UNIVERSITI TEKNIKAL MALAYSIA MELAKA

FAKULTI TEKNOLOGI MAKLUMAT DAN KOMUNIKASI

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R E P O R T

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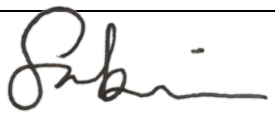
Supervisor Signature	:	
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EXECUTIVE SUMMARY

The hotel industry, being a significant player in the global economy, has witnessed a transformative impact with the integration of digital technologies, particularly through the widespread adoption of online hotel booking systems. These systems have evolved into a cornerstone of the industry, becoming indispensable tools for both travelers and hotel establishments. In the contemporary landscape, there is a discernible trend among travelers who increasingly favor the ease and convenience offered by online lodging booking over traditional methods.

This shifting consumer preference has led to a heightened demand for a more sophisticated and user-centric approach to hotel booking systems. Travelers now expect seamless and intuitive experiences during the reservation process, prompting the industry to adapt and innovate. The project at hand aims to respond to this demand by creating a hotel reservation system that goes beyond basic functionality.

The project's central objective is to develop a system that not only meets the expectations of modern travelers but also addresses the operational needs of hotel management. This multifaceted approach involves incorporating advanced technological features to enhance user experience while streamlining management processes. The system's sophistication lies not only in its technological aspects but also in its ability to provide a comprehensive solution that aligns with the dynamic nature of the contemporary hotel industry.

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CHAPTER 1: INTRODUCTION

1.1 Introduction

The hotel sector is undergoing a dramatic upheaval in the context of today's quickly changing global scene. This change is being driven by developments in technology as well as shifting preferences held by consumers. The traditional ways of reserving hotel rooms are becoming increasingly archaic, time-consuming, and prone to errors in this day and age, when everything is done online. These outmoded booking systems, which frequently rely on phone calls and email interactions, not only produce inefficiencies but also hamper both the quality of the guest experience and the operational effectiveness of hotels. It is vital for hotels to adapt and implement current technology in order to stay competitive and fulfill the developing wants of customers. This is because the travel and tourism business is expanding and diversifying at an increasing rate. This project proposal is to introduce the creation of a state-of-the-art Hotel Booking System, which is a ground-breaking solution set to transform the way customers interact with hotels and simplify the complicated operations of hotel management.

1.2 Problem Statement

The current approaches employed for hotel bookings encounter a number of significant challenges:

a) Inefficiency

The process of manual reservations is easy to make mistakes and is characterized by a significant investment of time, leading to customer dissatisfaction and operational inefficiencies for hotel personnel.

b) Lack of Real-time Information

Frequently, visitors have difficulties in obtaining real-time updates on the availability of rooms, price details, and the comprehensive range of amenities offered by hotels. This predicament typically results in less than ideal decisions and a compromised overall experience for guests.

c) Data Security

The manual management of sensitive client information can provide a substantial security vulnerability, particularly in a time when the occurrence of data breaches is an escalating worry.

d) Competitive Disadvantage

Hotels that do not embrace recent booking systems may have a notable disadvantage within a highly competitive industry, impeding their capacity to develop and maintain a stable future.

1.3 Objective (s) of the project

This project embarks on the following objectives:

a) To design and implement a streamlined booking system that enhances efficiency, minimizes inaccuracies, and optimizes time utilization for both patrons and hotel personnel.

b) To implement a thorough automation system is essential for effectively managing reservations, room availability, and safe online payments, accordingly, minimizing the need for human interaction.

c) To Develop a user interface that is intuitive and user-friendly, with the primary objective of meeting the requirements of both guests and hotel personnel, consequently augmenting the entire experience.

1.4 Scope

1.4.1 Module to be developed.

a) User Registration Module

Customers can easily make accounts with this feature, which also lets hotels list their homes on the system.

b) Room Booking Module

Customers will be able to easily look at rooms, choose one, and book it by using real-time data on prices, features, and room availability.

c) Admin Panel Module

An administrative interface will be provided made it possible to manage customer accounts, hotel sites, and system settings, which made the system run more smoothly.

d) Real-time Updates Module

The hotel staff will be able to change the prices and availability of rooms in real time, which will make the business run more smoothly.

e) Feedback and Reviews Module

The method will make it easier for customers to leave comments and reviews about their hotel stays, which will increase guest happiness overall.

1.4.2 Target User

a) Hotel Manager

The role of the hotel manager encompasses a broad range of responsibilities centered around the effective functioning of the hotel. Primarily, the manager is tasked with overseeing and coordinating various aspects of daily operations to guarantee a seamless and efficient running of the establishment. This involves not only the supervision of staff members but also extends to the meticulous management of financial matters, such as budgeting, financial reporting, and resource allocation. Furthermore, the hotel manager plays a pivotal role in maintaining high levels of customer satisfaction by implementing and monitoring quality standards, addressing guest concerns, and ensuring that the overall guest experience aligns with the hotel's service standards. In essence, the hotel manager serves as a multifaceted leader, balancing personnel management, financial stewardship, and customer-focused strategies to uphold the hotel's reputation and success.

b) Front Desk Staff

The front desk staff assumes a crucial role in overseeing the seamless functioning of the hotel's front desk operations. This encompasses a spectrum of responsibilities, prominently involving the efficient check-in and check-out processes for guests. As the first point of contact for visitors, they are entrusted with managing reservations, ensuring accuracy in room allocations, and facilitating a smooth arrival and departure experience for guests.

In addition to these core responsibilities, the front desk staff serves as the frontline for addressing customer inquiries. They play a pivotal role in providing information about the hotel's facilities, services, and local attractions, thereby contributing significantly to the overall guest experience.

To execute their duties effectively, the front desk staff is equipped with access to various modules, including the reservation management module, guest management module, and room management module. These technological tools empower them to navigate and update reservation details, efficiently manage guest information, and oversee room allocations with precision. By leveraging these modules, the front desk staff enhances their capacity to streamline processes, minimize errors, and ultimately contribute to a positive and efficient operation of the hotel's front desk services.

c) Guests

Guests, as the individuals temporarily residing at the hotel, play a pivotal role in the overall hospitality experience. To enhance their stay and provide a seamless interaction with the hotel's services, guests are afforded the privilege of accessing the guest management module. This specialized tool serves as a digital gateway for guests, allowing them to effortlessly retrieve and review comprehensive information about their reservations.

Within the guest management module, guests can peruse detailed reservation details, gaining insights into check-in and check-out times, room specifications, and any additional special requests they may have made during the booking process. This accessibility empowers guests with a sense of control over their stay, ensuring that they are well-informed and can plan their visit more efficiently.

Moreover, the guest management module goes beyond basic reservation information. It serves as a conduit for guests to communicate and interact with the hotel staff by providing a platform to request additional services. Whether it's a preference for room amenities, dining requests, or any specific needs, guests can convey their preferences and requirements through this module, facilitating a more personalized and tailored experience.

In essence, the guest management module acts as a user-friendly interface, enriching the overall guest experience by providing them with convenient access

to vital information and a channel to express their preferences, thereby contributing to a more satisfying and enjoyable stay at the hotel.

1.5 Project Significance

The Hotel Booking Management System is of considerable significance due to the following reasons:

1) Customer

   This system will provide users with a contemporary, quick, and secure platform for reserving rooms, significantly augmenting their overall travel experience.

2) Hotels

   Hotels stand to gain advantages in terms of enhanced operational efficiency, heightened occupancy rates, and elevated customer happiness, therefore making a positive impact on their financial performance and long-term viability.

3) Staff

   The hotel staff have the capability to access up-to-date information, therefore allowing them to efficiently manage room allocation and provide an exceptional standard of customer service.

4) Data Security

   The implementation of strict security protocols would not only safeguard client data but also build trust and assurance among users, therefore enhancing the system's standing.

5) Economy

   An effective hotel reservation system may significantly impact the promotion of tourism and contribute to the economic development of local communities, hence delivering larger economic effects.

1.6 Gantt Chart of Project Activities

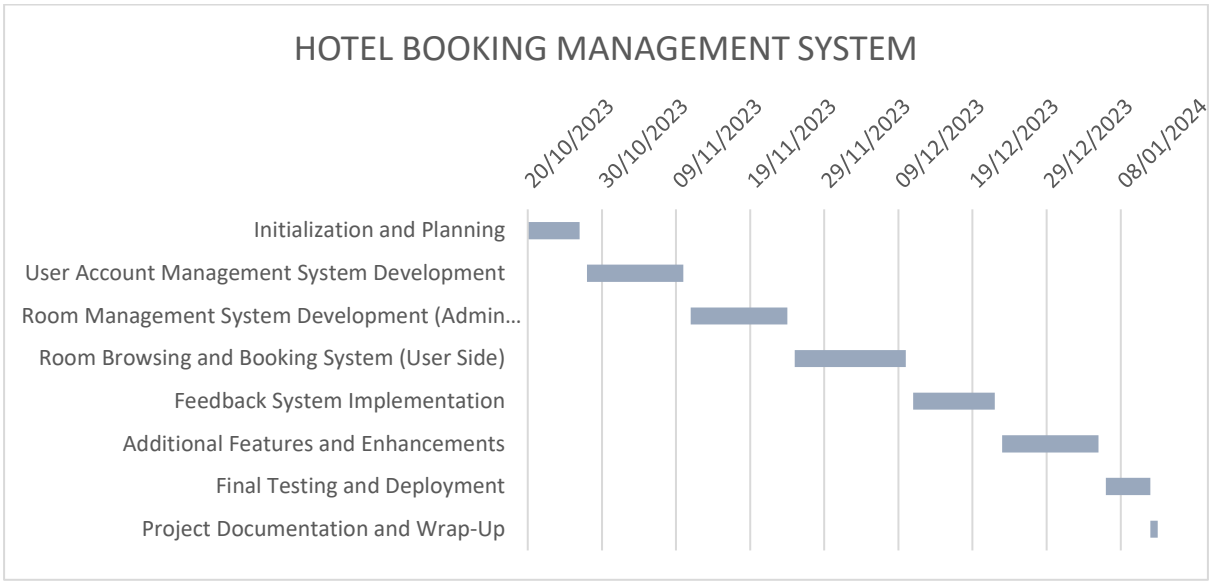

Figure 1.1 Gantt Chart for Hotel Booking Management System

CHAPTER 2: ANALYSIS OF PROBLEM

2.1 Problem Decomposition Description

1) User Account Management

   Sub-Problems:

   a) Registration: Create a system for new users to register.
   b) Login: Implement user authentication.
   c) Profile Management: Enable users to view and edit their profile details.

2) Room Management

   Sub-Problems:

   a) Room Inventory Management: Develop a system to manage room types, availability, and details.
   b) Room Booking: Create functionality for users to book rooms.
   c) Booking Modification: Allow users to modify or cancel their bookings.

3) Pricing and Payments

   Sub-Problems:

   a) Dynamic Pricing: Implement a system to adjust room prices based on various factors like demand, season, etc.
   b) Payment Processing: Integrate a secure payment system for booking transactions.

4) Feedback and Ratings

   Sub-Problems:

   a) Feedback Submission: Allow users to submit feedback and ratings for their stay.
   b) Feedback Management: Enable hotel administrators to view and respond to feedback.

5) User Interface and Experience

   Sub-Problems:

   a) Design: Create a user-friendly interface for the booking system.
   b) Usability Testing: Conduct tests to ensure the system is easy to navigate and use.

6) Security and Data Protection

   Sub-Problems:

   a) Data Security: Implement measures to protect user data and transaction details.
   b) System Security: Ensure the system is secure against unauthorized access and cyber threats.

Steps to Solve the Sub-Problems.

1) User Account Management
    a) Registration
        i. Design a user registration form. Collect essential information such as name, email, password, and contact details.
        ii. Implement input validation. Ensure that the data provided meets system criteria.
        iii. Store user data securely. Use a database with encryption for sensitive information like passwords.

    b) Login
        i. Create a login interface. A simple form asking for username and password.
        ii. Authenticate user: Check the provided credentials against your database.
        iii. Manage sessions: Upon successful login, start a user session that keeps the user logged in as they navigate the system.

    c) Profile Management
        i. Develop a profile page: Allow users to view their data.
        ii. Implement update mechanisms: Users should be able to update their details.
        iii. Ensure security: Any changes should require password confirmation.

2) Room Management
    a) Room Inventory Management
        i. Database design: Create a database schema to storeroom types, details, and availability.
        ii. Room editing interface: Develop an interface for hotel staff to add or update room details.

b) Room Booking
    i. Booking interface. Create a system where users can select room types, dates, and provide necessary information.
    ii. Availability checks. Implement logic to ensure users can only book available rooms.
    iii. Reservation system: Reserve the selected room for the user once the booking process begins.

c) Booking Modification.
    i. Manage bookings: Allow users to view their bookings.
    ii. Modify or cancel: Implement features for users to change dates or cancel bookings.

3) Pricing and Payments
    a) Dynamic Pricing
        i. Pricing algorithm. Develop logic that adjusts prices based on demand, time of year, or special events.
        ii. Update prices. Automate the update process in your database.

    b) Payment Processing
        i. Payment gateway integration: Incorporate a secure payment service provider.
        ii. Transaction management: Ensure that all transactions are recorded and linked to the corresponding bookings.

4) Feedback and Ratings
    a) Feedback Submission
        i. Feedback form. Provide a form for users to submit their feedback.
        ii. Store feedback. Save the feedback in the database for review by hotel staff.

b) Feedback Management

i. Admin interface: Allow staff to view feedback and respond if necessary.

5) User Interface and Experience

a) Design

i. Focus on creating a user-friendly design with intuitive navigation.

b) Usability Testing

i. Conduct thorough testing with real users to gather feedback on the system's usability.

6) Security and Data Protection

a) Data Security

i. Use industry-standard encryption for sensitive data.

b) System Security

i. Keep the system secure through continuous monitoring and updates.

2.2 Structured Chart

1) Register and Login Process:
    a) A new user starts with the option to Register. If the user chooses to log in, the system will check if the Login Details are correct. If details are not found, it loops back to registration.
    b) After registering or logging in successfully, the user goes through a Verification process.
    c) Upon successful verification, the user is taken to the Main Menu.

2) Main Menu:
    a) From the Main Menu, users have two primary paths they can take: Search Room or View Booking.
    b) The Search Room function allows users to search for a hotel room based on Price, Availability, and Types of Room. If a room is selected, the user can then Insert Details for booking.
    c) The View Booking function allows users to review their current bookings.

3) Booking Process:
    a) When booking details are inserted, the user is taken to the Payment step.
    b) After the Payment Okay, the booking is confirmed.

4) Feedback Process:
    a) Independently of booking, users can enter Feedback at any time after they have accessed the Main Menu.
    b) Users can insert feedback, and the feedback sent is then viewed within the system.

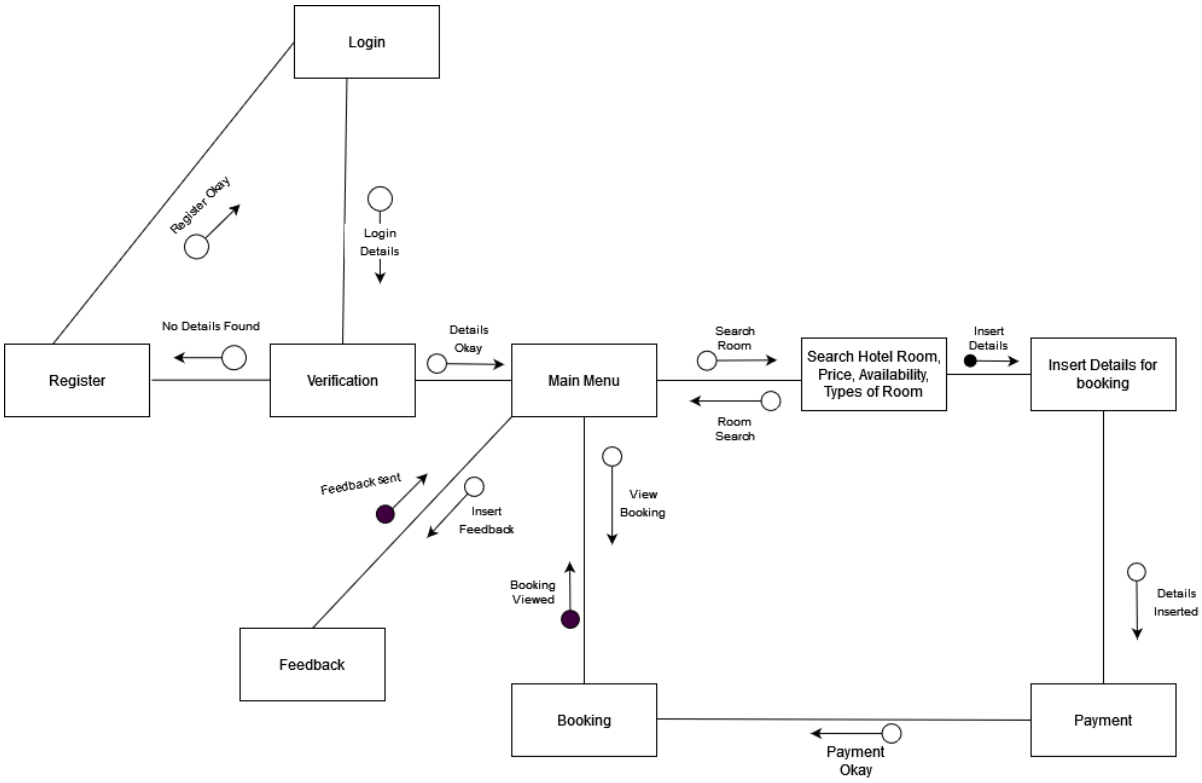

Figure 2.1 Structured Chart for Hotel Booking Management System

CHAPTER 3: DESIGN

3.1 Flowchart

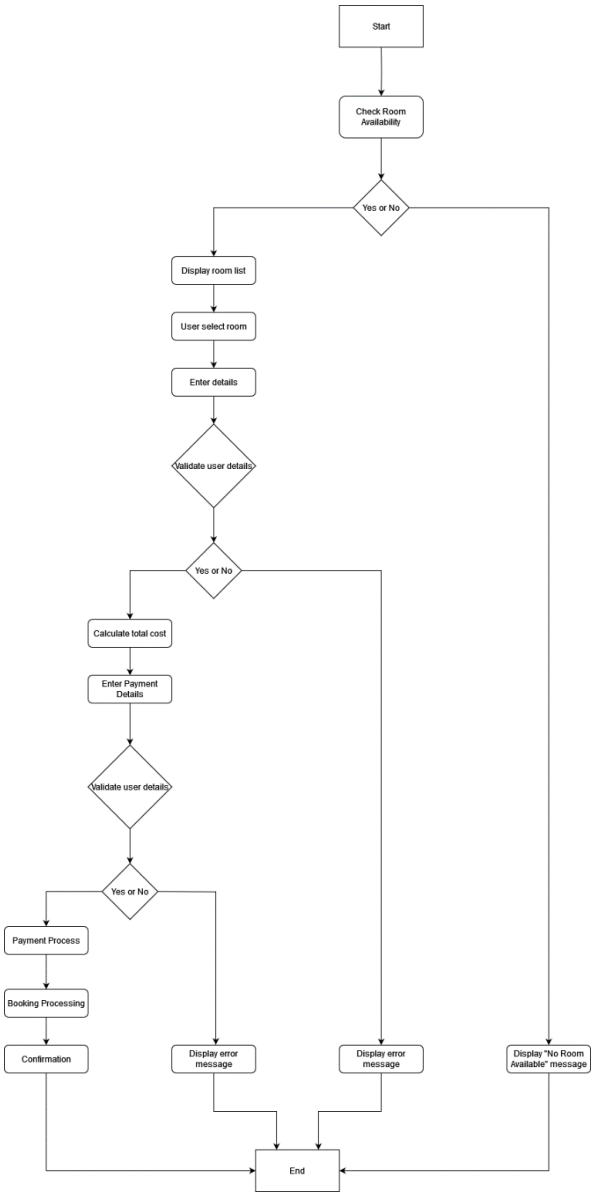

Figure 3.1 Hotel Management Booking System Flowchart

3.2 ERD

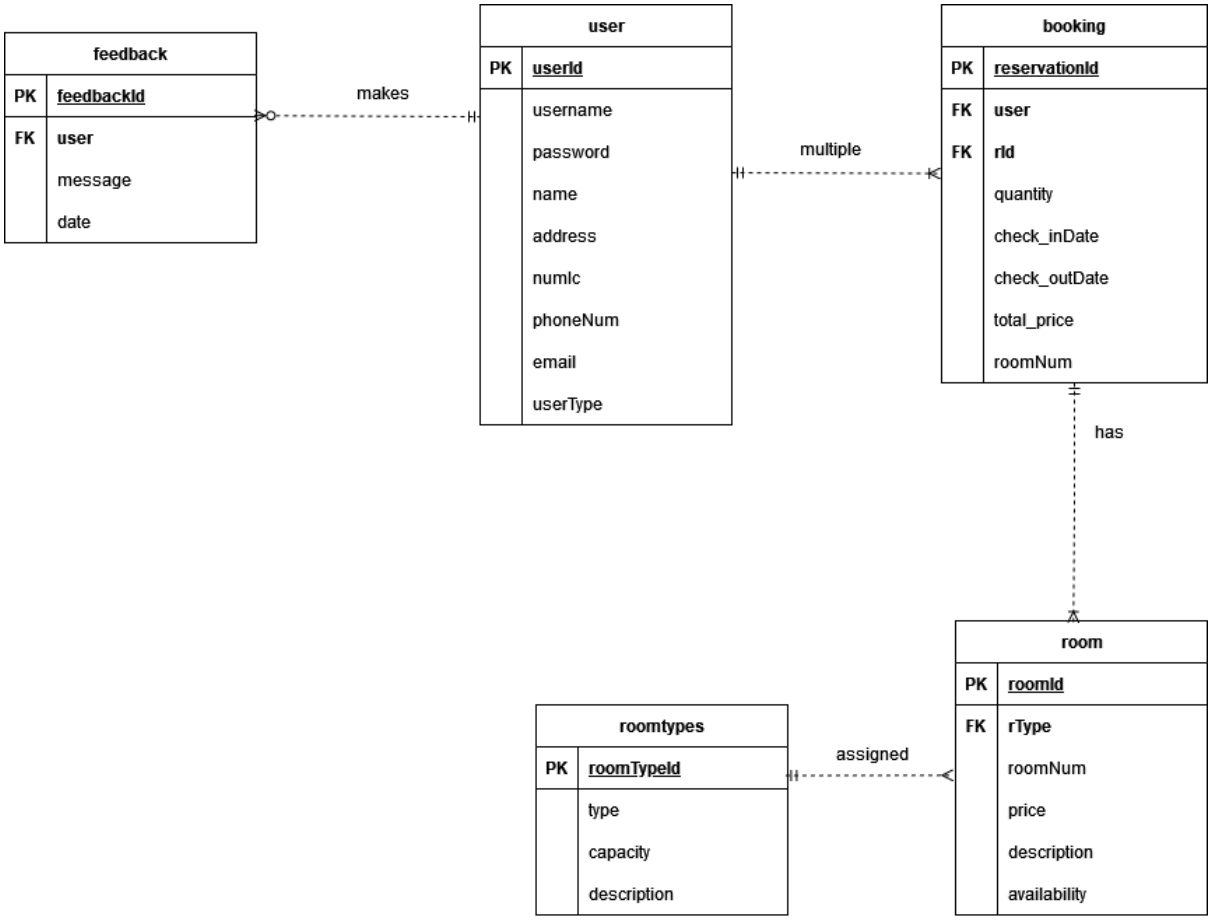

Figure 3.2 Entity Relational Diagram (ERD)

3.3 Data Dictionary

1) User Table

Table 3.1 User Data Dictionary

Attribute	PK / FK	Data Type	Data Format	Length	Description	Example
userId	PK	integer		11	Unique Identifier for User	1
username		varchar		50	Customer username for login	admin
Password		varchar		14	Customer password for login	utem123
email		varchar		25	Email for address communication	utem@gmail.com
numIc		integer		14	User identification number	010101110112
phoneNum		integer		14	User number for communication	0123456789
Name		varchar		50	User name for booking registration	Gafar bin Halim
Address		varchar		100	User address for registration	Durian Tunggal, Melaka
userType		varchar		50	User type to different admin and user.	Admin

2) Room Type Table

Table 3.2 Room Type Data Dictionary

Attribute	PK / FK	Data Type	Data Format	Length	Description	Example
roomTypeId	PK	integer		11	Unique Identifier for room type.	1
type		varchar		255	Type of room	Master Room
capacity		integer		14	Type of room capacity	2
description		varchar		255	Type of room description	King Bed

3) Room Table

Table 3.3 Room Data Dictionary

Attribute	PK / FK	Data Type	Data Format	Length	Description	Example
roomId	PK	integer		11	Unique Identifier for room.	1
rType	FK	integer		11	Unique identifier for room type	12
roomNum		varchar		255	Room number	M101
price		decimal		7,2	Room of the price	120.59
description		varchar		255	Room description.	Have Air conditioner
availability		varchar		255	Room availability	Occupied

4) Booking Table

Table 3.4 Booking Data Dictionary

Attribute	PK / FK	Data Type	Data Format	Length	Description	Example
reservationId	PK	integer		11	Unique Identifier for booking	2
rId	FK	integer		11	Unique identifier for room.	12
user	FK	integer		11	Unique Identifier for User	1
quantity		int		11	Quantity Room Number	1
checkInDate		date	yyyy-mm-dd		Date of check in hotel	2022-10-12
checkOutDate		date	yyyy-mm-dd		Date of check out hotel	2022-10-14
price		decimal		7,2	Price of the booking	120.59
roomNum		varchar		50	Booking room number	S101

5) Feedback Table

Table 3.5 Feedback Data Dictionary

Attribute	PK / FK	Data Type	Data Format	Length	Description	Example
feedbackId	PK	integer		11	Unique Identifier for feedback	123
user	FK	integer		11	Unique identifier for user	4
message		varchar		255	Feedback message	I would to recommend this hotel.
date		timestamp	yyyy-mm-dd		Feedback date issue.	2022-10-15

3.4 Interface Design

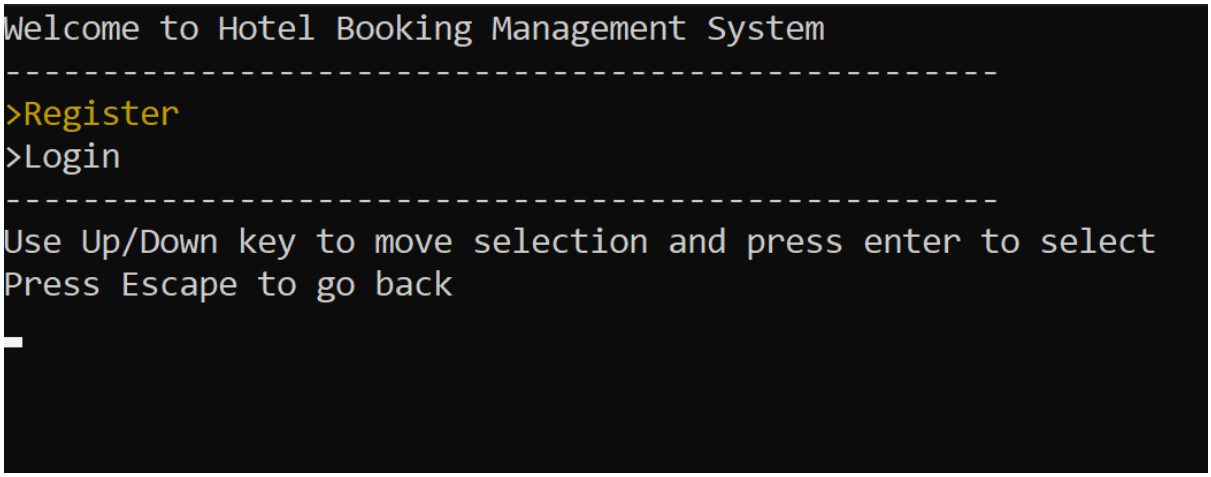

Figure 3.3 Main Menu Interface

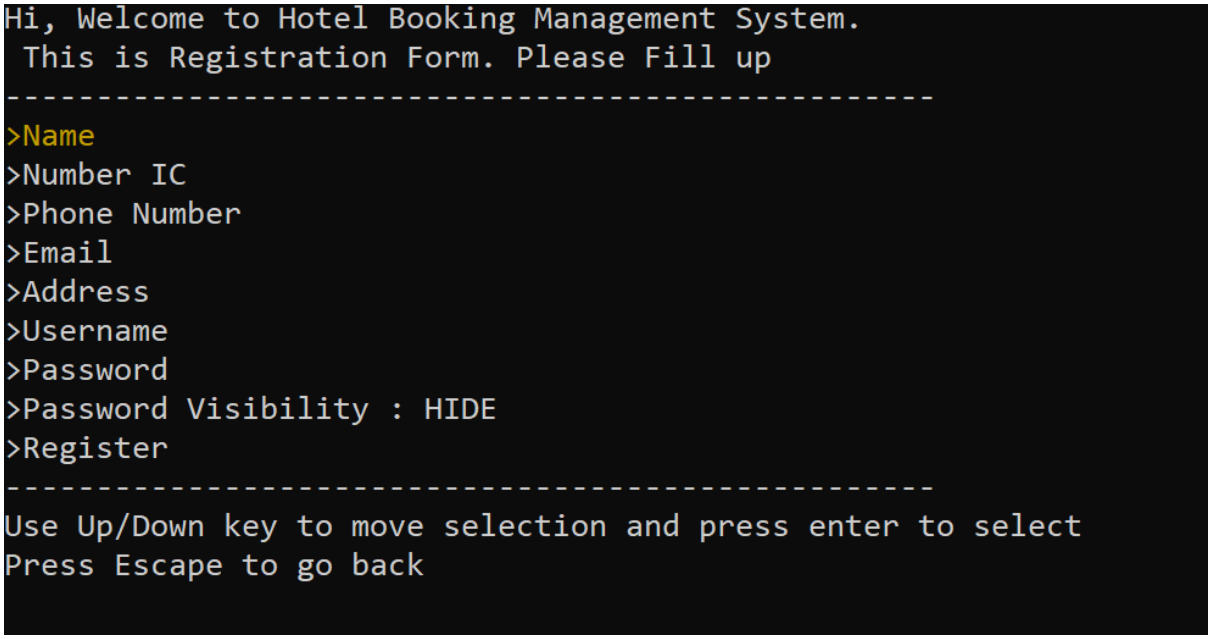

Figure 3.4 Registration Form Interface

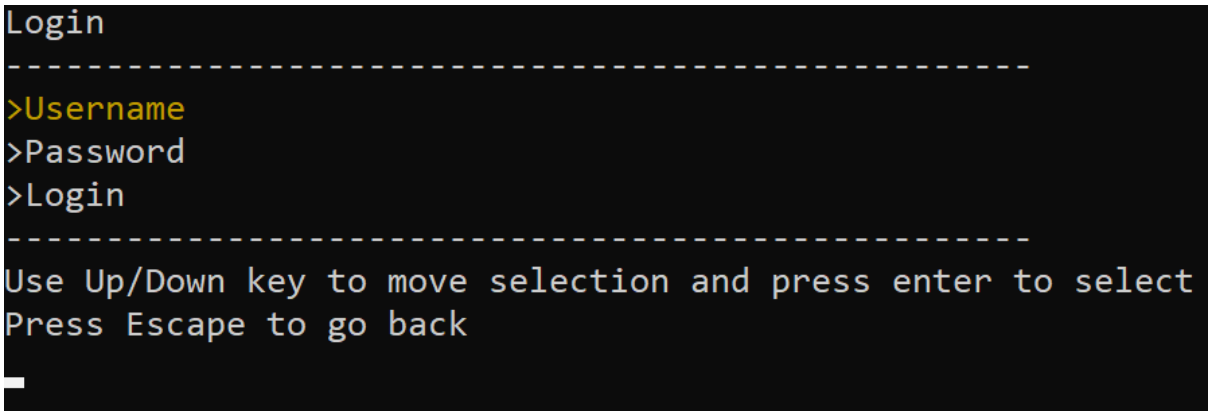

Figure 3.5 Login Menu Interface

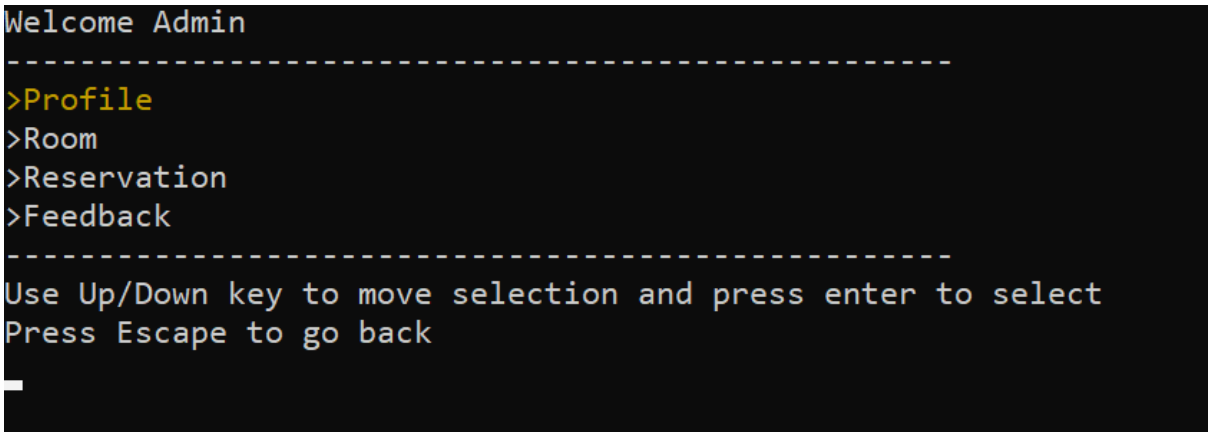

Figure 3.6 Admin Main Menu

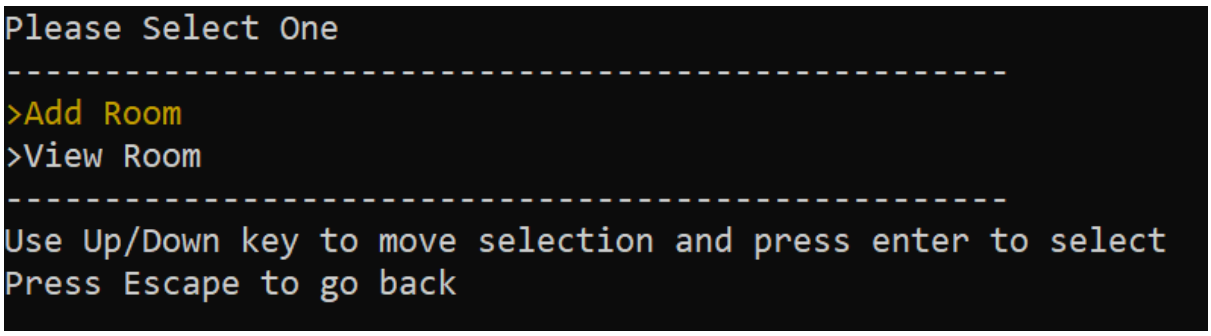

Figure 3.7 Admin Room Menu for Admin

```
Please Select ID based on the table

   ID |                Type |            Capacity |                                 Description |
----- + ------------------- + ------------------- + ------------------------------------------ +
    1 |         Master Room |                   2 |                                   King Bed |
    2 |          Queen Room |                   2 |                                  Queen Bed |
    3 |         Single Room |                   1 |                                 Single Bed |

--------------------------------------------------
>Enter Room Type ID
>Enter Room Number
>Enter Room Price
>Enter Description
>Submit
--------------------------------------------------
Use Up/Down key to move selection and press enter to select
Press Escape to go back
```

Figure 3.8 Admin Add Room Menu

```
List of Room

|RoomID   | Room Number           | Description                          | Availability  |         Price |
+---------+-----------------------+--------------------------------------+---------------+---------------+
|1        |A101                   |Beach View, Aircond                   |YES            |         89.99 |
|2        |Q123                   |Tower View, Aircond                   |YES            |         90.99 |
|3        |Q124                   |Beach View, Private Pool, No Aircond  |Occupied       |        102.10 |
|4        |Q125                   |Aircond with Beach View and Pool      |Occupied       |        150.00 |
|5        |Q126                   |Aircond with beach view and indoor pool |YES          |        200.00 |
|6        |Q132                   |Aircond, Tower View                   |Occupied       |        350.00 |
|7        |S101                   |Aircond with normal view              |YES            |         50.99 |
|8        |M201                   |with pool                             |YES            |         99.99 |

--------------------------------------------------
>Back
--------------------------------------------------
Use Up/Down key to move selection and press enter to select
Press Escape to go back
```

Figure 3.9 Admin View Room Menu

```
All Customer Booking Admin

|BookingID  |Room Name  |Quantity   |Check In Date   |Check Out Date  |     Price |
+-----------+-----------+-----------+----------------+----------------+-----------+
|1          |Q124       |1          |2024-01-04      |2024-01-05      |    102.10 |
|2          |Q132       |1          |2024-10-12      |2024-10-23      |   3850.00 |
|3          |Q125       |1          |2024-01-11      |2024-01-13      |    300.00 |

--------------------------------------------------
>Back
--------------------------------------------------
```

Figure 3.10 Admin Booking Menu

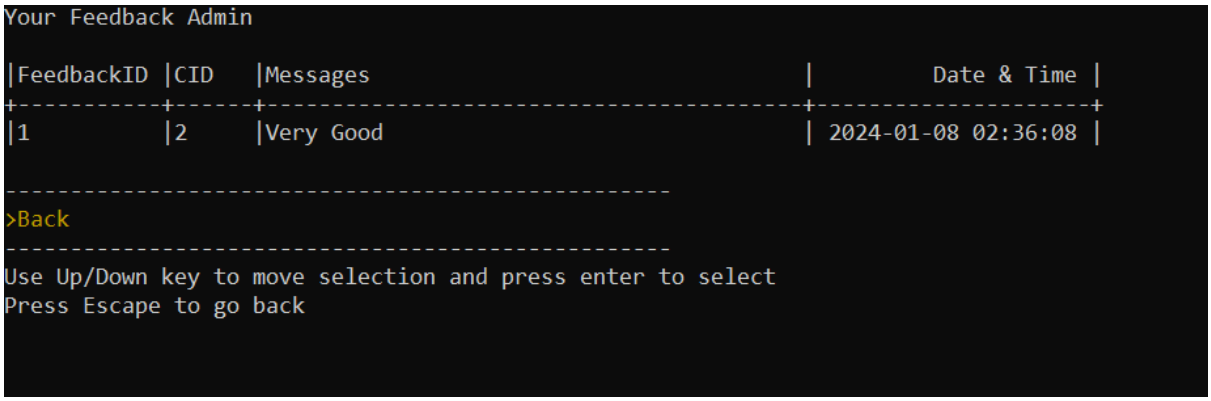

Figure 3.11 Admin Feedback Menu

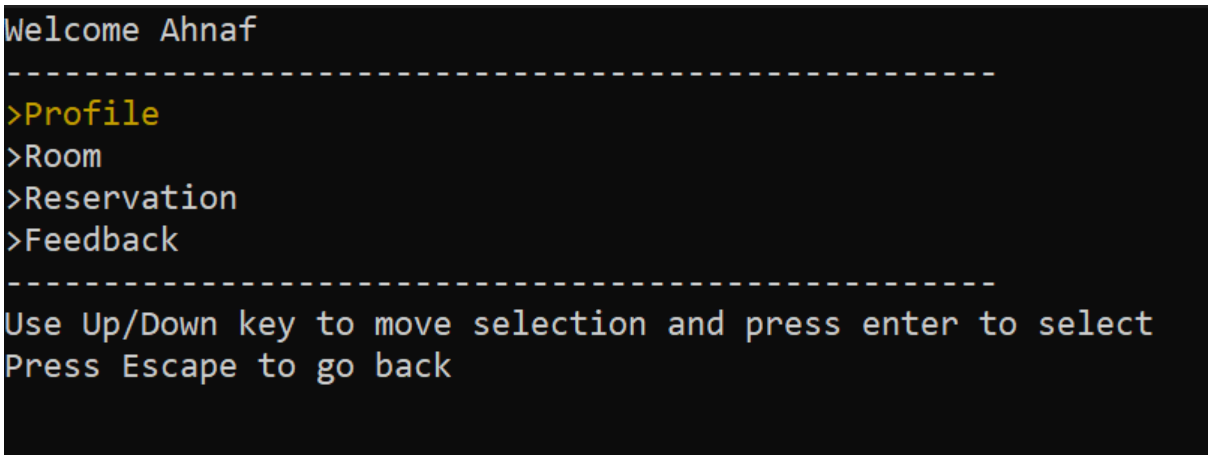

Figure 3.12 User Main Menu

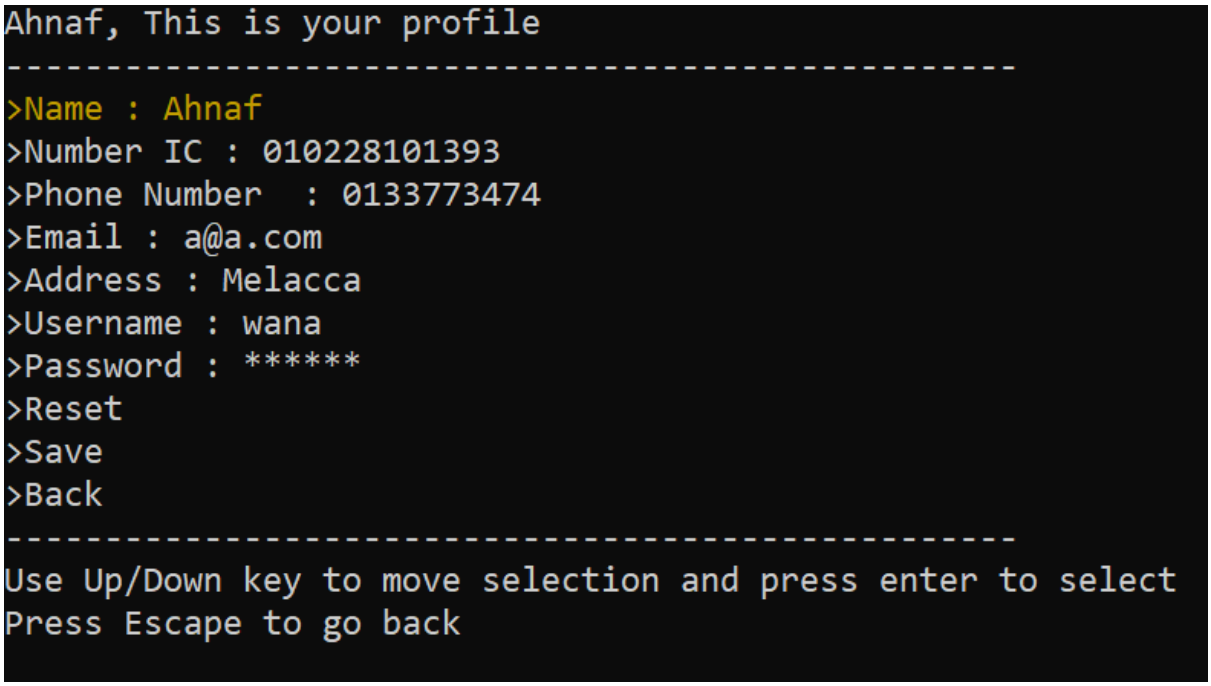

Figure 3.13 User Profile Menu

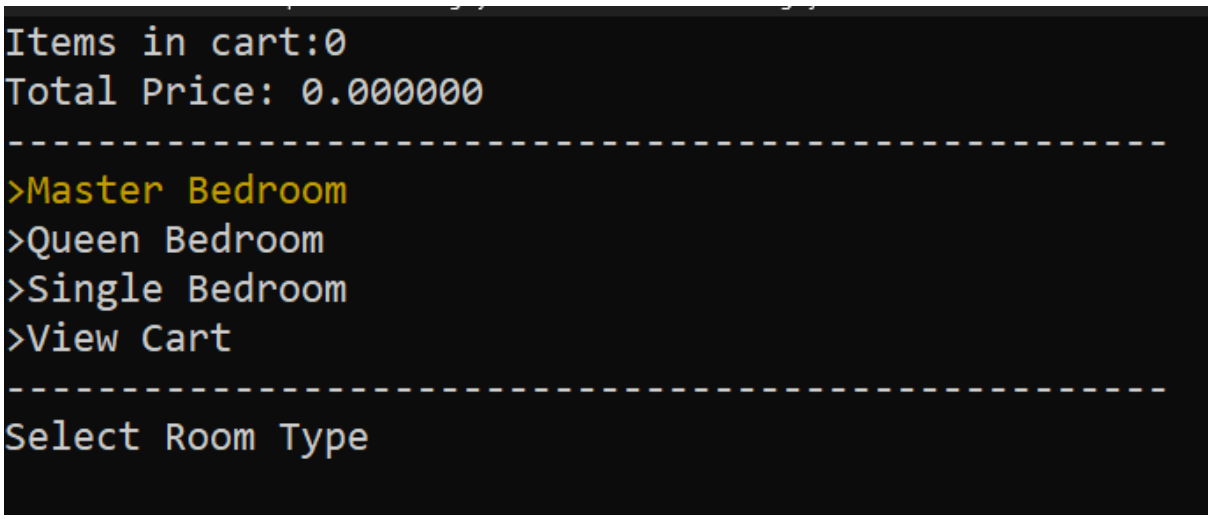

Figure 3.14 User Room Menu

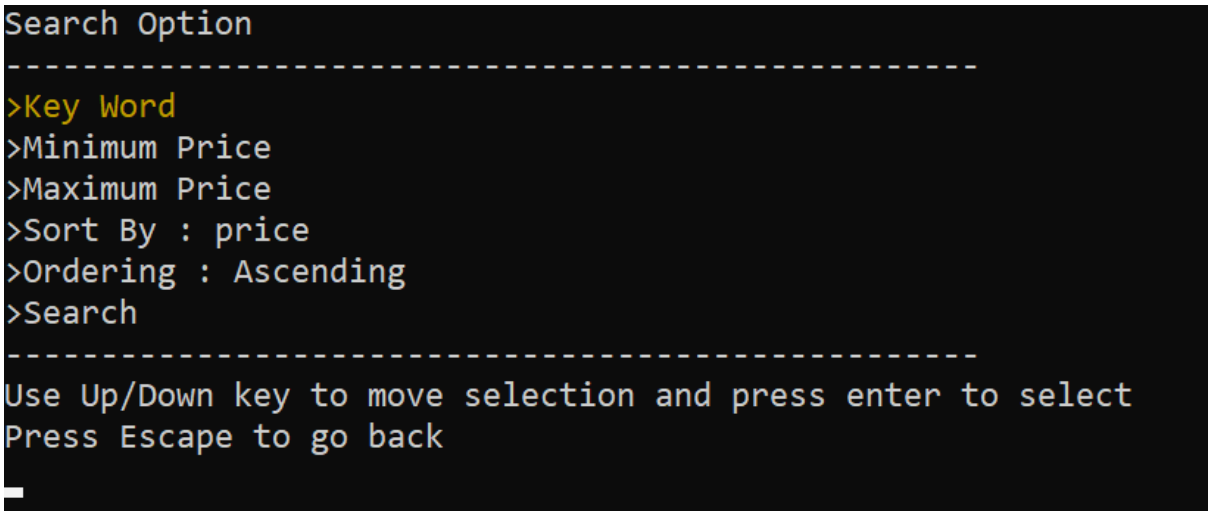

Figure 3.15 Search Room Menu

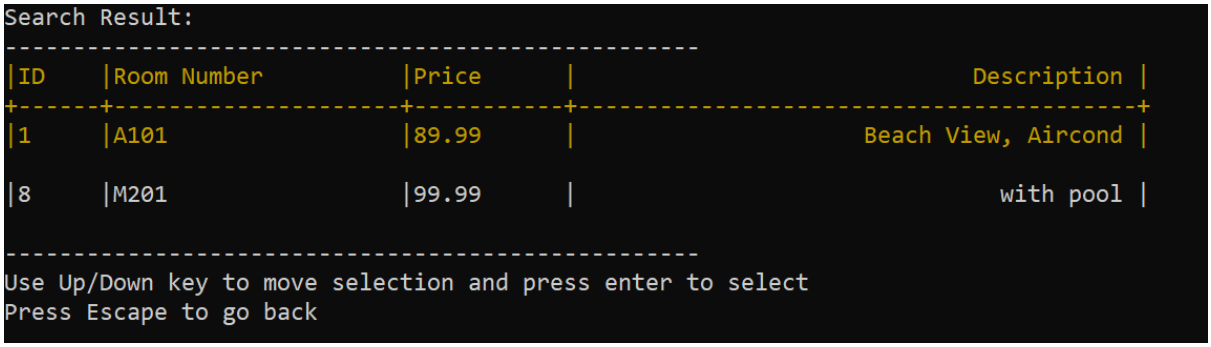

Figure 3.16 List of Master Bedroom available

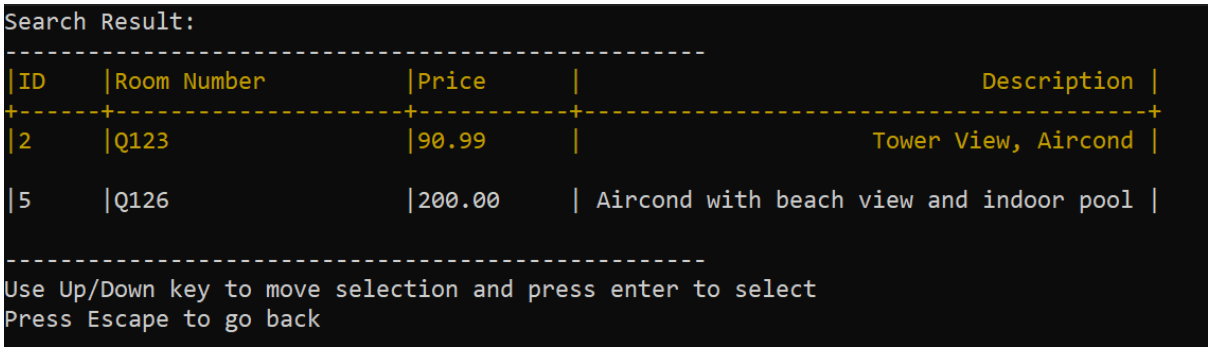

Figure 3.17 List of Queen Bedroom available

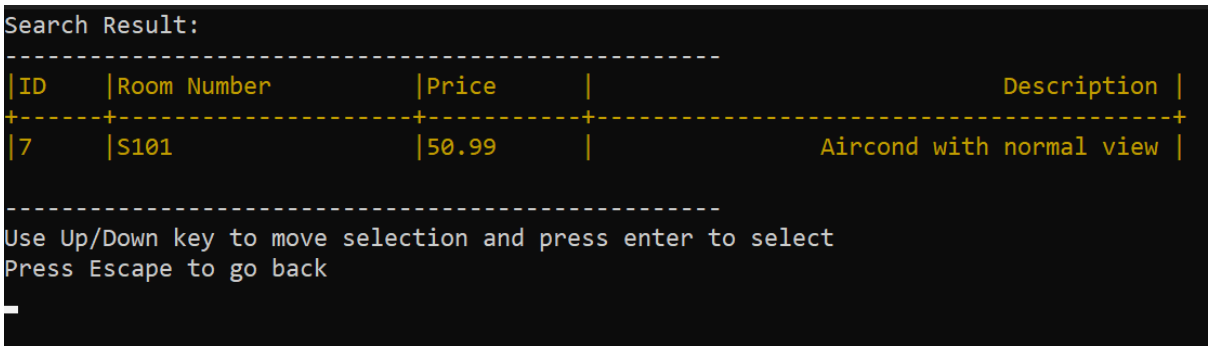

Figure 3.18 List of Single Bedroom available

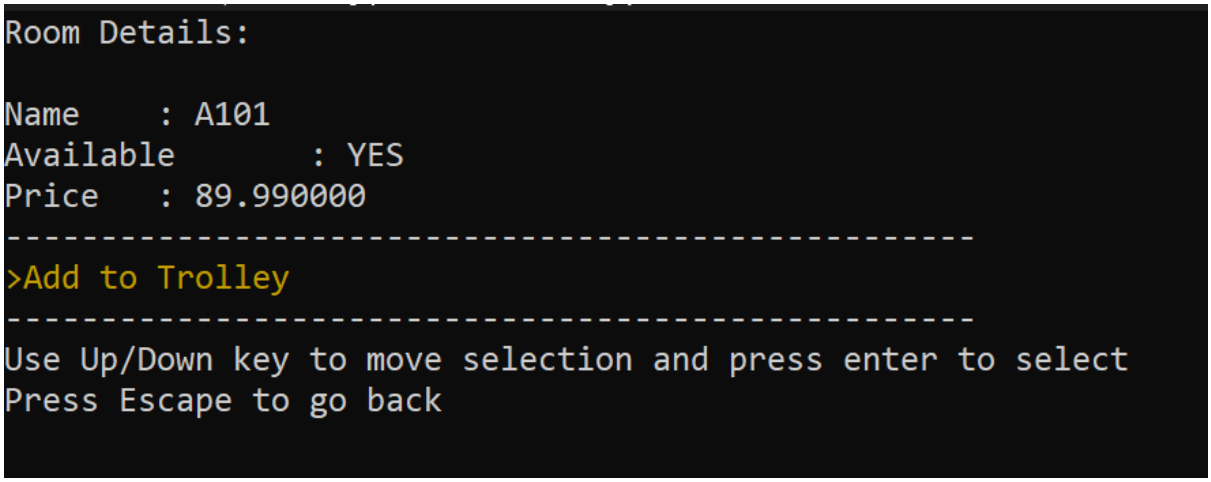

Figure 3.19 Room Details When Room Selected

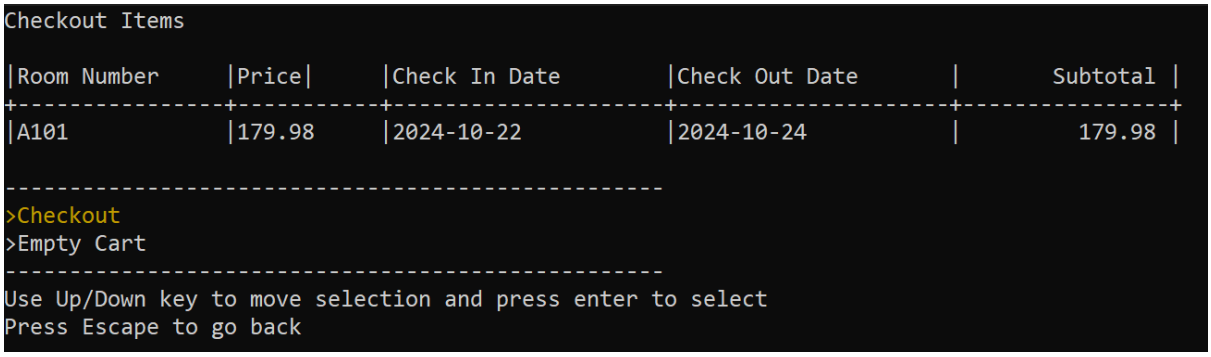

Figure 3.20 Trolley Menu

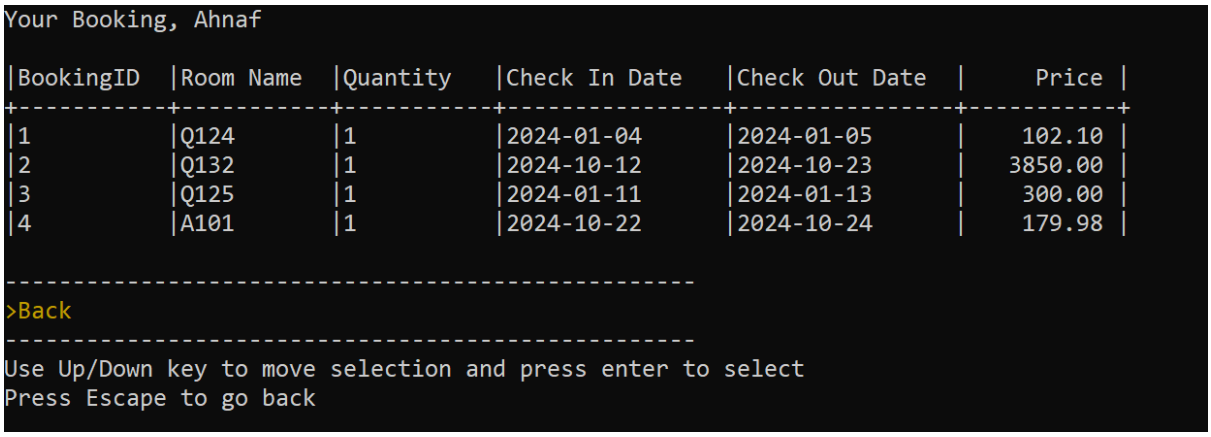

Figure 3.21 User Booking Menu

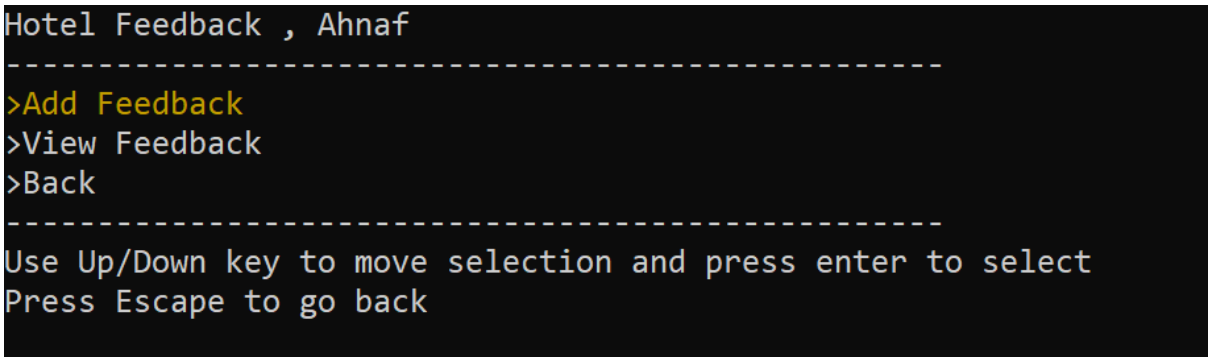

Figure 3.22 User Feedback Menu

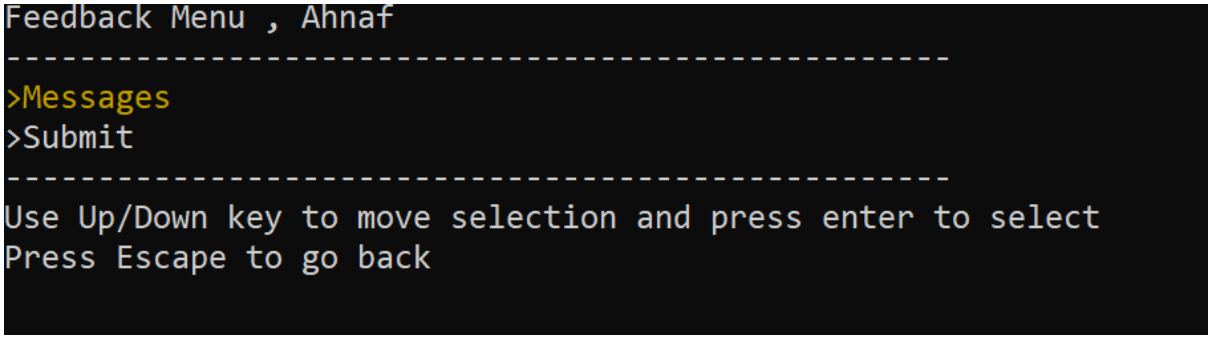

Figure 3.23 User Add Feedback Menu

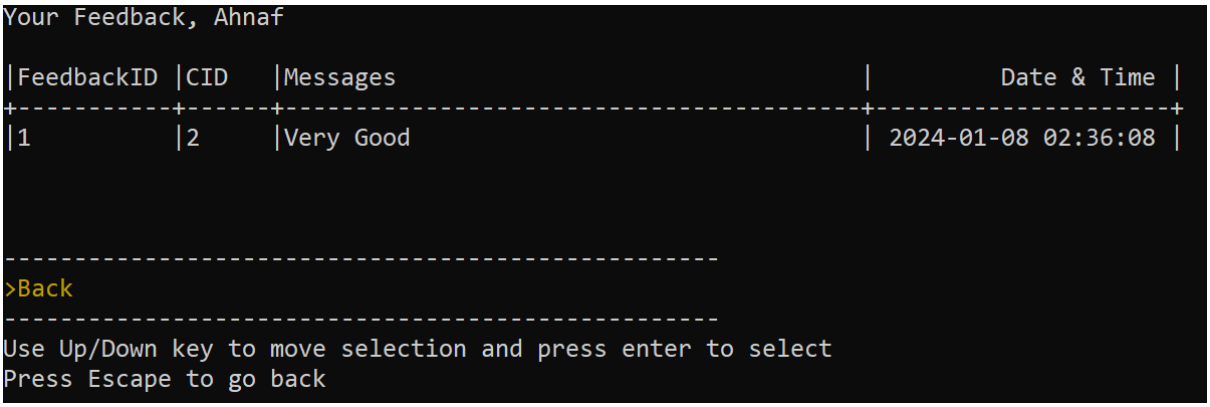

Figure 3.24 User Feedback View Menu

CHAPTER 4: IMPLEMENTATION

4.1 Naming Convention

In the Hotel Booking Management System, various programming techniques and conventions are employed.

1) camelCase

Primarily used for naming variables and function names in code. Examples from Hotel Booking Management System are “registerAccount”, “loginMenu”, and “addFeedBack”. Each of these identifiers is a function name. camelCase characteristic which is the first letter of the identifier is always lowercase. Moreover, if the identifier is made up of multiple words concatenated together, the first letter of each new word is capitalized. This makes it easier to read and understand. It improves readability for variable and function names. Other than that, helps in distinguishing functions and variables from other types of identifiers like class name.

2) Pascal Case

Pascal Case typically used for naming classes in code. Examples from Hotel Booking Management System are ‘Account’, ‘Room’, ‘Booking’, ‘Feedback’, these are identifiers for class name. Moving on to the pascal case characteristic. First, all words capitalize where the first letter of every word in the identifier is capitalized incl during the first word. Next is No space or Underscores. For Pascal Case is the same as camelCase, there are no spaces or underscores between words in identifiers. It helps provide a clear distinction between class names and other identifiers like variables and functions.

4.2 Function

Functions in this code play an important role in organizing and managing blocks of code that perform specific tasks. These functions help in reducing code repetition and simplify maintenance. Each of these functions is responsible for a specific aspect of the hotel reservation system, such as user registration, the login menu, and the display of the home page for admins.

1) Main Functions

This is the entry point of the program where the application starts. It initializes the main menu and controls the flow of the application based on the user's choice to either register or log in.

2) User-Related Functions
   a) registerAccount()

   Handles new user registration. It prompts users for their personal information and credentials, performs validation, and stores their data.

   b) loginMenu()

   Provides the interface for user login. It takes the username and password, authenticates them, and then redirects the user to either the admin or user home menu based on their role.

   c) profile(Account user)

   Allows users to view and edit their profile information. It includes options to change the name, IC number, phone number, email, address, username, and password.

3) User Menu Functions
   a) homeUser(Account user)

   Represents the main menu for regular users, allowing them to access profile management, room bookings, feedback submission, and viewing their bookings.

   b) roomsUser(Account user)

   Enables users to browse through different room types and add them to their booking cart.

   c) feedbackUser(Account user)

   Manages user feedback, allowing users to submit and view feedback.

   d) bookingUser(Account user, Booking view)

   Allows users to view their current and past bookings.

4) Room and Booking Functions
   a) roomType(Account user, int rType, Reservation trolley)

      Deals with the selection of room types during the booking process

   b) roomDetails(Account user, int roomId, Reservation trolley)

      Provides details for a specific room based on the room ID and facilitates adding it to the reservation cart

   c) trolleyMenu(Account user, Reservation trolley)

      Handles the user's booking cart, allowing them to check out or clear the cart.

5) Admin Functions
   a) homeAdmin(Account user)

      Represents the main menu for admin users, providing access to profile management, room management, booking overview, and feedback management.

   b) roomsAdmin(Account user)

      Provides room management functions for admins, allowing them to add rooms or view existing rooms

   c) bookingAdmin(Account user, Booking view)

      Allows the admin to view all bookings made by users.

   d) feedbackAdmin(Account user, Feedback view)

      Enables admins to view feedback submitted by users.

6) Utility Functions
   a) isNumeric(string input)

      Checks if a given string consists only of numeric characters.

   b) toInteger(string* input, int* valueholder)

      Converts a string to an integer if possible and stores the result in a provided integer variable.

   c) isValidDate(const std::string& dateStr)

      Validates a date string to ensure it follows a specific format.

4.3 Array

This system does not explicitly use an array in its basic form, a vector-like collection is used to store and manage related data. vectors are used because they provide greater flexibility than static arrays, including the ability to resize dynamically. For example, vector<Feedback> and vector<Booking> are used to store feedback and booking information.

4.4 Selection

Selection techniques are used to make decisions in the code based on conditions or criteria. This is typically achieved using if, else if, and else statements, or using switch statements. For example, in registerAccount(), there are numerous if statements that check the validity of user input, and in main(), a switch statement is used to determine actions based on user menu choices.

4.5 Control

Control structures like loops (for, while, do-while) are used to execute a block of code repeatedly. In this context, loops are used to display menus and handle user input. For example, a while loop in main() continually displays the main menu until the user chooses to exit.

4.6 Pointer

Pointers are used to store the memory address of variables. In this code, pointers are used indirectly through references and the use of classes and objects. For instance, pointers are used when operating with dynamic objects and when passing arguments to functions by reference, allowing the functions to modify the original data.

4.7 Error Handling

Error handling is used to manage errors or exception conditions that may occur during program execution. In this code, error handling may be necessary to ensure that user inputs are valid, like checking the format of emails or phone numbers. Although there's no explicit use of error handling mechanisms like try-catch, the code checks for errors through if conditions and provides feedback to the user.

CHAPTER 5: CONCLUSION

5.1 Constraints

1) Project Constraints

a) Timeline

Creating and launching a complex hotel reservation system is like navigating a complex journey marked by a crucial factor: time. The timeline for this project involves careful planning, dealing with technical details, and considering the needs of users. Rushing through this process is like taking a risky path without proper care, and it could lead to various problems.

The first step, development, requires a careful allocation of time to ensure each part of the system is well-crafted. The coding, integrations, and testing stages are like the precise strokes of an artist's brush, and hurrying through this creative process could result in bugs and technical issues. If these issues aren't addressed carefully, they could undermine the system's reliability, resulting in a less-than-optimal experience for users and, in turn, dissatisfaction

b) Change Management

When shifting from manual processes to a digital system in hotels, managing the change is crucial. Staff and guests may find it challenging to adapt. To overcome resistance and ensure a successful transition, it's essential to provide training, clear communication, and ongoing support. Training helps staff gain the necessary skills and confidence, while communication keeps

everyone informed about the changes. Ongoing support addresses concerns and issues, ensuring a smoother and positive adoption of the new digital system.

2) System Limitations

a) Human Error

Mistakes like entering wrong data, making errors in configurations, or accidentally deleting information can happen. To reduce these errors, it's important to provide training for users and implement safety measures in the system. Training helps users understand how to use the system correctly, while system safeguards act as a protective layer against unintended mistakes, ensuring the accuracy of the data. Combining user training with system safeguards creates a more reliable digital system that can better handle human errors.

b) Lack of Customization

Using ready-made solutions for hotels may not perfectly match their specific needs and workflows. Customizing these solutions to fit individual requirements can be expensive and time-consuming, posing challenges in terms of cost and potential delays in system implementation. Finding the right balance between tailored features and practical constraints is crucial for hotels to make informed decisions about customization.

5.2 Future Improvements

1) Comprehensive Error Handling

Implement a more robust error handling system across the board. Ensure that every function that can throw an exception has an appropriate try-catch block. Moreover, handle edge cases and provide user-friendly error messages.

2) Database Interaction

Introduce safer and more efficient database interaction practices. Utilize prepared statements to guard against SQL injection attacks and manage database connections more effectively to avoid leaks.

3) Input Validation

Strengthen input validation on both the client and server sides. Ensure that all inputs are sanitized to prevent common security vulnerabilities.

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