

# AMERICAN INTERNATIONAL UNIVERSITY-BANGLADESH (AIUB)

# **Dept. of Computer Science Faculty of Science and Technology**

**CSC2210: OBJECT ORIENTED PROGRAMMING 2** 

Fall 2024-2025

Section: [L]

**Group No: 15** 

# **Project Report On**

Project Name [CrystalOasis: A Luxurious Hotel Management System]

### **Supervised By**

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# **Submitted By:**

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#### Obtained Marks for CO2 and CO3 (Description given in the following page)

Assessment Criteria	Not Atto Incorre		Inadequate (1-2)	Average (3)	Good (4)	Excellent (5)
<b>Evaluation Criter</b>	ria (CO2)	Total =		Evaluation Cri	teria (CO3)	Total =
Requirement fulfil	lment			Organization of the application		
Validation				Representation and Integration of Database		
Verification				Graphical User Interface		

**CO2:** Display and verify the mean of a real-life Project using the concepts of C# Graphical User Interface based environment with database integration to depict a desktop-based application.

Assessment Criteria	Not Attended/ Incorrect (0)	-		Good (4)	Excellent (5)			
Evaluation Criteria	Evaluation Definition							
Requirement fulfillment	Fails to demonstrate any understanding of real-life scenario-based project development or functional requirement identification. There is no attempt to depict a project or identify functional requirements accurately.	Demonstrates limited understanding of real-life scenario-based project development and functional requirement identification. The project depicted lacks coherence or relevance to real-life scenarios, and functional requirements are inaccurately identified or insufficiently described.	Presents a basic depiction of a real-life scenario-based project and identifies some functional requirements. However, the project lacks depth or complexity, and some functional requirements may be vaguely defined or missing key details.	Effectively demonstrates a realistic scenario-based project and accurately identifies most functional requirements. The project is well-developed with appropriate complexity, and functional requirements are clearly articulated with relevant details.	Exhibits an exceptional understanding of real-life scenario-based project development and accurately identifies all functional requirements. The project is meticulously developed with thorough attention to detail, reflecting a comprehensive understanding of Object-Oriented Programming project development activities.			
Validation	Fails to demonstrate any understanding or implementation of validation forms in their system. There is no attempt to deal with data validation, and validation requirements are completely ignored or incorrectly applied.	Demonstrates limited understanding of validation forms and data validation techniques. While some attempt may be made to implement validation, it is incomplete or poorly executed, leading to inadequate handling of data validation.	Shows a basic understanding of validation forms and data validation techniques. They attempt to implement validation, but some aspects may be missing or incorrectly implemented, resulting in partial or inconsistent handling of data validation.	Effectively demonstrates the use of validation forms and implements data validation techniques. Validation is mostly accurate and comprehensive, ensuring the proper handling of data input and verification in the system.	Exhibits an exceptional understanding and implementation of validation forms and data validation techniques. Validation is meticulously implemented with thorough attention to detail, ensuring robust data validation procedures and contributing to the overall reliability and integrity of the system			
Verification	Fails to demonstrate any attempt to verify the system data or functional requirements. There is no evidence of	Demonstrates limited understanding of verification processes and data flow in the system. Verification	Shows a basic understanding of verification processes and attempts to verify system data. However, verification	Identifies and verifies system data, ensuring proper functional requirements are met. Verification efforts are mostly accurate and	system.  Exhibits an exceptional understanding of verification processes and meticulously verifies system data. Verification			

unde	erstanding or a	attempts are	efforts may be	thorough, with	efforts are
imple	ementation i	incomplete or	inconsistent or	attention to	comprehensive
of ve	erification i	inaccurate, and	lack	ensuring data	and precise, with
proce	esses, and t	there is	thoroughness,	integrity and	a keen focus on
data	flow is not i	insufficient	and there may be	appropriate data	ensuring all
consi	idered.	consideration	gaps in ensuring	flow within the	functional
		given to ensuring	proper functional	system.	requirements are
		data integrity and	requirements and		met and
	1	functionality.	data flow.		maintaining
		-			proper data flow
					throughout the
					system.

**CO3:** Prepare and Explain a real life desktop based application synthesizing several component of C# along with development tools to adhere the given requirements.

Assessment Criteria	Not Attended/ Incorrect (0)	Inadequate (1-2)	Average (3)	Good (4)	Excellent (5)		
Evaluation Criteria	<b>Evaluation Definition</b>						
Organization of the application	Fails to identify any suitable real time application or requirements for project development activities related to OOP.	Limited understanding about the project scopes and scenarios or identification of functional requirements.	Lacks depth or relevance to OOP project development activities and may contain inaccuracies. Real-life scenarios are mentioned, but the discussion lacks depth or clarity.	Consider and integrate the ide of several core aspects of the project along with relevance to real-life scenarios.  Demonstrating a solid understanding of the application presentation.	exceptional understanding of project preparation according to a to real-life scenarios. Also contains proper and insightful identification of the system which is comprehensive and precise.		
Representation and Integration of Database	Fails to identify and present any understanding or implementation of database. Also failed to integrate the data with the project itself.	Limited understanding of the database concepts or their proper way of using in a real time project. While some attempt may be made to implement but it is incomplete or poorly executed, leading to inadequate design.	Lacks depth or relevance to database integration with the application. Shows a basic understanding but some aspects may be missing or incorrectly implemented, resulting in partial or inconsistency. May lack proper normalization.	Integrate the database with the forms properly and implements with proper validation which is mostly accurate and comprehensive, ensuring the proper handling of data input and verification alon with general normalization.	understanding and implementation of database ensuring attention to detail, and robust data manipulation procedures and contributing to		
Graphical User Interface	Fails to present or prepare GUI based application interfaces. There is no evidence of creating or integrating such things according to their usefulness.	Limited understanding of graphical user interfaces. Lack of design knowledge. Very poor attempt to make such things which are currently obsolete	Shows a basic understanding of creating user interfaces. Most of them are interconnected but maybe some of them lack it. However, most of it can be	Effectively identifies and meet the consider the simplicity. Design related works are mostly accurate and taken proper attention to ensuring a user-	a high standard of simple and		

or can't be identified as	described as user friendly.	friendly coherent system.	preferred way according to the
coherent.	J. J.		coherent usage.

# **Table of Contents:**

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#### **CHAPTER 1: INTRODUCTION:**

In today's fast-paced world, hotels play an important role in providing people with comfort, relaxation, and care. Managing a hotel is not just about running a business; it's about creating a welcoming place where guests feel valued and cared for. To achieve this, it's crucial to handle guest services, staff coordination, and daily operations efficiently.

Our project, **CrystalOasis**: A Luxurious Hotel Management System, is designed to make hotel operations smoother and more effective. It helps guests easily book rooms, request services, and enjoy a better experience. At the same time, it supports hotel staff and managers with tools to organize their tasks, manage the hotel, and make better decisions. With **CrystalOasis**, we want to make life easier for everyone involved—guests, staff, and administrators. The system is built to meet the needs of today's hotels while also preparing them for the future. This project is more than just software. It's a way to bring people together, ensure every guest feels at home, and help hotels deliver the best hospitality experience possible.

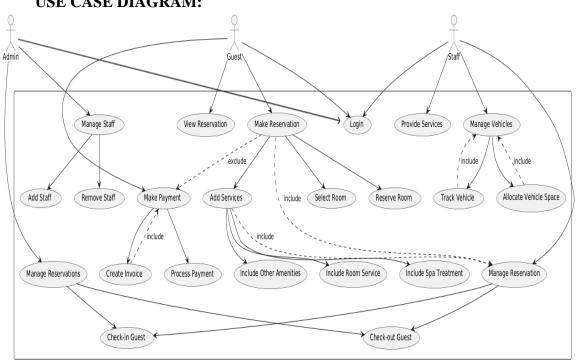
#### **CHAPTER 2: USER STORIES**

Use Case Name	Actor	User Story		
Admin Login	Admin	Admin logs in using credentials (ID, password) to access and manage staff, reservations, and other system functions.		
Guest Login	Guest	Guest logs in using credentials (ID, password) to manage reservations and access their account details.		
Staff Login	Staff	Staff logs in using credentials (ID, password) to manage guest reservations and provide services.		
Manage Staff	Admin	Admin manages staff (add, edit, delete) to ensure the efficient operation of the hotel.		
View Staff Details	Admin	Admin views details of staff members (name, role, contact info) for managing team members.		
Create Reservation	Guest	Guest reserves one or more rooms for a specific stay, selecting preferred dates and room types.		
View Room Availability	Guest	Guest checks room availability based on desired check-in and check-out dates.		
Manage Reservation	Admin	Admin manages reservations, making changes such as editing or canceling bookings to ensure smooth operations.		
View Guest Details	Admin	Admin views guest details (name, email, membership status) to manage reservations and services.		
Assign Room to Guest	Admin	Admin assigns a room to a guest's reservation to ensure proper room allocation.		

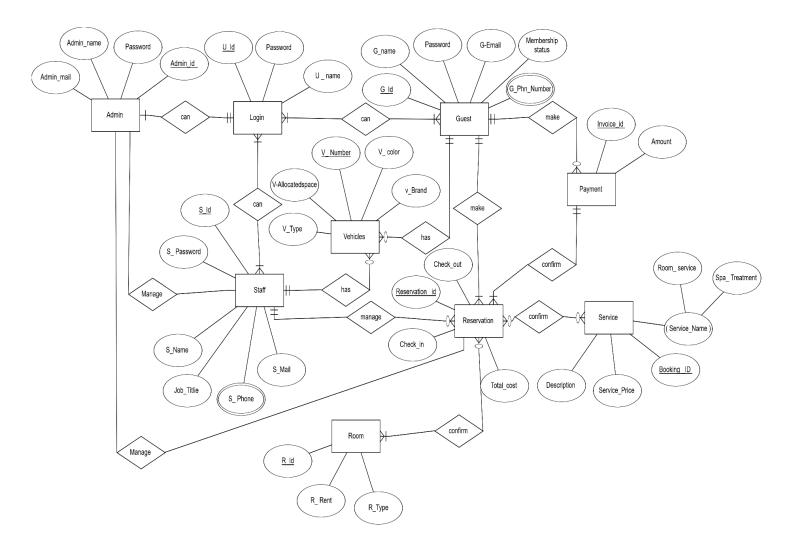
Manage Services	Staff	Staff provides and manages various services such as room services.
Add Service to Reservation	Staff	Staff adds services (room service, Gym, Swimming pool, etc.) to a reservation to enhance the guest's experience.
View Services for Reservation	Guest	Guest views available services and selects them for their reservation to customize their stay.
Make Payment	Guest	Guest makes payments for reservations using various payment methods to complete their transaction.
Generate Invoice	Admin	Admin generates invoices for guest payments, providing a detailed breakdown of charges, payment method, and dates.
Manage Vehicle	Admin	Admin manages the parking assignments and vehicle details for both staff and guests to ensure proper parking arrangements.
Assign Parking to Vehicle	Admin	Admin assigns specific parking spaces to guest or staff vehicles, ensuring proper space allocation within the resort.
View Vehicle Details	Admin	Admin views vehicle details (number, brand, type, parking space) for managing parking and ensuring organized vehicle allocation.
Add Vehicle to Guest	Guest	Guest adds vehicle details (number, brand, type) to their profile, ensuring an allocated parking space during their stay.
Add Vehicle to Staff	Staff	Staff adds vehicle details to their profile for proper parking allocation and parking space management.

### **CHAPTER 3: DATABASE:**

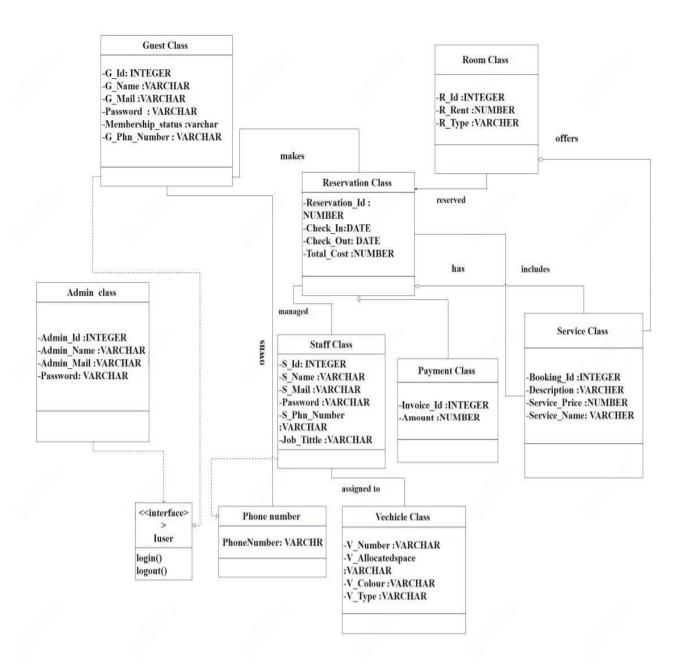
# **USE CASE DIAGRAM:**



#### **ER- DIAGRAM:**



#### **CLASS DIAGRAM:**



# **DATA DICTIONARY:**

DATA DICT.	IONARY:		
1. Admin Table			
Column Name	Data Type	Allow Null	Description
A_ID	Int	No	Primary Key - Unique Admin Id
Admin_Name	Varchar(50)	No	Name Of The Admin
Admin_Mail	Varchar(50)	No	Email Of The Admin
Admin_Phone	Varchar(20)	No	Contact Number Of The Admin
2. Staff Table			
Column Name	Data Type	Allow Null	Description
S_ID	Int	No	Primary Key - Unique Staff Id
S_Name	Varchar(50)	No	Name Of The Staff Member
Job_Title	Varchar(50)	No	Job Title Of The Staff
S_Phone	Varchar(50)	Yes	Phone Number Of The Staff
S_Mail	Varchar(50)	Yes	Email Address Of The Staff
A_ID	Int	No	Foreign Key - References A_ID
A_ID		NO	In Admin Table
3. Guest Table			
Column Name	Data Type	Allow Null	Description
G_ID	Int	No	Primary Key - Unique Guest Id
G_Name	Varchar(50)	No	Full Name Of The Guest
G_Mail	Varchar(50)	Yes	Email Address Of The Guest
G_Phone	Varchar(15)	No	Contact Number Of The Guest
Nationality	Varchar(50)	No	Nationality Of The Guest
Gender	Varchar(50)	No	Gender Of The Guest
DOB	Datetime	No	Date Of Birth Of The Guest
4. Room Table			
Column Name	Data Type	Allow Null	Description
Room_ID	Int	No	Primary Key - Unique Room Id
Room_Rent	Decimal(10,2)	No	Rent Price For The Room
Room_Type	Varchar(50)	No	Type Of Room (E.G., Single,
rtoom_rype	varenar(50)	110	Double, Suite)
Status	Varchar(50)	Yes	Status Of The Room
Status	(So)	105	(Available/Booked)
5. Reservation Table	ъ п		5
Column Name	Data Type	Allow Null	Description
Reservation ID	Int	No	Primary Key - Unique
_			Reservation Id
Check_Out	Datetime	No	Check-Out Date And Time
Check_In	Datetime	No	Check-In Date And Time
Room_ID	Int	No	Foreign Key - References
	-		Room_ID In Room Table
G_ID	Int	Yes	Foreign Key - References
_			G_ID In Guest Table
6 W 1' 1 - M 11			
6. Vehicles Table	D	A 11 - 3.7 - 11	<b>D</b>
Column Name	Data Type	Allow Null	Description

Vehicle_ID	Var	char(50)	N	No	Primary Key - Unique Vehicle Id
V_Color	Var	char(50)	N	Vo	Color Of The Vehicle
V_Brand		char(50)		No	Brand Of The Vehicle
_		` /			Type Of The Vehicle (Car,
V_Type	Var	char(50)	}	l'es	Bike, Etc.)
V_Allocated_Space	Var	char(50)	}	l'es	Parking Space Allocated
G_ID	Int		N	Vo	Foreign Key - References G_ID In Guest Table
S_ID	Int		N	No.	Foreign Key - References S_ID In Staff Table
7. Service Table	•				
Column Name	D	ata Type	;	Allow N	Tull Description
Service_Name	V	archar(5	0)	No	Name Of The Service
Booking_ID	Ir	nt		No	Foreign Key - Links To A Booking (Reservation)
Service_Price	D	ecimal(1	0,2)	Yes	Price Of The Service
Description	V	archar(5	0)	Yes	Description Of The Service
					Foreign Key - References
Reservation_ID	Ir	nt		Yes	Reservation_ID In
0. Danis and Talala					Reservation Table
8. Payment Table				Allov	
Column Name		Data Ty	ype	Null	Description
Invoice_ID		Int		No	Primary Key - Unique Invoice Id
Amount		Decima		No	Total Payment Amount
Payment_Time		Datetin	ne(2)	No	Date And Time Of Payment
Payment_Method		Varcha	r(50)	No	Payment Method (Cash, Credit Card, Etc.)
					Foreign Key - References
Reservation_ID		Int		Yes	Reservation_ID In Reservation Table
G_ID		Int		Yes	Foreign Key - References G_ID In Guest Table
C Nama		Vanaha	··(50)	No	Name Of The Guest Making
G_Name		Varcha	1(30)	No	Payment
9. Login Table					
Column Name	Data '	Гуре	Allow	Null	Description
ID	Int		No		Primary Key - Unique Login Id
Username		ar(50)	No		Username For Login
Password		ar(50)	No		Password For Login
Status	Int		No		User Status (Active/Inactive)
A_ID	Int		Yes		Foreign Key - References A_ID In Admin Table
S_ID	Int		Yes		Foreign Key - References S_ID In Staff Table
G_ID	Int		Yes		Foreign Key - References G_ID In

```
SQL QUERIES:
Create Admin Table
     CREATE TABLE Admin (
       A ID INT PRIMARY KEY AUTO INCREMENT,
       admin_name VARCHAR(50) NOT NULL,
       admin mail VARCHAR(50) NOT NULL,
       admin_phone VARCHAR(20) NOT NULL
Insert Admin Data
     INSERT INTO Admin (admin_name, admin_mail, admin_phone) VALUES ('Burhan
     Uddin', 'borhanuddin1902@gmail.com, '01932550019');
     SET @AdminID = LAST_INSERT_ID();
     INSERT INTO Login (Username, Password, Status, A_ID, S_ID, G_ID) VALUES
     ('admin1', 'password123', 1, @AdminID, NULL, NULL);
Create Staff Table
     CREATE TABLE Staff (
       S_ID INT PRIMARY KEY AUTO_INCREMENT,
       S Name VARCHAR(50) NOT NULL,
       Job title VARCHAR(50) NOT NULL,
       S_Phone VARCHAR(50),
       S_Mail VARCHAR(50),
       A_ID INT NOT NULL,
       FOREIGN KEY (A ID) REFERENCES Admin(A ID) ON DELETE CASCADE
     );
Create Guest Table
     CREATE TABLE Guest (
       G_ID INT PRIMARY KEY AUTO_INCREMENT,
       G_Name VARCHAR(50) NOT NULL,
       G mail VARCHAR(50),
       G phone VARCHAR(15) NOT NULL.
       Nationality VARCHAR(50) NOT NULL,
       Gender VARCHAR(50) NOT NULL,
       DOB DATETIME NOT NULL
     );
Create Room Table
     CREATE TABLE Room (
       Room_ID INT PRIMARY KEY AUTO_INCREMENT,
       Room_rent DECIMAL(10,2) NOT NULL,
       Room_type VARCHAR(50) NOT NULL,
       Status VARCHAR(50)
     ):
Create Reservation Table
     CREATE TABLE Reservation (
       Reservation_ID INT PRIMARY KEY AUTO_INCREMENT,
       Check out DATETIME NOT NULL,
       Check_in DATETIME NOT NULL,
       Room_ID INT NOT NULL,
       G ID INT,
       FOREIGN KEY (Room_ID) REFERENCES Room(Room_ID) ON DELETE
     CASCADE,
```

```
FOREIGN KEY (G_ID) REFERENCES Guest(G_ID) ON DELETE SET NULL
     );
Create Vehicles Table
     CREATE TABLE Vehicles (
        Vehicle_ID VARCHAR(50) PRIMARY KEY,
       V color VARCHAR(50) NOT NULL,
       V brand VARCHAR(50) NOT NULL,
       V type VARCHAR(50),
       V_allocated_space VARCHAR(50),
       G ID INT NOT NULL.
       S ID INT NOT NULL,
       FOREIGN KEY (G_ID) REFERENCES Guest(G_ID) ON DELETE CASCADE,
       FOREIGN KEY (S_ID) REFERENCES Staff(S_ID) ON DELETE CASCADE
     );
Create Service Table
     CREATE TABLE Service (
       Service name VARCHAR(50) NOT NULL,
       Booking ID INT NOT NULL,
       Service_price DECIMAL(10,2),
       Description VARCHAR(50),
       Reservation ID INT.
       PRIMARY KEY (Service name, Booking ID),
       FOREIGN KEY (Reservation_ID) REFERENCES Reservation(Reservation_ID)
     ON DELETE CASCADE
     );
Create Payment Table
     CREATE TABLE Payment (
       Invoice ID INT PRIMARY KEY AUTO INCREMENT.
       Amount DECIMAL(10,2) NOT NULL,
       Payment_time DATETIME(2) NOT NULL,
       Payment method VARCHAR(50) NOT NULL,
       Reservation_ID INT,
       G ID INT,
       G_Name VARCHAR(50) NOT NULL,
       FOREIGN KEY (Reservation_ID) REFERENCES Reservation(Reservation_ID)
     ON DELETE SET NULL.
       FOREIGN KEY (G_ID) REFERENCES Guest(G_ID) ON DELETE SET NULL
     );
Create Login Table
     CREATE TABLE Login (
       ID INT PRIMARY KEY AUTO_INCREMENT,
       Username VARCHAR(50) NOT NULL,
       Password VARCHAR(50) NOT NULL,
       Status INT NOT NULL,
       A ID INT,
       S_ID INT,
       G ID INT,
```

```
FOREIGN KEY (A_ID) REFERENCES Admin(A_ID) ON DELETE CASCADE, FOREIGN KEY (S_ID) REFERENCES Staff(S_ID) ON DELETE CASCADE, FOREIGN KEY (G_ID) REFERENCES Guest(G_ID) ON DELETE CASCADE
```

#### **Get All Staff with Their Associated Admins**

SELECT
s.S\_ID, s.S\_Name, s.Job\_title, s.S\_Phone, s.S\_Mail,
a.A\_ID, a.admin\_name, a.admin\_mail, a.admin\_phone
FROM Staff s
JOIN Admin a ON s.A ID = a.A ID;

#### **Get All Guests with Their Reservations**

SELECT

);

g.G\_ID, g.G\_Name, g.G\_mail, g.G\_phone, g.Nationality, g.Gender, g.DOB, r.Reservation\_ID, r.Check\_in, r.Check\_out, r.Room\_ID FROM Guest g

JOIN Reservation r ON g.G\_ID = r.G\_ID;

#### **Get All Reservations with Room Details**

**SELECT** 

r.Reservation\_ID, r.Check\_in, r.Check\_out, r.G\_ID, rm.Room\_ID, rm.Room\_type, rm.Room\_rent, rm.Status FROM Reservation r
JOIN Room rm ON r.Room\_ID = rm.Room\_ID;

#### Get All Payments with Guest and Reservation Info

**SELECT** 

p.Invoice\_ID, p.Amount, p.Payment\_time, p.Payment\_method,
 g.G\_ID, g.G\_Name, g.G\_mail,
 r.Reservation\_ID, r.Check\_in, r.Check\_out
FROM Payment p
JOIN Guest g ON p.G\_ID = g.G\_ID
JOIN Reservation r ON p.Reservation ID = r.Reservation ID;

## Get Staff with Their Login Credentials

SELECT
s.S\_ID, s.S\_Name, s.Job\_title, s.S\_Phone, s.S\_Mail,
1.Username, l.Status
FROM Staff s
JOIN Login 1 ON s.S\_ID = 1.S\_ID;

#### **Get Admins with Their Login Credentials**

**SELECT** 

a.A\_ID, a.admin\_name, a.admin\_mail, a.admin\_phone,l.Username, l.StatusFROM Admin aJOIN Login l ON a.A\_ID = l.A\_ID;

#### **CHAPTER 4: SCREENSHOT OF FORMS WITH FIGURE NAMES:**

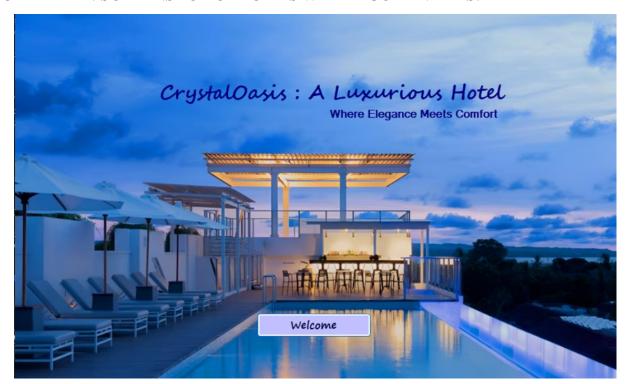


Figure-01: Welcome page

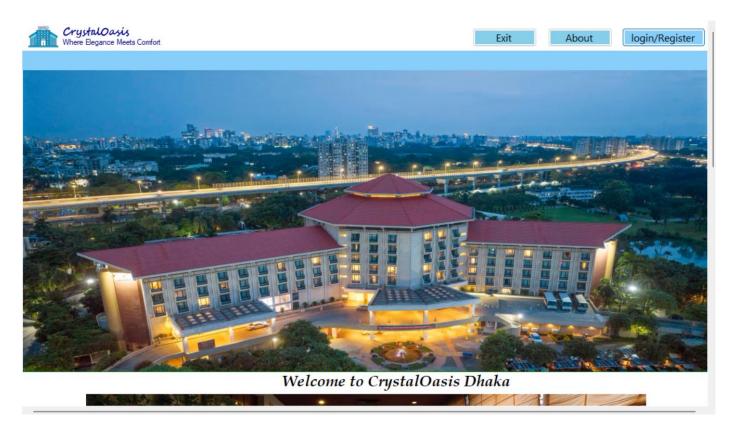


Figure-02: Home page

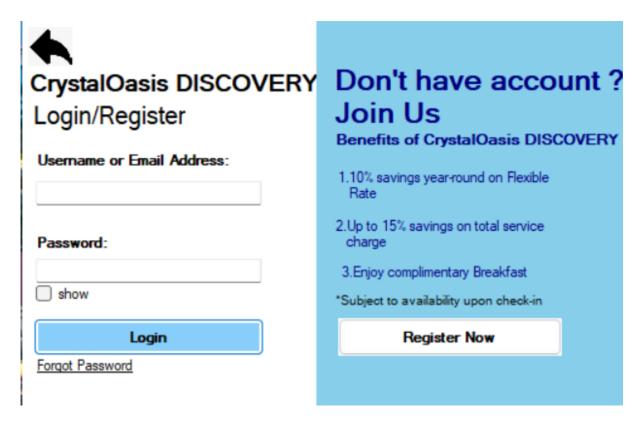


Figure-03: Login page

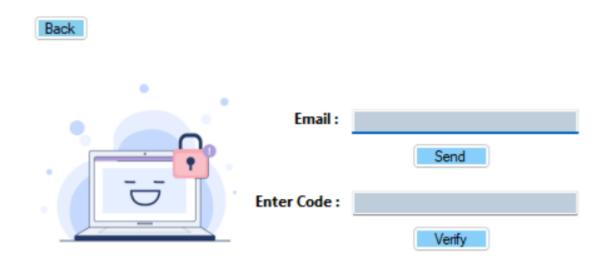


Figure-04: Forgot password page



Figure-05: Guest registration page

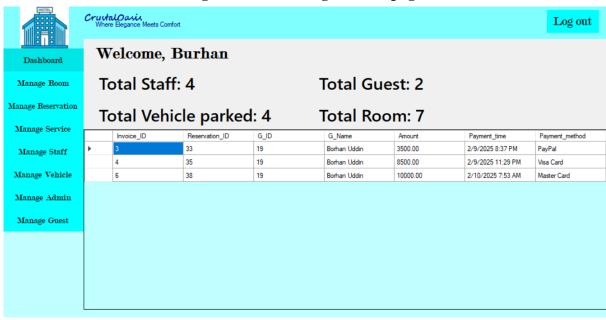


Figure-06: Admin Dashboard

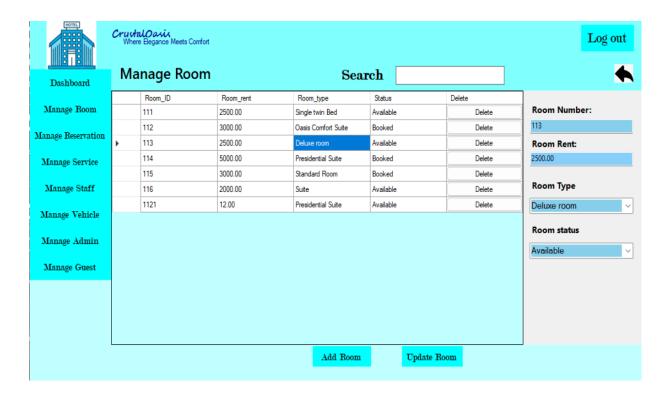


Figure-07: Manage room page for admin

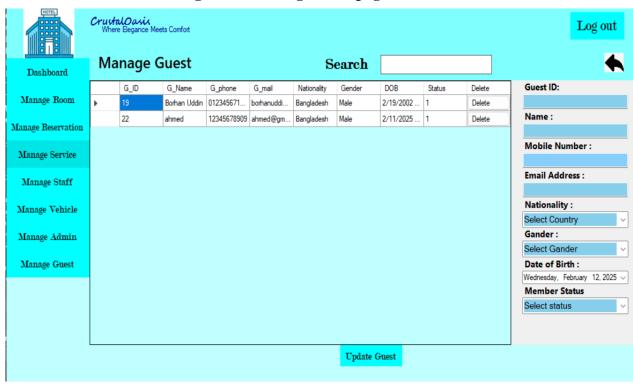


Figure-08: Manage Guest page for admin

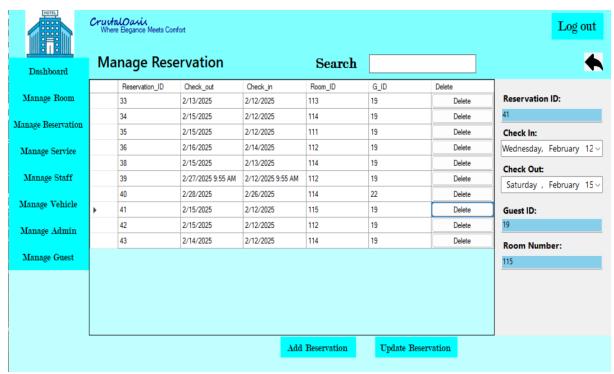


Figure-09: Manage Reservation page for admin

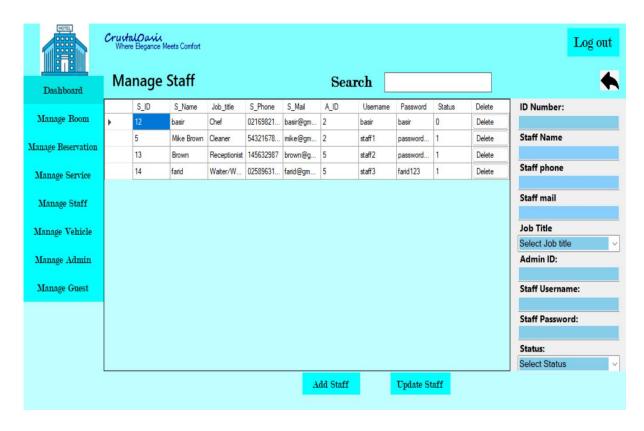


Figure-10: Manage Staff page for admin

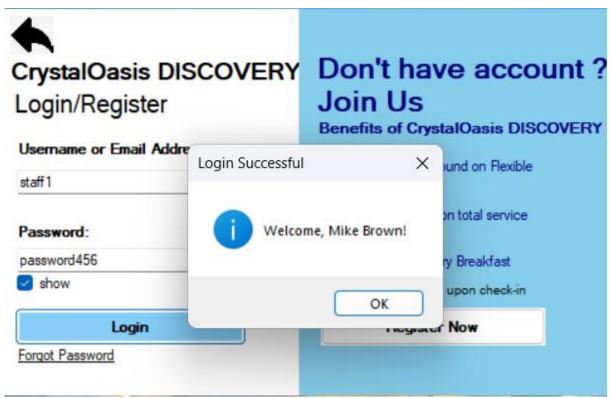


Figure-11: Staff successfully logged in

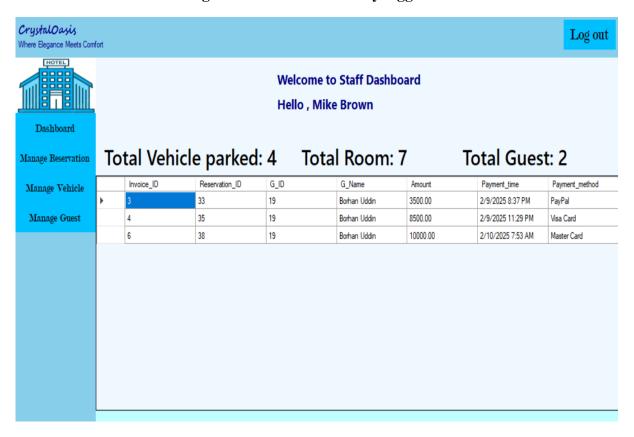


Figure-12: Staff Dashboard

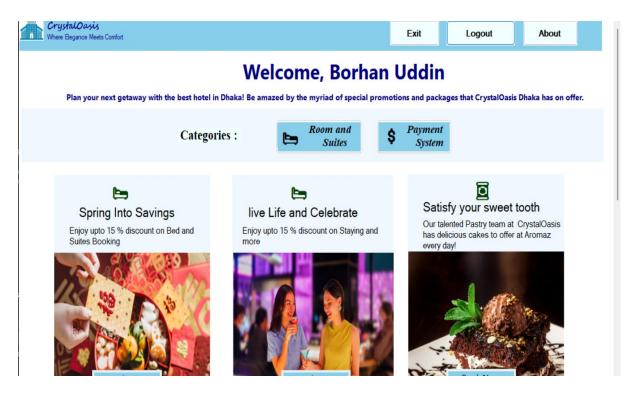


Figure-13: Guest home page after login

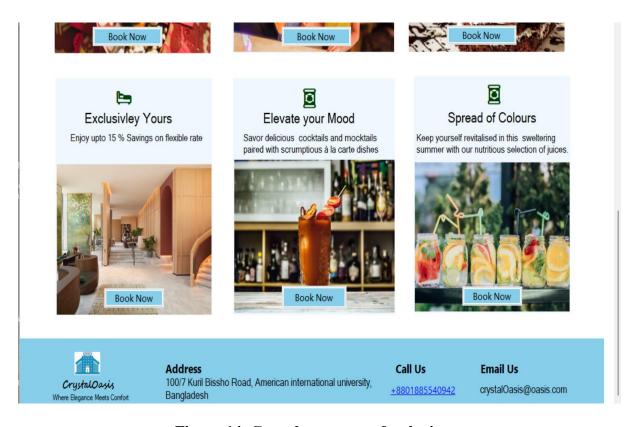


Figure-14: Guest home page after login

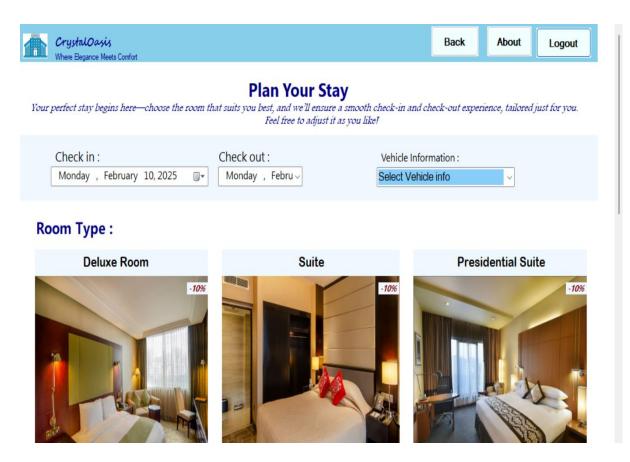


Figure-15: Guest room booking page

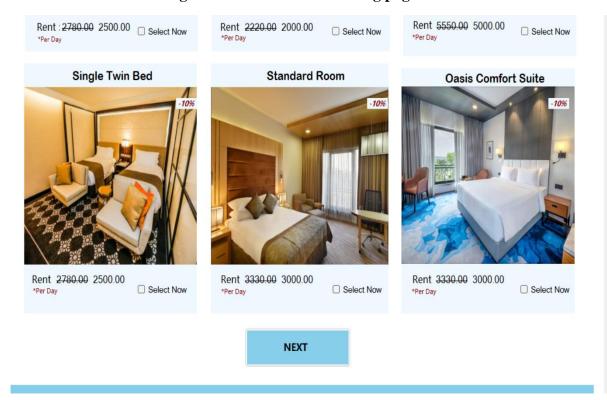


Figure-16: Guest room booking page

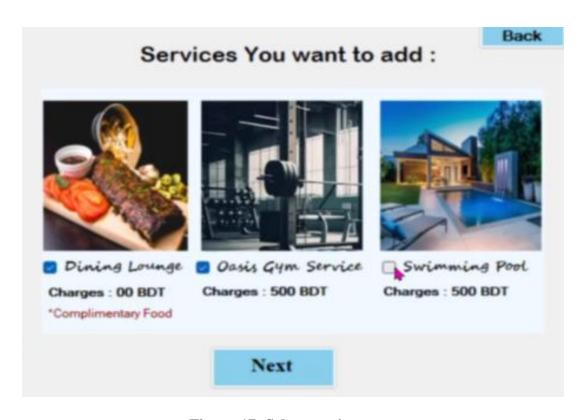


Figure-17: Select services

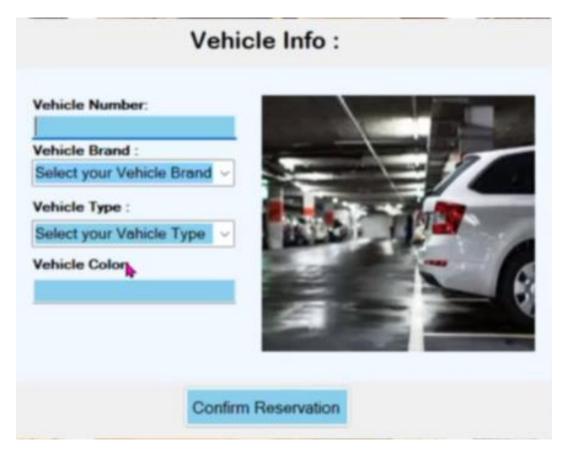
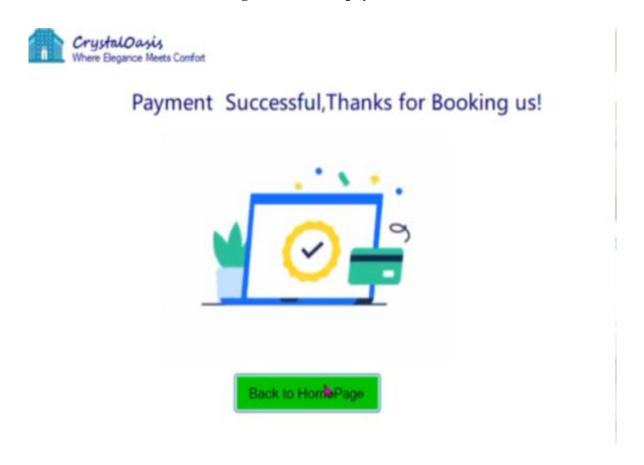


Figure-18: Add vehicles data

	Payment Checkout	Back Logout
	Total Am	ount to pay : 13000.00
Payment Method		
MasterCard	· VISA · P	PayPa
Cardholder Name :	Expiration Date :	
Card Number :	CVC Code : 0 0 0	
		Checkout

Figure-19: Make payment



**Figure-20: Payment confirmation**