

## 1. Name of the Company

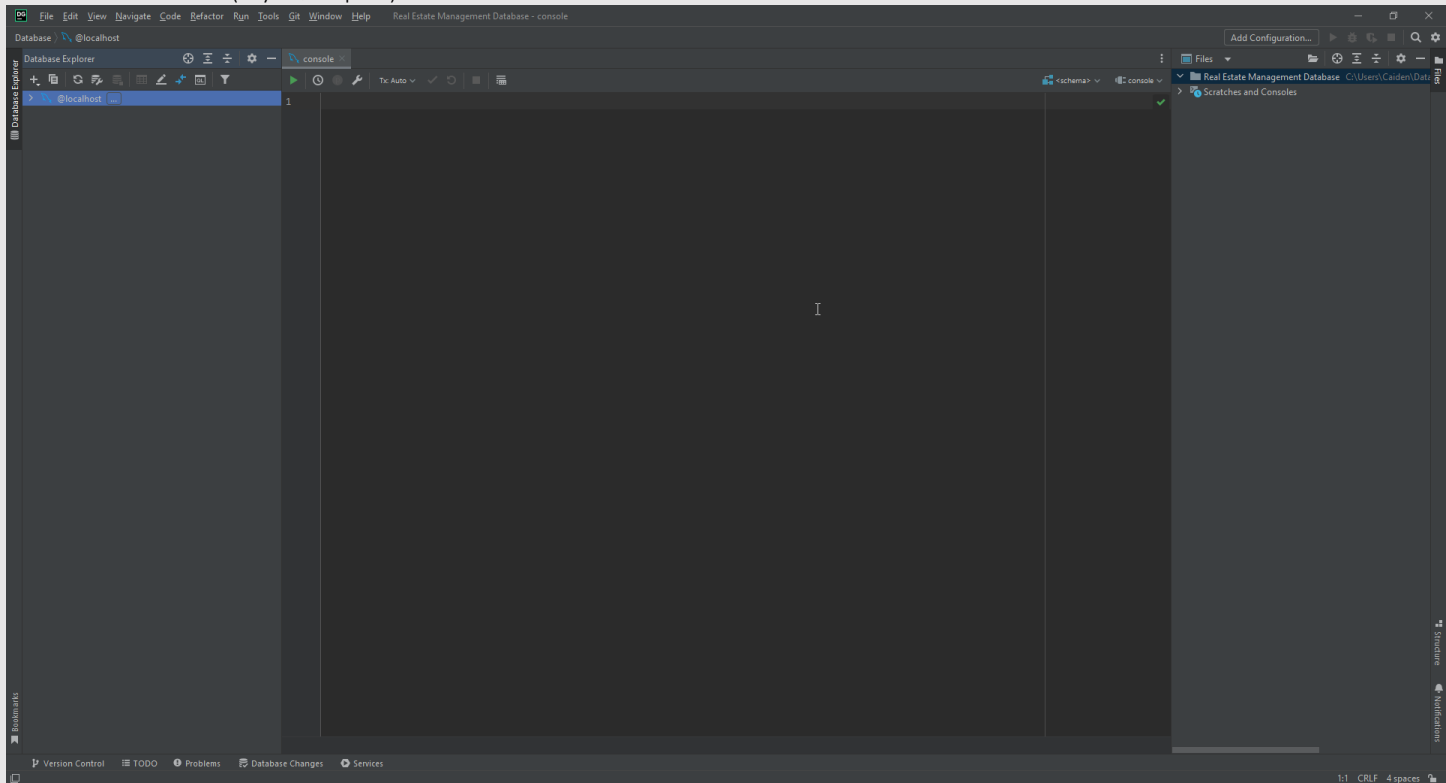
Red Gorillas

## 2. Project Title

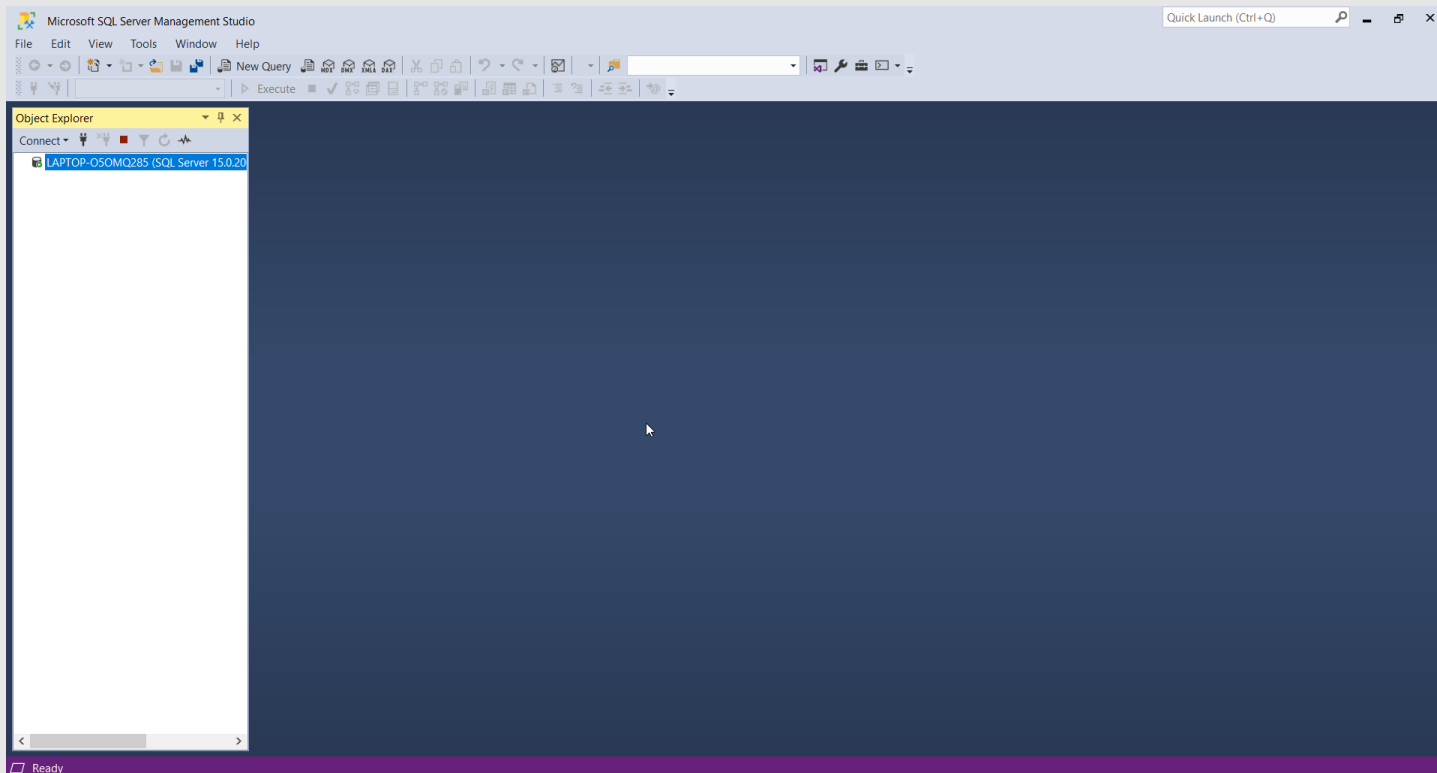
Real Estate Management Database

## 3. Team

- Member 1 full name (MySQL Expert) Sarina Abedi



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- Member 2 full name (MS SQL Server Expert) Caiden Merklin



You are going to learn MySQL and MS SQL Server. One of you implements the project on MySQL and the other on MS SQL Server. However, you are going to teach the DBMS which you learn to your project partner. At the end both of you know two well-known DBMS's.

## 4. Weekly Meeting Hours

We will meet and work on the project every (a day of the week, e.g. Monday, Tuesday...) from ..... to .....

Decide with your groupmate on a specific day and time. Do not write something like "We will meet every week for 1 hour". This is not specific and may not happen. Fixing a specific time for meetings and sticking to it is a good practice for time management and teamwork.

Tuesday 1030-1230

Thursday 1030-1230

## 5. Project Description

Project description is placed here. This part is used for describing, in non-technical terms, what your project is about. The description can be a few paragraphs to introduce the project to the reader. If you found that the description that was provided to you is not complete or it is not clear, make sure to complete it. If you found the description provided to you by your instructor is complete and clear, just copy paste it here:

This database will keep record of all properties listed for sale, rent or bought by buyers.

This database stores data about properties. A property can be a Detached House, Land, Condo, Recreational, Agriculture, Parking on sale in different cities of different provinces in Canada. They have some attributes such as Property ID, Address (follow Standard Canada Address), Price, Ownership, Listed Since, Description, many photos... Some property types may have specific attributes. For example, condos may have condo fee while Detached House may not have this attribute. (Find those attributes on websites such as realtor.ca)

A Realtor or Agents will have First Name, Last Name, License Number, Address, Years of experience, Phone number, email address.

A realtor works for a realty company. A realty company has name and address and phone number.

There can Renters, Buyers, or Sellers. Their attributes are First Name, Last Name, Address, Phone number, occupation.

Banks provide mortgage for buying houses. We need to store the name of the bank and the amount of mortgage.

If a property has been rented, information about the tenant(s), renter and his/her dependents, the start and end time of rent, amount of monthly rent is stored.

## 6. Assumptions about Cardinality and Participations

You can write all the assumptions about Cardinality and Participations (total/partial) here.

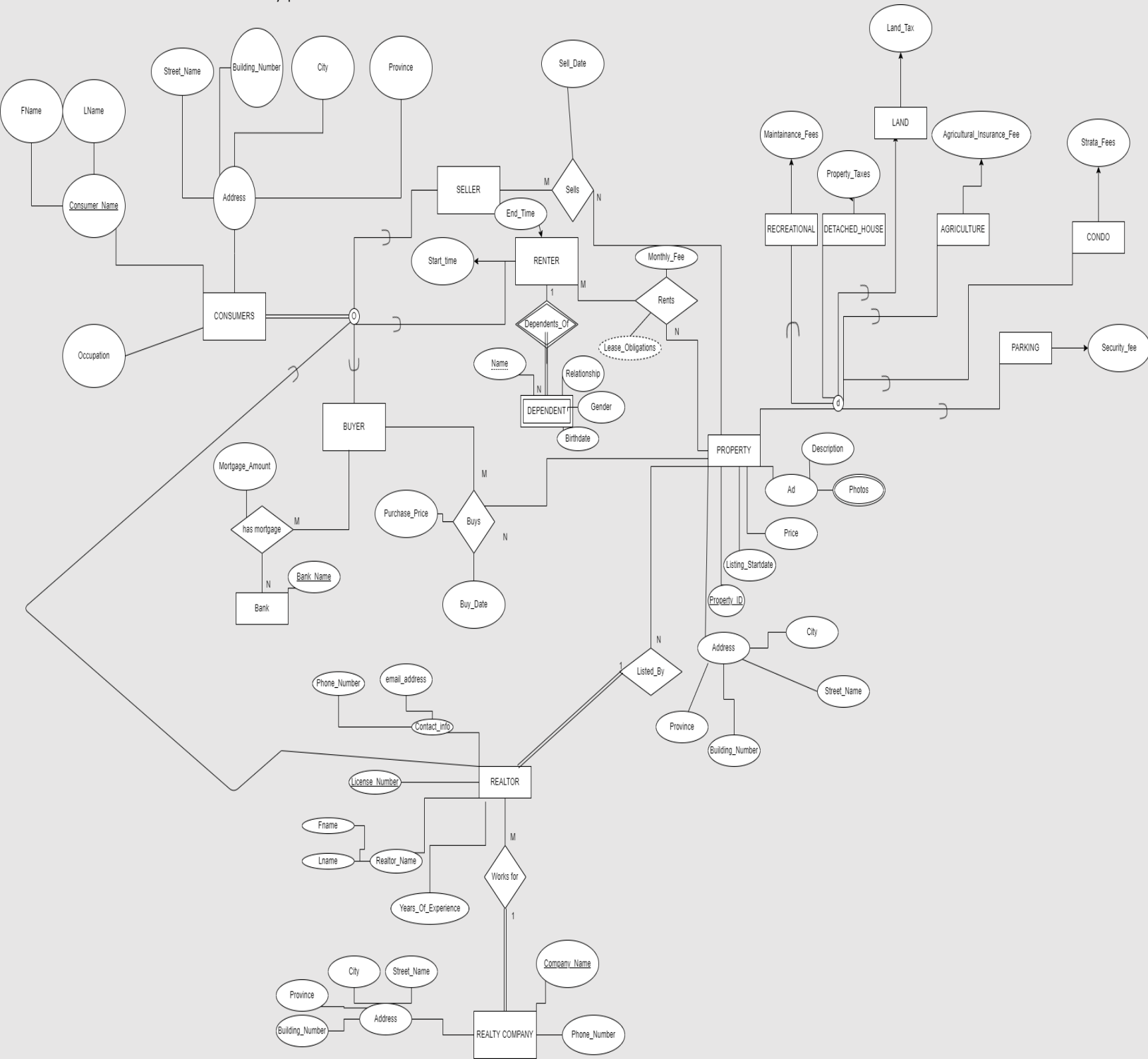
- Consumers
  - Many renters (families) rent many properties (M:N)
    - partial participation: Not every renter may rent a property
  - Many buyers may buy many properties (M:N)
    - Partial participation: Not every buyer may buy a property
  - Many sellers may sell many property (M:N)
    - Partial participation: Not every seller may sell a property
- Many properties are sold by one realtor (M:1); one realtor may have many properties on the market, but only one realtor is responsible for selling a certain property at a time.
  - Total participation: Every realtor must be selling a property (or else they would be fired)
- One renter may have many dependents
  - Partial participation, as not every renter may have dependents
- Dependent relationship with the dependents of relationship: will be total participation, as every dependent must belong to someone else.
- Many buyers may have one mortgage (M:1)
  - Partial participation: not every buyer needs a mortgage
- Many realtors may work for 1 realty company, there will be many realty companies available but a realtor can only belong to one of them (M:1)
  - Total participation; in this database every realtor is employed by a realty company
- Many banks provide many mortgages (M:N)
  - Partial participation as every buyer may not need a mortgage

## 7. EER Modeling Diagram

In the following drawing canvas, EER Modeling shapes have been provided. You can copy and replicate them (Ctrl+C to copy and Ctrl+V to paste. You can also select a shape, then press Ctrl button and drag and drop to copy a shape) and edit them to build your diagram.:

<https://drive.google.com/file/d/1K-TAvl86L7czBWmNmFEQj6uvE-dMTvan/view?usp=sharing>

- Link to the draw.io may pertain useful as this has been modified



## 8. ER-Model Mapping to Database Relational Schema

The relational Schema is written here

Consumer(ConsumerID, FirstName, LastName, Occupation, Street\_Name, Building\_Number, City, Province)

Buyer(ConsumerID)

Seller(ConsumerID)

Renter(ConsumerID, Start\_Time, End\_Time)

PurchaseContract(ContractID)

Bank(Bank\_Name)

Realtor(License\_Number, Phone\_Number, email\_address, Fname, Lname, Years\_Of\_Experience, **Company\_Name**)

Realty\_Company(Company\_Name, Phone\_Number, Building\_Number, Street\_Name, City, Province)

Property(PropertyID, Street\_Name, Building\_Number, City, Province, Listing\_StartDate, Price, Description, PropertyType)

Renter\_has\_Dependent(ConsumerID, Name, Relationship, Gender, Birthdate)

Buyer\_Buys\_Through\_Purchase\_Contract(ConsumerID, ContractID, Purchase\_Price, Buy\_Date)

Seller\_Sells\_Through\_Purchase\_Contract(ConsumerID, ContractID, Sell\_Date)

Renter\_Rents\_Through\_Purchase\_Contract(ConsumerID, ContractID, Monthly\_Fee)

Bank\_hasMortgage\_Through\_Purchase\_Contract(Bank\_Name, ContractID, Mortgage\_Amount)

Realtor\_lists\_PurchaseContract(License\_Number, ContractID)

Property\_Photo(PropertyId, Photo)

## 9. Normalization

All relations must be normalized up to BCNF. You must explain why you believe every relation in your database is normalized.

1nf:

Consumer(ConsumerID, FirstName, LastName, Occupation, Street\_Name, Building\_Number, City, Province)

- There can be only one consumer stored, with only one value for each attribute.

Buyer(ConsumerID)

- There can only be one buyer stored like this

Seller(ConsumerID)

- No nesting

Renter(ConsumerID, Start\_Time, End\_Time)

- No nesting

PurchaseContract(ContractID)

- No nesting

Bank(Bank\_Name)

- No nesting

Realtor(License\_Number, Phone\_Number, email\_address, Fname, Lname, Years\_Of\_Experience, **Company\_Name**)

- No nesting, only one option for each

Realty\_Company(Company\_Name, Phone\_Number, Building\_Number, Street\_Name, City, Province)

- No nesting, only one option for each

Property(PropertyID, Street\_Name, Building\_Number, City, Province, Listing\_StartDate, Price, Description, PropertyType)

- No nesting, each property can only be stored as one of each

Renter\_has\_Dependent(ConsumerID, Name, Relationship, Gender, Birthdate)

- Must be stored individually

Buyer\_Buys\_Through\_Purchase\_Contract(ConsumerID, ContractID, Purchase\_Price, Buy\_Date)

Seller\_Sells\_Through\_Purchase\_Contract(ConsumerID, ContractID, Sell\_Date)

Renter\_Rents\_Through\_Purchase\_Contract(ConsumerID, ContractID, Monthly\_Fee)

Bank\_hasMortgage\_Through\_Purchase\_Contract(Bank\_Name, ContractID, Mortgage\_Amount)

Realtor\_lists\_PurchaseContract(License\_Number, ContractID)

- Each of these will only have one purchase contract

Property\_Photo(PropertyId, Photo)

- Each photo will have to be stored individually

2nf:

Consumer(ConsumerID, FirstName, LastName, Occupation, Street\_Name, Building\_Number, City, Province)

- Everything is fully dependent on ConsumerID

Buyer(ConsumerID)

- Everything is fully dependent on ConsumerID

Seller(ConsumerID)

- Everything is fully dependent on ConsumerID

Renter(ConsumerID, Start\_Time, End\_Time)

- Everything is fully dependent on ConsumerID

Realtor(License\_Number, Phone\_Number, email\_address, Fname, Lname)

- Fully dependent on license\_number

PurchaseContract(ContractID, Obligations)

- Fully dependent on the contractID

Realty\_Company(Company\_Name, Phone\_Number, Building\_Number, Street\_Name, City, Province)

- Everything is fully dependent on Company\_Name

Property(PropertyID, Street\_Name, Building\_Number, City, Province, Listing\_StartDate, Price, Description, PropertyType)

- Maybe could break into listing as well, but this seems alright

Renter\_has\_Dependent(ConsumerID, Name, Relationship, Gender, Birthdate)

- The dependent relies entirely on the Renter

Realtor\_worksfor\_RealtyCompany(License\_Number, Company\_Name, Years\_Of\_Experience)

- Split the realtor in this, as years and company name are not necessarily fully dependent on realtor

Buyer\_Buys\_Through\_Purchase\_Contract(ConsumerID, ContractID, Purchase\_Price, Buy\_Date)

- Each purchase contract relies on both the purchase

Seller\_Sells\_Through\_Purchase\_Contract(ConsumerID, ContractID, Sell\_Date)

- Sell date depends on the contract, and consumerID of the seller

Renter\_Rents\_Through\_Purchase\_Contract(ConsumerID, ContractID, Monthly\_Fee)

- Monthly fee relies on the ConsumerID of the renter and the ContractID of the purchase

Bank\_hasMortgage\_Through\_Purchase\_Contract(Bank\_Name, ContractID, Mortgage\_Amount)

- mortgageAmount is fully dependent on the bank and contract

Realtor\_lists\_PurchaseContract(License\_Number, ContractID)

Property\_Photo(PropertyId, Photo)

- Each photo relies on the property

3nf:

Consumer(ConsumerID, FirstName, LastName, Occupation, **AddressID**)

Buyer(ConsumerID)

- Everything is fully dependent on ConsumerID

Seller(ConsumerID)

- Everything is fully dependent on ConsumerID

Renter(ConsumerID, Start\_Time, End\_Time)

- Everything is fully dependent on ConsumerID

Realtor(License\_Number, Phone\_Number, email\_address, Fname, Lname)

- Fully dependent on license\_number

PurchaseContract(ContractID)

- Fully dependent on the contractID

Realty\_Company(Company\_Name, Phone\_Number, **AddressID**)

- Changed it to include the address from before

Property(PropertyID, **AddressID**, Listing\_StartDate, Price, Description, PropertyType)

- Maybe could break into listing as well, but this seems alright? Only the listed properties need to be stored unless we want to keep the old listings available.

Address(AddressID, Street\_Name, Building\_Number, City, Province)

- I split this as it is transitively dependent on the Consumer
- If the consumer is modifying their street\_Name, we want them to modify the whole address to avoid update anomalies

This all remains unchanged as it is in 3nf:

Renter\_has\_Dependent(ConsumerID, Name, Relationship, Gender, Birthdate)

- The dependent relies entirely on the Renter

Realtor\_worksfor\_RealtyCompany(License Number, Company Name, Years\_Of\_Experience\_At\_Company)

- Split the realtor in this, as years and company name are not necessarily fully dependent on realtor

Buyer\_Buys\_Through\_Purchase\_Contract(ConsumerID, ContractID, Purchase\_Price, Buy\_Date)

- Each purchase contract relies on both the purchase

Seller\_Sells\_Through\_Purchase\_Contract(ConsumerID, ContractID, Sell\_Date)

- Sell date depends on the contract, and consumerID of the seller

Renter\_Rents\_Through\_Purchase\_Contract(ConsumerID, ContractID, Monthly\_Fee)

- Monthly fee relies on the ConsumerID of the renter and the ContractID of the purchase

Bank\_hasMortgage\_Through\_Purchase\_Contract(Bank Name, ContractID, Mortgage\_Amount)

- mortgageAmount is fully dependent on the bank and contract

Realtor\_lists\_PurchaseContract(License Number, ContractID)

Property\_Photo(PropertyId, Photo)

- Each photo relies on the property

BCNF:

Property type might be a potential option:

Property(PropertyID, AddressID, Listing\_StartDate, Price, Description)

- PropertyID -> PropertyType was an issue in case the property is deleted, the property type is also deleted.

Dependent\_HasInfo (DependentID, Name, Gender, Birthday)

- ConsumerID -> Gender, and ConsumerID -> Birthdate are possible BCNF violations, the Consumer, could also name all of their children the same thing if they wanted

Property\_has\_PropertyType(PropertyType, PropertyID, PropertyFees)

The purchase Contract, will need to be modified for each of the options:

- The only thing that matters in A\_Through\_PurchaseContract is the ConsumerID, and the ContractID.  
ConsumerID -> Purchase\_Price, Buy\_Date, Sell\_Date, Monthly\_Fee, MortgageAmount.

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So therefore the final schema is:

Consumer(ConsumerID, FirstName, LastName, Occupation, AddressID)

Buyer(ConsumerID)

Seller(ConsumerID)

Renter(ConsumerID, Start\_Date, End\_Date)

Realtor(License Number, Phone\_Number, email\_address, Fname, Lname)

PurchaseContract(ContractID)

Property(PropertyID, AddressID, Listing\_StartDate, Price, Description)

Address(AddressID, Street\_Name, Building\_Number, City, Province)

Realty\_Company(Company Name, Phone\_Number, AddressID)

Property\_has\_PropertyType(PropertyType, PropertyID, PropertyFees)

Renter\_has\_Dependent(ConsumerID, DependentID, Relationship)

Dependent\_HasInfo (DependentID, Name, Gender, Birthday)

Realtor\_worksfor\_RealtyCompany(License Number, Company Name, Years\_Of\_Experience\_At\_Company)

PurchaseContract\_BuyerObligations(ContractID, Purchase\_Price, Buy\_Date)

PurchaseContract\_SellerObligations(ContractID, ConsumerID, Sell\_Date)

PurchaseContract\_RenterObligations(ContractID, ConsumerID, Monthly\_fee)

PurchaseContract\_MortgageObligations(ContractID, ConsumerID, Mortgage\_Amount)  
Realtor\_lists\_PurchaseContract(License Number, ContractID)

Property\_Photo(PropertyId, Photo)

## 10.Determining Data Types (Domain) and Constraints

You explain why you choose a certain data type for a field and why you apply certain constraints

## 11.Creating Database and Tables - SQL DDL

You do not need to copy SQL commands here. Save your SQL commands in a script file and just mention the name of the file here. Make sure the script file is stored besides this document within the same folder.

Create\_Script.txt

## 12.Inserting Values in Tables

You do not need to copy SQL commands here. Save your SQL commands in a script file and just mention the name of the file here. Make sure the script file is stored beside this document within the same folder.

Insert\_Script.txt

## 13.SQL Queries

You do not need to copy SQL commands here. Save your SQL commands in a script file and just mention the name of the file here. Make sure the script file is stored beside this document within the same folder.

MYSQL\_Step5.txt

## 14.Views

You do not need to copy SQL commands here. Save your SQL commands in a script file and just mention the name of the file here. Make sure the script file is stored beside this document within the same folder.

MYSQL\_Step5.txt