Hawassa University

INSTITUTE OF TECHNOLOGY

Faculty of Informatics

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ADVANCED PROGRAMMING

HOTEL ROOM RESERVATION SYSTEM PROJECT

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Introduction

Hotel Room Reservation system

Travelers who book a hotel anticipate a quick, easy experience, or they might choose to stay somewhere else. Today, in order for hotels to meet this expectation, manual processes must be abandoned in favor of a booking system that enables customers to reserve a room whenever they want on their preferred channel. Every booking experience matters greatly, making their stay all the while before they even get to the hotel.

Behind each easy booking process, whether conducted online or off, is a quick and dependable hotel management system. This booking process is one of the many interrelated hotel management system activities which makes the stay of customers easy, relaxing and satisfactory.

Hotel Reservation System feels the gap that most hotels lack in their services and provides a versatile and user-friendly method of reserving a hotel room. It guarantees customers that they are taken care of in the hotel of their choosing by providing every bit of information that is required to decide an ideal room to stay in.

Background

In the 1950s, a chance encounter between the CEO of American Airlines and a senior IBM sales representative resulted in the creation of the central reservation system (CRS) that hotels use today. The first CRS models debuted in the 1960s, and hotels began making substantial use of them by the next decade.

By the 1990s, the CRS had evolved into a complex, interconnected network that was used to regulate prices and reservations across numerous channels. Online travel agencies (OTAs) and brand websites became commonplace in the 2000s, opening up new avenues for marketing directly to clients. Hotels might disseminate extensively through a number of platforms, creating possibilities to new markets around the globe.

The tech boom is still running strong, though. Metasearch websites and last- minute booking apps are only a few of the new distribution channels and booking techniques that the Internet era is continually developing. As they strive to stay up with the industry has altered in favor of independent distributors who offer a better user experience, nevertheless, as consumers have become more tech-savvy. In reality, more and more customers are relying only on OTAs, and many hotels are reporting narrower profit margins as their share of direct reservations drops. Ever- changing market, many hotels have let their website, which is their most profitable booking channel, to go by the wayside.

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Statement of the problem

Customers of hotels expect a good and relaxing experience from the hotel they are staying in whether they are staying there because of a business trip or a vacation. But if the process of reservation is hard and messy, customers are bound to look for other options. They may go to other hotels providing a simple and interactive way of reserving a room while displaying the full experience the customers can have in the hotel. The lack of a well-defined and integrated hotel room reservation system is affecting business of the hotel negatively.

Objectives

General objective

A hotel reservation system's main goal is to give clients a quick and easy way to reserve hotel rooms online. Customers should be able to simply browse for available rooms, compare costs and amenities, and make reservations using this system's user-friendly, secure, and dependable features.

Specific objective

- To automate the reservation process in order to increase the effectiveness of the hotel booking procedure.
- we hope to boost customer happiness, by offering a user-friendly interface that enables consumers
- To reduce errors in the booking process by eliminating manual data entry and automating the entire process.
- To improve revenue management by providing real-time data on room availability and pricing.
- To provide hotels with a comprehensive database of customer information that can be used for so many purposes.
- To increase operational efficiency by reducing the workload on hotel staff in managing bookings manually.
- To provide hotels with a competitive advantage over other hotels that do not.

Scope of the project

What is the Scope of this project

- Creating, managing and updating an easy-to-use user interface
- Adding new customers into the database as they check in
- Requesting customers to settle their tabs before they check out
- Deleting customer from database when they settle their tabs and check out
- Adding new rooms into the database as they are booked.
- Deleting rooms from database
- Updating the room status when the room is booked

What is not the scope of this project:

- It is not concerned with implementing the billing method rather it uses the hotel's general billing system. It will use it to instantiate the users tab record and request customers to settle their total tab (including other services they might have used on their stay) before they check out.
- It is not concerned with handling the services that are provided with the hotel. This system is going to be embedded within a bigger system that is going to be managing the system.

System Development Method

Once choice of system development methodology determines the entire workflow that the system development team is going to have. Hence It needs a very careful consideration on the bases of the technology used, the development teams' size and experience with the work environment, the user's involvement in the production of the system, the management method and there are previous works done on the system. These are the standards that are meant to be considered when choosing a system development method.

System development is the overall process of designing, building or programming, and completing a product. This process applies to the development of a computer, hardware device, or software program

The system development model that is going to be in use is the Waterfall Model. We have chosen this method because:

- The system is well defined and structured. All the necessary research can be done and a complete document to follow can be generated by using currently existing information.
- The end product is determined. What is needed by the customers is well- understood and there are no gray areas in the structure and functionalities of the system.
- The technology in use is well understood and documented. Since the technology we are going to use has been through a lot of modification and has pent up a big community. It is also well documented.
- The rigid methodology helps keep everything on track. It helps manage and control the development process in the predefined schedule promising on time if not close to the deadline delivery.
- The system is well documented. This ensures a stable build environment that is able to sustain after the replacement of the employees. Because the system is well documented, it is going to be easy for new employees to catch up.

Hardware and Software Requirement

The computer we are planning to run the Hotel Reservation System must satisfy the minimum specs both in Hardware and Software to run the proposed System. Making Sure to have met these requirements is a vital aspect of planning to deploy the System. Below are some of the needed requirements.

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Hardware Requirements	
Processor	· PC with dual core processor or faster
Memory	4 GB RAM (8GB recommended)
Disk Space	256 GB or more of Disk Space is needed
Monitor	Minimum display resolution 1024 x 768 pixels
Others	Standard Computer Peripherals like mouse, keyboard

Software Requirements	
Operating System	Windows 10 or Later Version
Programming Tool	VSCODE, MYSQL Workbench,postgreSQLOracle
Database Server	MYSQL 8.0 (Windows)
Web Server	Apache Server
Browser	Firefox, Chrome, Microsoft Edge

Chapter Two: System Analysis

2.1 .Data collection tools

It's imperative to first answer the question, "What is data?" before defining what data collection entails. The short answer is that data is a variety of types of information formatted in a specific way. As a result, data collecting is the act of gathering, gauging, and analyzing precise data from a range of pertinent sources in order to address issues, provide answers, assess results, and predict trends and possibilities. To assure quality assurance, keep research integrity, and make educated business decisions, accurate data collecting is required.

The researchers must specify the data sources, data types, and methodologies used during data gathering. We'll quickly find that there are numerous approaches of gathering data. Data collecting is heavily utilized in the domains of study, business, and government.

An analyst must initially provide three answers before they start gathering data:

- What is the aim or reason behind this study?
- What types of data are they going to collect?
- What techniques and policies will be applied to gather, store, and process the data?

Data can also be divided into qualitative and quantitative categories. Descriptions like color, size, quality, and appearance are all included in qualitative data.
Unsurprisingly, quantitative data involves numbers. Examples include statistics, poll results, percentages, etc.

Why Do We Need Data Collection?

As we'll discover later, the idea of data collection is nothing new, but times have changed. Today, there is a lot more data available in formats that were unheard of a century ago. The process of gathering data has had to evolve and develop to stay up with modern technology.

Let's look at the various data gathering techniques now that we are aware of what it is and why it is necessary. Although the term "data collection" may sound quite high- tech and digital, this doesn't mean that big data, the internet, and computers are

always involved. A telephone poll, a mail-in comment card, or simply a man with a clipboard asking bystanders some questions could be considered data collecting. But let's try to group the various data collection techniques into something resembling coherent categories.

What Are the Different Methods of Data Collection?

1.Surveys

In the context of system analysis, surveys are a common data collection technique that aids in learning about a specific system. Surveys are a type of research instrument that collects data from a sample of people or organizations, typically through questionnaires or interviews. In this essay, we will discuss what surveys are and how they function in system analysis

What is a Survey?

A survey is a research technique that involves gathering information from a sample of people or businesses. Various methods, such as questionnaires, interviews, or online surveys, can be used to obtain the data. A survey's objective is to collect data on a certain subject or problem so that it can be studied and used to help people make wise decisions.

You can get both quantitative and qualitative data via surveys. Data that may be examined statistically is referred to as quantitative data. Contrarily, qualitative data is non-numerical information that can be examined through thematic analysis or other qualitative research techniques.

2. Forms

Forms are a type of document that is used to collect information from individuals or organizations. Forms are used in various contexts, such as surveys, user feedback, or data collection. In system analysis, forms are an important tool for collecting data and information about a particular system or process.

The purpose of using forms in system analysis is to collect data and information from stakeholders or users of the system. The data collected through forms can help identify issues or inefficiencies in the system and inform the design or improvement of the system. Forms can be either paper-based or electronic. Paper-based forms are physical documents that are filled out by hand, while electronic forms are accessed and completed online. Electronic forms can be created using various software tools, such as Microsoft Word, Google Forms, or another specialized form-building software.

3. Interview

Interviews are an important part of the system analysis process. They are used to gather information from stakeholders, users, and other experts in order to understand the current system and identify potential problems. Interviews can also be used to validate the system requirements and to ensure that the system design meets the needs of the users.

There are a number of different interview techniques that can be used in system analysis. The most common technique is the structured interview. In a structured interview, the interviewer asks a series of predetermined questions. This type of interview is useful for gathering specific information about the system.

4. Simulation

Simulations are a powerful tool that can be used in system analysis to help understand the behavior of a system and to test different design alternatives. Simulations can be used to model a wide variety of systems, including manufacturing systems, transportation systems, and financial systems.

There are two main types of simulations: deterministic and stochastic. Deterministic simulations assume that the behavior of the system is completely predictable.
Stochastic simulations, on the other hand, consider the fact that the behavior of the system may be influenced by random events.

2.2.1. System Requirement

In software engineering, system requirements refer to the functional and non- functional specifications or capabilities that a software system must have to meet the needs of its users, stakeholders, and other interested parties. System requirements are an essential part of the software development process because they provide a clear understanding of what the software system needs to do and how it should perform.

System requirements in software engineering refer to the specifications and capabilities that a software system or application must meet to function properly within a given environment. These requirements are typically defined during the software development life cycle and are used to ensure that the software meets the needs of its users and stakeholders.

- System requirements are typically divided into two categories: functional requirements and non-functional requirements.

1.2.1 A) Functional Requirements

Functional requirements describe what the software system should do, in terms of the features and functionality it must provide to users. These requirements define the specific tasks that the software must be able to perform, the inputs and outputs it needs to handle, and the data it needs to process. Functional requirements are typically related to the user's needs and represent the core functionality of the software system.

Functional Requirements of our system (Hotel Room Reservation System) should include the following things;

- The system should allow the system-admin to manage Hotel Activities
- The System should allow to the system-admin to deletion of data such as rooms, prices, and user profiles.
- The System should register the customer in the System
- Allow for changes to information such as rooms, rates, menu items, prices, and user profiles.
- Should allow system-admin able to assign user passwords
- The system should accept customer's information.

1.2.1 B) Non-Functional Requirements

Non-functional requirements, on the other hand, describe how the software system should perform, in terms of its behavior, performance, and other characteristics.
These requirements define the quality attributes or attributes of the software system, such as its reliability, performance, scalability, maintainability, and security. Non- functional requirements are not directly related to the user's needs, but they are important for ensuring the software meets the required level of quality and performance.

- Non-functional requirements in a software engineering refer to the characteristics of a software System that are not related to specific functionality or behavior.
- They describe how the system should perform rather than what it should do'
- In addition to the core behavioral processes outlined in the system features section, the Hotel Room Reservation System is expected to have a number of other attributes.

Performance Requirements

Time it takes for the system to respond

Response time is one of the most important performance requirements to consider when creating the Hotel Booking System. The system must be able to respond promptly to the user's inputs and requests; any delays between the user's inputs and the system's response (if necessary) should be kept to a minimal, for example, while retrieving customer information for a booking.

Efficiency of the System

For a system like this, efficiency is critical; during peak demand periods, the system should be able to always perform at its highest level. Efficiency, in this context, refers to how the system leverages the inputs from the users to generate the output. In some ways, even though a system produces an output, it can still be considered inefficient if the input to output ratio is negative.

Fast Loading

Along with reaction times, the system's loading speeds must be quick. Users should not have to wait significant amounts of time to have access to information within the system.

Requirements for Safety

Another action that may be done is to ensure that the system is only available to authorized members of staff. This is because anyone can steal, tamper with, or delete any of the materials within the system, thus limiting access will ensure that the system is always protected from these threats.

Levels of Access

The system is expected to have several access levels depending on which staff member is accessing the system, such as hotel personnel or management, to assist prevent unauthorized parties from accessing, viewing, or changing parts and information within the system. This means that certain features of the system will be restricted to select individuals based on their level of power inside the firm.

Protection of Personal Information

It is critical for the company to maintain the privacy of customer information;

Availability

All authorized members of staff must be able to access the system when it is needed.

System Maintenance

Maintenance must be a top priority for the organization to ensure that the system is constantly in top working order. After the system is installed, all users and staff members who have access to it will be instructed on how to use and maintain it.

Reliability

Dependence on the system is to be expected, given that most the company's business transactions are based on actions performed on the system. As with availability, there is a high expectation that the system will always run effectively. This means that the system should be able to always perform at the greatest possible level and consistently generate the intended results.

2.3. Analysis Models

An analysis model in software engineering is a representation of the specifications and needs of a system that is being developed. An analysis model's function is to present a high-level perspective of the system that encapsulates the crucial elements necessary for the system to achieve its objectives.

A set of diagrams, models, and other artifacts that define the structure, behavior, and functioning of the system make up an analysis model most frequently. The models are produced using a variety of modeling methodologies, including flowcharts, entity- relationship diagrams, and the UML (Unified Modeling Language).

In this section we will draw and explain use-case, activity and sequence diagram for the Hotel Room Reservation system.

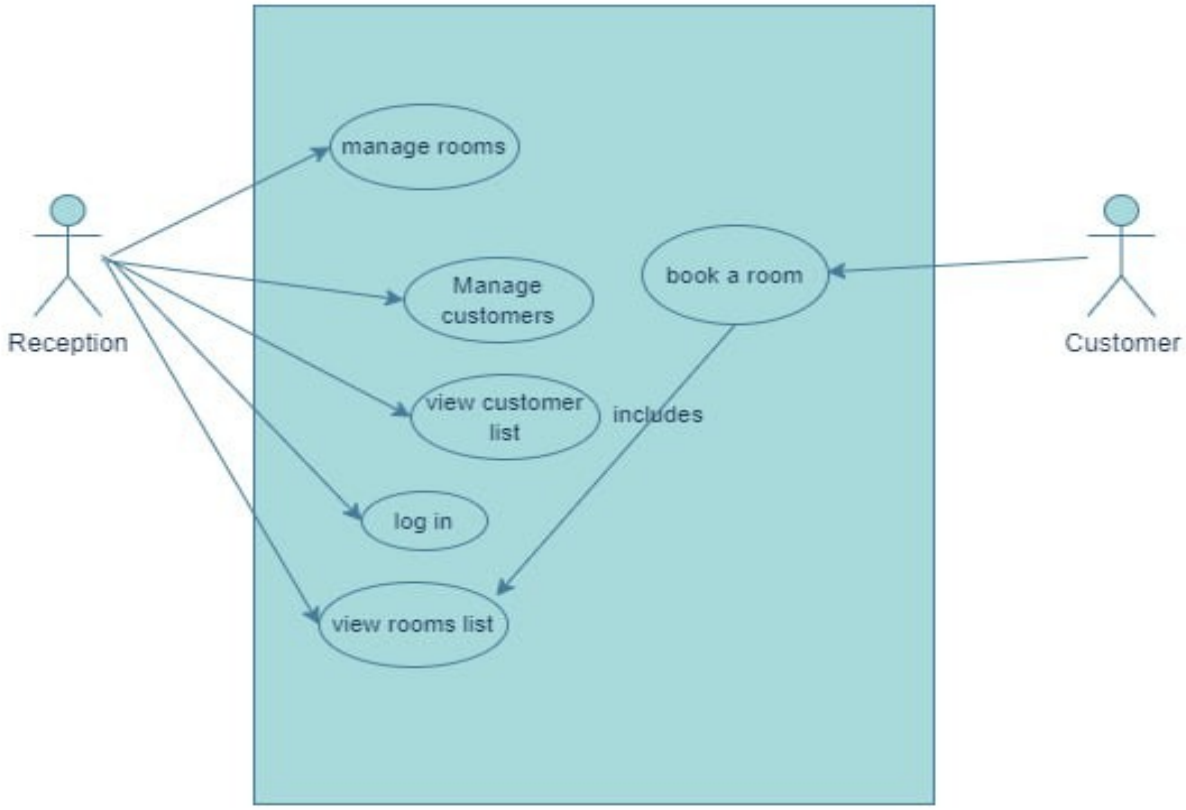
2.3.1. System Use Case Modeling

The functional requirements of a system can be gathered, examined, and documented using the use case modeling technique in software engineering. A use case describes a series of interactions between a user, or actor, and a system that lead to a result the actor finds valuable. The actors, their goals or aims, and the particular activities or interactions necessary to attain those goals are all identified with the aid of use case modeling.

Typically, the use case model is developed during the gathering of requirements stage of the software development process. A collection of use cases that define the functionality of the system from the viewpoint of the actors make up the use case model. Usage case and activity diagrams are two examples of UML (Unified Modeling Language) diagrams that are frequently used to visually describe use cases.

2.3.2. Use case diagram for Hotel Room Reservation System

Below is the Use-Case Diagram We prepared for the alleged Hotel Room Reservation System



- In the next page and further pages to come we will We will elucidate a use case narrative for the preceding schema, which will detail the steps involved in a particular scenario of how the system will be used. This will provide a more comprehensive understanding of the system's capabilities and how it can be used to meet the needs of the users."

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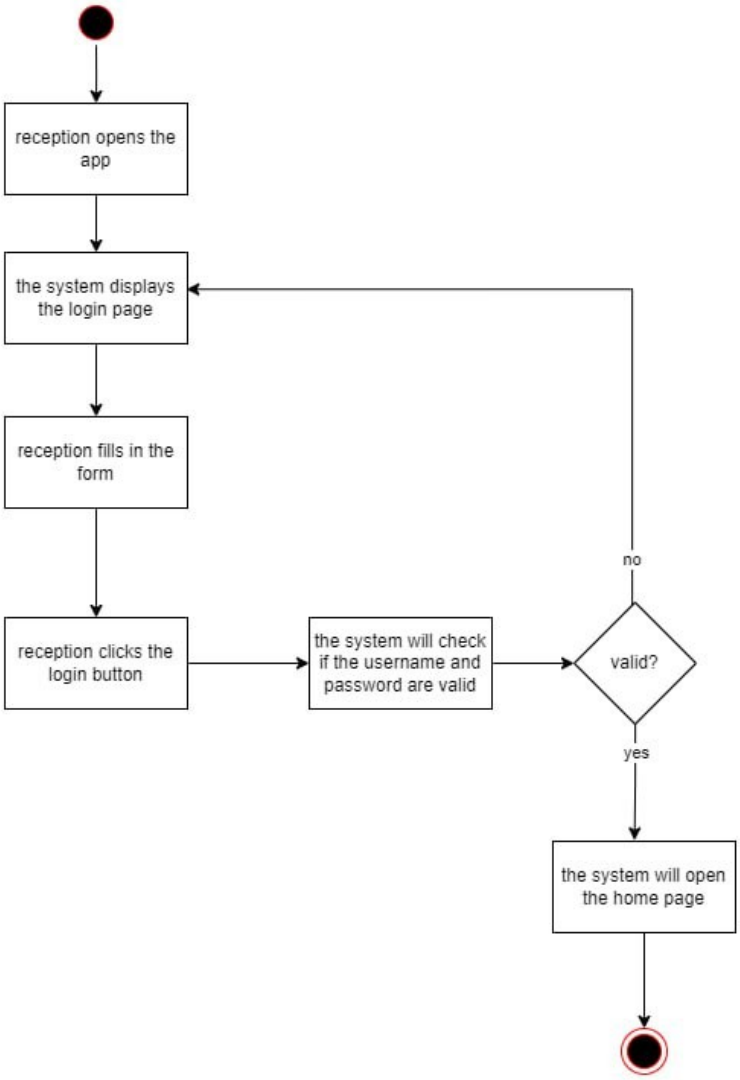
Activity Diagram

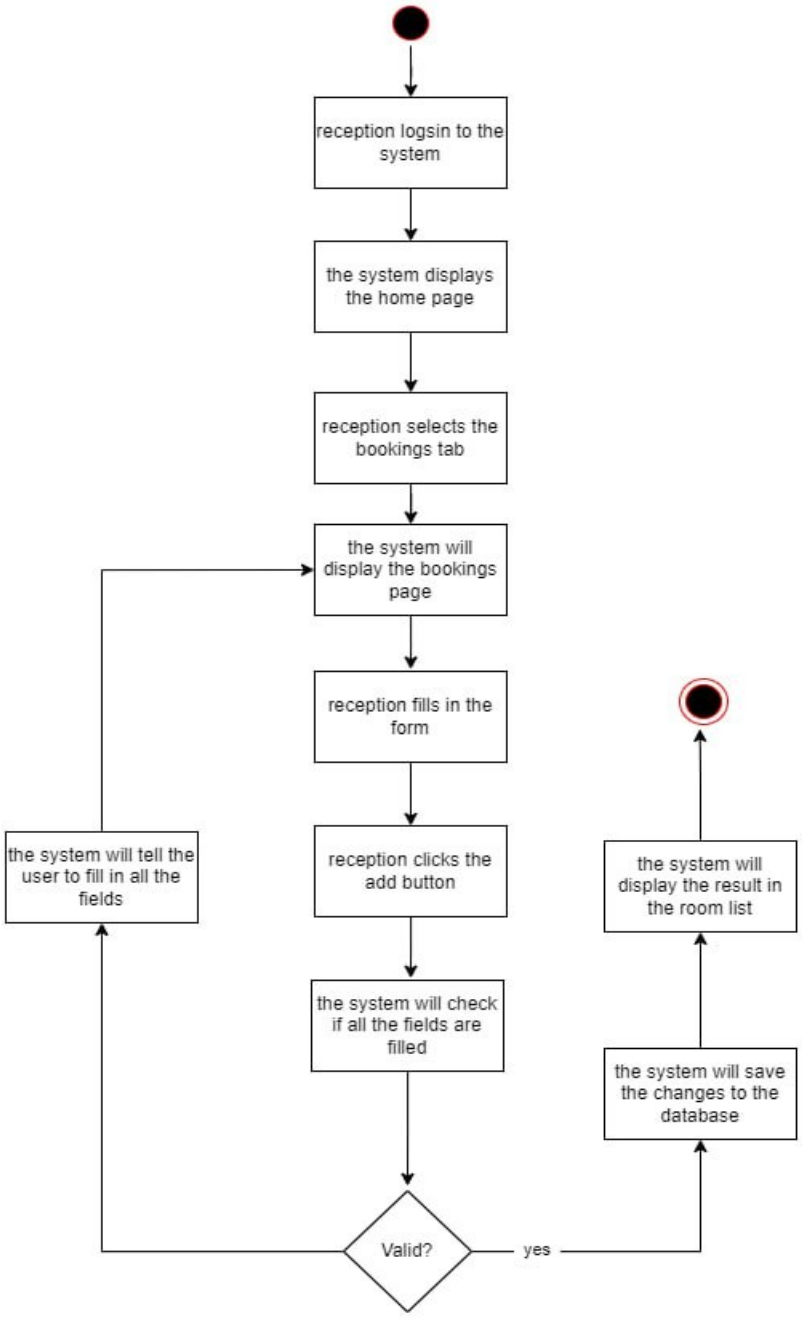
An activity diagram is another type of UML (Unified Modeling Language) diagram that can be used to model the behavior of a system. In the context of a hotel room reservation system, an activity diagram can be used to visualize the flow of activities that occur during the reservation process.

The activity diagram shows the various steps involved in the process, including searching for available rooms, selecting a room, providing personal information, and adding special services to the reservation. It also shows the decision points and the conditions that need to be met in order to proceed to the next step.

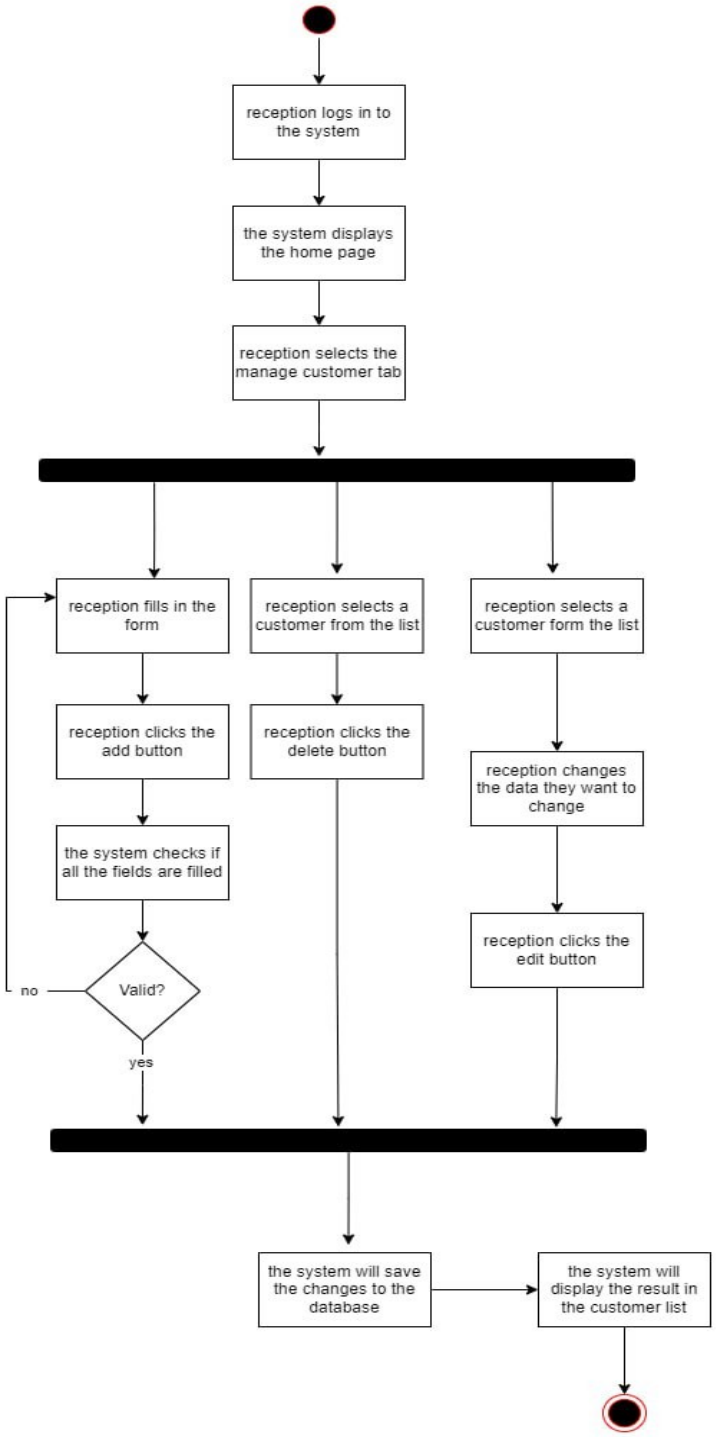
Log in


reception opens the app
the system displays the login page
reception fills in the form
reception clicks the login button
the system will check if the username and password are valid
valid?
no
yes
the system will open the home page

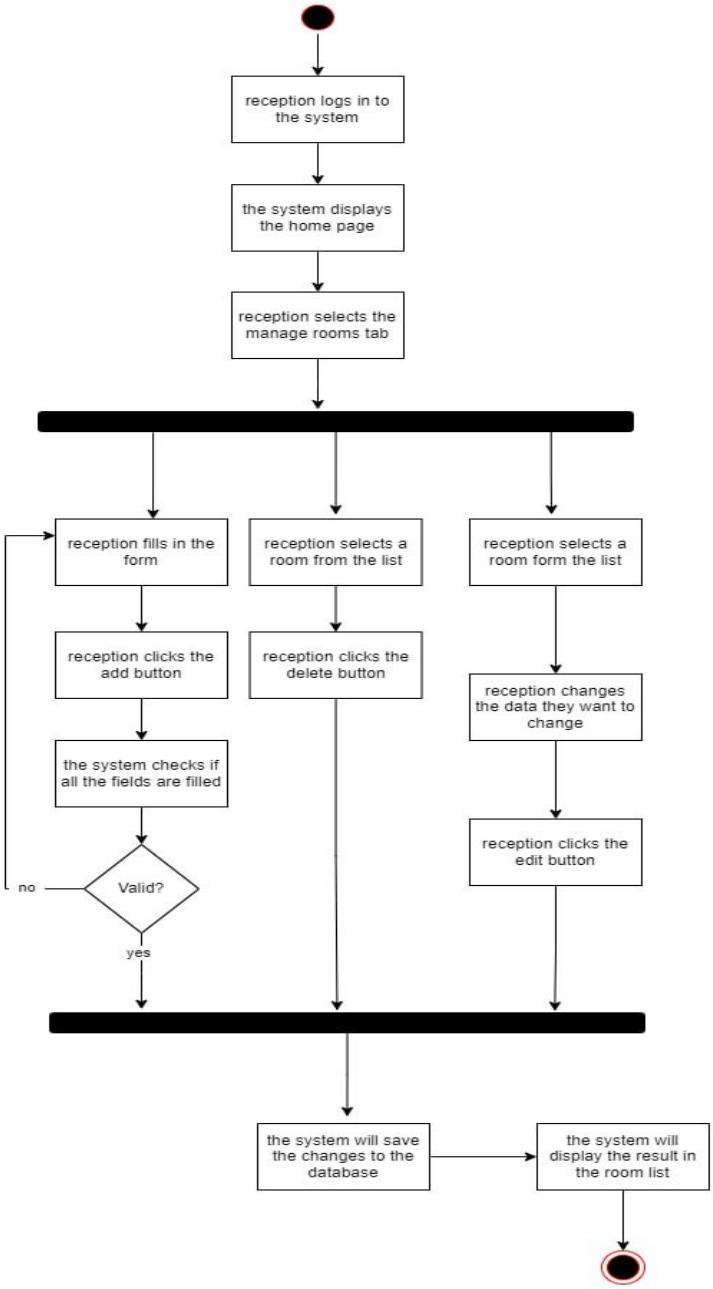
Book a room


reception logsin to the system
the system displays the home page
reception selects the bookings tab
the system will display the bookings page
reception fills in the form
reception clicks the add button
the system will check if all the fields are filled
Valid?
yes
the system will tell the user to fill in all the fields
the system will save the changes to the database
the system will display the result in the room list

Manage customer



Manage Rooms



Chapter 3: System Design

1.1 System Architecture

A hotel room reservation system enables consumers to look for available rooms, make reservations, and manage their bookings. It also enables hotel admin and reception to handle reservations, client data, and room availability. The total performance, scalability, and security of a hotel room reservation system are significantly influenced by the system design.

The design of the hotel room reservation system normally consists of a number of parts that interact to offer seamless service to customers and hotel staff.

- User interface
- Application server
- Database server (local Or Cloud)
- payment gateway
- authentication

A) The User Interface

Customers and hotel staff interact with the user interface at the front end of the system. It has a website or mobile app where consumers may look up available rooms, make reservations, and manage their bookings. The management of room availability, reservations, and client data is additionally supported by a web-based interface or desktop program for hotel workers.

B) The Application Server

Processing user requests and controlling application logic are the responsibilities of the application server.

- To retrieve and update data, it interfaces with the database server, as well as with other external systems like payment gateways or message services. Class Modeling

C) The Database Server

Whether it is cloud based or locally served the Database server is a crucial part of any system. It keeps track of all Records in and out or the database technically known ad the CRUD operations done on the system. The database server stores all the information related to hotel rooms, customer bookings, and other relevant data. It includes multiple tables to store information such as customer details, room availability, reservations, room types, pricing, and more.

D) Authentication

The hotel room reservation system depends on authentication to make sure that only

authorized individuals can access it and carry out particular tasks like making reservations, maintaining bookings, and getting access to client data. Before granting access to the system, a user's identity is confirmed through the process of authentication. Typically, user credentials and authentication methods are used in conjunction to implement authentication in a hotel room reservation system

Class Modeling

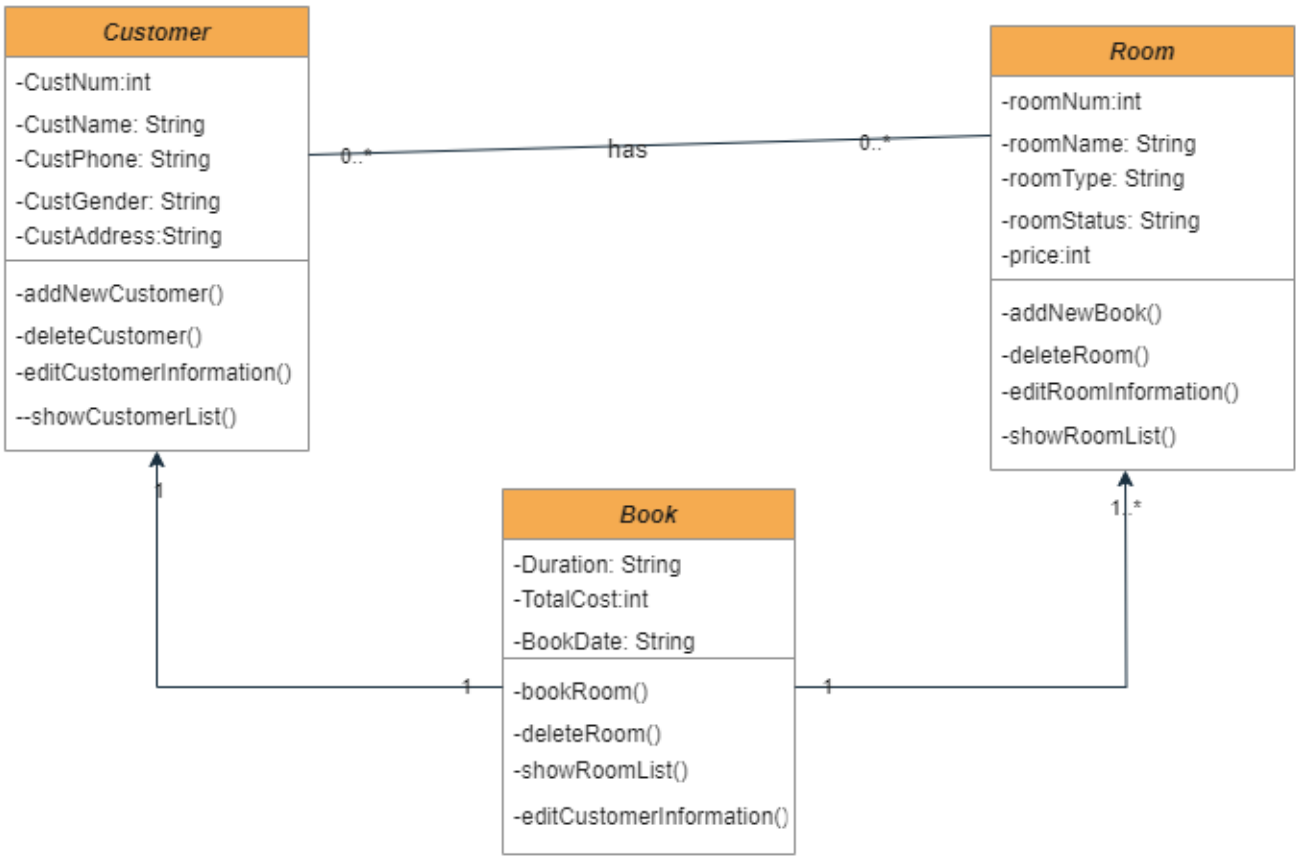
Class modeling is a technique for designing software systems based on identifying and describing the classes and relationships among them. In this section, we will present a class model for a hotel room reservation system. The main classes involved in this system are:

Room: This class represents a room in a hotel that can be reserved by customers. It has attributes such as number, type, price, and status.

Customer: This class represents a customer who can make reservations for rooms in hotels. It has attributes such as name, contact information, and payment method.

Reception: This class represents a special user which is a reception that cam make reservations and cancel reservations for a customer.

Class Diagram



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1.4 System User Interface

A computer program or system's graphical or textual representation known as a user interface (UI) enables users to interact with it. The interface offered by an operating system or other system-level software is particularly referred to as a system user interface.

The system user interface often combines textual components like dialog boxes, error messages, and status indicators with graphical elements like windows, icons, menus, and buttons. The system user interface's objective is to give users a simple and intuitive means of interacting with the system, enabling them to carry out tasks, obtain information, and adjust settings as necessary.

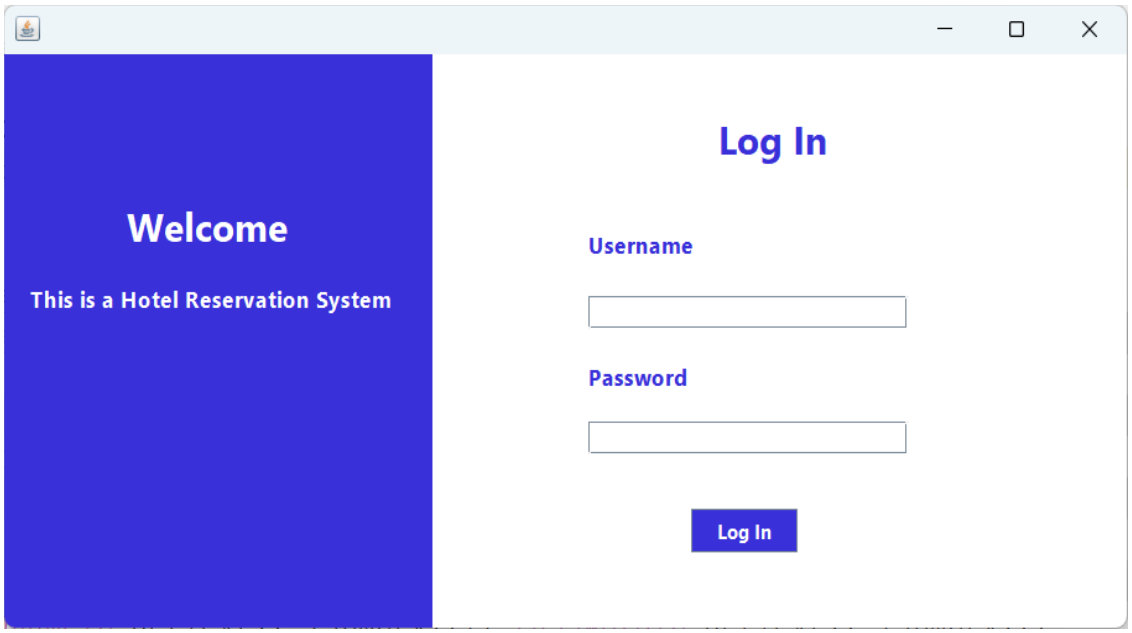
For software engineers, the design of a system user interface is crucial since it can significantly affect the software's usability and efficacy. A user interface that is well-designed should be simple to use, visually appealing, and give users clear feedback on the results of their actions. It should also be adaptable enough to meet a variety of user preferences and requirements, including accessibility capabilities for people with impairments.

As a Demonstration, we will have the view or prototype of users in our system.

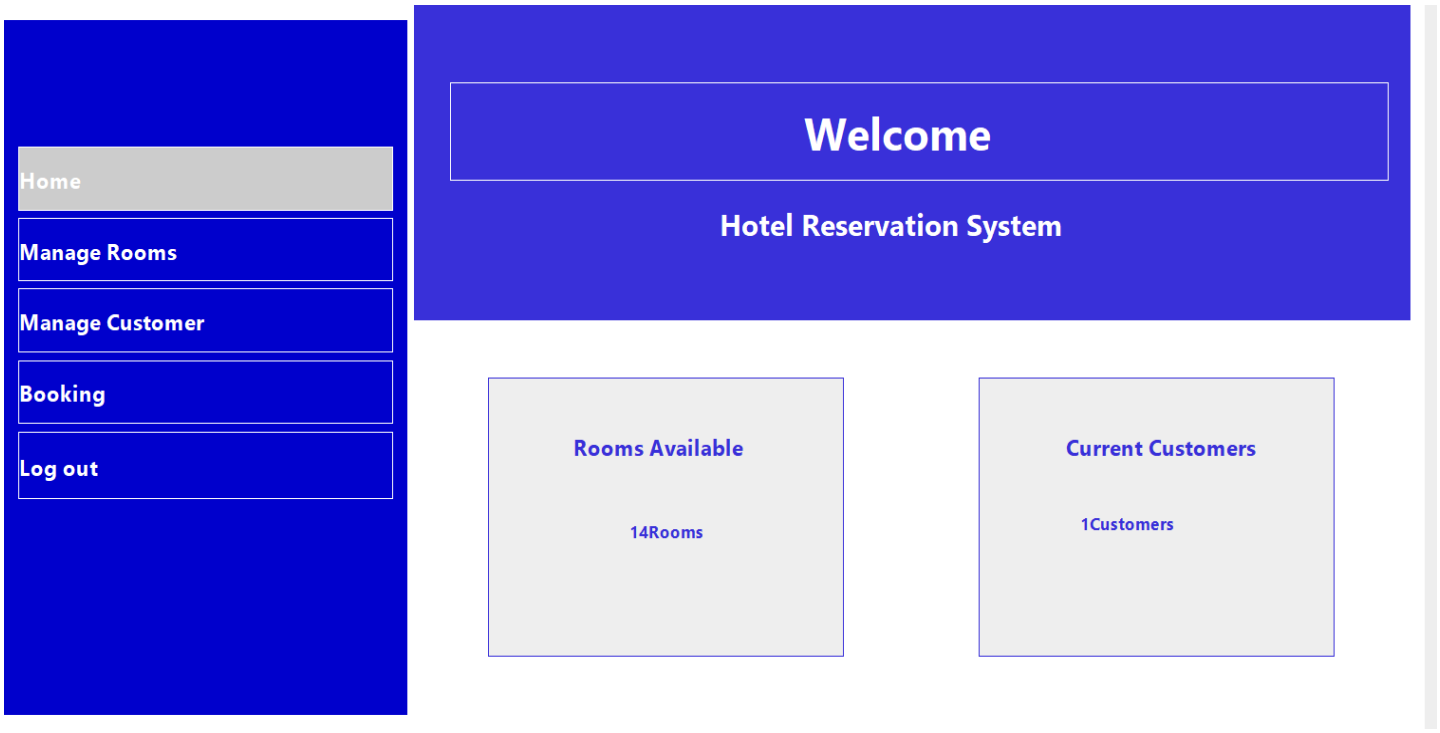
- Login

- Home Page
- Manage Rooms
- Manage Customers
- Booking

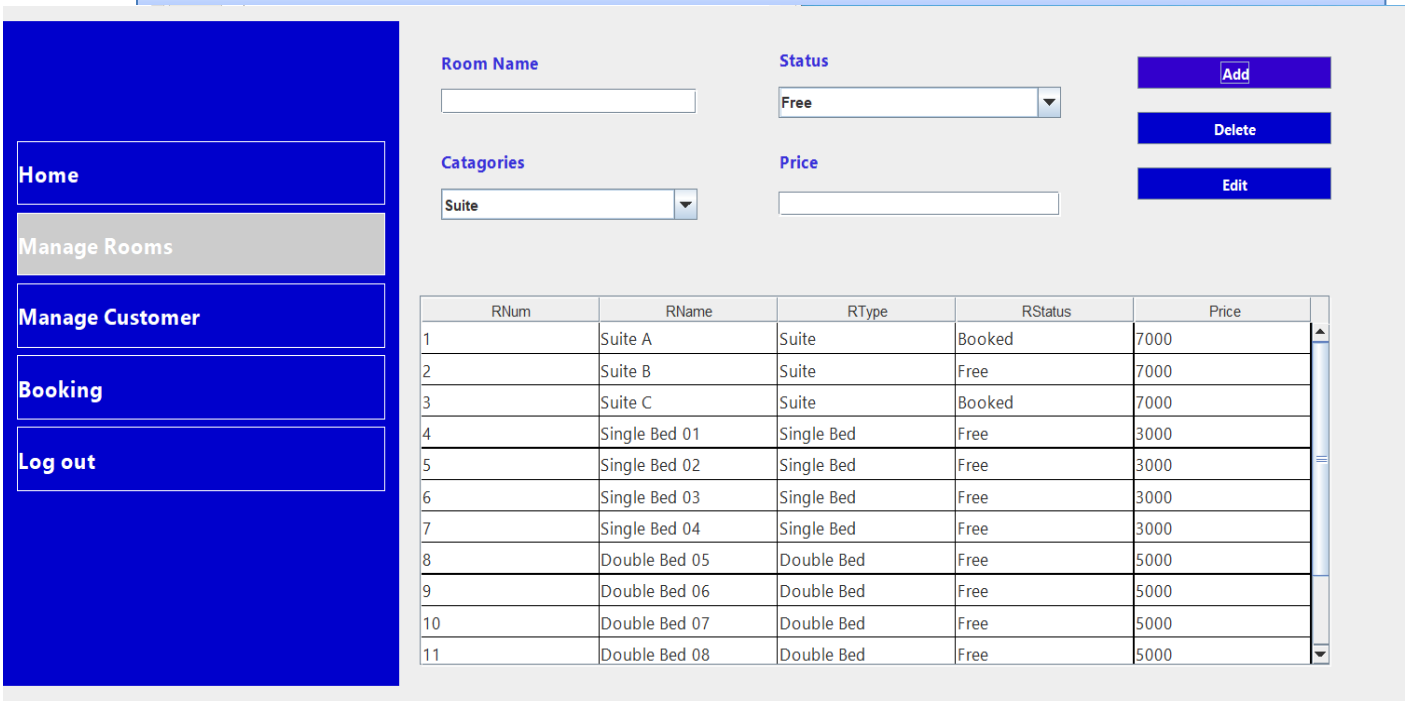
Log in Page


Welcome
This is a Hotel Reservation System
Log In
Username
Password
Log In

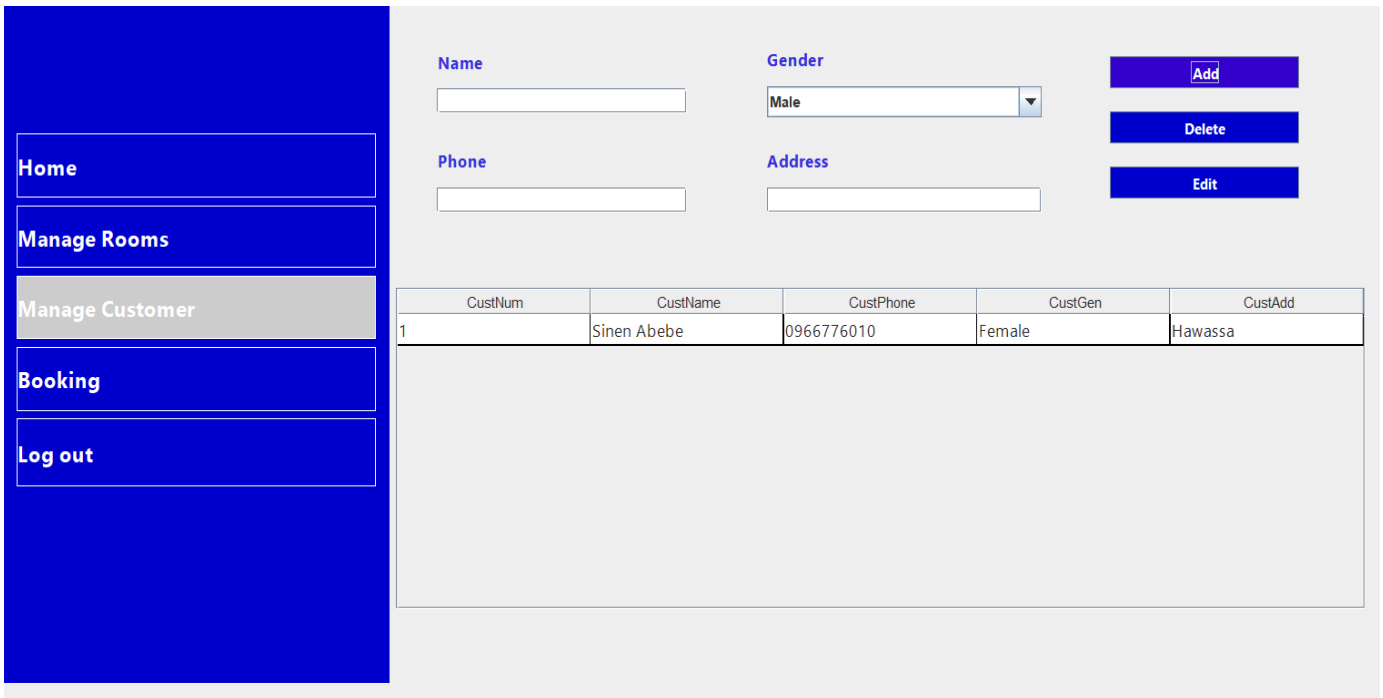
Home Page



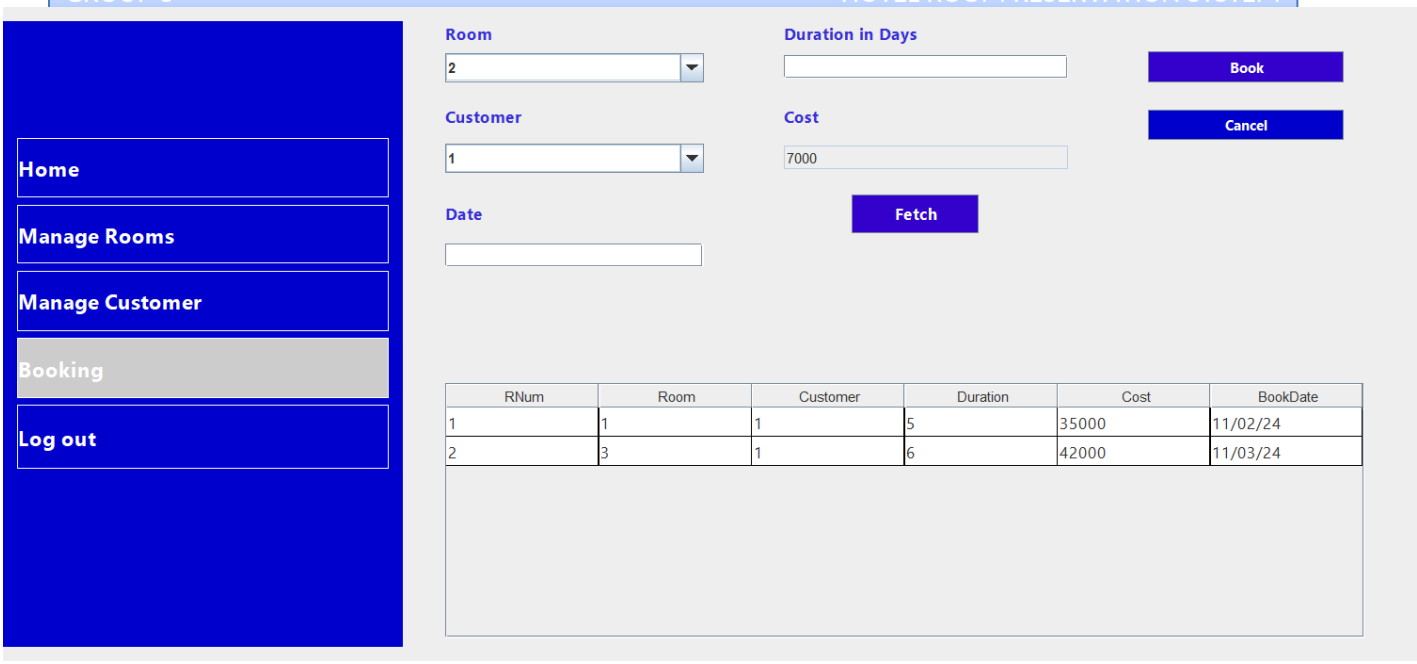
Manage Reservation



Manage Customer



Booking


Home
Manage Rooms
Manage Customer
Booking
Log out
Room
2
Customer
1
Date
Duration in Days
Cost
7000
Fetch
Book
Cancel
RNum Room Customer Duration Cost BookDate
1 1 1 5 35000 11/02/24
2 3 1 6 42000 11/03/24

SUMMARY

- The hotel room reservation system software documentation project aims to provide a comprehensive guide and reference for the development and implementation of a hotel room reservation system. The documentation includes detailed information about the system's architecture, functionalities, and user interactions. It covers use cases, system requirements, design specifications, and implementation guidelines. The documentation also includes instructions for system installation, configuration, and maintenance. It serves as a valuable resource for developers, system administrators, and stakeholders involved in building and managing the hotel room reservation system, promoting efficient development, smooth deployment, and effective utilization of the software.