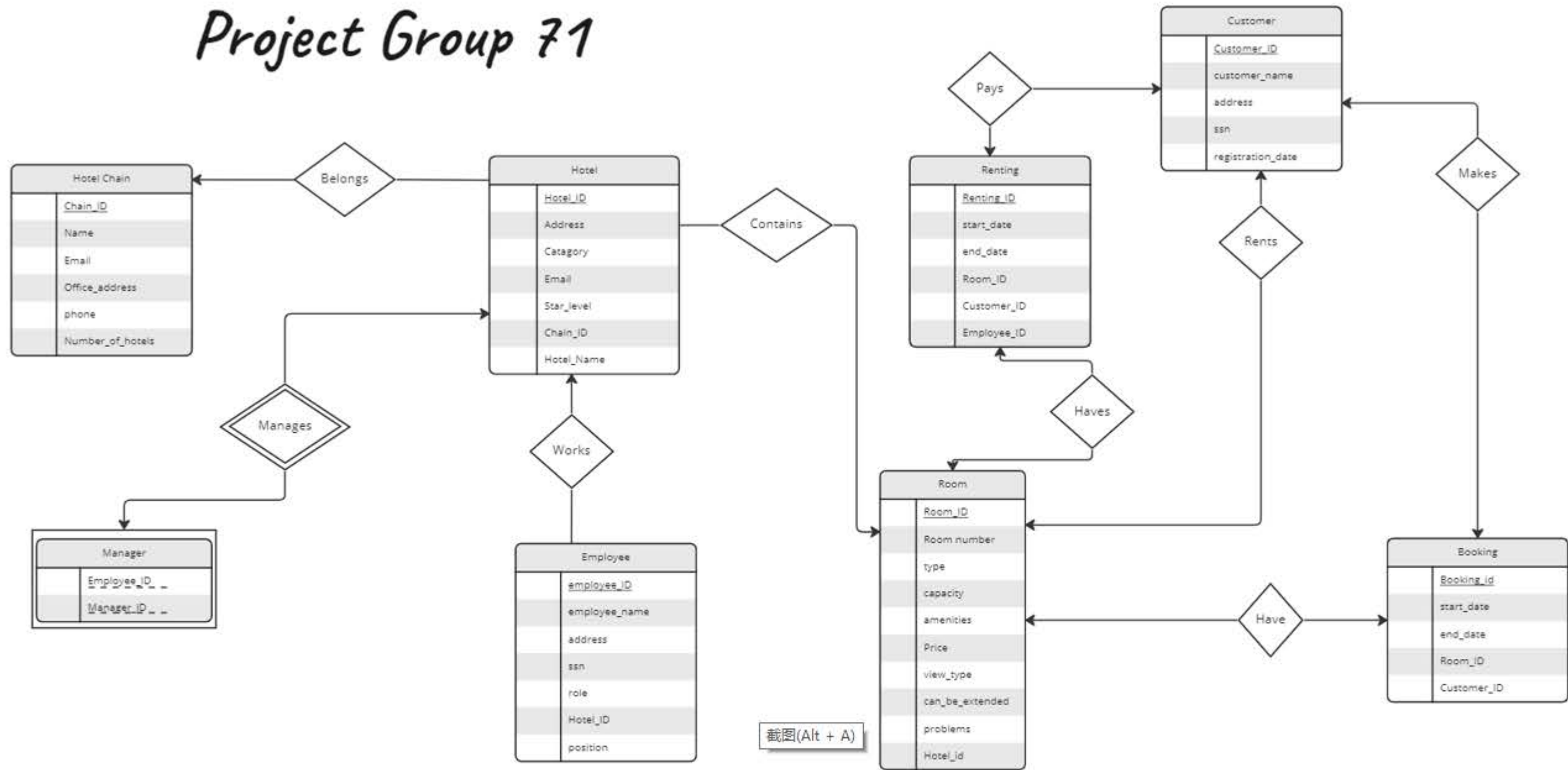
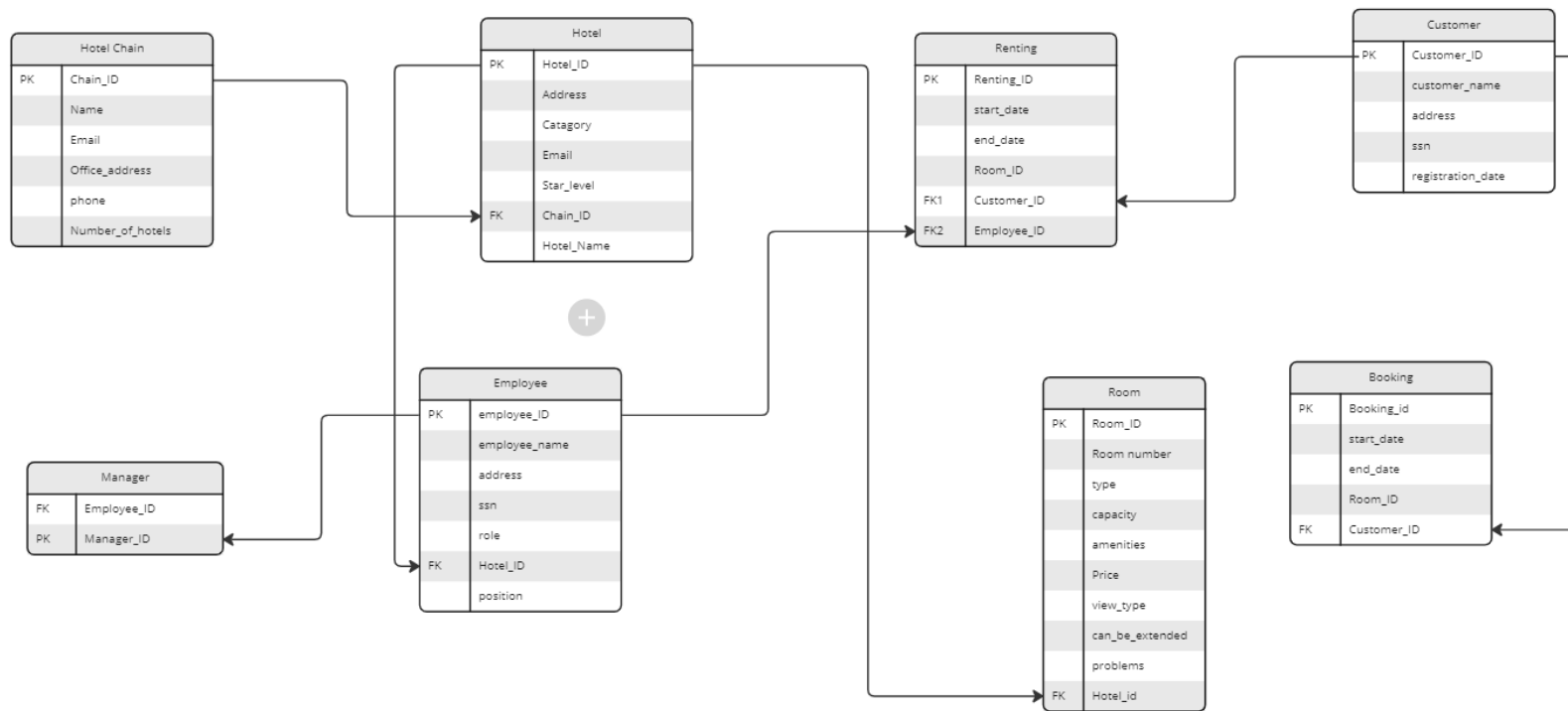


# Project Group 71



An ER model for a hotel booking application is presented here, and it is a suitable representation of the requirements for such an application. Various entities are included, such as hotels, hotel chains, customers, employees, and rooms, along with their attributes and relationships. A weak entity is also incorporated for bookings and renting, which depend on the rooms and customers involved. Rooms can be searched for and booked online by customers, and employees can rent rooms on-site. With cardinality constraints, defining and presenting one-to-one and one-to-many relationships between entities is well-defined and appropriate. Hotel booking applications can be developed using an ER model, which describes the entities, attributes, and relationships involved in the application, which can serve as the basis for a data model.

# Project Group 71



In this relational schema, all primary keys and foreign keys of relations are labeled correctly and the arrows are used to indicate the origin of each foreign key. The arrow points to foreign keys from primary keys of each relation.

#### Hotel\_Chain:

PRIMARY KEY (Chain\_id) NOT NULL  
name, email, office\_address, phone NOT NULL

Explanation: Chain\_id as primary key. All attributes need to be not null except number\_of\_hotels. If it is null, it means that the hotel chain have not yet started operating.

#### Hotel:

PRIMARY KEY (Hotel\_id) NOT NULL  
address, Catagory, Email, Star\_level, Hotel\_Name NOT NULL  
FOREIGN KEY (Chain\_id) REFERENCE Hotel\_Chain(Chain\_id) NOT NULL  
DOMAIN star\_level CHECK (value in(0,1,2,3,4,5))

Explanation: Hotel\_id as primary key and Chain\_id as foreign key refered from hotel\_chain. All of the attributes need to be not null to ensure every creation of hotel instance to be meaningful. Star level has a domain raning from 0 (non-serving) to 5 (highest level).

#### Room:

PRIMARY KEY (Room\_id) NOT NULL  
Room\_number UNIQUE NOT NULL  
Type, capacity, price, view\_type, can\_be\_extended NOT NULL  
FOREIGN KEY (Hotel\_id) REFERENCE Hotel(Hotel\_id) NOT NULL  
DOMAIN capacity CHECK (value in('Single','Double','Suite','Other'))  
DOMAIN view\_type CHECK (value in('Sea', 'Mountain'))

Explanation: Room\_id as primary key. Room number need to be unique for staff and customer to distinguish. Hotel\_id is foreign key of hotel to representing affiliation of the room. All attributes cannot be null except amenities and problems, which simply means that there is no facility/problem in a particular room. Capacity and view\_type have their respective domain as shown above.

#### Customer:

PRIMARY KEY (Customer\_id) NOT NULL  
customer\_name, ssn, registration\_date NOT NULL

Explanation: Customer\_id as primary key. All attributes cannot be null except address which customer can choose not to disclose when they register as a client.

#### Employee:

PRIMARY KEY (Employee\_id) NOT NULL  
employee\_name, address, ssn, role, position NOT NULL  
FOREIGN KEY (Hotel\_id) REFERENCE Hotel(Hotel\_id) NOT NULL

Explanation: Employee\_id as primary key. Hotel\_id as foreign key representing affiliation of the particular staff. All attributes need to be not null.

#### Manager:

FOREIGN KEY (manager\_id) REFERENCE Employee(employee\_id) NOT NULL  
FOREIGN KEY (employee\_id) REFERENCE Employee(employee\_id) NOT NULL

Explanation: Both ids are foreign referring to employee. None of the attribute can be null.

#### Booking:

PRIMARY KEY (Booking\_id) NOT NULL

FOREIGN KEY (Room\_id) REFERENCE Room(Room\_id) NOT NULL  
FOREIGN KEY (Customer\_id) REFERENCE Customer(Customer\_id) NOT NULL  
start\_date, end\_date NOT NULL

Explanation: Booking\_id as primary key. Room\_id reference attribute  
with same name in Room, and Customer\_id reference attribute in Customer.  
All attributes need to be not null.

Renting:

PRIMARY KEY (Renting\_id) NOT NULL  
FOREIGN KEY (Room\_id) REFERENCE Room(Room\_id) NOT NULL  
FOREIGN KEY (Customer\_id) REFERENCE Customer(Customer\_id) NOT NULL  
FOREIGN KEY (Employee\_id) REFERENCE Employee(Employee\_id) NOT NULL  
start\_date, end\_date NOT NULL

Explanation: Renting\_id as primary key. Room\_id reference attribute  
with same name in Room, Customer\_id reference attribute in Customer,  
and Employee\_id referred to instance in Employee, represent the staff  
responsible for the transaction of the renting. All attributes need  
to be not null.

Louis, Li 300193386

Haoxin, Zeng 300248305

Junyang Wang 300241369