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CS370: Fundamentals of Database **1st Semester 1443 H**

eHaraj Database System Application

Group #2

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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
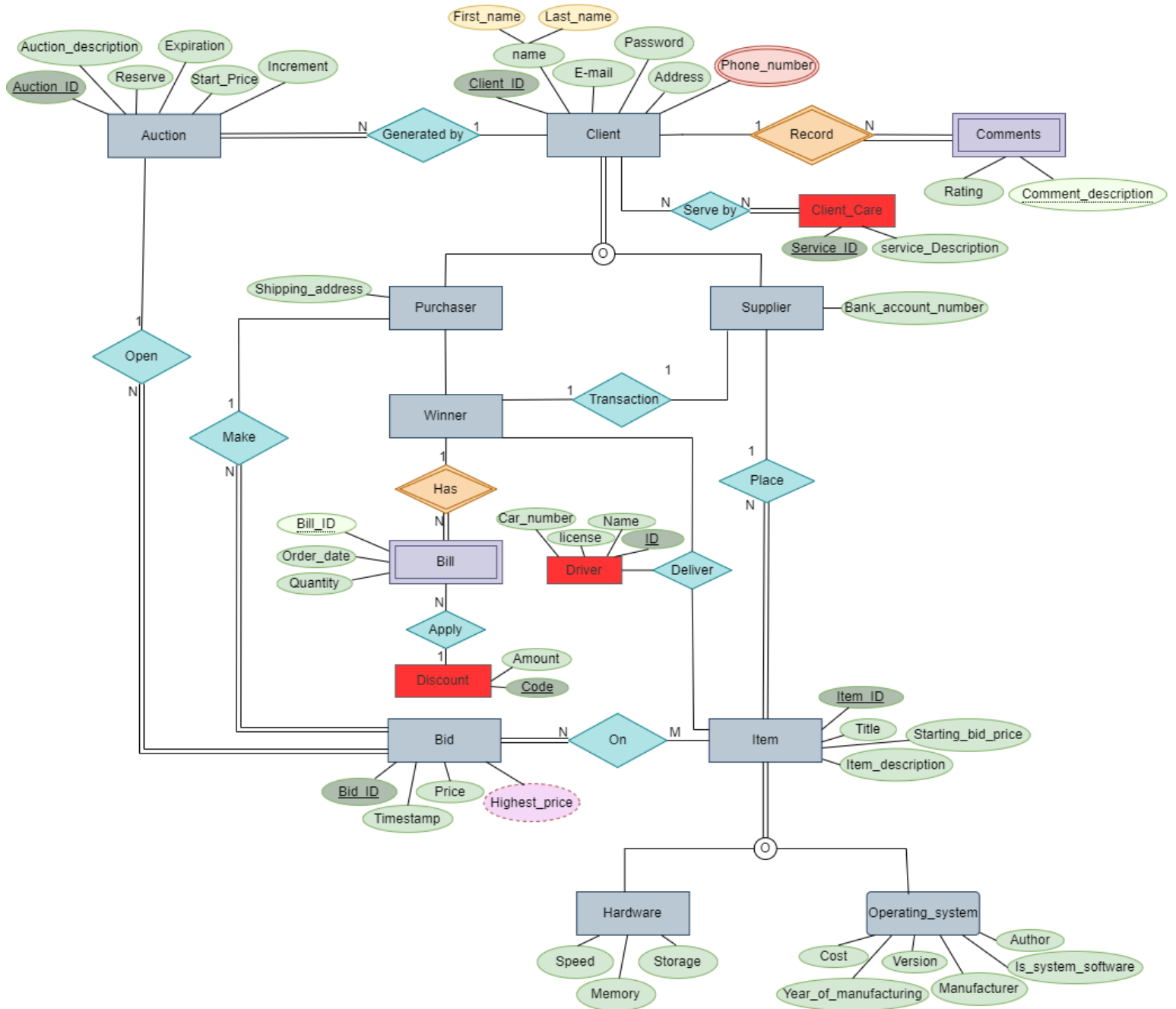
Figure 1-EER Diagram

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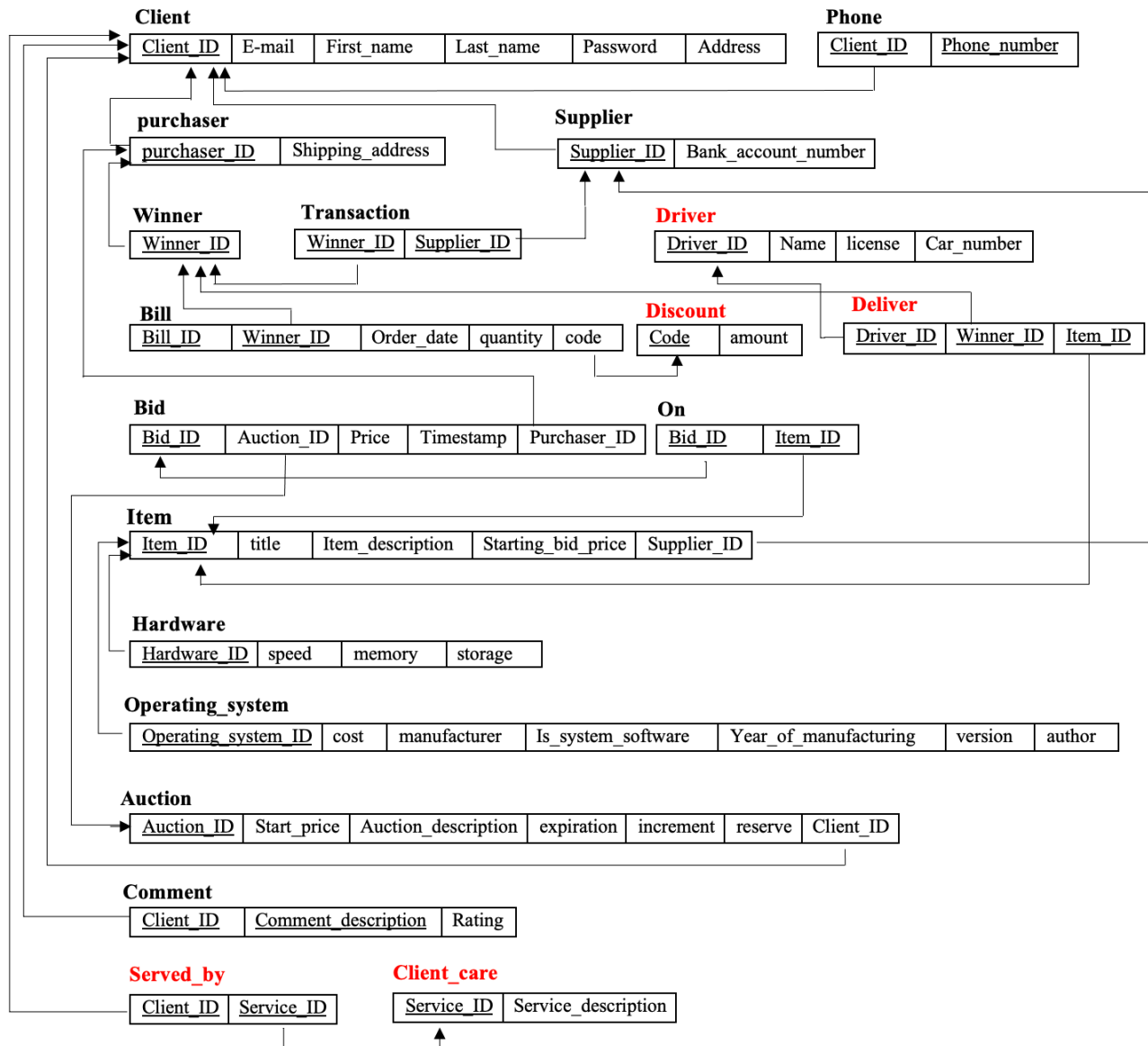
Figure 2-Database Schema using 8A:Multiple Relation Superclass and Subclass

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', '2020-01-05', '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', '2020-12-20', '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	'Oii0'	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	DOO	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

	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

	Winner_ID
	13
	2
	4
	5
	7
	8
	NULL

Figure 5-Winner 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

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

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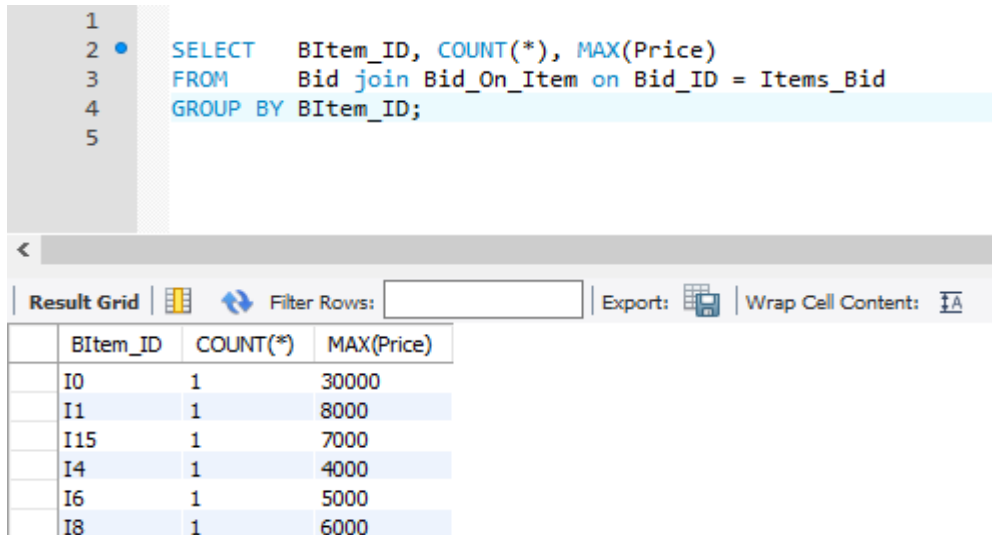
	code	amont
	x12	100%
	ksa	50%
	n15	25%
	%5	15%
	6^m	30%
	DXD	70%
	NULL	NULL

Figure 19- Discount Table

3.3   Query Implementation

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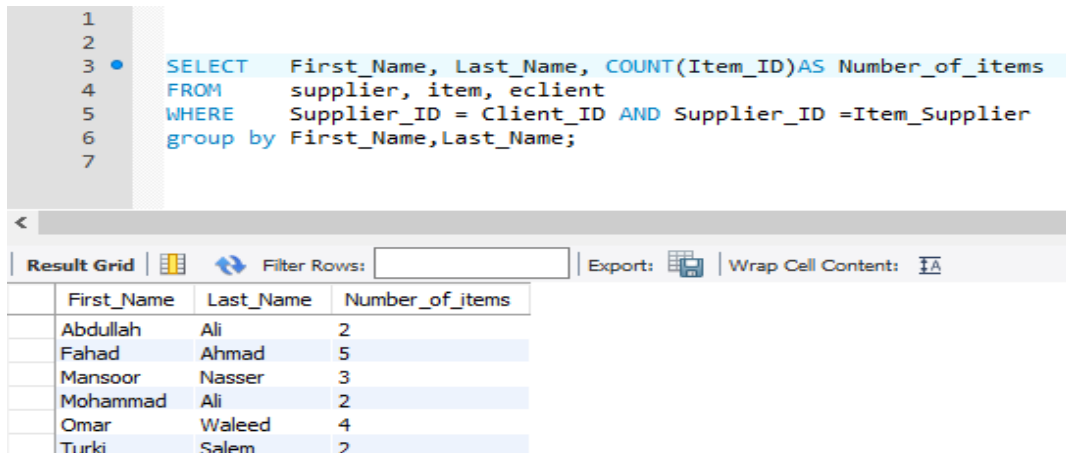   FROM   Bid NATURAL JOIN On
       GROUP BY Item_id;

```
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
```

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';
```

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
```

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
```

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
```

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

```
1
2 ●   Select           Auctio_ID , Auction_Description , Expiration , count(Bid_ID)
3         From         auction join bid on Bid_Auction= Auctio_ID
4         Having       count(Bid_ID) > 2
5
6
```

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'

```
1 ●   Select   First_name, Last_name
2         From     purchaser join eclient on Client_ID = Purchaser_ID
3         Where    `Shipping Address`='Saudi-Arabia'
4
```

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