

## **DAMG6210 Online Housing Rental Management System**

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### **Database Specification: Purpose, Business Problems Addressed and Business Rules**

#### **Database Purpose:**

The purpose of the database is to maintain the data used to generate and support housing rental management systems. It will be used by staff and clients to track, update and lookup housing resources. It will also help them to finish transactions and sign contracts.

#### **Business Problems Addressed:**

- Allow the rental company's administrative, marketing and financial staff to generate descriptive reports.
- Allow all web users to lookup the information about buildings and rooms, such as rent, availability, parking, service provider, contract, and floorplan.
- Allow marketing staff to anticipate future room rentals. Therefore, helping administrators make promotional plans according to address, building and season.
- Allow the maintenance team to process and record maintenance history online.
- Allow future residents to apply for room and process their contracts online.
- Permits management group members to track their tenants, landlords, and partner companies through contracts.
- Base on the application, the rental company can analyze the preferred rooms (location, floorplan, etc.) for tenants with different income level
- Figure out the more popular rooms base on the ratio between application and visiting.
- Find the most popular floorplan base on the total visit times.
- Evaluate different staff groups' performance by tracking the contracts.
- Find geography distribution for rooms in the database
- Evaluate different service companies in the database base on their charge and service time.
- Check each room's availability, the room's available date should later than the existing contract's end date.
- Encrypt the SSN in personal information.
- Generate average service fee for each service company.
- Generate evaluation score for each service company.
- Compare the expected tenancy from application with required tenancy for each room, generate the validity evaluation for each application.

#### **Business Rules:**

- Each building may have one or more rooms.
- Each address may have one or more buildings.
- Each building may have zero or more parking.
- Each building will belong to one management group.
- Each group may have one or more buildings to manage.

- Each group may have one or more staff.
- Each room may have zero or more applications.
- Each room may have zero or more maintenance histories.
- Each room may have zero or more visitors.
- Each room may have zero or more contracts.
- Each room will have one floorplan.
- Each floorplan may have one or more rooms
- Each maintenance history will have one service company
- Each service company may have one or more maintenance histories.
- Each service company will have one function.
- Each function type may have one or more service companies.
- Each staff member will belong to one group.
- Each staff member will belong to one department.
- Each staff member will have one personal information.
- Each department will have one or more staff.
- Each personal information will have one staff member or customer.
- Each customer type will have one or more customers.
- Each address may have one or more personal information.
- Each contract will belong to one room.
- Each customer belongs to one customer type.
- Each contract belongs to one contract type.
- Each customer may have zero or more visiting histories.
- Each customer may have zero or more contracts.

### Design Decisions:

Entity	Why Entity Included	How Entity is Related to Other Entities
Address	Address is important information to be considered in the rental process, also it is the information the rental company needs when dealing with the location of the rooms which are listed in the rental system. Whether the rental platform manages the properties, the landlords post the properties, or the tenants look for properties based on the address, it is necessary to manage the address where the properties are located.	The address entity is related to the building entity as a foreign key of the associated entity. An address may has multiple buildings.
Building	This entity represents the buildings containing the rooms listed in the rental system. It is necessary for the company to maintain the buildings and provide common services for the customers. Also, based on a	The building entity is related to the address entity, and address_id is used as a foreign key for the building entity. A building has multiple parking

	particular address, the property information needs to be further specific to the building for the rental platform to assign staff for management.	spaces. A group manages multiple buildings and group_id is a foreign key of building entity.
Parking	Parking positions are important facilities for tenants with vehicles. The availability of parking spaces in each building is one of the considerations for renting. The availability of parking spaces and the tenant's vehicle registration information need to be recorded.	The parking entity is directly associated with the building entity. Multiple parking spaces belong to a specific building.
Group	Group is a team of staff from the rental company, this is the unit responsible for multiple buildings.	The group consisted of staff performing duties. Staff provide services to the buildings as a group.
Department	Departments have different duties; it can define different staff's responsibility.	Department formed by staff with similar duties.
Staff	The rental platform needs to record the basic information of the staff and the groups and departments they belong to.	Each staff belongs to a department and a group. department_id and group_id are used as foreign keys for the staff entity.
Personal Information	Staff, tenants, and landlords have the same personal information properties as human.	Info_id is used as a foreign key for the Staff entity and the Customer entity to determine a personal information for each person.
Customer	Customers are required to participate in the signing of the rental contract and will also be recorded in the visiting history. When interested in a particular room, customers can submit an application.	Customer entity is indirectly related to the Room entity through the Visiting History entity and Application entity.
Customer Type	Customers include landlords, tenants and visitors, which are the three main subjects of rental matters.	The type attribute of the Customer entity is used as a foreign key for the Customer entity. One type corresponds to multiple customers.
Contract	Signing a rental contract is necessary for renting a room. In addition to the room information, it involves the tenant or the	Each contract is unique. The contract entity is directly related to the landlord (or

	landlord. The contract also needs to include the start and end dates of the rental to ensure that the contract is valid.	tenant), room. Also, each contract has a type, which is related to the Contract Type entity.
Contract Type	Each contract has a type, representing whether the contract is with the landlord or the tenant. The categorized contracts are easy to manage and more convenient to query and update.	One contract type corresponds to multiple contracts. type is used as a foreign key for the Contract entity.
Room	One of the primary purposes of this database is to track and update the information of each room belonging to the rental company. The rent and floorplan can be shown to all potential clients. And the availability and maintenance history will provide staff with a clear knowledge of the unit.	As the core entity in the database, the room's primary key, room_id is directly related to its building, application, visiting history, contract, and maintenance history. We may compute popularity for each room with those factors.
Floorplan	Floorplan is one of the main concerns for tenants. This entity is used to clarify the floorplan of each room.	It's directly related to Room entity.
Application	After one visitor viewed certain room, he or she might want to submit the application for that room. This entity is used to store detailed information of the application sheet.	Each application is unique. Both of customer_id (visitors, in specific) and room_id play as the foreign key in Application entity. In other words, each customer could only submit one application for each room.
Visiting History	Visiting History records when and which customer viewed certain room, which helps analyze the popularity of different types of room.	Each Visiting history is unique. The Visiting History entity is directly related to the customer and room. Both of customer_id (visitors, in specific) and room_id play as the foreign key in Visiting History entity.
Maintenance History	Maintenance History records when and which partner maintained certain room as well as the maintenance detail, fee and time range, which helps calculate the maintenance cost and trace the maintenance history of each room. These	Each maintenance history is unique. The Maintenance History entity is directly related to the service companies and room. service_company_id is used as the foreign key.

	would influence the rent and available date of each room.	
Service Companies	Service Companies records function type, average maintenance fee and rating for each partner company, which helps choose proper partner to cooperate.	The Service Companies entity is directly related to the Maintenance History and Function Type. function_id is used as the foreign key.
Function Type	Each partner has different function types, like decoration, cleaning, construction etc. This entity is used to clarify those functions.	It's directly related to Service Companies entity.