

HOTEL MANAGEMENT DATABASE

CENG315 PROJECT DESIGN REPORT G19

GROUP MEMBERS & STUDENT IDs

Bedir Arda Gül	280201070
Burak Eroğlu	300201109
Cansu Özküçükler	270104033Y
Gizem Boğan	280201071
Kaan Ersoy	280104049Y

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Name	Date	Reason For Changes	Version
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1. INTRODUCTION

1.1. Purpose

The report aims to succinctly present our hotel management database project, outlining its objectives and functionalities. Focused on optimizing tasks like reservations, guest services, and inventory control, the project aims to enhance operational efficiency, reduce costs, and improve customer satisfaction. This concise document will provide stakeholders with key insights into our innovative solutions for more effective hotel management.

1.2. Definitions

<u>text</u>	Attributes that written bold and underlined means they are primary key of the entity.
<u>text</u>	Attributes that written underlined means they are foreign key of the entity.
<i>text</i>	Attributes that written italic means they are composite attributes.
{text}	Attributes that in curly braces means they are multivalued attributes.

2. OVERALL DESCRIPTION

2.1. Product

In this project, it is planned to create a database for hotel managements to be able to keep required information about guests, their reservations, billing, inventory, rooms etc. Since hotels are businesses that handle multiple parameters at the same time to provide a better and more secure service, keeping both customer and staff's information including arrival/departure dates, working departments and days (for staff) etc. is essential. Also, in order to provide a perfect service, it is also very important to track customer billings, employee salaries and supply expenses in order to monitor the presence/absence of supply and to make income and expenses visible as a result of all these.

2.2. List of Entities

1. Hotel (**hotelID**, name, phone, email, *adress*)
2. Guest (**guestID**, *name*, dateOfBirth, {phone}, {email}, *adress*)
3. Room (**roomID**, hotelID, roomTypeID, status)
4. RoomType (**roomTypeID**, name, capacity, description, pricePerDay)
5. Booking (**bookingID**, {guestID}, {roomID}, checkinDate, checkoutDate, bookingDate, status)
6. Staff (**staffID**, {roomID}, hotelID, *name*, salary, position, dateOfBirth, hireDate, {phone}, {email}, *adress*)
7. Supplies (**supplyID**, hotelID, name, status)
8. Bill (**billID**, bookingID, date, charge)
9. Order (**orderID**, guestID, billID, name, cost, date)
10. DiningReservation (**reservationID**, guestID, guestNumber, type, reservationTime, serviceTime)

2.3. Relationships of Entities

1- Relationship between Hotel and Room:

The relationship between Hotel and Room entities has a one-to-many cardinality. This means that a hotel has more than one room, but a room belongs to only one specific hotel. The “hotelID” in the Room entity serves as a foreign key. This relationship increases the usability of this system and the ability to use this system with multiple hotels.

2- Relationship between Room and Booking:

The relationship between Room and Booking has a many-to-many cardinality. When making a booking, one or more rooms can be selected according to the guest number. So, the Booking entity can contain multiple “roomID”s as a foreign key. Also, a room can have multiple bookings for different dates. But there can be at most one booking on a date.

3- Relationship between Booking and Guest:

The relationship between Guest and Booking entities has a many-to-many cardinality. A Booking can have more than one Guest and it must include the IDs of each guest who will be staying in the rooms selected in that booking. So, the foreign key “GuestID” in Booking must be at least one. On the other hand, a guest may have multiple bookings on different dates or at different hotels.

4- Relationship between Room and RoomType:

The relationship between Room and RoomType entities has a many-to-one cardinality. That means every room has only one room type, but a room type can have many rooms. The “roomTypeID” in the Room entity is a foreign key. This relationship is important because room types indicate the capacity and the price of the rooms.

5- Relationship between Booking and Bill:

The relationship between Booking and Bill has a one-to-one cardinality. This implies that one Booking has only one Bill which has total fee of price of the room and orders and reservations of the guests. So that, the “bookingID” in Bill entity is a foreign key.

6- Relationship between Guest and Order:

The relationship between Guest and Order has a many-to-many cardinality. All orders placed by the guest in the room or in the hotel are recorded by taking the “guestID” in Order. A guest can have many or any orders. But an order can be placed by different guests.

7- Relationship between Guest and DiningReservation:

The relationship between Guest and DiningReservation has a many-to-many cardinality. The “guestID” in the DiningReservation entity is a foreign key. A guest can have many different reservations and the same reservation can be made by different guest.

8- Relationship between Bill and Order:

The relationship between Bill and Order has a one-to-many cardinality. The “billID” in the Order entity acts as a foreign key. So that, there can be multiple orders in a bill, but an order with a specific “orderID” can only be in one bill. The names of orders with different “orderID”s can be the same.

9- Relationship between Hotel and Staff:

The relationship between Hotel and Staff entities has a one-to-many cardinality which means a hotel can have many staff members, but each staff member relates to only one hotel. The “hotelID” in the Staff entity acts a foreign key.

10- Relationship between Room and Staff:

The relationship between Room and Staff has a many-to-many cardinality. The “roomID” in the Staff entity is a foreign key. A room can have multiple staff members and a staff member can have one or more room connected to them.

11- Relationship between Hotel and Supplies:

The relationship between Hotel and Supplies has a one-to-many cardinality. The “hotelID” in the Supplies entity is a foreign key. A hotel can have multiple supplies.

2.4. System Users

1- Administrator:

- Oversee the entire hotel management system.
- Full access to all features and data.

2- Front Desk Staff:

- Manage reservations, check-ins, and check-outs.
- Booking information, guest details, room status.

3- Housekeeping Staff:

- Manage room cleaning schedules and maintenance.
- Room status, cleaning schedules.

4- Restaurant Staff:

- Manage restaurant reservations and orders.
- Restaurant reservations, order details.

5- Guests:

- Make reservations, check-in, check-out, and request services.
- Personal reservation details, room service requests.

2.5. Assumptions

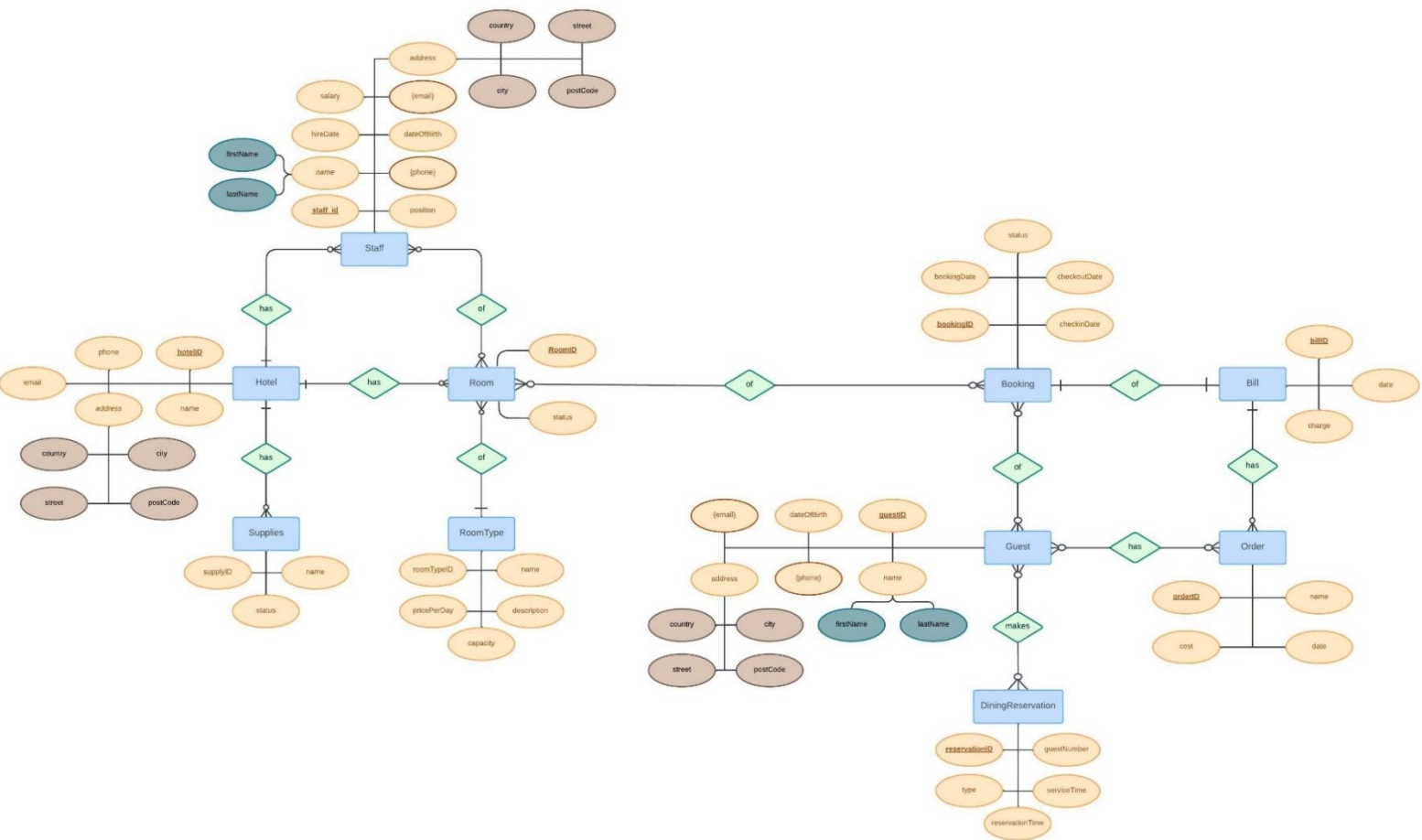
- 1- Guests can make reservations up to one year in advance.
- 2- Each reservation is for a single room.
- 3- Room availability is updated in real-time.
- 4- Check-in time is 3:00 PM, and check-out time is 11:00 AM.
- 5- Early check-in and late check-out are subject to room availability.
- 6- Rooms are categorized into standard, family, suite, and honeymoon types.
- 7- Each room type has a different nightly rate.
- 8- Guests can cancel reservations up to 48 hours before the check-in date without a penalty.
- 9- Late cancellations may incur a cancellation fee.
- 10- The guests whose age is under 12, assumed as children.
- 11- If the room's status is occupied, the staff member responsible for the room is assigned to daily clean-up.

2.6. Business Rules

- 1- The number of the guests assigned in the booking into a single room cannot exceed the room capacity.
- 2- Each room can only be booked by one guest and any room cannot be double-booked.
- 3- Room service charges will be added to the guest's final bill.
- 4- Rooms must have a responsible staff member.
- 5- Dining reservations must be applied at least one hour before the service time.
- 6- There is no fee for children.
- 7- In case the guest does not show up until the booking's check-in date, the room's status changes to available.
- 8- Guest contact information must include a valid email address and phone number.
- 9- Maximum occupancy for each room type is specified and should not be exceeded.
- 10- There must be at least one adult in a booked room.
- 11- The information (phone, address, email, etc.) of child guests aged 12 and under is entered by their parents.
- 12- Payment must be made at the time of check-in, and different payment methods (cash, credit card) are accepted.
- 13- A valid credit card is required for reservation confirmation.
- 14- The bill can be paid with different methods and different installment opportunities, this is independent of the system.
- 15- Housekeeping schedules are managed through the system, and rooms are marked as clean or in need of cleaning.
- 16- Guests can submit maintenance requests, and the staff should address them promptly.
- 17- Any discounts or promotional offers are applied according to predefined criteria.

2.7. ER Diagram

Figure-1. ER diagram for hotel management database.



2.8. ERD TO Relational Schema:

1. Hotel (**hotelID**, name, phone, email, country, city, street, postCode)
 - Composite attribute address becomes; country, city, street, postCode.
2. Guest (**guestID**, firstName, lastName, dateOfBirth, country, city, street, postCode)
 - Composite attribute *address* becomes; country, city, street, postCode.
 - Composite attribute *name* becomes; firstName, lastName.
3. GuestPhones (**guestID**, **phone**)
 - Multivalued attribute Guest:{phone}.
 - “guestID” referencing the Guest relation.
4. GuestEmails (guestID, email)
 - Multivalued attribute Guest:{email}.
 - “guestID” referencing the Guest relation.
5. Room (**roomID**, **hotelID**, **roomTypeID**, status)
 - “hotelID” referencing the Hotel relation.
 - “roomTypeID” referencing the RoomType relation.
6. RoomType (**roomTypeID**, name, capacity, description, pricePerDay)
7. Booking (**bookingID**, checkinDate, checkoutDate, bookingDate, status)
8. BookingRooms (**bookingID**, **roomID**)
 - Multivalued attribute Booking:{roomID}.
 - “bookingID” referencing the Booking relation.
 - “roomID” referencing the Room relation.
9. BookingGuests (**bookingID**, **guestID**)
 - Multivalued attribute Booking:{guestID}.
 - “bookingID” referencing the Booking relation.
 - “guestID” referencing the Guest relation.

10. Staff (**staffID**, hotelID, firstName, lastName, salary, position, dateOfBirth, hireDate, country, city, street, postCode)

- “hotelID” referencing the Hotel relation.
- Composite attribute *address* becomes; country, city, street, postCode.
- Composite attribute *name* becomes; firstName, lastName.

11. StaffRooms (**staffID**, **roomID**)

- Multivalued attribute Staff: {roomID}.
- “staffID” referencing the Staff relation.
- “roomID” referencing the Room relation.

12. StaffPhones (**staffID**, **phone**)

- Multivalued attribute Staff: {phone}.
- “staffID” referencing the Staff relation.

13. StaffEmails (**staffID**, **email**)

- Multivalued attribute Staff: {email}.
- “staffID” referencing the Staff relation.

14. Supplies (**supplyID**, hotelID, name, status)

- “hotelID” referencing the Hotel relation.

15. Bill (**billID**, bookingID, date, charge)

- “bookingID” referencing the Booking relation.

16. Order (**orderID**, guestID, billID, name, cost, date)

- “guestID” referencing the Guest relation.
- “billID” referencing the the Bill relation.

17. DiningReservation (**reservationID**, guestID, guestNumber, type, reservationTime, serviceTime)

- “guestID” referencing the Guest relation.

2.9. TABLES

1- Hotel :

HOTELID	NAME	PHONE	EMAIL	COUNTRY	CITY	STREET	POSTCODE
1	EGE INCISI	1234567890	egeincisi@gmail...	turkey	mugla	marmaris	48700
2	FOCA SUITS	2345678901	focasuits@gmai...	turkey	izmir	foca	35680

2- Guest :

GUESTID	FIRSTNAME	LASTNAME	DATEOFBIRTH	COUNTRY	CITY	STREET	POSTCODE
1	Asli	Sütçuoğlu	09/12/1976	USA	NewYork	StreetA	10012
2	Cem	Onaran	01/20/1972	USA	NewYork	StreetA	10012
3	Fatoş	Akin	10/05/1965	France	Bordeaux	StreetB	33300
4	Tanriverdi	Ekşioğullari	12/13/1984	France	Lyon	StreetC	69006
5	Şahika	Koçarslanli	08/06/1973	Turkey	Istanbul	NisantasiCaddesi	34360
6	Şehsuvar	Kementoğlu	03/23/1974	Russia	StPetersburg	StreetD	88502
7	Victoria	Henesey	07/16/1979	Italia	Milano	StreetE	20026
8	Bülent	Onaran	05/17/1952	Belgium	Brussels	StreetF	1110

3- GuestPhones :

GUESTID	PHONE
1	905070000011
2	905320000022
3	905410000033
4	905340000044
5	905060000055
6	905060000066
6	905310000066
7	905320000077
8	905340000088

4- GuestEmails :

GUESTID	EMAIL
1	asliiii@hotmail.com
1	aslisutc@gmail.com
2	cemnonaran33@hotmail.com
2	cemnrm@gmail.com
3	akinfatos@hotmail.com
3	fatos@gmail.com
4	tanrvrdeksi@gmail.com
5	sahikakoc@gmail.com
6	sesukemento@gmail.com
7	victoriahnsy@gmail.com
8	diplomatbulent@gmail.com

5- Room :

ROOMID	HOTELID	ROOMTYPEID	STATUS
101	1	1	available
102	1	2	available
103	1	2	available
104	1	7	available
105	1	3	available
106	1	8	available
107	1	6	available
108	1	5	available
109	1	5	available
110	1	9	available
201	2	1	available
202	2	1	available
203	2	5	available
204	2	7	available
205	2	5	available
206	2	8	available
207	2	3	available
208	2	6	available
209	2	2	available
210	2	9	available

6- RoomType :

ROOMTYPEID	NAME	CAPACITY	DESCRIPTION	PRICEPERDAY
1	st1	2	standart room for 2	1000
2	st2	3	standart room for 3	1500
3	fam	4	family room for 4	2000
5	suit2	2	suit room for 2	3000
6	suit3	3	suit room for 3	4500
7	suit4	4	suit room for 4	6000
8	honeym1	2	honeymoon room for 2	5000
9	honeym2	2	honeymoon suit room for 2	9000

7- Booking :

BOOKINGID	CHECKINDATE	CHECKOUTDATE	BOOKINGDATE	STATUS
1	01/06/2017	01/16/2017	12/24/2016	approved
2	01/03/2017	01/16/2017	12/21/2016	approved
3	01/06/2017	01/10/2017	12/22/2016	approved
4	06/12/2014	07/12/2014	04/04/2014	approved
5	06/20/2014	07/02/2014	05/15/2014	approved
6	07/10/2014	07/17/2014	06/30/2014	approved

8- BookingRooms :

BOOKINGID	ROOMID
1	101
2	105
3	103
4	203
5	202
6	205

9- BookingGuests :

BOOKINGID	GUESTID
1	1
1	2
2	4
3	6
4	8
5	7
6	5

10- Staff :

STAFFID	HOTELID	FIRSTNAME	LASTNAME	SALARY	POSITION	DATEOFBIRTH	HIREDATE	COUNTRY	CITY	STREET	POSTCODE
1	1	Gaffur	Aksoy	15000	Housekeeper	06/06/1974	06/03/2005	Turkey	Istanbul	NisantasiCaddesi	34360
2	1	Hediye	Aksoy	15000	Security	02/14/1954	04/09/2002	Turkey	Istanbul	NisantasiCaddesi	34360
3	1	Dursun	Tepe	25000	Receptionist	12/10/1973	01/12/2002	Turkey	Trabzon	Ol	61530
4	2	Bora	Alsancak	20000	Housekeeper	06/03/1986	11/22/2008	Turkey	İzmir	Karsiyaka	35600
5	2	Deniz	Alsancak	20000	Receptionist	10/16/1981	11/22/2008	Turkey	İzmir	Karsiyaka	35600
6	2	Katya	Ünal	17000	Receptionist	05/14/1986	11/02/2005	Turkey	İzmir	Aliağa	35800
7	2	Serbest	Mermer	15000	Security	06/28/1983	09/13/2008	Ukraine	Odessa	Kodyma	66000
8	2	Zafer	Mermer	15000	Housekeeper	12/29/1985	09/13/2008	Ukraine	Odessa	Kodyma	66000

11- StaffRooms :

STAFFID	ROOMID
1	101
1	102
1	103
1	104
1	105
1	106
1	107
1	108
1	109
1	110
4	201
4	202
4	203
4	204
4	205
8	206
8	207
8	208
8	209
8	210

12- StaffPhones :

STAFFID	PHONE
1	905160283550
2	905160283550
3	905410000001
4	905413300001
5	905413322001
6	905413300013
7	905413300555
8	905413770555

13- StaffEmails :

STAFFID	EMAIL
1	gaffurksu@gmail.com
2	hediyeysu@gmail.com
3	dursun@gmail.com
4	boralsnck@gmail.com
5	denizsnck@gmail.com
6	katiadimitri@mail.ru
6	katiounal@gmail.com
7	mermerserbest@gmail.com
8	mermerzafer@gmail.com

14- Supplies :

SUPPLYID	HOTELID	NAME	STATUS
1	1	toiletries	20%
2	2	cleaning equipment	38%
3	2	toiletries	12%
4	1	shampoo	45%
5	1	food	30%

15- Bill :

BILLID	BOOKINGID	CHARGE	BILLDATE
1	5	10000	07/02/2014
2	1	5500	01/16/2017
3	4	6250	07/12/2014
4	3	7500	01/10/2017
5	6	3035	07/17/2014
6	2	8200	01/16/2017

16- Order :

ORDERID	GUESTID	BILLID	NAME	COST	ORDERDATE
1	8	3	fruit juice	20	06/19/2014
2	4	6	sandwich	75	01/13/2017
3	7	1	water	20	06/23/2014
4	8	3	sandwich	75	07/01/2014
5	1	2	dessert	35	01/16/2017
6	5	5	drink	100	07/11/2014

17-DiningReservation :

RESERVATIONID	GUESTID	GUESTNUMBER	TYPE	RESERVATIONTIME	SERVICETIME
1	1	2	Breakfast	18-FEB-23 08.00.00.00...	18-FEB-23 08.30.00.00000...
2	4	3	Dinner	10-JAN-23 07.30.00.00...	10-JAN-23 08.00.00.0000...