# CSI 2132 Project Deliverable 1 Report

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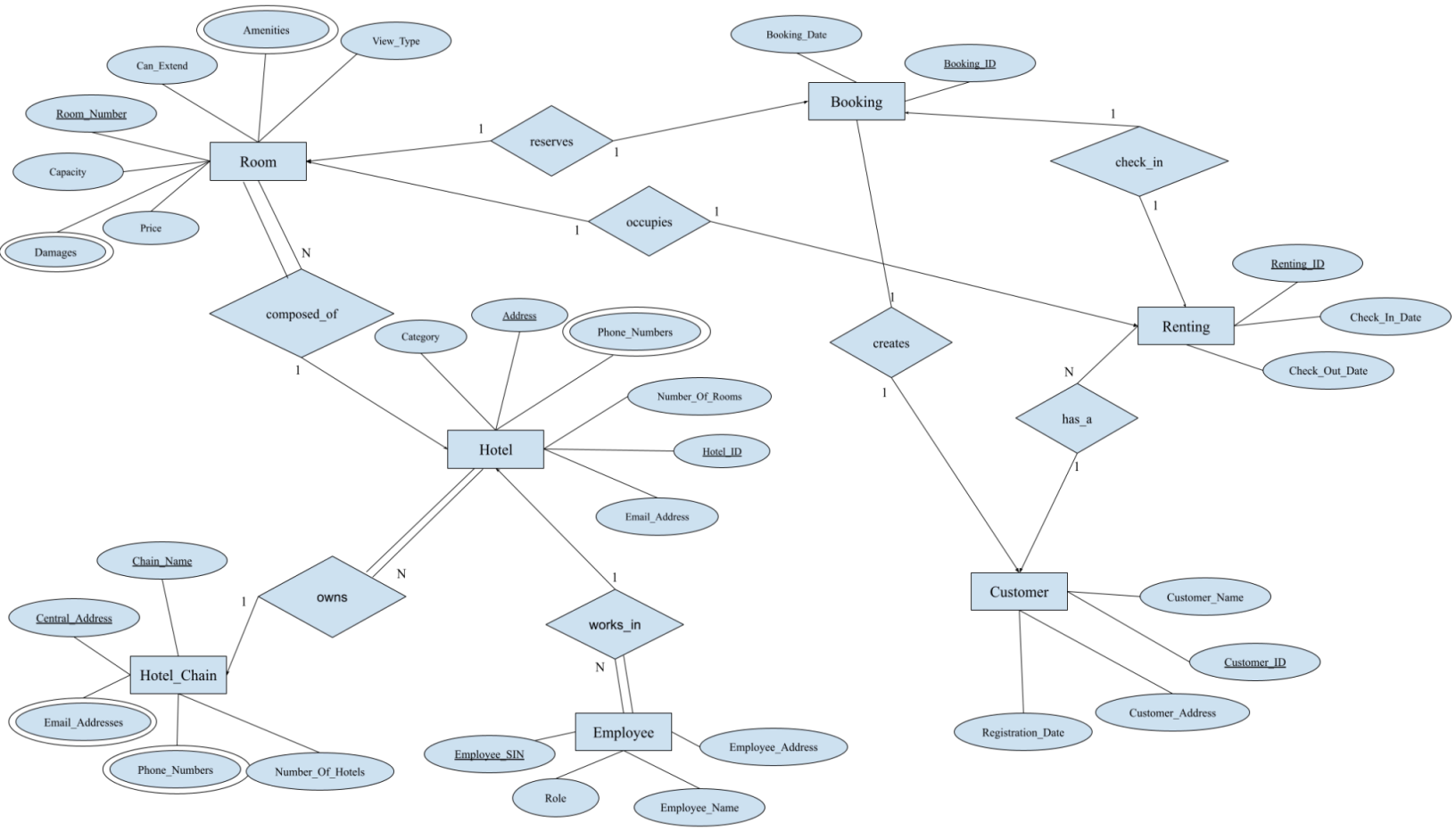
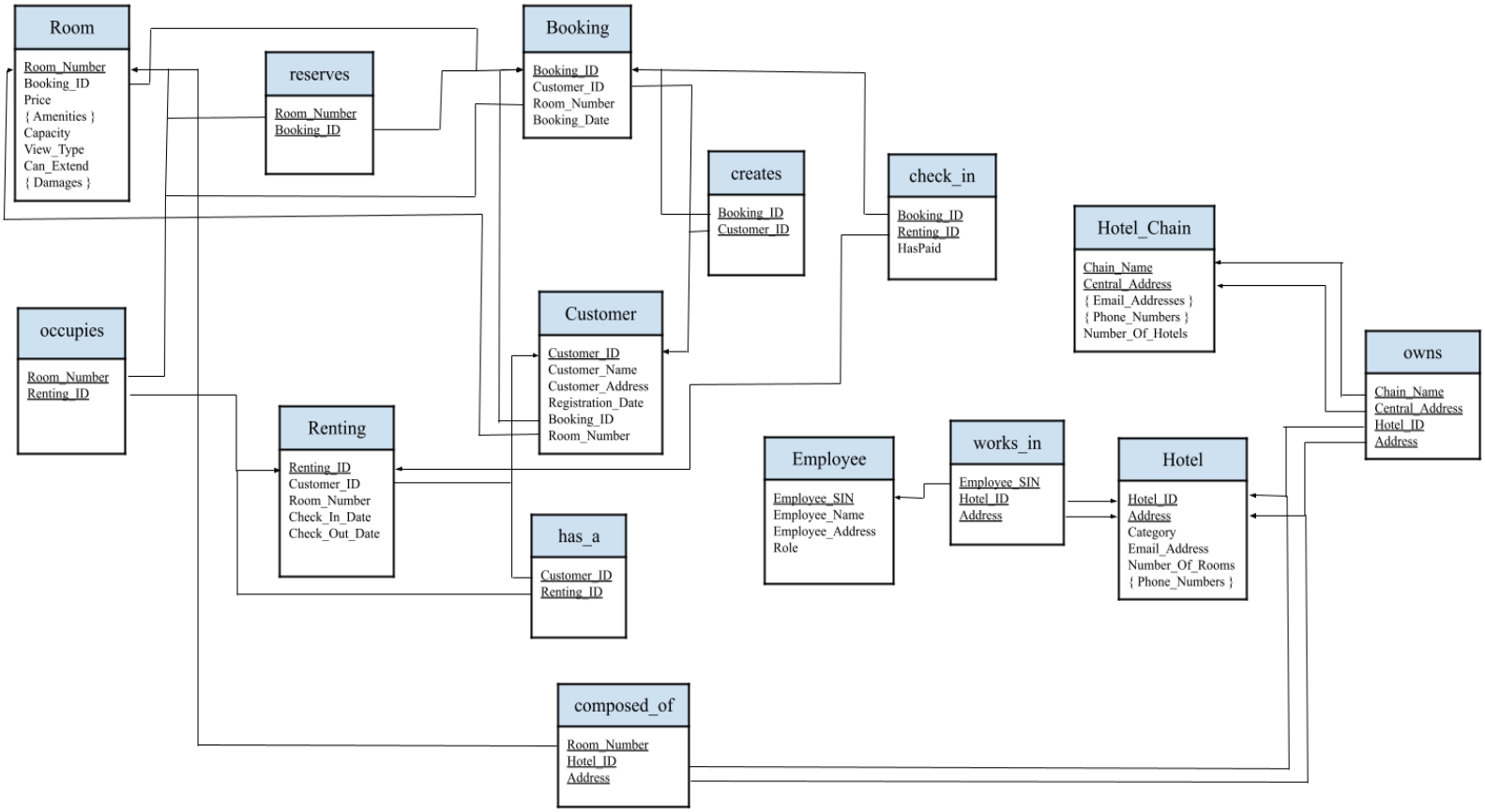
# The ER diagram:



# The Relational Database Schema:



# Entity names:

| | |
|---|---|
| **1) Room** | - Room_Number (primary key)<br>- Booking_ID (foreign key)<br>- Price<br>- Amenities<br>- Capacity<br>- View_Type (sea or mountain)<br>- Can_Extend (true or false)<br>- Damages |
| **2) Hotel_Chain** | - Chain_Name (primary key)<br>- Central_Address (primary key)<br>- Number_Of_Hotels (integer)<br>- Email_Addresses<br>- Phone_Numbers |
| **3) Hotel** | - Hotel_ID (primary key)<br>- Address (primary key)<br>- Chain_Name (foreign key)<br>- Category (1-star to 5-star)<br>- Number_Of_Rooms<br>- Email_Address<br>- Phone_Numbers |
| **4) Customer** | - Customer_ID (primary key)<br>- Customer_Name<br>- Customer_Address<br>- Registration_Date<br>- Booking_ID (foreign key)<br>- Room_Number (foreign key) |
| **5) Employee** | - Employee_SIN (primary key)<br>- Employee_Name<br>- Employee_Address<br>- Role |
| **6) Booking** (Separate tables for Old and Current Under the Same Entity) | - Booking_ID (primary key)<br>- Customer_ID (foreign key)<br>- Room_Number (foreign key)<br>- Booking_Date |

| | |
|---|---|
| 7) **Renting** (Separate tables for Old and Current Under the Same Entity) | - Renting_ID (primary key)<br>- Customer_ID (Foreign Key referencing Customer)<br>- Room_Number (Foreign Key referencing Room)<br>- Check_In_Date<br>- Check_Out_Date |
| **Check-In**<br><br>**(relational schema)** | - HasPaid<br>- Booking_ID (primary key)<br>- Renting_ID (primary key) |

# Relationships:

**Check-In: (From booking to renting:** paid + checked in)
-Booking - <**Check-In**> - Renting: One-to-One

- HotelChain - Hotel: One-to-Many
- Hotel - Room: One-to-Many
- Hotel - Employee: One-to-Many
- Customer - Booking: One-to-Many
- Room - Booking: One-to-One
- Customer - Renting: One-to-Many
- Room - Renting: One-to-One

# Assumptions (to justify each decision for ER Diagram):

- Assume that to enter the Renting phase from the Booking phase one must have gone through payment and check-in first (manually through the employee)
- Rooms can only extend one bed
- Each Booking is associated with only one Room
- Each Renting is associated with only one Room
- All Employees must belong to only one Hotel
- Each Hotel must belong to only one Hotel Chain
- Customers can have multiple Renting and Bookings
- A Room can only be rented/booked by one Customer
- Each Employee can only have one role

# Constraints:

### Primary Keys Constraints

List of the primary keys:

**PK → Entity name**

- Renting_ID → Renting
- Booking_ID → Booking
- Employee_SIN → Employee
- Customer_ID → Customer
- (Hotel_ID, Address) → Hotel
- (Chain_Name, Central_Address) → Hotel_Chain
- Room_Number → Room

### Referential Integrity Constraints

List of the Foreign Keys:

**FK in Entity →PK in Entity**

- Room_Number in Renting → Room_Number in Room
- Room_Number in Booking → Room_Number in Room
- Room_Number in Customer → Room_Number in Room
- Room_Number in reserves → Room_Number in Room
- Room_Number in occupies → Room_Number in Room
- Room_Number in composed_of → Room_Number in Room
- Customer_ID in Renting → Customer_ID in Customer
- Customer_ID in Booking → Customer_ID in Customer
- Customer_ID in has_a → Customer_ID in Customer
- Customer_ID in creates → Customer_ID in Customer
- Booking_ID in reserves → Booking_ID in Booking
- Booking_ID in Room → Booking_ID in Booking
- Booking_ID in Customer → Booking_ID in Booking
- Booking_ID in creates → Booking_ID in Booking
- Booking_ID in check_in → Booking_ID in Booking
- Renting_ID In occupies → Renting_ID in Renting
- Renting_ID in has_a → Renting_ID in Renting
- Renting_ID in check_in → Renting_ID in Renting
- Chain_Name in Hotel → Chain_Name in Hotel_Chain
- Chain_Name in owns → Chain_Name in Hotel_Chain
- Hotel_ID in composed_of → Hotel_ID in Hotel
- Hotel_ID in owns → Hotel_ID in Hotel
- Hotel_ID in works_in → Hotel_ID in Hotel
- Central_Address in owns → Central_Address in Hotel_Chain
- Address in composed_of → Address in Hotel
- Address in owns → Address in Hotel
- Address in works_in → Address in Hotel
- Employee_ID in works_in → Employee_ID in Employee

**Domain Constraints And Attributes Constraints**

| Attributes | Entity | Domain Constraints | Attribute Constraints |
|---|---|---|---|
| Room_Number | Room | Integer | 0 <= x <= 999 |
| Price | Room | Integer | x >= 0 |
| Amenities | Room | Varchar | length >= 0 |
| Capacity | Room | Integer | length > 0 |
| View_Type | Room | Varchar | x∈{Sea, Mountain} |
| Can_Extend | Room | Boolean | True, False |
| Damages | Room | Varchar | length >= 0 |
| Chain_Name | Hotel_Chain | Varchar | length > 0 |
| Central_Address | Hotel_Chain | Varchar | length > 0 |
| Number_Of_Hotels | Hotel_Chain | Integer | x >= 0 |
| Email_Addresses | Hotel_Chain | Varchar | length > 0 |
| Phone_Numbers | Hotel_Chain | Integer | x >= 0 |
| Hotel_ID | Hotel | Integer | x >= 0 |
| Address | Hotel | Varchar | length > 0 |
| Category | Hotel | Integer | 1 <= x <= 5 |
| Number_Of_Rooms | Hotel | Integer | 0 <= x <= 999 |
| Email_Address | Hotel | Varchar | length > 0 |
| Phone_Numbers | Hotel | Integer | x >= 0 |
| Registration_Date | Customer | Varchar | length > 0 |
| Customer_Address | Customer | Varchar | length > 0 |
| Customer_Name | Customer | Varchar | length > 0 |
| Customer_Name | Customer | Varchar | length > 0 |
| Customer_ID | Customer | Integer | x >= 0 |
| Employee_SIN | Employee | Integer | x >= 0 |
| Employee_Name | Employee | Varchar | length > 0 |
| Employee_Address | Employee | Varchar | length > 0 |

| | | | |
|---|---|---|---|
| Role | Employee | Varchar | length > 0 |
| Booking_ID | Booking | Integer | x>=0 |
| Booking_Date | Booking | Varchar | length > 0 |
| Renting_ID | Renting | Integer | x>=0 |
| Check_In_Date | Renting | Varchar | length > 0 |
| Check_Out_Date | Renting | Varchar | length > 0 |
| HasPaid | check_in | Boolean | True, False |

**User-defined Constraints**

- Rooms can only extend by one bed
- Each Booking is associated with only one Room
- Each Renting is associated with only one Room
- All Employees must belong to only one Hotel
- Each Hotel must belong to only one Hotel Chain
- Customers can have multiple Renting and Bookings
- A Room can only be rented/booked by one Customer
- Each Employee can only have one role