

**VIETNAM GENERAL CONFEDERATION OF LABOUR
TON DUC THANG UNIVERSITY
FACULTY OF INFORMATION TECHNOLOGY**



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HOTEL MANAGEMENT SYSTEM

FINAL REPORT ENTERPRISE SYSTEMS DEVELOPMENT CONCEPTS

Ho Chi Minh City, 2023.

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Lecturer:
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Ho Chi Minh City, November 2023.

Author

Trinh Lam Nhu

DECLARATION

I hereby declare that this is my own research work and is authorized Scientific guidance of Duong Huu Phuc. Research contents and results in this topic is honest and has not been published in any form before This. The data in the tables serve for analysis, comment, evaluations are collected by the author from various sources as clearly stated in the References section.

In addition, the project also uses a number of comments and reviews as well data from other authors and other organizations are cited and noted source.

We are aware of the consequences of academic dishonesty and understand that any violation of ethical standards in this project may lead to disciplinary actions as defined by Ton Duc Thang University's policies. Ton Duc Thang University no related to copyright and copyright violations caused by me during the process implementation (if any).

Ho Chi Minh City, November 2023.

Author

Trinh Lam Nhu

ABSTRACT

The Hotel Management System (HMS) is a software solution designed to streamline the complex operations of hotels. We aim to enhance operational efficiency, improve guest satisfaction, and provide strategic insights into business performance. Key functionalities of the HMS include an intuitive reservation and booking system, room management, and a seamless check-in and check-out process.

Contents

1	INTRODUCTION	1
1.1	Introduction	1
1.2	System Description	1
1.3	Topic Objectives	2
1.4	Topic Scope	2
1.5	Limitation	3
1.6	Report Structure	3
2	SYSTEM ANALYSIS AND DESIGN	4
2.1	Functional Requirements	4
2.2	Non-functional Requirements	5
2.3	Use-case Diagram	7
2.3.1	Use-case diagram	7
2.3.2	Use-case description	8
2.4	Data Flow Diagram	21
2.4.1	DFD Context	21
2.4.2	DFD Level-0	21
2.5	Entity-Relationship Diagram	28
2.6	Physical Database Design	29
2.7	Return on Investment(ROI)	29
3	SYSTEM IMPLEMENTATION	30
3.1	Technical Stack	30
3.2	System Architecture	31
4	DEMONSTRATION	32
4.1	Scenario	32
4.1.1	Manager	32
4.1.2	Receptionist	33

4.1.3	Accountant	33
4.2	Demo	33
4.2.1	Login	33
4.2.2	Check for available rooms	34
4.2.3	Booking	36
4.2.4	Update Booking	38
4.2.5	Cancel Booking	39
4.2.6	View room information	40
4.2.7	Book meal	41
4.2.8	Book airport transfer service	42
4.2.9	Check-in	43
4.2.10	Check-out	43
4.2.11	Send feedback	44
4.2.12	Find Invoice	44
4.2.13	View invoice history	45
4.2.14	Manage room	45
4.2.15	Manage Reservation	48
4.2.16	Manage menu item	49
4.2.17	Review guest's feedback	51
4.2.18	View all airport transfer services	52
5	CONCLUSION AND FUTURE WORK	53
5.1	Conclusion	53
5.2	Future Work	53
References		55
Appendix		55
Appendix A		56

List of Tables

2.1	List of actors of system	8
2.2	List of Use-Cases of system	9
2.3	UC01 Login	10
2.4	UC02 Check for availability Of Rooms	10
2.5	UC03 Booking	11
2.6	UC04 Update booking	11
2.7	UC05 Cancel booking	12
2.8	UC06 View room information	12
2.9	UC07 Book meals	13
2.10	UC08 Book airport transfer service	14
2.11	UC09 Check-in	14
2.12	UC010 Check out	15
2.13	UC011 Send feedback	15
2.14	UC012 Find invoice	16
2.15	UC013 View invoice history	16
2.16	UC04 Manage Room	17
2.17	UC015 Manage Reservation	18
2.18	UC016 Manage menu item	19
2.19	UC017 Review guest's feedback	19
2.20	UC018 View all airport transfer services	20

List of Figures

2.1	Use-case Diagram	7
2.2	DFD Context	21
2.3	DFD Level-0	23
2.4	DFD Fragment of UC02	23
2.5	DFD Fragment of UC03,UC07,UC08	24
2.6	DFD Fragment of UC11,UC17	25
2.7	DFD Fragment of UC14	25
2.8	DFD Fragment of UC16	25
2.9	DFD Fragment of UC12,UC13	26
2.10	DFD Fragment of UC18	26
2.11	DFD Fragment of UC05,UC09,UC10	27
2.12	DFD Fragment of UC04	27
2.13	Entity Relationship Diagram	28
2.14	Physical Database Design	29
2.15	Return on Investment	29

ABBREVIATION

HMS	Hotel Management System
DFD	Data Flow Diagram
ERD	Entity relationship diagram

Chapter 1

INTRODUCTION

1.1 Introduction

In the fast-paced world of hospitality, efficient management and seamless guest experiences are paramount. The Hotel Management System (HMS) is a software solution designed to computerize how the hotel operates, enhancing guest satisfaction, streamlining administrative tasks, and maximizing overall productivity. This innovative technology integrates various aspects of hotel operations into a centralized platform, offering hoteliers powerful tools to optimize their services.

1.2 System Description

Our Hotel Management System (HMS) is an integrated software platform designed to streamline the operational efficiency of hotel and services.

- **Room Booking and Reservations:** The HMS offers a room booking and reservation module that allows users to easily check room availability, book rooms, and manage reservations.
- **Front Desk Operations:** The front desk module streamlines daily operations such as room assignments.
- **In-Room Dining:** Guests can view menu items, and place orders through a receptionist. Meal charges are seamlessly integrated into the guest's overall billing.
- **Airport Transfer Services:** Guests can book airport transfer services, specifying details such as pickup and drop-off location, specific time, and preferred

vehicle type. Similar to the meal service, airport transfer charges are integrated into the guest's bill.

- **Customer service:** Helps in managing customer relationships through feedback collection.

1.3 Topic Objectives

The main objective of this system is to improve efficiency, reduce the overall manual workload of the hotel and provide suitable technical and profitable solutions for current problems such as time-consuming, heavy calculations.

Given below are the points that mention what are the objectives achieved by the project:

- Provide a system that helps check the room availability, make the relevant reservations efficiently, and replace the reservation book.
- Automate some possible current work being done manually in the hotel. Ability to check the current situation of the hotel with less effort and less time with high efficiency.

1.4 Topic Scope

Our Hotel Management System will have 4 end users: Customer, Receptionist, Accountant and Hotel Manager. Customers will be able to check for room availability, see the room information, and book some accompanying services. Receptionists will have access to check for room's availability to book for customer, assist hotel guests with the check-in and check-out processes, including handling reservations and payments, send customer feedback to the management. Accountants can view the hotel's revenue to make reports for management as well as resolve errors easily. Manager will be able to update room information such as cost and category change the guest's booking schedule upon request.

The main goal of this web-based is to simplify every day process of hotel. Day to day Hotels are increasing and they need to automate to provide customer ease of access. It will be able to take care of services to customer in a quick manner. This automation will be able to replace the drawbacks of large customer information physical files which were difficult to handle.

1.5 Limitation

- The system does not support multiple room bookings.
- The system primarily focuses on basic guest interactions and lacks features for direct guest communication, and advanced guest services (like spa booking, event participation, or personalized tour planning).
- There are no features related to staff management, or scheduling within the system.
- The system does not provide advanced analytics or customizable reporting features that can provide deeper insights into hotel operations.
- The system lacks functionality for managing and tracking maintenance and repairs of hotel properties.
- The system does not include features for user roles such as housekeepers or security staff, limiting their direct involvement in its operations.

1.6 Report Structure

The report is divided into 5 chapters:

- Chapter 1: Introduction

Introducing the topic, System description, Topic Objectives and Scope, Limitation, Topic contribution and Report structure.

- Chapter 2: System analysis and design

Including Functional requirements, Non-functional requirements, Use-Case diagram, Data flow diagram (DFD), Entity relationship diagram (ERD) and Physical database design.

- Chapter 3: System implementation

Describing used technologies in website to implement the system and system architecture.

- Chapter 4: Demo System

Including system scenarios and demonstrating the system through screenshots.

- Chapter 5: Conclusion and future work

- References

- List of Requirement Questions

Chapter 2

SYSTEM ANALYSIS AND DESIGN

2.1 Functional Requirements

Functional requirements define the fundamental actions that system must perform. The functional requirements for the system are divided into three main categories: Reservation, Food, and Management.

1. Reservation

- The system shall reservations.
- The system shall record the customer's information such as: their first name, last name, phone number.
- The system shall record the number of occupants.
- The system shall record the room number.
- The system shall display the room rate.
- The system shall generate a unique confirmation number for each reservation.
- The system shall automatically cancel reservations after 6 hours check-in time if the customer has not checked in.
- The system shall record the expected check-in date.
- The system shall record the expected checkout date.
- The system shall record the airport transfer booking (if any).
- The system shall check in customers.

- The system shall allow reservations to be modified some information.
- The system shall check out customers.
 - The system shall display the amount owed by the customer.
 - The system shall record that the room status is available.
 - The system shall record the invoice.
- The system shall record customer feedback.

2. Food

- The system shall track all meals purchased in the hotel.
- The system shall bill the current room if payment is not made at the time of service.

3. Management

- The system shall display the hotel occupancy for a specified period (days).
- The system shall display projected occupancy for a period of time (days).
- The system shall display room revenue.
- The system shall display food revenue.
- The system shall display customer feedback.
- The system shall allow manager to create new user.
- The system shall allow for the addition of information, regarding rooms, rates, menu items, prices, reservations and user profile.
- The system shall allow for the modification of information, regarding rooms, rates, menu items, prices, reservations and user profile.
- The system shall allow for the deletion of information, regarding rooms, rates, menu items, prices, and user profile.

2.2 Non-functional Requirements

1. Performance

Performance requirements define acceptable response time for system functionality.

2. Security

Security is also a major factor that needs to be handled carefully on every web application that allows the user to log in with accounts. The information provided by the users will be stored in a private database and the user's password will be hashed before storing in order to protect it from being exposed. HMS also has a separate route for the administrators to access the admin dashboard and prevent unauthorized access from normal users.

3. Availability

HMS is expected to be available 24 hours a day and the users can access the website at any time. Users can access the website from anywhere in the world, however, for receptionists and managers, need to log in with their account (provided before) to access all the functionalities of the website.

4. Maintainability

The hotel requirements are rapidly changing with the open economy and the system must be able to change rapidly. So to develop a new system in each change is not a possible task. So re-usability of components and maintainability of the system are very important.

2.3 Use-case Diagram

2.3.1 Use-case diagram

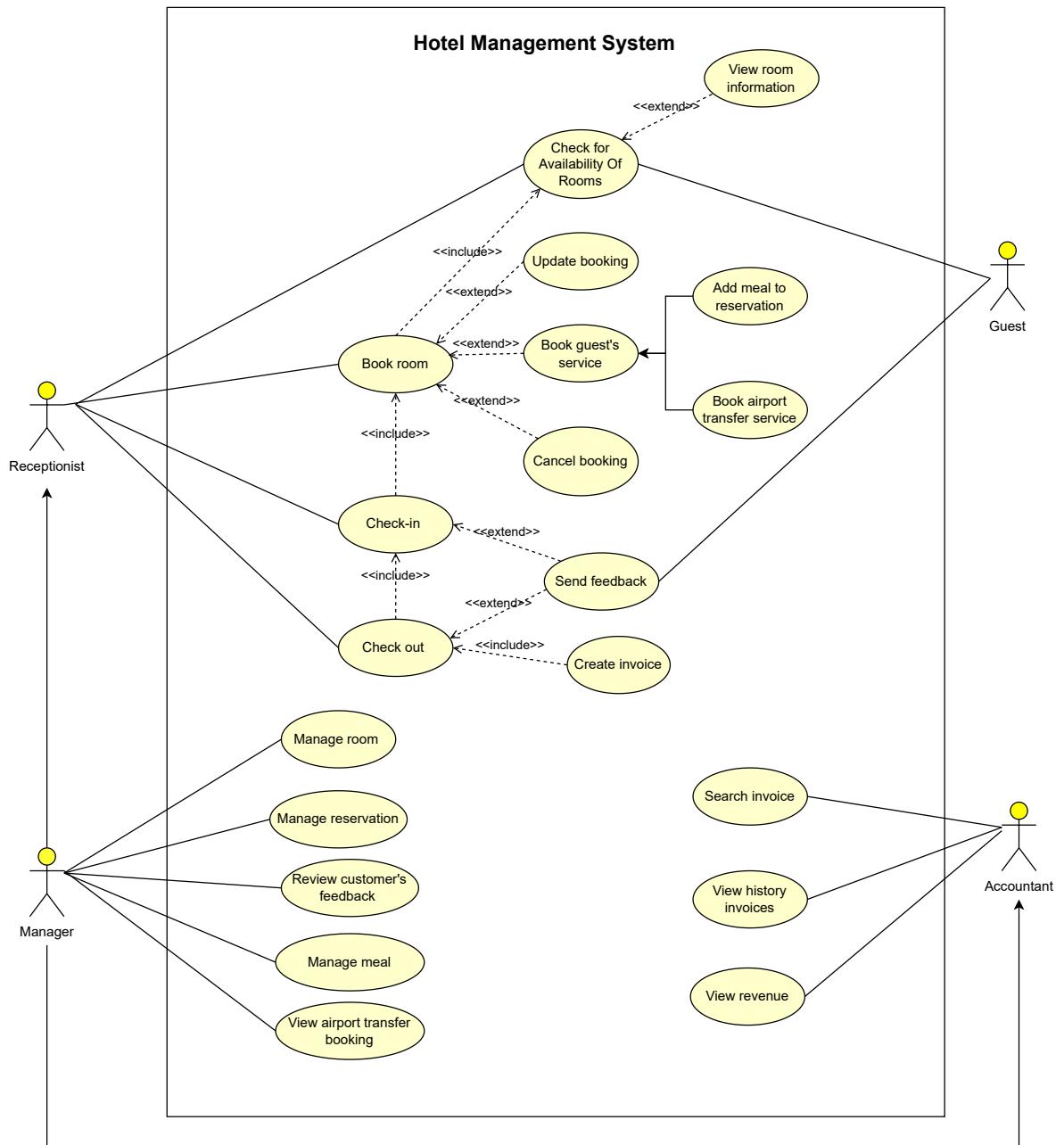


Figure 2.1: Use-case Diagram

2.3.2 Use-case description

There are 4 actors and 16 use-cases.

Actors	Description
Guest	Check for available rooms Send feedback
Receptionist	Booking Cancel booking Update booking Check for available rooms View room information Check in Check out Book airport transfer service Book meals Send feedback
Accountant	Search invoice View history invoice
Manager	Manage room Manage reservation Manage menu items Review guest's feedback View guest's services All right of accountant and receptionist

Table 2.1: List of actors of system

ID	Use-Case	Description	Actor
UC01	Login	Actor login to the system. Depending on the account type, there are different functions	Manager, Receptionist, Accountant
UC02	Check for available rooms	Actor enters the system to check whether the room is available or unavailable	Guest, Receptionist, Manager
UC03	Booking	Actor books rooms for guests and services such as vehicles and meals if guests need them.	Receptionist, Manager
UC04	Update booking	Actor edits reservation information for guests and services such as vehicle and meal	Receptionist, Manager
UC05	Cancel booking	Actor cancels booking information for guests and services.	Admin, Repository manager
UC06	View room information	Actor views room information (room price, room equipment, and room status)	Guest, Receptionist, Manager
UC07	Book meals	Actor book meals for guests, including name, quantity, type, and additional notes.	Receptionist, Manager
UC08	Book airport transfer service	Actor book transfer service to take guests from the airport to the hotel.	Receptionist, Manager
UC09	Check-in	Actor checks the guest's check-in time.	Receptionist, Manager
UC10	Check out	Actor checks the time a guest leaves a hotel room.	Receptionist, Manager
UC11	Send feedback	Actor evaluates the hotel's service quality and the staff's service attitude.	Receptionist, Guest
UC12	Find invoice	Actor search the list of issued invoices	Accountant, Manager
UC13	View invoice history	Actor views the history of invoices and views their details	Accountant, Manager
UC14	Manage room	Actor manages room status, facilities, images and prices of the room	Manager
UC15	Manage reservation	Actor manages check-in time, check-out of rooms that guests have reserved, and services such as vehicles and meals	Manager
UC16	Manage menu item	Actor manages the list of meals to be served to guests (editing, adding and deleting meal)	Manager
UC17	Review guest's feedback	Actor views guest's feedback after they use hotels and other services.	Manager
UC18	View all airport transfer services	Actor looks at all the vehicles that the hotel offers to guests.	Manager

Table 2.2: List of Use-Cases of system

ID	UC01
Use-Case Name	Login
Actors	Manager, Receptionist, Accountant
Brief Description	Actor login to the system. Depending on the account type, there are different functions and perform different operations.
Trigger	Actor wants to log in to the website
Preconditions	Actor already has an account on the system
Postconditions	Actor successfully logs into the system and performs its functions
Flow	<p>1.1 Manager, Accountant and receptionist log in to the website homepage and enter the link to access with permission: localhost:8080/@role.</p> <p>1.2 The system will take the actor to the login page</p> <p>1.3 Actor enters username and password. Then actor clicks login.</p>
Alternatives	

Table 2.3: UC01 Login

ID	UC02
Use-Case Name	Check for availability Of Rooms
Actors	Receptionist, Guest, Manager
Brief Description	The users check rooms ready for use based on their specific requirement
Trigger	Actor is on the system's home page
Preconditions	Actor successfully accessed the website.
Postconditions	Actor successfully view the room's details
Flow	<p>2.1 Guest, Receptionist, and Manager access the home page</p> <p>2.2 Actor fills in all fields such as the time they will check in, check out, and the number of people who will rent the room(including adults and children)</p> <p>2.3 The system displays available room information to the actor.</p>
Alternatives	

Table 2.4: UC02 Check for availability Of Rooms

ID	UC03
Use-Case Name	Booking
Actors	Receptionist, Manager
Brief Description	Actor receives advance reservations from guest
Trigger	Actor clicks "Add Booking room" on the toolbar in the "Front desk".
Preconditions	Actor successfully logs into the system and the hotel has available rooms
Postconditions	Room booked successfully
Flow	<p>3.1 Actor clicks on the "Front desk" on the toolbar</p> <p>3.2 The system displays room information for actor</p> <p>3.3 Actor selects an available room and fills in guest information.</p> <p>3.4 Actor adds additional services if customers need them, such as meal and airport transfer services</p> <p>Actor confirms the room has been booked.</p>
Alternatives	

Table 2.5: UC03 Booking

ID	UC04
Use-Case Name	Update booking
Actors	Receptionist, Manager
Brief Description	Actor updates booking information for guests, changes service details
Trigger	Actor clicks on the "Reservation" on the toolbar and then select the edit item in the menu of a reservation you want to edit.
Preconditions	Actor successfully logged into the system and the hotel had a room booked.
Postconditions	Updated successfully
Flow	<p>4.1 Actor clicks on the "Reservation" on the toolbar</p> <p>4.2 The system displays information about the room booked</p> <p>4.3 Actor selects the edit item in the menu of a reservation you want to edit</p> <p>4.4 The system displays information about the room booked, the guest, and services that the guest has booked for actor</p> <p>4.5 Actor edits the information they want to change in the reservation.</p>
Alternatives	

Table 2.6: UC04 Update booking

ID	UC05
Use-Case Name	Cancel booking
Actors	Receptionist, Manager
Brief Description	Actor cancels the guest's reservation
Trigger	Actor clicks on the "Reservation" on the toolbar and then actor select the edit item in the menu of a reservation you want to cancel.
Preconditions	Actor successfully logs into the system and the hotel had a room booked
Postconditions	Cancelled successfully
Flow	<p>5.1 The receptionist clicks on the "Reservation" on the toolbar</p> <p>5.2 The system displays information about the room booked, the guest, and services that the guest has booked for Actor</p> <p>5.3 Actor Actor selects "Edit" and changes the room's status to canceled and will cancel the booking from the guest.</p>
Alternatives	

Table 2.7: UC05 Cancel booking

ID	UC06
Use-Case Name	View room information
Actors	Receptionist, Manager, Guest
Brief Description	Actor views detail information about the room (images, facilities, price, etc.)
Trigger	Actor views detailed information about the room on the home page
Preconditions	Actor successfully logs into the system and the system has room to show
Postconditions	View room information successfully
Flow	<p>6.1 Actor goes to the home page of the website</p> <p>6.2 The system displays room information for Actor.</p>
Alternatives	

Table 2.8: UC06 View room information

ID	UC07
Use-Case Name	Book Meals
Actors	Manager, Receptionist
Brief Description	Actor booking meals for guests
Trigger	While booking a room for a guest, the "Meal" section will appear, where the Actor will add food according to the guest's request.
Preconditions	Actor successfully logs into the system and meals available
Postconditions	Book meals successfully
Flow	<p>7.1 Actor clicks on the "Front desk" and then clicks on the "Add booking room"</p> <p>7.2 The system displays information for booking room and then the system displays information board for actor to book meals for guests after actor have filled in all guest information and selected a room to book</p> <p>7.3 Actor enters the information of the guest who booked the meal and chooses the meal that the guest has booked.</p>
Alternatives	<p>7.4 Actor clicks on the "reservation" and then clicks on the "add meals"</p> <p>7.5 The system displays an information board for actor to book meals for guests.</p> <p>Actor chooses the meal that the guest has booked.</p>

Table 2.9: UC07 Book meals

ID	UC08
Use-Case Name	Book airport transfer service
Actors	Manager, Receptionist
Brief Description	Actor booking airport transfer service for guests
Trigger	While booking a room for a guest, the "Vehicle" section will appear, where the actor will choose the vehicle and place to pick up to guest's request.
Preconditions	Actor successfully logs into the system and vehicle available
Postconditions	Book airport transfer service successfully
Flow	<p>8.1. Actor clicks on the "Front desk" and then clicks on the "Add booking room"</p> <p>8.2 The system displays information for booking room and then the system displays information board for actor to book airport transfer service for guests after actor have filled in all guest information and selected a room to book.</p> <p>8.3 Actor enters the information of the guest who booked the airport transfer service and chooses the vehicle and place to pick up that the guest has booked.</p>
Alternatives	

Table 2.10: UC08 Book airport transfer service

ID	UC09
Use-Case Name	Check-in
Actors	Receptionist, Manager
Brief Description	Actor confirms that the room has been booked by the guest (guest check-in time)
Trigger	Actor clicks "Reservation" on the toolbar and edits the room's status.
Preconditions	Actor successfully logs into the system and previously booked room successfully or the hotel has available rooms for guests to book
Postconditions	Confirm the guest has successfully checked in
Flow	<p>9.1. Actor clicks on the "Reservation" on the toolbar</p> <p>9.2 The system displays information about the room booked, the guest, and services that the guest has booked for Actor</p> <p>9.3 Actor edits the room's status - Confirm the room is occupied("check-in").</p>
Alternatives	

Table 2.11: UC09 Check-in

ID	UC010
Use-Case Name	Check out
Actors	Receptionist, Manager
Brief Description	Actor confirms that the guest has left the room (guest check out time)
Trigger	Actor clicks "Room" on the toolbar and edits the room's status.
Preconditions	Actor successfully logged into the system and checked in successfully
Postconditions	Confirm the guest has successfully checked out
Flow	10.1. Actor clicks on the "Reservation" on the toolbar 10.2 The system displays information about the room booked, the guest, and services that the guest has booked for Actor 10.3 Actor edits the room's status -Confirm the guest has left the room("checkout")
Alternatives	

Table 2.12: UC010 Check out

ID	UC011
Use-Case Name	Send feedback
Actors	Guest, Receptionist
Brief Description	Actor send reviews about hotel quality, service, and staff attitude to the hotel
Trigger	Actor clicks on "feedback" on the toolbar on the home page.
Preconditions	Actor successfully logs into the system, reservation ID and phone must be present in the system data
Postconditions	Confirm the room has been check out by the guest
Flow	11.1. Actor clicks on the "feedback" 11.2 The system displays a feedback board for actor and gives detailed feedback information for actor evaluate. 11.3 Actor enters reservation ID and phone then writes problems when using the hotel.
Alternatives	11.4 The receptionist goes to his or her own work page and selects "Send feedback" on the toolbar. 11.5 The system displays a response panel to the agent and provides detailed feedback. The receptionist enters reservation ID and phone then writes problems.

Table 2.13: UC011 Send feedback

ID	UC012
Use-Case Name	Find invoice
Actors	Accountant, Manager
Brief Description	Accountant, Manager look for certain invoice
Trigger	Accountant, Manager click “Find invoice” in the “Invoice”.
Preconditions	Actor successfully logs into the system
Postconditions	Guest or Receptionist sent feedback successfully
Flow	12.1. Accountant, Manager click “Invoice” on the toolbar 12.2 The system displays a list of invoices 12.3 Accountant, Manager click “Search now” and enter the invoice code 12.4 The system displays detailed information of the invoice.
Alternatives	

Table 2.14: UC012 Find invoice

ID	UC013
Use-Case Name	View invoice history
Actors	Accountant, Manager
Brief Description	Actor reviews the history of invoices
Trigger	Accountant, Manager click “Invoice” on the toolbar
Preconditions	Actor successfully logs into the system
Postconditions	Actor successfully viewed existing invoices.
Flow	13.1. Accountant, Manager click “Invoice” on the toolbar 13.2 The system displays a list of invoices
Alternatives	

Table 2.15: UC013 View invoice history

ID	UC014
Use-Case Name	Manage Room
Actors	Manager
Brief Description	The manager uses it to manage room in the hotels
Trigger	The manager clicks on "Room" on the toolbar
Preconditions	Actor successfully logs into the system
Postconditions	
Flow	<p>14.1 The manager clicks on the "Room" on the sidebar</p> <p>14.2 The system displays a list of rooms for the actor</p> <p>14.3 The manager chooses the function he wants to perform:</p> <p>14.3.1 If the manager chooses to add or edit room information. After entering or adjusting all information about the room that needs to be edited (or added), the manager clicks on "Add" or "Save", and the room information in the hotel is automatically added to the database table.</p> <p>14.3.2 If the manager chooses to delete, the system requires the manager to enter the exact room code to be deleted, and then confirm, that information about that room will be deleted from the system's database table.</p>
Alternatives	

Table 2.16: UC04 Manage Room

ID	UC015
Use-Case Name	Manage Reservation
Actors	Manager
Brief Description	The manager uses it to manage room reservations in the hotels
Trigger	The manager clicks on "Reservation" on the toolbar.
Preconditions	Actor successfully logs into the system
Postconditions	
Flow	<p>15.1 The manager clicks on the "Reservation"</p> <p>15.2 The system displays a list of rooms for the actor</p> <p>15.3 The manager chooses the function he wants to perform:</p> <p>15.3.1 If the manager chooses to edit reservation information. After adjusting information about the reservation that needs to be adjusted, the manager clicks "Save", and the reservation information in the hotel is automatically added to the database table.</p> <p>15.3.2 If the manager chooses to add meals. They will select meal and quantity then press "Save". This is done when guests need food.</p>
Alternatives	

Table 2.17: UC015 Manage Reservation

ID	UC016
Use-Case Name	Manage menu item
Actors	Manager
Brief Description	The manager uses it to manage meal service in the hotels
Trigger	The manager clicks on "Meal" on the toolbar.
Preconditions	Actor successfully logs into the system
Postconditions	
Flow	<p>16.1 The manager clicks on "Meal" on the sidebar</p> <p>16.2 The manager chooses the function he wants to perform:</p> <p>16.2.1 If the manager chooses to add or edit meal information. After entering or adjusting all information about the meal that needs to be adjusted (or added), the manager clicks on "Add" or "Save", and the meal information in the hotel is automatically added to the database table.</p> <p>16.2.2 If the manager chooses to delete, the system requires the manager to enter the exact meal code to be deleted, and then confirm, that information about that meal will be deleted from the system's database table.</p>
Alternatives	

Table 2.18: UC016 Manage menu item

ID	UC017
Use-Case Name	Review guest's feedback
Actors	Manager
Brief Description	Manager views feedback that guests give after using the hotel
Trigger	The manager clicks on the "feedback" on the toolbar
Preconditions	Actor successfully logs into the system and guest have sent feedback
Postconditions	Actor successfully view feedback from guests or receptionists
Flow	<p>17.1. The manager clicks on "feedback" on the toolbar</p> <p>17.2 The system displays a list of feedback from guests.</p>
Alternatives	

Table 2.19: UC017 Review guest's feedback

ID	UC018
Use-Case Name	View all airport transfer services
Actors	Manager
Brief Description	Manager views all the vehicles guests using the airport transfer services
Trigger	Manager clicks on the "Services" on the toolbar
Preconditions	Actor successfully logs into the system
Postconditions	Actor successfully view all airport transfer services
Flow	18.1. The manager clicks on "Services" on the toolbar 18.2 The system displays a list of services and includes information about pick-up location and vehicle information, etc
Alternatives	

Table 2.20: UC018 View all airport transfer services

2.4 Data Flow Diagram

2.4.1 DFD Context

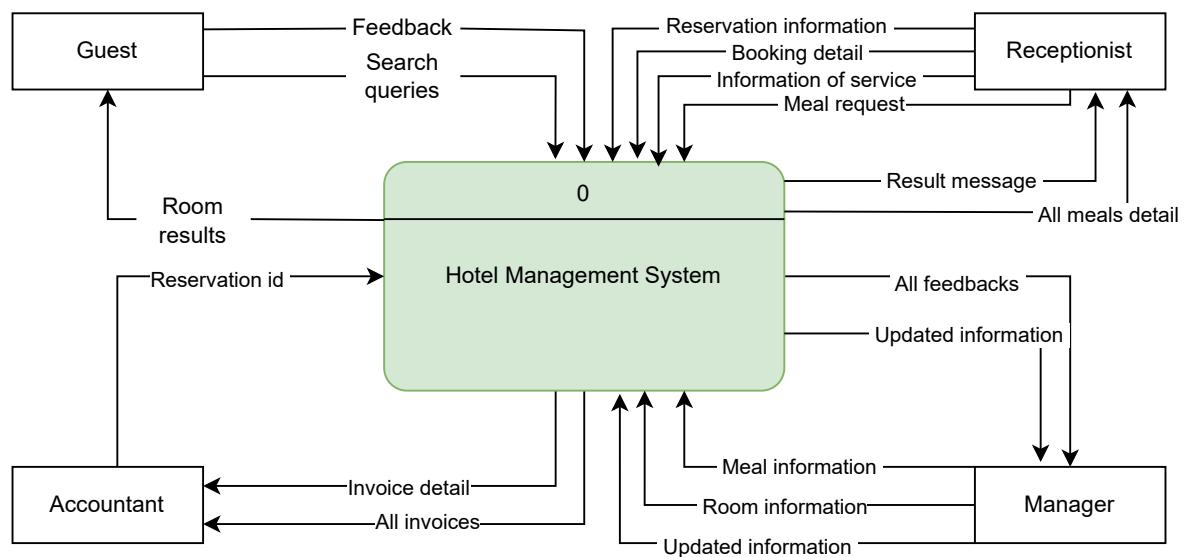


Figure 2.2: DFD Context

2.4.2 DFD Level-0

* Overview

The below Data Flow Diagram (DFD) represents a Level-0 diagram for a Hotel Management System (HMS), focusing on several key processes and their interactions with external entities and data stores. The diagram includes the following components:

1. Guest Interactions:

- Check for Available Rooms: The users initiate a room search query, and the system returns room results.
- Send Feedback: Guests can provide feedback, which is stored in the HMS's feedback data store.

2. Room and Reservation Management:

- Manage Room: This process involves updating room information based on guest check-ins, check-outs, and reservations.

- Book Room: Guests can book rooms, and the system records the booking information in the reservation data store.
- Check-In and Check-Out Processes: These are represented as individual processes, handling reservation information and updating the system accordingly.

3. Feedback:

- Review Guest Feedback: The manager can review feedback from guests stored in the feedback data store, facilitating improvements in service quality.

4. Accounting:

- Search Invoice: The accountant can search for invoices based on reservation IDs, and view invoice history, with all invoices stored in a dedicated invoice data store.

5. Meal and Transport Services:

- Manage Menu Item: This process involves updating meal information in the meal data store.
- Book Meals: Guests can book meals, and the system records meal details.
- Book Airport Transfer Service: Guests can book transport services, with booking information stored in a transport data store.

The diagram shows various data stores like Room, Feedback, Reservation, Invoice, Meal, Guest, and Transport, each storing relevant information for their respective processes. Entities like Guests, Managers, Receptionists, and Accountants interact with the system, providing inputs like queries, and information, and receiving outputs like room results and invoice details. This DFD provides a high-level overview of the core processes and data interactions within a Hotel Management System.

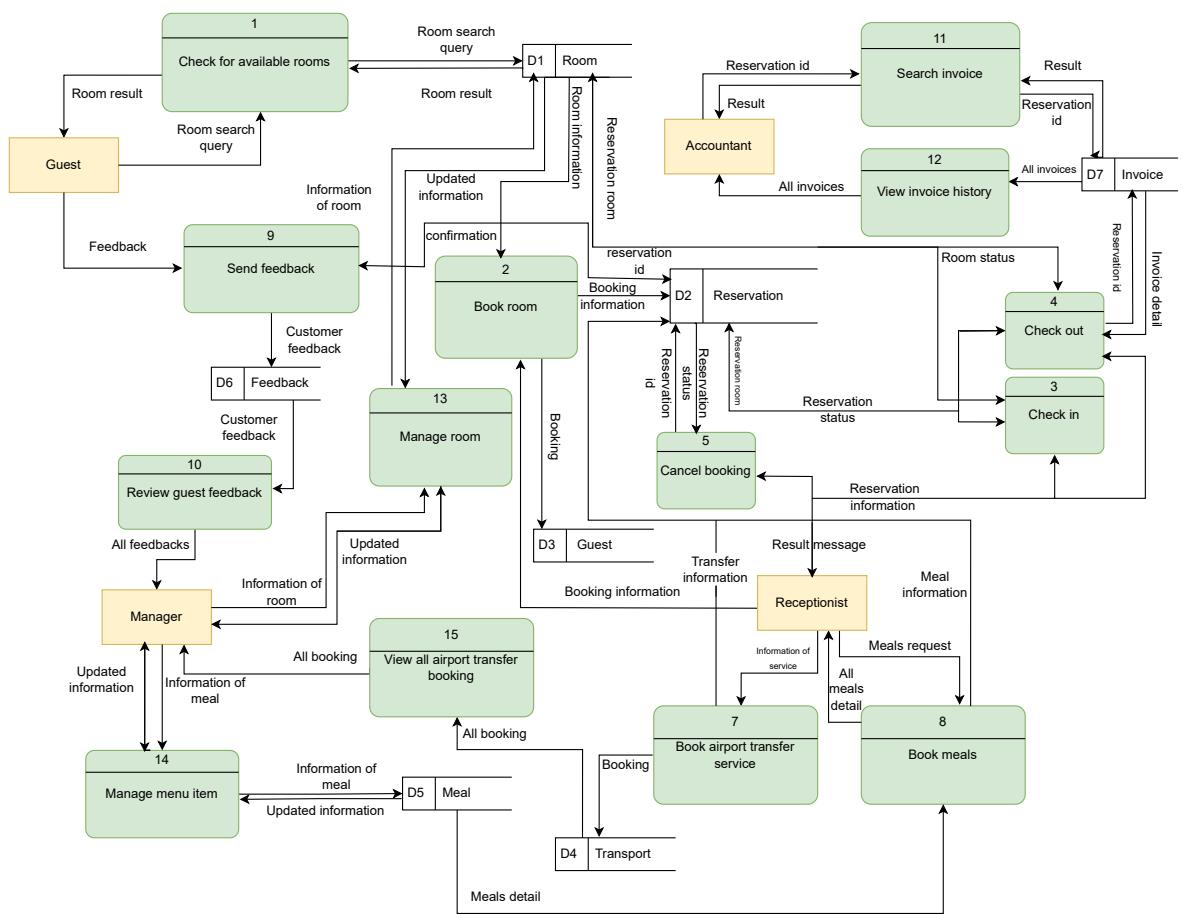


Figure 2.3: DFD Level-0

* DFD Fragment

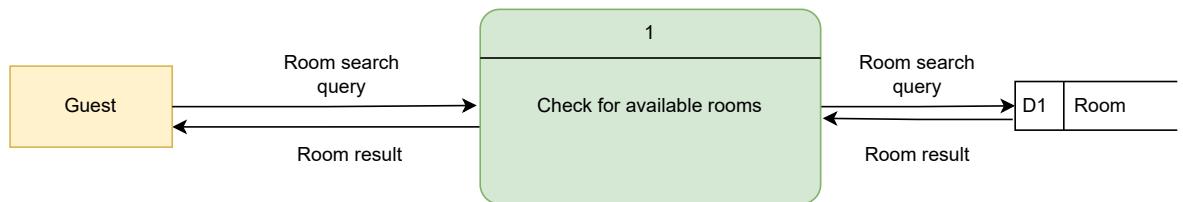


Figure 2.4: DFD Fragment of UC02

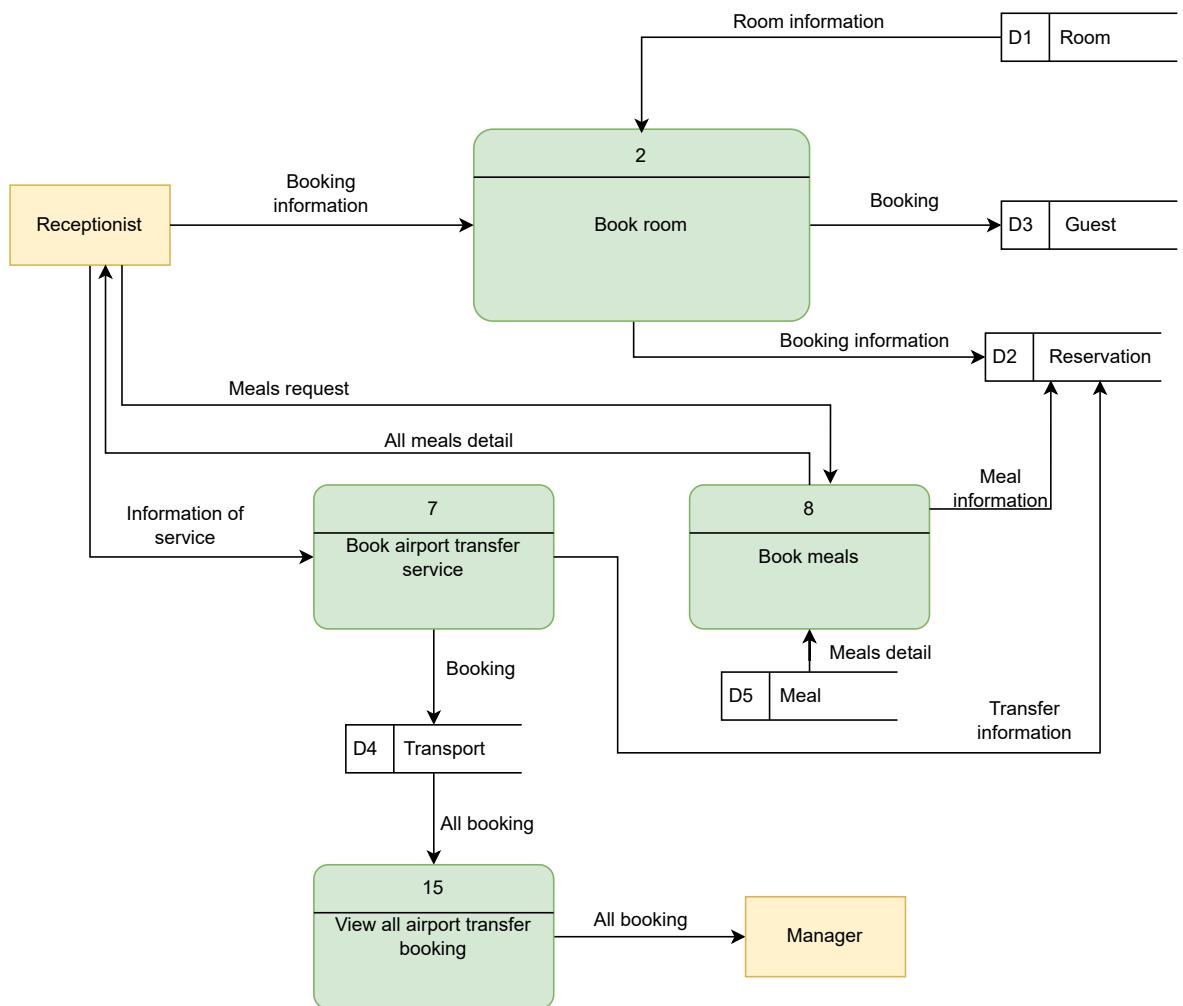


Figure 2.5: DFD Fragment of UC03,UC07,UC08

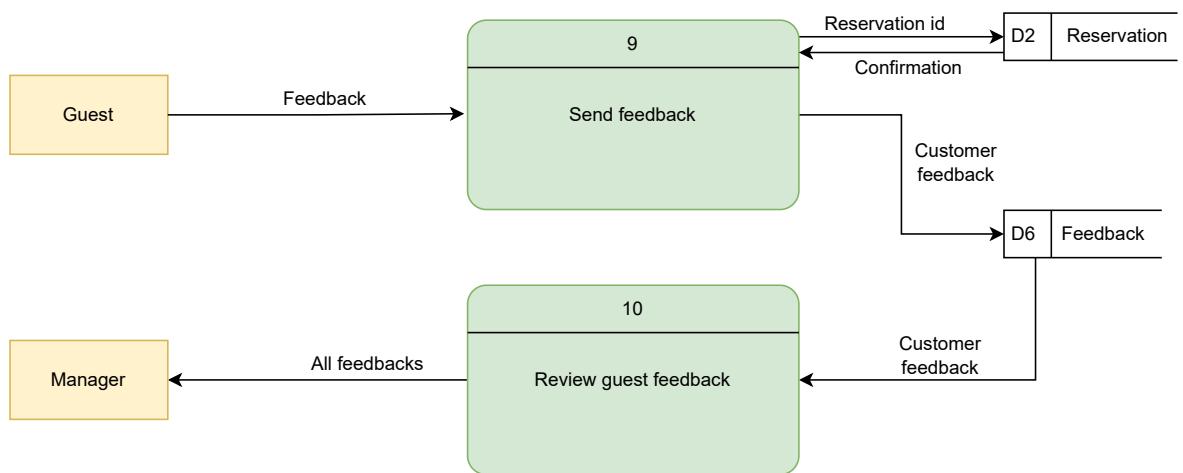


Figure 2.6: DFD Fragment of UC11,UC17

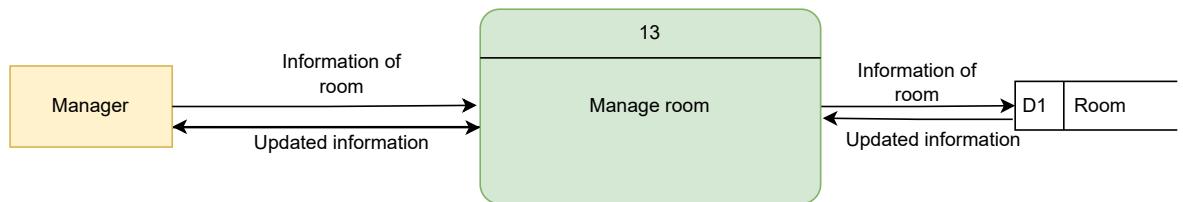


Figure 2.7: DFD Fragment of UC14

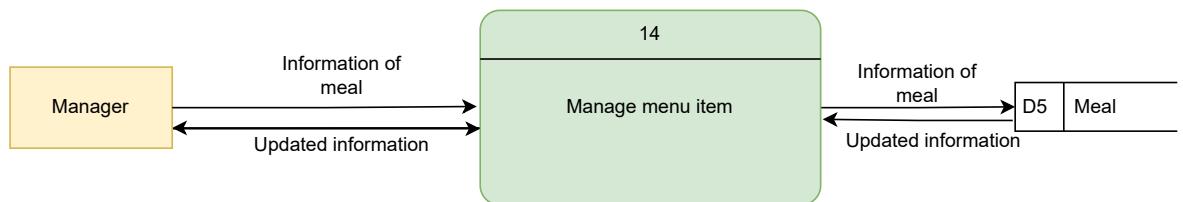


Figure 2.8: DFD Fragment of UC16

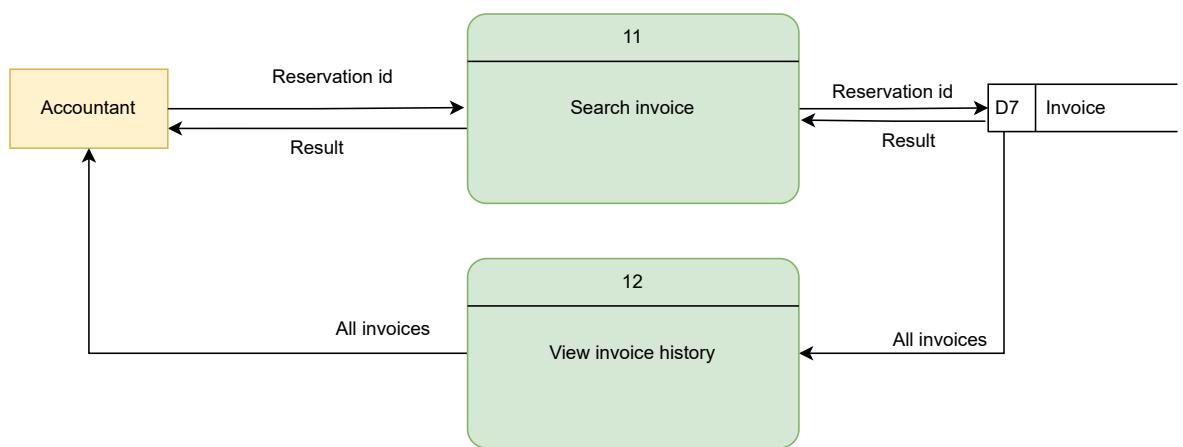


Figure 2.9: DFD Fragment of UC12,UC13

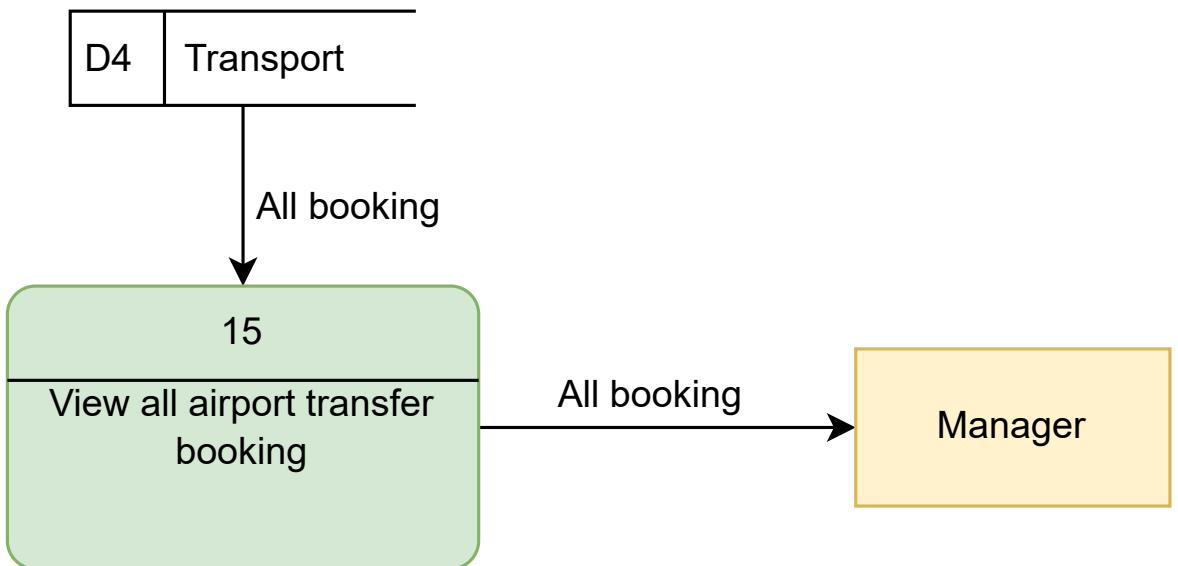


Figure 2.10: DFD Fragment of UC18

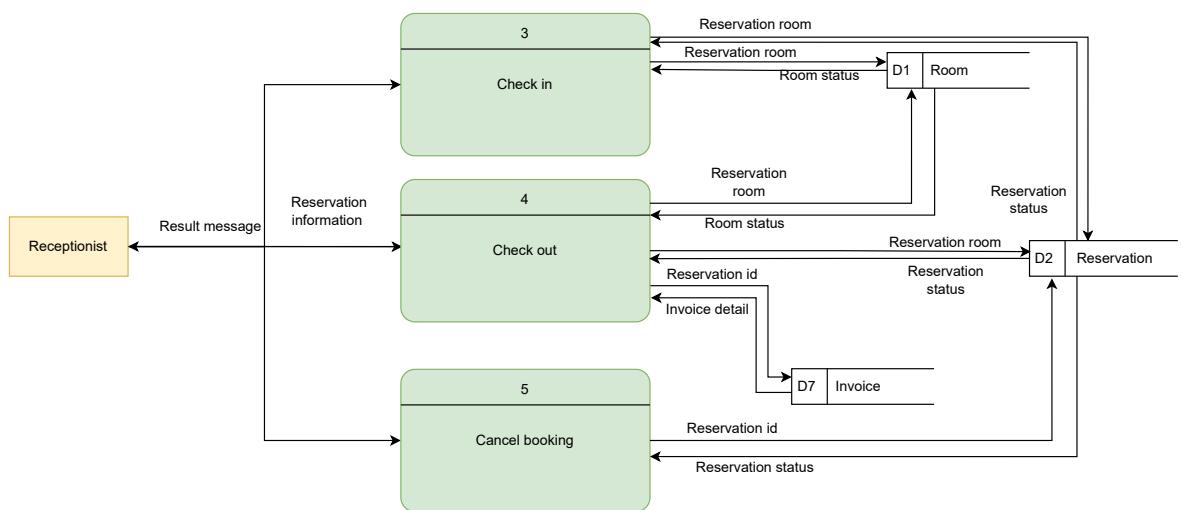


Figure 2.11: DFD Fragment of UC05,UC09,UC10

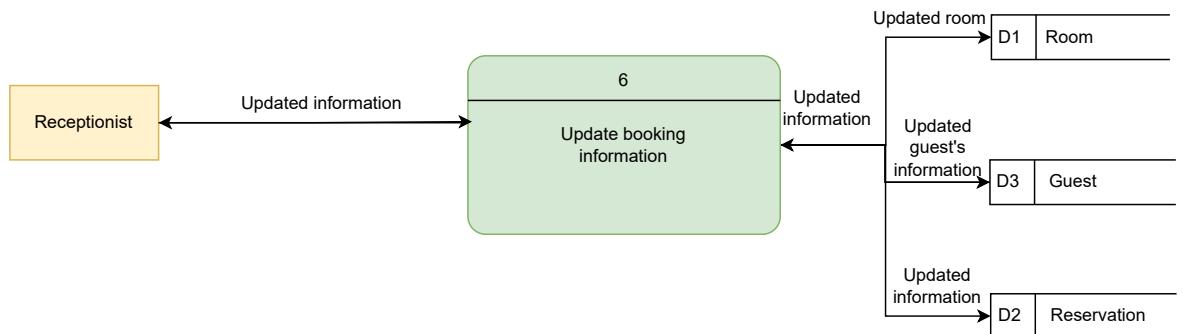


Figure 2.12: DFD Fragment of UC04

2.5 Entity-Relationship Diagram

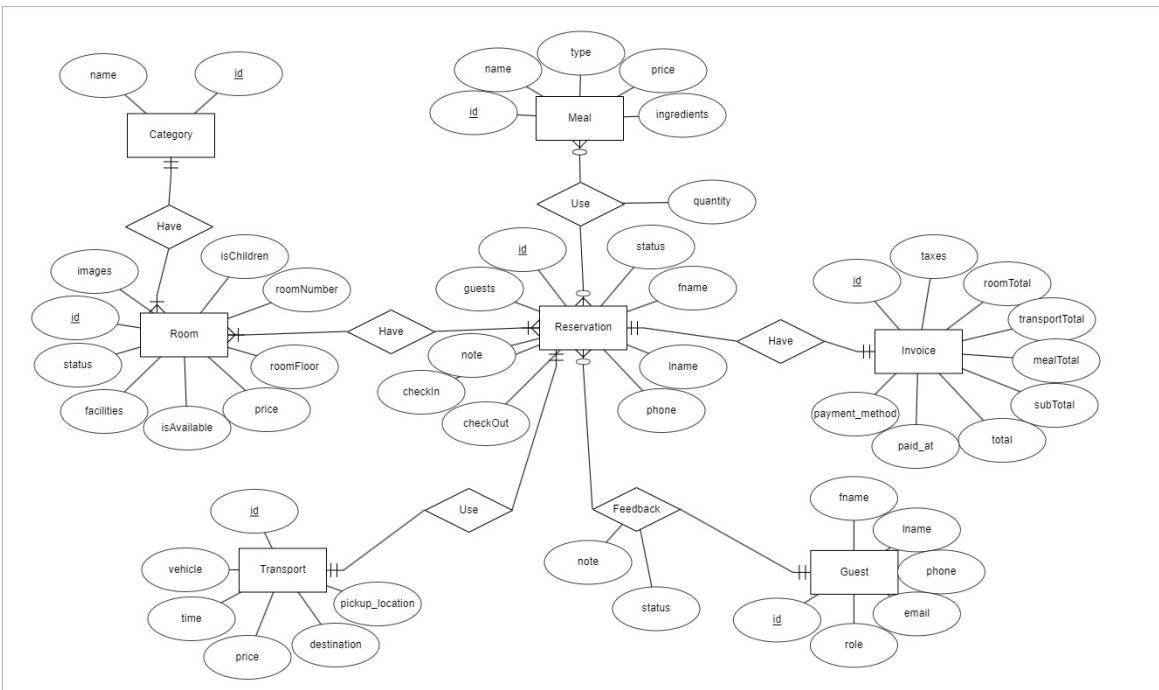


Figure 2.13: Entity Relationship Diagram

2.6 Physical Database Design

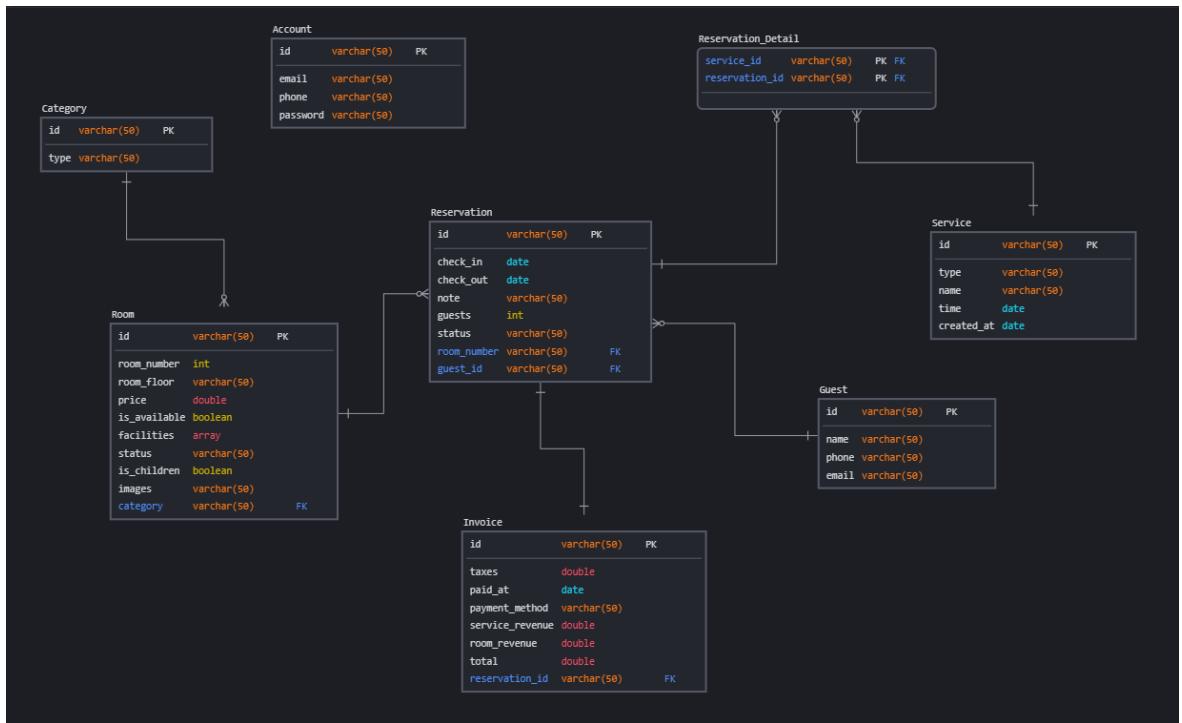


Figure 2.14: Physical Database Design

2.7 Return on Investment (ROI)

Novotel Cash Flows	Cash inflow Novotel	Cash outflow Novotel	Net CF Novotel	Cumul CF Novotel	Simple ROI Novotel
Now	0	-300	-300		
1	100	-40	60	-240	-0,71%
2	150	-50	100	-140	-0,14%
3	180	-20	160	20	16,88%
4	150	-20	130	150	34,88%
5	130	-30	100	250	54,35%
Total	710	-460	250		

Figure 2.15: Return on Investment

Chapter 3

SYSTEM IMPLEMENTATION

3.1 Technical Stack

In the development of our Hotel Management System (HMS), we have chosen a robust and versatile technology stack that ensures both efficiency and scalability. Our selection encompasses both front-end and back-end technologies, each playing a crucial role in creating a seamless user experience and robust backend functionality.

* Front-end Technologies:

1. EJS (Embedded JavaScript templating): We use EJS as our templating language to generate HTML markup with plain JavaScript. It provides an easy-to-use, flexible solution for rendering server-side data into HTML, ensuring dynamic content delivery that's integral for interactive user interfaces.
2. CSS: Cascading Style Sheets (CSS) are employed for styling the web pages. With CSS, we ensure that the user interface is not only functional but also aesthetically pleasing, providing an engaging user experience.
3. JavaScript: As the scripting language for the Web, JavaScript is used to create interactive and dynamic user interfaces. It enables us to implement complex features such as real-time updates, interactive forms, and other user-centric functionalities.
4. jQuery: jQuery simplifies HTML DOM tree traversal and manipulation, event handling, and animation, making it easier and quicker to develop JavaScript-based functionalities. It's particularly useful in enhancing the interactivity and responsiveness of the HMS.

5. Bootstrap: For responsive design, we integrate Bootstrap, a powerful front-end framework. Bootstrap's ready-to-use components and responsive grid system allow our HMS to be mobile-friendly and adaptable across various devices and screen sizes.

*** Back-end Technologies:**

1. Node.js: At the core of our back-end development is Node.js, a JavaScript runtime built on Chrome's V8 JavaScript engine. Node.js enables us to build fast and scalable network applications, perfectly suited for handling the extensive data processing required in hotel management systems.
2. Express.js: A minimal and flexible Node.js web application framework that provides a robust set of features for web and mobile applications.
3. Passport.js: A middleware for Node.js that simplifies the process of handling user authentication.
4. MongoDB: As our database solution, we use MongoDB, a NoSQL database known for its high performance, high availability, and easy scalability. Its flexible data model is ideal for handling diverse data types that a hotel management system entails.
5. Mongoose: To streamline working with MongoDB, Mongoose, an Object Data Modeling (ODM) library, is utilized. Mongoose provides a straightforward schema-based solution to model application data. It includes built-in type casting, validation, query building, and business logic hooks.

3.2 System Architecture

Chapter 4

DEMONSTRATION

4.1 Scenario

4.1.1 Manager

- The Manager logs in to the website using their manager credentials. Once logged in, the manager is directed to the dashboard where they can see the functions they can manage on the website. The manager can then navigate to different sections of the website, such as the front desk, room, reservation, etc.
- In the front desk section, the Manager can see the room being used by day, week, month and the Manager can add bookings.
- In the front desk section, the Manager can see the room being used and can add a booking.
- In the room section, the manager can add, edit, or delete a room from the website. The manager can also manage product categories, adjust pricing, and update room descriptions.
- In the reservation section, the manager can edit, and add meals for a room from the website. The manager can see all reservations.
- In the invoice section, the manager can view all invoices, total revenue, room revenue, food revenue, and transfer revenue. Additionally, the manager can search for a certain invoice.
- In the feedback section, the manager can see all guest reviews for the hotel.

- In the services section, the manager can view guests who use the airport pick-up service. Includes guest information, means of transportation used by guests, and pick-up location.
- In the meal section, the manager views the food that the hotel provides to serve guests. Includes dish name, type, ingredients, and price.

4.1.2 Receptionist

- In the front desk section, the receptionist can see the room being used and can add a booking.
- In the reservation section, the receptionist can edit, and add meals for a room from the website. The manager can see all reservations.
- In the send feedback section, the receptionist can send feedback to the manager to respond to hotel issues.

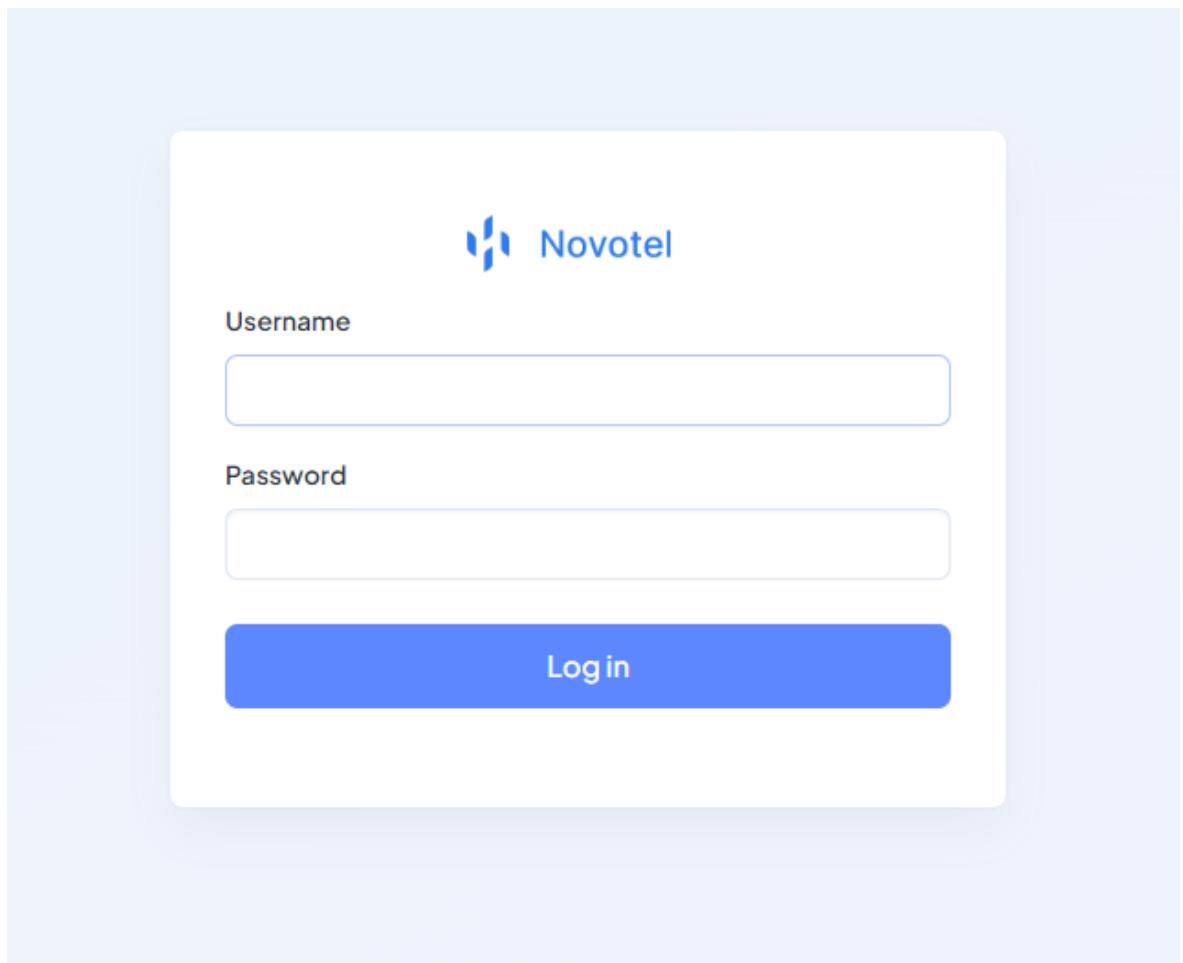
4.1.3 Accountant

- In the invoice section, the accountant can view all invoices, total revenue, room revenue, food revenue, and transfer revenue. Additionally, the accountant can search for a certain invoice.

4.2 Demo

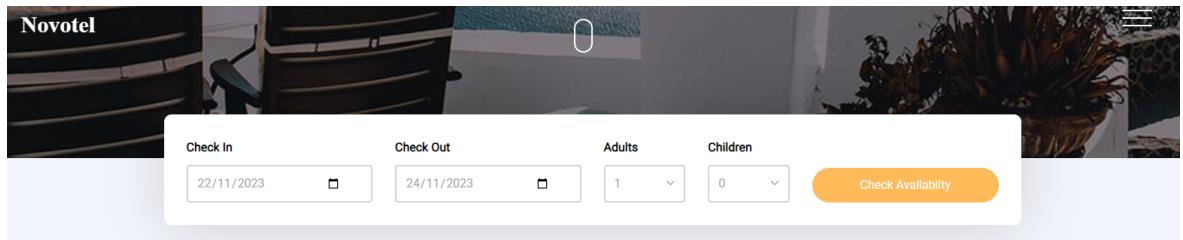
4.2.1 Login

- Manager, Accountant and receptionist log in to the website homepage and enter the link to access with permission:
 - Manager: localhost:8080/manager
 - Receptionist: localhost:8080/receptionist
 - After entering the path, the system will take the actor to the login page:

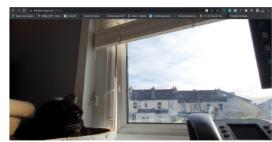


4.2.2 Check for available rooms

- Guest, Receptionist, and Manager access the home page and fill in the time they will check in, check out, and the number of people who will rent the room.



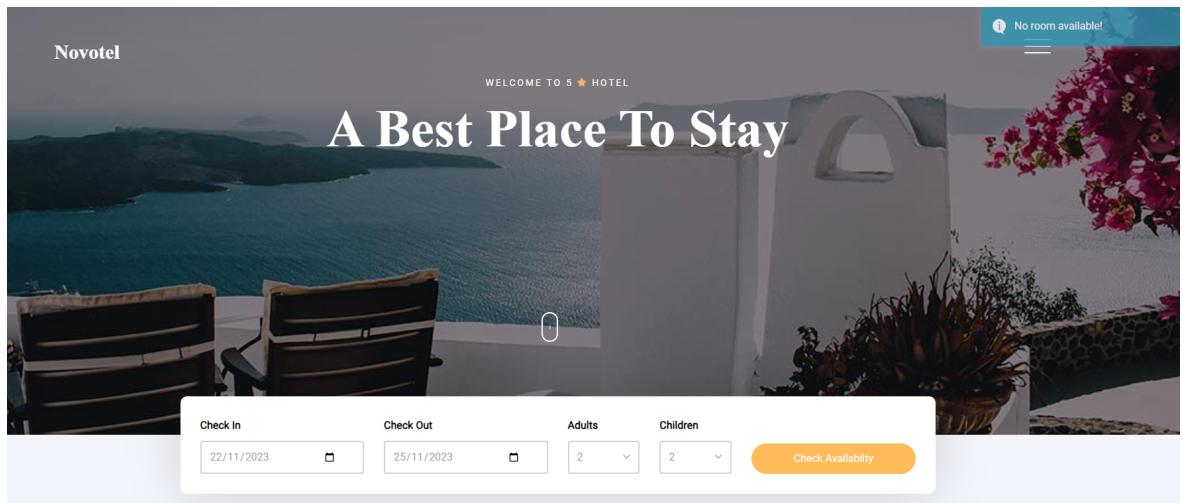
Rooms & Suites



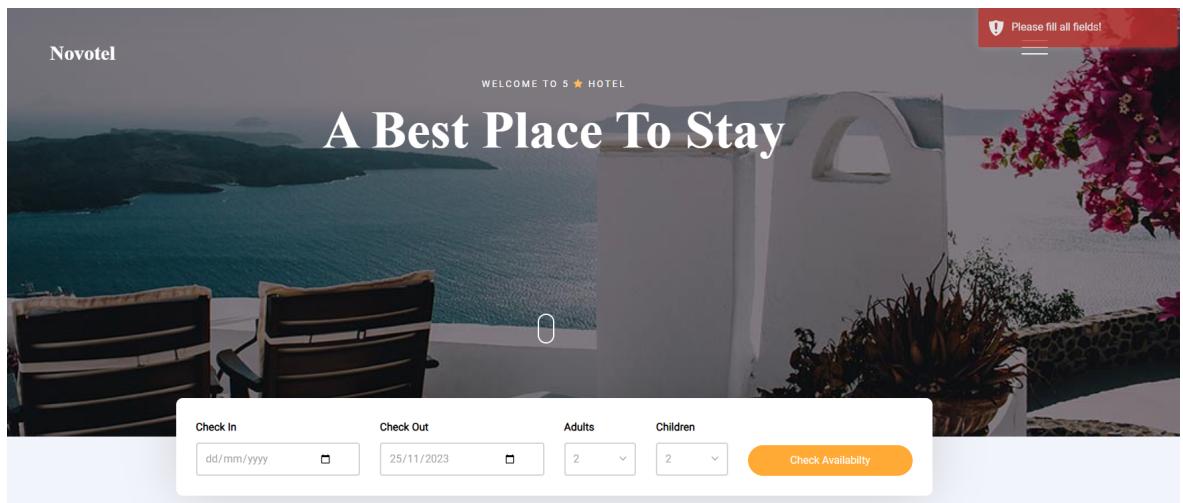
Single

500000 / PER NIGHT

- If the hotel has no available rooms, it will return no available rooms.



- If the Actor does not completely fill in the fields, an error message will be reported.



4.2.3 Booking

- Receptionist and manager fill in all fields for the room search and select available rooms.

Add new booking X

Novotel

[Book a room](#)
[Add information](#)
[Add meal](#)
[Comfirm](#)

From
To
Adults
Children
[Check Availability](#)

101
500.000 ₣ / PERNIGHT

[Back](#)
[Next](#)

- Continue filling in tenant information. If you want to use the airport shuttle service, please select the type of vehicle you want and fill in all relevant fields. If guests have special service requests, they will be recorded.

Add new booking

X



Book a room

Add information

Add meal

Comfirm

First Name

Nguyễn

Last Name

Đạt

Phone

0889834127

Vehicle

Bus

Enter Pick up location

Enter destination

dd/mm/yyyy



Special Service

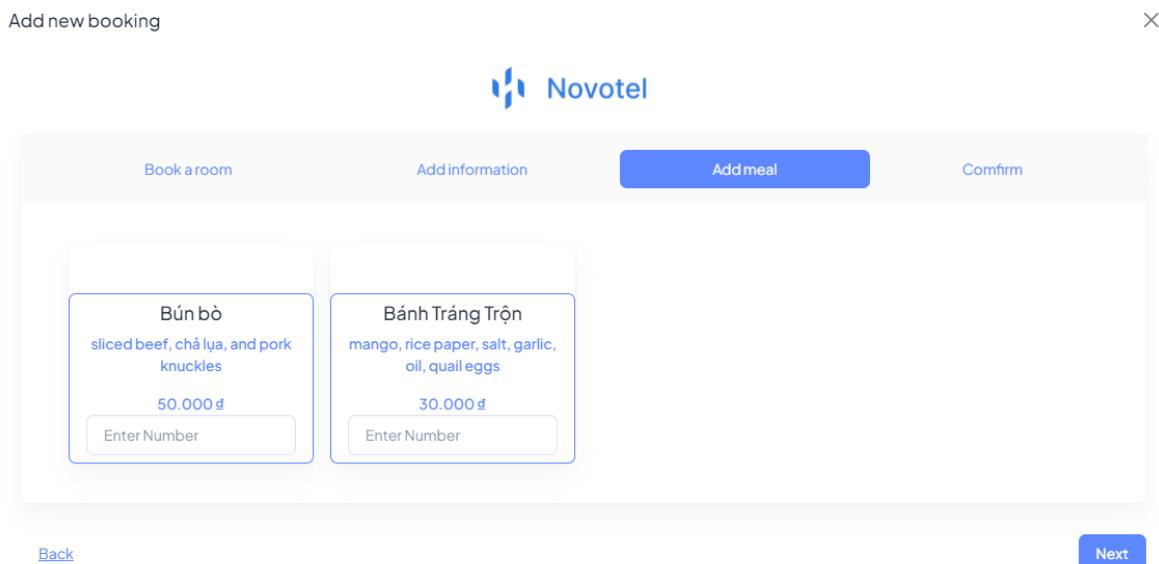
daas

www

[Back](#)

[Next](#)

- If the guest needs to eat food, they will choose the food according to the guest's request.



- Finally, the actor will confirm the booking and other services.

4.2.4 Update Booking

- Receptionist and manager edit information about services, status, guest information, vehicles, or notes.

Firstname

Lastname

Phone

Status

Room

AIRPORT TRANSFER:

Vehicle

Notes

[Close](#) [Save](#)

4.2.5 Cancel Booking

- Receptionist and manager change the room's status to canceled and will cancel the booking from the guest.

First name

Last name

Phone

Status

Room

AIRPORT TRANSFER:

Vehicle

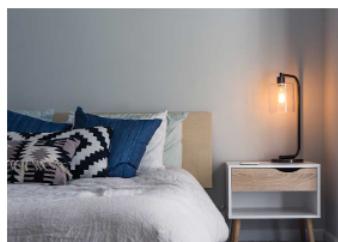
Notes

Close Save

4.2.6 View room information

- Guest views detail information about the room (images, price) on the home page.

Rooms & Suites



Single Room

90\$ / PER NIGHT



Family Room

120\$ / PER NIGHT



Presidential Room

250\$ / PER NIGHT

- Manager and receptionist view detail information about the room (images, price, facilities, status,etc).

All rooms

Add room

Number	Information	Price	Facility	Cleaning status	Status	...
--------	-------------	-------	----------	-----------------	--------	-----



102 Floor 1 500000 VND WiFi,TV,Tủ lạnh,Máy lạnh,Giường đơn

Clean

Occupied

...



201 Floor 2 1000000 VND WiFi,TV,Tủ lạnh,Máy lạnh,Giường đôi

Clean

Available

...



101 Floor 1 500000 VND WiFi,TV,Fridge,Air conditioner,Single bed

Clean

Available

...



401 Floor 4 2500000 VND WiFi,TV,Tủ lạnh,2 Máy lạnh,2 Giường đôi

Clean

Available

...

« 1 »

4.2.7 Book meal

- If the guest needs to eat food, manager or receptionist will choose the food according to the guest's request.

Add new booking

X



Book a room

Add information

Add meal

Comfirm

Bún bò
sliced beef, chả lụa, and pork
knuckles

50.000đ

Enter Number

Bánh Tráng Trộn
mango, rice paper, salt, garlic,
oil, quail eggs

30.000đ

Enter Number

[Back](#)

[Next](#)

4.2.8 Book airport transfer service

- If guest want to use the airport shuttle service, manager or receptionist select the type of vehicle guest want and fill in all relevant fields such as pick up location, pick up date and destination.

Add new booking

X



Book a room

Add information

Add meal

Comfirm

First Name

Nguyễn

Last Name

Đạt

Phone

0889834127

Vehicle

Bus

Enter Pick up location

Enter destination

dd/mm/yyyy



Special Service

daas

www

[Back](#)

[Next](#)

4.2.9 Check-in

- Receptionist and manager confirm that the room has been booked by the guest (guest check-in time).

Status

Checked in

4.2.10 Check-out

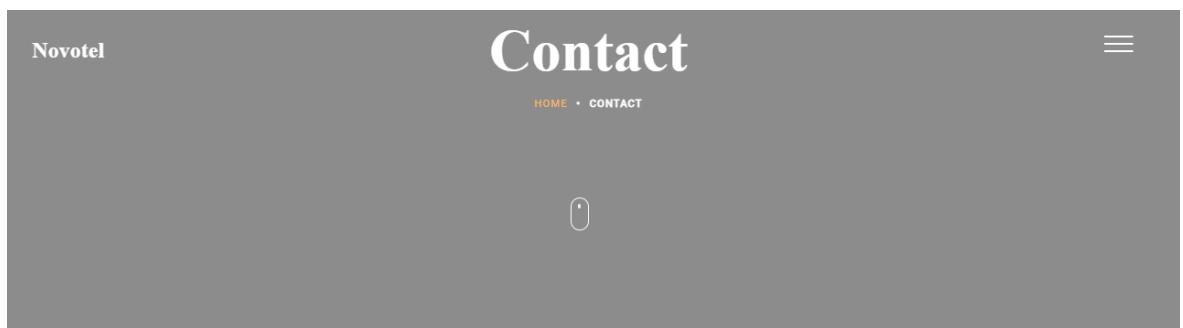
- Receptionist and manager change the room's status to check-out and receptionist or manager confirm that the guest has left the room (guest check-out time)

Status

Checked out

4.2.11 Send feedback

- Guest send reviews about hotel quality, service, and staff attitude to the hotel.
- Receptionist send feedback on the status of the facility, guest issues, and others.



Reservation Id

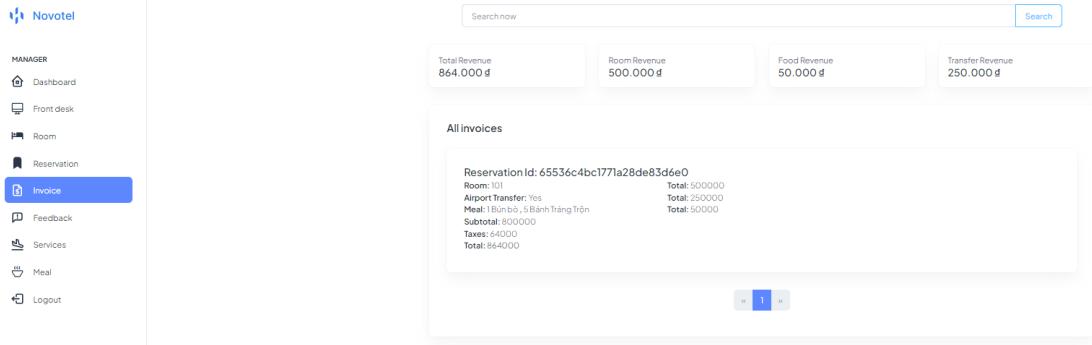
Phone

Write Message

Send Message

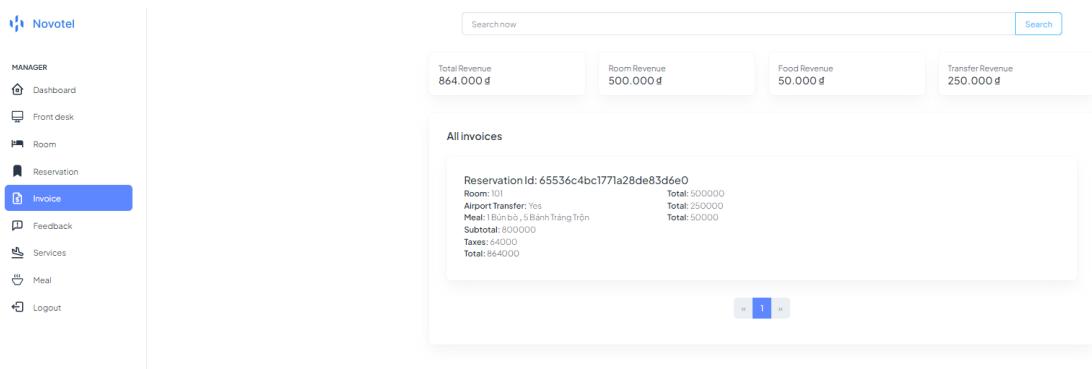
4.2.12 Find Invoice

- Manager and accountant search for invoices that have been created in "Invoice" on the toolbar to see detailed information about these invoices.



4.2.13 View invoice history

- Manager and accountant review invoice history to perform hotel revenue statistics in "Invoice" on the toolbar.



4.2.14 Manage room

- Manager clicks on the "Room" on the toolbar.
- The manager chooses the function he wants to perform:
 - If the manager chooses to add or edit room information. After entering or adjusting all information about the room that needs to be adjusted (or added), the manager clicks on "Add" or "Save", and the room information in the hotel is automatically added to the database table.

All rooms

Number	Information	Price	Facility	Cleaning status	Status	
	500000 VND	WiFi TV Tivi lạnh Máy lạnh	Giường đơn	Clean	Occupied	...
			Giường đôi	Clean	Available	...
			1 Giường đơn,Single bed	Clean	Available	...
			2 Giường đôi	Clean	Available	...

Add new room

Upload image

Room Number: 109

Room type: Single Room floor: Floor 1

Cleaning status: Clean Status: Available

Price: 500000 VND

Facility: no facility

[Close](#) [Add](#)

All rooms

Number	Information	Price	Facility	Cleaning status	Status	...
102	Floor 1	500000 VND	Wifi,TV,Tủ lạnh,Máy lạnh,Giường đơn	Clean	Occupied	...

Edit room



Upload image

X

Room Number:

Room type:

Room floor:

Cleaning status: Status:

Price:

Facility:

Close Save

- If the manager chooses to delete, the system requires the manager to enter the exact room code to be deleted and then confirm that information about that room will be deleted from the system's database table.

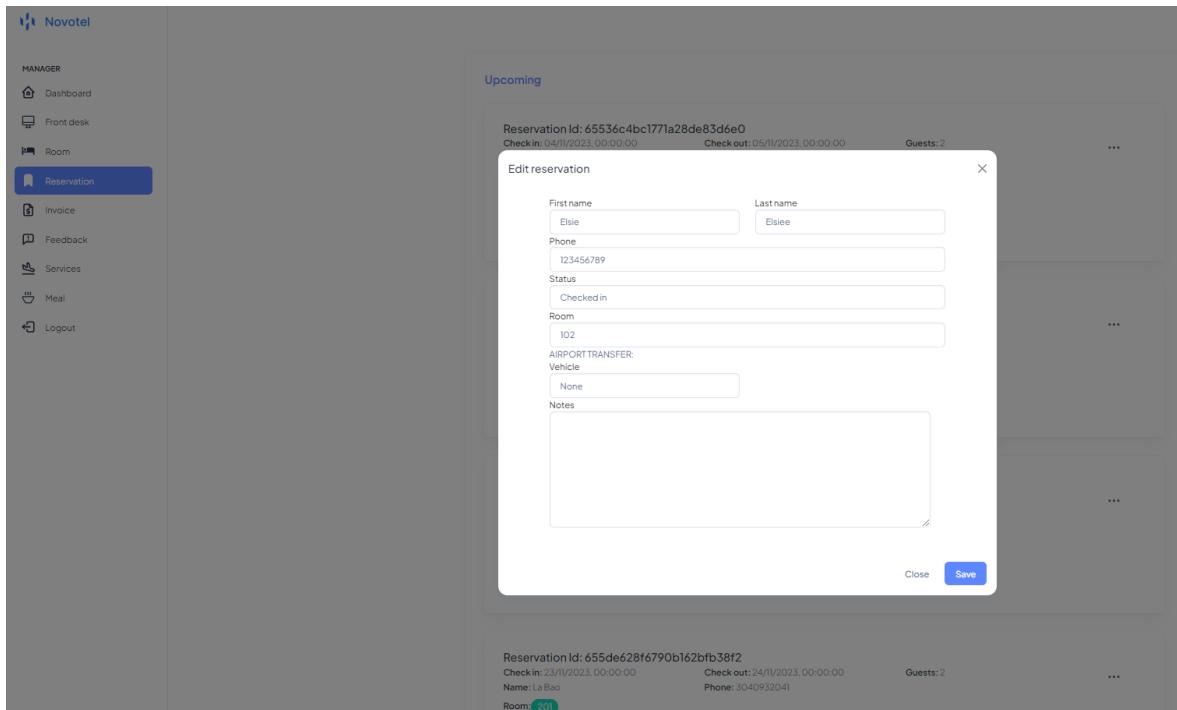
All rooms

Number	Information	Price	Facility	Cleaning status	Status	...
201	Floor 2	1000000 VND	Wifi,TV,Tủ lạnh,Máy lạnh,Giường đôi	Clean	Available	...
101	Floor 1	500000 VND	Wifi,TV,Fridge,Air conditioner,Single bed	Clean	Available	...
401	Floor 4	2500000 VND	Wifi,TV,Tủ lạnh,2 Máy lạnh,2 Giường đôi	Clean	Available	...

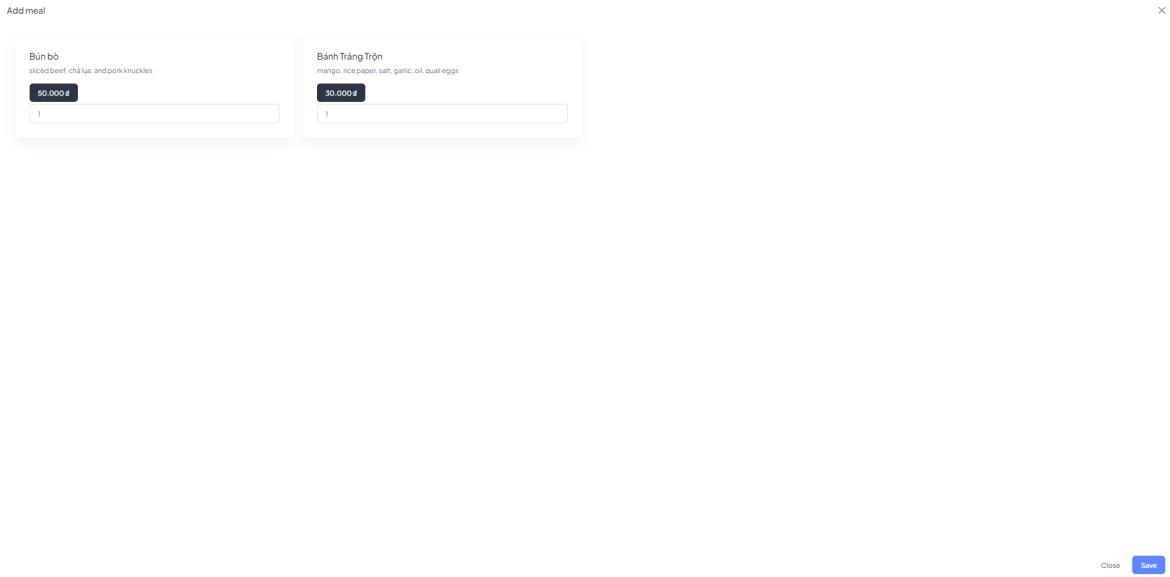
Edit
Hide

4.2.15 Manage Reservation

- Manager clicks on the "Room" on the toolbar.
- The manager chooses the function he wants to perform:
- If the manager chooses to edit reservation information. After adjusting information about the reservation that needs to be adjusted, the manager clicks "Save", and the reservation information in the hotel is automatically added to the database table.



- If the manager chooses to add meals. They will select the meal and quantity then press "Save". This is done when guests need food.



4.2.16 Manage menu item

- Manager clicks on "Meal" on the toolbar.
- The manager chooses the function he wants to perform:
 - If the manager chooses to add or edit meal information. After entering or adjusting all information about the meal that needs to be adjusted (or added), the manager clicks on "Add" or "Save", and the meal information in the hotel is automatically added to the database table.

Add new meal

X

Name

Enter name

Type

Enter type

Price

Enter price

Ingredients

Enter ingredients

Close

Add

Edit meal

Name	Bánh Tráng Trộn
Type	mixed rice paper
Price	30000
Ingredients	
mango, rice paper, salt, garlic, oil, quail eggs	

Close **Save**

- If the manager chooses to delete, the system requires the manager to enter the exact meal code to be deleted and then confirm that information about that meal will be deleted from the system's database table.

All meals				Add meal
Name	Type	Ingredients	Price	...
Bánh Tráng Trộn	mixed rice paper	mango, rice paper, salt, garlic, oil, quail eggs	30000	...
				Edit Remove

4.2.17 Review guest's feedback

- Manager click "Feedback" on the right toolbar of the website. The system will display a list of all the feedback that guests have sent to the hotel. Managers can

choose to resolve feedback coming from guest.

The screenshot shows the Novotel Manager dashboard. On the left, there's a sidebar with a 'Feedback' button highlighted in blue. The main area is titled 'All messages' and contains two messages. The first message is from a guest named Lam Si, with the ID 65536c4bc177la28de83d6e0. The second message is from a guest named Elsie Elsee, with the ID 6559b9361999781044e6a499. Both messages include a 'Solve' button. Below the messages is a navigation bar with arrows and a page number '1'.

4.2.18 View all airport transfer services

- Manager click "Services" on the right toolbar of the website. The system will display a list of all guests who have used the hotel's airport transport service.

The screenshot shows the Novotel Manager dashboard. On the left, there's a sidebar with a 'Services' button highlighted in blue. The main area is titled 'Airport Transfer' and displays a table of transfer services. The table has columns for Reservation id, Guest, Vehicle, Pick up Location, Destination, and Appointment. Two rows of data are shown:

Reservation id	Guest	Vehicle	Pick up Location	Destination	Appointment
65536c4bc177la28de83d6d0	Lam Si 0231823934	Car 250000	Q7, HCM	abc	28/10/2023, 10:35:44
6559b9351999781044e6a495	Elsie Elsee 123456789	Car	tan son nhat international airport	hotel	22/11/2023, 00:00:00

Below the table is a navigation bar with arrows and a page number '1'.

Chapter 5

CONCLUSION AND FUTURE WORK

5.1 Conclusion

Lessons learned by undertaking this project

- Writing the report following the standard methods was another learning outcome.
- Obtain knowledge in programming with Nodejs and MongoDB.
- From the beginning, requirement gathering to the deployment of the system was not a smooth task. It helped all members to learn to cooperate with people and to manage work and time

5.2 Future Work

As technology evolves and guest expectations change, continuous improvement of our Hotel Management System (HMS) is essential. Here are several areas of future work and potential improvements that can be integrated into the HMS to ensure it remains at the forefront of hotel management technology:

- **Expanded System Scope:** The expanded scope will encompass the following aspects:
 - Incorporating features for managing events, conferences, and banquets, including booking spaces, scheduling, and coordinating catering and equipment.

- Managing appointments, staff, inventory, and customer preferences for spa and wellness services.
 - Streamlining the management of recreational facilities like gyms, pools, and activity centers.
- **Chatbots and Virtual Assistants:** Advanced chatbots and virtual assistants using natural language processing can provide 24/7 customer service for common inquiries and requests, reducing the workload on staff and improving guest satisfaction.

Bibliography

- [1] Alan Dennis, Barbara Haley Wixom, and David Tegarden. *Systems Analysis and Design: An Object-Oriented Approach with UML*. 5th Edition, John Wiley and Sons, Inc., USA, 2015.
- [2] Karl E. Wiegers. *Software requirements (2nd ed.)*. Microsoft Press, 2003.

Appendix A

List of requirement questions

1. How many employees are in your hotel and what is the organizational structure?
2. What are the different types of reservations the hotel accepts?
3. Do customers need to log in to use the system?
4. Do you provide additional amenities to the rooms?
5. What is the hotel booking process like?
6. How to manage room availability and booked rooms?
7. How does the system support customers in evaluating prices and sharing opinions about the services they use?