SQL PROJECT

Task-2

HOTEL BOOKING MANAGEMENT SYSTEM

Overview

- The **Hotel Booking Management System** is designed to manage hotel operations, including room management, customer data, reservations, and payments. The system leverages a MySQL database for backend operations and a Python-based GUI using Tkinter for user interaction. It features a clean, user-friendly interface and enables users to view and manage key hotel-related data efficiently.
- **Features**

1. **Room Management**:
    1. Add new rooms with attributes like room number, type, and price per night.
    2. View existing room details in a tabular format.
2. **Customer Management**:
    1. Add new customer information, including name, email, and phone number.
    2. View the customer database.
3. **Reservation Management**:
    1. Record reservations with details like customer ID, room ID, check-in, and check-out dates.
    2. View reservations in a detailed table.

Payment Management:
Manage payments with details like reservation ID, payment date, amount, and payment method.
View all payment transactions in a tabular format.
Interactive GUI:
Buttons to view details for rooms, customers, reservations, and payments.
Pop-up windows displaying database tables with a clean and scrollable layout.
Light blue theme for the GUI with a bold header.

System Architecture Frontend

- **Python Tkinter:**
  - Used for designing the graphical user interface (GUI).
  - Includes buttons, labels, and tree views for displaying data.

Backend

- **MySQL Database:**
  - Four tables: Rooms, Customers, Reservations, and Payments.
  - Queries are dynamically executed to fetch and display data.

Database Design Tables

1.Rooms:

- RoomID: Primary key
- RoomNumber: Unique identifier for each room
- RoomType: Type of room (e.g., Single, Double, Suite)
- PricePerNight: Cost per night for the room

2. **Customers**:
    - CustomerID: Primary key
    - CustomerName: Name of the customer
    - Email: Email address of the customer
    - PhoneNumber: Contact number of the customer
3. **Reservations**:
    - ReservationID: Primary key
    - CustomerID: Foreign key referencing Customers
    - RoomID: Foreign key referencing Rooms
    - CheckInDate: Start date of the reservation
    - CheckOutDate: End date of the reservation
4. **Payments**:
    - PaymentID: Primary key
    - ReservationID: Foreign key referencing Reservations
    - PaymentDate: Date of payment
    - Amount: Payment amount
    - PaymentMethod: Mode of payment (e.g., Credit Card, Cash)

Key Insights

Rooms Table

```
76 •    select * from Rooms;
```

Result Grid | Filter Rows: | Edit: | Export/I

RoomID	RoomNumber	RoomType	PricePerNight	AvailabilityStatus
1	101	Single	50.00	1
2	102	Double	75.00	1
3	103	Suite	150.00	1
4	104	Single	50.00	0
5	105	Double	75.00	1
6	106	Single	50.00	1
7	101	Single	100.00	1
8	102	Double	150.00	1
9	103	Suite	250.00	1
10	104	Single	100.00	1
11	105	Double	150.00	1
12	106	Suite	250.00	1

CustomersTable

```
77 •    select * from Customers;
```

Result Grid | Filter Rows: | Edit: | Export/Import:

CustomerID	Email	PhoneNumber	CustomerName
1	john.doe@example.com	1234567890	john
2	jane.smith@example.com	9876543210	jany
3	michael.brown@example.com	5555555555	mechael
4	emily.davis@example.com	4444444444	emily
5	sarah.wilson@example.com	3333333333	sarah
6	shakirashakijsnz@gmail.com	77659875	shakira
17	johrn.doe@example.com	1234567890	John
18	jaane.smith@example.com	2345678901	Jane
19	alice.johnson@example.com	3456789012	Alice
20	bob.brown@example.com	4567890123	Bob
21	eve.davis@example.com	5678901234	Eve

Payments Table

```
78 •  select * from Payments;
```

Result Grid | Filter Rows: | Edit:

PaymentID	ReservationID	PaymentDate	Amount	PaymentMethod
1	1	2024-01-01	200.00	Credit Card
2	2	2024-01-02	300.00	Debit Card
3	3	2024-01-03	600.00	PayPal
4	4	2024-01-04	200.00	Cash
5	5	2024-01-05	300.00	Credit Card
6	1	2025-12-25	300.00	Online
NULL	NULL	NULL	NULL	NULL

Reservations Table

```
79 •  select * from Reservations;
```

Result Grid | Filter Rows: | Edit: | Export/Import: | Wrap Cell Cont

ReservationID	CustomerID	RoomID	CheckInDate	CheckOutDate	TotalAmount	ReservationStatus
1	1	1	2024-01-01	2024-01-05	200.00	Confirmed
2	2	2	2024-01-02	2024-01-06	300.00	Confirmed
3	3	3	2024-01-03	2024-01-07	600.00	Cancelled
4	4	4	2024-01-04	2024-01-08	200.00	Confirmed
5	5	5	2024-01-05	2024-01-09	300.00	Confirmed
6	3	1	2024-12-30	2025-01-05	NULL	Confirmed
7	1	1	2024-12-25	2024-12-30	NULL	Confirmed
8	1	2	2024-12-25	2024-12-30	NULL	Confirmed
NULL	NULL	NULL	NULL	NULL	NULL	NULL

Total Revenue Generated Per Room Type

```
114
115     -- Total Revenue Generated Per Room Type
116     SELECT
117         r.RoomType,
118         SUM(res.TotalAmount) AS TotalRevenue
119     FROM
120         Rooms r
121     JOIN
122         Reservations res ON r.RoomID = res.RoomID
123     GROUP BY
124         r.RoomType
125     ORDER BY
126         TotalRevenue DESC;
127
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

RoomType	TotalRevenue
Double	600.00
Suite	600.00
Single	400.00

Count of Reservations Made by Each Customer

```
128     -- Count of Reservations Made by Each Customer
129     SELECT
130         CustomerName,
131         COUNT(res.ReservationID) AS TotalReservations
132     FROM
133         Customers c
134     JOIN
135         Reservations res ON c.CustomerID = res.CustomerID
136     GROUP BY
137         c.CustomerID
138     ORDER BY
139         TotalReservations DESC;
140
141
142
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

CustomerName	TotalReservations
john	3
mechael	2
jany	1
emily	1
sarah	1

Average Stay Duration and Total Revenue Per Customer

```sql
-- Average Stay Duration and Total Revenue Per Customer
SELECT
    CustomerName,
    round(avg(DATEDIFF(res.CheckOutDate, res.CheckInDate))) AS AvgStayDuration,
    SUM(res.TotalAmount) AS TotalRevenue
FROM
    Customers c
JOIN
    Reservations res ON c.CustomerID = res.CustomerID
GROUP BY
    c.CustomerID
ORDER BY
    TotalRevenue DESC;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

CustomerName	AvgStayDuration	TotalRevenue
mechael	5	600.00
jany	4	300.00
sarah	4	300.00
john	5	200.00
emily	4	200.00

List of Rooms with Total Number of Reservations

```sql
-- List of Rooms with Total Number of Reservations
SELECT
    r.RoomNumber,
    r.RoomType,
    COUNT(res.ReservationID) AS ReservationCount
FROM
    Rooms r
LEFT JOIN
    Reservations res ON r.RoomID = res.RoomID
GROUP BY
    r.RoomID
ORDER BY
    ReservationCount DESC;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

RoomNumber	RoomType	ReservationCount
101	Single	3
102	Double	2
103	Suite	1
104	Single	1
105	Double	1

Payment Method Usage Statistics

```sql
-- Payment Method Usage Statistics
SELECT
    p.PaymentMethod,
    COUNT(p.PaymentID) AS PaymentCount,
    SUM(p.Amount) AS TotalPaymentAmount,
    AVG(p.Amount) AS AvgPaymentAmount
FROM
    Payments p
GROUP BY
    p.PaymentMethod
ORDER BY
    TotalPaymentAmount DESC;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

PaymentMethod	PaymentCount	TotalPaymentAmount	AvgPaymentAmount
PayPal	1	600.00	600.000000
Credit Card	2	500.00	250.000000
Debit Card	1	300.00	300.000000
Online	1	300.00	300.000000
Cash	1	200.00	200.000000

List of Customers Who Stayed for More Than 5 Days

```sql
--     List of Customers Who Stayed for More Than 5 Days
SELECT
    c.FirstName,
    c.LastName,
    res.CheckInDate,
    res.CheckOutDate,
    DATEDIFF(res.CheckOutDate, res.CheckInDate) AS StayDuration
FROM
    Customers c
JOIN
    Reservations res ON c.CustomerID = res.CustomerID
WHERE
    DATEDIFF(res.CheckOutDate, res.CheckInDate) > 5
ORDER BY
    StayDuration DESC;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

PaymentMethod	PaymentCount	TotalPaymentAmount	AvgPaymentAmount
PayPal	1	600.00	600.000000
Credit Card	2	500.00	250.000000
Debit Card	1	300.00	300.000000
Online	1	300.00	300.000000
Cash	1	200.00	200.000000

Top 3 Customers by Total Payments

```sql
--     Top 3 Customers by Total Payments
SELECT
    CustomerName,
    SUM(p.Amount) AS TotalPayments
FROM
    Customers c
JOIN
    Reservations res ON c.CustomerID = res.CustomerID
JOIN
    Payments p ON res.ReservationID = p.ReservationID
GROUP BY
    c.CustomerID
ORDER BY
    TotalPayments DESC
LIMIT 3;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

CustomerName	TotalPayments
mechael	600.00
john	500.00
jany	300.00

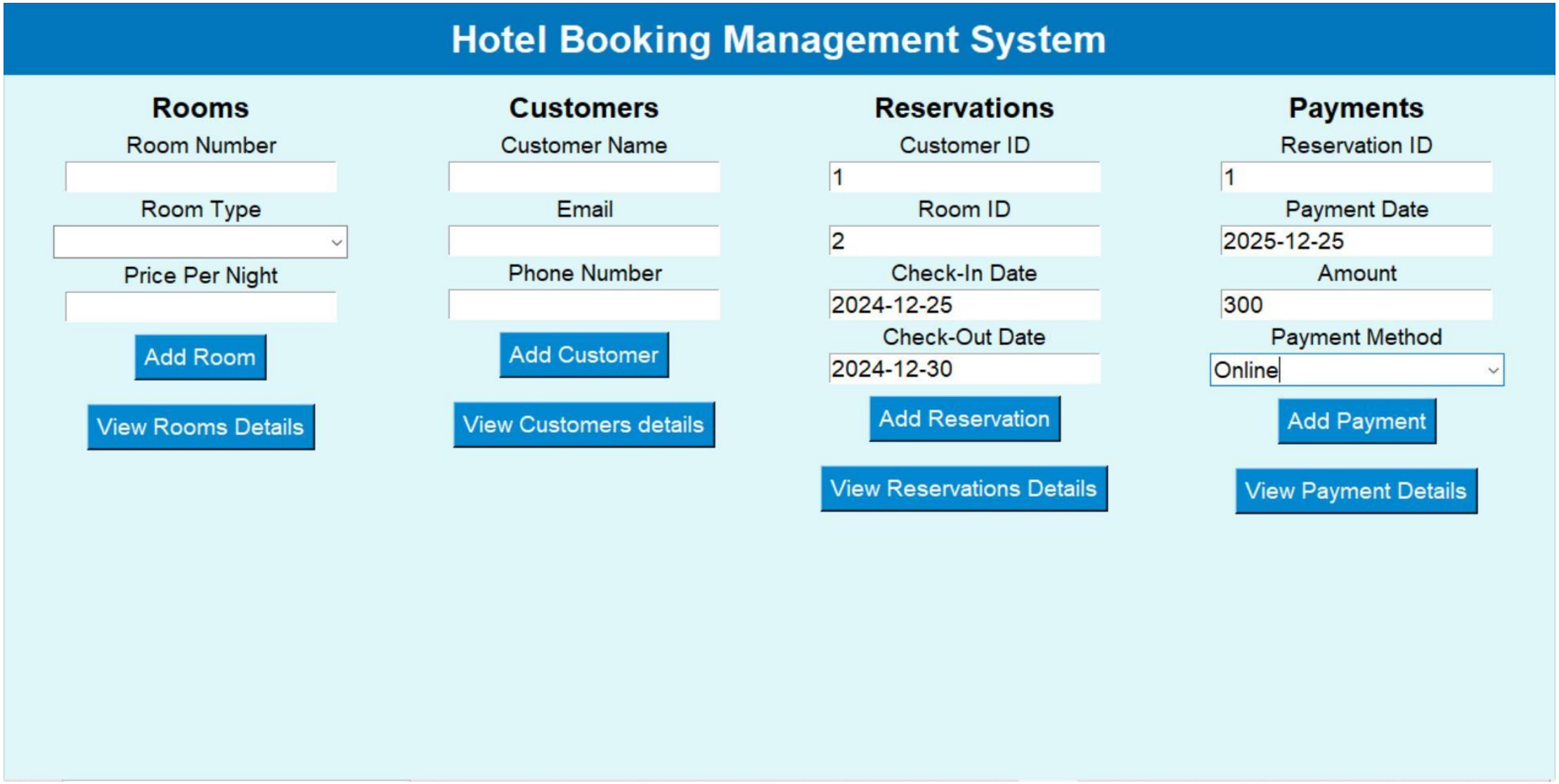
Rooms with Availability Status and Revenue

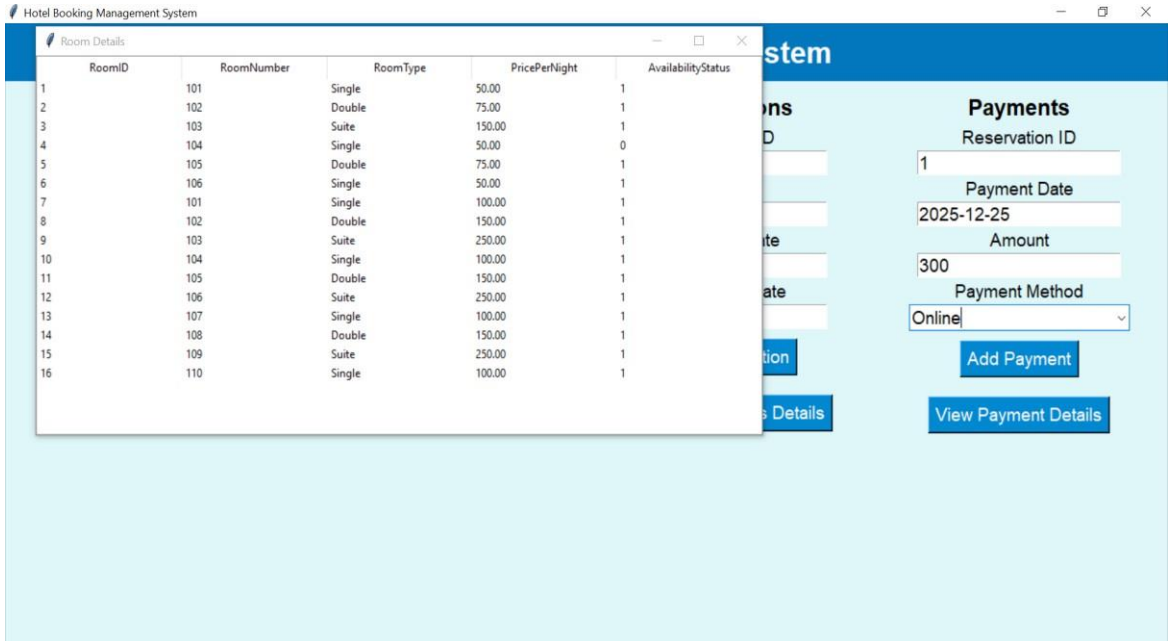
```sql
--     Rooms with Availability Status and Revenue
SELECT
    r.RoomNumber,
    r.RoomType,
    r.AvailabilityStatus,
    COALESCE(SUM(res.TotalAmount), 0) AS TotalRevenue
FROM
    Rooms r
LEFT JOIN
    Reservations res ON r.RoomID = res.RoomID
GROUP BY
    r.RoomID
ORDER BY
    r.AvailabilityStatus DESC, TotalRevenue DESC;
```

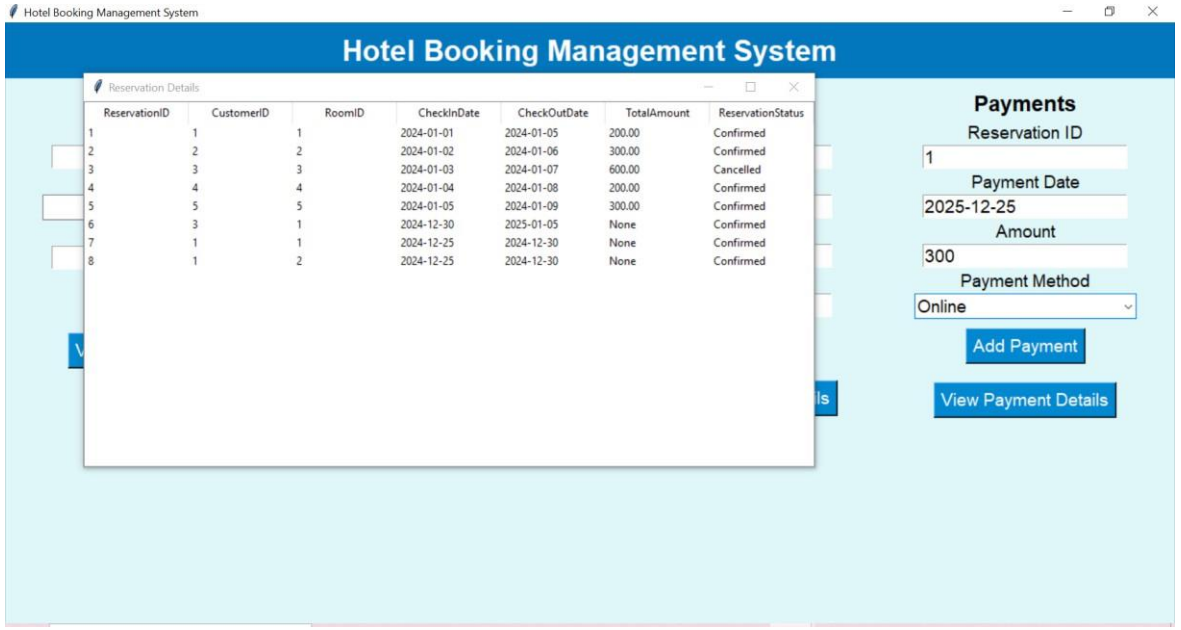
Result Grid | Filter Rows: | Export: | Wrap Cell Content:

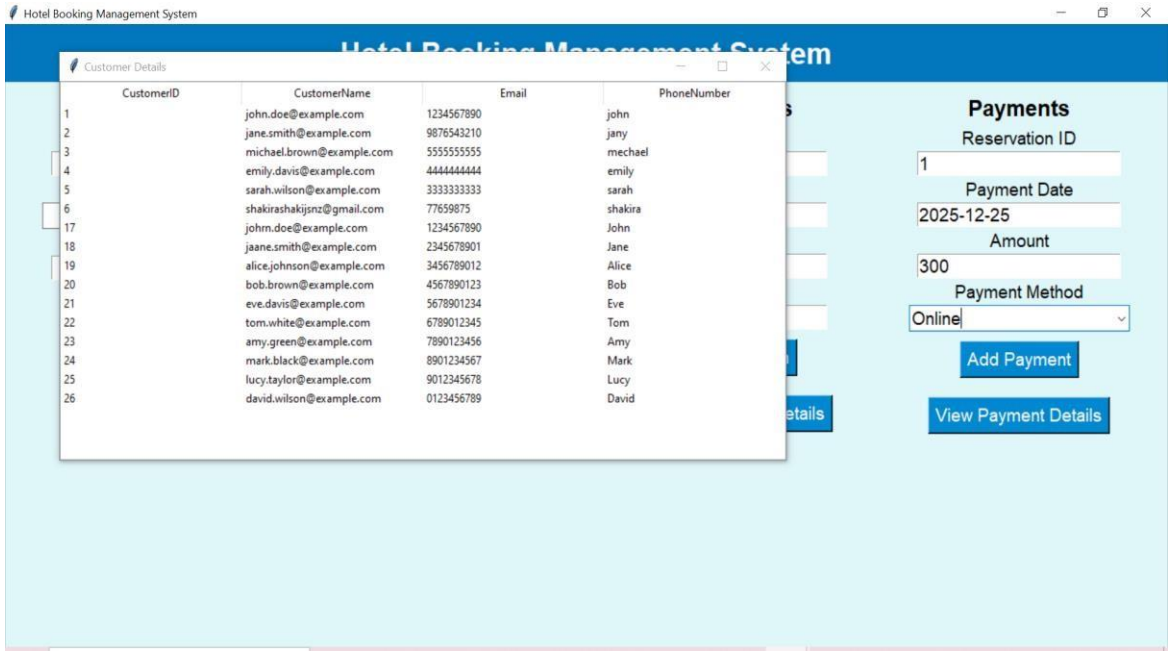
RoomNumber	RoomType	AvailabilityStatus	TotalRevenue
103	Suite	1	600.00
102	Double	1	300.00
105	Double	1	300.00
101	Single	1	200.00
106	Single	1	0.00

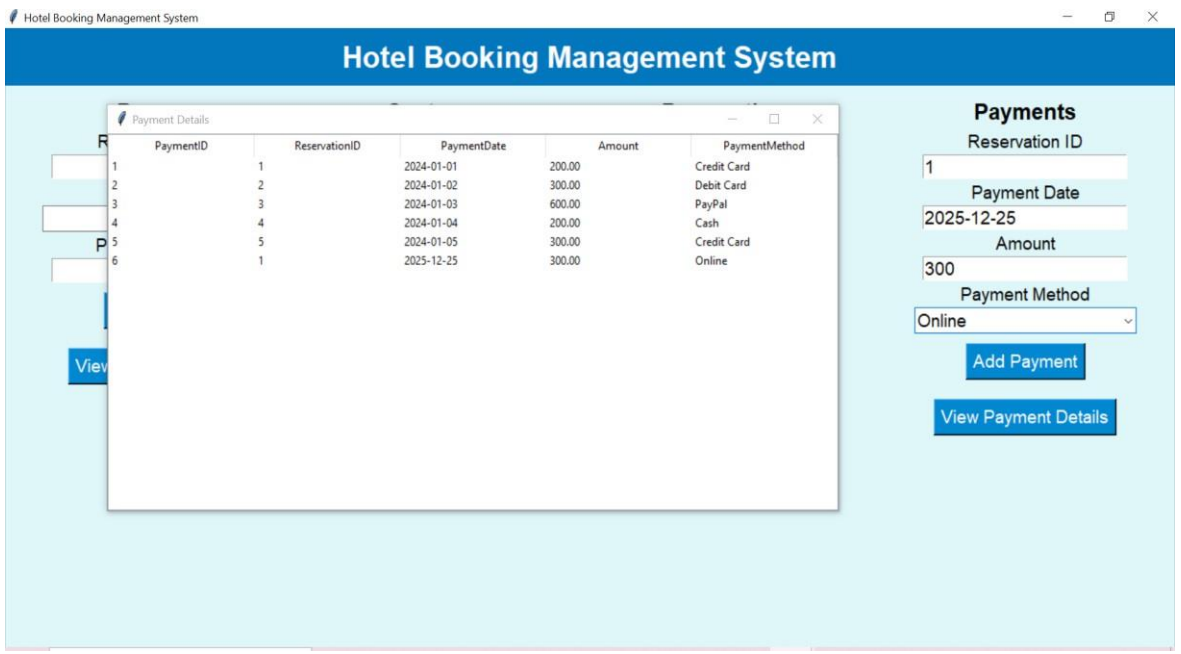
GUI Layout


Hotel Booking Management System
Rooms
Room Number
Room Type
Price Per Night
Add Room
View Rooms Details
Customers
Customer Name
Email
Phone Number
Add Customer
View Customers details
Reservations
Customer ID
1
Room ID
2
Check-In Date
2024-12-25
Check-Out Date
2024-12-30
Add Reservation
View Reservations Details
Payments
Reservation ID
1
Payment Date
2025-12-25
Amount
300
Payment Method
Online
Add Payment
View Payment Details


Hotel Booking Management System
Room Details
RoomID RoomNumber RoomType PricePerNight AvailabilityStatus
1 101 Single 50.00 1
2 102 Double 75.00 1
3 103 Suite 150.00 1
4 104 Single 50.00 0
5 105 Double 75.00 1
6 106 Single 50.00 1
7 101 Single 100.00 1
8 102 Double 150.00 1
9 103 Suite 250.00 1
10 104 Single 100.00 1
11 105 Double 150.00 1
12 106 Suite 250.00 1
13 107 Single 100.00 1
14 108 Double 150.00 1
15 109 Suite 250.00 1
16 110 Single 100.00 1
Payments
Reservation ID
1
Payment Date
2025-12-25
Amount
300
Payment Method
Online
Add Payment
View Payment Details


Hotel Booking Management System
Hotel Booking Management System
Reservation Details
ReservationID CustomerID RoomID CheckInDate CheckOutDate TotalAmount ReservationStatus
1 1 1 2024-01-01 2024-01-05 200.00 Confirmed
2 2 2 2024-01-02 2024-01-06 300.00 Confirmed
3 3 3 2024-01-03 2024-01-07 600.00 Cancelled
4 4 4 2024-01-04 2024-01-08 200.00 Confirmed
5 5 5 2024-01-05 2024-01-09 300.00 Confirmed
6 3 1 2024-12-30 2025-01-05 None Confirmed
7 1 1 2024-12-25 2024-12-30 None Confirmed
8 1 2 2024-12-25 2024-12-30 None Confirmed
Payments
Reservation ID
1
Payment Date
2025-12-25
Amount
300
Payment Method
Online
Add Payment
View Payment Details


Hotel Booking Management System
Customer Details
CustomerID CustomerName Email PhoneNumber
1 john.doe@example.com 1234567890 john
2 jane.smith@example.com 9876543210 jany
3 michael.brown@example.com 5555555555 mechael
4 emily.davis@example.com 4444444444 emily
5 sarah.wilson@example.com 3333333333 sarah
6 shakirashakijsnz@gmail.com 77659875 shakira
17 johrn.doe@example.com 1234567890 John
18 jaane.smith@example.com 2345678901 Jane
19 alice.johnson@example.com 3456789012 Alice
20 bob.brown@example.com 4567890123 Bob
21 eve.davis@example.com 5678901234 Eve
22 tom.white@example.com 6789012345 Tom
23 amy.green@example.com 7890123456 Amy
24 mark.black@example.com 8901234567 Mark
25 lucy.taylor@example.com 9012345678 Lucy
26 david.wilson@example.com 0123456789 David
Payments
Reservation ID
1
Payment Date
2025-12-25
Amount
300
Payment Method
Online
Add Payment
View Payment Details


Hotel Booking Management System
Hotel Booking Management System
Payment Details
PaymentID ReservationID PaymentDate Amount PaymentMethod
1 1 2024-01-01 200.00 Credit Card
2 2 2024-01-02 300.00 Debit Card
3 3 2024-01-03 600.00 PayPal
4 4 2024-01-04 200.00 Cash
5 5 2024-01-05 300.00 Credit Card
6 1 2025-12-25 300.00 Online
Payments
Reservation ID
1
Payment Date
2025-12-25
Amount
300
Payment Method
Online
Add Payment
View Payment Details

Conclusion

The **Hotel Booking Management System** is a versatile and user-friendly tool for managing hotel operations. With its robust database design and clean interface, it simplifies the tasks of handling room bookings, customer data, and financial transactions. Future enhancements can make the system even more powerful and adaptable to complex requirements.