
INSERT INTO `ehaaraj`.`bid_on_item` (`BItem_ID`, `Item's_Bid`) VALUES ('I6', 'B2');
INSERT INTO `ehaaraj`.`bid_on_item` (`BItem_ID`, `Item's_Bid`) VALUES ('I8', 'B3');
INSERT INTO `ehaaraj`.`bid_on_item` (`BItem_ID`, `Item's_Bid`) VALUES ('I15', 'B4'); INSERT INTO `ehaaraj`.`bid_on_item` (`BItem_ID`, `Item's_Bid`) VALUES ('I1', 'B5');

----------INSERT INTO transaction Table----------

INSERT INTO `ehaaraj`.`transaction` (`Tran_Winner`, `Tran_Supplier`) VALUES ('7', '1');
INSERT INTO `ehaaraj`.`transaction` (`Tran_Winner`, `Tran_Supplier`) VALUES ('4', '2');
INSERT INTO `ehaaraj`.`transaction` (`Tran_Winner`, `Tran_Supplier`) VALUES ('13', '3');
INSERT INTO `ehaaraj`.`transaction` (`Tran_Winner`, `Tran_Supplier`) VALUES ('5', '9');
INSERT INTO `ehaaraj`.`transaction` (`Tran_Winner`, `Tran_Supplier`) VALUES ('2', '10'); INSERT INTO `ehaaraj`.`transaction` (`Tran_Winner`, `Tran_Supplier`) VALUES ('8', '11');

----------INSERT INTO Bill Table----------

INSERT INTO `ehaaraj`.`bill` (`Bill_ID`, `Winner_Bill`, `Order_Date`, `Quantity`) VALUES ('b1', '7', '2020-01-01', '1');
INSERT INTO `ehaaraj`.`bill` (`Bill_ID`, `Winner_Bill`, `Order_Date`, `Quantity`) VALUES ('b2', '4', '2019-01-02', '1');
INSERT INTO `ehaaraj`.`bill` (`Bill_ID`, `Winner_Bill`, `Order_Date`, `Quantity`) VALUES ('b3', '13', '202001-05', '1');
INSERT INTO `ehaaraj`.`bill` (`Bill_ID`, `Winner_Bill`, `Order_Date`, `Quantity`) VALUES ('b4', '5', '2020-06-08', '1');
INSERT INTO `ehaaraj`.`bill` (`Bill_ID`, `Winner_Bill`, `Order_Date`, `Quantity`) VALUES ('b5', '2', '2020-12-01', '2');
INSERT INTO `ehaaraj`.`bill` (`Bill_ID`, `Winner_Bill`, `Order_Date`, `Quantity`) VALUES ('b6', '8', '2020-1220', '1');

After adding code to the table
UPDATE `ehaaraj`.`bill` SET `code` = 'x12' WHERE (`Bill_ID` = 'b1') and (`Winner_Bill` = '7');
UPDATE `ehaaraj`.`bill` SET `code` = 'ksa' WHERE (`Bill_ID` = 'b2') and (`Winner_Bill` = '4');
UPDATE `ehaaraj`.`bill` SET `code` = 'n15' WHERE (`Bill_ID` = 'b3') and (`Winner_Bill` = '13');
UPDATE `ehaaraj`.`bill` SET `code` = '%5' WHERE (`Bill_ID` = 'b4') and (`Winner_Bill` = '5');
UPDATE `ehaaraj`.`bill` SET `code` = '6^m' WHERE (`Bill_ID` = 'b5') and (`Winner_Bill` = '2'); UPDATE `ehaaraj`.`bill` SET `code` = 'pxp' WHERE (`Bill_ID` = 'b6') and (`Winner_Bill` = '8');

----------INSERT INTO Client_Comment Table----------
INSERT INTO `ehaaraj`.`client_comment` (`Client_CommID`, `Comment_Description`, `Rating`) VALUES ('7', 'I like it', '5');
INSERT INTO `ehaaraj`.`client_comment` (`Client_CommID`, `Comment_Description`, `Rating`) VALUES ('4', 'Cool', '4');

INSERT INTO `ehaaraj`.`client_comment` (`Client_CommID`, `Comment_Description`, `Rating`) VALUES ('13', 'Useful', '2');
INSERT INTO `ehaaraj`.`client_comment` (`Client_CommID`, `Comment_Description`, `Rating`) VALUES ('5', 'Not Bad', '1');
INSERT INTO `ehaaraj`.`client_comment` (`Client_CommID`, `Comment_Description`, `Rating`) VALUES ('2', 'Annoying', '0');

INSERT INTO `ehaaraj`.`client_comment` (`Client_CommID`, `Comment_Description`, `Rating`) VALUES ('8', 'I like it', '5');

----------INSERT INTO Client_care Table----------

INSERT INTO `ehaaraj`.`client_care` (`Service_ID`, `Service_Description`) VALUES ('CC0', 'Technology issues');
INSERT INTO `ehaaraj`.`client_care` (`Service_ID`, `Service_Description`) VALUES ('CC1', 'Payment issues');
INSERT INTO `ehaaraj`.`client_care` (`Service_ID`, `Service_Description`) VALUES ('CC2', 'Customer issues');
INSERT INTO `ehaaraj`.`client_care` (`Service_ID`, `Service_Description`) VALUES ('CC3', 'Delivary issues');
INSERT INTO `ehaaraj`.`client_care` (`Service_ID`, `Service_Description`) VALUES ('CC4', 'Items issues');
INSERT INTO `ehaaraj`.`client_care` (`Service_ID`, `Service_Description`) VALUES ('CC5', 'Genral office');

----------INSERT INTO served_by Table----------

INSERT INTO `ehaaraj`.`served_by` (`Client_Served`, `Service_id`) VALUES ('1', 'CC0');
INSERT INTO `ehaaraj`.`served_by` (`Client_Served`, `Service_id`) VALUES ('2', 'CC1');
INSERT INTO `ehaaraj`.`served_by` (`Client_Served`, `Service_id`) VALUES ('3', 'CC2');
INSERT INTO `ehaaraj`.`served_by` (`Client_Served`, `Service_id`) VALUES ('4', 'CC3');
INSERT INTO `ehaaraj`.`served_by` (`Client_Served`, `Service_id`) VALUES ('5', 'CC4'); INSERT INTO `ehaaraj`.`served_by` (`Client_Served`, `Service_id`) VALUES ('6', 'CC5');

----------INSERT INTO driver Table----------
INSERT INTO `ehaaraj`.`driver` (`Driver_ID`, `Name`, `License`, `Care Number`) VALUES ('D0', 'fahad', '123', '999');

INSERT INTO `ehaaraj`.`driver` (`Driver_ID`, `Name`, `License`, `Care Number`) VALUES ('D1', 'saleh', '654', '124');
INSERT INTO `ehaaraj`.`driver` (`Driver_ID`, `Name`, `License`, `Care Number`) VALUES ('D2', 'salem', '258', '200');

```
INSERT INTO `ehaaraj`.`driver` (`Driver_ID`, `Name`, `License`, `Care Number`) VALUES ('D3', 'samer',
'963', '121');
INSERT INTO `ehaaraj`.`driver` (`Driver_ID`, `Name`, `License`, `Care Number`) VALUES ('D4', 'MUSA',
'741', '222');
INSERT INTO `ehaaraj`.`driver` (`Driver_ID`, `Name`, `License`, `Care Number`) VALUES ('D5', 'NOOR',
'357', '333');
----------INSERT INTO deliver Table----------


INSERT INTO `ehaaraj`.`deliver` (`Driver_id`, `winner_deliver`, `Item_id`) VALUES ('D0', '13', 'I0');
INSERT INTO `ehaaraj`.`deliver` (`Driver_id`, `winner_deliver`, `Item_id`) VALUES ('D1', '2', 'I1');
INSERT INTO `ehaaraj`.`deliver` (`Driver_id`, `winner_deliver`, `Item_id`) VALUES ('D2', '4', 'I2');
INSERT INTO `ehaaraj`.`deliver` (`Driver_id`, `winner_deliver`, `Item_id`) VALUES ('D3', '5', 'I3');
INSERT INTO `ehaaraj`.`deliver` (`Driver_id`, `winner_deliver`, `Item_id`) VALUES ('D4', '7', 'I5'); INSERT
INTO `ehaaraj`.`deliver` (`Driver_id`, `winner_deliver`, `Item_id`) VALUES ('D5', '8', 'I4');

INSERT INTO `ehaaraj`.`discount` (`code`, `amont`) VALUES ('x12', '100%');
INSERT INTO `ehaaraj`.`discount` (`code`, `amont`) VALUES ('ksa', '50%');
----------INSERT INTO discount Table----------

INSERT INTO `ehaaraj`.`discount` (`code`, `amont`) VALUES ('n15', '25%');
INSERT INTO `ehaaraj`.`discount` (`code`, `amont`) VALUES ('%5', '15%');
INSERT INTO `ehaaraj`.`discount` (`code`, `amont`) VALUES ('6^m', '30%'); INSERT
INTO `ehaaraj`.`discount` (`code`, `amont`) VALUES ('pxp', '70%');
```

3.1.1 View Implementation

----------VIEW CREATION----------

```
CREATE VIEW Supplier_items
      AS  SELECT  First_Name, Last_Name , COUNT(*)
           FROM    Item JOIN Client ON Supplier_id=Client_id;


CREATE VIEW Winner_Detailes
      AS  SELECT  *
           FROM    Client
          WHERE  Client_id IN (SELECT  Winner_id
                                    FROM      Winner, Transaction, Item
                                   WHERE Winner_id=Winner_id AND
Supplier_id=Supplier_id );
```

3.2 Screenshot

Client_ID	Email	First_Name	Last_Name	Client_Password	Address
1	a@harai.com	Fahad	Ahmad	123	Rivadh
10	A@harai.com	Abdullah	Ali	nn-987	Makkah
11	k@harai.com	Omar	Waleed	325	Rivadh
12	l@harai.com	Saad	Abdullah	785	Rivadh
13	M@harai.com	Adel	Abdullah	963	Jeddah
14	p@harai.com	Saleh	Mansoor	'0ii0'	KHOBAR
2	M@harai.com	Mohammad	Ali	321	Jeddah
3	J@harai.com	Turki	Salem	852..	Makkah
4	F@harai.com	Fahad	Abdullah	xvx	Rivadh
5	a@harai.com	Ali	Fahad	654	Rivadh
6	M@harai.com	Saud	Ali	i x00	Jeddah
7	a@harai.com	Khalid	Ali	poo	Makkah
8	F@harai.com	Nasser	Abdullah	141	KHOBAR
9	i@harai.com	Mansoor	Nasser	852	Madinah
NULL	NULL	NULL	NULL	NULL	NULL

Figure 3-Client Table

Supplier_ID	Bank_Account_Number
2	2589
10	98765
9	345677
11	2523876
3	147852369
1	987654321
NULL	NULL

Figure 4-Supplier Table

Winner_ID
13
2
4
5
7
8
NULL

Figure 5-Winner Table

Hardware_ID	HW_Speed	HW_Memory	HW_Storage
I10	1GH	3GB	16GB
I11	2GH	10GB	8GB
I6	2.9GH	64GB	64GB
I7	2.9GH	1TB	16GB
I8	1.5GH	10MB	16GB
I9	2.9GH	2GB	32GB
NULL	NULL	NULL	NULL

Purchaser_ID	Shipping Address
12	Saudi-Arabia
13	Bahreen
14	Saudi-Arabia
2	Saudi-Arabia
4	Saudi-Arabia
5	USA
6	UAE
7	Saudi-Arabia
8	UK
NULL	NULL

Figure 6-Purchaser Table

Client_ID	Phone_Number
1	501478963
10	50505050
11	50707070
12	50808080
13	50909090
14	50101010
2	501478936
3	57896321
4	50789632
5	55478963
6	58789632
7	53214528
8	52525252
9	58963256
NULL	NULL

Figure 7-Phone attribute Table

Figure 8-Hardware Table

Operating_System_ID	OS_Cost	OS_Manufacturer	Is_System_Software	Year_of_ Manufacturing	Version
I12	1000	Microsoft	0	2021	1
I13	1000	Anti-Virous	1	2009	8
I14	1000	SOL	1	2019	5
I15	1000	Android-Studio	1	2021	1
I16	1000	VS-Code	1	2021	2
I17	1000	CMD	1	2020	0
NULL	NULL	NULL	NULL	NULL	NULL

Figure 9-Operating Systems Table

Auctio_ID	Start_Price	Auction_Description	Expiration	Increament	Reserve	Auction_Client
A0	1000	AUCTION FOR WA...	2021-12-20	200	500	1
A1	600000	Auction For a Furni...	2021-12-30	1000	50000	2
A2	2000	AUCTION FOR AN ...	2021-12-14	500	500	3
A3	30000	AUCTION FOR MA...	2022-01-01	800	500	9
A4	100	AUCTION FOR Mc...	2022-01-03	200	100	10
A5	500000	AUCTION FOR A CAR	2022-01-09	50000	900	11
NULL	NULL	NULL	NULL	NULL	NULL	NULL

Figure 10-Auction Table

Bid_ID	Bid_item	Price	Bid_Timestamp	Bid_Purchaser	Bid_Auction
B0	I0	30000	2021-11-26 0...	7	A0
B1	I1	4000	2021-11-26 0...	4	A1
B2	I2	5000	2021-11-26 0...	13	A2
B3	I3	6000	2021-11-26 0...	5	A3
B4	I4	7000	2021-11-26 0...	2	A4
B5	I5	8000	2021-11-26 0...	8	A5
NULL	NULL	NULL	NULL	NULL	NULL

Figure 11-Bid Table

	BItem_ID	Item's_Bid
	I0	B0
	I4	B1
	I6	B2
	I8	B3
	I15	B4
	I1	B5
	NULL	NULL

Figure 12- Bid On Item Table

	Tran_Winner	Tran_Supplier
	7	1
	2	10
	8	11
	4	2
	13	3
	5	9
	NULL	NULL

Figure 13- Transaction Table

	Bill_ID	Winner_Bill	Order_Date	Quantity	code
	b1	7	2020-01-01	1	x12
	b2	4	2019-01-02	1	ksa
	b3	13	2020-01-05	1	n15
	b4	5	2020-06-08	1	%5
	b5	2	2020-12-01	2	6^m
	b6	8	2020-12-20	1	pxp
	NULL	NULL	NULL	NULL	NULL

Figure 14-Bill Table

	Client_CommID	Comment_Description	Rating
	13	Useful	2
	2	Annoying	0
	4	Cool	4
	5	Not Bad	1
	7	I like it	5
	8	I like it	5
	NULL	NULL	NULL

Figure 16- Client Comment Table

	Client_Served	Service_id
	1	CC0
	2	CC1
	3	CC2
	4	CC3
	5	CC4
	6	CC5
	NULL	NULL

Figure 15- Served By relation Table

	Driver_ID	Name	License	Care Number
	D0	fahad	123	999
	D1	saleh	654	124
	D2	salem	258	200
	D3	samer	963	121
	D4	MUSA	741	222
	D5	NOOR	357	333
	NULL	NULL	NULL	NULL

Figure 17- Driver Table

	Driver_id	winner_deliver	Item_id
	D0	13	I0
	D1	2	I1
	D2	4	I2
	D3	5	I3
	D4	7	I5
	D5	8	I4
	NULL	NULL	NULL

Figure 18- Deliver Relation Table

	code	amont
	x12	100%
	ksa	50%
	n15	25%
	%5	15%
	6^m	30%
	DXD	70%
	NULL	NULL

Figure 19- Discount Table

3.3 Query Implementation

1] SELECT Item_id, COUNT(*), MAX(Price)
FROM Bid NATURAL JOIN On
GROUP BY Item_id;

```
1
2 •  SELECT   BItem_ID, COUNT(*), MAX(Price)
3    FROM     Bid join Bid_On_Item on Bid_ID = Items_Bid
4    GROUP BY BItem_ID;
5
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

	BItem_ID	COUNT(*)	MAX(Price)
	I0	1	30000
	I1	1	8000
	I15	1	7000
	I4	1	4000
	I6	1	5000
	I8	1	6000

Figure 20-Query 1 Result

2] SELECT First_Name, Last_Name, COUNT(Item_ID)AS Number_of_items
FROM (supplier NATURAL JOIN item),
Client WHERE supplier_ID = Client_ID group
by First_Name, Last_Name;

```
1
2
3   SELECT   First_Name, Last_Name, COUNT(Item_ID)AS Number_of_items
4   FROM     supplier, item, eclient
5   WHERE    Supplier_ID = Client_ID AND Supplier_ID =Item_Supplier
6   group by First_Name,Last_Name;
7
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

First_Name	Last_Name	Number_of_items
Abdullah	Ali	2
Fahad	Ahmad	5
Mansoor	Nasser	3
Mohammad	Ali	2
Omar	Waleed	4
Turki	Salem	2

Figure 21-Query 2 Result

3] select Fist_name , Bid_ID
From (bid NATURAL JOIN purchaser) winner ,client Where
purchaser_ID=winner_ID AND purchaser_ID=client_ID

```
1   select      First_name , Bid_ID
2       From    bid , purchaser , winner ,eclient
3       Where   Bid_Purchaser = Purchaser_ID AND Purchaser_ID=Winner_ID AND Purchaser_ID=Client_ID
4
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

First_name	Bid_ID
Adel	B2
Mohammad	B4
Fahad	B1
Ali	B3
Khalid	B0
Nasser	B5

Figure 22-Query 3 Result

4] SELECT *
FROM Hardware
WHERE Memory BETWEEN '8GB' AND '16GB';

```
1  SELECT *
2  FROM    hardware
3  WHERE   HW_Memory BETWEEN '8' AND '16';
```

Result Grid | Filter Rows: | Edit:

Hardware_ID	HW_Speed	HW_Memory	HW_Storage
I11	2GH	10	8GB
I8	1.5GH	10	16GB
NULL	NULL	NULL	NULL

Figure 23-Query 4 Result

6] SELECT Item_ID, COUNT(*), AVG(Price)
FROM Bid NATURAL JOIN On
GROUP by Item_ID;

```
3  SELECT   BItem_ID, COUNT(*), AVG(Price)
4          FROM      bid , bid_on_item
5          where    Items_Bid= Bid_ID
6          GROUP BY BItem_ID;
7
8
```

Result Grid | Filter Rows: | Export:

BItem_ID	COUNT(*)	AVG(Price)
I0	1	30000.0000
I1	1	8000.0000
I15	1	7000.0000
I4	1	4000.0000
I6	1	5000.0000
I8	1	6000.0000

Figure 24-Query 6 Result

9] Select First_name , Last_name
From Client NATURAL JOIN comment where
Rating >2

```
1  Select       First_name , Last_name
2      From      eclient join client_comment on Client_CommID= Client_ID
3      where       Rating >2
4
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

First_name	Last_name
Fahad	Abdullah
Khalid	Ali
Nasser	Abdullah

Figure 25-Query 9 Result

7] SELECT Item_ID, Title
FROM item
WHERE Item_ID not IN (SELECT Item_ID
FROM On);

```
1
2  SELECT
3      Item_ID, Title
4  FROM
5      item
6  WHERE
7      Item_ID not IN (SELECT
8              BItem_ID
9              FROM
10             bid_on_item
11                     );
12
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

Item_ID	Title
I10	TOSHEBA-LAP
I11	WINDOWS-10
I12	MAC
I13	McAfee
I14	WORD
I16	WINDOWS-7
I17	MvSOL
I2	LAND
I3	FARM
I5	IPAD
I7	MAC-LAP
I9	DELL-LAP

Figure 26-Query 7 Result

8] Select auction_ID , auction_description , expiration , count(bid_ID)
From auction NATURAL JOIN bid
Groupby auction_ID
Having count(bid_ID) > 2

```
Select          Auctio_ID , Auction_Description , Expiration , count(Bid_ID)
    From        auction join bid on Bid_Auction= Auctio_ID
    Having     count(Bid_ID) > 2
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

Auctio_ID	Auction_Description	Expiration	count(Bid_ID)
A0	AUCTION FOR WALL PAINTING	2021-12-20	6

Figure 27-Query 8 Result

10] Select First_name, Last_name
From purchaser join Client on Client_ID = Purchaser_ID
Where `Shipping Address`='Saudi-Arabia'

```
Select   First_name, Last_name
    From    purchaser join eclient on Client_ID = Purchaser_ID
    Where   `Shipping Address`='Saudi-Arabia'
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

First_name	Last_name
Saad	Abdullah
Saleh	Mansoor
Mohammad	Ali
Fahad	Abdullah
Khalid	Ali

Figure 28-Query 10 Result

3.4 Database Translation

We will explain our database in form feature based on Oracle sqlplus form guide[5].

First, we will look at our database in general, the result it supposes to be in a table with counting for schema.

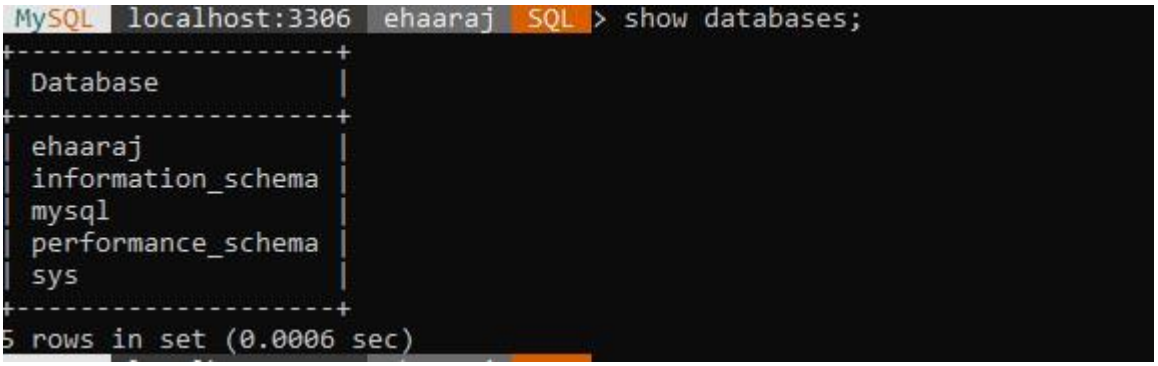

Figure 29-Database Form

Second, we will look at our specific schema and what it has. The form will goes as follow: It supposed to show the name of the schema at the top and attribute under each other, it should has a counter for the attribute as well.

```
MySQL  localhost:3306  ehaaraj  SQL > show tables;
+--------------------+
| Tables_in_ehaaraj  |
+--------------------+
| auction            |
| bid                |
| bid_on_item        |
| bill               |
| client_care        |
| client_comment     |
| deliver            |
| discount           |
| driver             |
| eclient            |
| hardware           |
| item               |
| operating_system   |
| phone              |
| purchaser          |
| served_by          |
| supplier           |
| supplier_item      |
| transaction        |
| winner             |
| winner_detailes    |
+--------------------+
21 rows in set (0.0009 sec)
```

Figure 30-Schema Form

Third, we will run a sample of a query where we can see the whole attribute in form of normal table result.

```
MySQL  localhost:3306  ehaaraj  SQL > select * from eclient;
+-----------+-------------+------------+-----------+-----------------+---------+
| Client_ID | Email       | First_Name | Last_Name | Client_Password | Address |
+-----------+-------------+------------+-----------+-----------------+---------+
| 1         | a@haraj.com | Fahad      | Ahmad     | 123             | Riyadh  |
| 10        | A@haraj.com | Abdullah   | Ali       | nn-987          | Makkah  |
| 11        | k@haraj.com | Omar       | Waleed    | 325             | Riyadh  |
| 12        | l@haraj.com | Saad       | Abdullah  | 785             | Riyadh  |
| 13        | M@haraj.com | Adel       | Abdullah  | 963             | Jeddah  |
| 14        | p@haraj.com | Saleh      | Mansoor   | '0ii0'          | KHOBAR  |
| 2         | M@haraj.com | Mohammad   | Ali       | 321             | Jeddah  |
| 3         | J@haraj.com | Turki      | Salem     | 852..           | Makkah  |
| 4         | F@haraj.com | Fahad      | Abdullah  | xvx             | Riyadh  |
| 5         | a@haraj.com | Ali        | Fahad     | 654             | Riyadh  |
| 6         | M@haraj.com | Saud       | Ali       | i_x00           | Jeddah  |
| 7         | a@haraj.com | Khalid     | Ali       | poo             | Makkah  |
| 8         | F@haraj.com | Nasser     | Abdullah  | 141             | KHOBAR  |
| 9         | i@haraj.com | Mansoor    | Nasser    | 852             | Madinah |
+-----------+-------------+------------+-----------+-----------------+---------+
14 rows in set (0.0142 sec)
```

Figure 31- A query Form

4. Appendix

Where you can download the schema as whole as .sql .

4 References

[1] For EER diagram : Draw.io

[2] https://drawio-app.com

[3] For schema diagram : Microsoft Word

[4] https://medium.com/nerd-for-tech/drawing-er-and-eer-diagrams-mapping-4965e2b3cc3e [5] https://docs.oracle.com/cd/B19306_01/server.102/b14357/ch6.htm