**Designing and Exploring a Real Estate Agency Database**

**TASK:** Consider an organization of your choice for which you are assigned to design and develop a database. Note that this is a real-world database and therefore all entities, attributes, and relationships, and assumptions must be reasonable.

The organization chosen for this project is [Keller Williams Realty](https://www.kw.com/) (KWR) which is an international real estate franchise with headquarters in Austin, Texas. It claimed to be the largest real estate franchise in number of agents and sales volume for 2018 and 2019. The database for this project will only be for all Keller Williams branches in Washington, D.C (Capitol Hill/Dupont Circle/Tenleytown). This database will reflect the sale, purchase and the leasing of properties in the aforementioned neighborhoods. In the interest of simplicity, other business transactions of KWR are ignored.

**1) - Define the information content of your database.**

a)-Define a set of entities and appropriate attributes for each entity. Minimum 10 entities.

1. Properties (Property ID, Property Type, Property Square Feet, Year Built, Built\_By, Number of Bedrooms, Number of Bathrooms, Number of Garages, Number of Stories)
2. Agents (Agent ID, Branch\_ID, First\_Name, Last\_Name, Type\_of\_Agent, Total Properties Managed, Email, Phone Number)
3. Agent\_Properties(Agent\_ID, Property\_ID)
4. Branch(Branch­­ \_ID, Name, Address, Area\_Served, Contact\_Point)
5. Payment (Payment\_ID, Sale Price, Agent Commission, Brokerage Commission, HOA fees, Property taxes, Down\_Payment, Loan\_Type, Monthly\_Mortgage, Mortgage\_Insurance, Payment\_mode, Payment\_Status)
6. Transactions (Transaction ID, Property\_ID, Payment\_ID Client\_ID, Seller\_Name, Buyer\_Name, Leaser\_Name, Leasee\_Name)
7. Location (Property\_ID, Street Address, City, Neigborhood, State, Zip Code)
8. Property\_Client(Property\_ID, Client\_ID, Role\_of\_Client)
9. Clients (Client ID, First\_Name, Last\_Name, Street Address, State\_Region, Phone, Email)
10. Sellers (Seller\_ID, Client ID)
11. Buyers (Buyer\_ID, Client ID)
12. Listing (Listing\_ID, Client\_ID, Property\_ID, Agent\_ID, listing\_date, listing\_price, Type of listing (rent or sale), open)
13. Offer(Offer\_ID, Listing\_ID, Property\_ID, ValidFrom, PriceValidUntil, Price, Currency, Accepted)
14. Admin (Admin\_ID, Branch\_ID, Admin\_Name, Contact, Address, Email\_ID)
15. Appoinment (Appointment\_ID, Client\_ID, Agent\_ID appointment\_description, appointment\_date, Appointment\_Time, appointment\_status)
16. Appointment\_Agent(Appointment\_ID, Agent\_ID)
17. Appointment\_Client(Appointment\_ID,Client\_ID)
18. Home\_Tour(Tour\_ID, Buyer\_ID, Client\_ID, Property\_ID, Dateofvisit, Timeofvisit, Agent\_ID)
19. Neighborhood\_Property(neighborhood\_ID, property\_ID)
20. Neighborhood(Neighborhood\_ID, Neighborhood\_Name, Neighborhood\_zipcode,)
21. Neighbourhood feature (Neighborhood\_ID, Noise Level, walkability score, Number of Bus Stops)
22. Environmental\_Risk(Neighborhood\_ID, Flood factor, fire factor)
23. Schools (Neighborhood\_ID, School\_names, Rating, Grades, Type(public or private) )
24. Market\_stats(Neighborhood\_ID, Number\_of\_homes\_for\_sale, Avg\_days\_on\_Mkt\_, Avg\_Home\_Price, Avg\_Home\_Price\_per\_sqft, avg\_sold\_price)
25. Property\_History (Property\_ID, date, event, price)
26. Property\_tax (Property\_ID, year, taxes, total assessments)
27. Showings(Showing\_ID, Seller\_ID, Client\_ID Property\_ID, Dateofshowing, Timeofshowing)

b)-Define a set of relationships that might exist between/among entities and attributes. Such relationships may include one-to-one, one-to-many and many-to-many associations.

One-to-one:

* Property and Transaction
* Transaction and Payment
* Property and Buyer
* Property and Seller
* Property and Location
* Neighborhood and neighborhood\_features
* Neighborhood and environmental\_risks
* Client and buyer
* Client and seller

One-to-many:

* Property and Listings
* Listing and Offer
* Client and Listing
* Property and Property\_Tax
* Property and Property\_History
* Neighborhood and Property
* Neighbourhood Schools
* Branch and Agent
* Branch and admin
* Appointment and Agent
* Appointment and Client
* Seller and Showings
* Buyer and Home Tours

Many-to-many:

* Property and Agent
* Appointment and clients
* Appointment and Agent

c)-Define a set of constraints that may be imposed on data.

* A client can be a seller, a buyer, or both(for different properties).
* A property can have multiple listings (at different times)­
* A client can have multiple listings
* A property can have multiple Agents handling it.
* An Agent can manage multiple properties
* An agent can be a buyers agent, a sellers agent or a dual agent
* A property can have one buyer and one seller
* A listing can have many offers
* ­­Appointments can only be made between agents and clients
* An appointment can be between multiple agents (for example, if multiple agents are handling one client or listing) and multiple clients (for example if both the seller are buyer are the clients of the agency)
* A client can have multiple appointments and an appointment can be between multiple clients
* ‘Event’ in Property History can take one of the following values: sold/listed/relisted/price changed)
* A Neighborhood can have multiple properties
* Home Tours can only be conducted by clients who are buyers (Sellers do not need to go on home tours)
* An Agent must be present at the time of the home tour, i.e Agent\_ID cannot be null
* ‘Offer’ includes offers made by and received by our clients.
* ‘Showings’ can only be conducted by clients who are sellers (buyers do not need to do showings)
* ‘Transaction’ can have Buyer\_Name, Seller\_Name, Leaser\_Name, Leasee\_Name who are not clients of KWR but at leaset one of the above must be the client and must match the Client\_ID
* In ‘Transaction’, Leaser Name and Leasee Name can be Null if the Transaction is between a Buyer and Seller.
* In ‘Transaction’, Buyer Name and Seller Name can be Null if the transaction is between Leasee and Leaser.

**2) - Define an E-R Diagram for your database design.**

**Diagram

Description automatically generated  
3) - Define a relational schema for your database design.**

Make sure that you have both one-to-many and many-to-many associations.  
a)-Define one or more realistic key(s) for every relation scheme. Use both simple and composite keys.

All keys are indicated in Answer 1.a where the Primary Keys are underlined for every relation.

b)-Define a realistic set of Functional / Multi-Valued Dependencies (when appropriate) for every relation scheme.

1. Property ID 🡪 Property Type, Property Square Feet, Year Built, Built\_By, Number of Bedrooms, Number of Bathrooms, Number of Garages, Number of Stories
2. Agent ID 🡪 Branch\_ID, First\_Name, Last\_Name, Type\_of\_Agent, Total Properties Managed, Email, Phone Number
3. Branch­­ \_ID ­­🡪 Name, Address, Area\_Served, Contact\_Point)
4. Transaction ID🡪Property\_ID, Payment\_ID, Client\_ID, Buyer\_Name, Seller\_Name, Leaser\_name, Leasee\_name
5. Payment\_ID 🡪Sale Price, Agent Commission, Brokerage Commission, HOA fees, Property taxes, Down\_Payment, Loan\_Type, Monthly\_Mortgage, Mortgage\_Insurance, Payment\_mode, Payment\_status
6. Property\_ID 🡪Street Address, City, Neighborhood, State, Zip Code
7. Client ID 🡪 First\_Name, Last\_Name, Street Address, State\_Region, Phone, Email
8. Property\_ID, Client\_ID 🡪Role\_of\_Client
9. Listing\_ID 🡪 Client\_ID, Property\_ID, Agent\_ID, listing\_date, listing\_price, Type of listing (rent or sale), open
10. Offer\_ID 🡪Listing\_ID, Property\_ID, ValidFrom, PriceValidUntil, Price, Currency, Accepted
11. Admin\_ID 🡪Branch\_ID, Admin\_Name, Contact, Address, Email\_ID
12. Appointment\_ID🡪client\_ID, Agent\_ID appointment\_description, appointment\_date, Appointment\_Time, Appointment\_status)
13. Tour\_id🡪 Buyer\_ID, Client\_ID, Property\_ID, Dateofvisit, Timeofvisit, Agent\_ID
14. Neighborhood\_ID 🡪Neighborhood\_Name, Neighborhood\_zipcode
15. Neighborhood\_ID 🡪Noise Level, walkability score, Number of Bus stops
16. Neighborhood\_ID🡪Flood factor, fire factor
17. Neighborhood\_ID, School\_name 🡪Rating, Grades, Type(public or private)
18. Neighborhood\_ID🡪Number\_of\_homes\_for\_sale, Avg\_days\_on\_Mkt\_, Avg\_Home\_Price, Avg\_Home\_Price\_per\_sqft, avg\_sold\_price
19. Property\_ID, date, event 🡪price
20. Property\_ID, year 🡪taxes, total assessments
21. Showing\_ID🡪Seller\_ID, Client\_ID, Property\_ID, Dateofshowing, Timeofshowing

C-Check whether your relational schema is in 2NF, 3NF, BCNF, 4NF.

1. Property ID 🡪 Property Type, Property Square Feet, Year Built, Built\_By, Number of Bedrooms, Number of Bathrooms, Number of Garages, Number of Stories
   1. It is in 2NF because it is in 1NF (there is atomicity of value in every attribute) and there are no partial dependencies.
   2. It is in 3NF because it is in 2NF and there are no non-key attributes that are transitively dependent on the primary key.
   3. It is BCNF because there are no non-trivial functional dependencies of attributes on anything other the primary key
   4. It is 4NF because there is no multi-vlued dependency.
2. Agent ID 🡪 Branch\_ID, First\_Name, Last\_Name, Type\_of\_Agent, Total Properties Managed, Email, Phone Number
   1. It is in 2NF because it is in 1NF (there is atomicity of value in every attribute) and there are no partial dependencies.
   2. It is in 3NF because it is in 2NF and there are no non-key attributes that are transitively dependent on the primary key.
   3. It is BCNF because there are no non-trivial functional dependencies of attributes on anything other the primary key
   4. It is 4NF because there is no multi-vlued dependency.
3. Branch­­ \_ID ­­🡪 Name, Address, Area\_Served, Contact\_Point
   1. It is in 2NF because it is in 1NF (there is atomicity of value in every attribute) and there are no partial dependencies.
   2. It is in 3NF because it is in 2NF and there are no non-key attributes that are transitively dependent on the primary key.
   3. It is BCNF because there are no non-trivial functional dependencies of attributes on anything other the primary key
   4. It is 4NF because there is no multi-vlued dependency
4. Payment\_ID 🡪Sale Price, Agent Commission, Brokerage Commission, HOA fees, Property taxes, Down\_Payment, Loan\_Type, Monthly\_Mortgage, Mortgage\_Insurance, Payment\_mode, Payment\_status
   1. It is in 2NF because it is in 1NF (there is atomicity of value in every attribute) and there are no partial dependencies.
   2. It is in 3NF because it is in 2NF and there are no non-key attributes that are transitively dependent on the primary key.
   3. It is BCNF because there are no non-trivial functional dependencies of attributes on anything other the primary key
   4. It is 4NF because there is no multi-vlued dependency
5. Transaction ID🡪Property\_ID, Payment\_ID, Client\_ID, Buyer\_name, seller\_name, Leaser\_name, Leasee\_name
6. Property\_ID 🡪Street Address, City, Neighborhood, State, Zip Code, Latitude, Longitude
7. Client ID 🡪 Client Name, Address, Phone, Email
8. Listing\_ID 🡪Property\_ID, agent, listing\_date, listing\_price, Type of listing (rent or sale), open
9. Offer\_id 🡪Listing\_ID, Property\_ID, ValidFrom, PriceValidUntil, Price, Currency, Accepted
10. Admin\_ID 🡪Branch\_ID, Admin\_name, contact, address, email)
11. appointment\_id🡪client\_ID, Agent\_ID, appointment\_description, appointment\_date, appointment\_time, appointment\_status
12. Tour\_id🡪Buyer\_ID, Property\_ID, Dateofvisit, Timeofvisit, Agent\_ID
13. Neighborhood\_ID 🡪Neighborhood\_Name, Neighborhood\_zipcode
14. Neighborhood\_ID 🡪Noise Level, walkability score, Number of Bus stops
15. Neighborhood\_ID🡪Flood factor, fire factor
16. Neighborhood\_ID, School\_name 🡪Rating, Grades, Type(public or private)
17. Neighborhood\_ID🡪Number\_of\_homes\_for\_sale, Avg\_days\_on\_Mkt\_, Avg\_Home\_Price, Avg\_Home\_Price\_per\_sqft, avg\_sold\_price
18. Property\_ID, date, event 🡪price
19. Property\_ID, year 🡪taxes, total assessments
20. Showing\_ID🡪seller\_ID, client\_ID, Property\_ID, Dateofshowing, Timeofshowing

d)-Put your relational schema in the highest normal form that is possible.  
Note that, every relation scheme should be in a specific normal form in order to have the relational schema in that normal form.

NOTE: Please provide a detailed explanation for every question when appropriate.

All functional dependencies above (from 1 to 20) are in the highest normal form i.e they satisfy the requirements mentioned aboved to be in 1NF, 2NF, 3NF, BCNF and 4NF. The following conditions are true for all the FDs mentioned above but have not been repeated in the interest of space:

1. It is in 2NF because it is in 1NF (there is atomicity of value in every attribute) and there are no partial dependencies.
2. It is in 3NF because it is in 2NF and there are no non-key attributes that are transitively dependent on the primary key.
3. It is BCNF because there are no non-trivial functional dependencies of attributes on anything other the primary key
4. It is 4NF because there is no multi-vlued dependency

**4) Implementation: Create your database using MySQL, or... to Perform the following operations.**

**Create 4 tables from your database project that are connected/linked together and insert few dummy records into these tables. Then use these tables to answer the following queries.**

**Creating Database**

create database if not exists RealEstate;

use RealEstate;

**Creating and Populating the table Property**

create table if not exists Property

(Property\_ID double not null primary key,

Property\_Type varchar(40),

Property\_SQFT double,

Year\_Built YEAR,

Built\_By varchar(40),

Number\_of\_Bedrooms double,

Number\_of\_Bathrooms double,

Number\_of\_Garages double,

Number\_of\_Stories double);

insert into Property values('101','Single Family','2352',1939,'Seller','4','3','1','2');

insert into Property values('102','Apartment','700',2021,'Seller','1','1','0','1');

insert into Property values('103','Townhouse','3200',1975,'Third Party','3','3','1','2');

insert into Property values('104','Single Family','4500',1989,'Seller','6','3','2','2');

insert into Property values('105','Townhouse','1900',2001,'Third Party','2','2','1','3');

insert into Property values('106','Single Family','4885',1979,'Seller','5','4','2','3');

insert into Property values('107','Apartment','1200',2007,'Third Party','2','2','0','1');

insert into Property values('108','Townhouse','2330',2009,'Third Party','4','4','1','2');

insert into Property values('109','Single Family','8320',1947,'Seller','8','9','4','3');

insert into Property values('110','Single Family','1352',1959,'Third Party','4','3','1','2');

insert into Property values('111','Townhouse','2100',1990,'Third Party','4','3','1','3');

insert into Property values('112','Single Family','4352',1992,'Third Party','7','4','1','2');

insert into Property values('113','Single Family','1750',2022,'Seller','4','3','1','2');

insert into Property values('114','Townhouse','2700',2000,'Third Party','4','3','1','2');

insert into Property values('115','Apartment','475',1932,'Seller','0','1','0','1');

**Creating and Populating the table Location**

create table if not exists Location

(Property\_ID double not null primary key,

Street\_Address varchar(50),

Neighborhood varchar(50),

City varchar(50),

State varchar(50),

Zip\_Code varchar(10));

insert into Location values('101','7708 Georgia Ave NW','Tanleytown','Washington DC','Washington DC','20024');

insert into Location values('102','1471 Bangor Ste SE','Du Pont Circle','Washington DC','Washington DC','20002');

insert into Location values('103','1811 Connecticut Ave NW','Capitol Hill','Washington DC','Washington DC','20022');

insert into Location values('104','1365 Kennedy St NW','Tanleytown','Washington DC','Washington DC','20011');

insert into Location values('105','5315 Connecticut Ave NW','Capitol Hill','Washington DC','Washington DC','20023');

insert into Location values('106','1343 Otis PI NW','Du Pont Circle','Washington DC','Washington DC','20011');

insert into Location values('107','3108 Westover Dr SE','Tanleytown','Washington DC','Washington DC','20020');

insert into Location values('108','922 Connecticut Ave NW','Capitol Hill','Washington DC','Washington DC','20024');

insert into Location values('109','4600 Connecticut Ave NW','Capitol Hill','Washington DC','Washington DC','20001');

insert into Location values('110','4308 Connecticut Ave NW','Tanleytown','Washington DC','Washington DC','20033');

insert into Location values('111','4400 Texas Ave NW','Du Pont Circle','Washington DC','Washington DC','20021');

insert into Location values('112','3111 Cypress Dr SE','Du Pont Circle','Washington DC','Washington DC','20007');

insert into Location values('113','957 Cameron PI NW','Tanleytown','Washington DC','Washington DC','20008');

insert into Location values('114','2789 Connecticut Ave NW','Capitol Hill','Washington DC','Washington DC','20016');

insert into Location values('115','1811 M St SE','Tanleytown','Washington DC','Washington DC','20002');

**Creating and Populating the table Agent**

create table if not exists Agent

(Agent\_ID varchar(10) not null primary key,

Branch\_ID double,

First\_Name varchar(10),

Last\_Name varchar(10),

Type\_of\_Agent varchar(20),

Total\_Properties\_managed double,

Email varchar(30) UNIQUE,

Phone\_Number double UNIQUE);

insert into Agent values('1001','2001','Sarah','Adams','Buyers Agent','39','sa@kwr.com','9374446669');

insert into Agent values('1002','2002','Jim','Hopper','Sellers Agent','29','jh@kwr.com','1235556669');

insert into Agent values('1003','2003','Nancy','Wheeler','Buyers Agent','40','nw@kwr.com','9987776669');

insert into Agent values('1004','2003','Mike','Wheeler','Sellers Agent','83','mw@kwr.com','1239996669');

insert into Agent values('1005','2002','Ali','Meer','Dual Agent','22','am@kwr.com','3334446669');

insert into Agent values('1006','2001','Will','Byers','Dual Agent','12','wb@kwr.com','2984446669');

insert into Agent values('1007','2003','Jane','johnson','Dual Agent','62','jj@kwr.com','1239446669');

insert into Agent values('1008','2002','Dustin','Bishop','Sellers Agent','9','db@kwr.com','9834446669');

insert into Agent values('1009','2002','Nick','Miller','Dual Agent','8','nm@kwr.com','128896669');

insert into Agent values('1010','2001','Winston','Schmidt','Buyers Agent','3','ws@kwr.com','1094446669');

**Creating and Populating the table Client**

create table if not exists Client

(Client\_ID double not null primary key,

First\_Name varchar(20),

Last\_Name varchar(20),

Street\_Address varchar(60),

State\_Region varchar(3),

Phone\_Number double UNIQUE,

Email varchar(30) UNIQUE);

insert into Client values('301','Billy','Hargrove','2323 Dulles Station Ave, Herndon', 'VA','1094678669','bh@kwr.com');

insert into Client values('302','Ian','Thomas','4343 Baron Rolfe Ave, Ashburn', 'VA','1094448649','it@kwr.com');

insert into Client values('303','Steve','Harrington','7865 Autumn Cameron Dr, Woodbridge', 'VA','3575446669','sh@kwr.com');

insert into Client values('304','Max','Mayfield','2234 Fuller Back BLVD, Springfield', 'VA','7865446669','mm@kwr.com');

insert into Client values('305','Robin','Buckley','9938 Fuller Baron Dr, Oakton', 'VA','7856446669','rb@kwr.com');

insert into Client values('306','Lucas','Sinclair','1657 Rolfe Station Ave, Charlestown', 'WV','7642146669','ad@kwr.com');

insert into Client values('307','Alison','DiLaurentis','7379 Stoney Fuller Dr, Bethesda', 'PA','1094345679','ls@kwr.com');

insert into Client values('308','Aria','Hastings','7435 Brook Back BLVD, Rockville', 'LA','1094765439','23dvv@kwr.com');

insert into Client values('309','Ezra','Fitz','5707 Vaughn Amonate Dr, Alexandria', 'CA','34579086669','dscsc@kwr.com');

insert into Client values('310','Hanna','Marin','6435 Venture Dunn BLVD, Frederick', 'MD','1053456769','sdcsd@kwr.com');

insert into Client values('311','Mona','Vanderwal','7799 Fuller Station Ave, Reston', 'CA','1094786544','dscsd@kwr.com');

insert into Client values('312','Toby','Cavanaugh','4367 Dunn Back Dr, Rockville', 'AR','4343446669','gfdfgf@kwr.com');

insert into Client values('313','Emily','Fields','8986 Gerald Fuller Dr, Arlingston', 'VA','1434346669','fdf@kwr.com');

insert into Client values('314','Jenna','Marshall','5689 Radio Rolfe BLVD, Herndon', 'VA','10944322669','dfdggd@kwr.com');

insert into Client values('315','Caleb','Rivers','4578 Fuller Back Dr, Silver Spring', 'CT','45678446669','dfgdf@kwr.com');

insert into Client values('316','Wren','Kingston','8966 Venture Baron Ave, Alexandria', 'DC','153346669','ksdhksd@kwr.com');

insert into Client values('317','Lucas','Gottesman','7654 Dunn Fuller Dr, Silver Spring','AZ','1445546669','ksdhfkjdf@kwr.com');

insert into Client values('318','Paige','McCullers','4856 Rolfe Venture Ave, Bethesda', 'MD','1093498469','skdhfksd@kwr.com');

insert into Client values('319','Noel','Kahn','6665 Dulles Baron Dr, Alexandria', 'VA','10932465469','ksdhf@kwr.com');

insert into Client values('320','Gabriel','Hargrove','6788 Fuller Venture Ave, Rockville', 'MD','4577446669','ksdjkd@kwr.com');

**Creating and Populating the table Sellers**

create table if not exists Sellers

(Client\_ID double not null,

Seller\_ID varchar(20) not null,

primary key(Client\_ID, Seller\_ID));

insert into Sellers values('301','S-301');

insert into Sellers values('303','S-303');

insert into Sellers values('305','S-305');

insert into Sellers values('307','S-307');

insert into Sellers values('309','S-309');

insert into Sellers values('311','S-311');

insert into Sellers values('313','S-313');

insert into Sellers values('315','S-315');

insert into Sellers values('317','S-317');

insert into Sellers values('318','S-318');

insert into Sellers values('319','S-319');

insert into Sellers values('320','S-320');

**Creating and Populating the table Buyers**

create table if not exists Buyers

(Client\_ID double not null,

Buyer\_ID varchar(20) not null,

primary key(Client\_ID, Buyer\_ID));

insert into Buyers values('302','B-302');

insert into Buyers values('304','B-304');

insert into Buyers values('306','B-306');

insert into Buyers values('308','B-308');

insert into Buyers values('310','B-310');

insert into Buyers values('312','B-312');

insert into Buyers values('314','B-314');

insert into Buyers values('316','B-316');

**Creating and Populating the table Agent\_Properties**

create table if not exists Agent\_Properties

(Agent\_ID double not null,

Property\_ID double not null,

primary key(Agent\_ID, Property\_ID));

insert into Agent\_Properties values('1001','112');

insert into Agent\_Properties values('1002','111');

insert into Agent\_Properties values('1002','105');

insert into Agent\_Properties values('1003','113');

insert into Agent\_Properties values('1004','110');

insert into Agent\_Properties values('1004','115');

insert into Agent\_Properties values('1004','106');

insert into Agent\_Properties values('1005','101');

insert into Agent\_Properties values('1005','104');

insert into Agent\_Properties values('1005','102');

insert into Agent\_Properties values('1006','102');

insert into Agent\_Properties values('1006','115');

insert into Agent\_Properties values('1007','101');

insert into Agent\_Properties values('1007','115');

insert into Agent\_Properties values('1008','109');

insert into Agent\_Properties values('1008','107');

insert into Agent\_Properties values('1009','103');

insert into Agent\_Properties values('1009','104');

insert into Agent\_Properties values('1010','114');

**Creating and Populating the table Property\_Client**

create table if not exists Property\_Client

(Client\_ID double not null,

Property\_ID double not null,

Role\_of\_Client varchar(30) not null,

primary key(Client\_ID, Property\_ID));

insert into Property\_Client values('301','101','Seller');

insert into Property\_Client values('302','101', 'Buyer');

insert into Property\_Client values('303','102', 'Seller');

insert into Property\_Client values('304','102', 'Buyer');

insert into Property\_Client values('305','103', 'Seller');

insert into Property\_Client values('306','103', 'Buyer');

insert into Property\_Client values('307','104', 'Seller');

insert into Property\_Client values('308','104', 'Buyer');

insert into Property\_Client values('309','105', 'Seller');

insert into Property\_Client values('310','112', 'Buyer');

insert into Property\_Client values('311','106', 'Seller');

insert into Property\_Client values('312','113', 'Buyer');

insert into Property\_Client values('313','107', 'Seller');

insert into Property\_Client values('314','114', 'Buyer');

insert into Property\_Client values('315','108', 'Seller');

insert into Property\_Client values('316','115', 'Buyer');

insert into Property\_Client values('317','109', 'Seller');

insert into Property\_Client values('318','115', 'Seller');

insert into Property\_Client values('319','110', 'Seller');

insert into Property\_Client values('320','111', 'Seller');

**A)** You are required to execute SQL queries that include the following operations. For each query, provide the SQL statements along with the output. For each of the following, try different SQL statements (i.e., using one relation, more than one relations,...).

**- Create tables: (just for creating 4 tables, not all)**

**- Select:**

Select involving one/more conditions in Where Clause

**Query: Find the names of all clients who sold property located in Tanleytown, had greater than 2 bedrooms and had greater than 2 bathrooms.**

select First\_Name, Last\_Name

from Client

where Client\_ID in

(select Client\_ID

from Property\_Client

where Role\_of\_Client='Seller'

and Property\_ID in

(select Property\_ID

from Property

where Number\_of\_Bedrooms>2 and

Number\_of\_Bathrooms>2 and

Property\_ID in

(Select Property\_ID

from Location

where Neighborhood="Tanleytown")));

# First\_Name Last\_Name

Billy Hargrove

Alison DiLaurentis

Noel Kahn

Select with aggregate functions (i.e., SUM,MIN,MAX,AVG,COUNT)

**Query: Find the names of all agents who sold properties that have more bedrooms than the average number of bedrooms in a property**

select avg(Number\_of\_Bedrooms)

from Property;

# avg(Number\_of\_Bedrooms)

3.866

select First\_Name, Last\_Name

from Agent

where Agent\_ID in

(select Agent\_ID

from Agent\_Properties

where Property\_ID in

(select Property\_ID

from Property

where Number\_of\_Bedrooms>3.86));

# First\_Name Last\_Name

Sarah Adams

Jim Hopper

Nancy Wheeler

Mike Wheeler

Ali Meer

Jane johnson

Dustin Bishop

Nick Miller

Winston Schmidt

**Query: Find the name and address of the client who purchased the property with the maximum SQFT and the name and address of the client who sold the property with the maximum SQFT.**

select max(Property\_SQFT)

from Property

where Property\_ID in

(Select Property\_ID

from Property\_Client

where Role\_of\_Client="Seller");

# max(Property\_SQFT)

8320

select First\_Name, Last\_Name, Street\_Address

from Client

where Client\_ID in

(select Client\_ID

from Property\_Client

where Role\_of\_Client="Seller"

and Property\_ID in

(select Property\_ID

from Property

where Property\_SQFT=8320));

# First\_Name Last\_Name Street\_Address

Lucas Gottesman 7654 Dunn Fuller Dr, Silver Spring

select max(Property\_SQFT)

from Property

where Property\_ID in

(Select Property\_ID

from Property\_Client

where Role\_of\_Client="Buyer");

# max(Property\_SQFT)

4500

select First\_Name, Last\_Name, Street\_Address

from Client

where Client\_ID in

(select Client\_ID

from Property\_Client

where Role\_of\_Client="Buyer"

and Property\_ID in

(select Property\_ID

from Property

where Property\_SQFT=4500));

# First\_Name Last\_Name Street\_Address

Aria Hastings 7435 Brook Back BLVD, Rockville

Nested Select

**Query: List the properties and their neighborhood managed by the agent who has managed the most properties**

select max(Total\_Properties\_managed)

from Agent;

# max(Total\_Properties\_managed)

83

Select Property\_ID, Neighborhood

from Location

where Property\_ID in

(select Property\_ID

from Agent\_Properties

where Agent\_ID in

(select Agent\_ID

from Agent

where Total\_Properties\_managed=83));

# Property\_ID Neighborhood

106 Du Pont Circle

110 Tanleytown

115 Tanleytown

By, Order By clause

**Query:List down the agent names by the SQFT of the property that they managed in descending order**

select First\_Name, Last\_Name, Property\_SQFT

from Agent, Property, Agent\_Properties

where Agent.Agent\_ID=Agent\_Properties.Agent\_ID and

Agent\_Properties.Property\_ID=Property.Property\_ID

ORDER by Property\_SQFT desc;

# First\_Name Last\_Name Property\_SQFT

Dustin Bishop 8320

Mike Wheeler 4885

Ali Meer 4500

Nick Miller 4500

Sarah Adams 4352

Nick Miller 3200

Winston Schmidt 2700

Ali Meer 2352

Jane johnson 2352

Jim Hopper 2100

Jim Hopper 1900

Nancy Wheeler 1750

Mike Wheeler 1352

Dustin Bishop 1200

Ali Meer 700

Will Byers 700

Mike Wheeler 475

Will Byers 475

Jane johnson 475

select with Having, Group

**Query:Find all the property IDs and address of all the properties that were sold by and bought by clients of KWR**

select Property\_ID, Count(Property\_ID)

FROM Property\_Client

group by Property\_ID

Having Count(Property\_ID)>1;

# Property\_ID Count(Property\_ID)

101 2

102 2

103 2

104 2

115 2  
select involving the Union operation

**Query: Find the IDs and names of all agents who managed property 101 along with the IDs and names of the buyer and seller of that property.**

select Agent\_ID as ID,First\_Name, Last\_Name

from Agent

where Agent\_ID in

(Select Agent\_ID

from Agent\_Properties

where Property\_ID='101')

union

select Client\_ID, First\_Name, Last\_Name

from Client

where Client\_ID in

(Select Client\_ID

from Property\_Client

where Property\_ID='101');

# ID First\_Name Last\_Name

1005 Ali Meer

1007 Jane johnson

301 Billy Hargrove

302 Ian Thomas

**- Insert:**

insert one tuple into a table (for 2 tables, just add 3 records for each table)

**Query:** **insert a property with ID 116 that is a 10,250 SQFT single family home built in 1929, has 10 bedrooms, 12 bathrooms, 5 garages and 2 story.**

insert into Property values('116','Single family','10250',1929, "Third Party",'10','12','5','2');

**Property Before Query:**

# Property\_ID Property\_Type Property\_SQFT Year\_Built Built\_By Number\_of\_Bedrooms Number\_of\_Bathrooms Number\_of\_Garages Number\_of\_Stories

101 Single Family 2352 1939 Seller 4 3 1 2

102 Apartment 700 2021 Seller 1 1 0 1

103 Townhouse 3200 1975 Third Party 3 3 1 2

104 Single Family 4500 1989 Seller 6 3 2 2

105 Townhouse 1900 2001 Third Party 2 2 1 3

106 Single Family 4885 1979 Seller 5 4 2 3

107 Apartment 1200 2007 Third Party 2 2 0 1

108 Townhouse 2330 2009 Third Party 4 4 1 2

109 Single Family 8320 1947 Seller 8 9 4 3

110 Single Family 1352 1959 Third Party 4 3 1 2

111 Townhouse 2100 1990 Third Party 4 3 1 3

112 Single Family 4352 1992 Third Party 7 4 1 2

113 Single Family 1750 2022 Seller 4 3 1 2

114 Townhouse 2700 2000 Third Party 4 3 1 2

115 Apartment 475 1932 Seller 0 1 0 1

**Property After Query:**

# Property\_ID Property\_Type Property\_SQFT Year\_Built Built\_By Number\_of\_Bedrooms Number\_of\_Bathrooms Number\_of\_Garages Number\_of\_Stories

101 Single Family 2352 1939 Seller 4 3 1 2

102 Apartment 700 2021 Seller 1 1 0 1

103 Townhouse 3200 1975 Third Party 3 3 1 2

104 Single Family 4500 1989 Seller 6 3 2 2

105 Townhouse 1900 2001 Third Party 2 2 1 3

106 Single Family 4885 1979 Seller 5 4 2 3

107 Apartment 1200 2007 Third Party 2 2 0 1

108 Townhouse 2330 2009 Third Party 4 4 1 2

109 Single Family 8320 1947 Seller 8 9 4 3

110 Single Family 1352 1959 Third Party 4 3 1 2

111 Townhouse 2100 1990 Third Party 4 3 1 3

112 Single Family 4352 1992 Third Party 7 4 1 2

113 Single Family 1750 2022 Seller 4 3 1 2

114 Townhouse 2700 2000 Third Party 4 3 1 2

115 Apartment 475 1932 Seller 0 1 0 1

**116 Single family 10250 1929 Third Party 10 12 5 2**

insert into Location values('116','7712 Georgia ct NW','Tanleytown','Washington DC','Washington DC','20214');

**Location Before Query:**

# Property\_ID Street\_Address Neighborhood City State Zip\_Code

101 7708 Georgia Ave NW Tanleytown Washington DC Washington DC 20024

102 1471 Bangor Ste SE Du Pont Circle Washington DC Washington DC 20002

103 1811 Connecticut Ave NW Capitol Hill Washington DC Washington DC 20022

104 1365 Kennedy St NW Tanleytown Washington DC Washington DC 20011

105 5315 Connecticut Ave NW Capitol Hill Washington DC Washington DC 20023

106 1343 Otis PI NW Du Pont Circle Washington DC Washington DC 20011

107 3108 Westover Dr SE Tanleytown Washington DC Washington DC 20020

108 922 Connecticut Ave NW Capitol Hill Washington DC Washington DC 20024

109 4600 Connecticut Ave NW Capitol Hill Washington DC Washington DC 20001

110 4308 Connecticut Ave NW Tanleytown Washington DC Washington DC 20033

111 4400 Texas Ave NW Du Pont Circle Washington DC Washington DC 20021

112 3111 Cypress Dr SE Du Pont Circle Washington DC Washington DC 20007

113 957 Cameron PI NW Tanleytown Washington DC Washington DC 20008

114 2789 Connecticut Ave NW Capitol Hill Washington DC Washington DC 20016

115 1811 M St SE Tanleytown Washington DC Washington DC 20002

**Property After Query:**

# Property\_ID Street\_Address Neighborhood City State Zip\_Code

101 7708 Georgia Ave NW Tanleytown Washington DC Washington DC 20024

102 1471 Bangor Ste SE Du Pont Circle Washington DC Washington DC 20002

103 1811 Connecticut Ave NW Capitol Hill Washington DC Washington DC 20022

104 1365 Kennedy St NW Tanleytown Washington DC Washington DC 20011

105 5315 Connecticut Ave NW Capitol Hill Washington DC Washington DC 20023

106 1343 Otis PI NW Du Pont Circle Washington DC Washington DC 20011

107 3108 Westover Dr SE Tanleytown Washington DC Washington DC 20020

108 922 Connecticut Ave NW Capitol Hill Washington DC Washington DC 20024

109 4600 Connecticut Ave NW Capitol Hill Washington DC Washington DC 20001

110 4308 Connecticut Ave NW Tanleytown Washington DC Washington DC 20033

111 4400 Texas Ave NW Du Pont Circle Washington DC Washington DC 20021

112 3111 Cypress Dr SE Du Pont Circle Washington DC Washington DC 20007

113 957 Cameron PI NW Tanleytown Washington DC Washington DC 20008

114 2789 Connecticut Ave NW Capitol Hill Washington DC Washington DC 20016

115 1811 M St SE Tanleytown Washington DC Washington DC 20002

**116 7712 Georgia ct NW Tanleytown Washington DC Washington DC 20214**

insert a set of tuples (by using another select statement)

**Query: Insert agents who managed Property 116 into table 'Agent' and 'Agent\_Properties'**

insert into Agent values('1011','2002','Dustin','Crew','Sellers Agent','27','11db@kwr.com','98347799669');

insert into Agent values('1012','2002','JC','Tag','Dual Agent','48','12wnm@kwr.com','128899000');

insert into Agent values('1013','2001','Macy','Wills','Buyers Agent','13','wwws@kwr.com','10944489789');

**Agent Before Query:**

# Agent\_ID Branch\_ID First\_Name Last\_Name Type\_of\_Agent Total\_Properties\_managed Email Phone\_Number

1001 2001 Sarah Adams Buyers Agent 39 sa@kwr.com 9374446669

1002 2002 Jim Hopper Sellers Agent 29 jh@kwr.com 1235556669

1003 2003 Nancy Wheeler Buyers Agent 40 nw@kwr.com 9987776669

1004 2003 Mike Wheeler Sellers Agent 83 mw@kwr.com 1239996669

1005 2002 Ali Meer Dual Agent 22 am@kwr.com 3334446669

1006 2001 Will Byers Dual Agent 12 wb@kwr.com 2984446669

1007 2003 Jane johnson Dual Agent 62 jj@kwr.com 1239446669

1008 2002 Dustin Bishop Sellers Agent 9 db@kwr.com 9834446669

1009 2002 Nick Miller Dual Agent 8 nm@kwr.com 128896669

1010 2001 Winston Schmidt Buyers Agent 3 ws@kwr.com 1094446669

**Agent After Query:**

# Agent\_ID Branch\_ID First\_Name Last\_Name Type\_of\_Agent Total\_Properties\_managed Email Phone\_Number

1001 2001 Sarah Adams Buyers Agent 39 sa@kwr.com 9374446669

1002 2002 Jim Hopper Sellers Agent 29 jh@kwr.com 1235556669

1003 2003 Nancy Wheeler Buyers Agent 40 nw@kwr.com 9987776669

1004 2003 Mike Wheeler Sellers Agent 83 mw@kwr.com 1239996669

1005 2002 Ali Meer Dual Agent 22 am@kwr.com 3334446669

1006 2001 Will Byers Dual Agent 12 wb@kwr.com 2984446669

1007 2003 Jane johnson Dual Agent 62 jj@kwr.com 1239446669

1008 2002 Dustin Bishop Sellers Agent 9 db@kwr.com 9834446669

1009 2002 Nick Miller Dual Agent 8 nm@kwr.com 128896669

1010 2001 Winston Schmidt Buyers Agent 3 ws@kwr.com 1094446669

**1011 2002 Dustin Crew Sellers Agent 27 11db@kwr.com 98347799669**

**1012 2002 JC Tag Dual Agent 48 12wnm@kwr.com 128899000**

**1013 2001 Macy Wills Buyers Agent 13 wwws@kwr.com 10944489789**

insert into Agent\_Properties values('1011','116');

insert into Agent\_Properties values('1012','116');

insert into Agent\_Properties values('1013','116');

**Agent\_Properties Before Query:**

'1001','112'

'1002','105'

'1002','111'

'1003','113'

'1004','106'

'1004','110'

'1004','115'

'1005','101'

'1005','102'

'1005','104'

'1006','102'

'1006','115'

'1007','101'

'1007','115'

'1008','107'

'1008','109'

'1009','103'

'1009','104'

'1010','114**’**

**Agent\_Properties After Query:**

'1001','112'

'1002','105'

'1002','111'

'1003','113'

'1004','106'

'1004','110'

'1004','115'

'1005','101'

'1005','102'

'1005','104'

'1006','102'

'1006','115'

'1007','101'

'1007','115'

'1008','107'

'1008','109'

'1009','103'

'1009','104'

'1010','114'

**'1011','116'**

**'1012','116'**

**'1013','116'**

insert involving two tables

**Query: Create a table which has the IDs, names and properties managed by all the Dual Agents of KWR (Dual Agents are those who represent both the Seller and buyer of the property)**

Create table DualAgents as

select Agent.Agent\_ID, First\_Name, Last\_Name, Property\_ID

from Agent, Agent\_Properties

where Agent.Agent\_ID=Agent\_Properties.Agent\_ID

and

Type\_of\_Agent="Dual Agent";

Select \* from DualAgents;

# Agent\_ID First\_Name Last\_Name Property\_ID

1005 Ali Meer 101

1005 Ali Meer 102

1005 Ali Meer 104

1006 Will Byers 102

1006 Will Byers 115

1007 Jane johnson 101

1007 Jane johnson 115

1009 Nick Miller 103

1009 Nick Miller 104

**Query:** **Create a table which shows the years in which the oldest property, in each of the three neighborhood, was built, in ascending order.**

create table Oldest\_Properties as

select min(Year\_Built), Neighborhood

from Property, Location

where Property.Property\_ID=Location.Property\_ID

group by Location.Neighborhood

order by min(Year\_Built);

select \* from Oldest\_Properties;

# min(Year\_Built) Neighborhood

1932 Tanleytown

1947 Capitol Hill

1979 Du Pont Circle

**- Delete:**

delete one tuple or a set of tuples: from one table, from multiple tables.

**Query: Delete the records of the studio apartments from Property, i.e the properties with 0 bedrooms**

delete from Property

where Number\_of\_Bedrooms="0";

select Property\_ID, Number\_of\_Bedrooms

from Property;

**Before Query:**

# Property\_ID Number\_of\_Bedrooms

101 4

102 1

103 3

104 6

105 2

106 5

107 2

108 4

109 8

110 4

111 4

112 7

113 4

114 4

**115 0**

116 10

**After Query:**

# Property\_ID Number\_of\_Bedrooms

101 4

102 1

103 3

104 6

105 2

106 5

107 2

108 4

109 8

110 4

111 4

112 7

113 4

114 4

116 10

**Query: Delete the property that does not have a buyer or a seller associated with it**

delete from Property

where Property\_ID not in

(Select Property\_ID

from Property\_Client);

**Before Query:**

# Property\_ID Number\_of\_Bedrooms

101 4

102 1

103 3

104 6

105 2

106 5

107 2

108 4

109 8

110 4

111 4

112 7

113 4

114 4

**116 10**

**After Query:**

# Property\_ID Number\_of\_Bedrooms

101 4

102 1

103 3

104 6

105 2

106 5

107 2

108 4

109 8

110 4

111 4

112 7

113 4

114 4

**- Update:**

update one tuple or a set of tuples: from one table, from multiple tables.

**Query: Update the type of the property to 'Multi-family' home when the property\_sqft is greater than 3500**

update Property

set Property\_Type= "Multi-Family"

where Property\_SQFT>3500;

**Property Before Query:**

# Property\_ID Property\_Type Property\_SQFT Year\_Built Built\_By Number\_of\_Bedrooms Number\_of\_Bathrooms Number\_of\_Garages Number\_of\_Stories

101 Single Family 2352 1939 Seller 4 3 1 2

102 Apartment 700 2021 Seller 1 1 0 1

103 Townhouse 3200 1975 Third Party 3 3 1 2

104 Single Family 4500 1989 Seller 6 3 2 2

105 Townhouse 1900 2001 Third Party 2 2 1 3

106 Single Family 4885 1979 Seller 5 4 2 3

107 Apartment 1200 2007 Third Party 2 2 0 1

108 Townhouse 2330 2009 Third Party 4 4 1 2

109 Single Family 8320 1947 Seller 8 9 4 3

110 Single Family 1352 1959 Third Party 4 3 1 2

111 Townhouse 2100 1990 Third Party 4 3 1 3

112 Single Family 4352 1992 Third Party 7 4 1 2

113 Single Family 1750 2022 Seller 4 3 1 2

114 Townhouse 2700 2000 Third Party 4 3 1 2

**Property After Query:**

# Property\_ID Property\_Type Property\_SQFT Year\_Built Built\_By Number\_of\_Bedrooms Number\_of\_Bathrooms Number\_of\_Garages Number\_of\_Stories

101 Single Family 2352 1939 Seller 4 3 1 2

102 Apartment 700 2021 Seller 1 1 0 1

103 Townhouse 3200 1975 Third Party 3 3 1 2

**104 Multi-Family 4500 1989 Seller 6 3 2 2**

105 Townhouse 1900 2001 Third Party 2 2 1 3

**106 Multi-Family 4885 1979 Seller 5 4 2 3**

107 Apartment 1200 2007 Third Party 2 2 0 1

108 Townhouse 2330 2009 Third Party 4 4 1 2

**109 Multi-Family 8320 1947 Seller 8 9 4 3**

110 Single Family 1352 1959 Third Party 4 3 1 2

111 Townhouse 2100 1990 Third Party 4 3 1 3

**112 Multi-Family 4352 1992 Third Party 7 4 1 2**

113 Single Family 1750 2022 Seller 4 3 1 2

114 Townhouse 2700 2000 Third Party 4 3 1 2

**Query: Update the client State\_Region to DMV for all clients from DC, MD and VA**

update Client

set State\_Region="DMV"

where State\_Region like '%MD%' or

State\_Region like '%VA%' or

State\_Region like '%DC%';

**Client Before Query:**

# Client\_ID State\_Region

301 VA

302 VA

303 VA

304 VA

305 VA

306 WV

307 PA

308 LA

309 CA

310 MD

311 CA

312 AR

313 VA

314 VA

315 CT

316 DC

317 AZ

318 MD

319 VA

320 MD

**Client After Query:**

# Client\_ID State\_Region

**301 DMV**

**302 DMV**

**303 DMV**

**304 DMV**

**305 DMV**

306 WV

307 PA

308 LA

309 CA

**310 DMV**

311 CA

312 AR

**313 DMV**

**314 DMV**

315 CT

**316 DMV**

317 AZ

**318 DMV**

**319 DMV**

**320 DMV**

**Query: Update the ‘Role\_of\_Client” to “Seller and Builder” for all those clients who sold properties that were built by them**

Update Property\_Client

set Role\_of\_Client ="Seller and Builder"

where Role\_of\_Client ="Seller" and

Property\_ID in

(select Property\_ID

from Property

where Built\_By="Seller");

**Property\_Client Before Query:**

# Client\_ID Property\_ID Role\_of\_Client

301 101 Seller

302 101 Buyer

303 102 Seller

304 102 Buyer

305 103 Seller

306 103 Buyer

307 104 Seller

308 104 Buyer

309 105 Seller

310 112 Buyer

311 106 Seller

312 113 Buyer

313 107 Seller

314 114 Buyer

315 108 Seller

316 115 Buyer

317 109 Seller

318 115 Seller

319 110 Seller

320 111 Seller

**Property\_Client After Query:**

# Client\_ID Property\_ID Role\_of\_Client

301 101 Seller and Builder

302 101 Buyer

303 102 Seller and Builder

304 102 Buyer

305 103 Seller

306 103 Buyer

307 104 Seller and Builder

308 104 Buyer

309 105 Seller

310 112 Buyer

311 106 Seller and Builder

312 113 Buyer

313 107 Seller

314 114 Buyer

315 108 Seller

316 115 Buyer

317 109 Seller and Builder

318 115 Seller

319 110 Seller

320 111 Seller

**- Create View:**

based on one relation and more than one relation:

**Query: Create a view with employees who manage more than the average number of properties or agents who are dual agents or both**

select avg(Total\_Properties\_Managed)

from Agent;

# avg(Total\_Properties\_Managed)

30.384615384615383

create view HighPerformingAgents as

select Agent\_ID, First\_Name, Last\_Name, Total\_Properties\_managed, Type\_of\_Agent

from Agent

where Total\_Properties\_Managed>30 or Type\_of\_Agent="Dual Agent";

# Agent\_ID First\_Name Last\_Name Total\_Properties\_managed Type\_of\_Agent

1001 Sarah Adams 39 Buyers Agent

1003 Nancy Wheeler 40 Buyers Agent

1004 Mike Wheeler 83 Sellers Agent

1005 Ali Meer 22 Dual Agent

1006 Will Byers 12 Dual Agent

1007 Jane johnson 62 Dual Agent

1009 Nick Miller 8 Dual Agent

1012 JC Tag 48 Dual Agent

**Query: Create a view showing Client IDs, their respective roles (i.e whether the client is a buyer, seller or seller and builder), their Property\_ID and the Squarefeet of their properties**

create view client\_SQFT as

select Client\_ID,Role\_of\_Client, Property\_SQFT, Property.Property\_ID

from Property, Property\_Client

where Property.Property\_ID= Property\_Client.Property\_ID;

# Client\_ID Role\_of\_Client Property\_SQFT Property\_ID

301 Seller and Builder 2352 101

302 Buyer 2352 101

303 Seller and Builder 700 102

304 Buyer 700 102

305 Seller 3200 103

306 Buyer 3200 103

307 Seller and Builder 4500 104

308 Buyer 4500 104

309 Seller 1900 105

310 Buyer 4352 112

311 Seller and Builder 4885 106

312 Buyer 1750 113

313 Seller 1200 107

314 Buyer 2700 114

315 Seller 2330 108

317 Seller and Builder 8320 109

319 Seller 1352 110

320 Seller 2100 111

- operate on View (i.e., select, insert, delete, update,..)

**Query: Select the High performing agents who bought and sold properties in the Du Pont Neigborhood.**

select \*

from HighPerformingAgents

where Agent\_ID in

(select Agent\_ID

from Agent\_Properties

where Property\_ID in

(Select Property\_ID

from Location

where Neighborhood="Du Pont Circle"));

# Agent\_ID First\_Name Last\_Name Total\_Properties\_managed Type\_of\_Agent

1001 Sarah Adams 39 Buyers Agent

1004 Mike Wheeler 83 Sellers Agent

1005 Ali Meer 22 Dual Agent

1006 Will Byers 12 Dual Agent

**Query: Delete the high performing agents who bought or sold less than 10 properties from HighPerformingAgents**

delete from HighPerformingAgents

where total\_Properties\_managed<10;

**HighPerformingAgents After Query:**

# Agent\_ID First\_Name Last\_Name Total\_Properties\_managed Type\_of\_Agent

1001 Sarah Adams 39 Buyers Agent

1003 Nancy Wheeler 40 Buyers Agent

1004 Mike Wheeler 83 Sellers Agent

1005 Ali Meer 22 Dual Agent

1006 Will Byers 12 Dual Agent

1007 Jane johnson 62 Dual Agent

1012 JC Tag 48 Dual Agent

**Query: Insert Agents ‘Asim Javed’ and ‘Asma Qureshi’ to HighPerformingAgents**

insert into Agent values('1014','2002','Asim','Javed','Sellers Agent','55','11d33b@kwr.com','93339669');

insert into Agent values('1015','2001','Asma','Qureshi','Dual Agent','89','11d3333b@kwr.com','93355555');

**HighPerformingAgents After Query:**

# Agent\_ID First\_Name Last\_Name Total\_Properties\_managed Type\_of\_Agent

1001 Sarah Adams 39 Buyers Agent

1003 Nancy Wheeler 40 Buyers Agent

1004 Mike Wheeler 83 Sellers Agent

1005 Ali Meer 22 Dual Agent

1006 Will Byers 12 Dual Agent

1007 Jane johnson 62 Dual Agent

1012 JC Tag 48 Dual Agent

1014 Asim Javed 55 Sellers Agent

1015 Asma Qureshi 89 Dual Agent

**Query: Increase the ‘Total Properties Managed’ by 2 for all the Dual Agents in HighPerformingAgents**

Update HighPerformingAgents

set Total\_Properties\_managed=2+Total\_Properties\_managed

where Type\_of\_Agent="Dual Agent";

**HighPerformingAgents After Query:**

# Agent\_ID First\_Name Last\_Name Total\_Properties\_managed Type\_of\_Agent

1001 Sarah Adams 39 Buyers Agent

1003 Nancy Wheeler 40 Buyers Agent

1004 Mike Wheeler 83 Sellers Agent

1005 Ali Meer 24 Dual Agent

1006 Will Byers 14 Dual Agent

1007 Jane johnson 64 Dual Agent

1012 JC Tag 50 Dual Agent

1014 Asim Javed 55 Sellers Agent

1015 Asma Qureshi 91 Dual Agent

**Query: Show the average squarefeet bought/sold by buyer, sellers, and seller and builers grouped by Role\_of\_Client**

select Role\_of\_Client, avg(Property\_SQFT)

from client\_SQFT

group by Role\_of\_Client;

# Role\_of\_Client avg(Property\_SQFT)

Seller and Builder 4151.4

Buyer 2793.4285714285716

Seller 2013.6666666666667

**Query: insert data into the view Client\_SQFT of a property with ID 130 sold by Client 321**

insert into Property\_Client values('321','130', 'Seller');

insert into Property values('130','Single Family','2323',1939,'Seller','4','3','1','2');

**Client\_SQFT before Query:**

# Client\_ID Role\_of\_Client Property\_SQFT Property\_ID

301 Seller and Builder 2352 101

302 Buyer 2352 101

303 Seller and Builder 700 102

304 Buyer 700 102

305 Seller 3200 103

306 Buyer 3200 103

307 Seller and Builder 4500 104

308 Buyer 4500 104

309 Seller 1900 105

310 Buyer 4352 112

311 Seller and Builder 4885 106

312 Buyer 1750 113

313 Seller 1200 107

314 Buyer 2700 114

315 Seller 2330 108

317 Seller and Builder 8320 109

319 Seller 1352 110

320 Seller 2100 111

**Client\_SQFT After Query:**

# Client\_ID Role\_of\_Client Property\_SQFT Property\_ID

301 Seller and Builder 2352 101

302 Buyer 2352 101

303 Seller and Builder 700 102

304 Buyer 700 102

305 Seller 3200 103

306 Buyer 3200 103

307 Seller and Builder 4500 104

308 Buyer 4500 104

309 Seller 1900 105

310 Buyer 4352 112

311 Seller and Builder 4885 106

312 Buyer 1750 113

313 Seller 1200 107

314 Buyer 2700 114

315 Seller 2330 108

317 Seller and Builder 8320 109

319 Seller 1352 110

320 Seller 2100 111

321 Seller 2323 130

**Query: Reduce the Squarefeet of all Properties on the street Connecticut Ave NW by 50 Squarefeet.**

Update client\_SQFT

set Property\_SQFT=Property\_SQFT-50

WHERE Property\_ID in

(select Property\_ID

from Location

where Street\_Address like '%Connecticut Ave NW%');

**Client\_SQFT Before Query:**

# Client\_ID Role\_of\_Client Property\_SQFT Property\_ID

301 Seller and Builder 2352 101

302 Buyer 2352 101

303 Seller and Builder 700 102

304 Buyer 700 102

305 Seller 3200 103

306 Buyer 3200 103

307 Seller and Builder 4500 104

308 Buyer 4500 104

309 Seller 1900 105

310 Buyer 4352 112

311 Seller and Builder 4885 106

312 Buyer 1750 113

313 Seller 1200 107

314 Buyer 2700 114

315 Seller 2330 108

317 Seller and Builder 8320 109

319 Seller 1352 110

320 Seller 2100 111

321 Seller 2323 130

**Client\_SQFT After Query:**

# Client\_ID Role\_of\_Client Property\_SQFT Property\_ID

301 Seller and Builder 2352 101

302 Buyer 2352 101

303 Seller and Builder 700 102

304 Buyer 700 102

**305 Seller 3150 103**

**306 Buyer 3150 103**

307 Seller and Builder 4500 104

308 Buyer 4500 104

**309 Seller 1850 105**

310 Buyer 4352 112

311 Seller and Builder 4885 106

312 Buyer 1750 113

313 Seller 1200 107

**314 Buyer 2650 114**

**315 Seller 2280 108**

**317 Seller and Builder 8270 109**

**319 Seller 1302 110**

320 Seller 2100 111

321 Seller 2323 130

**Query: Delete all sellers who built their properties from Client\_SQFT**

delete from Property\_Client

where Role\_of\_Client="Seller and Builder";

**Client\_SQFT before Query:**

# Client\_ID Role\_of\_Client Property\_SQFT Property\_ID

301 Seller and Builder 2352 101

302 Buyer 2352 101

303 Seller and Builder 700 102

304 Buyer 700 102

305 Seller 3150 103

306 Buyer 3150 103

307 Seller and Builder 4500 104

308 Buyer 4500 104

309 Seller 1850 105

310 Buyer 4352 112

311 Seller and Builder 4885 106

312 Buyer 1750 113

313 Seller 1200 107

314 Buyer 2650 114

315 Seller 2280 108

317 Seller and Builder 8270 109

319 Seller 1302 110

320 Seller 2100 111

321 Seller 2323 130

**Client\_SQFT After Query:**

# Client\_ID Role\_of\_Client Property\_SQFT Property\_ID

302 Buyer 2352 101

304 Buyer 700 102

305 Seller 3150 103

306 Buyer 3150 103

308 Buyer 4500 104

309 Seller 1850 105

310 Buyer 4352 112

312 Buyer 1750 113

313 Seller 1200 107

314 Buyer 2650 114

315 Seller 2280 108

319 Seller 1302 110

320 Seller 2100 111

321 Seller 2323 130

**B)** Also, create at least 4 different practical/useful triggers (written in MySQL) for your database to perform the following tasks:

Show how these triggers are used and what these triggers produce (outputs).

- enforcing referential integrity

**Query: Referrential integrity : to add a child=PROPERTY, the parent=Client must exist. The client (who is the buyer or seller of the property) must exist before the property they buy or sell is added into the database.**

Delimiter //

create trigger addproperty before insert on Property

for each row

begin

declare temp Int;

set temp=0;

select count(\*) into temp from Property\_Client where Property\_ID=NEW.Property\_ID;

if temp=0 then

SIGNAL SQLSTATE '45000' SET MESSAGE\_TEXT ="Client is not in the system";

end if;

end; //

delimiter ;

#Activation

insert into Property value('117','Single Family','3332',1939,'Seller','5','4','2','2');

**Output:**

22:37:42 insert into Property value('117','Single Family','3332',1939,'Seller','5','4','2','2') Error Code: 1644. **Client is not in the system** 0.0033 sec

When we try to add property 117, we get an error which says that the corresponding client does not exist.  
- enforcing attribute domain constraints

create table DomainPropertyType(Property\_Type varchar(30));

insert into DomainPropertyType values("Townhouse");

insert into DomainPropertyType values("Single Family");

insert into DomainPropertyType values("Apartment");

select \* from DomainPropertyType;

# Property\_Type

Townhouse

Single Family

Apartment

Delimiter //

create trigger domain\_PropertyType\_checking before insert on Property

for each row

begin

declare temp Int;

set temp=0;

select count(\*) into temp from DomainPropertyType where Property\_Type=new.Property\_Type;

if temp=0 then

SIGNAL SQLSTATE '45000' SET MESSAGE\_TEXT = ' Invaid Type ';

end if;

end; //

delimiter ;

#Activation

insert into Property values('1111','Family','2352',1939,'Seller','4','3','1','2');

**Output:**

22:44:18 insert into Property values('1111','Family','2352',1939,'Seller','4','3','1','2') Error Code: 1644. **Invaid Type** 0.0029 sec

- creating database log

Create table MyLog (message varchar(70));

Delimiter //

create trigger add\_agent after insert on Agent

for each row

begin

insert into Mylog values(concat('Agent ',new.Last\_Name,' has been added by ',current\_user(), ' on ',current\_date()));

end//

delimiter ;

#Activation

insert into Agent values('1420','2003','Michael','Jackson','Buyers Agent','39','sasjs@kwr.com','9112233669');

select \* from Agent;

# Agent\_ID Branch\_ID First\_Name Last\_Name Type\_of\_Agent Total\_Properties\_managed Email Phone\_Number

1001 2001 Sarah Adams Buyers Agent 39 sa@kwr.com 9374446669

1002 2002 Jim Hopper Sellers Agent 29 jh@kwr.com 1235556669

1003 2003 Nancy Wheeler Buyers Agent 40 nw@kwr.com 9987776669

1004 2003 Mike Wheeler Sellers Agent 83 mw@kwr.com 1239996669

1005 2002 Ali Meer Dual Agent 24 am@kwr.com 3334446669

1006 2001 Will Byers Dual Agent 14 wb@kwr.com 2984446669

1007 2003 Jane johnson Dual Agent 64 jj@kwr.com 1239446669

1008 2002 Dustin Bishop Sellers Agent 9 db@kwr.com 9834446669

1010 2001 Winston Schmidt Buyers Agent 3 ws@kwr.com 1094446669

1011 2002 Dustin Crew Sellers Agent 27 11db@kwr.com 98347799669

1012 2002 JC Tag Dual Agent 50 12wnm@kwr.com 128899000

1013 2001 Macy Wills Buyers Agent 13 wwws@kwr.com 10944489789

1014 2002 Asim Javed Sellers Agent 55 11d33b@kwr.com 93339669

1015 2001 Asma Qureshi Dual Agent 91 11d3333b@kwr.com 93355555

**1420 2003 Michael Jackson Buyers Agent 39 sasjs@kwr.com 9112233669**

Select \* from Mylog;

# message

Agent Jackson has been added by root@localhost on 2022-06-19

- gathering statistics

create table Property\_summary(Property\_Type varchar(15),minSQFT double, maxSQFT double, avgSQFT double);

Delimiter //

create trigger Property\_insert after insert on Property

for each row

begin

delete from Property\_summary;

insert Property\_summary

select Property\_Type, min(Property\_SQFT),max(Property\_SQFT),avg(Property\_SQFT) from Property group by Property\_Type;

end//

delimiter ;

#Activation

insert into Property value('117','Single Family','3332',1939,'Seller','5','4','2','2');

# Property\_Type minSQFT maxSQFT avgSQFT

Single Family 1302 3332 2211.8

Apartment 700 1200 950

Townhouse 1850 3150 2406

Multi-Family 4352 8270 5501.75

insert into Property value('118','Apartment','4000',1939,'Seller','5','4','2','2');

# Property\_Type minSQFT maxSQFT avgSQFT

Single Family 1302 3332 2211.8

**Apartment 700 4000 1966.6666666666667**

Townhouse 1850 3150 2406

Multi-Family 4352 8270 5501.75

--------------------------------------------------------------------------------------------------------------------------------------------- NOTE: - You can define your own hypothetical organization, provided that you give enough information as to what this organization does.

- You can make any assumptions about your database, provided that you define them and give reasons as why these assumptions are being made.

- Please let me know if you have any trouble in finding a suitable practical/operational organization.

- Attach any documents that you use to acquire the data for your database.  
- This Project is graded based on accuracy and completeness and its practicality to real world problem. ------------------------------------------------------------------------------------------------------------------------------------------------

**You need to provide a complete copy of the entire project:  
Do the project as instructed above: part 1, 2,3, 4; and within each part a, b, c, etc. All the inputs, outputs, sql statements, sql results, codes for triggers/results, etc.**

**All in one PDF file, with your name for your project (MyName\_Database Project.PDF) and submit it to the Canvas.**