



Al-Imam University
Computer Science Department
College of Computer and Information Sciences



Group name: group 4

Schema Definitions and Query Implementations

Group's Members Info: Group 4

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Course: CS370
Section: 371
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Conceptual EER Model

Date Modeling Tool:

Lucidchart, notability.

Assumptions (Bonus)

Winner entity: Is identified by bid entity when he/she proposed the highest bid price. Also, he/she makes many bids. When he/she win the bid, they assign to one and only one bill.

Auction entity: It can have many bids. Also, it has ID and increment to determine the amount of increment in bid price.

Manager entity: It can manage many auctions. It has ID and name.

Shipping_company: It is a company responsible for delivering the shipment. The client could use it or deliver it / pick it by her/him self. It must has at least one client. It has tracking_ID, name, deliver_date and derived attribute (address) from client.

Description: ER Data Model component:

Entities: 13 entities, 2 specialization, 2 weak entity

1. Client: ID (key), email, F_name, L_name, password, address, P_number.
2. Item: ID(key), email, product_name, item_manufacture, used_months, item_languages, auction_start_date, auction_end_date, description, start_bid_price.
3. Bid: ID (key), proposed_price, bid_date.
4. Billing: ID (key), date.
5. Specialization: Purchaser: billing_address, Supplier: bank_acc.
- Computer: Memory, speed, storage. Printer: is_wireless, inkjet, is_contains_scanner.
6. Feedback (weak): ID (partial), description, rating.
7. Auction: Auction_ID, increment.
8. Manager: Manager_ID , F_name , L_name.
9. Winner (weak): Bill_ID (partial), highest_bid_price.
10. Shipping_company: tracking_ID, name, deliver_date.

Relationship: 4 Relationships + 2 identifying Relationship

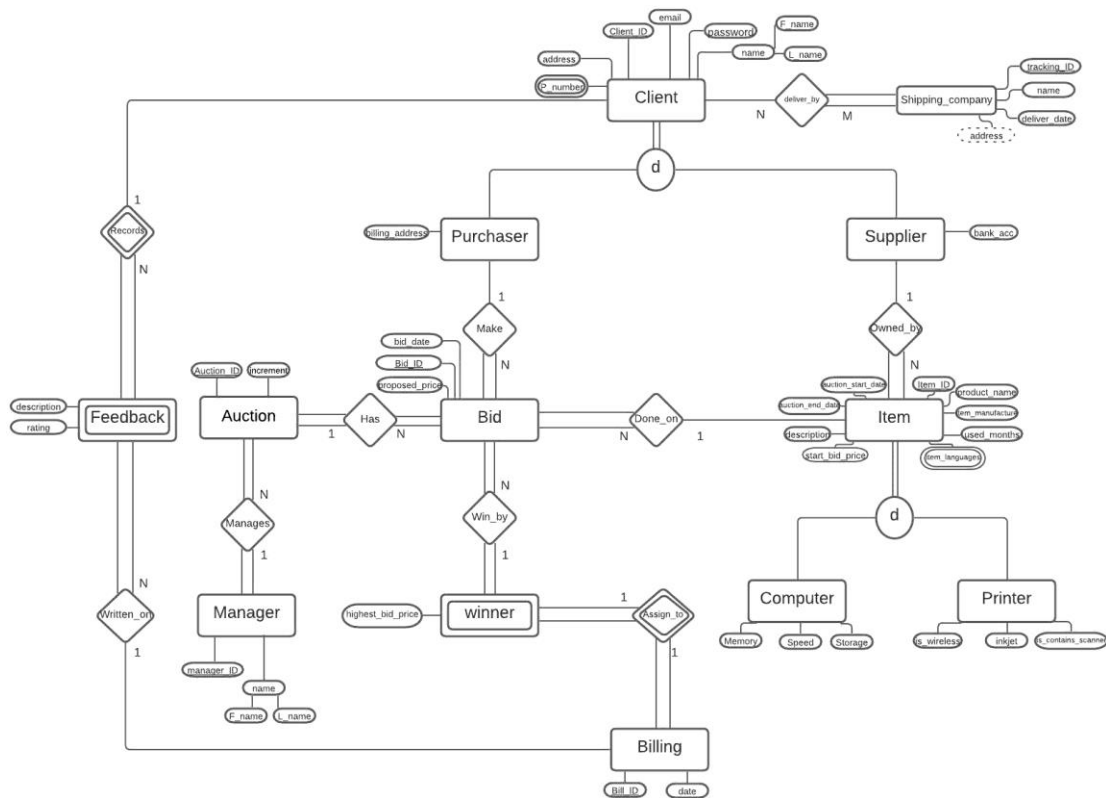
1. Client **delivered_by** Shipping_company
2. Item **owned_by** Supplier
3. Purchaser **make** Bid
4. Winner **assign_to** Bill
5. Bid **done_on** Item
6. Feedback **written_on** Billing
7. Client **records** Feedback
8. Bid **win_by** Winner

9. Auction **has** Bid
10. Manager **manages** Auction

Constraints:

1. Client N **delivered_by** M Shipping_company
2. Item N **owned_by** 1 Supplier
3. Purchaser 1 **make** N Bid
4. Winner 1 **assign_to** 1 Bill
5. Bid N **done_on** 1 Item
6. Feedback N **written_on** 1 Billing
7. Client 1 **records** N Feedback
8. Bid N **win_by** 1 Winner
9. Auction 1 **has** N Bid
10. Manager 1 **manages** N Auction

Conceptual Data Model



Relational Database Schema

Assumptions (Bonus)

Winner entity: Is identified by bid entity when he/she proposed the highest bid price. Also, he/she makes many bids. When he/she win the bid, they assign to one and only one bill.

Auction entity: It can have many bids. Also, it has ID and increment to determine the amount of increment in bid price.

Manager entity: It can manage many auctions. It has ID and name.

Shipping_company: It is a company responsible for delivering the shipment. The client could use it or deliver it / pick it by her/him self. It must has at least one client. It has tracking_ID, name, deliver_date and derived attribute (address) from client.

Relational Database Schema

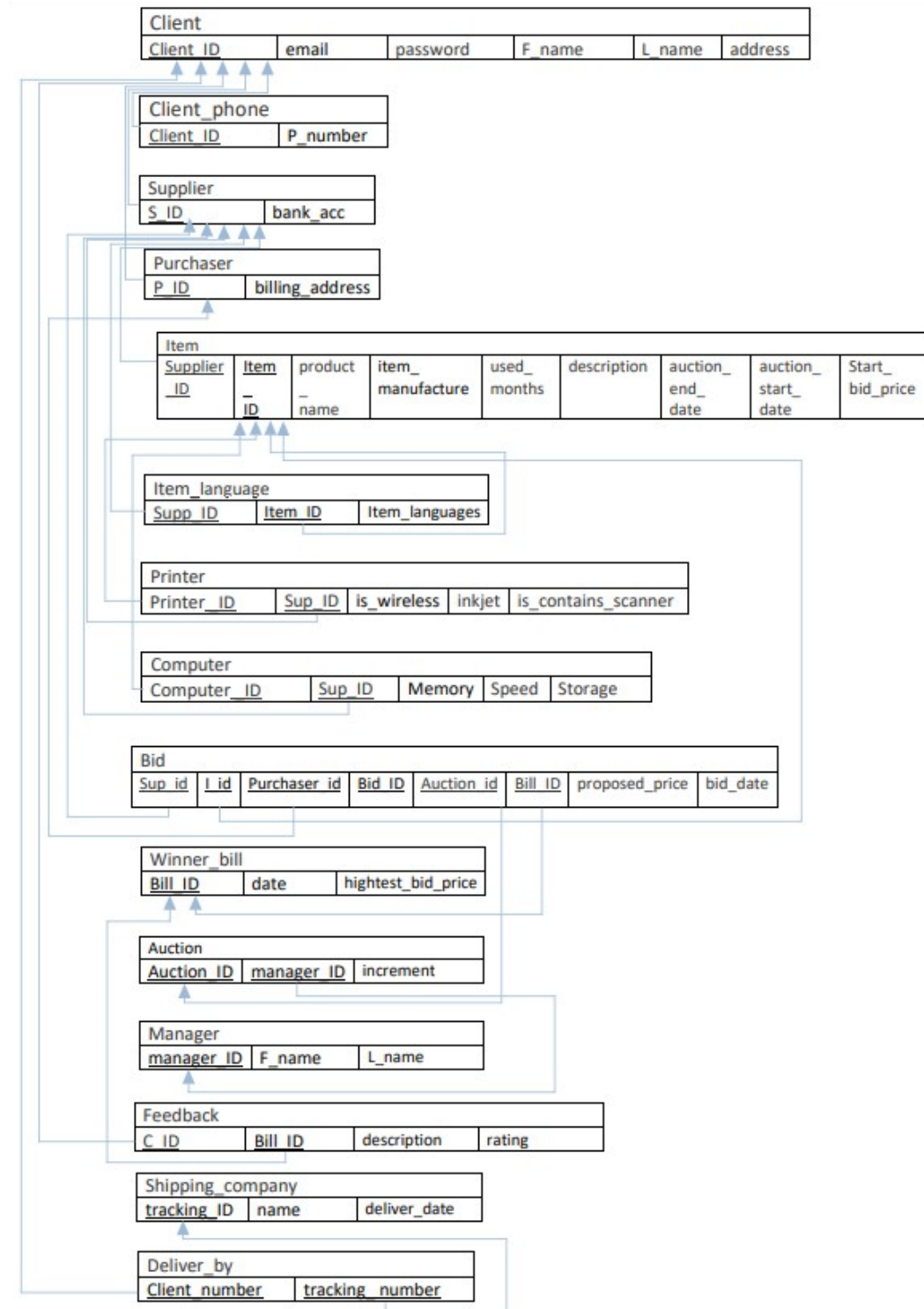


Table Creation:

Client:

```
CREATE TABLE client (  
  Client_ID      INTEGER      NOT NULL,  
  Email          VARCHAR(50)  NOT NULL,  
  F_name        VARCHAR(15)   NOT NULL,  
  L_name        VARCHAR(15)   NOT NULL,  
  Password      CHAR(8)      NOT NULL,  
  Address       VARCHAR(30)   NOT NULL,  
  PRIMARY KEY (Client_ID) );
```

client_phone:

```
CREATE table client_phone (  
  Client_ID      INTEGER      NOT NULL ,  
  Phone_number   INTEGER      NOT NULL,  
  UNIQUE(Phone_number),  
  FOREIGN KEY (Client_ID) REFERENCES client(Client_ID));
```

Purchaser:

```
CREATE TABLE purchaser (  
  P_ID          INTEGER      NOT NULL,  
  Billing_address VARCHAR(30)  NOT NULL,  
  FOREIGN KEY (P_ID) REFERENCES client(Client_ID));
```

Supplier:

```
CREATE table supplier (  
  S_ID          INTEGER      NOT NULL ,  
  Bank_account_number VARCHAR(10) NOTNULL check(LENGTH(Bank_account_number) = 10),  
  UNIQUE(Bank_account_number),  
  FOREIGN KEY (S_ID) REFERENCES client(Client_ID));
```

Item:

```
CREATE table item (  
  Item_ID       INTEGER      NOT NULL ,  
  Product_name  VARCHAR(50)   NOT NULL,  
  Item_manufacture VARCHAR(15) NOT NULL,
```

```
Used_months      INTEGER      NOT NULL,
Description       VARCHAR(100) NOT NULL,
Auction_start_date date      NOT NULL,
Auction_end_date  date      NOT NULL check(DATE(Auction_end_date)>=DATE(Auction_end_date)),
Start_bid_price  DECIMAL(4,2) NOT NULL,
Supplier_ID      INTEGER      NOT NULL,
PRIMARY KEY (Item_ID),
FOREIGN KEY (Supplier_ID) REFERENCES supplier(S_ID));
```

Item_language:

```
CREATE table item_language (
Item_ID          INTEGER          NOT NULL,
Item_language    VARCHAR(15)      NOT NULL,
Supp_ID          INTEGER          NOT NULL,
FOREIGN KEY (Item_ID) REFERENCES item (Item_ID)
FOREIGN KEY (Supp_ID) REFERENCES Supplier(S_ID));
```

Computer:

```
CREATE table computer (
Sup_ID INTEGER          NOT NULL,
Computer_ID  INTEGER  NOT NULL,
Memory       VARCHAR(10) NOT NULL,
Storage      VARCHAR(10) NOT NULL,
Speed        VARCHAR(10) NOT NULL,
FOREIGN KEY (Computer_ID) REFERENCES item(Item_ID)
FOREIGN KEY (Sup_ID) REFERENCES supplier(S_ID));
```

Printer:

```
CREATE table printer (
Printer_ID     INTEGER      NOT NULL,
Sup_ID INTEGER          NOT NULL,
Is_wireless    BOOLEAN      NOT NULL,
Inkjet         VARCHAR(15)   NOT NULL,
Is_contains_scanner BOOLEAN  NOT NULL,
FOREIGN KEY (Printer_ID) REFERENCES item(Item_ID)
```

FOREIGN KEY (Sup_ID) REFERENCES supplier(S_ID));

Manager:

CREATE table manager (

Manager_ID INTEGER NOT NULL,

F_name VARCHAR(15) NOT NULL,

L_name VARCHAR(15) NOT NULL,

PRIMARY KEY (Manager_ID));

Auction:

CREATE table auction(

Auction_ID INTEGER NOT NULL,

M_ID INTEGER NOT NULL,

Increment DECIMAL(4,2),

PRIMARY KEY (Auction_ID),

FOREIGN KEY (M_ID) REFERENCES manager(Manager_ID));

Winner_bill:

CREATE table winner_bill (

Bill_ID INTEGER NOT NULL ,

Bill_date date NOT NULL,

Highest_bid_price DECIMAL(4,2),

PRIMARY KEY (Bill_ID));

Bid:

CREATE table bid (

Bid_ID INTEGER NOT NULL,

Bid_date date NOT NULL,

Proposed_price DECIMAL(4,2) NOT NULL,

Purchaser_id INTEGER NOT NULL,

Sup_id INTEGER NOT NULL,

Auction_id INTEGER NOT NULL,

Bill_id INTEGER ,

I_id INTEGER NOT NULL ,

PRIMARY KEY (Bid_ID),

FOREIGN KEY (Sup_ID) REFERENCES supplier(S_ID),

FOREIGN KEY (Auction_id) REFERENCES auction(Auction_ID)

FOREIGN KEY (Purchaser_id) REFERENCES purchaser(P_ID),

FOREIGN KEY (Bill_id) REFERENCES winner_bill(Bill_ID),

FOREIGN KEY (I_id) REFERENCES item(Item_ID));

Feedback:

CREATE table feedback (

C_ID INTEGER NOT NULL,

Description VARCHAR(100),

Rating INTEGER check(Rating>=1 AND Rating<=5),

Billing_ID INTEGER NOT NULL,

FOREIGN KEY (C_ID) REFERENCES client(Client_ID),

FOREIGN KEY (Billing_ID) REFERENCES winner_bill(Bill_ID));

Shipping_company:

CREATE table shipping_company(

Tracking_ID VARCHAR(15) NOT NULL,

Name VARCHAR(15) NOT NULL,

Deliver_date date NOT NULL,

PRIMARY KEY (Tracking_ID));

Deliver_by:

CREATE table deliver_by(

Client_number INTEGER NOT NULL,

Tracking_number VARCHAR(15) NOT NULL,

FOREIGN KEY (Client_number) REFERENCES client(Client_ID),

FOREIGN KEY (Tracking_number) REFERENCES shipping_company(Tracking_ID));

Database State:

We insert some values into the database in order to test our SQL create view and query statement.

- **INSERTION OF TABLE client:**

```
INSERT INTO client (Client_ID,Email,F_name,L_name>Password,address)VALUES
(012116,'ahmad@gmail.com','ahmad','alateq','11223344','Riyadh, Olaya'),
(012117,'sara@gmail.com','sara','alshammri','12345678','Riyadh, Irqa'),
(012118,'khalid12@gmail.com','khalid','aldail','99955331','Riyadh, Irqa'),
(012119,'reem_almutairi@gmail.com','reem','almutairi','777#$776','Dammam, AlFursan'),
(012120,'reema.almohsen@gmail.com','reema','almohsen','99887766','Jeddah, Aziziyah'),
(012121,'saeed.alqahtani@gmail.com','saeed','alqahtani','11223344','Riyadh, Dhahrat Laban'),
(012122,'amal@gmail.com','amal','alrajhi','12345678','Dammam, Taiba'),
(012123,'lama@gmail.com','lama','almutairi','12335678','Jeddah, Aziziyah'),
(012124,'khalid34567@gmail.com','khalid','alqahtani','46768987','Riyadh, Irqa'),
(012125,'sara_alshammri@gmail.com','sara','alshammri','77436776','Dammam, AlFursan'),
(012126,'shatha.almohsen@gmail.com','shatha','almohsen','sh887766','Jeddah, Aziziyah'),
(012127,'raghad.alqahtani@gmail.com','raghad','alqahtani','Ra23344$','Riyadh, Dhahrat Laban');
```

- **INSERTION OF TABLE client_phone:**

```
INSERT INTO client_phone(Client_ID,Phone_number)VALUES
(012116,0553984773),
(012117,0599935683),
(012118,050324119),
(012119,0507463643),
(012120,0554361390),
(012121,0594744460),
(012122,0577300543),
(012123,0564864337),
(012124,0554291390),
(012125,0507467743),
(012126,0564892337),
(012127,050324299);
```

- **INSERTION OF TABLE purchaser:**

```
INSERT INTO purchaser (P_ID,Billing_address)VALUES
(012116,'Riyadh, Olaya'),
(012117,'Riyadh, Irqa'),
(012118,'Riyadh, Irqa'),
```

```
(012119,'Dammam, AlFursan'),  
(012120,'Jeddah, Aziziyah'),  
(012121,'Riyadh, Dhahrat Laban');
```

- **INSERTION OF TABLE supplier:**

```
INSERT INTO supplier (S_ID,Bank_account_number)VALUES  
(012122,'SA57946809'),  
(012123,'SA10724795'),  
(012124,'SA45695677'),  
(012125,'SA31866807'),  
(012126,'SA21323325'),  
(012127,'SA77658755');
```

- **INSERTION OF TABLE Item:**

```
INSERT INTO Item  
(Item_ID,Product_name,Item_manufacture,Used_months,Description,Auction_start_date,Auction_end_date,Start_bid_price,Supplier_ID)VALUES  
(452116,'HP Sprocket Select instant photo printer','HP',1,'This in-demand instant photo printer from HP is seriously cheap right now.',2021-05-11,2021-05-20,0400.00,012122),  
(452117,'Canon IVY mini photo printer','Canon',0,'This mini photo printer from Canon is also available at a juicy discount.',2021-03-26,2021-04-02,0600.00,012123),  
(452118,'Epson Expression Home XP-5100 color all-in-one printer','Epson',2,' This little photo-centric inkjet printer from Epson is excellent value.',2021-09-03,2021-10-20,0550.00,012124),  
(452119,'Epson EcoTank ET-2800 all-in-one color printer','Epson',1,'This Epson printer might be a little slow (10ppm in mono), but it certainly prints gorgeous high-resolution images. ',2021-12-11,2022-04-23,0550.50,012125),  
(452120,'Epson Expression Photo XP-8600 wireless all-in-one printer','Epson',6,'If you want to print really high-quality photos from home, the XP-8600 could be an excellent buy. ',2021-01-01,2021-05-20,1100.00,012126),  
(452121,'Canon imageCLASS MF445dw wireless laser printer','Canon',3,'Designed for small-medium businesses, this black and white laser printer (with scanner) from Canon',2021-10-22,2021-12-22,1500.00,012127),  
  
(452122,'Dell XPS 13 (9310)','Dell',4,'A trim-to-the-max chassis, a beautiful screen, and a cutting-
```

edge Intel (Tiger Lake).',2021-07-05,2021-09-28,4000.00,012122),
(452123,'MSI Modern 14','MSI',2,'MSIs under-\$500 Modern 14 is a compelling budget laptop for day-to-day tasks.',2021-10-19,2021-11-25,2500.50,012123),
(452124,'Acer Chromebook Spin 713','Acer',1,'A touch screen with a squarish 3:2 aspect ratio.',2021-05-10,2021-05-26,3000.00,012124),
(452125,'Dell Inspiron 16 Plus (7610)','Dell',2,'The Inspiron 16 Plus (7610) is a top-notch value in a burgeoning category of laptops.',2021-06-15,2021-08-02,2500.00,012125),
(452126,'Apple iMac 27-inch (2020)','Apple',0,'Type: All-in-One CPU: 10th-gen Intel Core i5',2021-09-14,2021-09-23,5250.00,012126),
(452127,'Apple iMac 24-inch (2021)','Apple',1,'Display: 24-inch, 4480 x 2520 display Special Features: 1080p webcam, great speakers',2021-10-10,2021-11-10,6799.99,012127);

- **INSERTION OF TABLE item_language:**

INSERT INTO item_language(Item_ID,Item_language,Supp_ID)VALUES

(452116,'english,chinese',012122),
(452117,'english,japanese',012123),
(452118,'english',012124),
(452119,'english',012125),
(452120,'english',012126),
(452121,'english,japanese',012127),
(452122,'english,arabic',012122),
(452123,'english',012123),
(452124,'english',012124),
(452125,'english',012125),
(452126,'english,arabic',012126),
(452127,'english',012127);

- **INSERTION OF TABLE computer:**

INSERT INTO computer (Sup_ID,Computer_ID,Memory,Storage,Speed)VALUES

(012122,452122,'RAM16GB','512GB','2.3GHz'),
(012123,452123,'RAM8GB','128GB','2.1GHz'),
(012124,452124,'RAM8GB','128GB','1.6GHz'),
(012125,452125,'RAM16GB','512GB','2.3GHz'),
(012126,452126,'RAM128GB','4TB','2.3GHz'),

```
(012127,452127,'RAM8GB','256GB','2.3GHz');
```

- **INSERTION OF TABLE printer:**

```
INSERT INTO printer (Sup_ID,Printer_ID,Is_wireless,Inkjet,Is_contains_scanner)VALUES
```

```
(012122,452116,1,'toner',0),
```

```
(012123,452117,1,'toner',0),
```

```
(012124,452118,0,'ink',1),
```

```
(012125,452119,0,'ink',1),
```

```
(012126,452120,1,'toner',1),
```

```
(012127,452121,1,'toner',1);
```

- **INSERTION OF TABLE manager:**

```
INSERT INTO manager (Manager_ID,F_name,L_name)VALUES
```

```
(580000,'norah','almarul'),
```

```
(580001,'raghad','alfares'),
```

```
(580002,'shatha','alsuwaid');
```

- **INSERTION OF TABLE auction:**

```
INSERT INTO auction (Auction_ID,M_ID,Increment)VALUES
```

```
(680000,580000,0050.00),
```

```
(680001,580000,0100.50),
```

```
(680002,580001,0040.00),
```

```
(680003,580001,0150.50),
```

```
(680004,580002,0300.00),
```

```
(680005,580002,0400.50);
```

- **INSERTION OF TABLE winner_bill:**

```
INSERT INTO winner_bill(Bill_ID,Bill_date,Highest_bid_price)VALUES
```

```
(214143,2021-05-19,0450.00),
```

```
(214144,2021-10-15,0650.50),
```

```
(214145,2021-03-03,1140.00),
```

```
(214146,2021-05-18,4150.50),
```

```
(214147,2021-09-14,3150.50),
```

```
(214148,2021-08-07,4550.50);
```

- **INSERTION OF TABLE bill:**

INSERT INTO bid

(Bid_ID,Bid_date,Proposed_price,Bill_id,Auction_id,Purchaser_id,Sup_id,I_id)VALUES

(362102,2021-05-19,0450.00,214143,680000,012116,012122,452116),
(362103,2021-10-15,0650.50,214144,680001,012117,012124,452118),
(362104,2021-03-03,1140.00,214145,680002,012118,012126,452120),
(362105,2021-08-05,4550.50,214146,680003,012119,012122,452122),
(362106,2021-05-18,3150.50,214147,680004,012120,012124,452124),
(362107,2021-09-14,5300.00,214148,680005,012121,012126,452126),
(362108,2021-08-07,4150.00,NULL,680003,012118,012122,452122);

- **INSERTION OF TABLE feedback:**

INSERT INTO feedback (C_ID,Description,Rating,Billing_ID)VALUES

(012122,'nice person',4,214143),
(012116,'fast delivery',5,214143),
(012124,'good person but bad delivery',2,214144),
(012121,'bad quality',1,214144),
(012126,'perfect deal',5,214145),
(012118,'nice price',4,214145);

- **INSERTION OF TABLE shipping_company:**

INSERT INTO shipping_company (Tracking_ID,Name,Deliver_date)VALUES

('OSADC00024204','FedEx','2021-12-23'),
('OSADC06704254','Smsa','2021-12-30'),
('OSADC67004352','Zajil','2021-12-20'),
('OSADC00784353','FedEx','2022-01-01'),
('OSADC06904385','Smsa','2021-12-19'),
('OSADC23009357','Zajil','2021-12-15');

- **INSERTION OF TABLE deliver_by:**

INSERT INTO deliver_by (Client_number,Tracking_number)VALUES

(012116,'OSADC00004352'),
(012117,'OSADC00004353'),
(012118,'OSADC00004254'),
(012125,'OSADC00009357'),
(012126,'OSADC00004385'),
(012127,'OSADC00004204');

Screenshot:Client

Client_ID	Email	F_name	L_name	Password	Address
12116	ahmad@gmail.com	ahmad	alateq	11223344	Riyadh, Olaya
12117	sara@gmail.com	sara	alshammri	12345678	Riyadh, Irqa
12118	khalid12@gmail.com	khalid	aldail	99955331	Riyadh, Irqa
12119	reem_almutairi@gmail.com	reem	almutairi	777#\$776	Dammam, AlFursan
12120	reema.almCLIENTohsen@gmail.com	reema	almohsen	99887766	Jeddah, Aziziyah
12121	saeed.alqahtani@gmail.com	saeed	alqahtani	11223344	Riyadh, Dhahrat Laban
12122	amal@gmail.com	amal	alrajhi	12345678	Dammam, Taiba
12123	lama@gmail.com	lama	almutairi	12335678	Jeddah, Aziziyah
12124	khalid34567@gmail.com	khalid	alqahtani	46768987	Riyadh, Irqa
12125	sara_alshammri@gmail.com	sara	alshammri	77436776	Dammam, AlFursan
12126	shatha.almohsen@gmail.com	shatha	almohsen	sh887766	Jeddah, Aziziyah
12127	raghad.alqahtani@gmail.com	raghad	alqahtani	Ra23344\$	Riyadh, Dhahrat Laban

client_phone

Client_ID	Phone_number
12116	553984773
12117	599935683
12118	50324119
12119	507463643
12120	554361390
12121	594744460
12122	577300543
12123	564864337
12124	554291390
12125	507467743
12126	564892337
12127	50324299

supplier

S_ID	Bank_account_num...
12122	SA57946809
12123	SA10724795
12124	SA45695677
12125	SA31866807
12126	SA21323325
12127	SA77658755

purchaser

P_ID	Billing_address
12116	Riyadh, Olaya
12117	Riyadh, Irqa
12118	Riyadh, Irqa
12119	Dammam, AlFursan
12120	Jeddah, Aziziyah
12121	Riyadh, Dhahrat Laban

Item

Item_ID	Product_name	Item_manufact...	Used_months	Description	Auction_start_d...	Auction_end_da...	Start_bid_pri...	Supplier_ID
452116	HP Sprocket Select instant photo printer	HP	1	This in-demand instant photo printer from HP is...	2021-05-11	2021-05-20	0400	12122
452117	Canon IVY mini photo printer	Canon	0	This mini photo printer from Canon is also avail...	2021-03-26	2021-04-02	0600	12123
452118	Epson Expression Home XP-5100 color all-in-o...	Epson	2	This little photo-centric inkjet printer from Epso...	2021-09-03	2021-10-20	0550	12124
452119	Epson EcoTank ET-2800 all-in-one color prtnr	Epson	1	This Epson printer might be a little slow (10ppm...	2021-12-11	2022-04-23	0550.5	12125
452120	Epson Expression Photo XP-8600 wireless all-i...	Epson	6	If you want to print really high-quality photos fro...	2021-01-01	2021-05-20	1100	12126
452121	Canon imageCLASS MF445dw wireless laser p...	Canon	3	Designed for small-medium businesses, this bla...	2021-10-22	2021-12-22	1500	12127
452122	Dell XPS 13 (9310)	Dell	4	A trim-to-the-max chassis, a beautiful screen, a...	2021-07-05	2021-09-28	4000	12122
452123	MSI Modern 14	MSI	2	MSIs under-\$500 Modern 14 is a compelling bu...	2021-10-19	2021-11-25	2500.5	12123
452124	Acer Chromebook Spin 713	Acer	1	A touch screen with a squarish 3:2 aspect ratio.	2021-05-10	2021-05-26	3000	12124
452125	Dell Inspiron 16 Plus (7610)	Dell	2	The Inspiron 16 Plus (7610) is a top-notch value...	2021-06-15	2021-08-02	2500	12125
452126	Apple iMac 27-inch (2020)	Apple	0	Type: All-in-One CPU: 10th-gen Intel Core i5	2021-09-14	2021-09-23	5250	12126
452127	Apple iMac 24-inch (2021)	Apple	1	Display: 24-inch, 4480 x 2520 display Special F...	2021-10-10	2021-11-10	6799.99	12127

Item language

Item_ID	Item_language	Supp_ID
452116	english,chinese	12122
452117	english,japanese	12123
452118	english	12124
452119	english	12125
452120	english	12126
452121	english,japanese	12127
452122	english,arabic	12122
452123	english	12123
452124	english	12124
452125	english	12125
452126	english,arabic	12126
452127	english	12127

Computer

Suplier_ID	Computer_ID	Memory	Storage	Speed
12122	452122	RAM16GB	512GB	2.3GHz
12123	452123	RAM8GB	128GB	2.1GHz
12124	452124	RAM8GB	128GB	1.6GHz
12125	452125	RAM16GB	512GB	2.3GHz
12126	452126	RAM128GB	4TB	2.3GHz
12127	452127	RAM8GB	256GB	2.3GHz

Printer

Printer_ID	Suplier_ID	Is_wireless	Inkjet	Is_contains_scann...
452116	12122	1	toner	0
452117	12123	1	toner	0
452118	12124	0	ink	1
452119	12125	0	ink	1
452120	12126	1	toner	1
452121	12127	1	toner	1

Manager

Manager_ID	F_name	L_name
580000	norah	almarul
580001	raghad	alfares
580002	shatha	alsuwaid

Auction

Auction_ID	M_ID	Increment
680000	580000	0050
680001	580000	0100.5
680002	580001	0040
680003	580001	0150.5
680004	580002	0300
680005	580002	0400.5

winner bill

Bill_ID	Bill_date	Highest_bid_pri...
214143	1997	0450
214144	1996	0650.5
214145	2015	1140
214146	1998	4150.5
214147	1998	3150.5
214148	2006	4550.5

bid

Bid_ID	Bid_date	Proposed_pri...	Purchaser_id	Sup_id	Auction_id	Bill_id	I_id
362102	1997	450.00	12116	12122	680000	214143	452116
362103	1996	650.50	12117	12124	680001	214144	452118
362104	2015	1140.00	12118	12126	680002	214145	452120
362105	2008	4550.50	12119	12122	680003	214146	452122
362106	1998	3150.50	12120	12124	680004	214147	452124
362107	1998	5300.00	12121	12126	680005	214148	452126
362108	2006	4150.00	12118	12122	680003	NULL	452122

Feedback

C_ID	Description	Rating	Billing_ID
12122	nice person	4	214143
12116	fast delivery	5	214143
12124	good person but bad delivery	2	214144
12121	bad quality	1	214144
12126	perfect deal	5	214145
12118	nice price	4	214145

Shipping company

Tracking_ID	Name	Deliver_date
OSADC00004204	FedEx	2021-12-23
OSADC00004254	Smsa	2021-12-30
OSADC00004352	Zajil	2021-12-20
OSADC00004353	FedEx	2022-01-01
OSADC00004385	Smsa	2021-12-19
OSADC00009357	Zajil	2021-12-15

Deliver by

Client_number	Tracking_number
12116	OSADC00004352
12117	OSADC00004353
12118	OSADC00004254
12125	OSADC00009357
12126	OSADC00004385
12127	OSADC00004204

Query Implementation:

Views

1- Supplier_items: this view shows the names of supplier, and the number of items they have placed:

```
CREATE VIEW Supplier_items AS
SELECT F_name , L_name, COUNT(product_name)
FROM supplier AS s, item AS i , client AS c
WHERE c.Client_ID = s.S_ID AND i.Supplier_ID = s.S_ID
GROUP BY s.S_ID;
```

2- Winner_Details: This view returns all of the winners information as well as the item they won:

```
CREATE VIEW Winner_Details AS
SELECT F_name, L_name,email,address ,product_name
FROM supplier AS s, item AS i , client AS c
WHERE c.Client_ID = s.S_ID AND i.Supplier_ID = s.S_ID
GROUP BY c.Client_ID;
```

Queries

1. Retrieve the number of bids and the highest bid made for every item:

```
SELECT COUNT(Bid_ID),Highest_bid_price
FROM item AS i,bid AS b,winner_bill AS w
WHERE i.Item_ID=b.I_id AND b.Bill_ID=w.Bill_ID;
```

Output:



6|4550.5

2. Retrieve the name of every supplier, and the number of items placed by him/her:

```
SELECT * FROM Supplier_items;
```

Output:

```
amal|alrajhi|2  
lama|almutairi|2  
khalid|alqahtani|2  
sara|alshammri|2  
shatha|almohsen|2  
raghad|alqahtani|2
```

3. List all printers name and ID that have scanners and still in auction:

```
SELECT Product_name, Printer_ID  
FROM item AS i, printer AS p  
WHERE i.Item_ID=p.Printer_ID AND p.Is_contains_scanner=1 AND  
i.Auction_end_date>=2021-12-13;
```

Output:

```
Epson Expression Photo XP-8600 wireless all-in-one printer|452120
```

4. For each item with more than two bids, retrieve the item description, auction expiration, and the number of bids for that item.

```
SELECT Description, Auction_end_date, COUNT(Bid_ID)  
FROM item AS i, bid AS b  
WHERE i.Item_ID=b.I_id  
GROUP BY Product_name  
HAVING COUNT(Bid_ID)>=2;
```

Output:

```
A trim-to-the-max chassis, a beautiful screen, and a cutting-edge Intel (Tiger Lake).|1984|2
```

5. For each item, retrieve the number of bids, and the average price:

```
SELECT COUNT(Bid_ID), AVG(Start_bid_price)  
FROM item AS i, bid AS b  
WHERE i.Item_ID=b.I_id  
GROUP BY Product_name;
```

Output:

```
1|3000.0
1|5250.0
2|4000.0
1|550.0
1|1100.0
1|400.0
```

6. Find all items name and ID that has no bids yet:

```
SELECT Item_ID,Product_name
FROM item AS i
WHERE NOT EXISTS (SELECT Bid_ID
                  FROM bid AS b
                  WHERE i.Item_ID=b.I_id);
```

Output:

```
452117|Canon IVY mini photo printer
452119|Epson EcoTank ET-2800 all-in-one color pritner
452121|Canon imageCLASS MF445dw wireless laser printer
452123|MSI Modern 14
452125|Dell Inspiron 16 Plus (7610)
452127|Apple iMac 24-inch (2021)
```

7. List all purchasers or suppliers names who recorded a comment with 3 and above as transaction rating:

```
SELECT F_name,L_name
FROM feedback ,client
WHERE C_ID=Client_ID AND Rating>=3;
```

Output:

```
amal|alrajhi
ahmad|alateq
shatha|almohsen
khalid|aldail
```

8. List all suppliers name and ID who are from Riyadh that have more than two placed items:

```
SELECT DISTINCT Client_ID,F_name,L_name
FROM client,item
WHERE Client_ID=Sup_id AND Address LIKE '%Riyadh%';
```

Output:

```
12124|khalid|alqahtani  
12127|raghad|alqahtani
```