Part I: Understanding of Hotel & ERD Assumptions with Analysis

Below is our ERD design, with each table described in detail; it also incorporates the key assumptions we made while designing the database to address missing or ambiguous business information.

a. Hotel Construction

1. **Building, Wing, Floor:** Represent the hotel's hierarchical layout.
2. **Proximity:** Indicate the distance of wings to amenities such as pools, garages, or accessible areas. Proximity serves as a decoding table categorizing numeric ranges into categories.
3. **Room**: The smallest room unit. Each individual room contains attributes such as bed type, room type, function, door access, floor, wing, and building. Each room is associated with a daily rate, status, and whether it has a paid bar.
4. **Room_Type and Bed_Type:** Standardized classifications defining the purpose (e.g., sleeping, meeting, working) and configuration of each room. Meeting rooms with and without paid bars are considered different types. Bed_type includes queen, long, extra long, etc.
5. **Suite:** One suite may contain multiple rooms. A suite usually consists of two rooms (one sleeping room and one meeting room).
6. **Extra_Space,** and **Door_Access:** Capture variations such as meeting tables, extra rollaway beds, or hallway configurations.
7. **Adjacency:** Tracks physical relationships between rooms (e.g., shared doors or connecting rooms).
8. **Meeting_Space:** Represents larger or composite spaces composed of individual meeting-type rooms. "Type" attribute in meeting space refers to available facilities, such as a patio, pool, or courtyard. Represents time-based usage of rooms, including whether a paid bar is involved.
9. **Usage_Time:** Defines standardized time slots (morning, lunch, afternoon, evening, night) for meeting room scheduling. This only applies to meeting rooms.

b. **Reservation and Customer Management**

10. **Customer:** Stores each client's identity, billing relationship, and deposit requirements. All persons interacting with the hotel will be considered a customer, regardless of their occupant status. In other words, a third-party responsible for paying a certain bill is considered a customer. A contact person that is not present at the hotel or responsible for a bill is also considered a customer.
11. **Reservation:** Stores details about room bookings, linked to Billing, Room, and Usage_Time. Reservation may contain multiple rooms. Reservation captures stay duration, total rates, and time windows. If an extension is granted to a reservation, duration, time windows, and total rates will be modified.
12. **Event:** Represents organized activities, with fields for expected attendance, associated rooms, and responsible customers. Each event can be linked to multiple reservations and guests.

13. **Reservation_Party_Info:** Differentiates between booker, occupant, and contact, addressing cases where the payer and occupant are different individuals.
14. **Customer_Requests:** Logs special requests or needs submitted before or during a stay, with resolution and deposit status indicators. Unless a reservation including an assigned room is made, customer requests remain open. This table is to address cases where customers try to book a room ahead of time.
15. **Call:** Records calls from customers, including confidentiality flags and staff response tracking.

c. Billing and Charges

16. **Billing:** Aggregates transactions under one responsible party. Each billing can contain multiple transactions, but must be paid as a single bill.
17. **Transaction:** Tracks monetary charges, including date and amount, for all billable services. Each time a customer engages in a monetary interaction with the hotel, a transaction is recorded. This includes room base rates and other charged services; each account is an individual transaction. Transactions cannot be paid individually.

d. Access Control and Staff Management

18. **Customer_Card_Assignment** and **Staff_Card_Assignment**: Assign keycards with specific access privileges and PINs. Only customers' cards have a PIN.
19. **Reading_Info:** Logs for location tracking and room access. Each swipe is recorded as an individual record in Reading_Info.
20. **Readers:** Record card swipe reader location and reader.
21. **Staff:** Includes staff roles for operational tracking.

e. Users

22. Our target users consist of two kinds of stakeholders. From the Hotel end, the system works as a management system, which tracks all bookings, customer and staff information. From the customer end, they could retrieve all their past and present booking details through the database.

Part II: For later analysis

a. **Floor plan:** A computer system enabling graphical representation of the layout of a room and its facilities with zoom in/out functionality.
b. **Flexible meeting room charges:** Meeting room charges may be reduced or waived based on the number of guests involved.
c. **Room assignment:** Assign rooms in the wings that have lowest numbers first.

Part III: Work allocation

- **10.13 ERD**

  The entire group was involved throughout the ERD process: we collaborated on table design, established the relationships across tables on Lucidchart, and carried out the analysis that informed our general comprehension of the database structure.

Laura	Room Type (id, type_name) --» type: sleeping room, meeting room w paid bar, mr w/o paid bar, working room	meeting room with/without paid bar are separate types with different rates
	Bed Type	
	Room (room id, bedtype id, roomtype id, extra space, smoking (Y/N), door access, room function fk, num toilets, room status, daily rate, wing fk, floor fk, building fk)	
	Extra space (id, extra space type) --» type: table+meeting space, extra rollaway beds, ...	fixed number of types of extra space
	door access (id, access type): single hallway, separate hallway, etc..	
	suite (id, fk roomid)	
	meeting space (id, fk roomid (multiple entries), type, capacity, hasMovable walls(YN), #of toilet)--» type: courtyard, pool, patio, ...	meeting space refers to a larger space consisting individual rooms with "meeting room" type
	Adjacency (id, roomid fk)	Records adjacency of meeting rooms
	Functions (id, function) --» funciton: sleeping, meeting, etc..	
Christina	room status (id, status) --» renovation, reconstruction, need to be cleaned, cleaned	Status inside room table is live updated, a room can change status, but at a given moment, a certain room can only be under one status. usagetime and paidbar only works for meeting room,
	Daily rate (pk/fk room type, rate)	
	Reservation (id, room id, days, total rate, billingid fk, start datetime, end datetime)	extension will modify total days
	Usage times (id, time) --» time: morning, breakfast, lunch, afternoon, supper, evening, night	
	Building (id, bname)	
	Wing (id, wname, indoor pool prox, outdoor pool prox, parking garage prox, handicapped access YN)	first three proxs are fk into proximity range type
	floor(id, wingid (FK), floor, smoking (Y/N))	
	proximity (id, category, range) --» category: far, very far; range: actual numbers in range	categorize proximity into far, very far, ...
Lucy	customer (id, billing, deposit yn)	customer id refers to the responsible party (could be third party org as billing party), all individuals related to reservation, paying bill, contacts, and using facilities)
	reservation party info (reservation id (FK), booker (customerId) , occupant, contact)	
	billing(billingId, reservationId, customerId, charge, transactions, status)	customer id refers to the responsible party (could be org), 1 billing can contain multiple transactions, all charges must be paid once as a bill, no individual transaction payment allowed
	event (id, duration, roomid (multiple entries possible), customerid, estimated attendance, estimated # guests)	
	customer requests (id, customer id, notes, resolved, deposit_status) --» status: not applicable, received, pending	request refers to customer requests via outreach, notes records specific needs and desires, resolved confirms reservation
Jack	transaction(id, datetime, amount)	
	customer card assignment(customerCardId, customerId, access (text), pin)	
	reading info (id, customerCardId, staffCardId,readerId, datetime)	
	readers (id, location)	
	call (id, customerId, datetime, confidential YN, content raw text, responded YN)	
	staff (id, role)	
	staff card assignment(staffCardId, staffId, access (text))	

CC