

**A REPORT OF THE HOTEL MANAGEMENT AND RESERVATION  
SYSTEM(DATABASE PROJECT).**

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## **INTRODUCTION**

The purpose of the Hotel Reservation Management System (HRMS) is to assist in the organization and management of critical hotel data, including reservations, payments, client information, and other hotel services. This database system facilitates the integration of various hotel processes, enhancing overall efficiency, accuracy, and data accessibility. Hotels can monitor room availability, manage reservations more effectively, and enhance clients relations by implementing this technology.

## **RATIONALE**

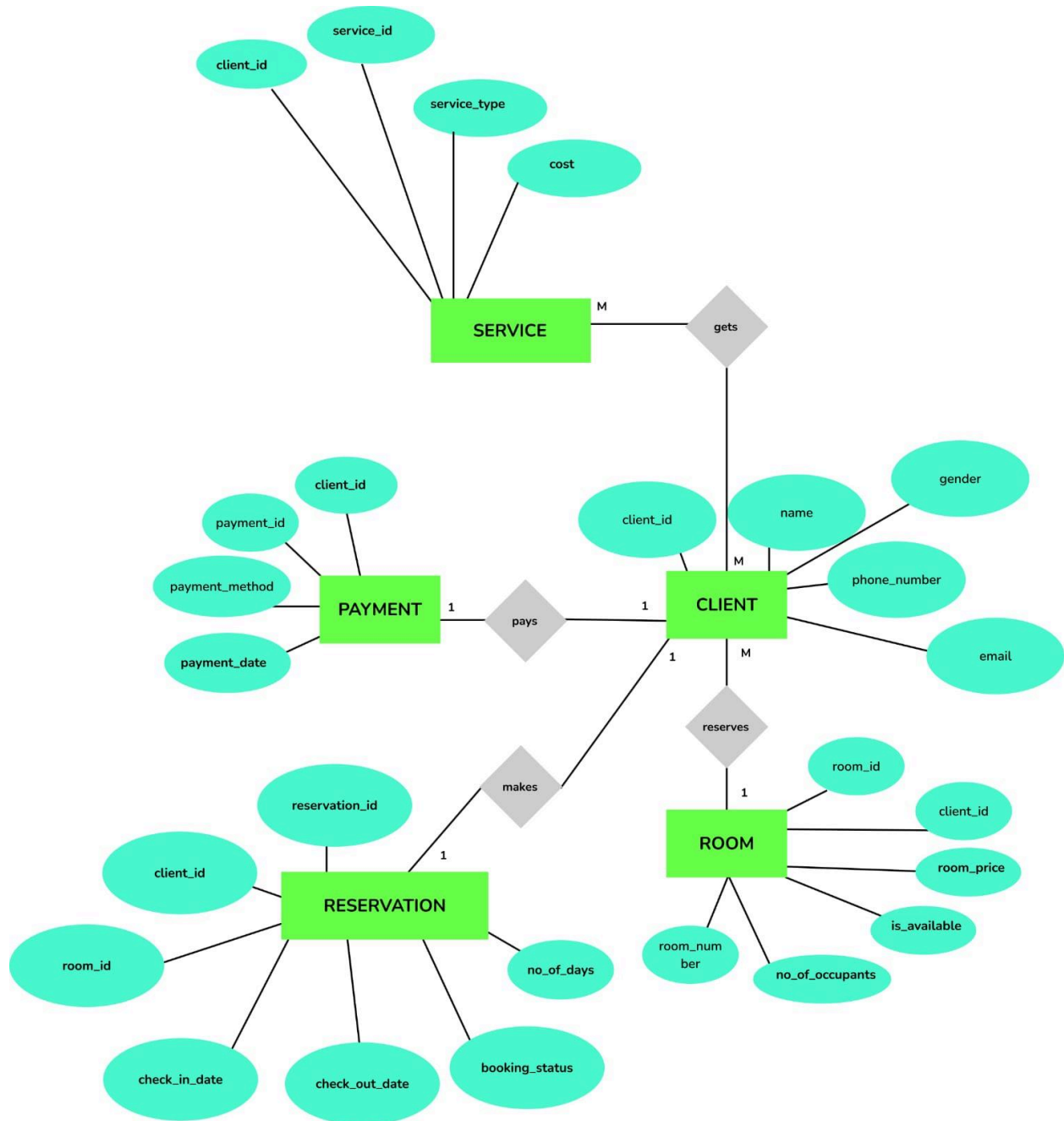
In the highly competitive hospitality industry, running operations smoothly and keeping customers happy are crucial for success. Traditional methods of managing bookings and room assignments can lead to mistakes, delays, and inefficiencies. The HRMS database solves these problems by automating repetitive tasks, reducing errors, and making better use of resources. It also allows hotels to grow and expand their services without affecting the system's performance.

## **OBJECTIVES**

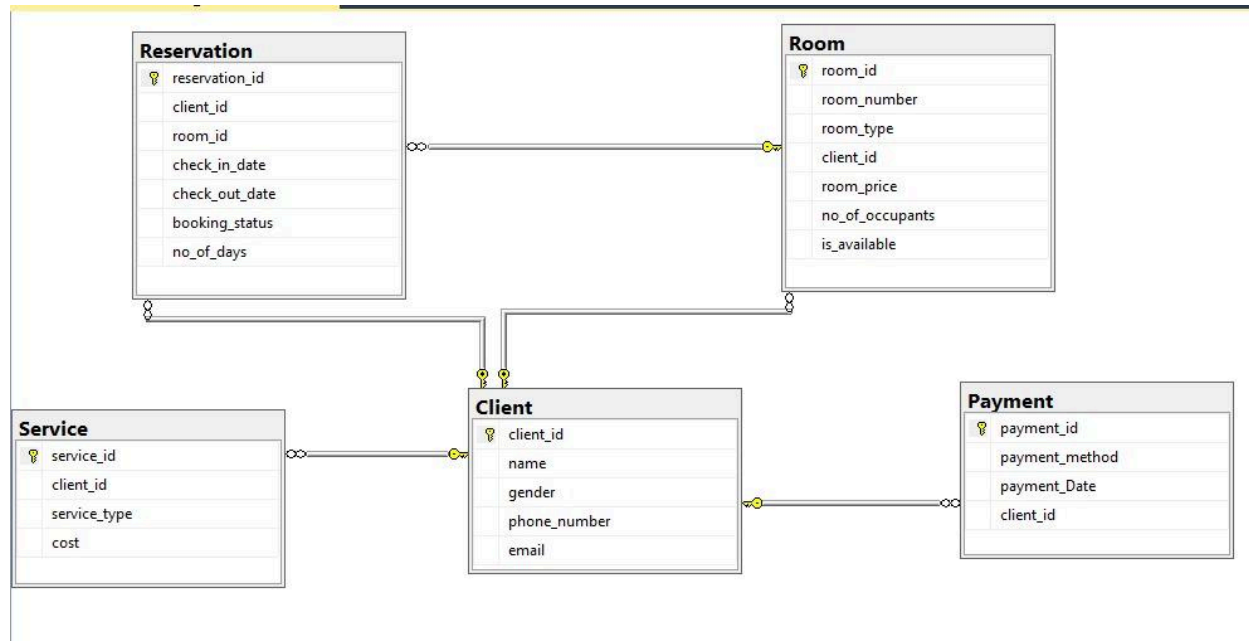
- Analyse peak and off-peak periods for better room and resource management.
- To provide real-time updates on room availability, ensuring that the system can efficiently manage bookings .
- Understand customer payment preferences to provide flexible and efficient payment options, enhancing the overall guest experience and simplifying transaction.

## SYSTEM DESIGN

### ER-Diagram



## Table Structure



## SQL SCHEMA

USE HRMS;

-- table to store client details

```
CREATE TABLE Client (  
    client_id INT PRIMARY KEY IDENTITY(1,1),  
    name VARCHAR(50) NOT NULL,  
    gender VARCHAR(20),  
    phone_number VARCHAR(50),  
    email VARCHAR(100)  
);
```

-- table to store room details

```
CREATE TABLE Room (  
    room_id INT PRIMARY KEY IDENTITY(1,1),  
    room_number INT NOT NULL,  
    room_type VARCHAR(50),  
    client_id INT NOT NULL,
```

```
    room_price DECIMAL(10, 2) NOT NULL,  
    no_of_occupants INT NOT NULL,  
    is_available BIT NOT NULL DEFAULT 1, --status (1 = available, 0 = not available),  
    FOREIGN KEY(client_id) REFERENCES Client(client_id)  
);
```

-- table to store reservation details

```
CREATE TABLE Reservation (  
    reservation_id INT PRIMARY KEY IDENTITY(1,1),  
    client_id INT NOT NULL,  
    room_id INT NOT NULL,  
    check_in_date DATE NOT NULL,  
    check_out_date DATE NOT NULL,  
    booking_status VARCHAR(20) DEFAULT 'Confirmed',  
    no_of_days INT,  
    FOREIGN KEY (client_id) REFERENCES Client(client_id),  
    FOREIGN KEY (room_id) REFERENCES Room(room_id)  
);
```

-- table to store payment details

```
CREATE TABLE Payment (  
    payment_id INT PRIMARY KEY IDENTITY(1,1),  
    payment_method VARCHAR(50),  
    payment_Date DATE,  
    client_id INT NOT NULL,  
    FOREIGN key(client_id) REFERENCES Client(client_id)  
);
```

-- table to store service details

```
CREATE TABLE Service (  
    service_id INT PRIMARY KEY IDENTITY(1,1),  
    client_id INT NOT NULL,
```

```
service_type VARCHAR(50) NOT NULL,  
cost DECIMAL(10, 2) NOT NULL,  
FOREIGN key(client_id) REFERENCES Client(client_id)  
);
```

## **Implementation**

### **CRUD OPERATIONS**

```
use hrms2;
```

```
insert into Client(name, gender, phone_number, email)values  
(('Alice Nzombo', 'F', '+25474355797', 'alice.nzombo@gmail.com'),  
(('Gloria Atieno', 'F', '+25474332417', 'gloria.atieno@gmail.com'),  
(('Alex Odhiambo', 'M', '+254743533222', 'alex.odhiambo@gmail.com'),  
(('Murugi Munyi', 'F', '+254743343569', 'Murugi.munyi@gmail.com'),  
(('Jeph Kiplagat', 'M', '+25475729797', 'jeph.kiplagat@gmail.com'),  
(('Lorraine Ouma', 'F', '+25474324565', 'lorraine.ouma@gmail.com'),  
(('Tim Opwondi', 'M', '+25474323111', 'tim.opwondi@gmail.com'),  
(('Justin Raymond', 'M', '+254712332123', 'justin.raymond@gmail.com'),  
(('Joel Runji', 'M', '+254757886904', 'joel.runji@gmail.com'),  
(('Lydia Masabarakiza', 'F', '+254743552973', 'Lydia.Masabarakiza@gmail.com'),  
(('Martin Marsai', 'M', '+254742399761', 'martin.marsai@gmail.com'),  
(('Ann Njoroge', 'M', '+254742553802', 'ann.njoroge@gmail.com'),  
(('Frida Oyuch', 'F', '+254786448975', 'Frida.oyuch@gmail.com'),  
(('Lisa Mwikali', 'F', '+254743553568', 'lisa.mwikal@gmail.com'),  
(('Francis Nzombo', 'M', '+2544737393226', 'francis.nzombo@gmail.com'),  
(('Gilbert Kamau', 'M', '+254784905237', 'gilbert.kamau@gmail.com'),  
(('Rhotimmi Ofweneke', 'M', '+254742390452', 'rhotimmi.ofweneke@gmail.com'),  
(('Nancy Auma', 'F', '+254711227789', 'nancy.auma@gmail.com'),  
(('Sasha Tonde', 'F', '+254768995403', 'sasha.tondegmail.com'),  
(('Klaus Taifa', 'M', '+254749852212', 'klaus.taifa@gmail.com'),  
(('Purity Kibaki', 'F', '+254732998564', 'purity.kibaki@gmail.com'),  
(('Mary Nekesa', 'F', '+25473456426', 'mary.nekesa@gmail.com'));
```

```
insert into Room(room_number, room_type, client_id, room_price, no_of_occupants,  
is_available)values
```

```
(101, 'junior', 1, 9000.00, 1, 1),  
(102, 'executive suite', 2, 16000.00, 2, 1),  
(103, 'junior', 3, 11000.00, 2, 0),  
(104, 'presidential suite', 4, 18000.00, 1, 1),  
(105, 'executive suite', 5, 17000.00, 3, 1),  
(106, 'junior', 6, 9000.00, 2, 1),  
(107, 'junior', 9, 11000.00, 2, 1),  
(108, 'junior', 10, 9000.00, 1, 0),  
(109, 'junior', 7, 9000.00, 2, 1),  
(110, 'presidential suite', 8, 20000.00, 2, 1),  
(111, 'executive suite', 15, 15500.00, 1, 0),  
(112, 'presidential suite', 12, 25000.00, 3, 1),  
(113, 'junior', 11, 12000.00, 2, 1),  
(114, 'junior', 13, 13500.00, 3, 1),  
(115, 'executive suite', 14, 16000.00, 2, 1);
```

```
insert into Reservation(client_id, room_id, check_in_date, check_out_date, booking_status,  
no_of_days)values
```

```
(1, 1, '2024-04-01', '2024-04-03', 'confirmed', 2),  
(2, 2, '2024-04-10', '2024-04-14', 'confirmed', 3),  
(3, 3, '2024-03-01', '2024-03-08', 'confirmed', 7),  
(4, 4, '2024-05-01', '2024-05-03', 'pending', 2),  
(5, 5, '2024-04-21', '2024-04-25', 'confirmed', 3),  
(6, 6, '2024-03-01', '2024-04-05', 'confirmed', 4),  
(7, 7, '2024-06-25', '2024-06-28', 'confirmed', 3),  
(8, 8, '2024-06-01', '2024-06-03', 'pending', 2),  
(9, 9, '2024-05-14', '2024-05-18', 'confirmed', 4),  
(10, 10, '2024-03-15', '2024-03-20', 'confirmed', 5),
```

(11, 11, '2024-07-24', '2024-07-26', 'cancelled', 2),  
(12, 12, '2024-05-11', '2024-05-16', 'confirmed', 5),  
(13, 13, '2024-06-26', '2024-06-30', 'confirmed', 4),  
(14, 14, '2024-07-01', '2024-07-03', 'cancelled', 2),  
(15, 15, '2024-03-03', '2024-03-07', 'confirmed', 4);

insert into Payment(payment\_method, payment\_Date, client\_id)values  
( 'Mpesa', '2024-04-01', 1),  
( 'Debit card', '2024-04-01', 2),  
( 'Bank transfer', '2024-03-04', 3),  
( 'Mpesa', '2024-04-14', 5),  
( 'Debit Card', '2024-02-01', 6),  
( 'Bank Transfer', '2024-06-01', 7),  
( 'Cash ', '2024-05-05', 9),  
( 'Mpesa', '2024-03-10', 10),  
( 'Mpesa', '2024-05-02', 12),  
( 'Debit card', '2024-05-20', 13),  
( 'Debit card', '2024-03-02', 15);

insert into Service(client\_id, service\_type, cost)values  
(1, 'Laundry', 1000.00),  
(2, 'Food Delivery', 300.00),  
(3, 'Gym', 1000.00),  
(4, 'Spa', 2500.00),  
(5, 'Concierge Services', 5000.00),  
(7, 'Laundry', 1000.00),  
(8, 'Food Delivery', 300.00),  
(9, 'Gym', 1000.00),  
(5, 'Spa', 2500.00),  
(11, 'Concierge Services', 5000.00),  
(6, 'Sauna', 3000.00),



```
(10, 'Gym', 1000.00),
(13, 'Spa', 2500.00),
(15, 'Concierge Services', 5000.00),
(12, 'Sauna', 3000.00),
(4, 'Laundry', 1000.00),
(3, 'Food Delivery', 300.00),
(2, 'Gym', 1000.00),
(1, 'Spa', 2500.00);
```

#### **–UPDATE Client**

```
SET name = 'Zarah Adana', email = 'zarahAdana@ gmail.com'
WHERE client_id = 4;
```

#### **–delete record from service table**

```
DELETE FROM Service WHERE service_id=1;
```

### **ADVANCED SQL QUERIES**

```
use hrms2;
```

#### **1. Retrieves a list of unique room types from the room table.**

```
Select distinct room_type from Room;
```

	room_type
1	executive suite
2	junior
3	presidential suite

#### **2.Calculates the total number of unique room types in the room table.**

```
SELECT COUNT(DISTINCT room_type) FROM Room;
```

(No column name)
3

#### **3.Fetches the records of all female clients.**

```
SELECT * FROM Client WHERE gender='F';
```

	client_id	name	gender	phone_number	email
1	1	Alice Nzombo	F	+25474355797	alice.nzombo@gmail.com
2	2	Gloria Atieno	F	+25474332417	gloria.atieno@gmail.com
3	4	Murugi Munyi	F	+254743343569	Murugi.munyi@gmail.com
4	6	Lorraine Ou...	F	+25474324565	lorraine.ouma@gmail.com
5	10	Lydia Masa...	F	+254743552973	Lydia.Masabarakiza@g...
6	13	Frida Oyucho	F	+254786448975	Frida.oyucho@gmail.com
7	14	Lisa Mwikali	F	+254743553568	lisa.mwikal@gmail.com
8	18	Nancy Auma	F	+254711227789	nancy.auma@gmail.com
9	19	Sasha Tonde	F	+254768995403	sasha.tondegmail.com
10	21	Purity Kibaki	F	+254732998564	purity.kibaki@gmail.com
11	22	Mary Nekesa	F	+25473456426	mary.nekesa@gmail.com

**4. Displays the booking status and total days of the confirmed reservations and sorts them in terms of no\_of\_days in ascending order.**

```
SELECT booking_status, no_of_days
```

```
FROM Reservation
```

```
WHERE booking_status = 'confirmed'
```

```
ORDER BY no_of_days
```

	booking_status	no_of_days
1	confirmed	2
2	confirmed	3
3	confirmed	3
4	confirmed	3
5	confirmed	4
6	confirmed	4
7	confirmed	4
8	confirmed	4
9	confirmed	5
10	confirmed	5
11	confirmed	7

**5. Fetch details of junior rooms that can accommodate 3 or fewer occupants.**

```
SELECT * FROM Room
```

```
WHERE room_type = 'junior' AND no_of_occupants <=3;
```

	room_id	room_number	room_type	client_id	room_price	no_of_occupants	is_available
1	1	101	junior	1	9000.00	1	1
2	3	103	junior	3	11000.00	2	0
3	6	106	junior	6	9000.00	2	1
4	7	107	junior	9	11000.00	2	1
5	8	108	junior	10	9000.00	1	0
6	9	109	junior	7	9000.00	2	1
7	13	113	junior	11	12000.00	2	1
8	14	114	junior	13	13500.00	3	1

**6.Fetches all executive suites whose price is greater than 16000.**

SELECT \* FROM Room

WHERE room\_price > 16000

AND room\_type = 'executive suite';

	room_id	room_number	room_type	client_id	room_price	no_of_occupants	is_available
1	5	105	executive suite	5	17000.00	3	1

**7. Retrieves the records of all clients whose names begin with letter A.**

SELECT \* FROM Client

WHERE NAME LIKE 'A%';

	client_id	name	gender	phone_number	email
1	1	Alice Nzombo	F	+25474355797	alice.nzombo@gmail.com
2	3	Alex Odhiambo	M	+25474353222	alex.odhiambo@gmail.com
3	12	Ann Njoroge	M	+254742553802	ann.njoroge@gmail.com

**8.Selects the price of most expensive presidential suites.**

SELECT MAX(room\_price) AS [PRESIDENTIAL SUITE] FROM Room;

	PRESIDENTIAL SUITE
1	25000.00

**9. Retrieves the records of the rooms whose price range between 8000 and 14000.**

```
SELECT * FROM Room
WHERE room_price BETWEEN 8000 AND 14000
```

	room_id	room_number	room_type	client_id	room_price	no_of_occupants	is_available
1	1	101	junior	1	9000.00	1	1
2	3	103	junior	3	11000.00	2	0
3	6	106	junior	6	9000.00	2	1
4	7	107	junior	9	11000.00	2	1
5	8	108	junior	10	9000.00	1	0
6	9	109	junior	7	9000.00	2	1
7	13	113	junior	11	12000.00	2	1
8	14	114	junior	13	13500.00	3	1

**10. Displays client names, emails, and their reservation check-in dates.**

```
SELECT C.name, C.email, R.check_in_date
FROM Client C
INNER JOIN Reservation R ON C.client_id = R.client_id;
```

	name	email	check_in_date
1	Alice Nzombo	alice.nzombo@gmail.com	2024-04-01
2	Gloria Atieno	gloria.atieno@gmail.com	2024-04-10
3	Alex Odhia...	alex.odhiambo@gmail.c...	2024-03-01
4	Murugi Munyi	Murugi.munyi@gmail.com	2024-05-01
5	Jeph Kiplagat	jeph.kiplagat@gmail.com	2024-04-21
6	Lorraine Ou...	lorraine.ouma@gmail.com	2024-03-01
7	Tim Opwondi	tim.opwondi@gmail.com	2024-06-25
8	Justin Raym...	justin.raymond@gmail.c...	2024-06-01
9	Joel Runji	joel.runji@gmail.com	2024-05-14
10	Lydia Masa...	Lydia.Masabarakiza@g...	2024-03-15
11	Martin Marsai	martin.marsai@gmail.com	2024-07-24
12	Ann Njoroge	ann.njoroge@gmail.com	2024-05-11
13	Frida Oyucho	Frida.oyucho@gmail.com	2024-06-26
14	Lisa Mwikali	lisa.mwikal@gmail.com	2024-07-01
15	Francis Nzo...	francis.nzombo@gmail....	2024-03-03

**11. Displays payment details of each client.**

```
SELECT P.payment_Date, p.payment_method, C.name
FROM Payment P
```

INNER JOIN Client C ON C.client\_id = P.client\_id;

	payment_Date	payment_method	name
1	2024-04-01	Mpesa	Alice Nzombo
2	2024-04-01	Debit card	Gloria Atieno
3	2024-03-04	Bank transfer	Alex Odhia...
4	2024-04-14	Mpesa	Jeph Kiplagat
5	2024-02-01	Debit Card	Lorraine Ou...
6	2024-06-01	Bank Transfer	Tim Opwondi
7	2024-05-05	Cash	Joel Runji
8	2024-03-10	Mpesa	Lydia Masa...
9	2024-05-02	Mpesa	Ann Njoroge
10	2024-05-20	Debit card	Frida Oyucho
11	2024-03-02	Debit card	Francis Nzo...

**12.List client names, room IDs, and reservation dates, ordered by the number of days reserved.**

```
SELECT C.name AS Client_name, R.room_id, R.check_in_date, R.check_out_date
FROM Reservation R
JOIN Client C
ON R.client_id = C.client_id
ORDER BY no_of_days;
```

	Client_name	room_id	check_in_date	check_out_date
1	Alice Nzombo	1	2024-04-01	2024-04-03
2	Murugi Munyi	4	2024-05-01	2024-05-03
3	Justin Raym...	8	2024-06-01	2024-06-03
4	Martin Marsai	11	2024-07-24	2024-07-26
5	Lisa Mwikali	14	2024-07-01	2024-07-03
6	Tim Opwondi	7	2024-06-25	2024-06-28
7	Jeph Kiplagat	5	2024-04-21	2024-04-25
8	Gloria Atieno	2	2024-04-10	2024-04-14
9	Lorraine Ou...	6	2024-03-01	2024-04-05
10	Joel Runji	9	2024-05-14	2024-05-18
11	Frida Oyucho	13	2024-06-26	2024-06-30
12	Francis Nzo...	15	2024-03-03	2024-03-07
13	Lydia Masa...	10	2024-03-15	2024-03-20
14	Ann Njoroge	12	2024-05-11	2024-05-16
15	Alex Odhia...	3	2024-03-01	2024-03-08

**13. Count the number of reservations made by each client, sorted in descending order of reservation count and by name.**

```
SELECT C.name, COUNT(R.reservation_id) AS Reservation_count
FROM Client C
LEFT JOIN Reservation R ON C.client_id = R.client_id
GROUP BY C.name
ORDER BY Reservation_count DESC, C.name;
```

	name	Reservation_count
1	Alex Odhiambo	1
2	Alice Nzombo	1
3	Ann Njoroge	1
4	Francis Nzom...	1
5	Frida Oyucho	1
6	Gloria Atieno	1
7	Jeph Kiplagat	1
8	Joel Runji	1
9	Justin Raymo...	1
10	Lisa Mwikali	1
11	Lorraine Ouma	1
12	Lydia Masab...	1
13	Martin Marsai	1
14	Murugi Munyi	1
15	Tim Opwondi	1
16	Gilbert Kamau	0
17	Klaus Taifa	0
18	Mary Nekesa	0
19	Nancy Auma	0
20	Purity Kibaki	0
21	Rhotimmi Of...	0

**14. Analyse Peak and Off-Peak Periods**

```
SELECT COUNT(client_id) AS No_of_Customers, FORMAT(check_in_date, 'MM') AS
MONTH
FROM Reservation
GROUP BY FORMAT(check_in_date, 'MM')
ORDER BY FORMAT(check_in_date, 'MM')ASC;
```

	No_of_Customers	MONTH
1	4	03
2	3	04
3	3	05
4	3	06
5	2	07

### 15.Returns gender distribution by clients.

```
SELECT COUNT(client_id) AS No_of_Customers, gender
FROM CLIENT
GROUP BY gender
ORDER BY COUNT(client_id) DESC;
```

	No_of_Customers	gender
1	11	F
2	11	M

### 16.Displays client details and their associated reservation information, including room ID and reservation dates.

```
SELECT C.client_id, C.name, C.phone_number, R.room_id, R.check_in_date,
R.Check_out_date
FROM Client C
INNER JOIN Reservation R ON R.client_id = C.client_id;
```

	client_id	name	phone_number	room_id	check_in_date	Check_out_date
1	1	Alice Nzombo	+25474355797	1	2024-04-01	2024-04-03
2	2	Gloria Atieno	+25474332417	2	2024-04-10	2024-04-14
3	3	Alex Odhia...	+254743533...	3	2024-03-01	2024-03-08
4	4	Murugi Munyi	+254743343...	4	2024-05-01	2024-05-03
5	5	Jeph Kiplagat	+25475729797	5	2024-04-21	2024-04-25
6	6	Lorraine Ou...	+25474324565	6	2024-03-01	2024-04-05
7	7	Tim Opwondi	+25474323111	7	2024-06-25	2024-06-28
8	8	Justin Raym...	+254712332...	8	2024-06-01	2024-06-03
9	9	Joel Runji	+254757886...	9	2024-05-14	2024-05-18
10	10	Lydia Masa...	+254743552...	10	2024-03-15	2024-03-20
11	11	Martin Marsai	+254742399...	11	2024-07-24	2024-07-26
12	12	Ann Njoroge	+254742553...	12	2024-05-11	2024-05-16
13	13	Frida Oyucho	+254786448...	13	2024-06-26	2024-06-30
14	14	Lisa Mwikali	+254743553...	14	2024-07-01	2024-07-03
15	15	Francis Nzo...	+254473739...	15	2024-03-03	2024-03-07

## 17. Real-Time Updates on Room Availability.

SELECT room\_id, room\_type, is\_available

FROM Room

WHERE is\_available = 1;

	room_id	room_type	is_available
1	1	junior	1
2	2	executive suite	1
3	4	presidential suite	1
4	5	executive suite	1
5	6	junior	1
6	7	junior	1
7	9	junior	1
8	10	presidential suite	1
9	12	presidential suite	1
10	13	junior	1
11	14	junior	1
12	15	executive suite	1



## **RECOMMENDATIONS**

- Data-Driven Marketing: Use peak-period insights to create targeted campaigns and offer tailored promotions.
- System Integration: Integrate real-time room availability data into online booking platforms to improve user experience.
- Customer Feedback: Regularly collect feedback on payment methods and booking experiences to identify new areas for improvement.
- Automation: Leverage automation for updating room availability and notifying staff of critical resource requirements.

## **CONCLUSION**

- Data-driven insights into customer behavior, booking patterns, and payment preferences enable the hotel to optimize operations, enhance guest satisfaction, and improve resource management.

## **LIST OF REFERENCES**

Official MySQL Documentation: <https://dev.mysql.com/doc/>

W3Schools SQL Tutorial: <https://www.w3schools.com/sql/default.asp>