COEN 280 Database Systems Spring 2023

Project (Groups of two allowed)

Total Points: 200

You are required to design and implement a **Rental Management System** for ***StrawberryField's Rental Management Inc,*** which manages rental properties on behalf of the owners. The system to be designed is to assist the rental manager to keep track of rental properties and lease agreements using a relational database for data and transaction management.

1.0 A description of the *information* managed at each of the *StrawberryField* offices is given below:

StrawberryField has several branches located throughout California.

Each **branch** is identified by a **branch number, phone** and **address (street, city and zip).**

Each branch has several **employees** – **managers, supervisors** and **staff**. A manager supervises the supervisors and a supervisor manages a number of rental properties. Managers, supervisors and staff, in addition to their **employee ids**, **names** and **phones**, have a **start date** of their employment and **job designation** (*manager, supervisor or staff*).

A **rental property** is identified by a **number** (unique among all branches), **property owner**, **address, number of rooms**, **monthly rent**. A rental property has a **status** that can be ***available, not-available*** or ***leased*.** A rental property's availability is indicated by the **start date of availability**.

A rental property is listed with one **property-owner**. An owner may own more than one rental property. **A property-owner's name, permanent address** and **phone number** should be recorded. The Rental Management company charges (for managing the property and rental details) the property owner a 10% of the rent, per month, once the property is rented.

Each rental property is managed by a **supervisor**. A supervisor can manage up to three rental properties. When a property is rented, a **lease agreement** should be created.

1.1 A lease agreement consists of the following information:

a) Rental Property Number, address
b) Renter's name
c) Renter's Home and Work phone
d) Starting day of lease
e) Ending day of lease
f) Deposit amount (one month's rent)
g) Monthly rent

1.2 The following constraints should be enforced.

a) A supervisor cannot supervise more than three rental properties at a time.
b) A lease agreement should be for a minimum of six months and a maximum of one year. The rent for a six-month lease is 10% more than the regular rent for that property.
c) When a lease agreement is created, the status for the property should be changed to ***leased (or not_available)***.
d) When a rental property is removed from the list of rentals, it should also be removed from its supervisor's list.
e) With every new lease, a 10% increase in rent should be added to the rent from the previous lease.

1.3 The following transactions are to be implemented

1) Generate a list of rental properties available for a specific branch (where the name of the branch is entered as input).
2) Generate a list of managers and for each manager, a list of supervisors under the manager and supervisors and the properties (with addresses) the supervisors supervise.
3) Generate a list of rental properties by a specific owner (where the owner's name and phone number are entered as input), listed in a *StrawberryField* branch (the branch name is input).
4) Show a listing of properties available, where the properties should satisfy the criteria (city, no of rooms and/or range for rent given as input).
5) Show the number of properties available for rent by branch.

6) Create a lease agreement (See section 1.1). The information to be entered into this agreement can be input via a Graphical User interface (See section 2.1) or from the command line.
7) Show a lease agreement for a renter (name or phone number is entered as input).
8) Show the renters who rented more than one rental property.
9) Show the average rent for properties managed by this Rental Management System. You can take the average of all the properties that are rented out and those available for rent in that town.
10) Show the names and addresses of properties whose leases will expire in the next two months (from the current date).
11) Show the money that is earned by the rental agency per month. This is calculated as 10% of the rent of the properties that are currently rented.
12)

Design and implement a relational database to maintain the data and transactions for ***StrawberryField*** **Rental Management System.**

2.0 Deliverables

Deliverable 1 (25 pts) (Due 16th May)

(20 pts) 1. A detailed, conceptual design using the E-R model should be included, showing the entities, relationships, multiplicities and integrity constraints. Any diagramming tool may be used, but a detailed legend to identify the notation used, should be included.

Deliverable 2 (175 pts) (Due in 10th Week)

a) The process of translating the E-R model into a relational model should be clearly shown with the resulting tables. Clearly identify the primary keys and foreign keys**. (10 pts)**
b) The script files to create the tables using SQL and load the tables with data of your choice. The script files and program files to implement the queries that are necessary to offer the functionality required (as described in 1.3). **(40 pts)**

c) A spool file that clearly demonstrates the functionality implemented by showing the queries and the results. **(125 pt)**

Project Documentation: should include a brief description of the system, the ER diagram, the Functional dependencies used, resulting tables with primary and foreign keys and normalization process applied, queries and results. Any assumptions you have made and any restrictions (in addition to the ones that are specified in this document) you may have imposed. You are free to include any additional attributes you may require for the entities described in this document

Two people teams are required to implement a web application with a Graphical User interface .

You are required to implement a graphical user interface to do the following:

- A main window to offer a menu of transactions required of the system.

  For example, the main menu may consist of

  i. Show Properties available
  ii. Create a lease agreement
  iii. Show a lease agreement

When an option is selected, the corresponding queries needed to fulfill the functionality should be executed.

- Offer a lease form that provides the input fields for the user to submit the input. Here, you may assume that a user is the person renting the property. On submitting the lease form, the lease document should be displayed.