

CS 746 - Software Modeling and Analysis

Spring 2020

Assignment 1

Due on or before February 25, 2020 (Tuesday)

Instructions

1. All the answers must be typed. No hand-written assignments will be accepted.
 2. All diagrams must be drawn using software tool(s). No hand-drawn diagrams will be accepted.
 3. Send your electronic copy in WORD or in PDF format to the instructor at or before the class on the due date. Late submissions will be penalized.
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Falcon brothers, a real-estate company, would like to create a data server which holds information about real-estate properties in the seven-rivers region. Information of a property will include a number of parameters such as type (land or building, residential - isolated, residential - duplex, commercial), address (door number, city, state, ZIP code), location (latitude and longitude), area (in sq. ft.), specific information for residential properties (number of bedrooms, size of each room, number of bathrooms, type of each bathroom, garage etc.) or specific information for commercial properties (number of rooms, size of each room, facilities in each room, number of bathrooms, type of each bathroom, etc.), price, valid until (a date after which the said price is not applicable), broker who handles this property (labeled as “self” if it is managed by the *Falcon brothers*, and so on. There will be three types of users who will access the information:

Public This type of users can browse through information on properties that are currently posted for sale. These users do not need to login into the system.

Customer This type of user must login into the system first. Therefore, they must have an account to login. For simplicity, we can assume that creating an account is not part of this software system and will be considered outside the scope of this software system. A customer, once logged in, can browse through all information posted. In addition, he/she can complete an offer (a form to purchase) on a property. An offer will be processed by an administrator or a broker (see the other types of users below).

Broker This type of user must login into the system first. Similar to customers, we can assume that broker accounts are created and manipulated outside the scope of this software system. A broker, once logged in, can make a request to handle a property, meaning, taking control over the property to sell. An administrator (the next type of user) will have to approve the request. Once approved, a broker can adjust the price and contact information but cannot change other details of the property. If a customer makes an offer handled by a broker, then the broker can accept the offer, can deny the offer or can put a comment on the offer (negotiation).

Administrator This type of user must login into the system first. Similar to the other two types of users, administrator accounts will be created and manipulated outside the scope of this software system. An administrator can virtually do anything with the data. He/she can add/remove/change information on a property, can accept or deny or comment on an offer which is not taken over by a broker, and can accept or deny request from a broker to take over a property.

Draw the diagrams for the above problem using a data-centric architecture. Give three levels of refinement (very similar to the exercise given in the class notes). Use the same notation given in the class notes. If you wish, you can introduce additional symbols but must give an explanation of those symbols.

Bonus (10% additional marks): Draw the class diagram for the software system using UML class diagram. Refer to CS 743 notes or any UML book for UML notation to draw class diagram. Your class diagram should be augmented with the attributes and methods of each class, and the relationships between the classes.