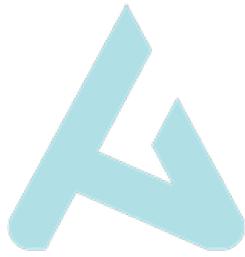


Project Update 2



P R O P E R T Y B Y A S H L E Y

Database

March 27, 2022

IST 659

Chad Harper

Part One

Summary

Ashley Lew has over ten years of experience working in the Real Estate Industry. She decided to start her own Real Estate business in October 2019. Since then, she's been using her website to track her sales data. I want to build a database for Property by Ashley to provide her with a more effective way of monitoring sales data allowing her to gain insights from her past sales.

What problem am I solving? Most Realtor Database Software systems focus on Marketing and Customer Relationship Management. The platforms provide a way to track the sales process (monitoring Sales Leads, Contacts, and next steps)¹. Realtor Database systems lack the data analysis portion: how can we use previous sales data to make intelligent business decisions?

Stakeholders

- **Ashley Lew**

Business Rules

- **Representation:** Ashley Lew represents the Buyer, the Seller, or Both.
- Ashley Lew represents many Buyers and many Sellers. All Sellers and Buyers are represented by Realtor, Ashley Lew.
- One House sells for one Amount.
- Each House also has one Sales Percentage.
- Many Sell Prices can be found in one city and one city can have many Sell Prices.



¹ Bourgeois, D. (2021, October 6). *6 best real estate database software*. Fit Small Business. Retrieved February 13, 2022, from <https://fitsmallbusiness.com/best-real-estate-database-software/>

Data Questions

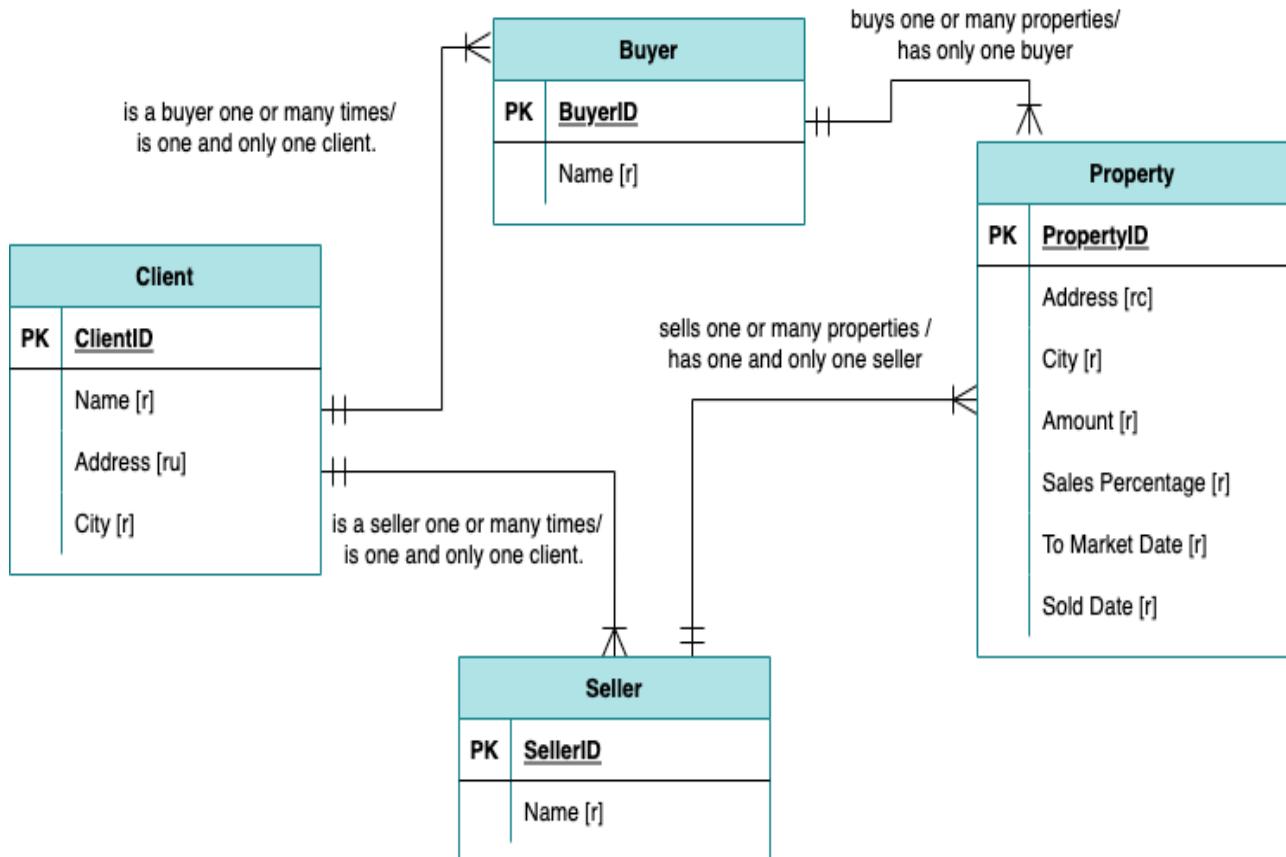
- What is the Minimum, Average, and Maximum Home Sales Price?
- What is the Average Home Sales Price for each month?
- What are the Average Number of Days on the Market per year? Per month? Per City?
- Which City produces the Highest Sales Rates?
- Evaluating Sales Rates: What is the ideal Sales Rate for a specific city?
- Which homes should you showcase on your website? (Long Term question)



Communicating Insights

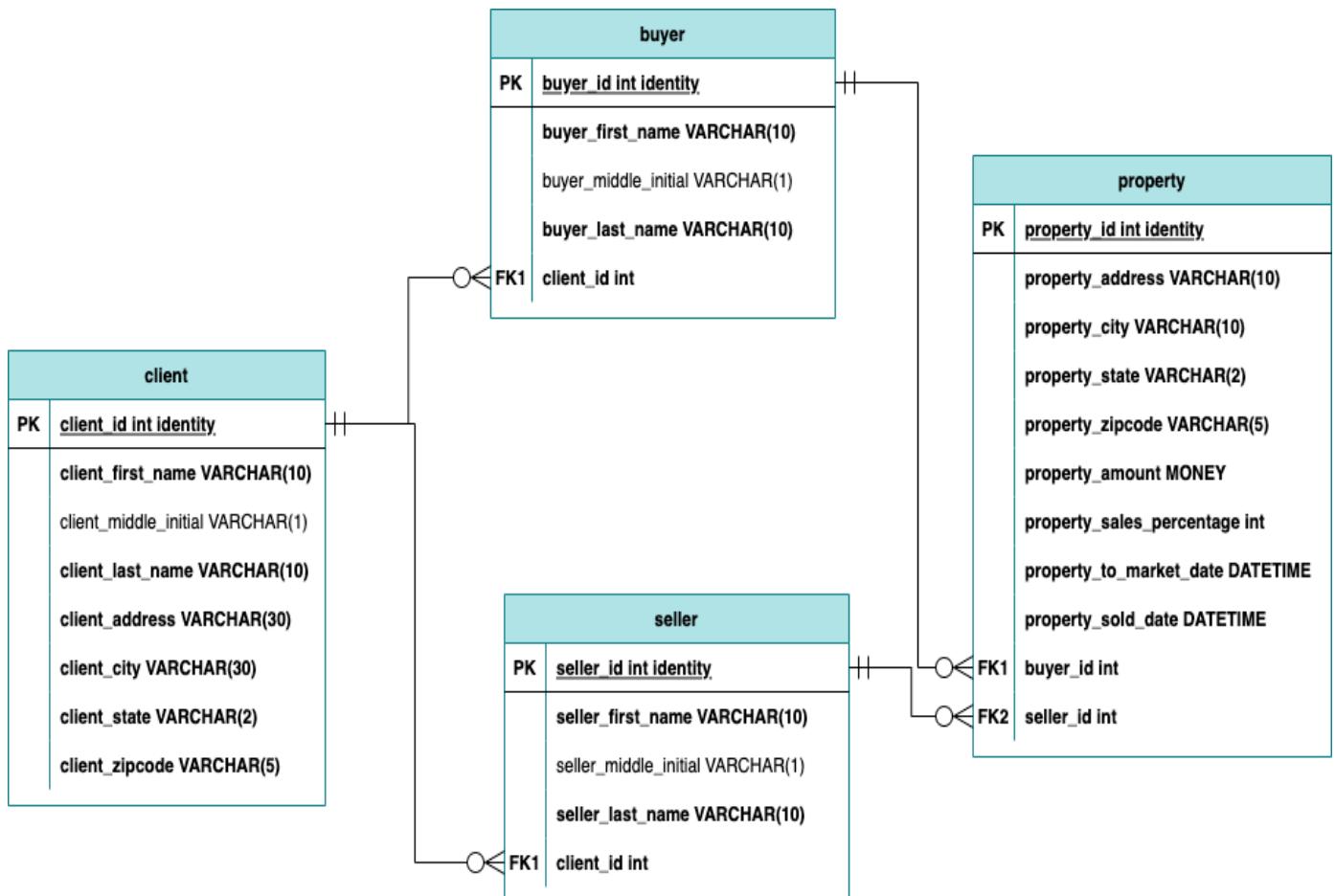
How will Ashley access the answers to Data Questions? After meeting with Ashley to discuss the project, I couldn't help but wonder what the best way will be to communicate findings to Data Questions. Furthermore, it would be ideal if these findings were constantly communicated once a new transaction is inputted into the database. Ashley is not a SQL user; therefore, it would be impractical to give her a document of SQL queries that she can run on her own to find answers to her questions. Instead, a Tableau Dashboard that automatically updates as we input data will prove to be a wise way to communicate findings.

Conceptual Model



Logical Model

Translating from Conceptual to Logical: When translating from Conceptual to Logical Model, it was essential to select Data types for each attribute. Surrogate keys were introduced in the Conceptual Model to avoid any Primary Key problems. Datetime data type will be used for all dates. I struggled to choose a datatype for the property_amount attribute in the property relation. My Logical Model shows Money as the data type selected for property_amount. However, after this week's material, I plan to update this value to decimal. Property_sales_percentage is another attribute I struggled with when selecting the data type. My Logical Model shows Integer as the chosen data type but, after giving it some thought, decimal might be a better choice for this attribute as well.



Part Two

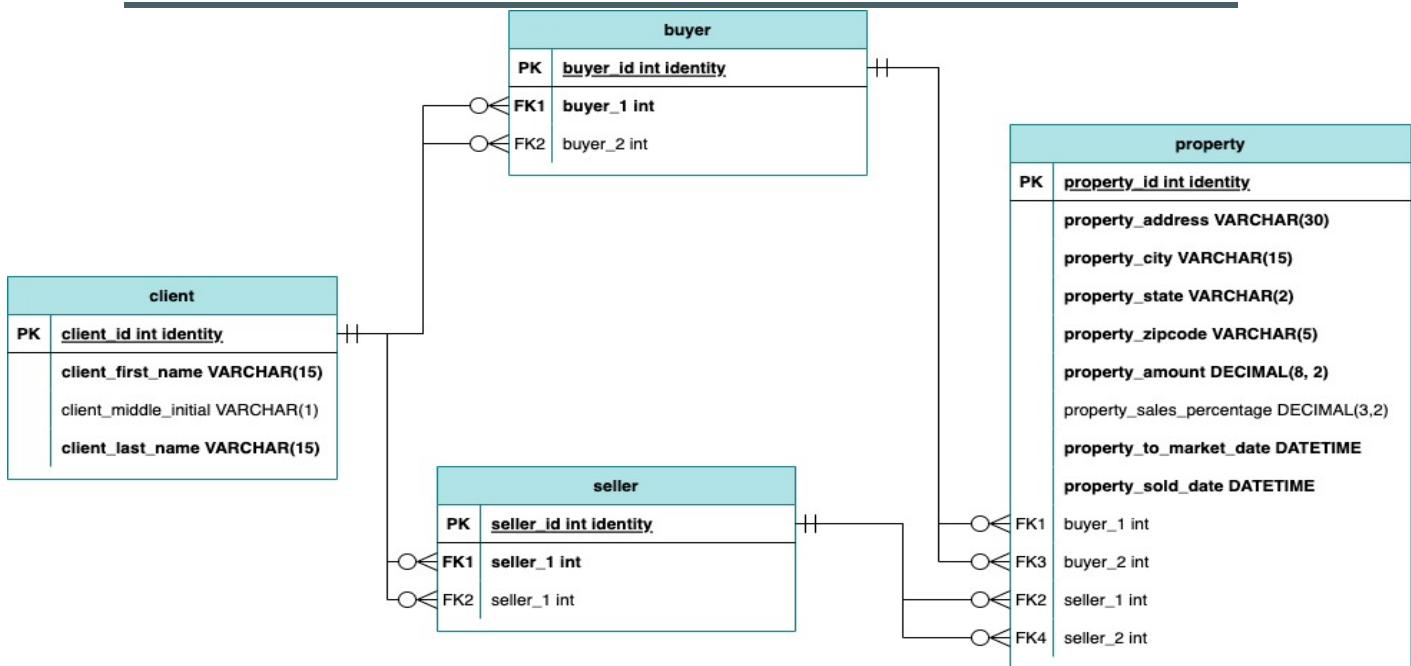
Updates to the Logical Model

Updates were made to the Logical Model while creating database tables.

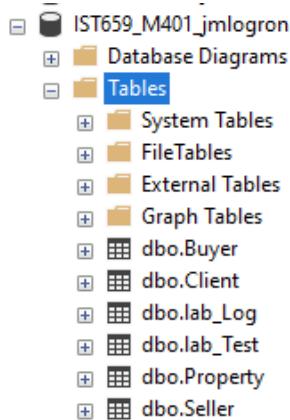
- **Client Table:** Different numerical values were selected to represent VARCHAR attributes. For example, Client_first_name VARCHAR(10) was changed to VARCHAR(15).
- **Property Table:** Initially, buyer_id int and seller_id_int were both required attributes. However, this won't work when Ashley is representing only the Seller or only the Buyer. Therefore, both Foreign Keys are no longer required attributes.

Buyer and Seller tables were normalized:

- **Buyer Table:** Creating Buyer_First_Name, Buyer_Last_Name, Buyer_Middle_Initial attributes would create redundancy. Instead, I'll rely on a SQL query to bring those values in from the Client table via the Client_id Foreign Key. Every time a buyer buys a home, they will be assigned a buyer_id for the specific transaction.
- **Seller Table:** Creating Seller_First_Name, Seller_Last_Name, Seller_Middle_Initial attributes would also create redundancy. Instead, I'll rely on a SQL query to bring those values in from the Client table. Every time a seller sells a home, they will be assigned a seller_id for the specific transaction.
- **Client Table:** The Address is no longer an attribute.
- **Property Table:** Sales Percentage is no longer a required attribute.



Data Definition Language – Creating Tables and Constraints



```
--drop Property table before creating it
DROP TABLE IF EXISTS Property

GO
--drop Seller table before creating it
DROP TABLE IF EXISTS Seller

GO

--drop buyer table before creating it
DROP TABLE IF EXISTS Buyer

GO

--drop client table before creating it
DROP TABLE IF EXISTS Client

GO

--Creating the Client table
CREATE TABLE Client(
--Columns for Client Table
Client_id int identity,
Client_First_Name VARCHAR(15) NOT NULL,
Client_Middle_Initial VARCHAR(1) NULL,
Client_Last_Name VARCHAR(15) NOT NULL,
CONSTRAINT PK_Client_ID PRIMARY KEY (Client_id)
)
GO
--End creating the Client Table

--Creating the Buyer Table
CREATE TABLE Buyer(
--Columns for Buyer Table
Buyer_id int identity,
Buyer_1 int not null,
Buyer_2 int null,
```

```

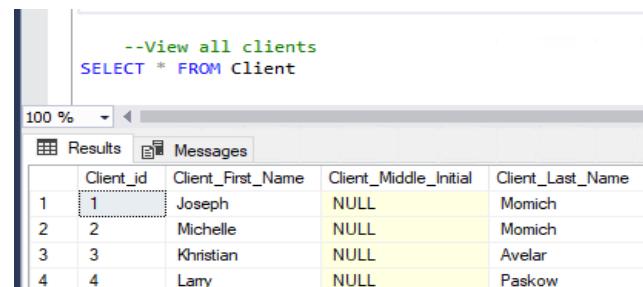
CONSTRAINT PK_Buyer_ID PRIMARY KEY(Buyer_id),
CONSTRAINT FK1_Buyer_1 FOREIGN KEY (Buyer_1) REFERENCES Client(Client_id),
CONSTRAINT FK2_Buyer_2 FOREIGN KEY (Buyer_2) REFERENCES Client(Client_id)
)
GO
--End creating Buyer Table

--Creating Seller Table
CREATE TABLE Seller(
--Columns for Seller Table
Seller_id int identity,
Seller_1 int NOT NULL,
Seller_2 int NULL,
CONSTRAINT PK_Seller_ID PRIMARY KEY(Seller_id),
CONSTRAINT FK1_Seller_1 FOREIGN KEY (Seller_1) REFERENCES Client(Client_id),
CONSTRAINT FK2_Seller_2 FOREIGN KEY (Seller_2) REFERENCES Client(Client_id)
)
GO
--End creating Seller Table

--Creating Property Table
CREATE TABLE Property(
--Column for Property Table
Property_id int identity,
Property_Address VARCHAR(50) NOT NULL,
Property_City VARCHAR(15) NOT NULL,
Property_Zipcode VARCHAR(5) NOT NULL,
Property_Sell_Price DECIMAL(30,2) NOT NULL,
Property_Commission_Percentage DECIMAL(3,2) NULL,
Property_To_Market_Date DATETIME NOT NULL,
Property_Sold_Date DATETIME NOT NULL,
Buyer_id int NULL,
Seller_id int NULL,
CONSTRAINT PK_Property_ID PRIMARY KEY (Property_id),
CONSTRAINT FK1_Buyers FOREIGN KEY (Buyer_id) REFERENCES Buyer(Buyer_id),
CONSTRAINT FK2_Sellers FOREIGN KEY (Seller_id) REFERENCES Seller(Seller_id)
)
GO
--End creating Property Table

```

Data Manipulation Language – INSERT Statements



The screenshot shows a SQL query window with the following content:

```
--View all clients
SELECT * FROM Client
```

The results pane displays the following data:

Client_id	Client_First_Name	Client_Middle_Initial	Client_Last_Name
1	Joseph	NULL	Momich
2	Michelle	NULL	Momich
3	Khristian	NULL	Avelar
4	Lamy	NULL	Paskow

```
--Adding data to Client Table
```

```
INSERT INTO dbo.Client (Client_First_Name, Client_Last_Name)
VALUES
('Joseph', 'Momich'),
('Michelle', 'Momich'),
('Khristian', 'Avelar'),
('Larry', 'Paskow'),
('Inguss', 'Strikaitis'),
('Gabriel', 'Williams'),
('Stephanie', 'Banh'),
('Edwin', 'Lew'),
('Janelle', 'Bode'),
('Lee', 'Austria'),
('Amber', 'McCurry'),
('Beverly', 'Calpito'),
('Scott', 'Saling'),
('Lora', 'Graham'),
('Ann', 'Berg'),
('Lilian', 'Lew'),
('Josephine', 'Cheung'),
('Bob', 'Tang')
```

```
--End adding data to Client Table
```

```
--Adding data to Buyer Table
```

```
INSERT INTO Buyer (Buyer_1, Buyer_2) VALUES
(1,2), (4,5), (6,7), (10,11), (12,13)
```

```
INSERT INTO Buyer (Buyer_1) VALUES (8),(15),(16),(17),(16),(18)
```

```
--End adding data to Buyer Table
```

```
--Adding data to Seller Table
```

```
INSERT INTO Seller (Seller_1) VALUES (3), (9), (14), (16)
```

```
--Adding data to Property Table
```

```
--Inserting properties with sellers represented in the transaction
```

```
INSERT INTO Property (Property_Address, Property_City, Property_Zipcode, Property_Sell_Price,
Property_To_Market_Date, Property_Sold_Date, Seller_id) VALUES
('272 Magda Way', 'Pachecho', '94553', 150000.00, '9/9/2021', '9/29/2021', 2),
('1404 Henry Street', 'Berkeley', '94709', 668000.00, '6/17/2021', '8/18/2021', 3),
('2925 Grande Corte', 'Walnut Creek', '94598', 1225000.00, '09/08/2020', '10/13/2020', 4)
```

```
--Inserting properties with buyers and sellers represented in single transaction
```

```
INSERT INTO Property (Property_Address, Property_City, Property_Zipcode, Property_Sell_Price,
Property_To_Market_Date, Property_Sold_Date, Buyer_id, Seller_id) VALUES
('1505 Kirker Pass Road, #161', 'Concord', '94521', 325000.00, '12/01/2021', '12/22/2021', 1,1)
```

```
--Inserting properties where the buyers was reperesented in transctions
```

```
INSERT INTO Property (Property_Address, Property_City, Property_Zipcode, Property_Sell_Price,
Property_To_Market_Date, Property_Sold_Date, Buyer_id) VALUES
('1255 Detroit Avenue, #22', 'Concord', '94520', 470000.00, '11/29/2021', '12/22/2021', 2),
('378 Topaz Street', 'Brentwood', '94513', 740888.00, '11/02/2021', '12/07/2021', 3),
```

```
( '4710 Colorado Court', 'Camino', '95709', 615000.00, '09/17/2021', '10/26/2021', 6),
('840 Flores Way', 'Rio Vista', '94571', 470000.00, '08/05/2021', '09/02/2021', 4),
('1312 Tuolumne Way', 'Oakley', '94561', 756000.00, '07/22/2021', '08/20/2021', 5),
('5212 Clovis Court', 'Concord', '94521', 945000.00, '06/01/2021', '07/09/2021', 7),
('1325 Rimer Drive', 'Moraga', '94556', 1041000.00, '11/30/2020', '12/18/2020', 10),
('3191 Tiffanie Lane', 'Napa', '94558', 1200000.00, '09/22/2020', '11/16/2020', 9),
('2925 Grande Corte', 'Walnut Creek', '94598', 910000.00, '03/04/2020', '03/05/2020', 10),
('50 Rainbow Circle', 'Danville', '94506', 885000.00, '09/18/2019', '11/22/2019', 11)
```

SELECT Statements & Answering Data Questions

--View all Properties

```
SELECT Property.Property_Address, Property.Property_City,
       Property.Property_Sell_Price FROM Property
```

0 %

Results Messages

	Property_Address	Property_City	Property_Sell_Price
1	272 Magda Way	Pachecho	150000.00
2	1404 Henry Street	Berkeley	668000.00
3	2925 Grande Corte	Walnut Creek	1225000.00
4	1505 Kirker Pass Road, #161	Concord	325000.00
5	1255 Detroit Avenue, #22	Concord	470000.00
6	378 Topaz Street	Brentwood	740888.00

--View all Buyers

```
SELECT Buyer.Buyer_id, Client.Client_First_Name, Client.Client_Last_Name FROM Buyer JOIN Client
      on Buyer.Buyer_1 = Client.Client_id OR Buyer.Buyer_2 = Client.Client_id
```

--Results:

100 %

Results Messages

	Buyer_id	Client_First_Name	Client_Last_Name
1	1	Joseph	Momich
2	1	Michelle	Momich
3	2	Lary	Paskow
4	2	Inguss	Strikaitis
5	3	Gabriel	Williams
6	3	Stephanie	Banh
7	4	Lee	Austria
8	4	Amber	McCurry
9	5	Beverly	Calpito
10	5	Scott	Saling
11	6	Edwin	Lew
12	7	Ann	Berg
13	8	Lilian	Lew
14	9	Josephine	Cheung
15	10	Lilian	Lew
16	11	Bob	Tang

```
--View all Sellers
SELECT Seller.Seller_id, Client.Client_First_Name, Client.Client_Last_Name FROM Seller JOIN
Client ON Seller.Seller_1 = Client.Client_id OR Seller.Seller_2 = Client.Client_id
GO
--Results:
```

	Seller_id	Client_First_Name	Client_Last_Name
1	1	Kchristian	Avelar
2	2	Janelle	Bode
3	3	Lora	Graham
4	4	Lilian	Lew

```
--What is the Minimum, Average, and Maximum Home Sales Price?
SELECT MIN(Property.Property_Sell_Price) AS MinSalesPrice,
AVG(Property.Property_Sell_Price) AS AvgSalesPrice,
MAX(Property.Property_Sell_Price) AS MaxSalesPrice
FROM Property
--Results:
```

	MinSalesPrice	AvgSalesPrice	MaxSalesPrice
1	150000.00	742920.571428	1225000.00

```
--What is the Average Home Sales Price for each Month?
SELECT MONTH(Property.Property_Sold_Date) AS SellMonth, YEAR(Property.Property_Sold_Date) AS
SellYear,
AVG(Property.Property_Sell_Price) AS AvgSellPrice
FROM Property
GROUP BY MONTH(Property.Property_Sold_Date), YEAR(Property.Property_Sold_Date)
ORDER BY AvgSellPrice DESC
GO
--Results:
```

	SellMonth	SellYear	AvgSellPrice
1	10	2020	1225000.000000
2	11	2020	1200000.000000
3	12	2020	1041000.000000
4	7	2021	945000.000000
5	3	2020	910000.000000
6	11	2019	885000.000000
7	8	2021	712000.000000
8	10	2021	615000.000000
9	12	2021	511962.666666
10	9	2021	310000.000000

--What are the Average Number of days on the market per year?

```
SELECT YEAR(Property.Property_Sold_Date) AS YearofTransaction,  
AVG(DATEDIFF(DAY, Property.Property_To_Market_Date, Property.Property_Sold_Date)) AS  
AvgDaysOnMarket  
FROM Property GROUP BY YEAR(Property.Property_Sold_Date)  
--Results:
```

	YearofTransaction	AvgDaysOnMarket
1	2019	65
2	2020	27
3	2021	32

--What are the Average Number of days on the market per city?

```
SELECT Property.Property_City AS City,  
AVG(DATEDIFF(DAY, Property.Property_To_Market_Date, Property.Property_Sold_Date)) AS  
AvgDaysOnMarket  
FROM Property GROUP BY Property.Property_City  
--Results:
```

	City	AvgDaysOnMarket
1	Berkeley	62
2	Brentwood	35
3	Camino	39
4	Concord	27
5	Danville	65
6	Moraga	18
7	Napa	55
8	Oakley	29
9	Pacheco	20
10	Rio Vista	28
11	Walnut Creek	18

--What are the Average Number of days on the market for each month?

```
SELECT MONTH(Property.Property_Sold_Date) AS MonthofTransaction,  
AVG(DATEDIFF(DAY, Property.Property_To_Market_Date, Property.Property_Sold_Date)) AS  
AvgDaysOnMarket  
FROM Property GROUP BY MONTH(Property.Property_Sold_Date)  
GO  
--Results:
```

	MonthofTransaction	AvgDaysOnMarket
1	3	1
2	7	38
3	8	45
4	9	24
5	10	37
6	11	60
7	12	24

Programming Objects

--Creating a View to see All Buyers and Property Details

```
CREATE OR ALTER VIEW PropertyBuyers AS
    SELECT Property.Property_Address, Property.Property_City, Property.Property_Zipcode,
    Property.Property_Sell_Price, Client.Client_First_Name, Client.Client_Last_Name FROM Property
    LEFT JOIN Buyer ON Property.Buyer_id = Buyer.Buyer_id JOIN Client ON Client.Client_id =
    Buyer.Buyer_1 OR Client.Client_id = Buyer.Buyer_2
GO
SELECT * FROM PropertyBuyers
GO
```

--Results:

	Property_Address	Property_City	Property_Zipcode	Property_Sell_Price	Client_First_Name	Client_Last_Name
1	1505 Kirker Pass Road, #161	Concord	94521	325000.00	Joseph	Momich
2	1505 Kirker Pass Road, #161	Concord	94521	325000.00	Michelle	Momich
3	1255 Detroit Avenue, #22	Concord	94520	470000.00	Lary	Paskow
4	1255 Detroit Avenue, #22	Concord	94520	470000.00	Inguss	Strikaitis
5	378 Topaz Street	Brentwood	94513	740888.00	Gabriel	Williams
6	378 Topaz Street	Brentwood	94513	740888.00	Stephanie	Banh
7	4710 Colorado Court	Camino	95709	615000.00	Edwin	Lew

--Creating a View to see All Sellers and Property Details

```
CREATE OR ALTER VIEW PropertySellers AS
    SELECT Property.Property_Address, Property.Property_City,
    Property.Property_Zipcode, Property.Property_Sell_Price, Client.Client_First_Name,
    Client.Client_Last_Name FROM Property
    LEFT JOIN Seller ON Property.Seller_id = Seller.Seller_id JOIN Client ON
    Client.Client_id = Seller.Seller_1 OR Client.Client_id = Seller.Seller_2
GO
SELECT * FROM PropertySellers
--Results:
```

	Property_Address	Property_City	Property_Zipcode	Property_Sell_Price	Client_First_Name	Client_Last_Name
1	272 Magda Way	Pachecho	94553	150000.00	Janelle	Bode
2	1404 Henry Street	Berkeley	94709	668000.00	Lora	Graham
3	2925 Grande Corte	Walnut Creek	94598	1225000.00	Lilian	Lew
4	1505 Kirker Pass Road, #161	Concord	94521	325000.00	Khristian	Avelar

--Creating a procedure to add a new Client

```
CREATE OR ALTER PROCEDURE NewClient (@firstName varchar(30), @middleInitial varchar(30),
@lastName varchar(30))
AS
BEGIN
```

```

INSERT INTO Client (Client.Client_First_Name, Client.Client_Middle_Initial,
Client.Client_Last_Name)
VALUES (@firstName, @middleInitial, @lastName)
END
GO

```

```
EXEC NewClient 'Jazmin', 'M', 'Logrono'
```

```
SELECT * FROM Client
```

--Results:

16	16	Lilian	NULL	Lew
17	17	Josephine	NULL	Cheung
18	18	Bob	NULL	Tang
19	19	Jazmin	M	Logrono

--Creating a procedure for adding a Client to the Seller table

```
CREATE OR ALTER PROCEDURE NewSeller (@clientID int)
```

```
AS
```

```
BEGIN
```

```
    INSERT INTO Seller (Seller.Seller_1) VALUES (@clientID)
```

```
END
```

```
GO
```

```
EXEC NewSeller 19
```

```
GO
```

--Creating a procedure for adding a Client to the Buyer table

```
CREATE OR ALTER PROCEDURE NewBuyer (@clientID int)
```

```
AS
```

```
BEGIN
```

```
    INSERT INTO Buyer (Buyer.Buyer_1) VALUES (@clientID)
```

```
END
```

```
GO
```

```
EXEC NewBuyer 19
```

```
GO
```

--Creating a procedure for adding a Property to the Property table

```
CREATE OR ALTER PROCEDURE NewProperty (@propertyAddress varchar(30), @propertyCity varchar(30),
@propertyZipcode varchar(5), @propertySellPrice DECIMAL(30,2), @propertyToMarket DATETIME,
@propertySoldDate DATETIME)
```

```
AS
```

```
BEGIN
```

```
    INSERT INTO Property (Property.Property_Address, Property.Property_City,
Property.Property_Zipcode,
Property.Property_Sell_Price, Property.Property_To_Market_Date, Property.Property_Sold_Date)
VALUES (@propertyAddress, @propertyCity, @propertyZipcode, @propertySellPrice,
@propertyToMarket, @propertySoldDate)
```

```
END
```

```
GO
```

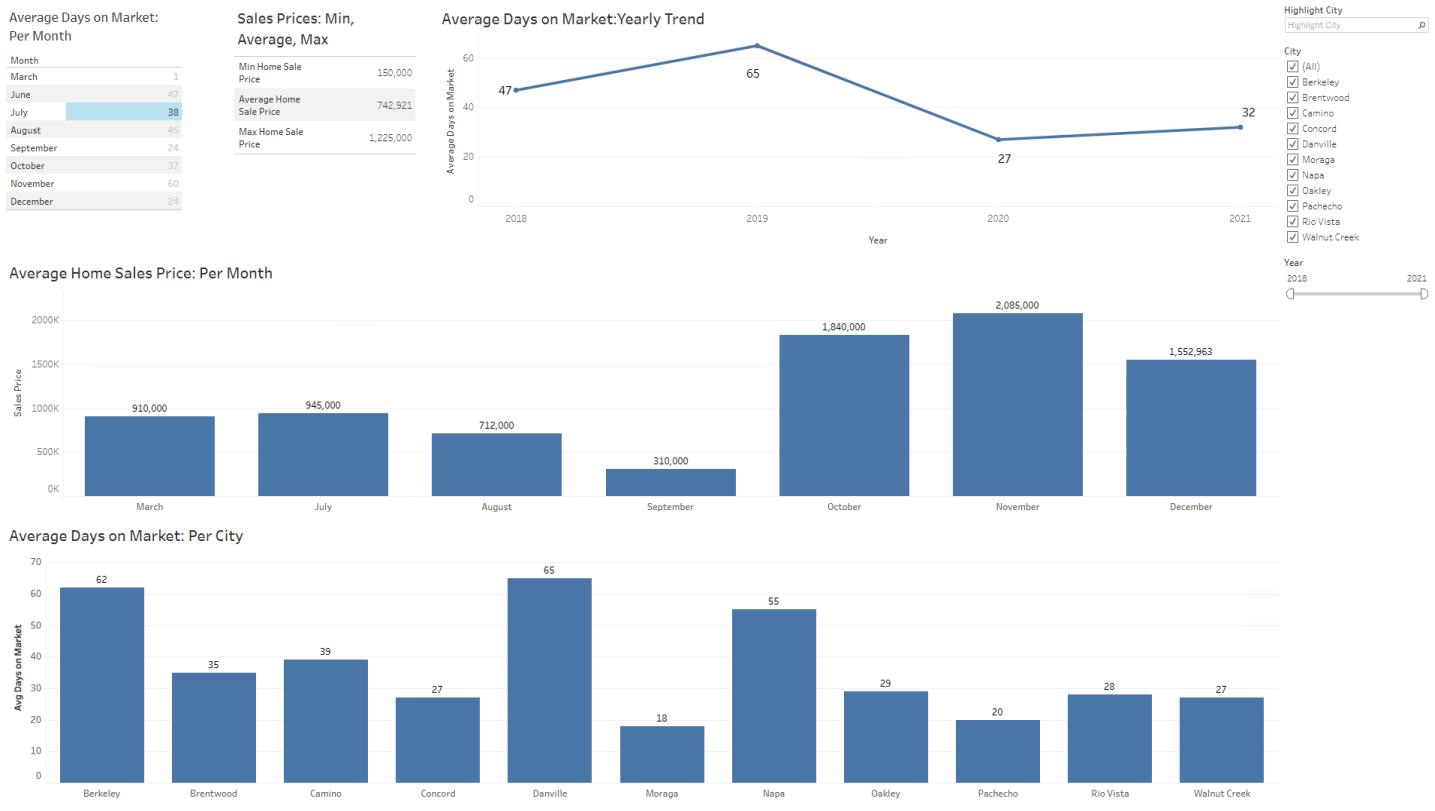
```
EXEC NewProperty '320 N Civic Drive', 'Walnut Creek', 94596, 260000.00, '05/12/2018',
'6/28/2018'
```

User Interface

I created a Tableau Dashboard as the User Interface. The goal of the dashboard is to inform the stakeholder of current values. Specifically, looking at the answers to Data Questions.

Dashboard link:

https://public.tableau.com/views/PropertyByAshleyDashboard/Dashboard1?:language=en-US&publish=yes&:display_count=n&:origin=viz_share_link



Reflection

The next time you go through the process of creating a database, what will you do differently now that you have been through the whole process?

That was undoubtedly tougher than I thought it would be! I didn't know how to normalize my data until I started creating tables. Next time, I will be more aware of normalizing before I begin to code. Also, I will think more about the User Interface during the earlier stages of design process.