Fusemachines Nepal Pvt. Ltd.

Hattisar, Kathmandu

A Project Proposal

on

"Design and Implementation of an Online Hotel Reservation System With Payment Integration"

Submitted by: Group 4

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Abstract

A hotel reservation system is a piece of software that allows guests to book directly with the hotel through the internet, eliminating the need for middlemen. The main aim of the entire activity is to avoid the manual and repetitive process of day-to-day activities of Hotel and to provide a website that can allow a user to search and reserve a hotel room or cancel his/her reservation over the internet at any time. HTML5, CSS3, JavaScript, Bootstrap5, jQuery, SQLite are some tools and languages used in building this project. The main goal of any hotel reservation system is to make it easier for its user to find the services/products that they are looking for simply and quickly. So, this system will be simple, user-friendly, and easy for the users to understand and navigate with. At the end of the project, we will be able to understand the basic workflow of a hotel reservation system.

Keywords: Reservation, Booking, hospitality, usability, industry, tourist, programming languages, online, etc.

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1. Introduction

1.1 Background

The advancement in mobile technology and accessibility of broadband has made it much more simple to find and book a hotel through an online reservation system. A global online hotel reservation system is managed by the hotel management system for both domestic and international tourists. To compete with the international e-marketplace, a greater emphasis should be put on enhancing user demands to provide recommended hotel options. In general definition, hotel management is the process of maintaining various activities of a hotel where a large number of staff are engaged to perform several different activities.

Taking a glance at an ordinary hotel, the customer must meet with the receptionist of the particular hotel to collect the information regarding the facilities and services that they are offering. If the client is satisfied, he is to sign up the pro forma provided by the hotel authority, pay the defined bill and he is offered the room key. But the client always seeks greater privacy and reliable security. The major purpose of the hotel industry is to give the best hospitality service to their customers who could be travelers, foreigners, businessmen, tourists, etc. Customers are mainly constrained in their attempts to get a place for the night, as the standard procedure is to hunt for a hotel when arrived in a specific location, walk in and check out for a vacant room. If not available must move to the next closest hotel to enquire one more time. Likewise, booking a room over the phone is unreliable and insecure because hotels are quick in serving the one who walks in. Such a situation will leave customers helpless. There is no system in place to ensure that the hotel and the customer are both aware that the client has booked a room and more importantly, that the customer is guaranteed a room. Therefore, our study's goal is to create an online hotel reservation system that would allow customers from any part of the world to book whatever they needed. The system is designed to make information and reporting accessible and retrievable.

Reservations are the most crucial aspect of any hotel system. The reservation process is must be efficient to meet up the hotel's business objectives. Since rooms are the most important component of the reservation process so it should be dynamic.

1.2. Objectives

The objective of our project includes:

1. To build an online hotel reservation system that allows the customer to book and pay for a service directly through a website.
2. To give features that would help clients become familiarized with the online hotel reservation system.
3. To check out the system and point out the benefits it may bring to the hotel management and customers.
4. To eliminate paperwork and duplicate data entry and errors at the time of booking a hotel.

1.3. Motivation and Significance

In a large number of hospitality sector around the world, manual management and the organizational process is still in practice. Humans are more likely to make mistakes at the front desk during reservations, cancellations, special requests, etc. Such double bookings, forgotten reservations will ruin the customer's experience and will impact hotel revenue. Like other businesses, it needs marketing and distribution to welcome people from all around the world which is not enough by managing social media pages and blogs in this competitive era. When there are dozens of hotels lining up with special offers and discounts, the customer will not take time to search for an up hotel.

We choose to design and implement an online hotel reservation system with payment to register clients who want to reserve a room or rooms by gathering their information, stay length, room type, and other relevant fields. The system will then instantly notify the hotel, allowing it to reserve a room for the customer in a fast and error-free manner. (Kehinde Wiilams, Micheal Ajinaja, 2019)

2. Literature Review

The Internet is a continually developing network of millions of computers and users in over 200 countries that connects hundreds of millions of computers for commerce education and research. It is a global communication network, connected by guided, wireless, and fiber-optic technologies, encompassing commercial, public, business, academic, and government networks. In today's era, the Internet is one of the most powerful channels for business marketing, communication, and brand new business opportunities. Small businesses can now use new e-business or e-commerce to exhibit their items, advertise their store, and connect with their clients, as well as compete with major corporations by simply having a better web display of their products or services. At the same time, online clients can benefit from a wider selection of products or services, more competitive prices, and the ability to buy their preferred goods from sellers thousands of kilometers distant.

The Internet has had a profound impact on how businesses are run today. Nowadays, searching for destinations, travel, and lodging alternatives online is virtually a given. Travelers now have a choice in their hands because the entire room reservation system, whether for accommodation or travel, has become so simple, convenient, and transparent. Competition has become healthier and larger as a result of the internet.

Online hotel reservations are becoming increasingly popular as a means of reserving rooms. Travelers do not need to collect information manually to understand the services and products provided by the hotel. Many international hotel companies, like Marriott, Hilton, and Sheraton in the United States, use their websites to reach out to new markets, inform customers about their products and services, and build brand awareness. (Delizo, Esguerra, 2021)

Hotelogix, eZee Absolute, Viewpoint, Bookinglayer, innRod, are some of the top and latest Hotel Management Software.

Some of the well-known existing online hospitality services are:

1. **OYO Rooms**, also known as OYO Hotels & Homes, is an Indian multinational hotel chain, operating franchised and leased hotels, homes, and living spaces. The company has the ingenuity of, the world's leading hotel chain. OYO is already present in over 800 cities across 80 countries. OYO Rooms has been a major competitor all over the world. The lucrative hospitality of Oyo Rooms is the largest registered branded network of hotels with 4,50,000 listings in 5,000 locations in Indonesia, China, India, United Arab Emirates, Nepal, China. OYO plans to develop a strategy by developing copies of its company's businesses in different locations around the world.

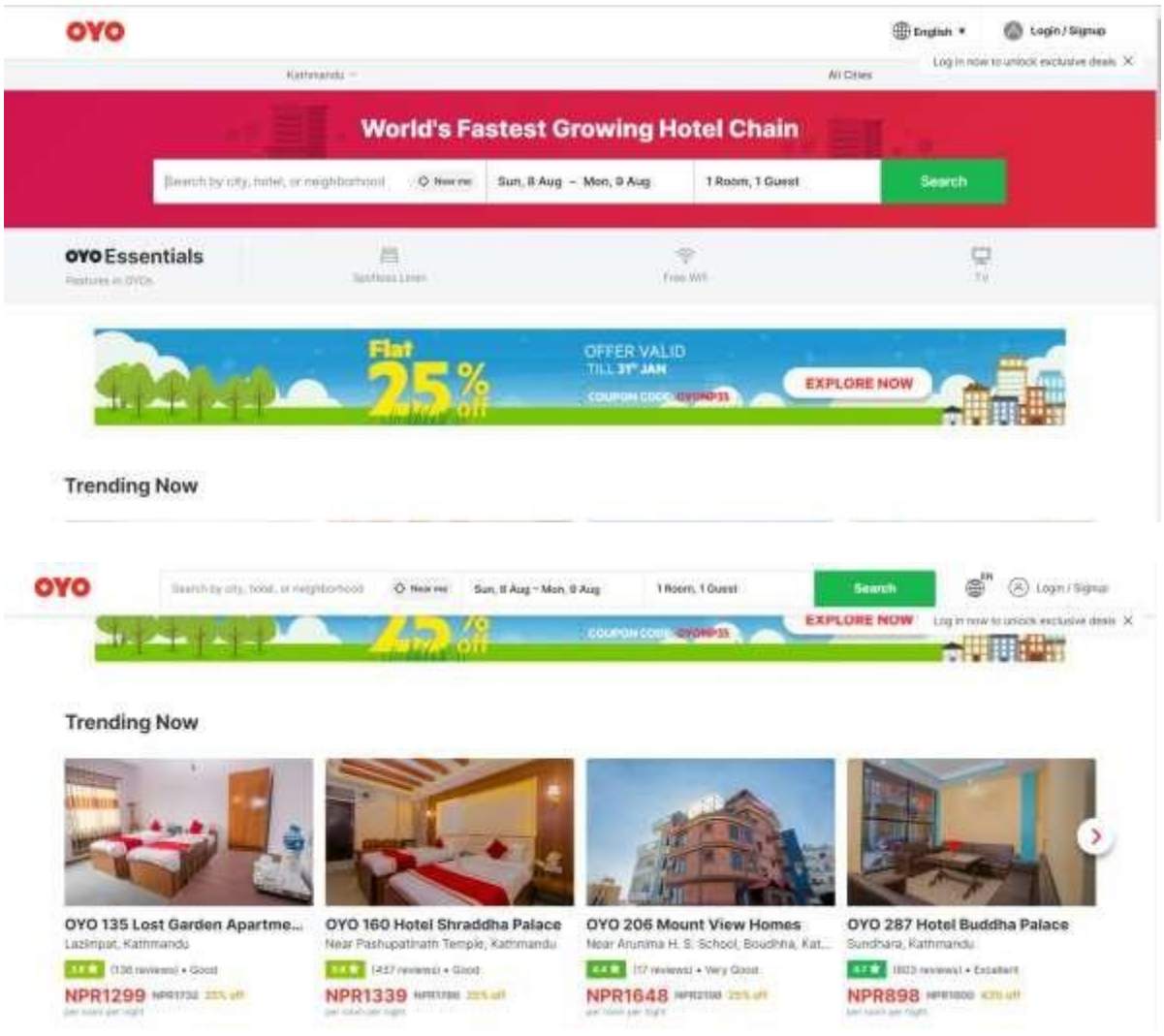
   The recent growth of Oyo has given traditional hospitality outlets substantial cause for concern about their day-to-day operations. Oyo Rooms has risen through the ranks of India's start-up ecosystem thanks to a revolutionary business model that makes good hotel rooms affordable.(Negi, Kukreti, Dani, Rawat, 2021)

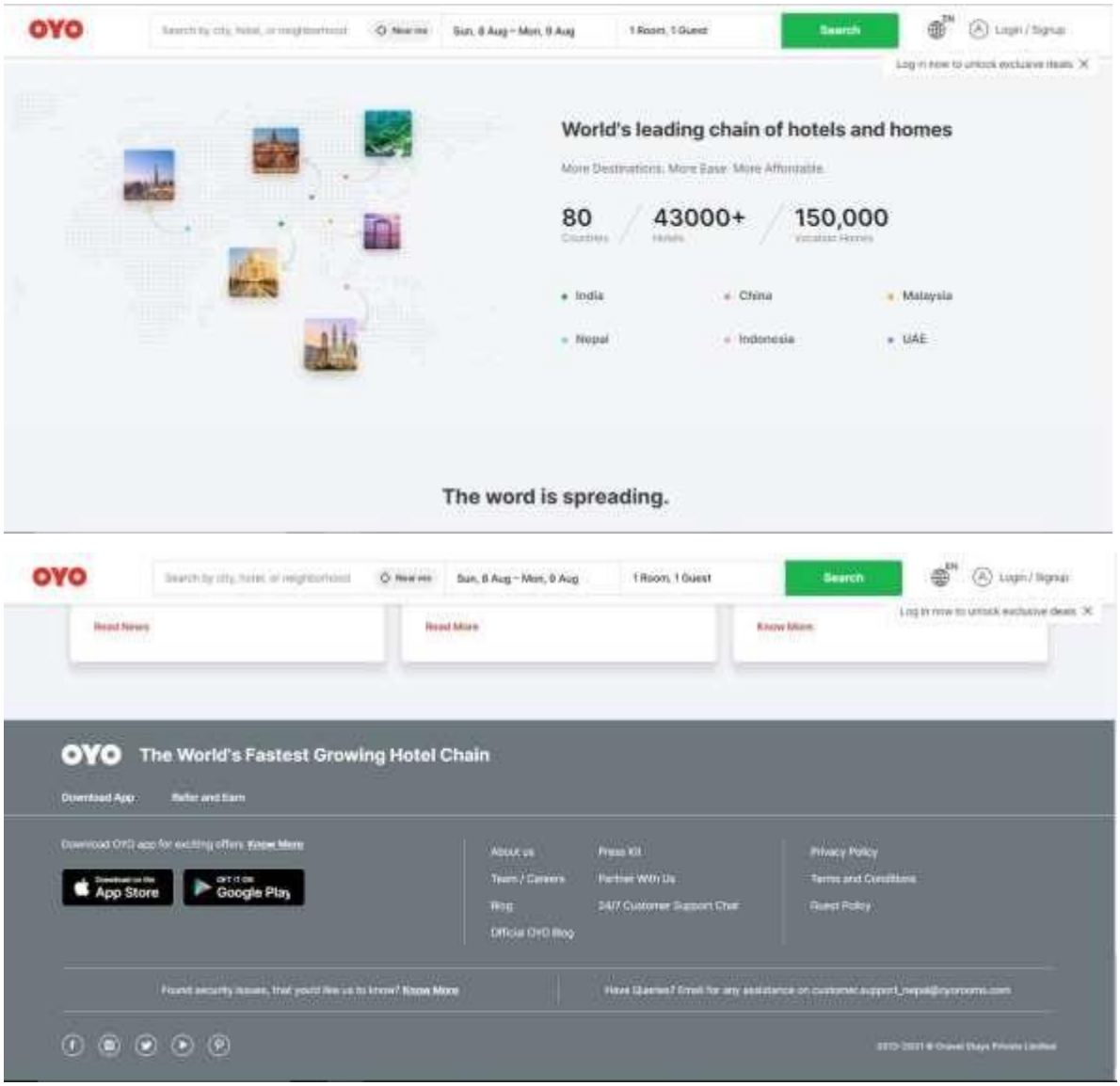
   OYO has a heavily open-sourced technology-based stack. The basic languages being used are Java, J2EE as well as earlier systems which are based on Ruby on Rails. Database technologies like MongoDB, Postgress SQL, and Hadoop are used to a large extent. Hive is used for database processing and Kafka for queueing etc.

   To deliver the best hotel booking services all around the world, OYO rooms use the platforms and technologies like WordPress for a content management system, PHP for server-side, JavaScript for client-side, jQuery, Bootstrap, Modernizr (JavaScript Libraries), Gmail for an email service provider, Google Analytics, Hotjar, Microsoft UET for Traffic analysis, Google Ads for the advertising market, Markup language - HTML5, Platforms - Android and iOS. Their entire infrastructure is hosted on the cloud and uses Machine Learning and Natural Language Processing for customer services. (W3 Techs, 2021)

Website of OYO (oyorooms.com)

Allowing the visitors to understand the services or products as fast and effectively as possible is a very important component of today's websites. Websites that are slow to load or difficult to access are no longer appropriate. In reality, the usability of a website represents the deciding moment of our online achievement. Good website usability establishes a decent connection with visitors that might be possible customers. Website usability tests are important tools as they will allow us to gain valuable insight into how our website is attracting, keeping, or turning away users.

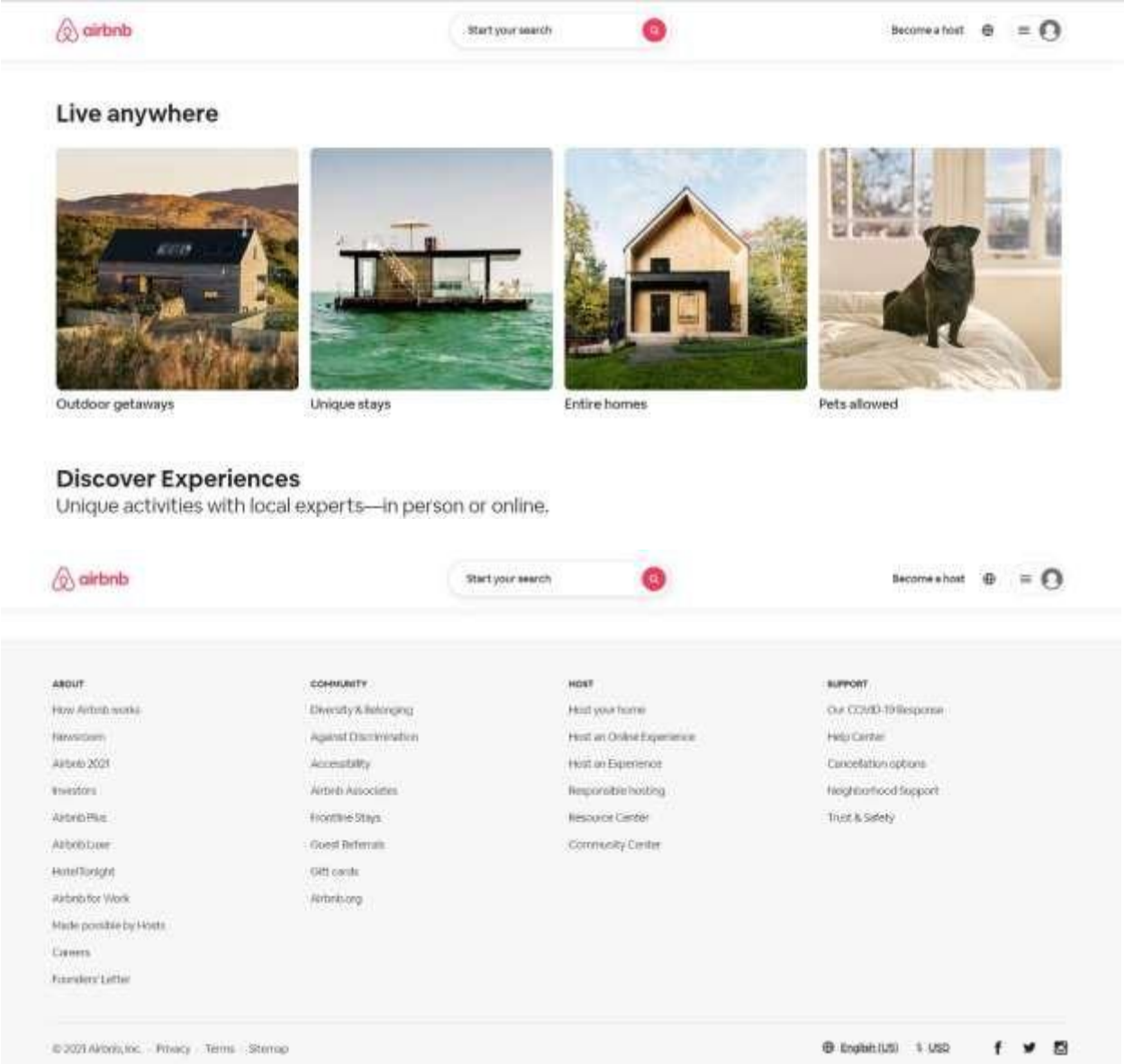




Here, the website looks very attractive and easy to use where every small detail is shown clearly. In the header section, along with the logo of the company, they have the options of login/signup and different languages that the website is compatible with. In the body part, at the very first, they have provided the user with the search option for different cities and hotels with dates and numbers of rooms which makes it easier for users to locate the booking section which is the most crucial part of the system. They have clearly shown different types of trending as well as their regular rooms along with their prices. The fonts-sizes, its color, and the images used are very clear and simple. Also, it has shown different countries where OYO services are majorly available. In the footer section, all the important information and shortcuts are provided in a very clear way.

2. **Airbnb** is a peer-to-peer short-term rental service that lets people post and book rooms via a website and mobile app. The company, which was founded in 2008 and is located in San Francisco, allows the average homeowner to rent out spare space for a charge. The startup attracted a great amount of attention after its seventh round of funding in April 2014, when it was valued at $10 billion. By 2014, Airbnb has 4 million users and over 300,000 listings in 190 countries. Its responsibilities include listing spaces, collecting payments, functioning as escrow, and providing hosts with damage insurance. Similar to OYO, Airbnb uses platforms and languages like Ruby and Javascript for a programming language, Ruby on Rails for framework, React, a JavaScript UI library for JavaScript framework, Nginx for web server, Redis for Key-value storage, Amazon S3, EBS for cloud storage, Amazon EC2 for cloud hosting, Amazon RDS for cloud database and Big Data tools like Presto, Druid, Kirpal. (Kunwar, 2020)

Website of Airbnb (airbnb.com)



Airbnb's website looks very eye-catching. Similar to Oyo's, they have the logo and different options in the header section and maintained consistency and standard. The search and the reservation section is very distinct and very easy to find. The quality of the image used on this website is very catchy. They have shown all the categories of the options available in Airbnb. The footer is very simple yet clear to understand. The website is very flexible to use.

3. Proposed Approach

3.1 ERD Diagram of Hotel Booking System

The given ER Diagram shows the model of Hotel Booking System Entity as it shows all the visual instruments of databases tables and the relations between all required actions like Booking, Hotels, Payments, Services, etc. The main entities of Hotel Booking Systems Are Payments, Booking Customers, hotels, Rooms, and services.

Descriptions:

1. Payments information is stored in the Payments tables, which are linked to all other tables.
2. The entity customers, rooms have been bind with Payments, Booking entities with foreign key
3. There are primary and unique keys in each entity.
4. All entities, such as payments, rooms, customers, and service, are normalized, reducing record duplication.
5. For faster query execution, indexing has been implemented on each table of the Hotel Booking System tables.

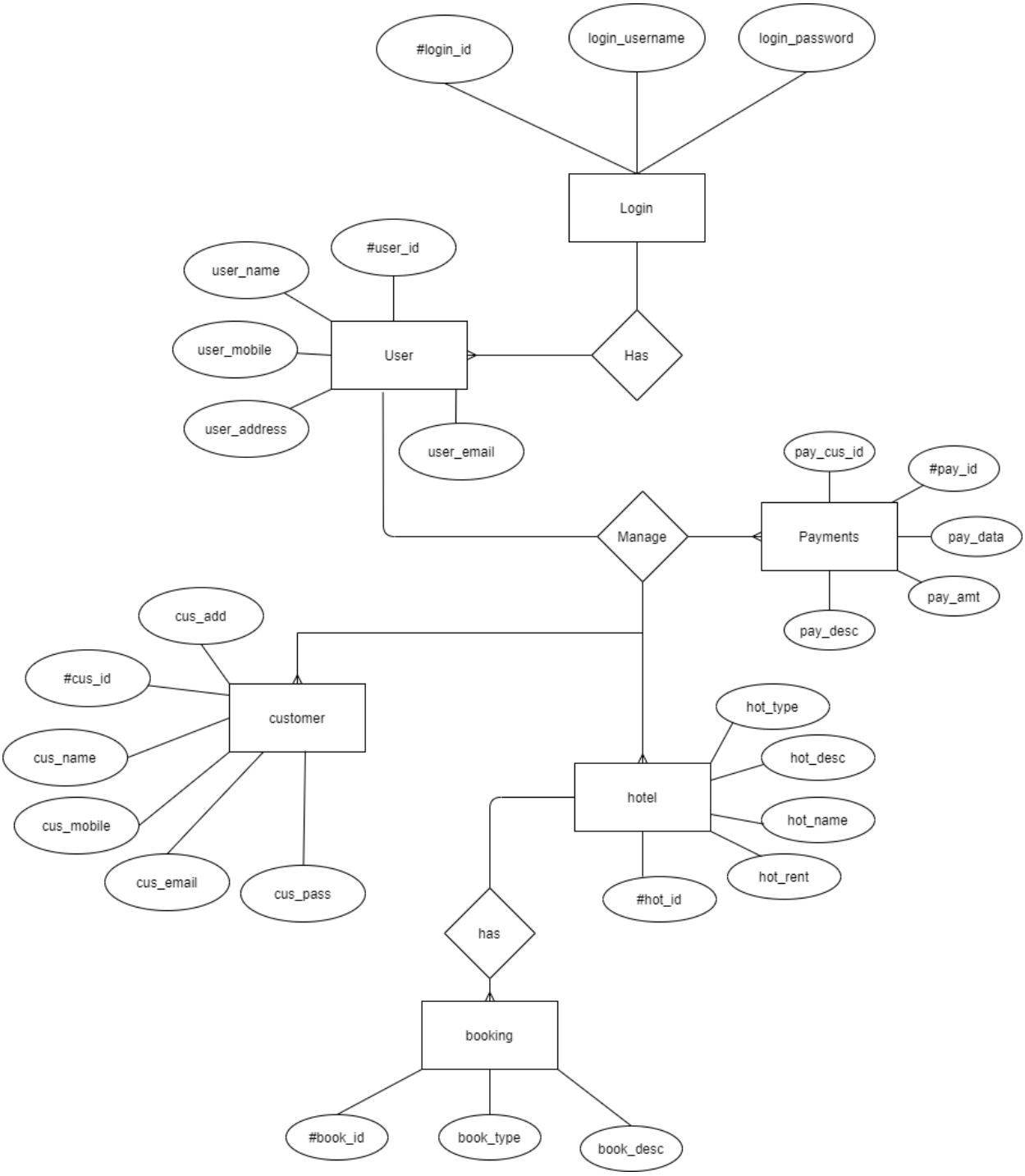


Figure 1: ERD Diagram of Hotel Booking System

3.2 Zero Level Data Flow Diagram of Hotel Booking System

In the given diagram the high-level process of Hotel Room Booking has been elaborated. This depicts a broad overview of the entire system being studied or modeled. This is intended to be a quick view of the customer, payment, and hotel, displaying the entire system as a high-level process, as well as its relationships with external entities. The high-level flow of the Hotel Room System is being described.

High-level entities and process flow:

1. Managing all the hotels
2. Managing all the Room Facility
3. Managing all the Booking
4. Managing all the Payment
5. Managing all the Customer
6. Managing all the Room Category

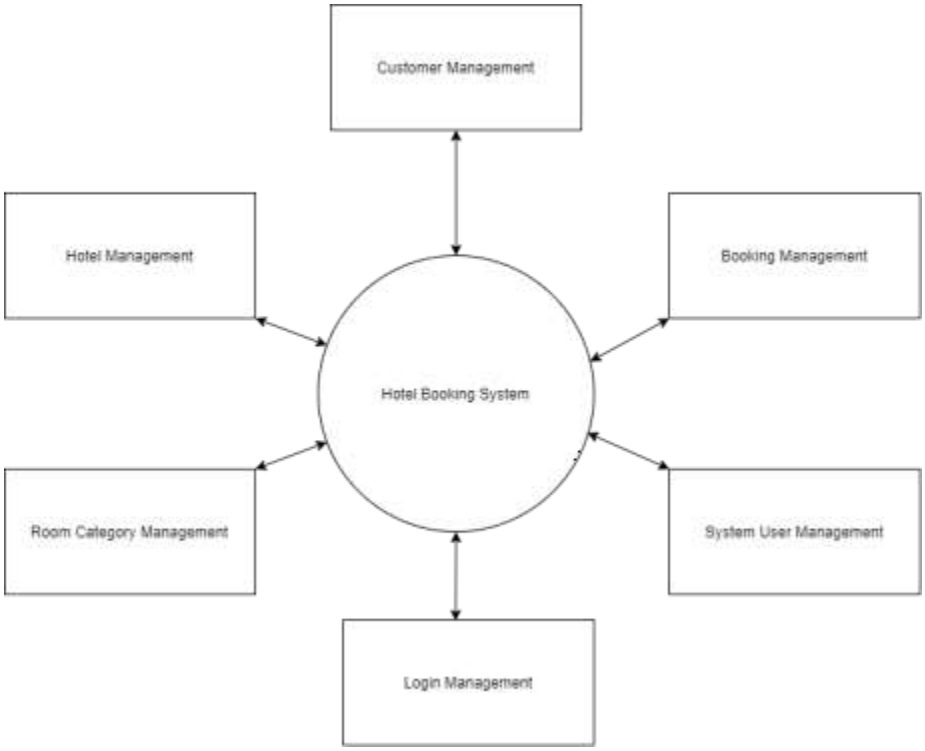


Figure 2: Zero Level Data Flow Diagram

3.3 First Level Data Flow Diagram of Hotel Room Booking System

This diagram depicts how the system is divided into sub-systems (processes), each of which handles one or more data flows to or from an external agent, and which together provide all of the system's functionality. This shows the flow of data between the various parts of the Hotel, Room Category, Customer, Hotel Employee, Payment system and identifies internal data stores of Hotel employees, Customer, Payment, Booking, Room Category that must be present in order for the system to function. It shows more detailed breakouts of pieces of the 1st level DFD.

Main entities and output of First Level DFD

1. Processing hotel records and generating an all-hotel report
2. Processing records for room facilities and generating a report for all room facilities
3. Process Room Category records and generate all Room Category report.
4. Process booking records and generate an all-bookings report
5. Process customer records and generate an all-customer report
6. Process payment records and generates an all-bookings report
7. Processing Hotel Employee records and generate reports of all Hotel Employee

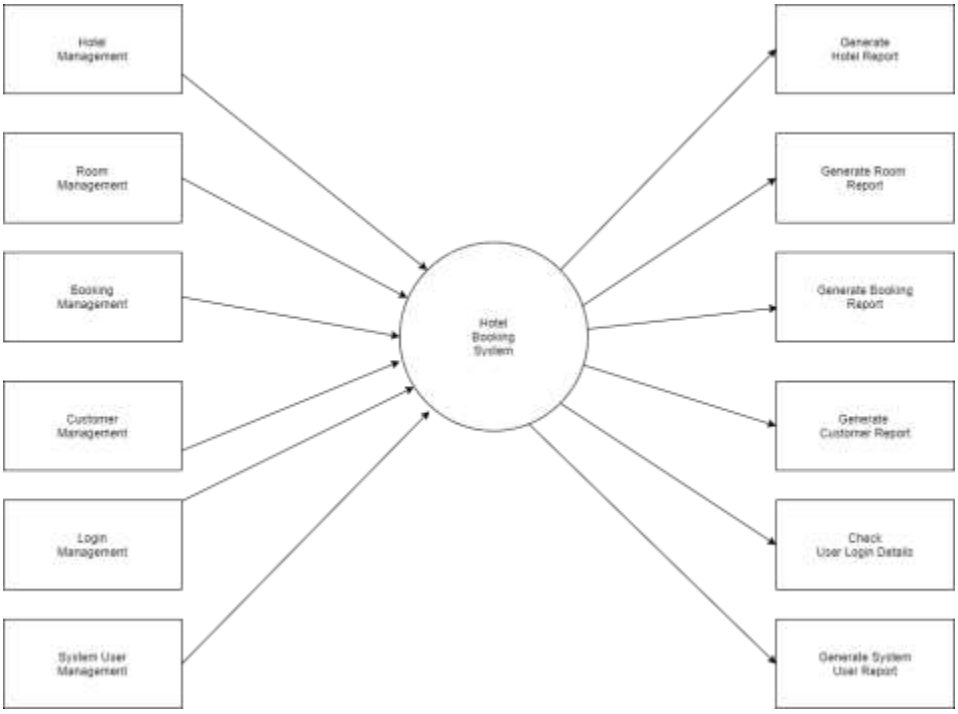


Figure 3: First Level Data Flow Diagram of Hotel Room Booking System

3.4 Second Level Data Flow Diagram of Hotel Room Booking System

DFD Level 2 deeps deeper into part of level 1. This necessitates the addition of more Hotel Room functionalities in order to achieve the required level of detail regarding Hotel Room operation. It depicts the division of the system into sub-systems. It contains more details of Hotel Employee, Customer, Payments, Booking, Room Category, Room Facility.

Low-level functionalities of Hotel Room Booking System.

1. The system's administrator logs in and manages all of the Hotel Booking System's features.
2. Hotel, Room, Category, Payment, and Hotel Employee records can be added, edited, deleted, and viewed by the administrator.
3. The administrator has access to all room facilities and booking customer information.
4. The administrator can look up information about the room, payment, and customers.
5. The administrator has access to detailed information about the Room Facility, Room Category, Booking, and Payment.

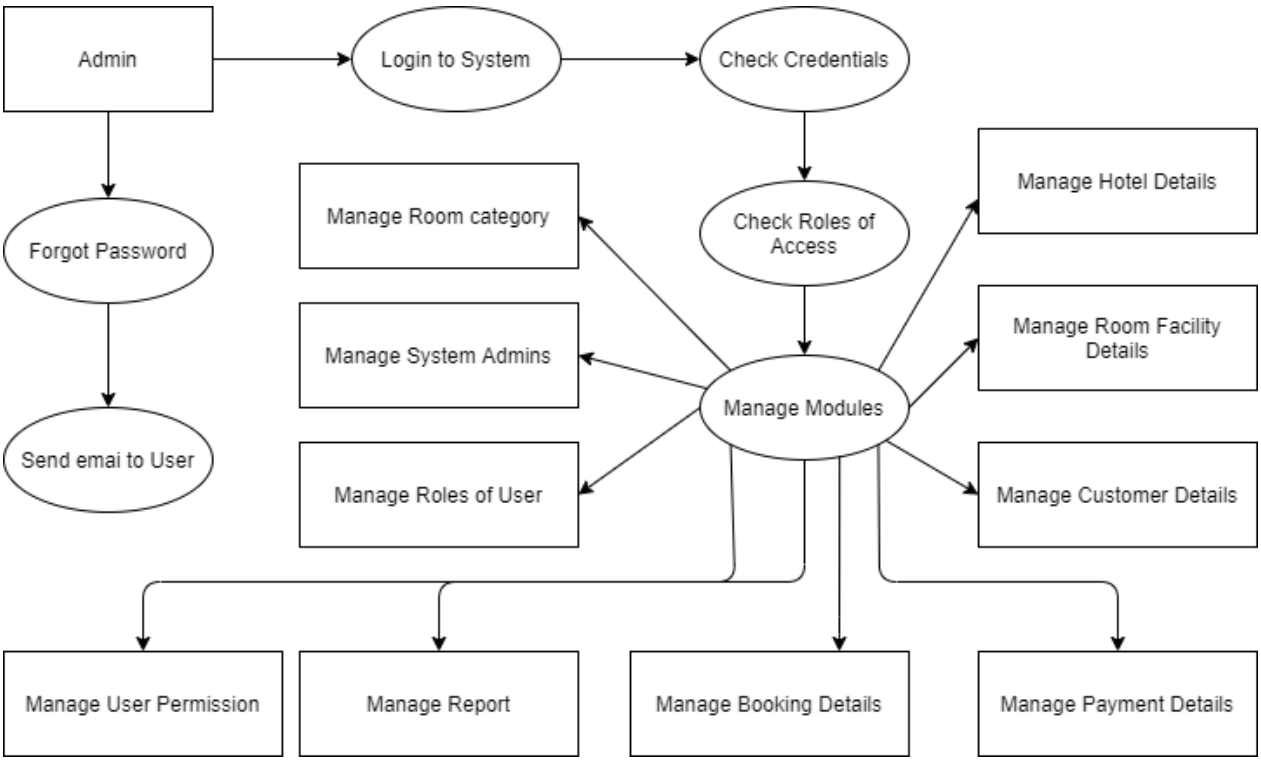


Figure 4: 2nd Level Data flow Diagram

4. Project Requirement Specifications

4.1 Requirement Specifications

4.1.1 Functional Requirements

Table 1: Functional Requirements

SN.	Functional Requirements The application should have:	Success Criteria
Mandatory Functional Requirements		
1.	Admin and User Login forms must be available.	
2.	A new user must have the gateway to register for a new account.	
3.	A user must log in to get access to booking rooms in a hotel.	
4.	Booking confirmation must be sent to the specified contact details.	
5.	The customer must be registered to a unique id to avoid data duplication.	
6.	Users must have the option to cancel the booking.	
7.	Digital payment apps must be available for easy transactions.	
8.	Admin must log in to manage the whole system.	
Desired Functional Requirements		
1.	All registered and unregistered users can browse, view hotel and available rooms and facilities.	
2.	Any user can register for the booking.	
3.	Users can rate and review the hotel.	

4.	Admin can add, delete hotel rooms and services.	
5.	Admin should keep the track of activities and responses.	
Performance Requirements		
1.	Accuracy	> 70%
2.	Execution Speed	< 60sec
3.	Concurrency	

4.1.2. Non- Functional Requirement Specifications

Table 2: Non-Functional Requirements

SN.	**Non-Functional Requirements** The system shall:	**Success Criteria**
1.	Admin will control and manage all users' access.	
2.	Font Enlarger as an accessibility feature for visually impaired users.	
3.	The system should be user-friendly, accessible, and easy to learn.	
4.	The performance of the system should be fast and accurate.	
5.	The system will prevent any unauthorized users from gaining access to other accounts.	

4.2. Software Requirement Specifications

Table 3: Software Requirements

SN.	Software used	Versions
Programming Languages and Frameworks		
1.	Python	3.7.0
2.	Django	3.2.5 or later
3.	Postman	
Database		
1.	SqLite	2.1.0
Building and Testing Tools		
1.	Postman API client	
Deployment Tools		
1.	Local Environment	

4.3. Hardware Requirement Specification

Table 4: Hardware Requirements

SN.	Hardware used	Type
1.	Windows/Mac/Linux with Python installed	

4.4. System Architecture

ERD Diagram of Hotel Booking System

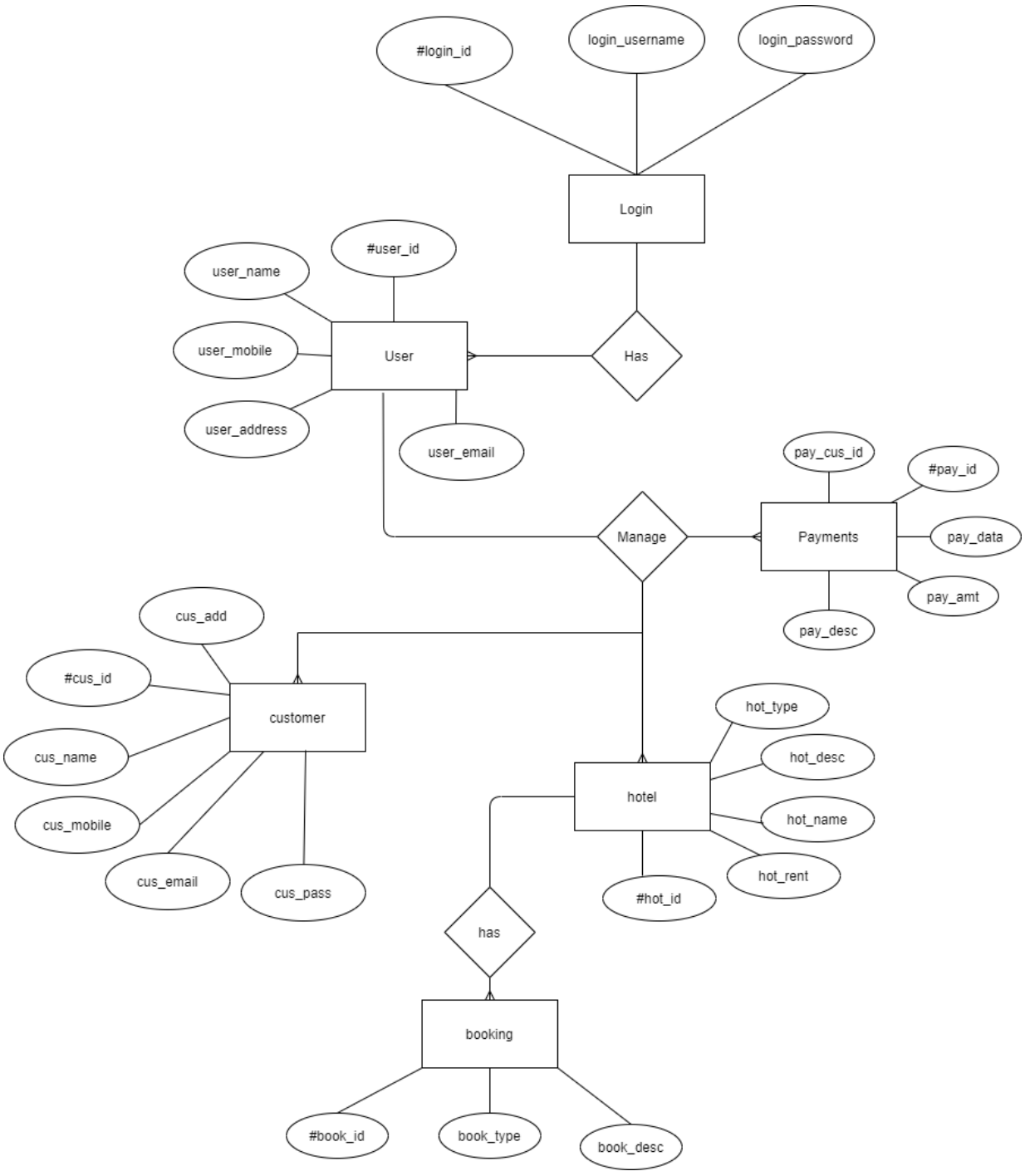


Figure 5: ERD Diagram of Hotel Booking System

Zero Level Data Flow Diagram of Hotel Booking System

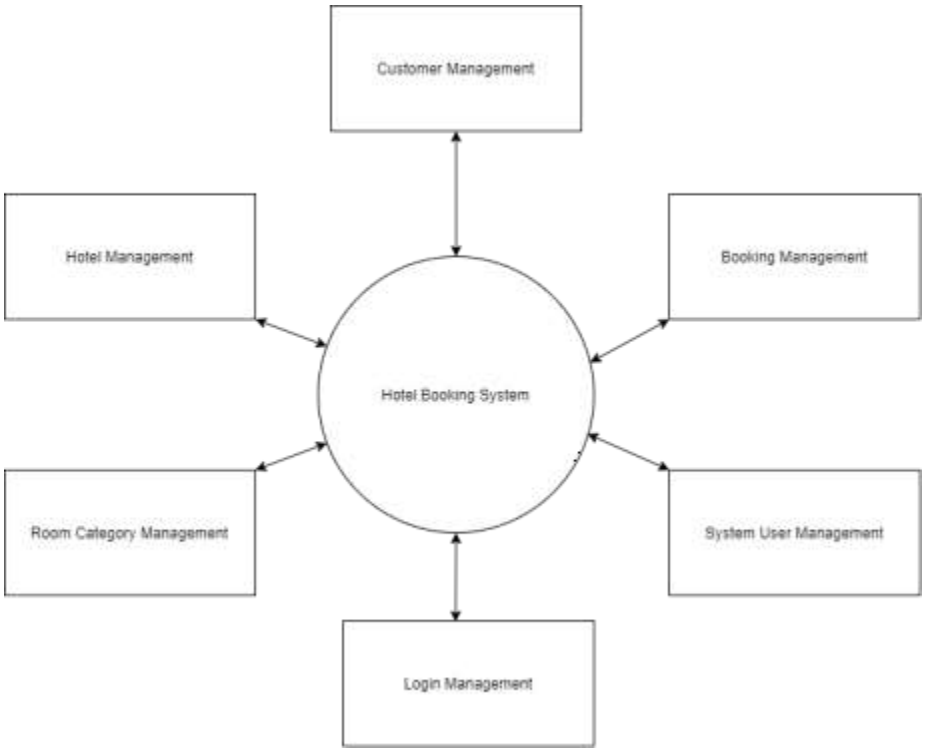


Figure 6: Zero Level Data Flow Diagram

First Level Data Flow Diagram of Hotel Room Booking System

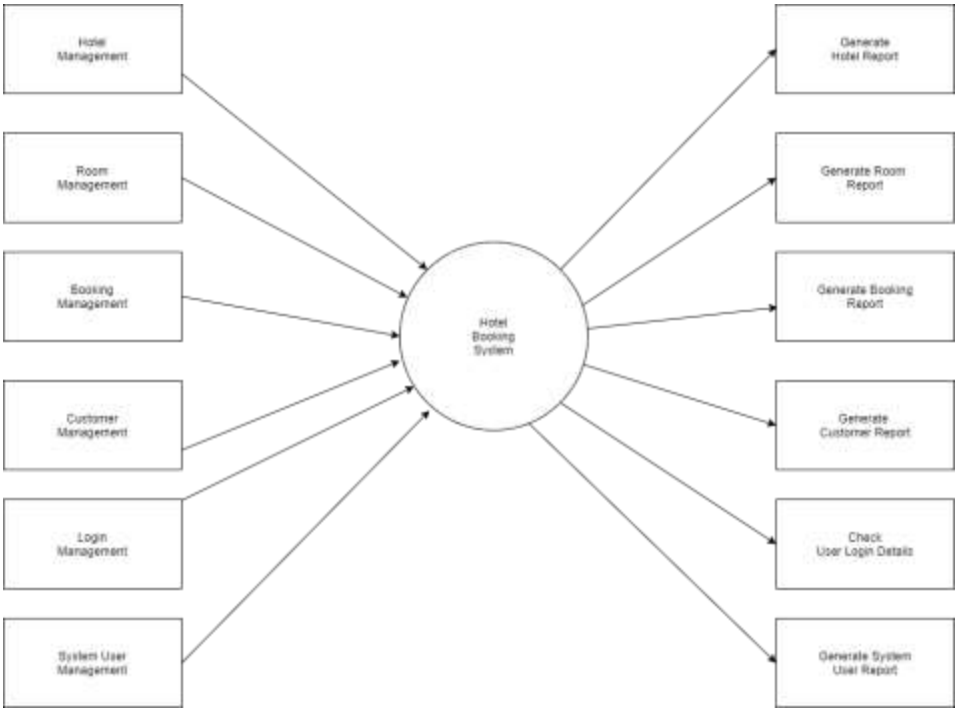


Figure 7: First Level Data Flow Diagram of Hotel Room Booking System

Second Level Data Flow Diagram of Hotel Room Booking System

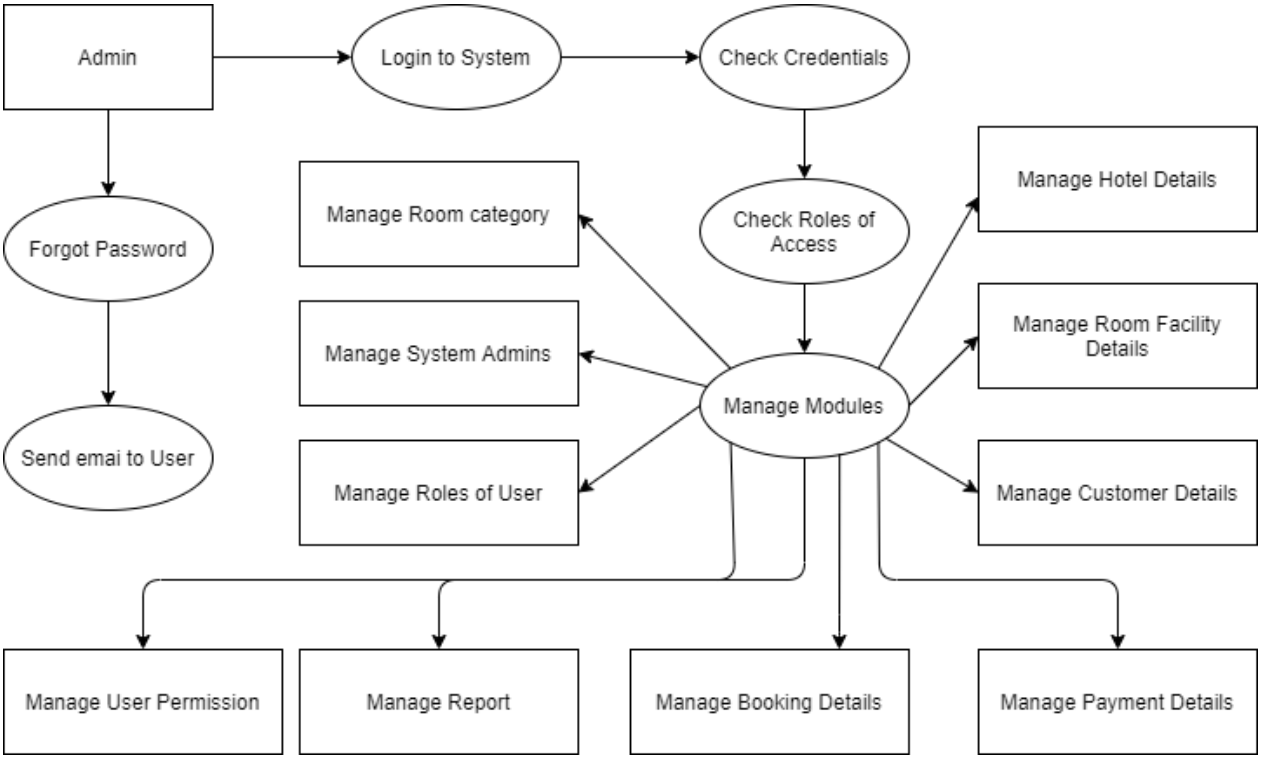


Figure 8: 2nd Level Data Flow Diagram

5. Project Planning and Scheduling

Project Title	Project Duration	Start Date	End Date
Online Hotel Reservation System	11 weeks	2 August 2021	21 October 2021

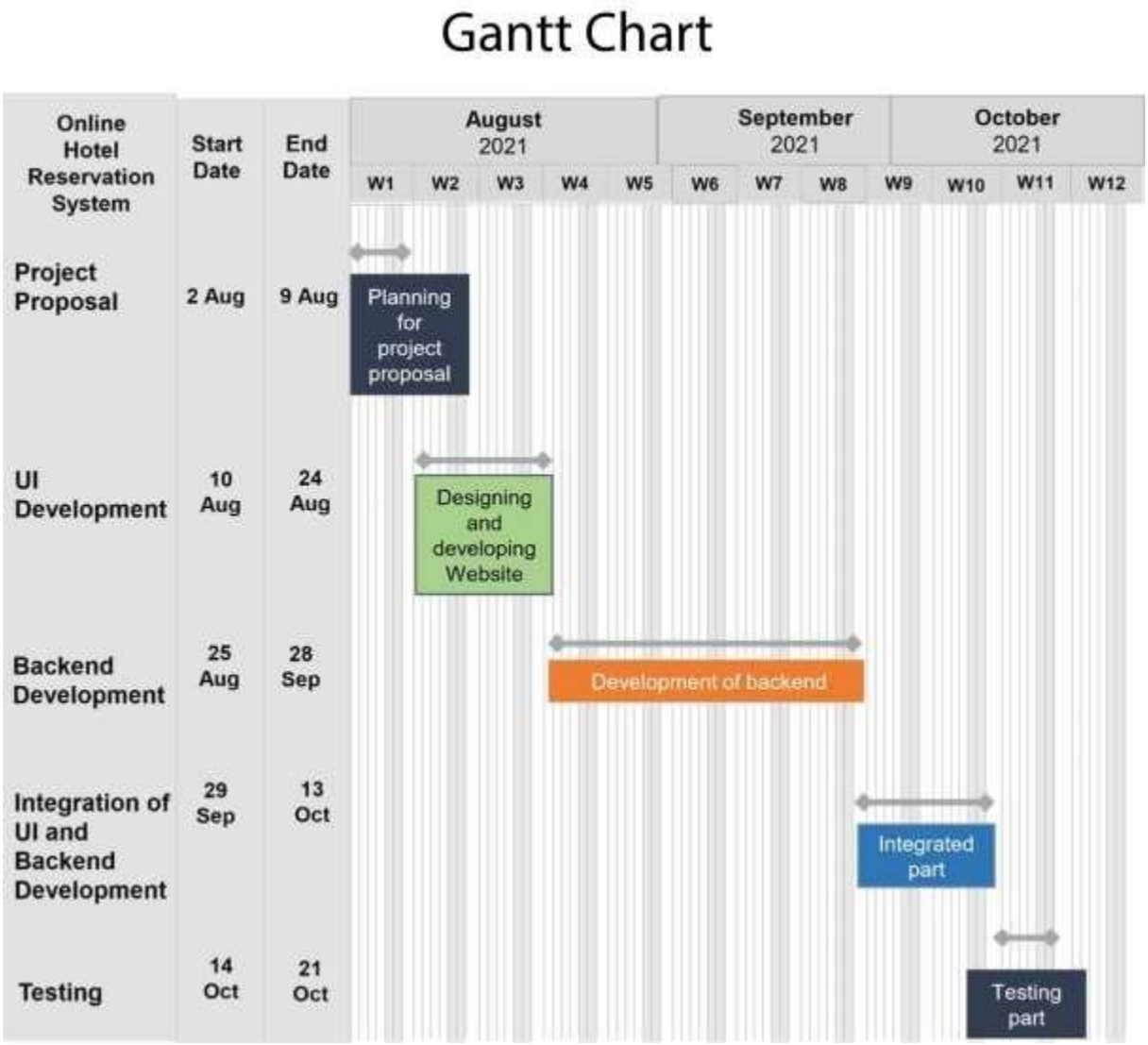


Figure 5: Gantt Chart

GitHub Link: https://github.com/Saijeet7/Hotel-Booking-System-with-Payment-Integration

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