REAL ESTATE DATABASE MANAGEMENT SYSTEM

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1. Executive Summary

According to the National Association of Realtors (NAR) in a 2014 report, 87% of all new agents fail after five years in the industry, due to not making enough money. One of the biggest factors in this high failure rate was the inability, and the lack of resources and knowledge, to generate leads. The purpose of this database is to work alongside data scraped from public record websites in order to provide new, potential leads. Public record websites publicly store the names, addresses, age, and contact information of people, which is essential. This application will serve real estate agents and provide them with a unique way to expand their client base and will serve clients by providing them an efficient way to achieve their property selling and buying needs.

For instance, we can look up the average age of first-time home buyers (e.g. 27-35 year olds) and scrape the names, contact info, and property info of all people within that range. We can also look at the average age of home sellers (e.g. 55-68) and do the same. Further optimizations can be done by narrowing the data range to people in a city, and not the national average. Our database will then provide these people as "prospects" that can be used in the search for clientele for our users. This also provides a mechanism for prospective clients to connect with real estate agents and other clients.

This application will allow agents to keep track of prospects and prospects turned clients and allow for an easy medium to connect buyers and sellers. The application will keep track of buyers and sellers, their respective agents, and other property information being utilized. It will allow for sales based on offers and provide a payment system integrated into the application.

2. Use Cases

1. Use Case: House Property Search

A real estate agent wants to search for a property with specific attributes. He is looking for a house with a garage and a swimming pool. The agent then wants to compare the prices of the houses against each other along with the differences in each property. He plans to contact the homeowner of properties he is interested in, to offer his services in helping to sell or buy the property.

2. Use Case: Seller Looking for Agent

Seller wants to list their property in a specific neighborhood and compare his prices to the competition. He also wants a list of real estate agents that he can contact so that he can choose the best one for himself, instead of the first one to message him.

3. Use Case: Email Blast for Advertisement

An agent wants to quickly advertise a property he is helping sell, to as many people as possible. He intends to use the email of other real estate agents and other people in the database to quickly send out an email blast advertisement. He wants a list of emails to potential home buyers so that he can perform this task quickly.

4. Use Case: Executive Summary Goal, Cold Calling Network for New Agents

New agents have a hard time building clientele due to not having a network of connections and trust. They start by cold calling, but need prospective people in order to maximize their efficiency and time. They want a list of older people to call about home selling, and a list of younger ones to call about home buying.

5. Use Case: Buyer Looking for Properties

A buyer wants to find a home in her budget of $1,500,000 and in Fremont. She wants to be able to quickly find potential properties and be able to contact the real estate agent representing the property being sold, or the homeowner.

6. Use Case: Tracking Sale History of Agents

Peter is a buyer that wants to buy a house, but is untrusting of agents. He prefers to sell to someone with a good reputation and with a track record of selling many homes. He believes that this shows that the agent has given fair prices, as most people have closed deals with that agent. He would like information on how many properties an agent has successfully sold.

7. Use Case: Property Search by Location and Size

An elderly couple would like to sell their house in the city to move somewhere less hectic. They also want a smaller house since they are planning to retire and don't have kids living with them anymore. The couple wants to be able to look through a list of houses that match their preferences on location and house size.

8. Use Case: Property Search by Price

Jane is a homeowner that wants to sell her house, but is unsure of what a fair price would be. She wants to be able to look at an assortment of houses near her, with similar traits so that she can have a preliminary assessment of the value of her own house.

9. Use Case: Agent Search by Firm

A real estate brokerage wants to hire some well-performing real estate agents and build them up as employees. They want a list of agents that are not currently hired by any brokerages.

10. Use Case: Payment Method

Jaden wants to pay for a house and close the deal with a seller. He wants to be able to pay with a method that takes the least amount of fees, so he wants to take a look at what payment methods are available.

11. Use Case: Account Role

The employees running the database and application want to have higher permissions to be able to efficiently moderate the application. They require an admin role that separates them from other users.

12. Use Case: Commission

Usually the commission is split between the buyer and seller's respective agents. They would like the commission agreed upon in the offer to be utilized when payment goes through and the deal closes.

3. Database Requirements

1. Real Estate Agent
 2.1. A real estate agent shall have an email, phone number, and/or an address
 2.2. A real estate agent shall work with zero or more buyers/sellers
 2.3. A real estate agent shall work for one or more broker
 2.4. A real estate agent will receive a commission fee from the sale of a property
 2.5. A real estate agent shall have a date of birth and age
 2.6. A real estate agent shall have at least one payment method
 2.7. A real estate agent shall have a real estate license

2. Broker
 2.1. A broker is a real estate agent
 2.2. A broker shall have a real estate broker license along with their real estate license
 2.3. A broker may supervise zero or more real estate agents or brokers
 2.4. A broker may receive a percentage of a real estate agent's commission fee

3. Firm
 3.1. A firm has zero or many employees
 3.2. A firm shall have a firm name
 3.3. A firm may have an address

4. Prospect
 4.1. A prospect is a person in the database
 4.2. A prospect is someone who may work with a real estate agent
 4.3. A prospect has contact information

5. Property
 5.1. A property shall have location information
 5.2. A property shall have at least one owner
 5.3. A property may have an accepted offer
 5.4. A property may be rented or sold by anyone that owns it
 5.5. A property will have a size

6. House
 6.1. A house is a property
 6.2. A house shall have a size (in square feet)
 6.3. A house shall have number of rooms, bedrooms, and bathrooms

7. Apartment
 7.1. An apartment is a property
 7.2. An apartment shall have separate living units
 7.3. Each unit of an apartment shall have occupancy status and number of current occupants
 7.4. An apartment shall have number of rooms, bedrooms, and bathrooms
 7.5. An apartment shall have listed utilities

8. Offer
 8.1. An offer shall either be pending or accepted
 8.2. Both buyer and seller must accept the offer for it to be binding
 8.3. An offer will include both parties involved, property details, purchase price offer, earnest money deposit offer, closing costs, and closing date

9. Employee
 9.1. An employee shall work for a firm or a broker

10. Seller
 10.1. A seller is a client
 10.2. A seller may work with zero or many real estate agents
 10.3. A seller shall have a property listed and for sale
 10.4. A seller shall have at least one payment method

11. Buyer
 11.1. A buyer is a client
 11.2. A buyer may work with zero or many real estate agents
 11.3. A buyer shall have at least one payment method

12. Commission
 12.1. A commission shall be a percentage of a property's sale price
 12.2. A commission shall be paid to a real estate agent upon closing a deal
 12.3. A broker may be paid a percentage of the commission made by agents and/or brokers that they are supervising
 12.4. A commission shall be paid with a payment method

13. Payment Method
 13.1. A payment method is a bank account, online payment system (PayPal), cryptocurrency, cash, or check
 13.2. A bank account payment method is either through a credit card, debit card, or bank account information (wire transfer or direct deposit)
 13.3. A cryptocurrency payment method only accepts BTC and ETH

14. Account
 14.1. An account shall belong to one person
 14.2. An account may have contact information
 14.3. An account shall have permissions to post property listings
 14.4. An account may have multiple properties listed
 14.5. An account shall have permissions to view listings

15. Rooms
 15.1. A property shall have a number of rooms

16. Listing
     16.1. A listing shall belong to one property
     16.2. A listing shall have location information
     16.3. A listing shall have a phone number and/or email
     16.4. A listing shall have a description and post info

17. Location Information
     17.1. Location information shall have an address
     17.2. Location information shall have a city
     17.3. Location information shall have a state
     17.4. Location information shall have a zip code

18. Role
     18.1. A role can be assigned to many accounts
     18.2. A role shall give different access permissions for the role designated
     18.2. A role may be changed

19. Sale
     19.1. A sale is a closed offer
     19.2. A sale means a commission shall be paid as a percentage of the total sale value
     19.3. A sale shall be completed when the buyer has paid with an accepted payment method

20. Rent
     20.1. A property may be rented
     20.2. A rent agreement will have a lease

21. Lease
     19.1. A lease is required for renting
     19.2. A lease shall have a renting price
     19.3. A lease shall have a starting and end date

22. Unit
     20.1. A unit is part of an apartment
     20.2. A unit can be leased

1. Main Entities, Attributes and Keys

1) **Real Estate Agent (Strong)**
   a) **agent_id:** *key, numeric*
   b) **name:** *composite, alphanumeric*
      i) first_name
      ii) last_name
   c) **dob:** *multivalue, date*
      i) year
      ii) month
      iii) day
   d) **address:** *multivalue, composite, alphanumeric*
      i) street
      ii) city
      iii) state
      iv) zip_code
   e) **phone:** *composite, multivalue, numeric*
      i) country_code
      ii) area_code
      iii) phone_number
   f) **email:** *composite, alphanumeric*
   g) **age:** *derived, numeric*

2) **Address (Strong)**
   a) **address_id:** *key, numeric*
   b) **street:** *alphanumeric*
   c) **city:** *alphanumeric*
   d) **zip_code:** *alphanumeric*

3) **Supervisor (Associative Entity)**
   a) **supervisor_id:** *key, numeric*

4) **Firm**
   a) **firm_id:** *key, alphanumeric*
   b) **firm_name:** *composite, alphanumeric*
   c) **address:** *multivalue, composite, alphanumeric*

5) **Prospect (Strong)**
   a) **prospect_id:** *key, numeric*
   b) **name:** *composite, alphanumeric*
      i) first_name
      ii) last_name
   c) **dob:** *multivalue, date*
      i) year
      ii) month

        iii) day
- d) **phone:** *composite, multivalue, numeric*
    - i) country_code
    - ii) area_code
    - iii) phone_number
- e) **email:** *composite, alphanumeric*
- f) **age:** *derived, numeric*

6) **Buyer (Weak)**
- a) **buyer_id:** *key, numeric*

7) **Seller (Weak)**
- a) **seller_id:** *key, numeric*

8) **Property (Strong)**
- a) **property_id:** *key, numeric*
- b) **property_name:** *alphanumeric*
- c) **address_FK**

9) **Listing (Weak)**
- a) **listing_id:** *key, numeric*
- b) **user_FK**
- c) **property_FK**
- d) **price:** *numeric*

10) **Amenities (Weak)**
- a) **amenities_id:** *key, numeric*
- b) **property_FK**
- c) **num_bedrooms:** *numeric*
- d) **num_bathrooms:** *numeric*
- e) **num_garage:** *numeric*
- f) **num_kitchen:** *numeric*
- g) **num_parking:** *numeric*

11) **Payment Method (Strong)**
- a) **debit card:** *composite, alphanumeric*
- b) **credit card:** *composite, alphanumeric*
- c) **cryptocurrency:** *alphanumeric*
    - i) BTC_address: *alphanumeric*
    - ii) ETH_address: *alphanumeric*
- d) **PayPal:** *composite, alphanumeric*

12) **House (Weak)**
- a) **house_id:** *key, numeric*
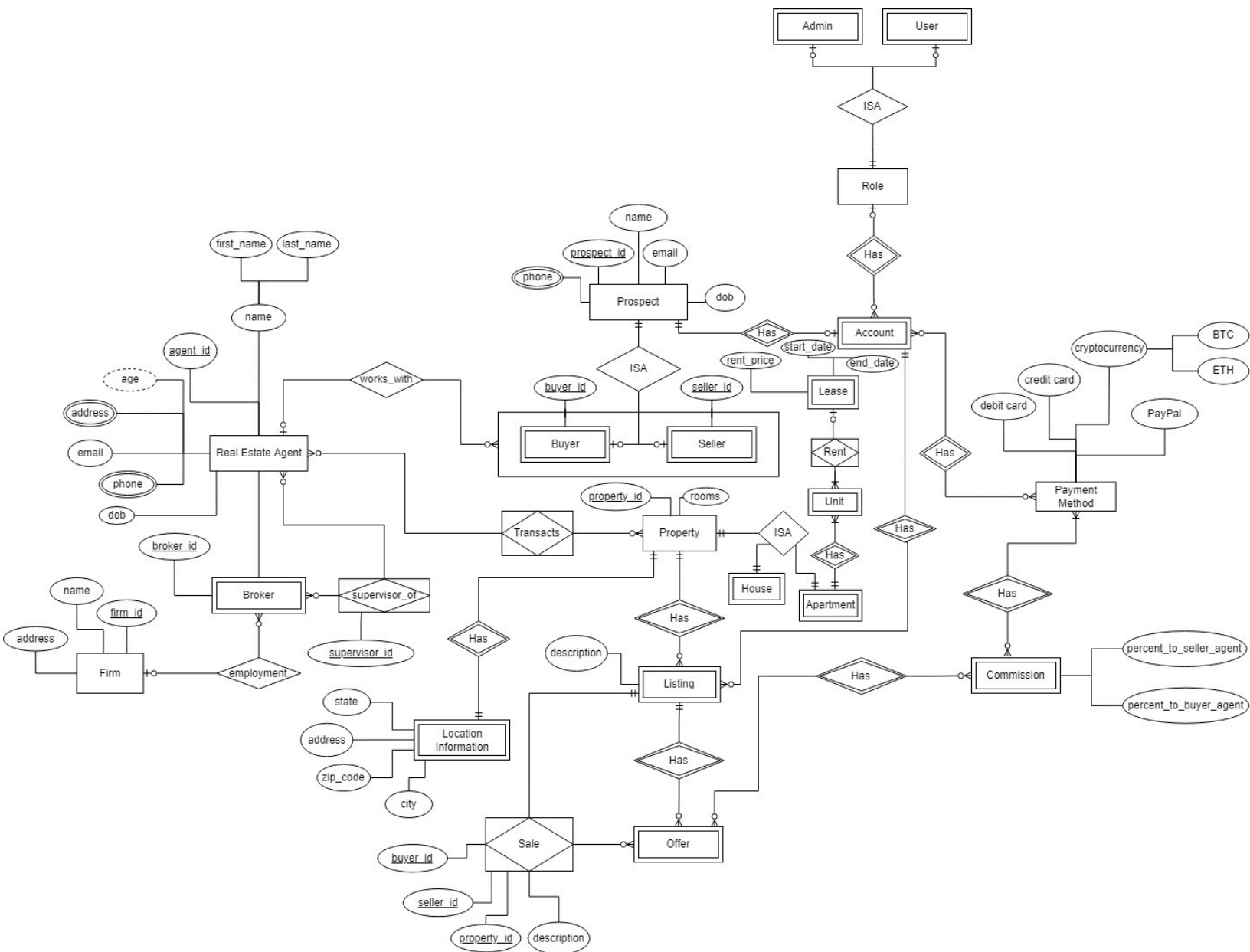- b) **property_FK**

    c) **amenities_FK**

13) **Apartment (Weak)**
    a) **apartment_id:** *key, numeric*
    b) **property_FK**

14) **Account (Weak)**
    a) **username:** *alphanumeric*
    b) **prospect_id:** *key, numeric*
    c) **password:** *alphanumeric*

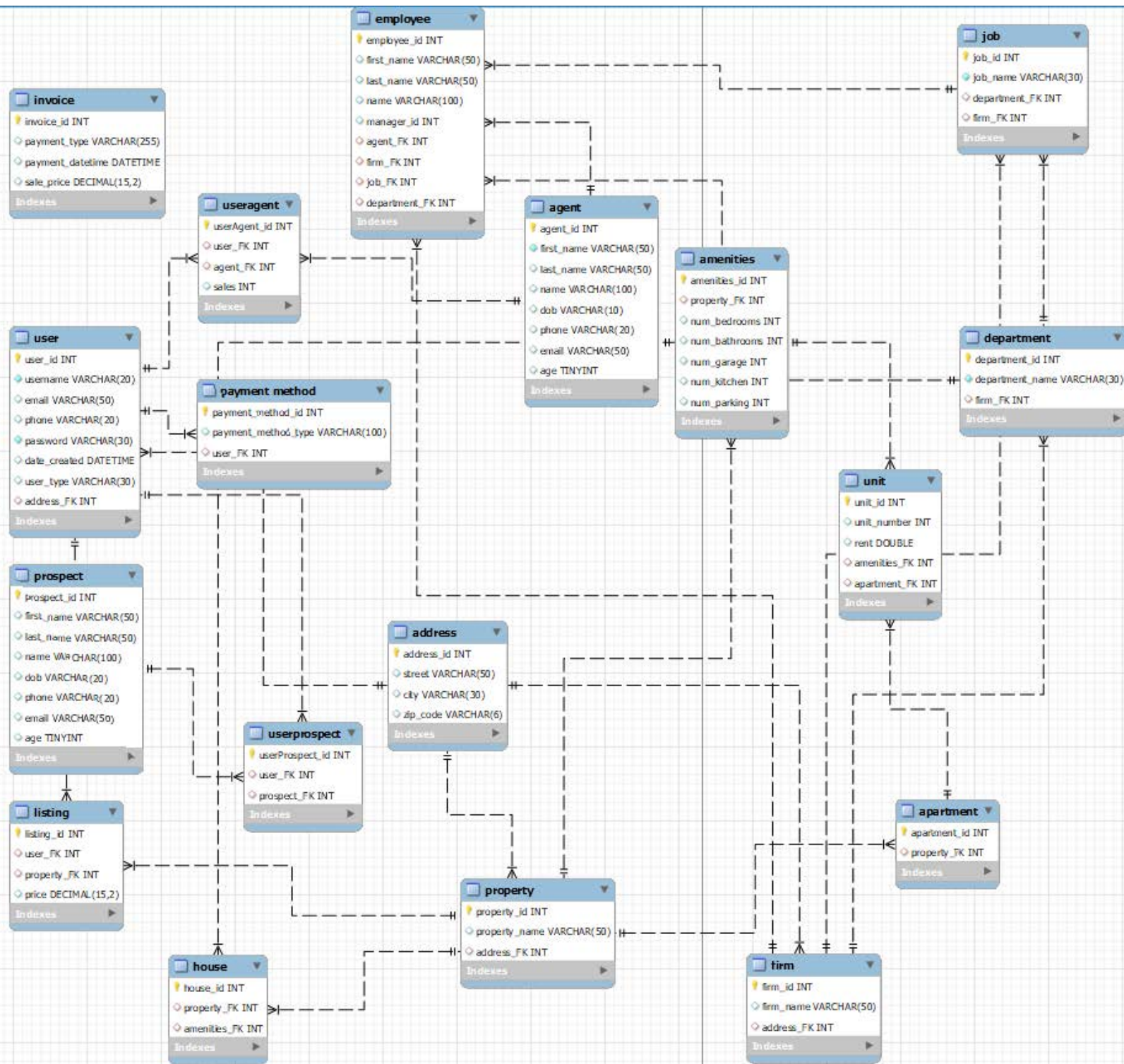# 5. Entity Relationship Diagram (ERD)

6. Database Model/ERR

Table	FK	ON DELETE	ON UPDATE	Comment
userAgent	user	ON CASCADE	ON CASCADE	If a user is deleted, then the account from that userAgent must be deleted as well
Listing	user	ON CASCADE	ON CASCADE	If a user is deleted from the user table, the listing made by that user will be deleted
Firm	address	ON NULL	ON CASCADE	If an address is deleted, then the firm's address should be set to NULL
Job	department	ON CASCADE	ON CASCADE	If a department is deleted, then the job should also be deleted
Job	firm	ON CASCADE	ON CASCADE	If a firm is deleted, then the job should also be deleted
Employee	firm	ON CASCADE	ON CASCADE	If a firm is deleted, then the employee should also be deleted