

**DESIGN AND DEVELOPMENT OF A TOURISM PROMOTION WEB
APPLICATION**

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ABSTRACT

Travel planning can be difficult when users need to search for attractions, arrange itineraries, check routes, and manage bookings on different platforms. This project aims to develop a tourism web application that helps users explore places in Malaysia, plan trips, and organize travel activities in a more convenient way. The system allows users to browse destinations, view place details, create trips, add attractions into day-based itineraries, and view routes using an interactive map. It also includes a sandbox hotel booking feature where users can search hotels, view room details, make simulated bookings, and check booking receipts. An admin module is provided to manage places, trip templates, hotel information, and booking records.

The application is developed using React, Tailwind CSS, Node.js, Express.js, and MongoDB Atlas. Leaflet is used for map display and route visualization, while JWT authentication is used to manage user access. Overall, this project provides a simple and organized platform for tourism planning, helping users reduce manual planning work and improve their travel experience.

Area of Study (Minimum 1 and Maximum 2): Web development, front-end development

Keywords (Minimum 5 and Maximum 10): Tourism web application, trip planning, itinerary management, hotel booking simulation, interactive map, Malaysia tourism, React, MongoDB

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LIST OF ABBREVIATIONS

Abbreviation	Full Name
API	Application Programming Interface
CSS	Cascading Style Sheets
ERD	Entity Relationship Diagram
FYP	Final Year Project
HTML	HyperText Markup Language
HTTP	HyperText Transfer Protocol
JSON	JavaScript Object Notation
JWT	JSON Web Token
MERN	MongoDB, Express.js, React, Node.js
NoSQL	Not Only SQL
UI	User Interface
URL	Uniform Resource Locator
UX	User Experience
VS Code	Visual Studio Code
API	Application Programming Interface
CSS	Cascading Style Sheets
ERD	Entity Relationship Diagram
FYP	Final Year Project
HTML	HyperText Markup Language
HTTP	HyperText Transfer Protocol
JSON	JavaScript Object Notation
JWT	JSON Web Token
MERN	MongoDB, Express.js, React, Node.js
NoSQL	Not Only SQL
UI	User Interface
URL	Uniform Resource Locator
UX	User Experience
VS Code	Visual Studio Code

CHAPTER 1: INTRODUCTION

Since the challenges of COVID-19, people are looking for ways to relax and recover from the stress caused by the pandemic. People have been trapped in their home for too long and now travel seems like the best way to relieve that pressure. After the last lockdown ended 28th June 2021, the travel demand in Malaysia. People began using travel websites to plan their trip. In recent years, the internet has changed how people plan and book travel [1]. With the help of online travel agencies, social media, and mobile applications, tourists now have access to a wealth of information about destinations, hotels, attractions, and activities at their fingertips. However, despite the availability of a wide range of travel-related information, the process of trip planning can still be complex and time-consuming. Users often have to visit multiple websites to gather information, book transportation and accommodations, and create their itineraries.

1.1 Problem Statement and Motivation

Planning a trip can be time-consuming, especially when users need to search for destinations, arrange routes, manage itinerary schedules, and check accommodation details manually. Many travellers depend on multiple platforms during the planning process. For example, they may use travel websites to find attractions, map applications to check routes, notes or spreadsheets to arrange itineraries, and hotel booking platforms to search for accommodation. This creates a scattered and inconvenient planning experience.

Another problem is that many tourism platforms mainly provide destination information but do not support flexible itinerary management. Users may be able to view attractions, but they still need to manually decide the visiting order, check the location of each place, and organize the route by themselves. Without a proper map-based itinerary system, users may create inefficient travel plans, such as visiting places that are far apart or arranged in an unsuitable order [2].

In addition, some users may want to plan a trip before making actual bookings. However, real booking platforms usually require users to go through a serious

payment process. For a student project or planning simulation, it is more suitable to provide a sandbox booking feature where users can test the booking flow, view room details, and generate booking receipts without real payment.

The motivation of this project is to create a tourism web application that combines destination exploration, itinerary planning, map route display, and booking simulation in one platform. By doing so, users can plan their travel activities more easily and clearly. The system is also useful for promoting Malaysian tourism places because users can discover attractions by state, view details, and add them directly into their trips.

1.2 Research Objectives

The objectives of this project are:

1. To design and develop a tourism web application that allows users to explore tourism destinations in Malaysia.
2. To provide an itinerary planning feature where users can create trips, add selected places, and organize their travel schedule.
3. To integrate an interactive map that displays itinerary locations and route directions for better trip visualization.
4. To allow users to reorder or adjust itinerary stops so that they can plan their route more flexibly.
5. To develop a sandbox hotel booking simulation that allows users to search hotels, view room details, make simulated bookings, and view booking receipts.
6. To provide an admin module for managing tourism places, trip templates, hotel-related information, and booking records.
7. To improve the overall travel planning experience by reducing the need to use multiple separate platforms.

1.3 Project Scope and Direction

The scope of this project is focused on the development of a web-based tourism planning system for Malaysia travel. The system is designed for general users who

want to explore attractions, create trips, arrange itineraries, and simulate hotel bookings. It is also designed for administrators who need to manage tourism content and booking-related data.

The main features included in the project are:

Destination Exploration

Users can browse tourism places in Malaysia, search for attractions, view featured places, and access detailed information about each destination.

Trip and Itinerary Management

Users can create trips and add selected places into their itinerary. The itinerary can be arranged based on the user's preferred travel plan. Users can also reorder stops to improve their route arrangement.

Interactive Map and Route Display

The system uses map integration to show selected itinerary places visually. Routes between places can be displayed on the map to help users understand the travel path. This allows users to plan their journey more clearly instead of only viewing a text-based itinerary.

Sandbox Hotel Booking Simulation

Users can search for hotels, view hotel and room information, simulate a booking, and view booking receipts. This feature is only for simulation purposes and does not involve real payment transactions.

Admin Management Module

Administrators can manage tourism places, trip templates, hotel information, and booking records. This helps keep the system content organized and updated.

The project does not include real online payment, real hotel reservation confirmation, real-time customer support, tour guide hiring, flight booking, or transportation ticket booking. These features can be considered as future improvements. The current direction of the project is to focus on building a functional and organized tourism planning platform with itinerary and booking simulation features.

1.4 Contributions

This project provides several contributions:

Firstly, the system helps users plan trips in a more organized way by combining destination discovery, itinerary management, route visualization, and booking simulation in one web application. This reduces the need for users to switch between many different platforms during the planning process.

Secondly, the interactive map feature improves the travel planning experience by allowing users to view the location of itinerary places and understand the route between destinations. This makes the itinerary more practical and easier to follow.

Thirdly, the itinerary management feature gives users flexibility to add, remove, and reorder places according to their travel preferences. This supports a more personalized trip planning experience.

Fourthly, the sandbox hotel booking feature allows users to experience a basic booking process without using real payment. This is useful for demonstrating how hotel booking can be connected to a tourism planning system.

Lastly, the admin module supports content management by allowing administrators to manage tourism places, trip templates, hotels, and bookings. This helps ensure that the system can be maintained and updated more easily.

1.5 Report Organization

This report is divided into five main chapters, each covering a specific part of the project development process. Chapter 1 provides an introduction to the project, including the background, problem statement, objectives, project scope, and the contributions of the proposed system. Chapter 2 presents a review of related literature and technologies, discussing existing tourism platforms and web development tools that are relevant to this project. Chapter 3 explains the proposed method and system design, including the tools and technologies used, the architecture of the system, challenges encountered, and the project timeline. Chapter 4 outlines the preliminary work that has been completed so far, such as the development of key user and tour guide pages, testing of core features, and the use of diagrams to visualize the system's structure and flow. Finally, Chapter 5 concludes the report by summarizing the entire project, reflecting on the progress made, and identifying the potential for future improvement.

CHAPTER 2: Literature Reviews

2.1 Literature Review 1: Star Travel Malaysia Website

Star Travel Malaysia [3] is a Malaysia-based travel platform, award-winning travel agency known for offering diverse travel packages, including international and domestic tours, flight bookings, and customized holiday packages. The site caters to users seeking well-planned trips, featuring pre-arranged packages to popular destinations such as Penang and beyond.

2.1.1 Advantages

Star Travel's **flight search feature** makes it easy for users to find and book flights, allowing a seamless start to trip planning. The website also offers **various pre-designed travel packages**, such as "2D1N in Penang," providing a well-organized itinerary with timeline and date validity included. These packages are ideal for users who prefer planned-out trips, eliminating the need for detailed personal planning. Another significant advantage is the **24/7 support line**, which ensures customer assistance around the clock, providing peace of mind to users who may need help with bookings or inquiries. The platform also includes a **search bar** for users to quickly find destinations or specific packages, saving time and simplifying the navigation process.

2.1.2 Limitations

A significant limitation is the **fixed timeline** for the pre-arranged packages, which cannot be modified by users. While convenient for those seeking structured travel, it limits flexibility, making the platform less suitable for users who prefer to personalize their itineraries. Additionally, while the 24/7 support line is an excellent feature, there is no live chat function on the website for immediate assistance, which may frustrate users looking for faster, more interactive support. Moreover, users still have to **book their hotels separately** and cannot fully customize their trips, such as selecting specific destinations or restaurants within a package. This reduces the platform's appeal to users who seek more personalized, flexible trip arrangements. The **absence of a live chat function** for customer support further adds to the limitations.

Star Travel provides a convenient and structured travel planning experience with its flight search, pre-arranged packages, and continuous customer support. However, the inability to modify trip details or book hotels within the package limits its flexibility. Despite these drawbacks, the platform remains a helpful resource for users looking for comprehensive, pre-planned trips.

2.2 Literature Review 2: Malaysia Tourism Website

The Malaysia Travel website [4] is an official tourism platform that provides comprehensive information about exploring the country. It is designed to offer users insights into Malaysia's rich culture, destinations, events, and travel packages. It also serves as a key resource for visitors to explore the country's rich culture and natural beauty.

2.2.1 Advantages

One of the key advantages of the Malaysia Travel website is its **intuitive navigation bar**, which provides easy access to various travel-related categories such as "About Malaysia," "Experience," and "Deals & Packages." The **"Experience" section** is especially helpful as it allows users to filter destinations by state and topics like islands, beaches, culture, and food, offering a customized experience. This section ensures that users can discover Malaysia's unique features based on their interests.

The **"Deals & Packages" section** offers an excellent resource for user looking for discounted travel options. This feature includes transportation and activities, giving users the flexibility to plan their trips without needing to book full packages that include accommodation and meals. Users can quickly find relevant deals by selecting filters based on state, campaign, or category, making the process streamlined and convenient.

A major highlight of the website is its **real-time event listing** under the "Events & Happenings" section. This feature offers user's the opportunity to stay updated on top cultural events, such as national holidays and festivals, providing additional incentives

to visit at particular times. This is especially useful for tourists looking to experience Malaysia's diverse cultural celebrations, including Hari Merdeka and other festivals.

The **gallery and e-brochures** provide additional visual and informational content, helping users gain an in-depth view of different states, destinations, and travel ideas. These resources allow users to get inspired by browsing photos and brochures showcasing the beauty of Malaysia. The **chat box** further enhances the user experience by providing real-time support, making it easier for users to receive quick answers to their travel-related queries

2.3.2 Limitations

However, the site has some limitations, including the **absence of real-time booking** capabilities, requiring users to rely on third-party platforms. It also focuses more on popular destinations, limiting options for those seeking unique experiences.

A notable limitation of the website is the **lack of multiple language support**, which restricts accessibility for non-English-speaking users. Additionally, Malaysia Tourism lacks personalized trip-planning tools, and its reliance on external services for bookings can create a fragmented user experience.

Despite these limitations, the website is regularly updated with fresh content, mobile-friendly features, and diverse travel themes like halal travel and medical tourism, making it a valuable resource for exploring Malaysia.

2.3 Literature Review 3: TripAdvisor Website

TripAdvisor [5] is part of the global TripAdvisor network, one of the most widely used travel platforms worldwide. It provides user-generated reviews, ratings, recommendations for various travel services, including hotels, restaurants, tours, and attractions. TripAdvisor integrates various tools, including AI-driven trip planning, to help users create personalized travel itineraries.

2.3.1 Advantages

One of the major advantages of TripAdvisor is its AI-driven trip planning tool, which allows users to create personalized itineraries by inputting their travel dates, interests (e.g., food, culture, outdoor activities), and trip type (solo, couple, family, friends, or with pets). Based on this input, the platform generates a unique itinerary that users can access through their profile. However, it is important to note that this AI feature is not yet available for every destination, such as Malaysia. This tool gives users the flexibility to select their preferred attractions, hotels, and restaurants, making the travel planning process smoother.

Another significant advantage is the Traveler's Choice Awards, which ranks hotels, restaurants, and destinations based on user reviews. This ranking system offers new users a quick reference guide to popular destinations while allowing long-time users to contribute by rating and ranking their experiences. This adds an extra layer of credibility and helps create a trusted environment for user-generated content.

The multi-language and multi-currency features of TripAdvisor make it accessible to a global audience. By offering several language options and enabling currency conversion, the platform is tailored for users worldwide, enhancing its usability and convenience.

Additionally, TripAdvisor offers a wide range of travel-related services, including hotel bookings, restaurant reviews, things to do, flights, car rentals, and holiday rentals. The user-friendly interface allows users to quickly find what they are looking for, as it is well-organized and provides numerous choices.

In addition to the extensive user reviews, TripAdvisor offers detailed travel information beyond just reviews, such as descriptions of accommodations, attractions, restaurants, and tours. Users can easily access relevant information, including availability and pricing. This helps users make comprehensive travel decisions within a single platform. Additionally, TripAdvisor integrates booking functionalities from third-party providers, allowing users to not only compare options but also seamlessly book accommodations, tours, and flights through the platform.

A unique feature is the inclusion of user-uploaded photos, which provide more candid and realistic views of accommodations and attractions, offering more transparency

compared to promotional photos from hotels and vendors. Along with detailed reviews, these photos contribute to a more comprehensive understanding of what to expect from a destination.

2.3.2 Limitations

Despite its strengths, there are some **disadvantages**. One of the main issues is the **over-reliance on user reviews**, which may not always reflect objective opinions. Reviews can be biased, exaggerated, or influenced by isolated incidents, and it can be challenging to differentiate between genuinely helpful feedback and misleading comments.

However, one notable disadvantage is the **absence of direct customer service**. TripAdvisor functions primarily as a review aggregator and information platform, so users experiencing issues may find it difficult to get direct support from the platform. Instead, they have to rely on the third-party services or companies they book with through TripAdvisor.

Another issue is the **limitation of the AI trip planning tool**. While the tool offers personalized itineraries for many destinations, it's not available for all, including Malaysia, reducing the platform's functionality for users interested in visiting such locations.

One limitation is that TripAdvisor depends on **user participation**, which means that not all destinations or services are equally covered. Remote or niche locations may have fewer reviews and less detailed information, making it harder for user to rely on the site when visiting less popular areas.

Additionally, the platform may have **inconsistent updates**. While the user-generated content is continuously added, some reviews or listings may become outdated, which can lead to inaccurate or incomplete information. This is especially problematic for businesses that may have improved or changed over time but still suffer from outdated negative reviews.

TripAdvisor Malaysia remains a valuable resource for users seeking comprehensive and user-generated travel insights. The platform's global reach, extensive reviews, and integration with booking services make it a go-to tool for many tourists. However, the over-reliance on subjective user reviews and limited personalization are notable disadvantages. While there are limitations, TripAdvisor continues to evolve with features that enhance user engagement and streamline the travel planning experience.

2.4 Literature Review 4: Website Development Technologies: A Review

2.4.1 Introduction

The paper [6] discusses the development of web technologies, including methodologies and tools that have been employed over time. Developers have worked on making web development more structured and efficient by creating methodologies like the Web Development Life Cycle (WDLC), which standardizes the process of building websites and web applications. Tools and frameworks such as AngularJS, NodeJS, and the MEAN/MERN/Django stacks have been developed to solve various challenges related to web application development, particularly to improve scalability, speed, and user interaction.

2.4.2 Previous work done by them

Previous works in web development have included the evolution of static websites in the early 1990s to more dynamic, interactive, and scalable platforms. Technologies like HTML, CSS, and early programming languages were used to create simple web pages. The introduction of JavaScript and server-side programming languages such as PHP allowed for more interactive experiences. More recently, developers have leveraged NoSQL databases like MongoDB, front-end frameworks like React and Angular, and back-end environments such as NodeJS to handle the complexity of modern web apps.

2.4.3 Strengths of the Solutions

The solutions developed over the years show several strengths:

- **Modularity and Structure:** Frameworks like MEAN and Django offer structured ways to develop applications, enabling rapid and organized development.
- **Scalability:** Technologies like NodeJS and NoSQL databases (e.g., MongoDB) offer high scalability, making it easier to handle large-scale applications (Website_Development_Tec...).
- **Speed and Performance:** Technologies like AngularJS and ReactJS enable faster rendering and updating of web content, ensuring high responsiveness and interactivity (Website_Development_Tec...).
- **Cross-platform compatibility:** Web technologies are designed to run on any operating system, improving accessibility and user reach (Website_Development_Tec...).

2.4.4 Weaknesses and Limitations

- **Responsiveness Issues:** A common limitation noted is that applications that are not fully optimized for different screen sizes may have poor responsiveness. The paper mentions the importance of making sure websites and web apps work across all platforms and screen sizes, something that is often neglected in early designs.
- **Dependence on Internet Connectivity:** Web apps require a stable internet connection, limiting their functionality when offline. This limitation can significantly affect user experience in areas with unstable internet.
- **Potential for Poor Website Performance:** If the underlying website has performance issues such as slow load times or security vulnerabilities, the associated web application may also suffer from these issues.
- **Complexity of Managing Stacks:** While MEAN, MERN, and Django stacks offer flexibility, their implementation can be complex and require a deep understanding of multiple components, which can become overwhelming for less experienced developers.

2.4.5 How These Weaknesses Can Be Resolved

- **Enhancing Responsiveness:** Improving the responsiveness of web applications by testing across various devices and screen sizes can help address performance issues. Using tools like Bootstrap or employing responsive design techniques early in development can help ensure compatibility across platforms.
- **Developing Offline Capabilities:** Introducing Progressive Web App (PWA) technologies can help mitigate reliance on constant internet connectivity. PWAs allow web applications to cache resources locally and function offline, improving usability.
- **Optimizing Website Performance:** Regular testing and optimization, including improving server response times and database queries, can enhance the performance of both websites and web applications. The use of Content Delivery Networks (CDNs) can also help speed up load times.
- **Simplifying Stack Management:** Tools like Docker and Kubernetes can assist in managing complex stacks by automating deployment and scaling. They can simplify the configuration and integration of various stack components.

This review synthesizes the research and development efforts in web technologies, identifies the benefits and drawbacks of current solutions, and suggests improvements for future advancements.

2.5 Literature Review 5: Real-Time Chat Application

2.5.1 Problem statement

The problem statement [7] they are trying to solve is the need for a **reliable, secure, and user-friendly chat application** that works across different platforms and devices, while ensuring data protection and efficient communication. They aim to address concerns about **data theft** and **third-party breaches** by developing a system that handles both sending and receiving processes securely and simultaneously. Additionally, they want to improve the overall **user experience** and workflow efficiency in chat applications using the **MERN stack**

2.5.2 Solutions from Previous Developers

The solution proposed is to develop a cross-platform chat application using the **MERN stack** (MongoDB, Express.js, React, and Node.js). This stack enables the creation of a secure, scalable, and efficient chat system that supports real-time communication by handling simultaneous sending and receiving of messages. By utilizing the strengths of the MERN stack, the team can ensure a seamless user experience across various devices and platforms. Additionally, the solution focuses on protecting user data from third-party breaches by implementing robust security measures within the application. The use of the MERN stack also enhances the development process, allowing for faster iterations and improved workflow, making it an ideal choice for delivering a reliable and user-friendly chat application. In the provided study, the application allows users to create accounts, join chat rooms, and send real-time messages using WebSockets for seamless communication. The use of AngularJS and Socket.io to handle dynamic views and real-time updates is also common in similar applications, highlighting their ability to handle large volumes of messages efficiently.

2.5.3 Previous Work Done

Prior work on real-time chat applications has been focused on developing efficient front-end and back-end frameworks. The document emphasizes the use of technologies such as MongoDB, Express, React, and Node.js in building the chat application:

- MongoDB is utilized for its flexible document-oriented data storage.
- Express.js is used as the back-end web framework to handle API requests.
- React helps in building an interactive user interface.
- Socket.io enables real-time, bidirectional communication between clients and servers, which is essential for real-time updates in chat applications.
- Node.js serves as the platform for executing server-side JavaScript code, which enhances the scalability of the app.

2.5.4 Strengths of the Solutions

- **Scalability:** The use of Node.js and Socket.io ensures that the system can handle multiple users concurrently without compromising performance. This allows the application to efficiently scale with the number of users.
- **Real-time Communication:** The use of WebSockets via Socket.io enables instant communication, a key feature for any chat application. This results in reduced latency and improved user experience.
- **Cross-platform Flexibility:** The stack used (MERN) allows the chat application to run across different platforms and devices, making it accessible to a wider audience.
- **Security:** The application incorporates JWT (JSON Web Tokens) for user authentication, enhancing data security and preventing unauthorized access.
- **Efficient State Management:** React allows developers to manage the application state efficiently, which is crucial in keeping the chat application responsive and dynamic.

2.5.5 Weaknesses and Limitations

- **Data Security Concerns:** Although the use of JWT provides a level of security, there are concerns about potential vulnerabilities to token theft, especially during transmission if proper encryption mechanisms are not in place.
- **Latency in High Traffic:** Despite using Socket.io and Node.js for scalability, the system might still experience latency issues under extremely high traffic due to the limited computational power of Node.js when handling CPU-intensive operations.
- **Limited Features:** The application described focuses on basic messaging features. It lacks advanced functionalities like video/voice calls, file sharing, and integration with external services, which are now common in modern chat applications.

2.5.6 How These Weaknesses Can Be Resolved

- **Improved Security:** To mitigate security risks, stronger encryption mechanisms such as SSL/TLS should be implemented alongside JWT. Additionally, regular updates to security protocols and using two-factor authentication (2FA) can help prevent unauthorized access.
- **Handling High Traffic:** The system can integrate load balancing techniques and deploy the app across a cloud service with auto-scaling capabilities, such as AWS or Google Cloud Platform, to manage high traffic more efficiently.
- **Feature Expansion:** Adding functionalities such as voice/video chat, file-sharing, and integration with other platforms can increase the application's versatility and make it more competitive with other modern chat applications.

In conclusion, while the existing solution provides a solid framework for real-time communication using the MERN stack, there is room for improvement in terms of security, performance, and additional features. By addressing these weaknesses, the chat application can offer a more robust and feature-rich experience for users.

CHAPTER 3: System Methodology /Approach

3.1 System Methodology

3.1.1 Waterfall Methodology

The methodology utilized in this project is the Waterfall methodology, which is a structured and sequential approach commonly used in software development and system engineering [8]. This methodology follows a linear process where each phase must be completed before moving on to the next stage. It is suitable for this project as the system requirements are clearly defined at the early stage.

The first phase is Requirement Analysis, where user needs and system requirements are identified and documented. This stage defines the scope of the tourism web application, including features such as trip planning, itinerary management, and booking simulation.

The second phase is the System Design stage. In this phase, the overall system architecture, database structure (MongoDB), and user interface design are planned. Technologies such as React, Node.js, and Tailwind CSS are selected to ensure a responsive and efficient system.

The third phase is Implementation, where the system is developed based on the design specifications. This includes building the frontend interface, backend logic, API integration (such as OpenStreetMap and Hotelbeds sandbox), and core functionalities like itinerary management and booking simulation.

The fourth phase is Testing, which ensures the system functions correctly and meets user requirements. This includes unit testing, integration testing, and user acceptance testing to verify system performance, usability, and compatibility across different devices.

The final phase is Deployment, where the system is made available for users after successful testing. The application can be accessed through modern web browsers on devices such as desktops, tablets, and smartphones.

In summary, the Waterfall methodology provides a clear and organized development process, allowing each stage to be completed systematically. This reduces

development risks and ensures that the system is built according to the defined requirements.

3.1.2 Timeline

FYP1

- Week 1-2: Research and Planning
- Week 3-4: Brainstorming & Draft
- Week 4-11: Coding & Debug
- Week 11-12: Writing Report

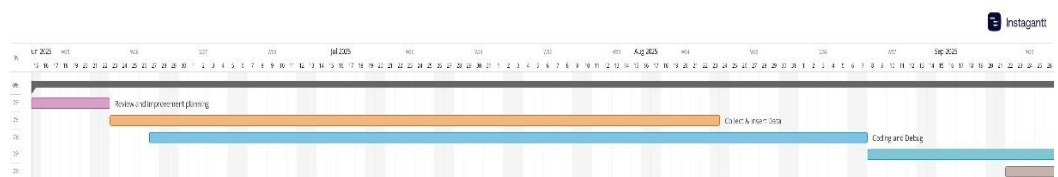


Figure 3.4.2.1 Timeline of FYP 1

FYP2:

- Week 1-2: Review &Improvement Planning
- Week 2-8: Collect & Insert Data
- Week 3-10: Coding & Debug
- Week 10-13: UI Design
- Week 11-14: Writing Report

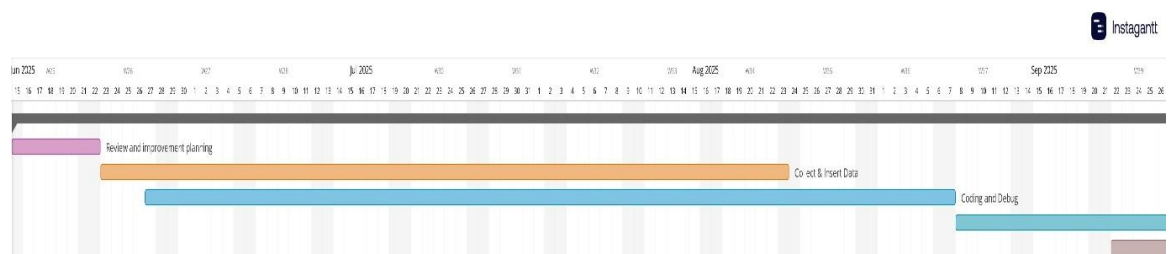


Figure 3.4.2.2 Timeline of FYP 2

3.2 System Modeling

3.2.1 Use Case Diagram

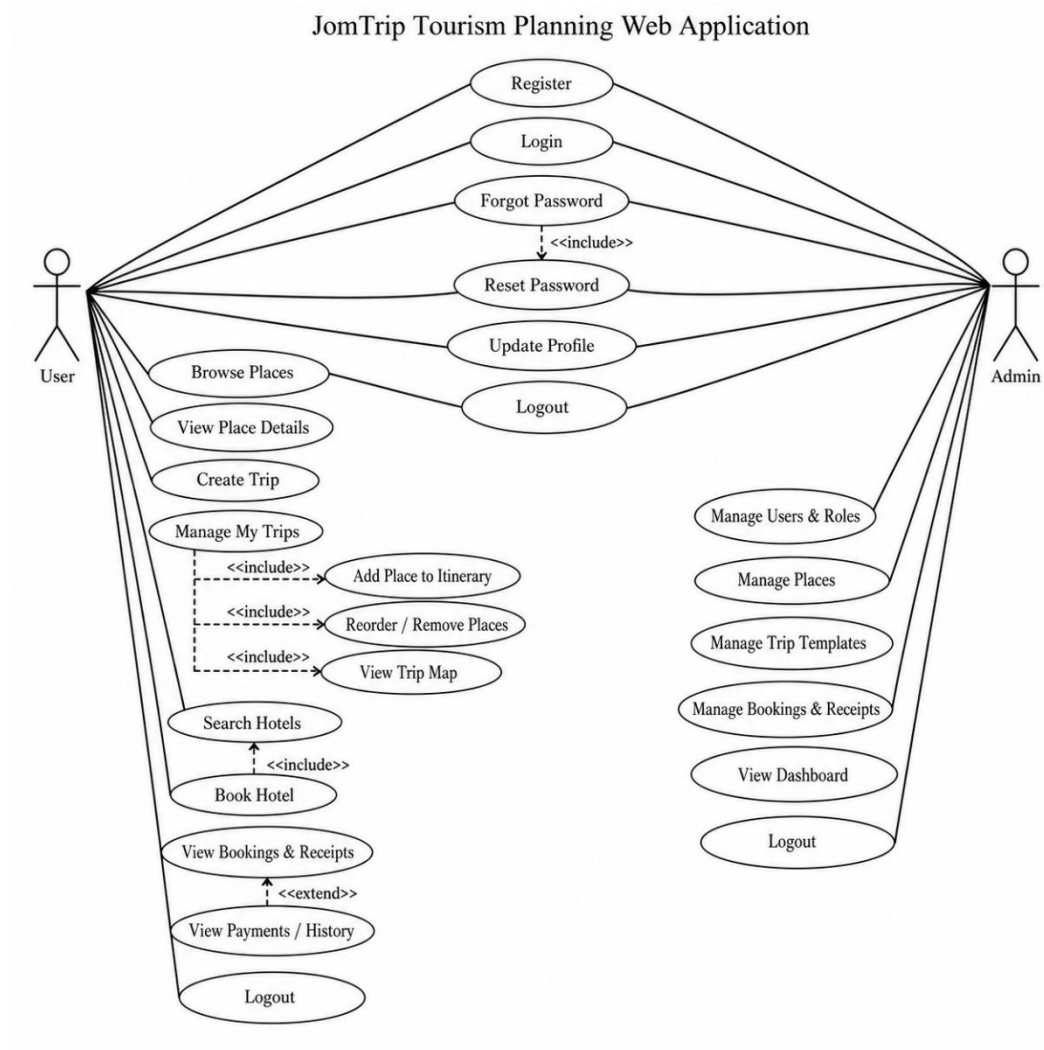


Figure 3.2.1.1 Use Case Diagram

3.2.2 Use Case Diagram and Description

Use Case: Register	Actor (s): User
Purpose: To allow new user to create an account to access the system.	
Trigger: User clicks the “Register” button.	
Precondition: User does not have an existing account.	
Normal Event Flow: 1. User enters username, email, and password. 2. System validates the input. 3. System checks whether the email already exists. 4. System stores the new user account in the database. 5. System displays successful registration message.	
Alternative/Exceptional Flow: 1a. If the email is already registered, the system shows an error message. 2a. If required fields are empty, the system requests the user to complete them.	
Postcondition: A new account is created, and the user can log in.	

Table 3.2.2.1 Use Case Description of Register

Use Case: Login	Actor (s): User, Admin
Purpose: To allow registered users and admin to access the system	
Trigger: User clicks the “Login” button.	
Precondition: Actor already has an account.	
Normal Event Flow: 1. Actor enters email and password. 2. System validates the login credentials. 3. System generates authentication token. 4. System redirects actor to the correct interface.	

Alternative/Exceptional Flow: 1a. If email or password is incorrect, system shows an error message. 2a. If required fields are empty, system asks actor to complete them.
Postcondition: Actor is logged into the system successfully.

Table 3.2.2.2 Use Case Description of Login

Use Case: Explore	Actor (s): User
Purpose: To allow users to browse tourism places in Malaysia.	
Trigger: User opens the Explore page.	
Precondition: Tourism places are available in the system.	
Normal Event Flow: 1. User views a list of recommended places. 2. User filters or searches places by state/category. 3. System displays matching tourism places. 4. User selects a place to view more details.	
Alternative/Exceptional Flow: 1a. If no place matches the search, system displays no result message. 2a. If place data fails to load, system shows an error message.	
Postcondition: User can browse and select tourism places.	

Table 3.2.2.3 Use Case Description of Explore

Use Case: View Place Details	Actor (s): User
Purpose: To allow user to view detailed information about a tourist place.	
Trigger: User clicks on a place card.	

Precondition: The selected place exists in the database.
Normal Event Flow: 1. User selects a place. 2. System retrieves place details. 3. System displays place name, image, description, location, opening hours, phone number, and map.
Alternative/Exceptional Flow: 1a. If the place cannot be found, system displays an error message. 2a. If map coordinates are invalid, system may not display the map correctly.
Postcondition: User understands the details of the selected place.

Table 3.2.2.4 Use Case Description of View Place Details

Use Case: Save Place	Actor (s): User
Purpose: To allow user to view detailed information about a tourism place.	
Trigger: User clicks the “Save” button on a place.	
Precondition: User is logged in.	
Normal Event Flow: 1. User selects a place to save 2. System checks the user account. 3. System saves the place under the user’s saved places. 4. System displays success message.	

Alternative/Exceptional Flow: 1a. If user is not logged in, system asks user to log in. 2a. If the place is already saved, system shows a message.
Postcondition: The selected place is saved to the user's account.

Table 3.2.2.5 Use Case Description of Save Place

Use Case: Create Trip	Actor (s): User
Purpose: To allow user to create a new travel trip.	
Trigger: User clicks "Create Trip".	
Precondition: User is logged in.	
Normal Event Flow: 1. User enters trip name and optional travel dates. 2. System validates the trip details. 3. System creates a new trip in the database. 4. System redirects user to the trip detail page.	
Alternative/Exceptional Flow: 1a. If trip name is empty, system requests user to enter a trip name. 2a. If system fails to save the trip, an error message is shown.	
Postcondition: A new trip is created.	

Table 3.2.2.6 Use Case Description of Create Trip

Use Case: Manage Trip	Actor (s): User
Purpose: To allow user to edit or delete existing trips.	
Trigger: User opens "My Trips".	

Precondition: User has at least one trip.
Normal Event Flow: 1. User views list of created trips. 2. User selects a trip. 3. User edits trip details or deletes the trip. 4. System updates the database.
Alternative/Exceptional Flow: 1a. If user has no trip, system displays “Start your trip now”. 2a. If update fails, system shows an error message.
Postcondition: Trip information is updated or removed.

Table 3.2.2.7 Use Case Description of Manage Trip

Use Case: Manage Itinerary	Actor (s): User
Purpose: To allow user to manage travel itinerary inside a trip.	
Trigger: User opens a trip detail page.	
Precondition: User has created a trip.	
Normal Event Flow: 1. User selects a trip day. 2. User adds places to the itinerary. 3. User removes places if needed. 4. User reorders itinerary stops. 5. System updates the itinerary list. 6. System displays route and map information.	
Alternative/Exceptional Flow:	

1a. If no places are added, system displays an empty itinerary message.
2a. If route calculation fails, system shows available places without route.
Postcondition: User's itinerary is saved and updated.

Table 3.2.2.8 Use Case Description of Manage Itinerary

Use Case: Optimize Itinerary	Actor (s): User
Purpose: To arrange itinerary places into a better travel route.	
Trigger: User clicks "Optimize Route".	
Precondition: Itinerary contains at least two valid places with coordinates.	
Normal Event Flow: 1. User clicks optimize button. 2. System reads all itinerary stops. 3. System calculates nearest route using coordinates. 4. System rearranges the itinerary order. 5. System updates the route on the map.	
Alternative/Exceptional Flow: 1a. If there are not enough places, system shows a warning message. 2a. If coordinates are missing or invalid, system cannot optimize the route.	
Postcondition: Itinerary is arranged into a more efficient route.	

Table 3.2.2.9 Use Case Description of Optimize Itinerary

Use Case: View Map and Route	Actor (s): User
Purpose: To allow user to view itinerary places and route on a map.	

Trigger: User opens the itinerary or trip detail page.
Precondition: Itinerary contains valid place coordinates.
Normal Event Flow: 1. System loads itinerary places. 2. System displays numbered markers on the map. 3. System draws route between selected places. 4. User views route direction visually.
Alternative/Exceptional Flow: 1a. If coordinates are invalid, the place marker is not displayed. 2a. If routing service fails, system displays markers only.
Postcondition: User can visually understand the trip route.

Table 3.2.2.10 Use Case Description of Manage Itinerary

Use Case: Search Hotel	Actor (s): User
Purpose: To allow user to search hotels for travel planning.	
Trigger: User opens the Hotel page.	
Precondition: Hotel data or sandbox hotel search is available.	
Normal Event Flow: 1. User enters destination and search details. 2. System searches available hotels. 3. System displays hotel results. 4. User views hotel room information.	
Alternative/Exceptional Flow:	

1a. If no hotel is found, system displays no result message. 2a. If search fails, system shows an error message.
Postcondition: User can view available hotel options.

Table 3.2.2.11 Use Case Description of Search Hotel

Use Case: Book Hotel Sandbox	Actor (s): User
Purpose: To simulate hotel booking without real payment.	
Trigger: User clicks “Book” on a hotel room.	
Precondition: User has selected a hotel room.	
Normal Event Flow: 1. User views room details. 2. User confirms booking information. 3. System simulates booking process. 4. System creates a booking record. 5. System generates booking receipt.	
Alternative/Exceptional Flow: 1a. If required booking details are missing, system asks user to complete them. 2a. If booking simulation fails, system shows an error message.	
Postcondition: A sandbox hotel booking is created.	

Table 3.2.2.12 Use Case Description of Book Hotek Sandbox

Use Case: View Booking Receipt	Actor (s): User
Purpose: To allow user to view booking receipt details.	

Trigger: User clicks on a booking receipt.
Precondition: User has completed a sandbox booking.
Normal Event Flow: 1. User opens booking receipt list. 2. User selects a receipt. 3. System displays receipt details. 4. User views hotel, room, date, price, and booking status.
Alternative/Exceptional Flow: 1a. If receipt cannot be found, system shows an error message. 2a. If user has no booking, system displays empty booking message.
Postcondition: User can view completed booking details.

Table 3.2.2.13 Use Case Description of View Booking Receipt

Use Case: Manage Places	Actor (s): Admin
Purpose: To allow admin to manage tourism place records.	
Trigger: Admin opens Manage Places page.	
Precondition: Admin is logged in.	
Normal Event Flow: 1. Admin views list of tourism places. 2. Admin adds a new place. 3. Admin edits existing place details. 4. Admin deletes unwanted place records. 5. System updates the database.	

Alternative/Exceptional Flow: 1a. If required place details are missing, system shows validation error. 2a. If place deletion fails, system shows an error message.
Postcondition: Tourism place data is maintained by admin.

Table 3.2.2.14 Use Case Description of Manage Places

Use Case: Manage Trip Templates	Actor (s): Admin
Purpose: To allow admin to create and edit trip templates for users.	
Trigger: Admin opens Manage Trip Templates page.	
Precondition: Admin is logged in.	
Normal Event Flow: 1. Admin views existing trip templates. 2. Admin creates a new trip template. 3. Admin edits template details. 4. Admin deletes unsuitable templates. 5. System updates template data.	
Alternative/Exceptional Flow: 1a. If template details are incomplete, system shows an error message. 2a. If update fails, system keeps the old template data.	
Postcondition: Trip templates are available for users to view or use.	

Table 3.2.2.15 Use Case Description of Manage Trip Template

Use Case: View Bookings	Actor (s): Admin
--------------------------------	-------------------------

Purpose: To allow admin to view user booking records.
Trigger: Admin opens booking management page.
Precondition: Admin is logged in.
Normal Event Flow: 1. Admin views all booking records. 2. System displays booking information. 3. Admin checks user booking details and status.
Alternative/Exceptional Flow: 1a. If no booking exists, system displays empty booking list. 2a. If booking data fails to load, system shows an error message.
Postcondition: Admin can monitor booking records.

Table 3.2.2.16 Use Case Description of View Bookings

Use Case: Manage Users	Actor (s): Admin
Purpose: To allow admin to view and manage system users.	
Trigger: Admin opens Manage Users page.	
Precondition: Admin is logged in.	
Normal Event Flow: 1. Admin views registered users. 2. Admin checks user account information. 3. Admin updates or manages user status if needed.	
Alternative/Exceptional Flow: 1a. If user data cannot be loaded, system shows an error message.	
Postcondition: Admin can manage user information.	

Table 3.2.2.17 Use Case Description of Manage Users

Use Case: Logout	Actor (s): User, Admin
Purpose: To allow actor to safely exit the system.	
Trigger: Actor clicks the “Logout” button.	
Precondition: Actor is currently logged in.	
Normal Event Flow: 1. Actor clicks the “Logout” button. 2. System removes the authentication session/token. 3. System redirects actor to the login page or main page.	
Alternative/Exceptional Flow: 1a. If logout fails, system displays an error message.	
Postcondition: Actor is logged out from the system.	

Table 3.2.2.18 Use Case Description of Logout

3.2.3 Activity Diagram

1. Register

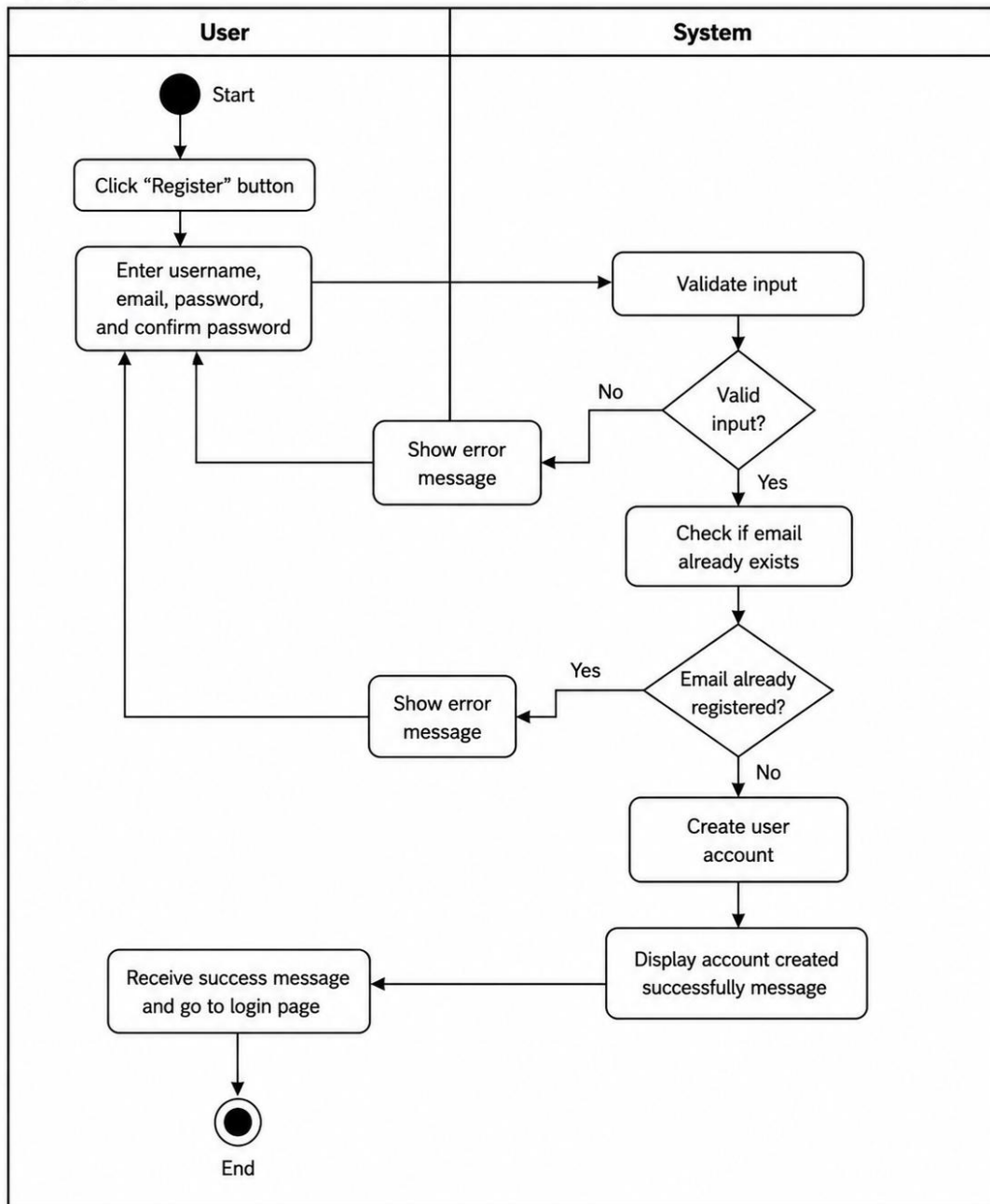


Figure 3.2.3.1 Activity Diagram of Register

2. Login

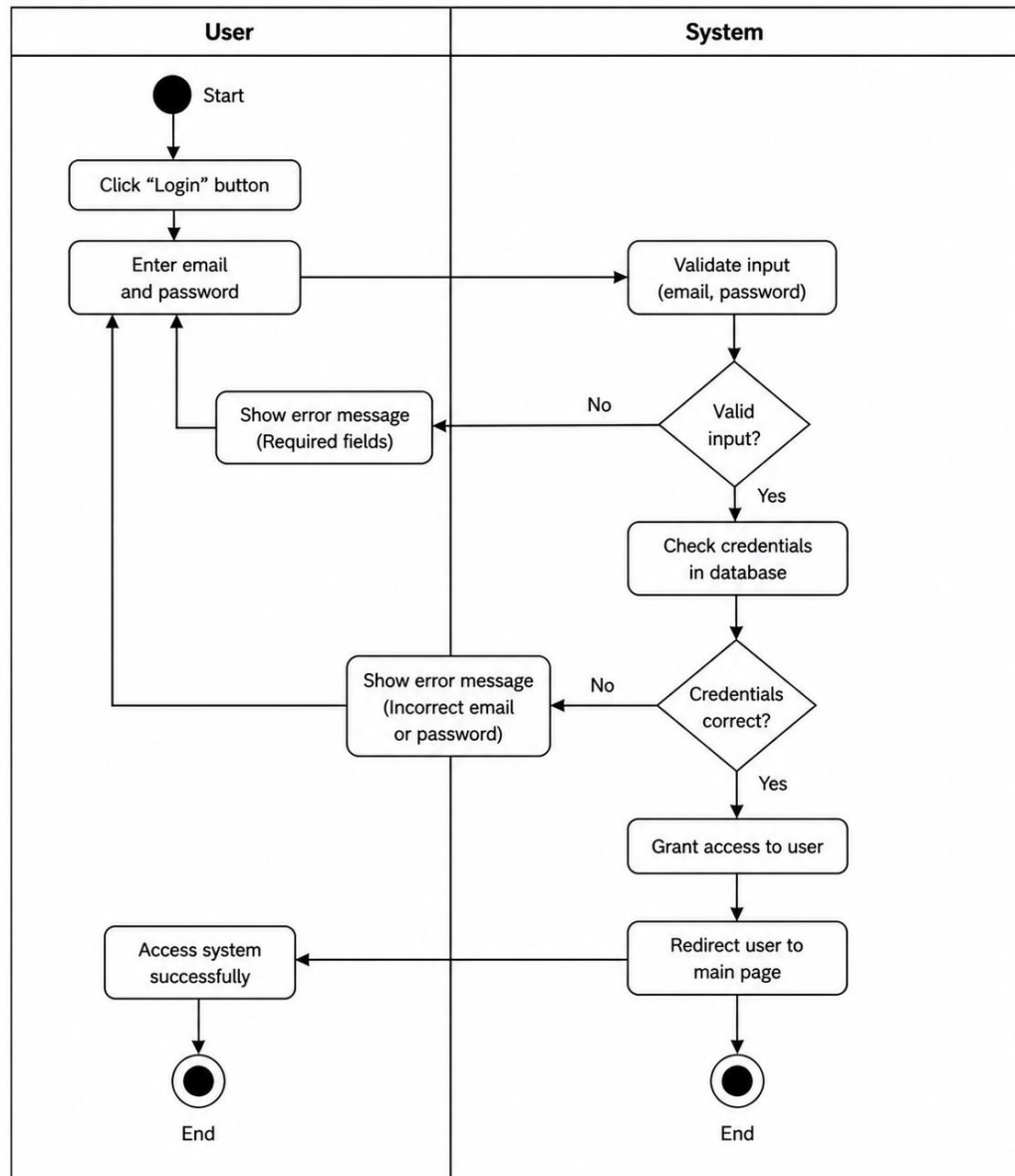


Figure 3.2.3.2 Activity Diagram of Login

3. Explore Places

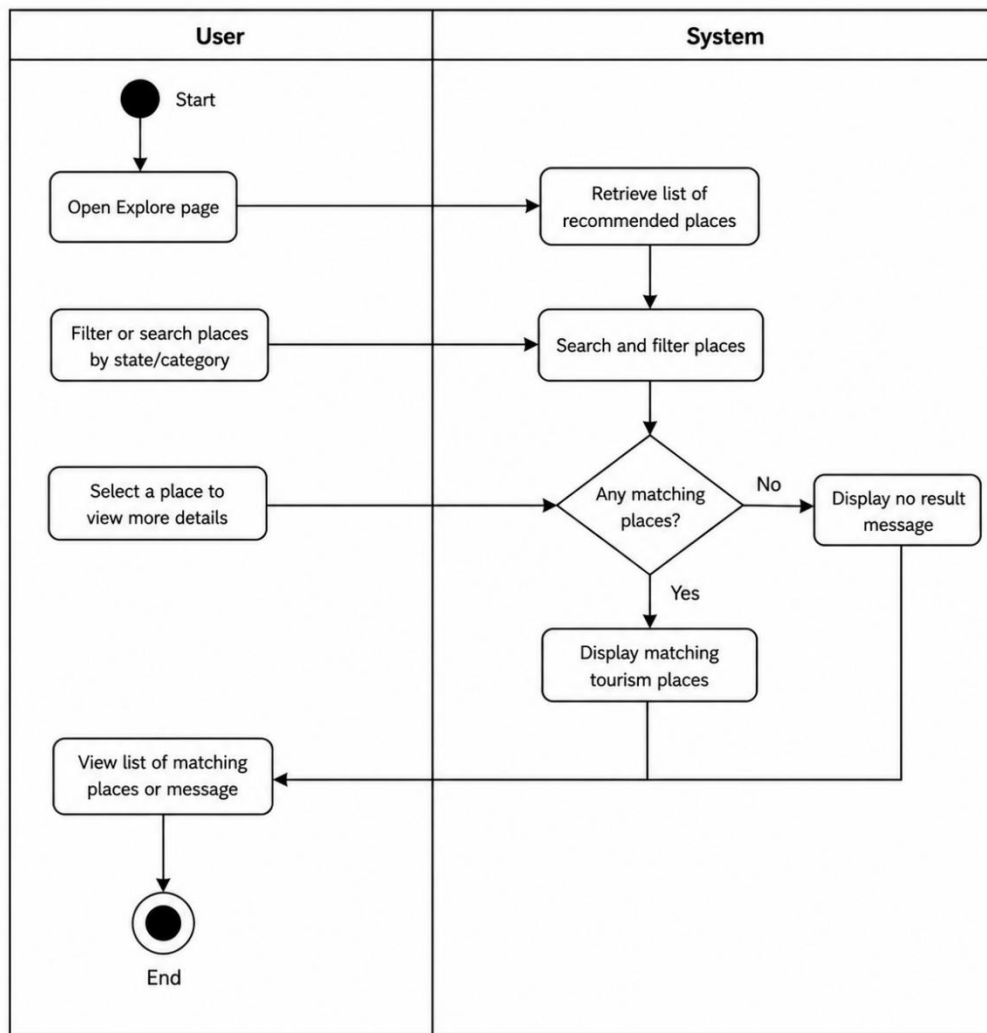


Figure 3.2.3.3 Activity Diagram of Explore Places

4. View Place Details

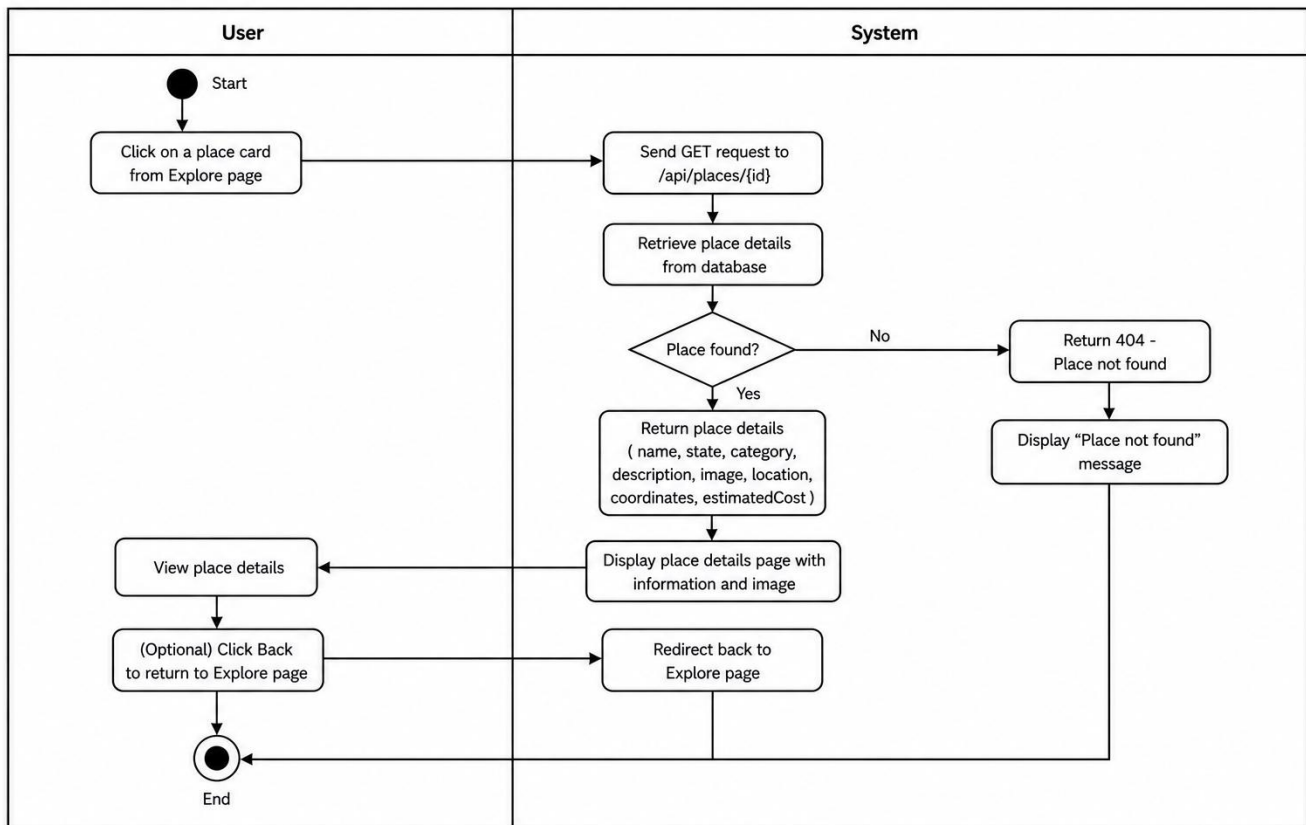


Figure 3.2.3.4 Activity Diagram of View Place Details

5. Save Place to Trip

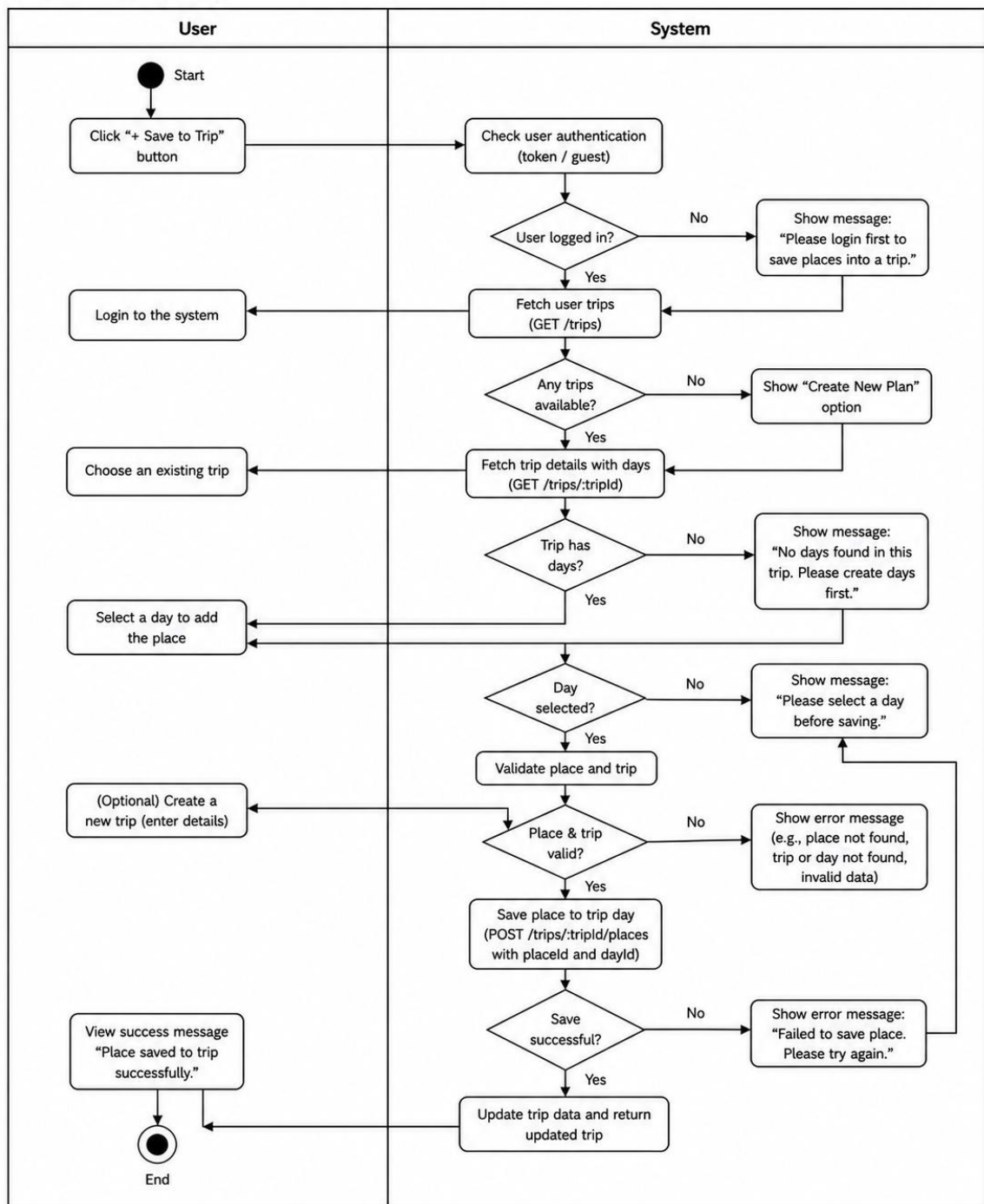


Figure 3.2.3.5 Activity Diagram of Save Place

6. Create Trip

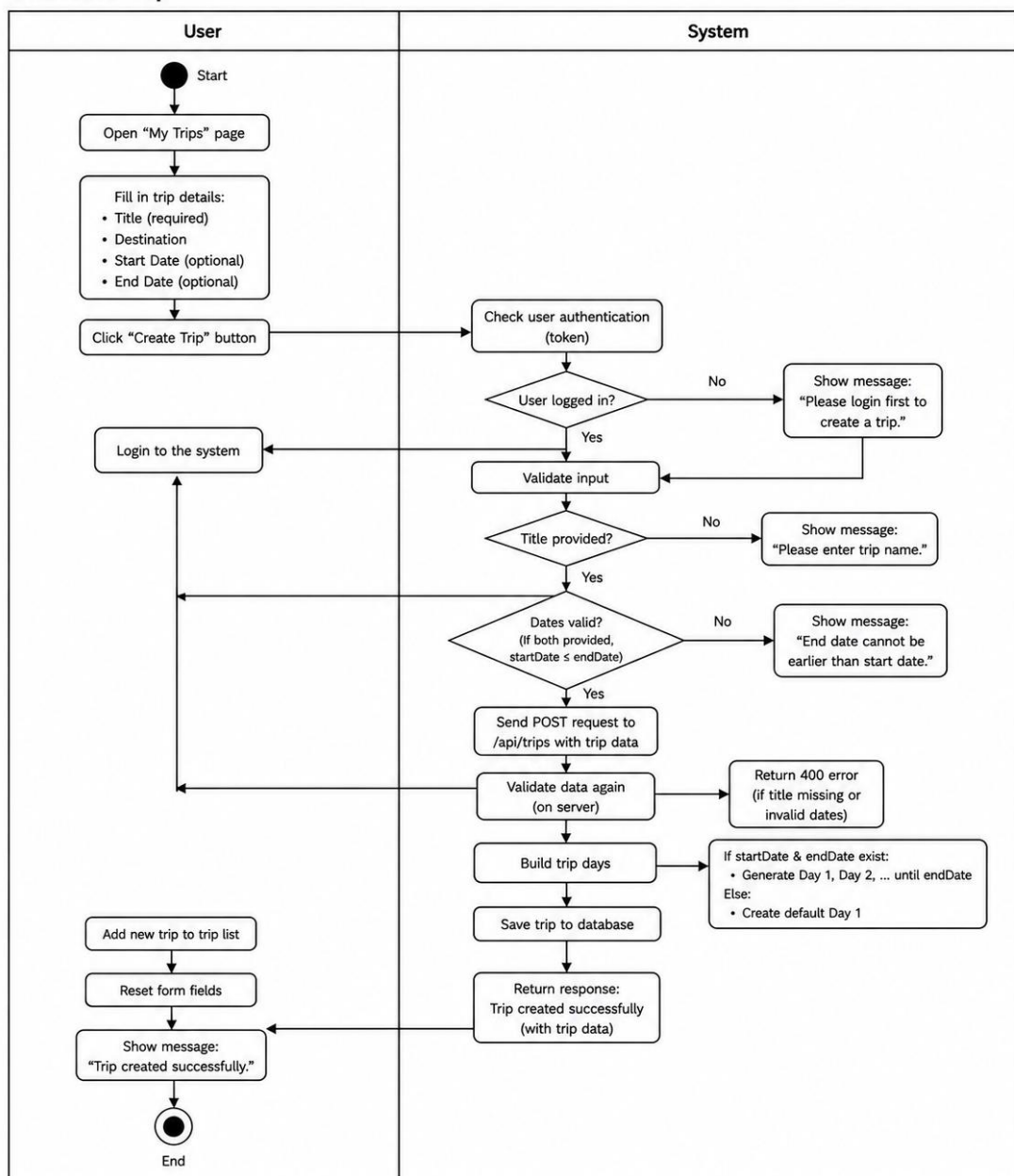


Figure 3.2.3.6 Activity Diagram of Create Trip

7. Manage Trip (View / Edit / Delete)

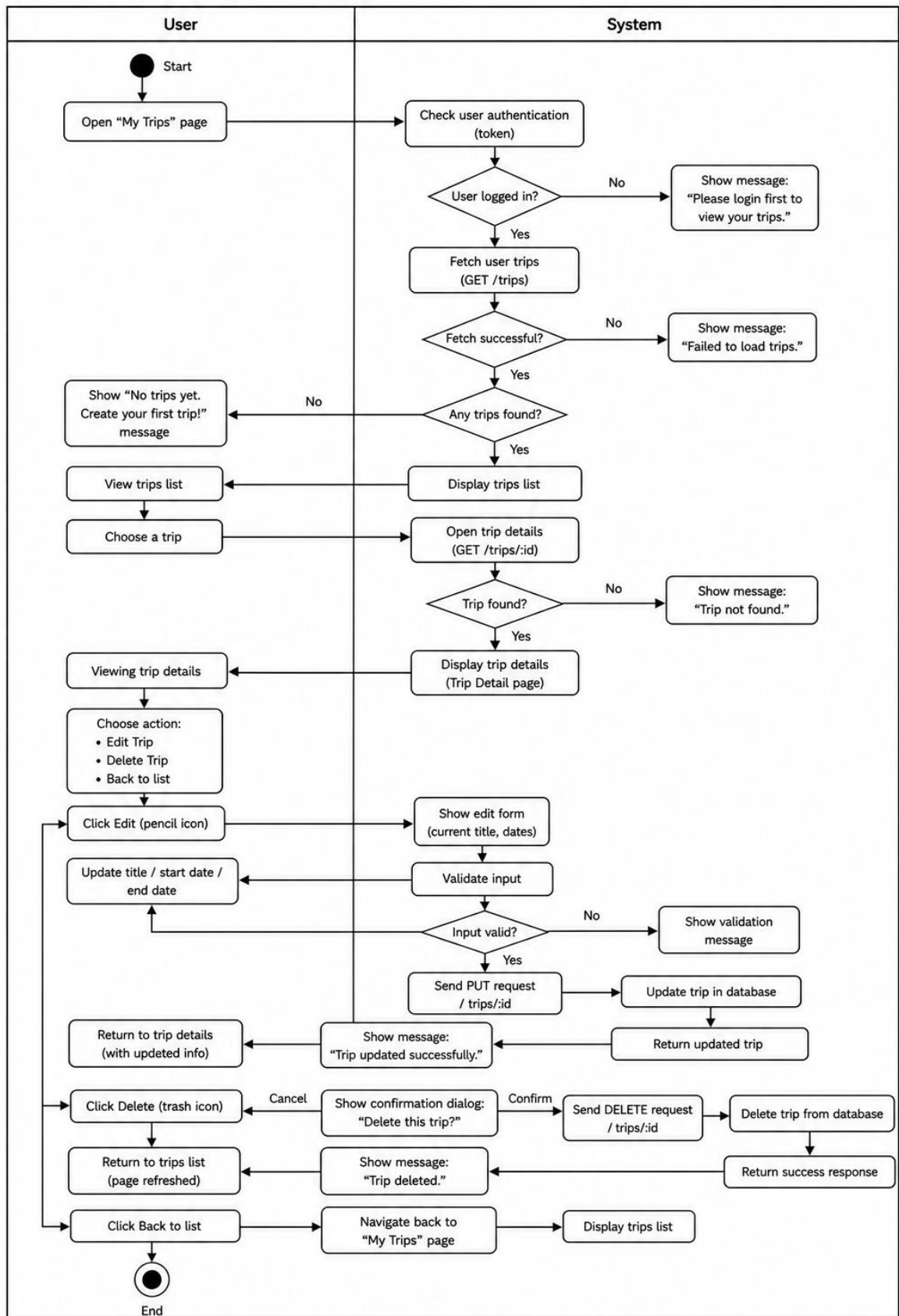


Figure 3.2.3.7 Activity Diagram of Manage Trip (View /Edit/ Delete)

8. Manage Itinerary

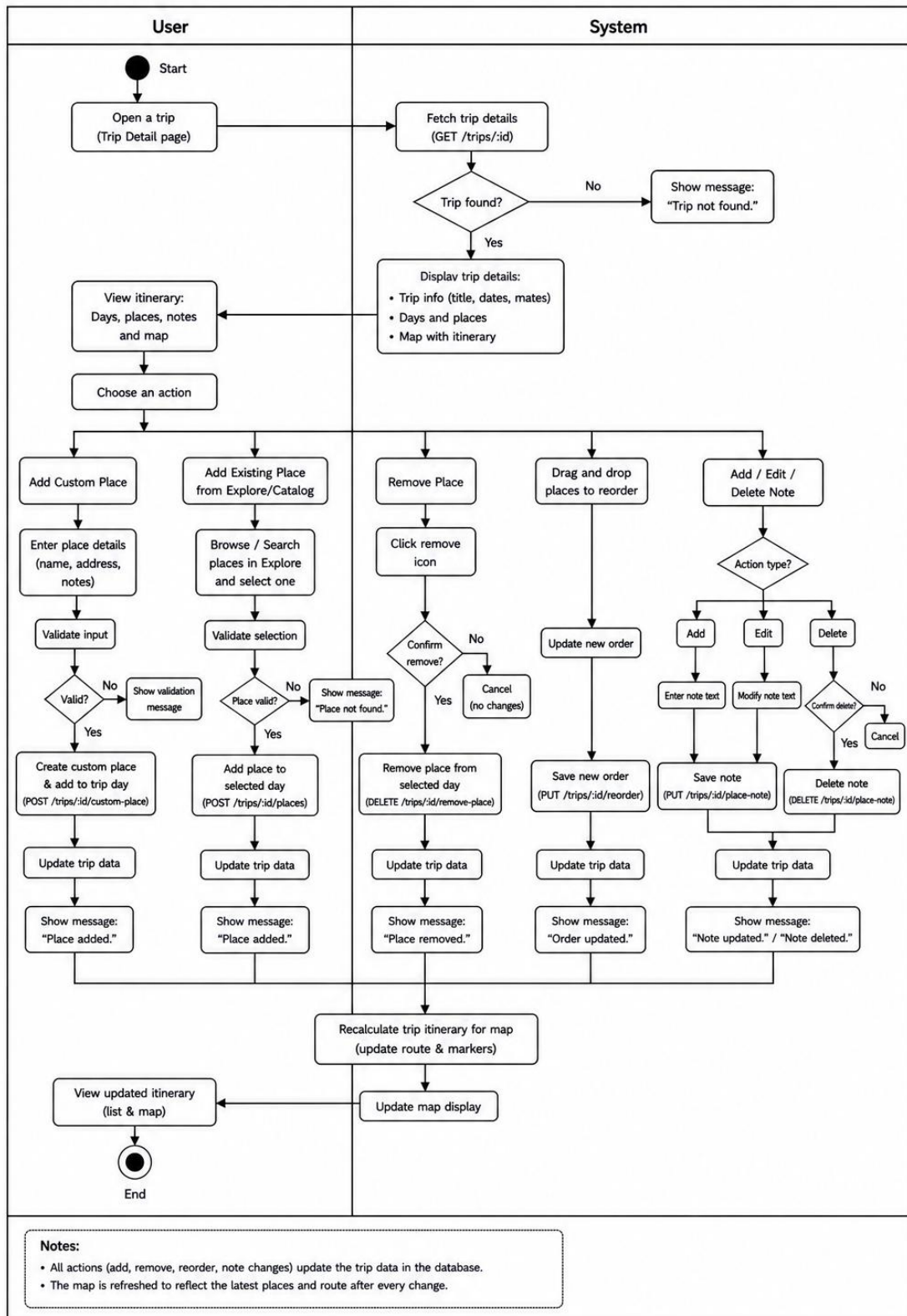


Figure 3.2.3.8 Activity Diagram of Manage Itinerary

9. Optimize Itinerary

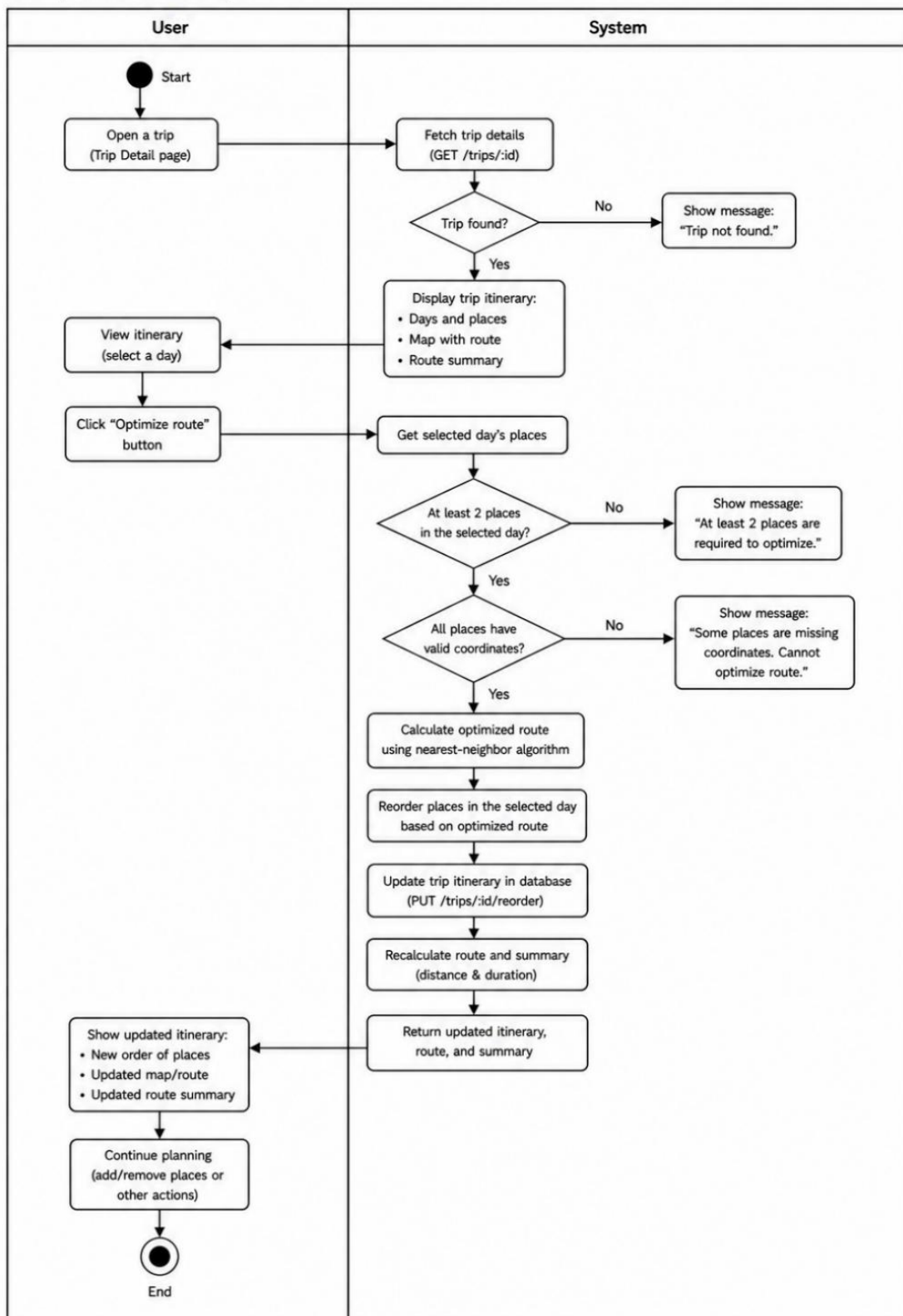


Figure 3.2.3.9 Activity Diagram of Optimize Itinerary

10. View Map and Route

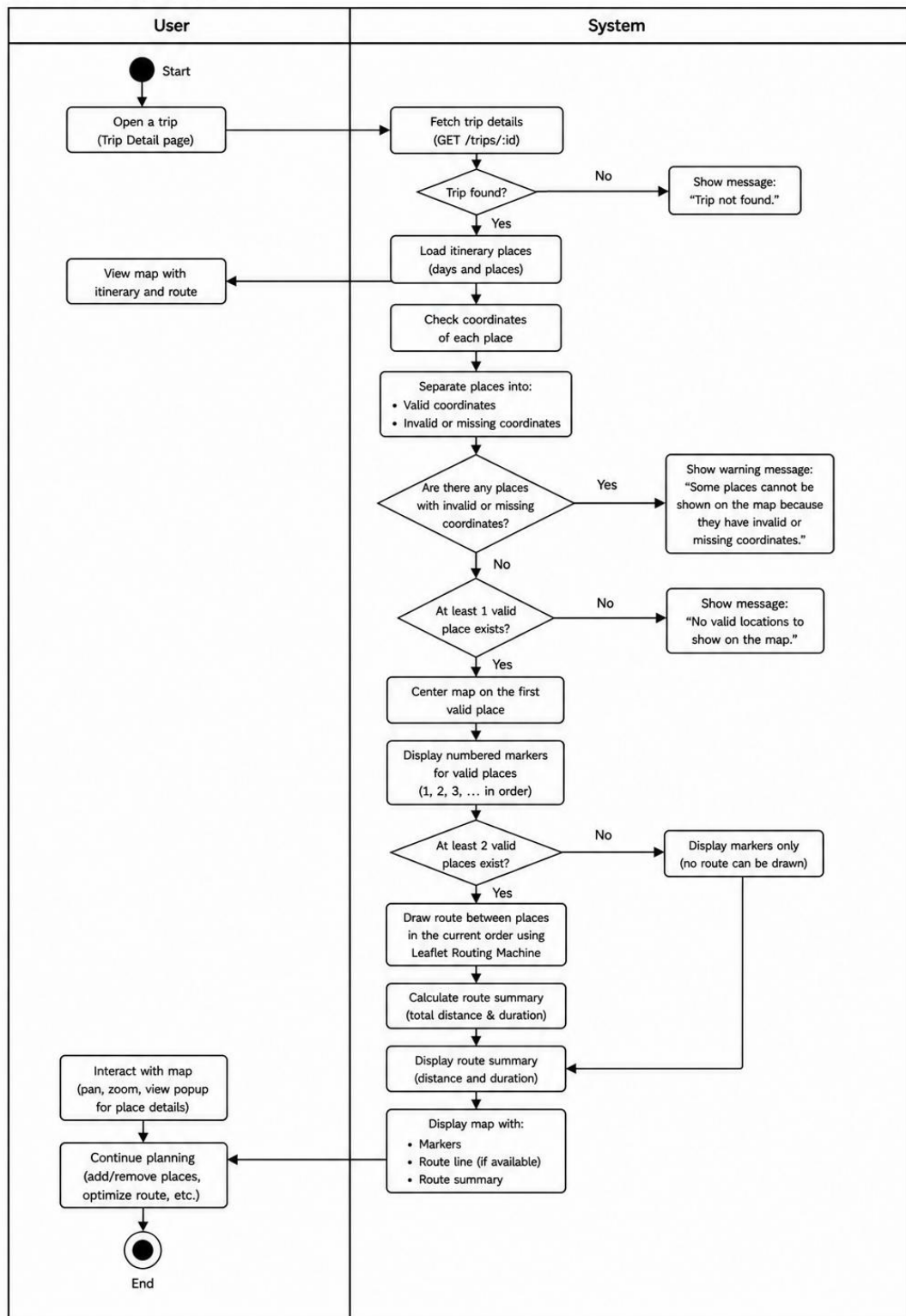


Figure 3.2.3.10 Activity Diagram of View Map and Route

11. Search Hotel

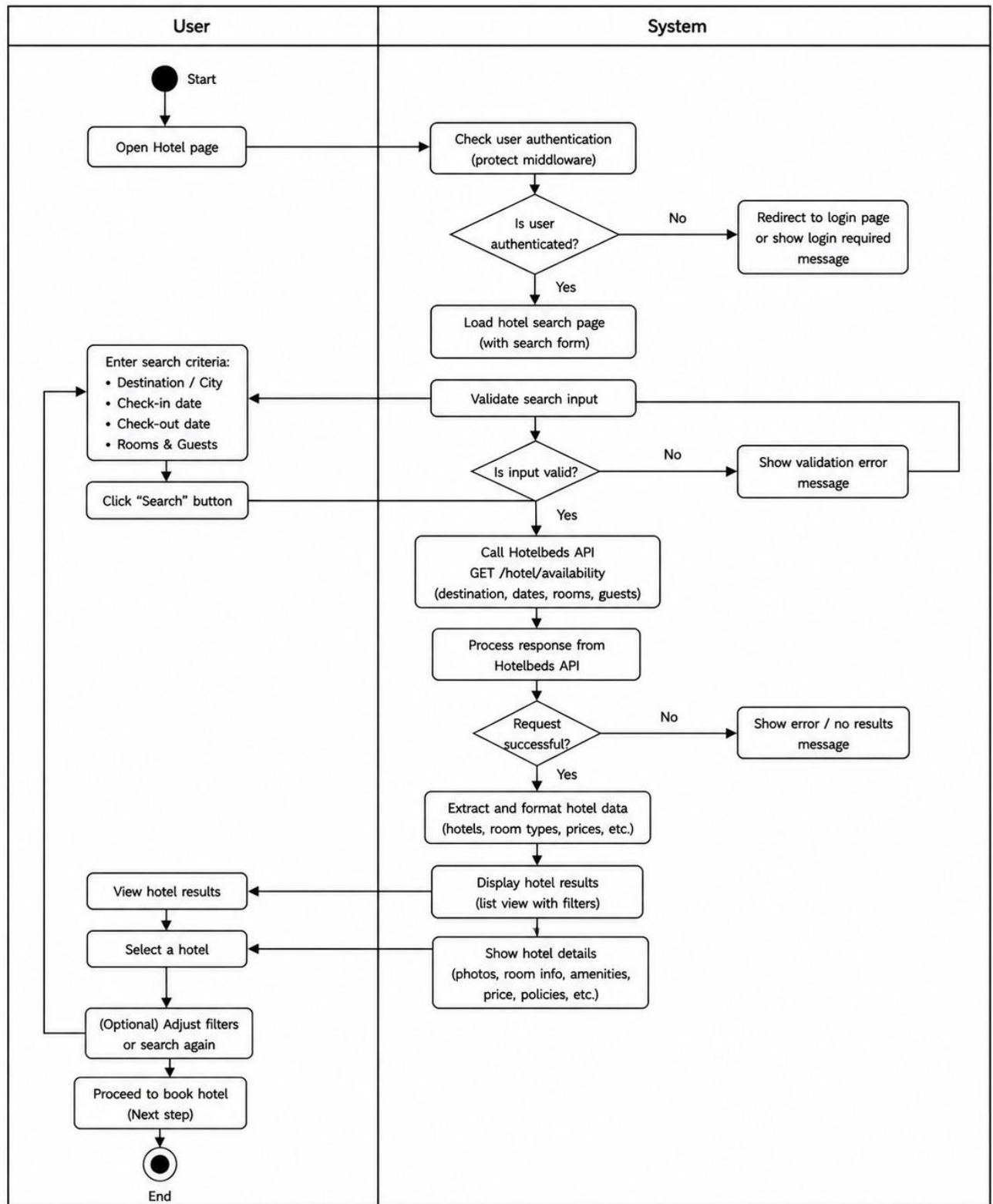


Figure 3.2.3.11 Activity Diagram of Search Hotel

12. Select Hotel and Book

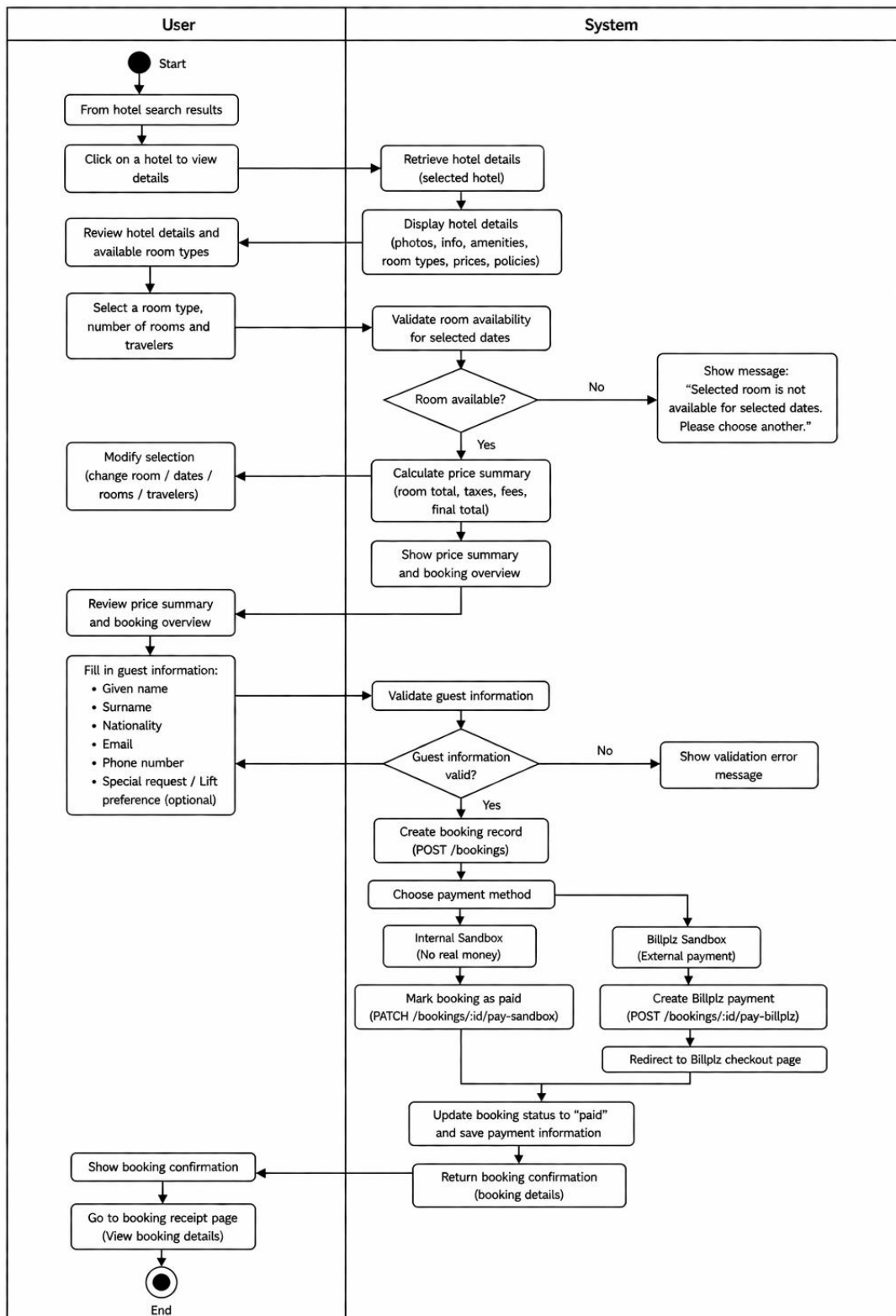


Figure 3.2.3.12 Activity Diagram of Select Hotel and Book

13. View Booking Receipt

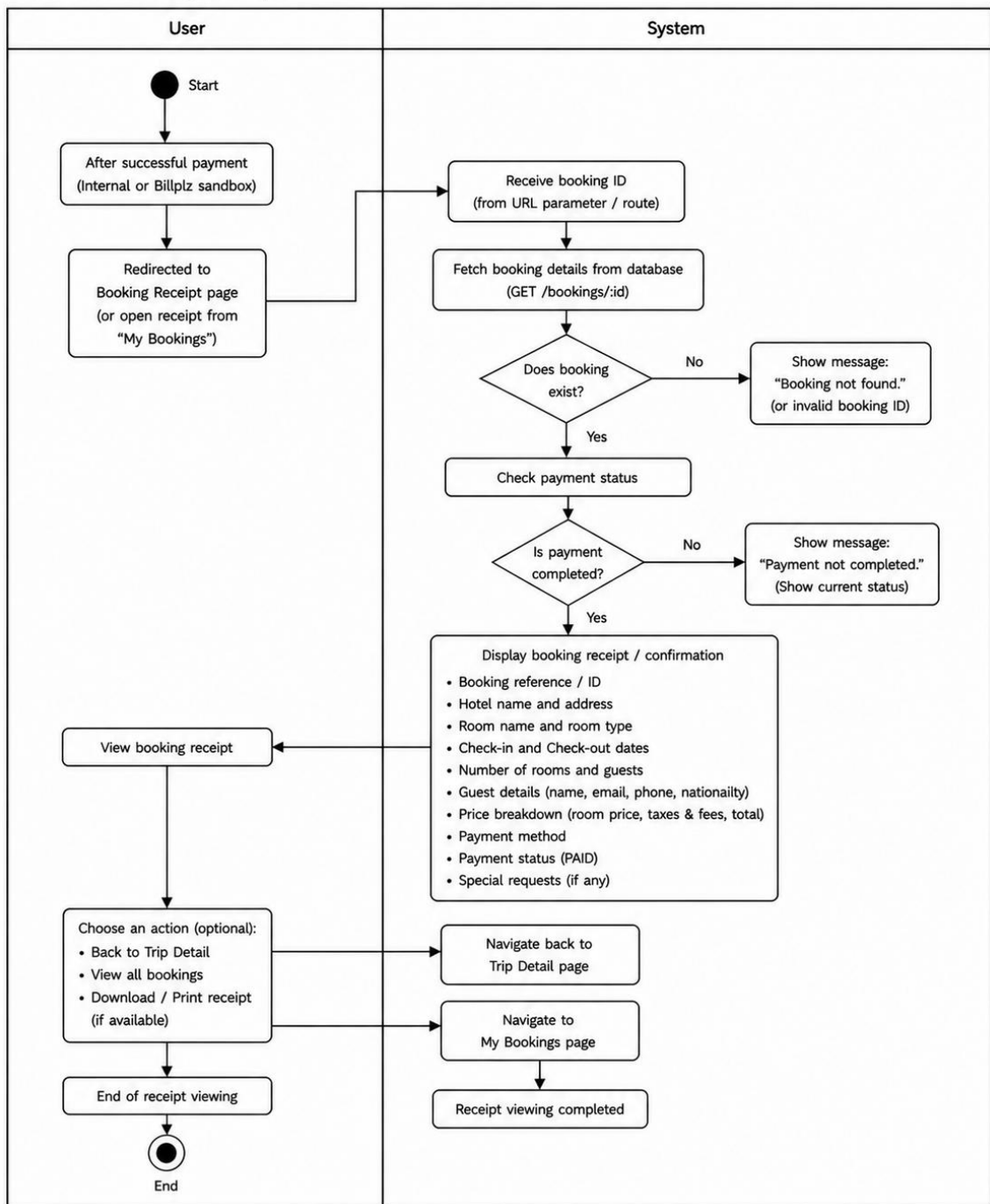


Figure 3.2.3.13 Activity Diagram of View Booking Receipt

Chapter 4: System Design

4.1 System Flowchart

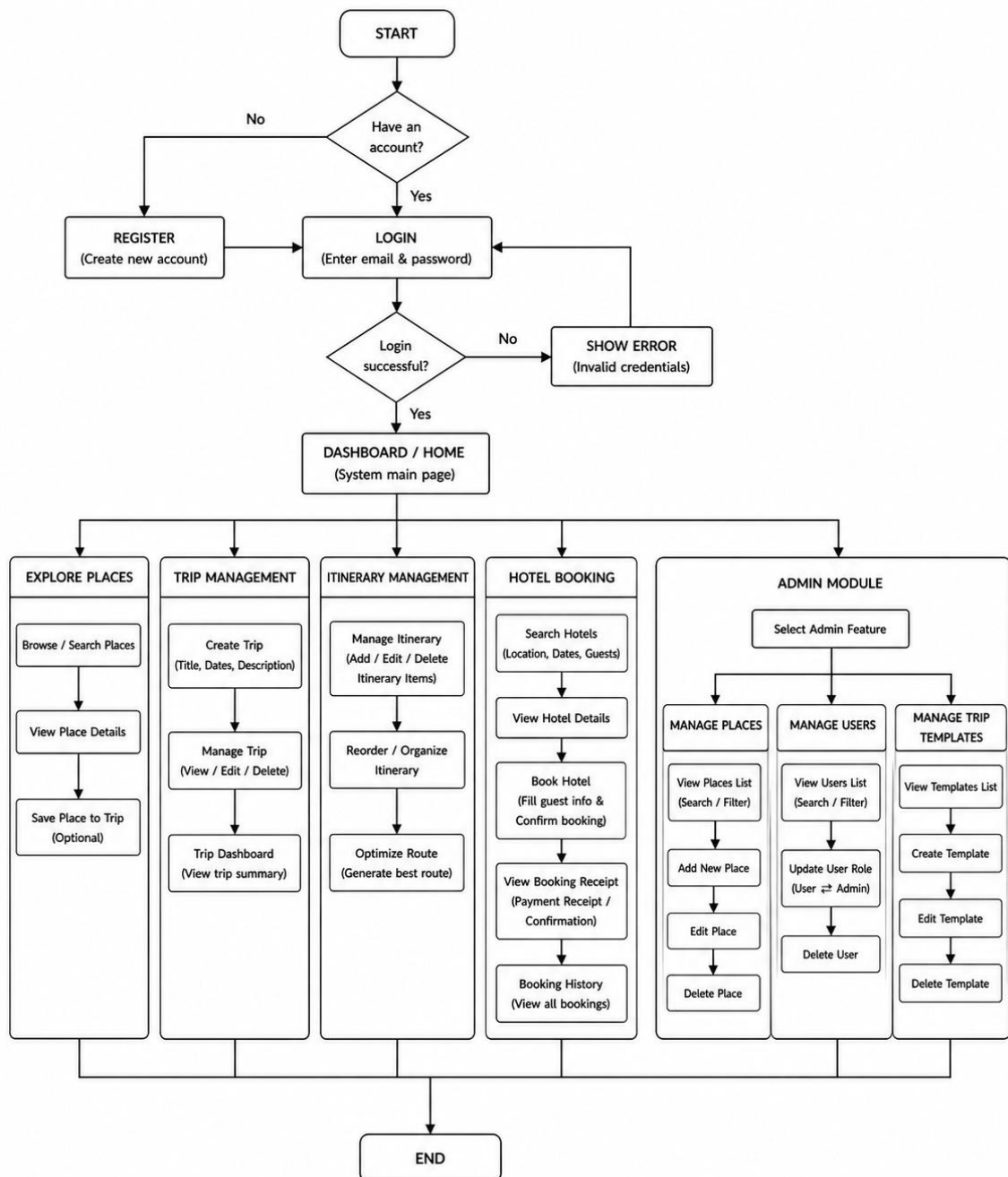


Figure 4.1.1 Flowchart of the system

4.2 Block Diagram

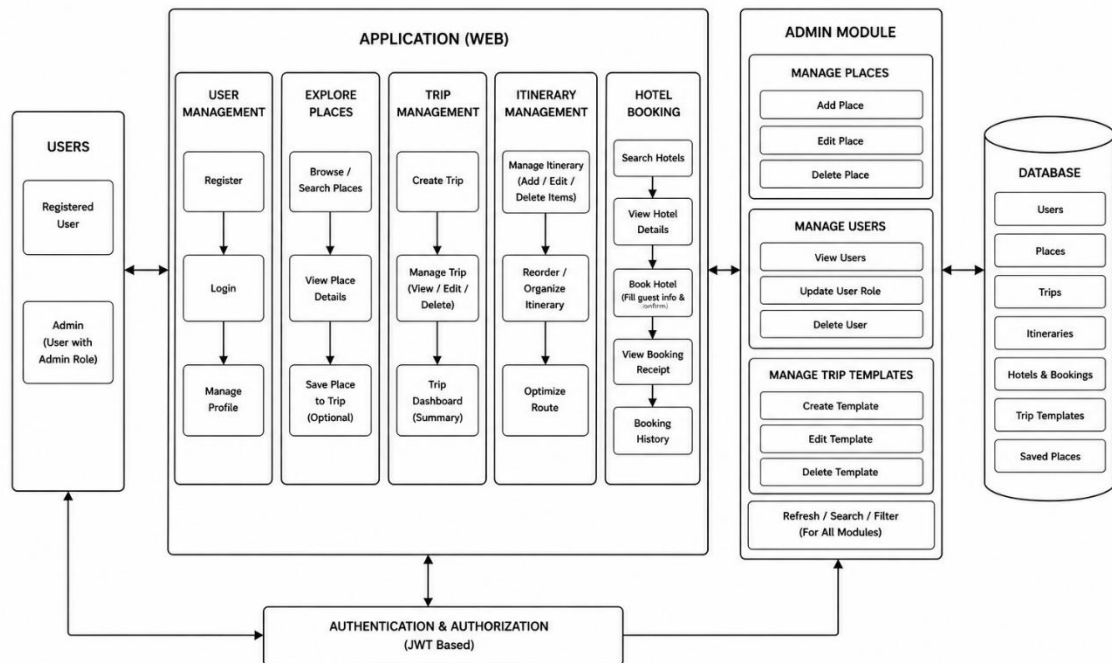


Figure 4.2.1 Block Diagram of the system

4.3 System Components Specifications

Component	Description
User	The user can register, log in, explore tourist places, view place details, create trips, manage itineraries, save places to trips, search hotels, make bookings, view booking receipts, view booking history, and log out.
Admin	The admin can log in, manage places, manage users (update roles and delete users), manage trip templates, and log out.
Authentication Module	Handles user and admin registration, login, logout, and secure access using JWT authentication.
Explore Place Module	Allows users to browse and search tourist places, view place details, and save places to trips.

Trip Management Module	Allows users to create trips, update trip details, and delete trips.
Itinerary Management Module	Allows users to add, remove, reorder, and organize places within trip days, as well as manage notes and optimize travel routes.
Map and Route Module	Displays itinerary locations on a map using Leaflet and generates travel routes between places.
Hotel Booking Module	Allows users to search hotels, view hotel details, make bookings, and simulate payments using internal and external sandbox methods.
Booking Management Module	Allows users to view booking receipts and booking history after completing a booking.
Admin Management Module	Allows admin to manage places (add, edit, delete), manage users (view, update roles, delete), and manage trip templates (create, edit, delete).
Database	Stores system data including users, places, trips, itineraries, bookings, trip templates, and related metadata.

Table 4.3.1 System Components Specification

4.4 ERD Diagram

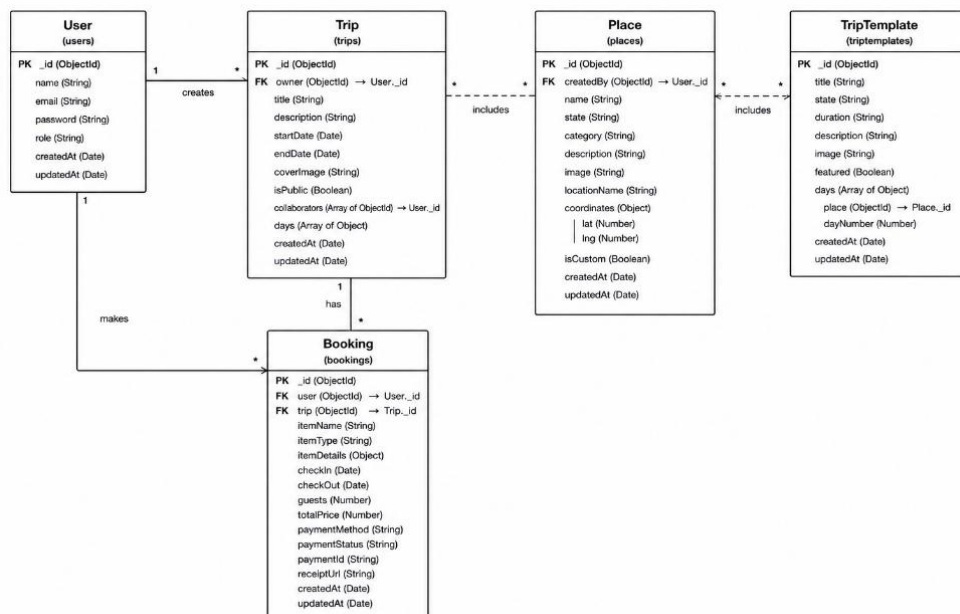


Figure 4.4.1 ERD Diagram

4.5 System Architecture Diagram

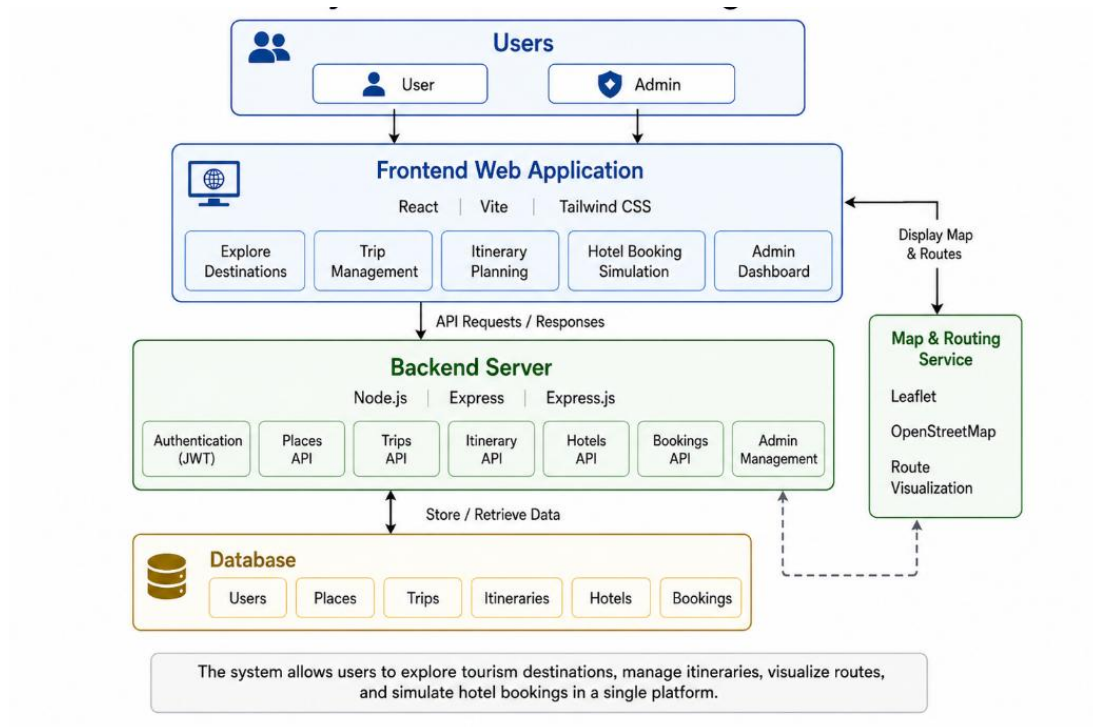
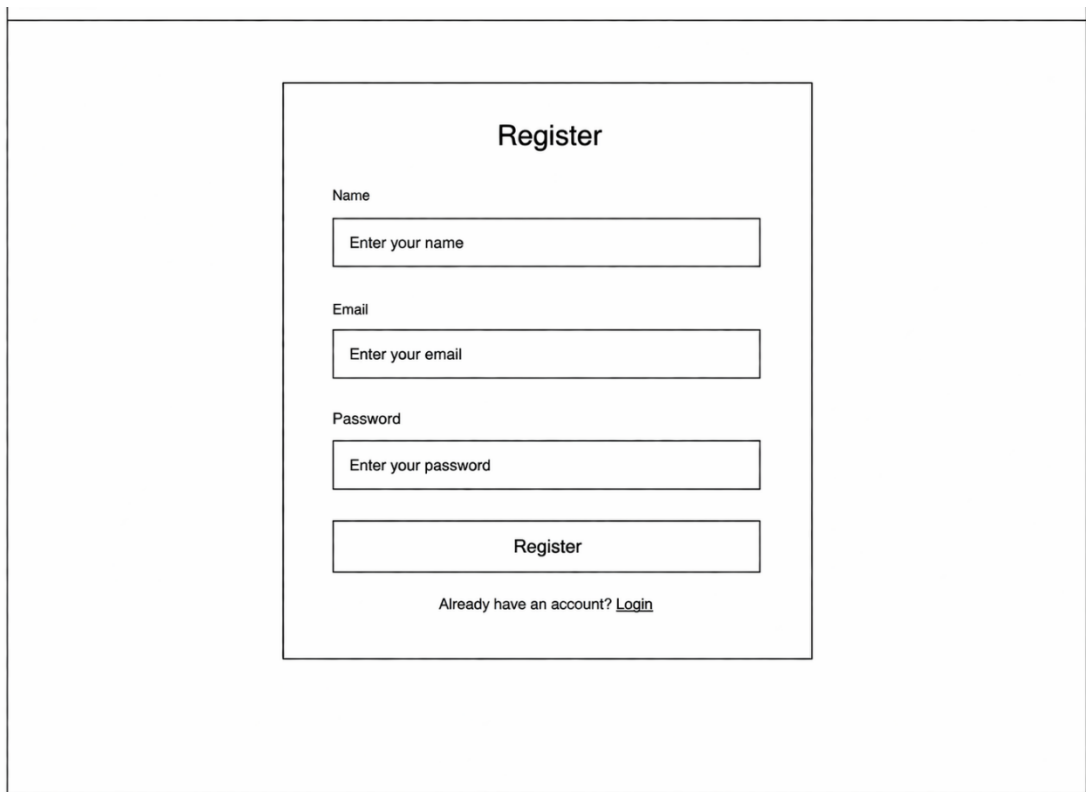


Figure 4.5.1 System Architecture Diagram

4.6 Wireframe



The wireframe for the Register page is centered within a large rectangular frame. It features a title 'Register' at the top. Below the title are three input fields, each preceded by a label: 'Name' with the placeholder 'Enter your name', 'Email' with the placeholder 'Enter your email', and 'Password' with the placeholder 'Enter your password'. Below these fields is a 'Register' button. At the bottom, there is a link that says 'Already have an account? [Login](#)'.

Figure 4.6.1 Register Page Wireframe



The wireframe for the Login page is centered within a large rectangular frame. It features a title 'Login' at the top. Below the title are two input fields, each preceded by a label: 'Email' with the placeholder 'Enter your email' and 'Password' with the placeholder 'Enter your password'. Below these fields are two buttons: 'Login' and 'Continue as Guest'. At the bottom, there is a link that says 'Forgot password?' and another link that says 'Don't have an account? [Register](#)'.

Figure 4.6.2 Login Page Wireframe

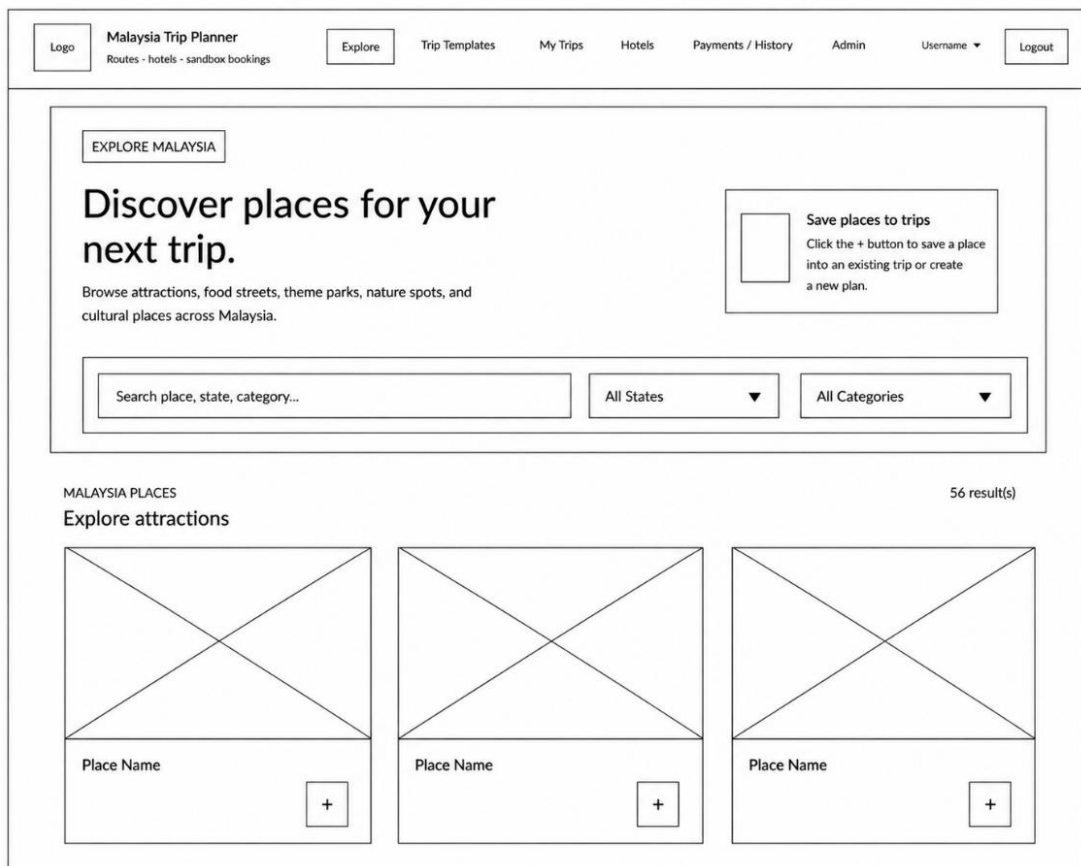


Figure 4.6.3 Explore Page Wireframe

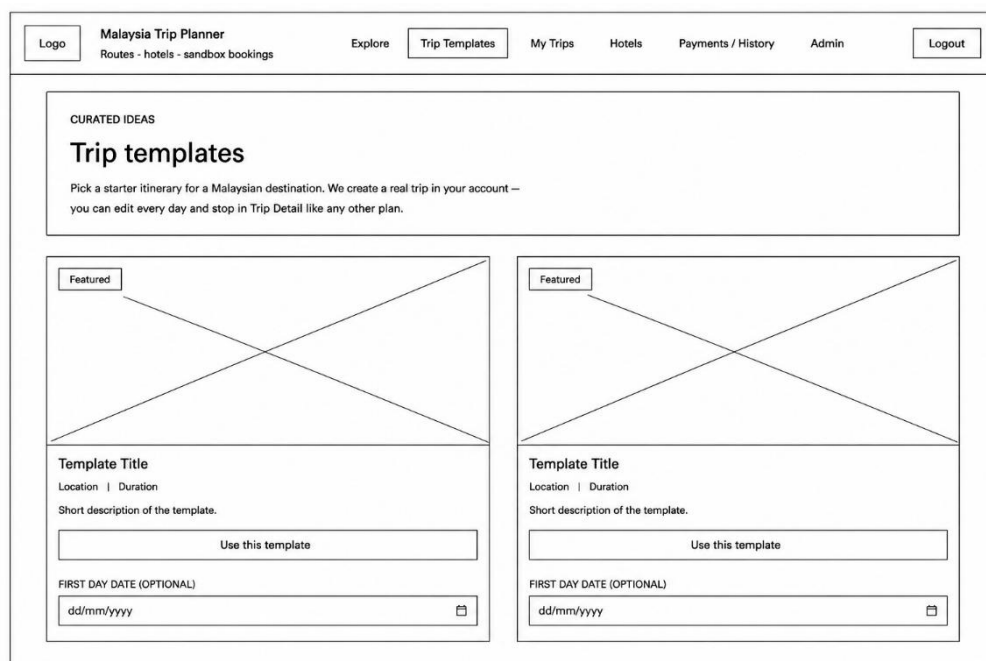


Figure 4.6.4 Trip Template Page Wireframe

Logo

Malaysia Trip Planner

Routes - hotels - sandbox bookings

Explore

Trip Templates

My Trips

Hotels

Payments / History

Admin

Logout

MULTI-TRIP PLANNER

My Trips

Create different trips, choose travel dates, and plan each day separately.

START FASTER WITH A SUGGESTED ROUTE STRUCTURE

Pick a template to generate dated days and optional starter places.

You can edit everything afterwards in Trip Detail.

Template Title

Location | Duration

Short description of the template.

Create trip from template

Template Title

Location | Duration

Short description of the template.

Create trip from template

FIRST DAY DATE

dd/mm/yyyy

CREATE NEW TRIP

Trip name (e.g. Penang Trip 30/5 - 5/6)

Destination

dd/mm/yyyy

dd/mm/yyyy

Create Trip

MY TRIPS

Trip Name

Delete

Start

dd/mm/yyyy

End

dd/mm/yyyy

Places

X

Day 1

Day 2

...

Day N

Open Trip

Trip Name

Delete

Start

dd/mm/yyyy

End

dd/mm/yyyy

Places

X

Day 1

Day 2

...

Day N

Open Trip

Trip Name

Delete

Start

dd/mm/yyyy

End

dd/mm/yyyy

Places

X

Day 1

Day 2

...

Day N

Open Trip

Figure 4.6.4 My Trip Page Wireframe

Bachelor of Computer Science (Honours)
Faculty of Information and Communication Technology (Kampar Campus), UTAR

50

Logo

Malaysia Trip Planner

Routes • hotels • sandbox bookings

Explore

Trip Templates

My Trips

Hotels

Payments / History

Admin

Logout

TRIP PLANNER

Destination

X stops

trip name

Trip map

Date range

c

JUMP TO DAY

Day 1

Day 2

Day 1

Date

Optimize route

Time / Distance

X stop(s)

1

Place / Activity

Location

Note

+ Note

Remove

+ Add Place

Day 2

Date

Optimize route

Time / Distance

X stop(s)

1

Place / Activity

Location

Note

+ Note

Remove

+ Add Place

COMPLETE YOUR TRIP PLAN

Save hotels and tickets you plan to book for this trip using the modules below.

No saved items yet. Booking and billing are available on each module.

Hotel Stay

Search and save hotels, dates, and number of travelers.

Check in | Check out | Guests

Theme Park Ticket

Search and save tickets for your selected travel dates.

Visit date | Tickets | Confirmation

TRIP HOTEL BOOKING

Hotel rooms added to cart and purchased will appear here.

RECEIPT

No receipt added yet.

Add a hotel room to cart and complete the purchase to see the receipt here.

Refresh

Figure 4.6.5 Trip Details Page Wireframe

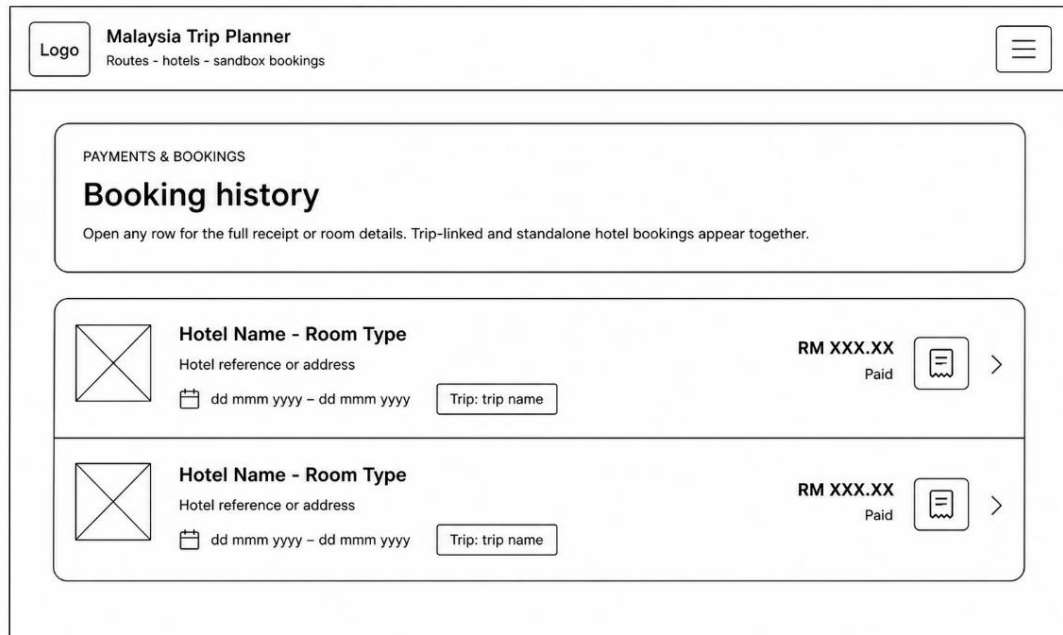


Figure 4.6.6 Booking History Page Wireframe

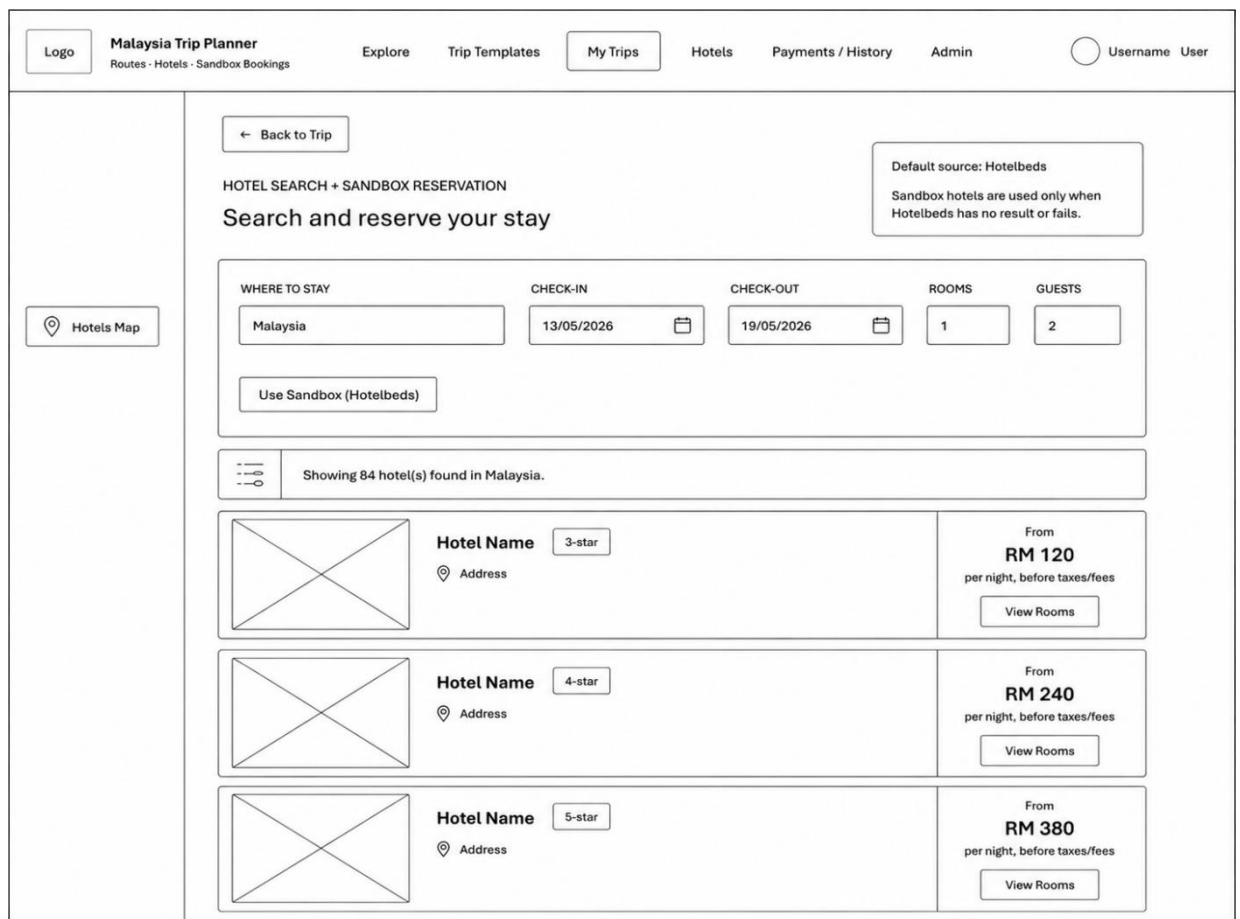


Figure 4.6.7 Search Hotel Page Wireframe

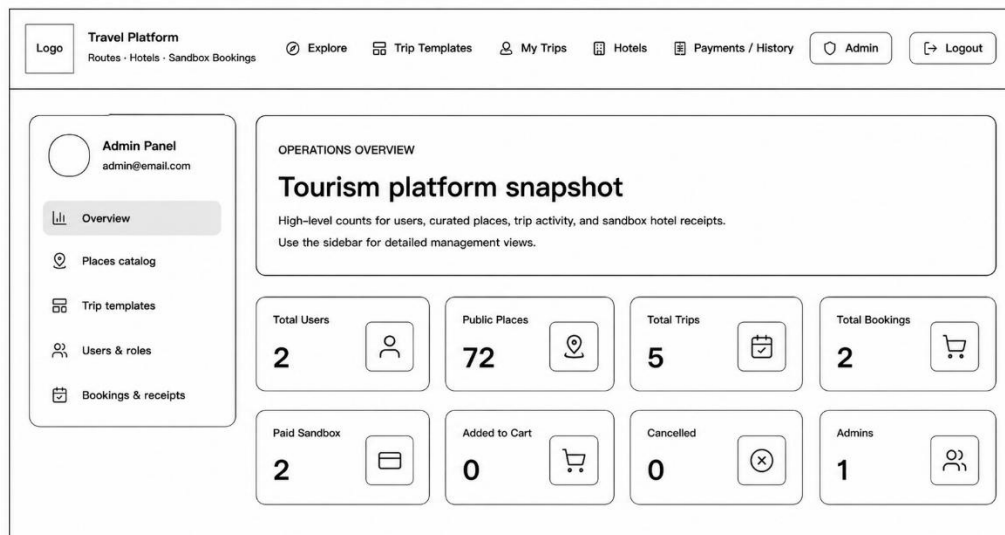


Figure 4.6.8 Admin Page Wireframe

Chapter 5: System Implementation

5.1 Hardware Setup

The hardware used in this project is a laptop computer. The laptop was used to develop, test, and run the tourism web application, including the frontend, backend server, database connection, and browser testing.

Description	Specifications
Model	Vivobook_ASUSLaptop X515EA_A1500EA
Processor	11th Gen Intel(R) Core(TM) i7
Operating System	Windows 11
Graphic	Intel(R) Iris(R) Xe Graphics
Memory	16GB DDR4 3200 MHz
Storage	512GB PCIe® 3.0 SSD
System Type	64-bit Operating System

Table 5.1.1 Specifications of Laptop

5.2 Software Setup

The development of the Tourism Web Application utilizes modern web technologies, frameworks, and third-party services to support both front-end and back-end development. These tools ensure efficient system development, real-time interaction, and scalable deployment.

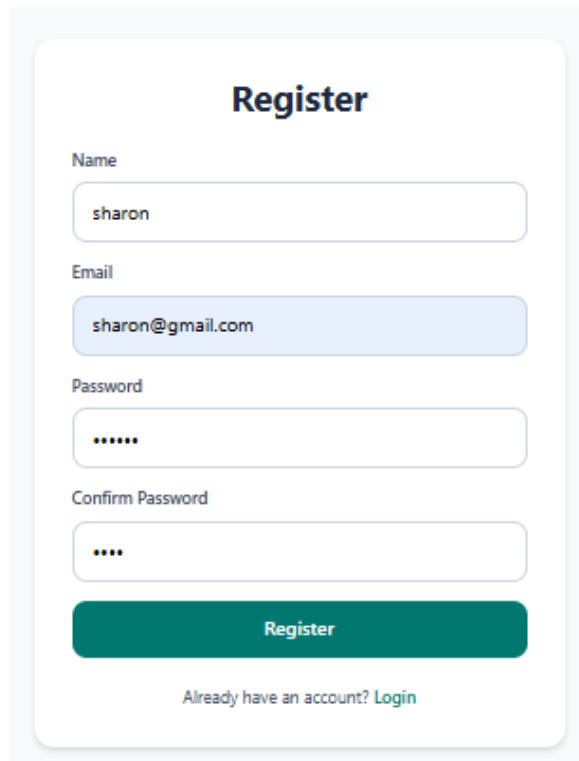
Software / Technology	Purpose
Visual Studio Code	A lightweight code editor used to write, edit, and debug the system source code.
React (Vite)	Used to develop the front-end user interface. Vite provides faster development and build performance.
Tailwind CSS	A utility-first CSS framework used to design responsive and modern user interfaces.
Node.js	A JavaScript runtime environment used to run the back-end server.

Express.js	A Node.js framework used to build RESTful APIs and handle server-side logic.
MongoDB Atlas	A cloud-based NoSQL database used to store users, places, itineraries, bookings, and payment-related data.
Mongoose	An Object Data Modeling library used to define schemas and manage interactions with MongoDB.
Leaflet	An open-source JavaScript library used to display interactive maps in the system.
Leaflet Routing Machine	Used to generate routes and display travel paths between selected destinations.
OpenStreetMap Nominatim API	A geocoding service used to convert addresses into geographic coordinates for location search and mapping.
JWT (JSON Web Token)	Used to manage user authentication and authorization securely.
Hotelbeds API	A third-party hotel service API used to retrieve hotel information, availability, pricing, and booking-related data.
Billplz API	A third-party payment gateway API used to handle online payment transactions for booking features.
Postman	An API testing tool used to send requests and verify backend endpoints during development.
Swagger (OpenAPI)	A tool used to document and visualize RESTful APIs, making it easier to understand and test endpoints.
Google Chrome	Web browsers used to run, test, and debug the web application.

Table 5.2.1 Specifications of Laptop

5.3 System Operation

5.3.1 Register Page

A user registration form titled "Register" in bold black text. The form is contained within a light gray rounded rectangle. It features four input fields: "Name" with the value "sharon", "Email" with the value "sharon@gmail.com", "Password" with six dots, and "Confirm Password" with four dots. Below the input fields is a green "Register" button. At the bottom, there is a link that says "Already have an account? Login".

Register

Name
sharon

Email
sharon@gmail.com

Password
.....

Confirm Password
....

Register

Already have an account? [Login](#)

Figure 5.3.1.1 User register page

The system provides a registration page for new users to create an account. Registered users can access additional features such as saving trips and managing trips. The system requires users to create a password with at least six characters. The registration will only be completed after all required conditions are fulfilled.

5.3.2 Login Page

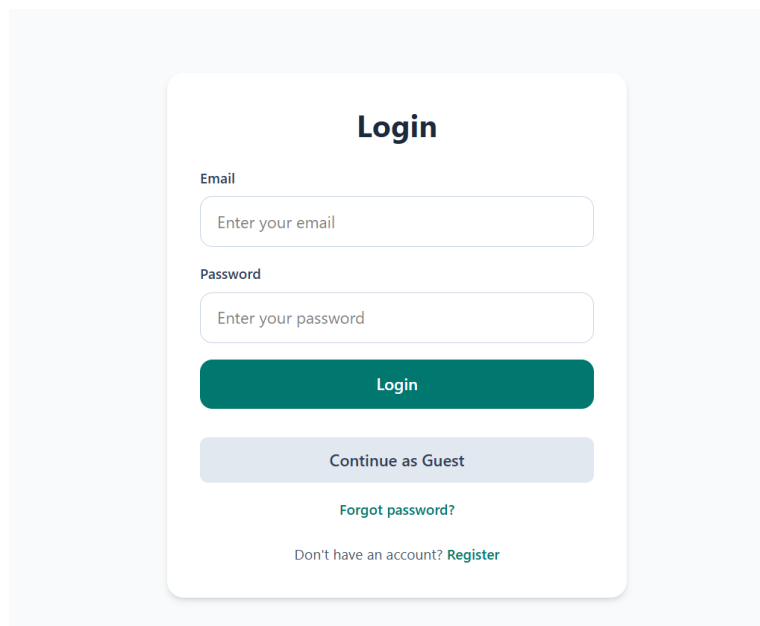
The image shows a login page with a white card centered on a light blue background. The card has a title "Login" in bold black text. Below the title are two input fields: "Email" with the placeholder "Enter your email" and "Password" with the placeholder "Enter your password". Below these fields are two buttons: a dark teal "Login" button and a light blue "Continue as Guest" button. At the bottom of the card, there is a link "Forgot password?" in teal and a link "Don't have an account? Register" in teal.

Figure 5.3.2.1 Login Page

Users and administrators must enter their email address and password to log in and access the system. Users may also continue as guests, but guest users will only have access to limited features.

5.3.3 Forgot and Reset Password Page

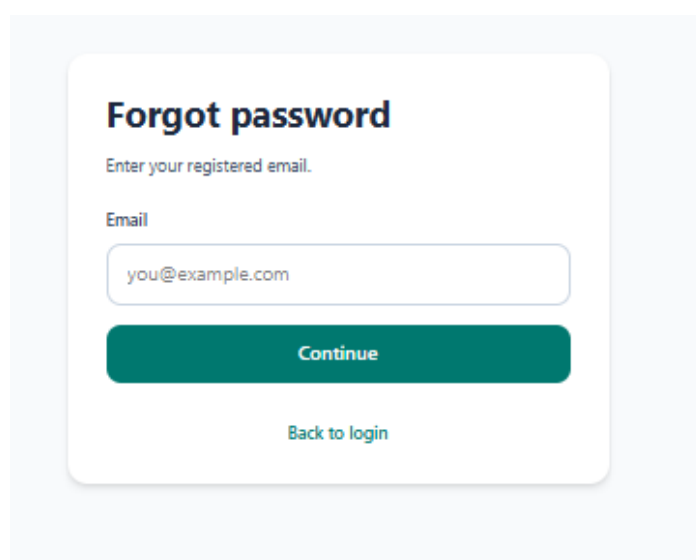
The image shows a "Forgot password" page with a white card centered on a light blue background. The card has a title "Forgot password" in bold black text. Below the title is a text prompt "Enter your registered email." followed by an "Email" label and an input field containing the placeholder "you@example.com". Below the input field is a dark teal "Continue" button. At the bottom of the card, there is a link "Back to login" in teal.

Figure 5.3.3.1 Forgot Password Page

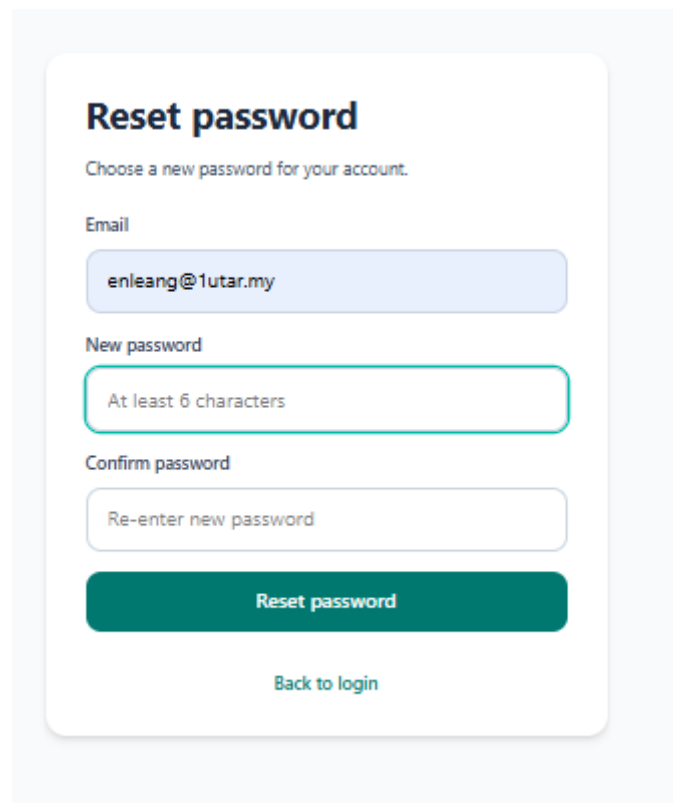
A screenshot of a 'Reset password' web form. The form is centered on a light blue background. It has a title 'Reset password' in bold black text, followed by the instruction 'Choose a new password for your account.' in a smaller font. There are three input fields: 'Email' with the value 'enleang@1utar.my', 'New password' with the placeholder 'At least 6 characters', and 'Confirm password' with the placeholder 'Re-enter new password'. Below the input fields is a large green button labeled 'Reset password' and a smaller blue link labeled 'Back to login'.

Figure 5.3.3.2 Reset Password Page

If a user forgets their password, the system will send a password reset link to the registered email address. After receiving the link, the user can return to the system and create a new password.

5.3.4 Explore Page

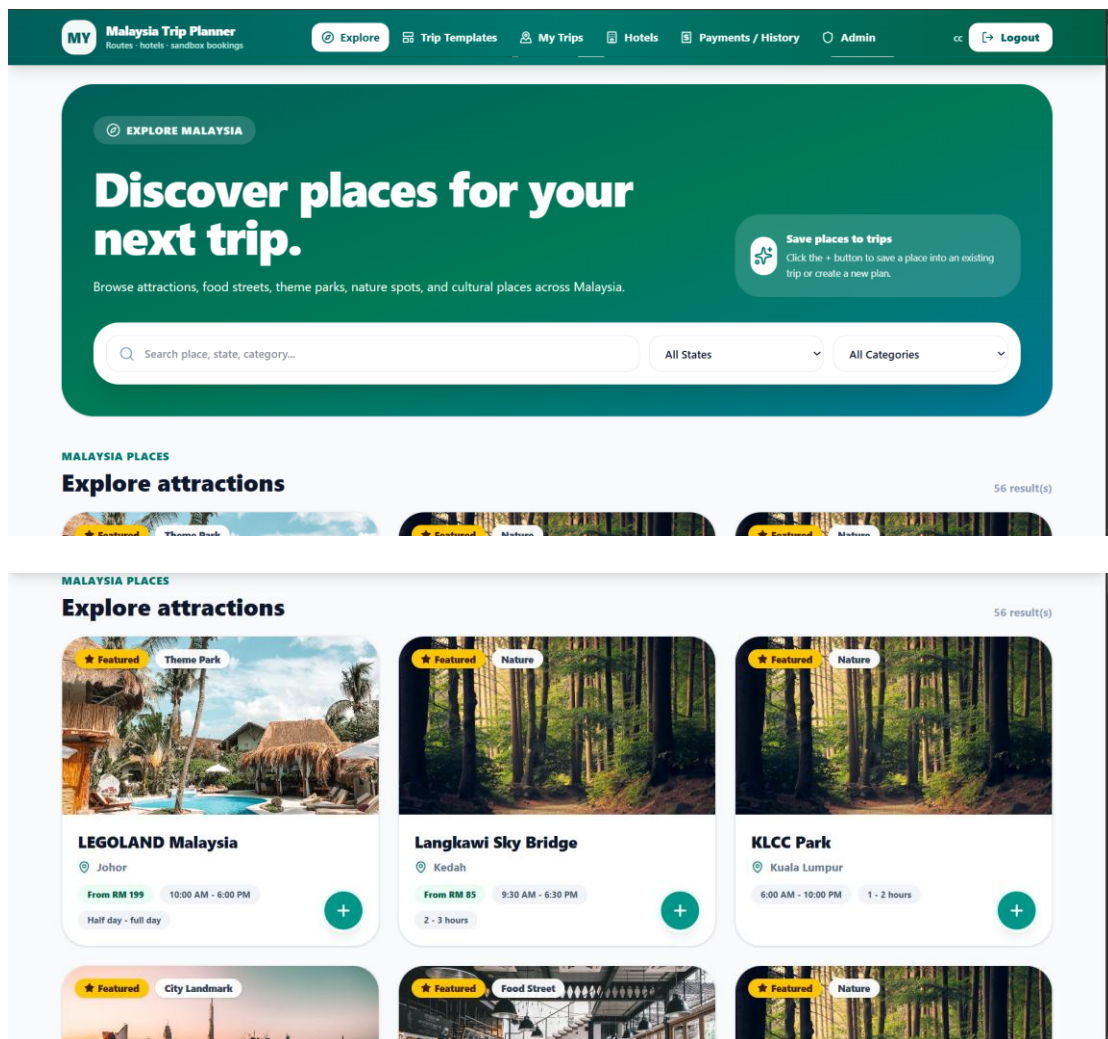


Figure 5.3.4.1 Explore Page

The system provides an **Explore page** where users can discover various tourist attractions across Malaysia. At the top of the page, a navigation bar allows users to access different sections such as Explore, Trip Templates, My Trips, Hotels, Payments/History, and Admin.

The main section highlights a banner with the title *“Discover places for your next trip”*, encouraging users to browse attractions such as food streets, theme parks, nature spots, and cultural locations.

Users can search for places using the search bar by entering keywords such as place name, state, or category. Additionally, users can filter results using dropdown menus for **state** and **category**, making it easier to find specific destinations.

Below the search section, the system displays a list of attractions in a card layout. Each attraction card includes:

- An image of the place
- The place name
- Location (state)
- Estimated price
- Opening hours
- Suggested duration
- Category labels (e.g., Nature, Theme Park, City Landmark)
- A “Featured” tag for highlighted locations

Users can click the “+” **button** on each card to add a place directly to their trip itinerary.

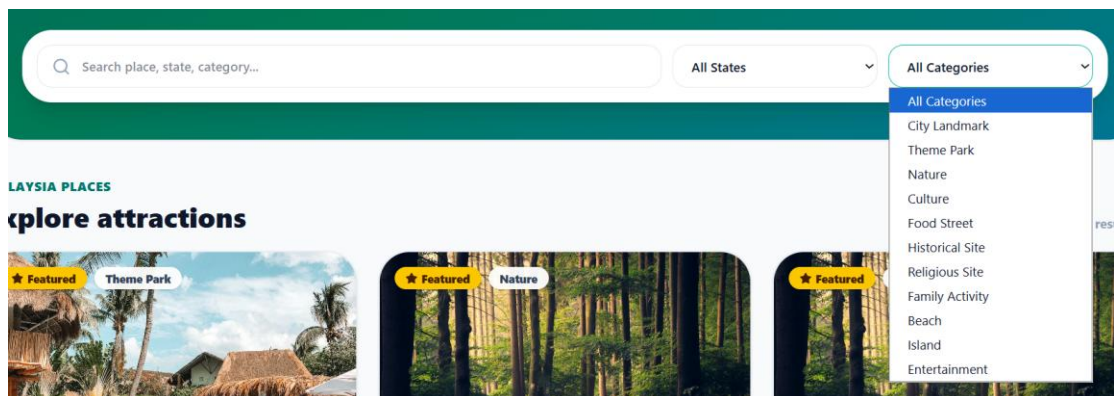


Figure 5.3.4.2 Figure of Filter

The system provides a “**Save to Trip**” **pop-up** when the user clicks the “+” **button** on a place card. Users can select an existing trip or create a new trip plan. The pop-up displays each trip name, travel date, and duration.

After selecting a trip, users can choose a specific day to save the place. Each day is shown with its date, and users can scroll if the trip contains many days. The **Back** button allows users to return to the trip selection page.

This feature helps users save attractions into the correct trip and day more easily.

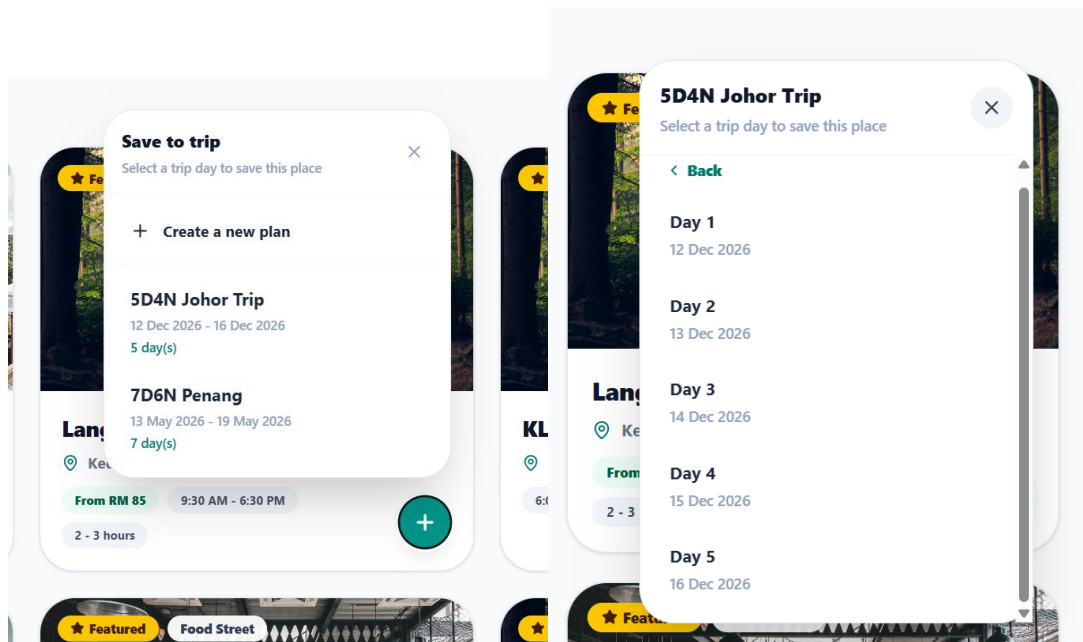


Figure5.3.5.2 Save the trip to “My Trip”

The system provides a “Save to Trip” pop-up that appears when the user clicks the “+” button on a place card. This pop-up allows users to save the selected place into an existing trip or create a new trip plan. Each trip displays its name, travel dates, and total duration, making it easier for users to choose the correct trip.

After the user selects a trip, the system shows another pop-up where the user can choose a specific day within that trip. Each day is displayed together with its date, and users can scroll through the list if the trip has multiple days. The Back button allows users to return to the previous trip selection screen.

This feature helps users organize attractions into the correct trip and day, making the itinerary planning process more structured and convenient.

5.3.5 Trip Templates Page

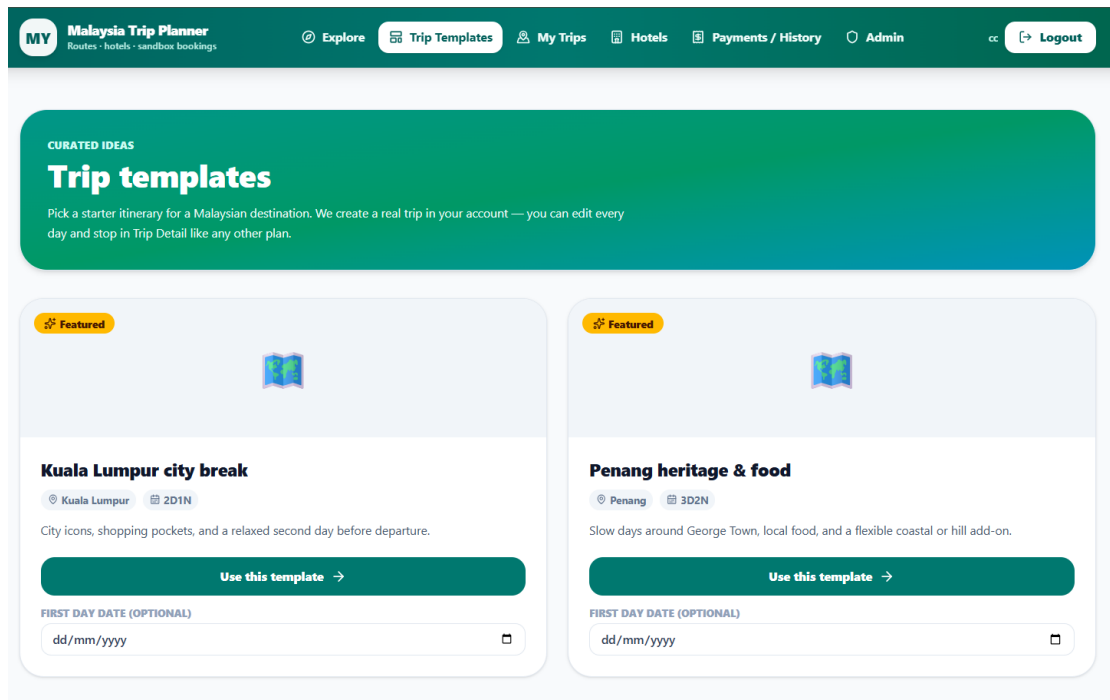


Figure 5.3.5.1 Trip Templates Page

The Trip Templates page enables users to begin trip planning using predefined itineraries. Each template includes the destination, trip duration, and a short description to help users understand the travel plan.

Users can select a template by clicking the “Use this template” button. They may also choose an optional first-day date before applying the template. After the template is used, a new trip plan will be created, and users can edit or customize the itinerary based on their preferences.

This feature helps users save time by providing ready-made travel plans that can be adjusted easily.

5.3.6 My Trip Page

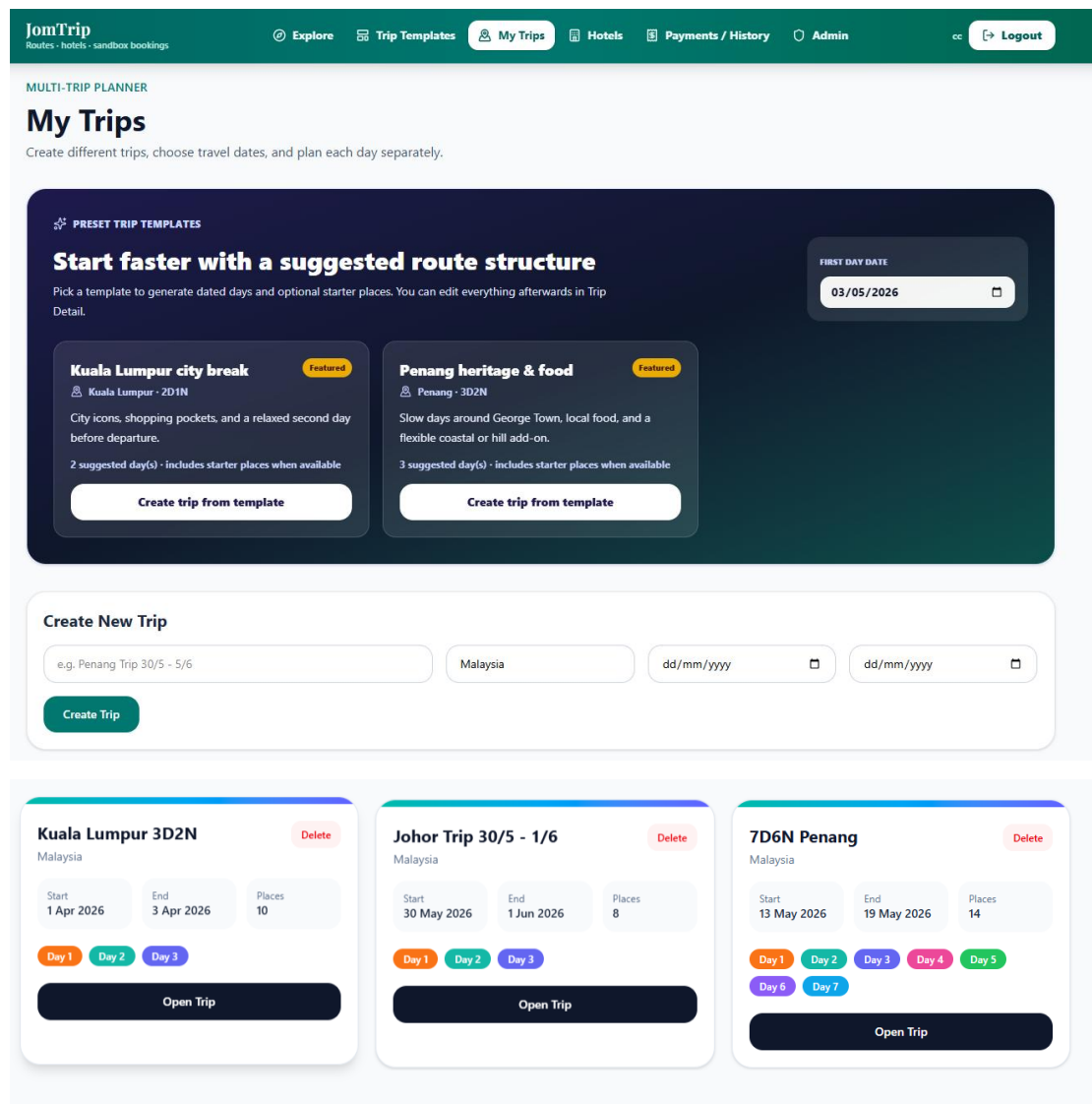


Figure 5.3.6.1 My Trip Page

The system includes a My Trips page that allows users to manage and organize their travel plans. At the top of the page, a template section is provided as a quick reference to suggested route structures. Users can view predefined trip ideas and optionally create a trip based on these templates by selecting a start date and clicking the provided button.

Below this section, users can create their own trips by entering details such as trip name, destination, and travel dates. After creating a trip, it will be displayed as a card showing key information including the trip duration, number of places, and daily breakdown.

Each trip card allows users to view and manage their itinerary by clicking the “Open Trip” button. Users can also delete trips if needed. This page helps users organize multiple trips and manage their itineraries in a structured way.

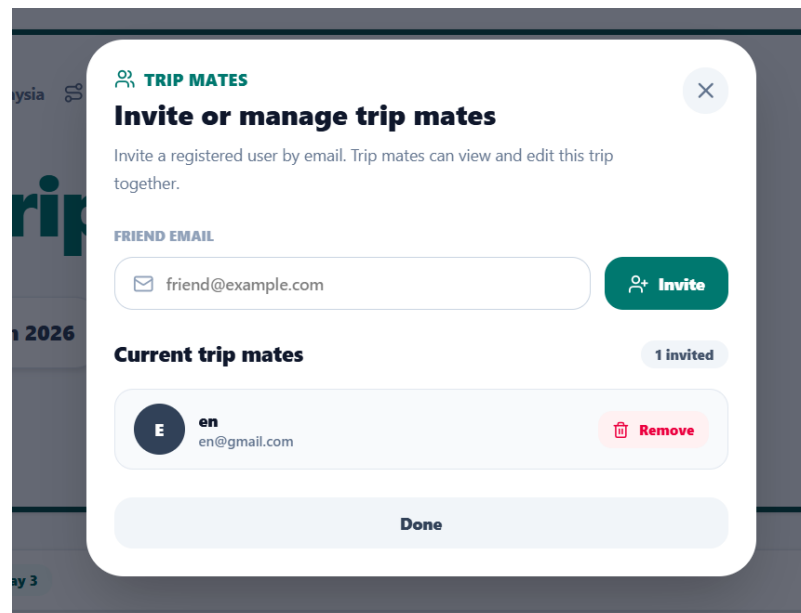


Figure 5.3.6.2 Invite Pop Up

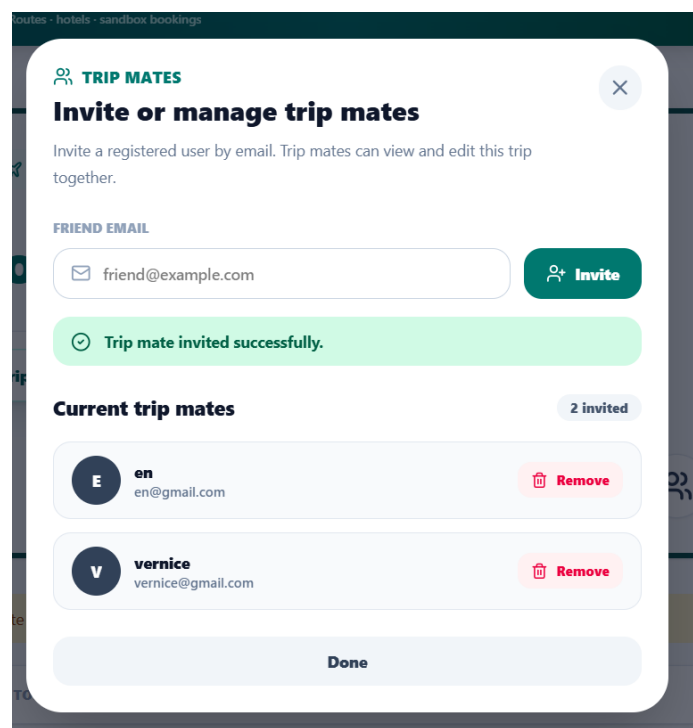


Figure 5.3.6.3 Invite Trip Mate Successful

The system provides an Invite Trip Mates pop-up that allows users to invite and manage participants in a trip. Users can invite others by entering a registered email address, as only users with existing accounts are allowed to join the trip.

Both the trip owner and members can send invitations. However, only the trip owner has permission to remove existing trip mates from the trip.

The pop-up displays a success message after an invitation is sent and shows a list of current trip mates, including their name and email. This feature enables collaboration by allowing multiple users to view and edit the same trip plan.

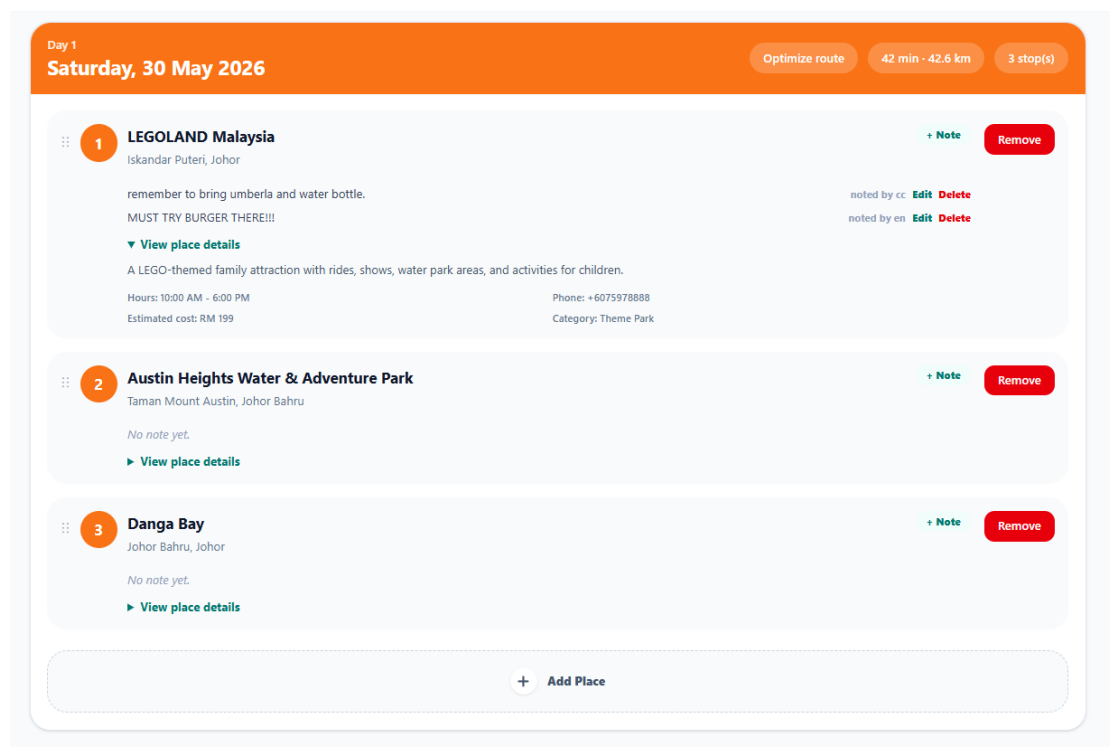


Figure 5.3.6.4 Itinerary Display

The Trip Detail page displays the daily itinerary for a selected trip. Each day is organized with a header showing the date, estimated travel time, distance, and total number of stops. Users can also optimize the route to arrange the places more efficiently.

Within each day, the itinerary is shown as an ordered list of places. Users can drag and reorder the places based on their preferred travel sequence. If a place is added from the Explore page, its details are already available, such as description, operating

hours, estimated cost, contact number, and category. However, if users manually add a custom place, these details may not be available.

Users can add, edit, and delete notes for each place, and notes can be contributed by different trip members. Users can also remove places from the itinerary or add new places using the “Add Place” button.

This page helps users plan and manage their daily travel activities in a structured and flexible way.

The figure shows two screenshots of the 'Add Place for Day 1' form. The top screenshot shows the form with empty input fields. The bottom screenshot shows the form with 'chew' entered in the address field, displaying a list of suggestions.

Add Place for Day 1
Search address or manually type an address. Selecting a result is optional.

Place name, optional

Search or type address, e.g. Penang Hill

Notes, opening hours, ticket info...

Cancel Add Place

Add Place for Day 1
Search address or manually type an address. Selecting a result is optional.

Place name, optional

chew

- Chew Jetty**
Chew Jetty, Central George Town, North-East, George Town, Penang, Malaysia
- Jalan Sin Chew Kee**
Jalan Sin Chew Kee, Bukit Bintang, Kuala Lumpur, 50150, Malaysia
- Jalan Chew Sin Onn**
Jalan Chew Sin Onn, Taman Hoover, Kampung Kuchai, Ipoh, Kinta, Perak, 30250, Malaysia
- Jalan Chew Boon Juan**
Jalan Chew Boon Juan, Kampung Kuchai, Ipoh, Kinta, Perak, 30250, Malaysia
- Jalan Chew Peng Loon**
Jalan Chew Peng Loon, Ipoh Garden, Ipoh, Kinta, Perak, 31400, Malaysia

Day 2
Sunday, 31 May 2026

Figure 5.3.6.5 Add Place Field

The system provides an Add Place section that allows users to manually add a location to a specific day in their itinerary. Users can enter a place name, search or type an address, and include additional notes such as opening hours or ticket information.

As users type in the address field, the system uses OpenStreetMap Nominatim to display suggested locations [9]. To ensure accuracy, users are required to select an address from the provided suggestions. Manually typed addresses that are not selected

from the suggestion list will not be accepted, as the system needs valid location data such as coordinates to display the place correctly on the map and process route planning.

After selecting a valid address, users can add the place to the itinerary using the “Add Place” button or cancel the action if needed. This feature allows users to include custom locations that may not be available on the Explore page while ensuring the address can be recognized by the system.

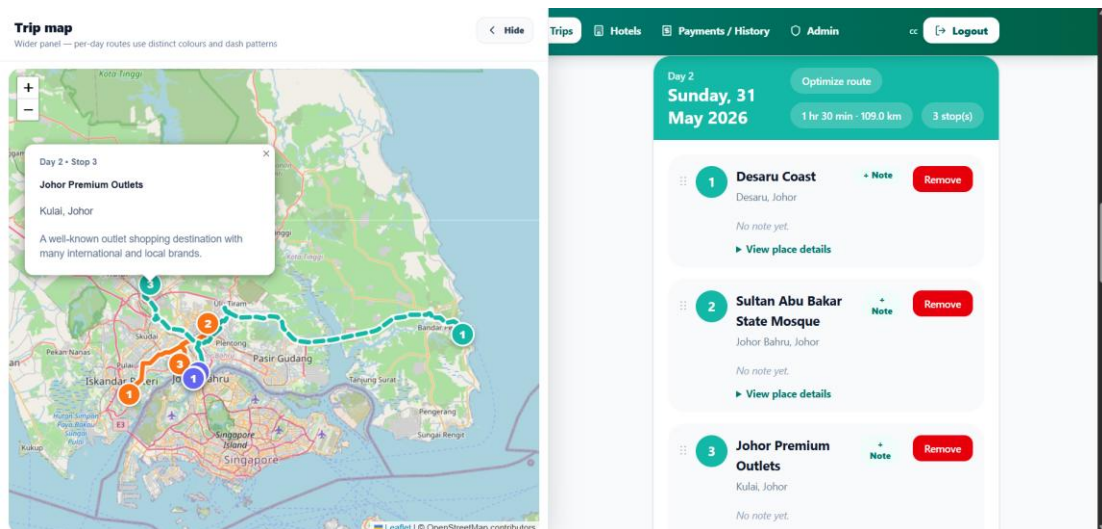


Figure 5.3.6.6 Trip Map

The system provides a Trip Map to help users view their itinerary more conveniently. The map shows the places planned for each day, allowing users to clearly see where they will go on Day 1, Day 2, and other trip days.

Each stop is displayed with a numbered marker on the map. When users click a stop, the system shows information about the selected place, such as the place name, location, and description. The route is also shown on the map to help users understand the travel path between stops.

Users can hide or show the map whenever needed, giving them more flexibility while managing the itinerary. Users can also drag and reorder places freely, and the map will help them visualize the updated travel arrangement.

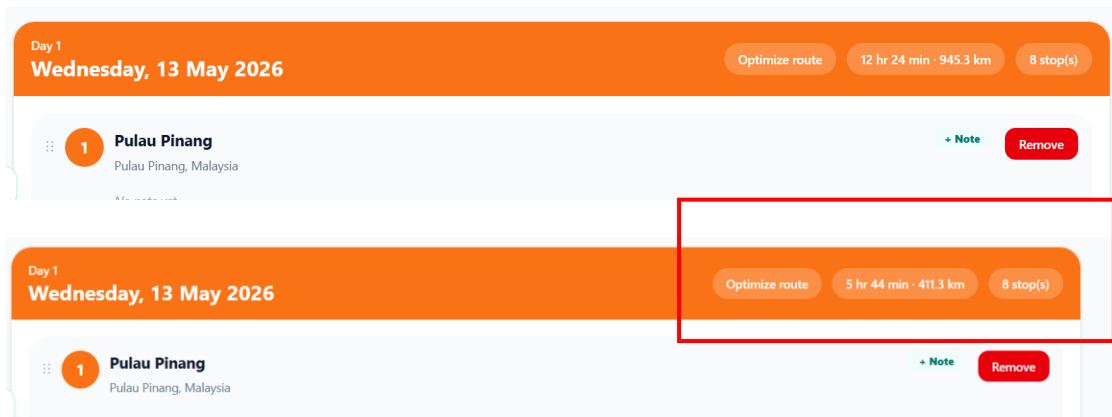


Figure 5.3.6.7 Optimize Route Function

The system provides a route optimization feature that helps improve travel efficiency. When users click the “Optimize route” button, the system rearranges the order of places to generate a more efficient travel path.

After optimization, the estimated travel time and distance are reduced, as shown in the updated route information. This allows users to complete their planned stops in a shorter time and with less travel distance.

This feature helps users plan their trips more efficiently by minimizing unnecessary travel and improving the overall route arrangement.

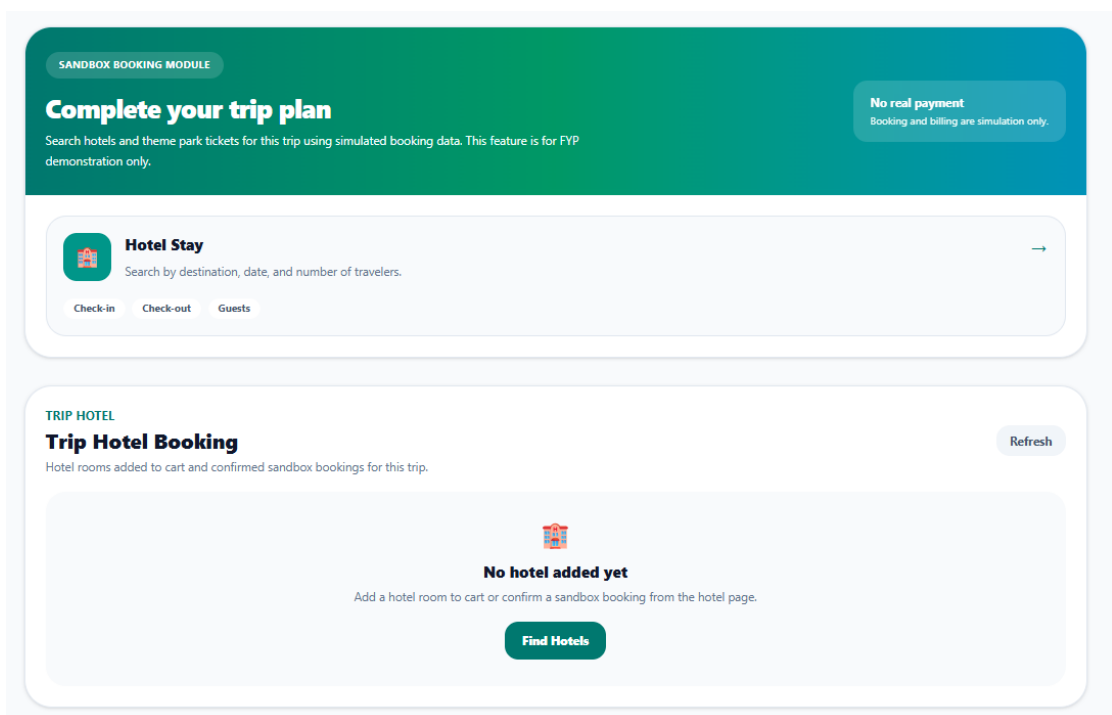


Figure 5.3.6.8 Hotel Booking Section

The system provides a Booking Module page that allows users to manage hotel bookings for their trip using simulated data. Users can access the hotel booking page by clicking the Hotel Stay card or by navigating through the navigation bar, providing multiple entry points for convenience.

The page includes a section for Trip Hotel Booking, where users can view hotels added to their trip or confirm sandbox bookings. If no hotel has been added, the system displays a message with a “Find Hotels” button to guide users to search for available hotels.

This feature allows users to easily access and manage hotel bookings while supporting a flexible and user-friendly navigation experience.

SANDBOX BOOKING MODULE

Complete your trip plan

Search hotels and theme park tickets for this trip using simulated booking data. This feature is for FYP demonstration only.

Hotel Stay

Search by destination, date, and number of travelers.

Check-in Check-out Guests

TRIP HOTEL

Trip Hotel Booking

Hotel rooms added to cart and confirmed sandbox bookings for this trip.

THE SAUJANA KUALA LUMPUR - DELUXE KING

Jalan Lapangan Terbang Subang

REFERENCE NO.
HTL-20260503-8136

DATE
1 Jun 2026 – 3 Jun 2026

DETAILS
1 room(s) - 2 guest(s)

PROVIDER
Internal Sandbox

GUEST
Sharon Liew

Total Amount
RM 151.40
Sandbox simulation

View Room Details

View Receipt

Figure 5.3.6.9 Show Hotel Booking Details in Hotel Booking Session

The system provides a Trip Hotel Booking section where users can view and manage their hotel bookings for the selected trip. When a booking is available, it is displayed

as a detailed card showing important information such as the hotel name, location, booking dates, number of rooms and guests, reference number, and booking provider.

The booking status is indicated using labels such as Active and Paid, along with the payment status. The total amount is also displayed clearly on the right side of the card.

Users can view more details about the booked room by clicking the “View Room Details” button or access the payment receipt through the “View Receipt” button.

This section allows users to easily review their booking information and track their payment status within the system.

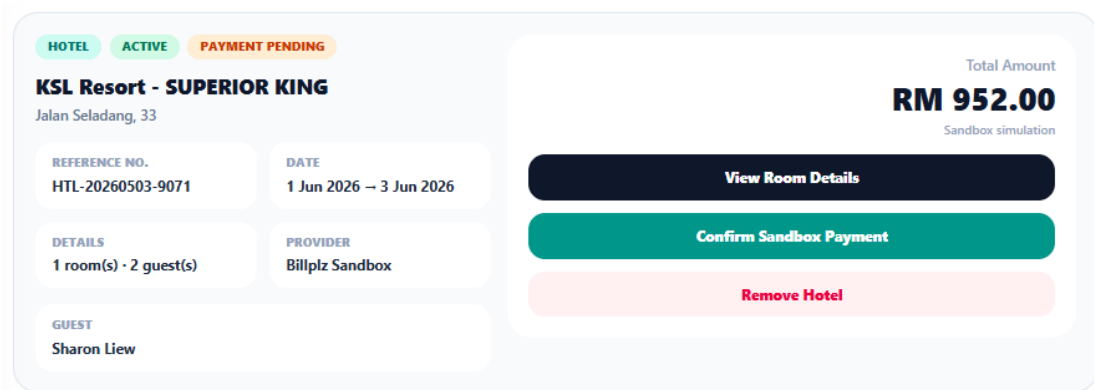


Figure 5.3.6.10 Shows Payment Pending

The system displays different booking states based on the payment status. When a booking is marked as Payment Pending, the booking card shows the label “Payment Pending”, indicating that the payment has not yet been completed.

In this state, users are provided with additional actions, including “Confirm Sandbox Payment” to complete the simulated payment process and “Remove Hotel” to cancel the booking. The “View Room Details” button is also available for users to review booking information.

Compared to a completed booking (Paid), the pending payment state requires user action to finalize the booking. Once the payment is confirmed, the status will be updated, and the available actions will change accordingly.

This distinction helps users clearly identify which bookings still require payment and take the necessary actions.

[← Back to Trip](#)

HOTEL ROOM DETAILS

Room Details

Review the saved hotel room details before confirming sandbox payment.

ROOM DETAILS

The Face Suites

Jalan Sultan Ismail, 1020

Room / package: 1 Bedroom Superior

ROOM TYPE

1 Bedroom Superior

BOARD / BREAKFAST

See room package details

REFUNDABILITY

Cancellation policy depends on room rate

SOURCE / PROVIDER

internal sandbox

CHECK-IN

13 May 2026

CHECK-OUT

19 May 2026

NIGHTS

6 night(s)

ROOMS / GUESTS

1 room(s) · 2 guest(s)

Room price summary

Price per unit RM 97.55

Total amount **RM 585.30**

PAYMENT PROVIDER

Internal Sandbox

PAYMENT STATUS

Paid

[View Receipt](#)

[Back to Trip](#)

This page is generated by the app for sandbox booking simulation. No real hotel reservation is made.

Figure 5.3.6.11 Room Details

HOTEL BOOKING RECEIPT
Payment Receipt
Your sandbox payment has been completed. This receipt is generated for FYP demonstration only.

RECEIPT
HTL-20260502-1051
Payment proof for sandbox booking

REFERENCE NO.
HTL-20260502-1051

PAYMENT STATUS
paid_simulated

PAYMENT PROVIDER
internal sandbox

PAID DATE
2 May 2026

HOTEL
The Face Suites

ROOM TYPE
1 Bedroom Superior

CHECK-IN
13 May 2026

CHECK-OUT
19 May 2026

LINKED TRIP
Standalone booking

TOTAL AMOUNT PAID
RM 585.30

Guest information

GUEST NAME
xxx xxx

NATIONALITY
Malaysia

EMAIL
xue.en040321@gmail.com

PHONE
78465454

Payment summary

Price per unit
RM 97.55

Total amount
RM 585.30

PAYMENT PROVIDER
Internal Sandbox

PAYMENT STATUS
Paid

View Room Details

Back to Trip

This page is generated by the app for sandbox booking simulation. No real hotel reservation is made.

Figure 5.3.6.12 Payment Receipt

The system provides a **Hotel Booking Details page** that displays the booking information retrieved from the Hotelbeds sandbox data. This page allows users to review the selected hotel, room package, check-in and check-out dates, number of nights, rooms and guests, refund policy, payment provider, payment status, and total amount.

After the sandbox payment is completed, the system generates a **Payment Receipt page** as proof of the simulated booking payment. The receipt displays the reference number, payment status, provider, paid date, hotel information, stay dates, total amount paid, and guest information.

These pages are used for FYP demonstration purposes only, as the booking and payment process is based on sandbox data and does not involve a real hotel reservation or real payment.

5.3.7 Hotels Page

The screenshot displays the 'Hotels' page of the 'MY Malaysia Trip Planner' application. The top navigation bar includes links for 'Explore', 'Trip Templates', 'My Trips', 'Hotels', 'Payments / History', and 'Admin', along with a 'Logout' button. The main header area is green and contains a 'Back to Trip' link, the title 'HOTELBEDS SEARCH + SANDBOX RESERVATION', and a 'Search and reserve your stay' section. This section includes a search bar for 'WHERE TO STAY' (set to 'Kuala Lumpur'), 'CHECK-IN' (01/06/2026), 'CHECK-OUT' (03/06/2026), and 'ROOMS / GUESTS' (1 room, 2 guests). Below the search bar are buttons for 'Search Hotelbeds', 'Use Sandbox Fallback', and 'Source: Hotelbeds Test API'. A note states: 'Default source: Hotelbeds. Internal sandbox hotels are only used as fallback when Hotelbeds has no result or fails.' The main content area shows 'Showing Hotelbeds test availability for Kuala Lumpur. 20 hotel(s) found.' and a list of 'Available stays'. The list includes three hotels: 'The Saujana Kuala Lumpur' (5-star property, starting from RM 75.7), 'Pulse Grande Hotel' (5-star property, starting from RM 84.59), and 'Grand Millennium Kuala Lumpur'. Each hotel entry features a thumbnail image, a brief description, and a 'View Rooms' button. A sidebar on the left contains a 'Filter stays' section with a 'Hotels map' button, a 'Price range' filter (RM 0 to RM 10,000), and a 'Sandbox payment' note. The bottom of the page shows a 'Sandbox payment' note: 'Hotelbeds is used for hotel search by default. Reservation and payment are still simulated for your FYP.'

Figure 5.3.7.1 Hotels Page

The system provides a Hotel Search and Reservation page that allows users to search for available hotels using Hotelbeds test data [10]. Users can enter the destination, select check-in and check-out dates, and specify the number of rooms and guests. If users access this page from a specific trip, the trip dates will be automatically filled into the check-in and check-out fields, but users can still edit them before searching.

The page displays a list of available stays, where each hotel card includes details such as hotel name, location, rating, description, and price per night. Users can click the “View Rooms” button to view more details and continue with the booking process.

A filter section is provided to help users refine the hotel results by sorting preference and price range. This allows users to narrow down the available hotels based on their budget and preferences.

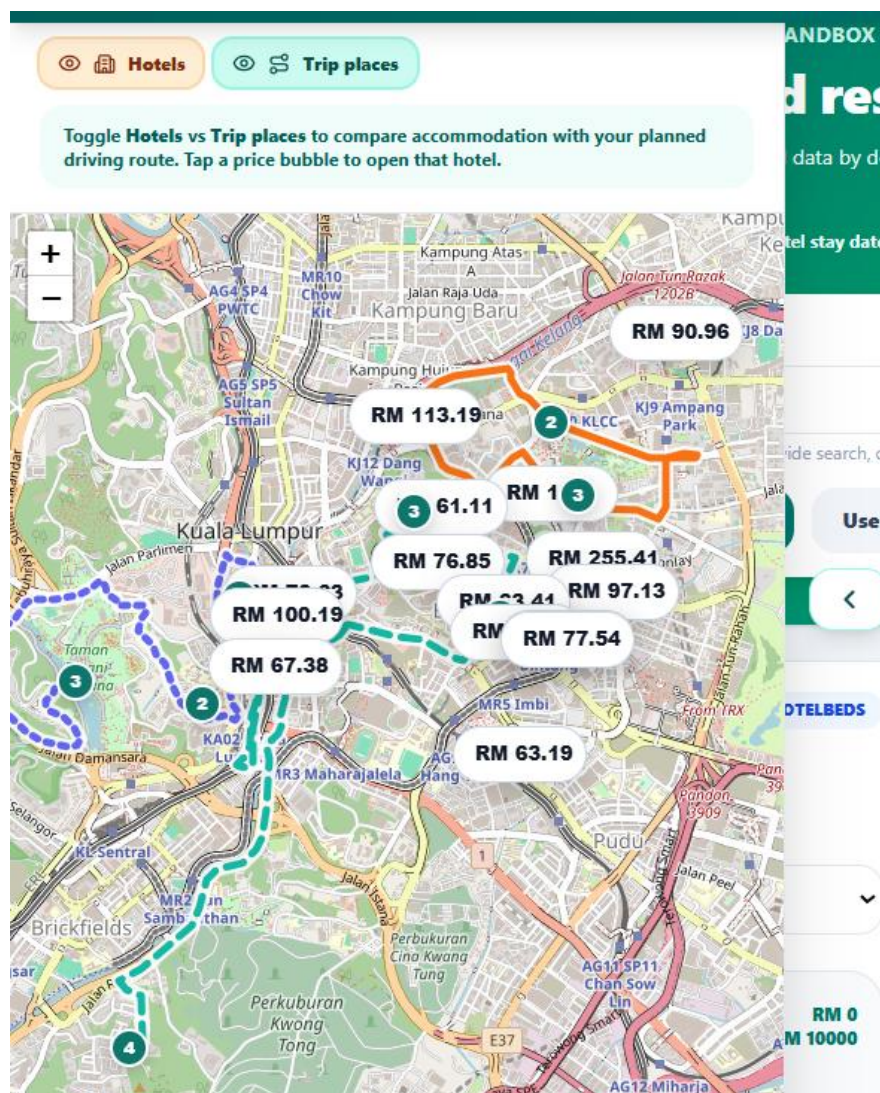


Figure 5.3.7.2 Hotel Map

The page also includes a map toggle function that helps users compare hotel locations with their planned trip route. Users can use the eye toggle buttons to show or hide Hotels and Trip Places on the map.

Hotel locations are displayed with price bubbles, while trip places are shown with numbered markers and route lines. This allows users to visually compare nearby hotels with their itinerary stops and choose accommodation that is more convenient for their travel plan.

By viewing both hotels and trip places together, users can select a hotel that is closer to their planned destinations and reduce unnecessary travel distance.

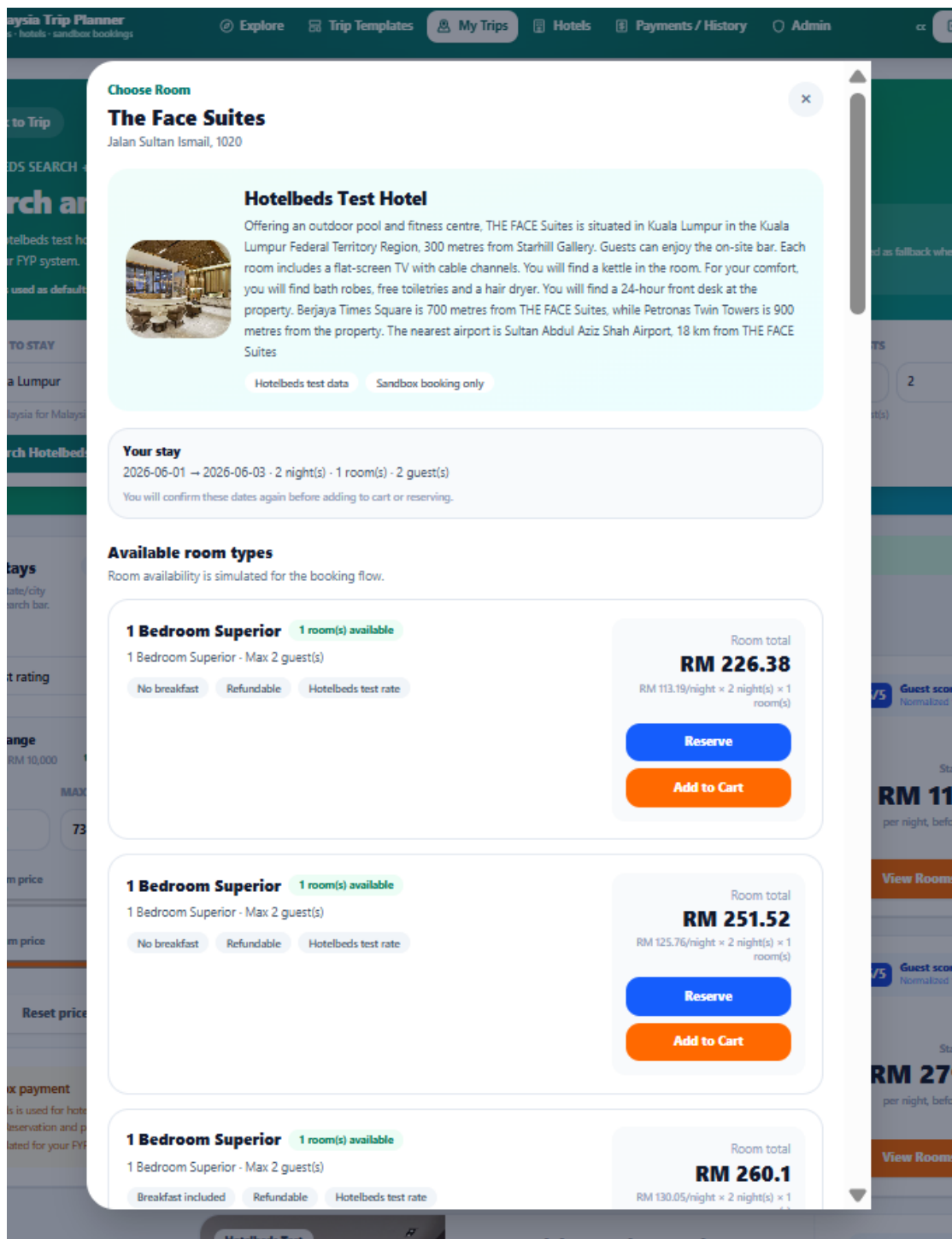


Figure 5.3.7.3 Hotel details

The system displays a Hotel Details pop-up using hotel information retrieved from the Hotelbeds API. When users click “View Rooms”, the pop-up shows the hotel name, location, image, description, and available room types.

Users can review their stay details, including check-in date, check-out date, number of nights, rooms, and guests. Each available room option shows the room type, availability, breakfast/refund information, total room price, and price calculation.

Users can either reserve the room or add it to cart before confirming the sandbox booking. This allows users to compare room options before making a simulated booking decision.

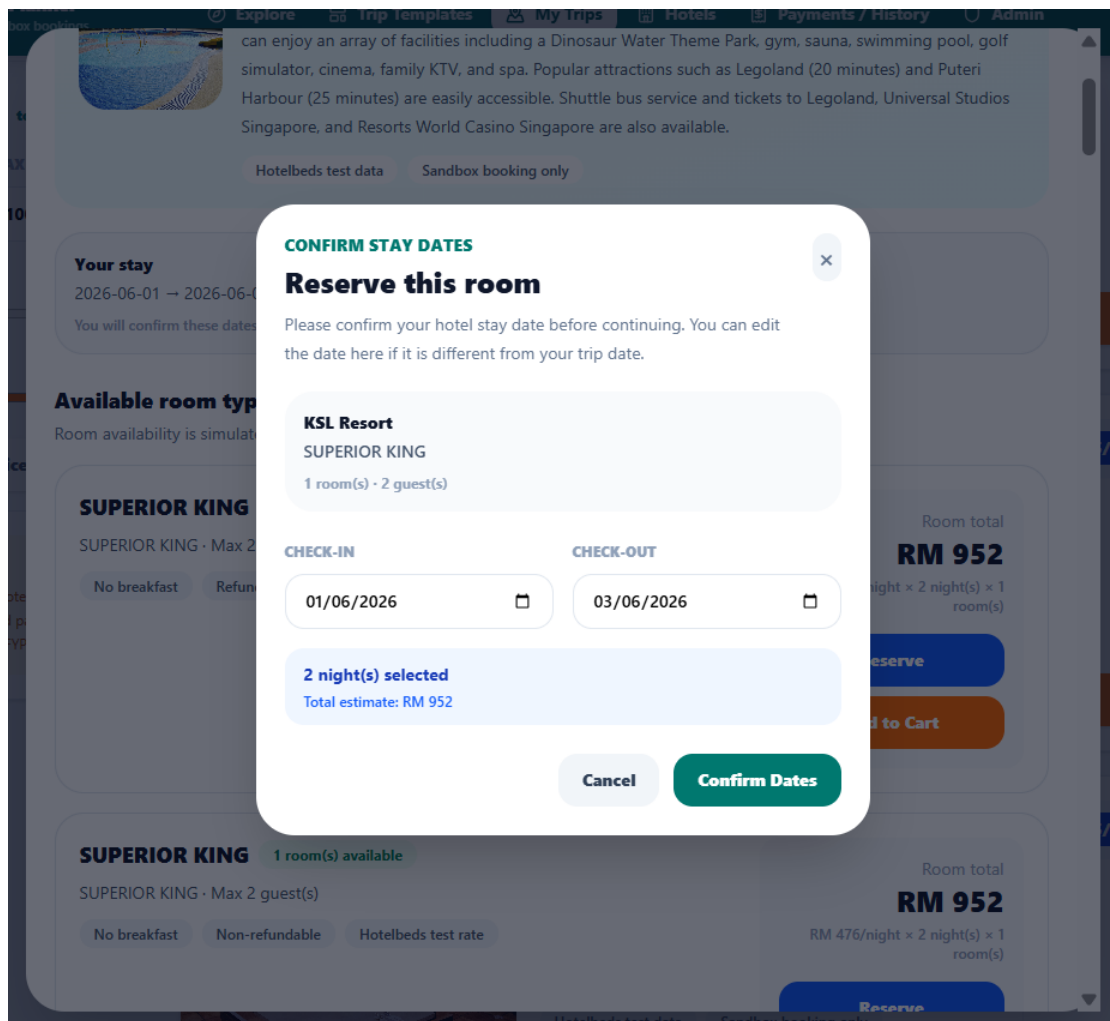


Figure 5.3.7.4 Confirm Stay Dates Pop-up

Before users reserve a room or add it to cart, the system displays a Confirm Stay Dates pop-up. This pop-up allows users to review and confirm the hotel stay details, including the selected hotel, room type, number of rooms and guests, check-in date, and check-out date.

Users can edit the stay dates if they are different from the trip dates. The system also shows the number of selected nights and the total estimated price before continuing.

After confirming the dates, users can proceed with the sandbox booking or add the room to their cart.

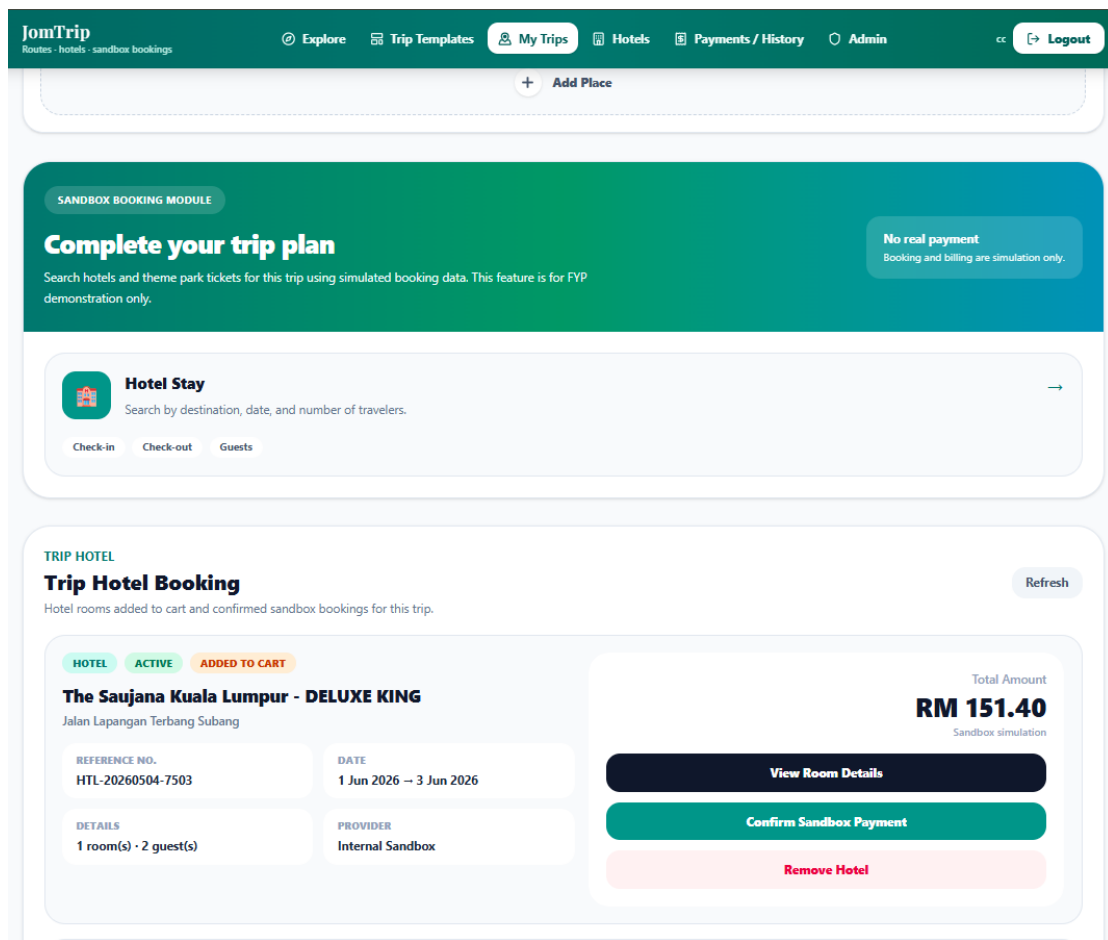


Figure 5.3.7.5 Hotel Added to Cart

The system displays an “Added to Cart” booking state when a user selects a hotel room but has not yet completed the payment. In this state, the booking card shows labels such as Hotel, Active, and Added to Cart to indicate that the booking is saved but still pending confirmation.

The card presents key booking details, including the hotel name, location, stay dates, number of rooms and guests, booking reference number, and total amount. Users are provided with actions such as “View Room Details”, “Confirm Sandbox Payment”, and “Remove Hotel”.

This allows users to review their selected booking, proceed with payment, or remove it from the cart before finalizing the reservation.

[Back to rooms](#)

Complete your hotel booking

Fill in guest information and confirm this sandbox hotel booking.

Check-in
2026-06-01
15:00 - 21:00

2 night(s)

Check-out
2026-06-03
09:00 - 11:00

DELUXE KING - 1 room(s)

- Price for 2 adult(s)
- DELUXE KING
- Non-smoking
- Breakfast included
- Non-refundable

This is an internal sandbox booking. No real payment or real reservation will be made.

Price summary

Room price	RM 151.40
Taxes & fees	RM 0.00
Total	RM 151.40

Sandbox total price

[Create booking & pay with Bliplz](#)

By submitting this booking, you acknowledge this is a sandbox reservation for FYP demonstration only.

This flow simulates hotel booking and payment without charging real money.

Guest info

Sharon

Liew

Malaysia

sharon@gmail.com

011-26214127

Guest information is saved only for this FYP sandbox booking simulation.

Payment method

Choose Bliplz sandbox when configured, or stay on the built-in sandbox flow.

Internal sandbox
Instant simulated payment inside this app (provider: internal_sandbox).

Bliplz sandbox
Opens Bliplz test checkout (provider: bliplz_sandbox). Falls back to internal if unavailable.

Special requests

The property will do its best, but requests cannot be guaranteed.

Lift proximity

☐ Near lift
☒ Away from lift

Extra pillow please!

Figure 5.3.7.6 Information Form

The system requires users to fill in basic information to complete the hotel booking. This includes guest details such as first name, last name, nationality, email address, and phone number.

Users also need to confirm their stay details, including check-in and check-out dates, number of nights, and room type. In addition, users can select a payment method for the sandbox booking.

Optional special requests can be added, such as room preferences or additional notes. This information helps simulate the booking process and complete the reservation within the system.

5.3.8. Billplz Page

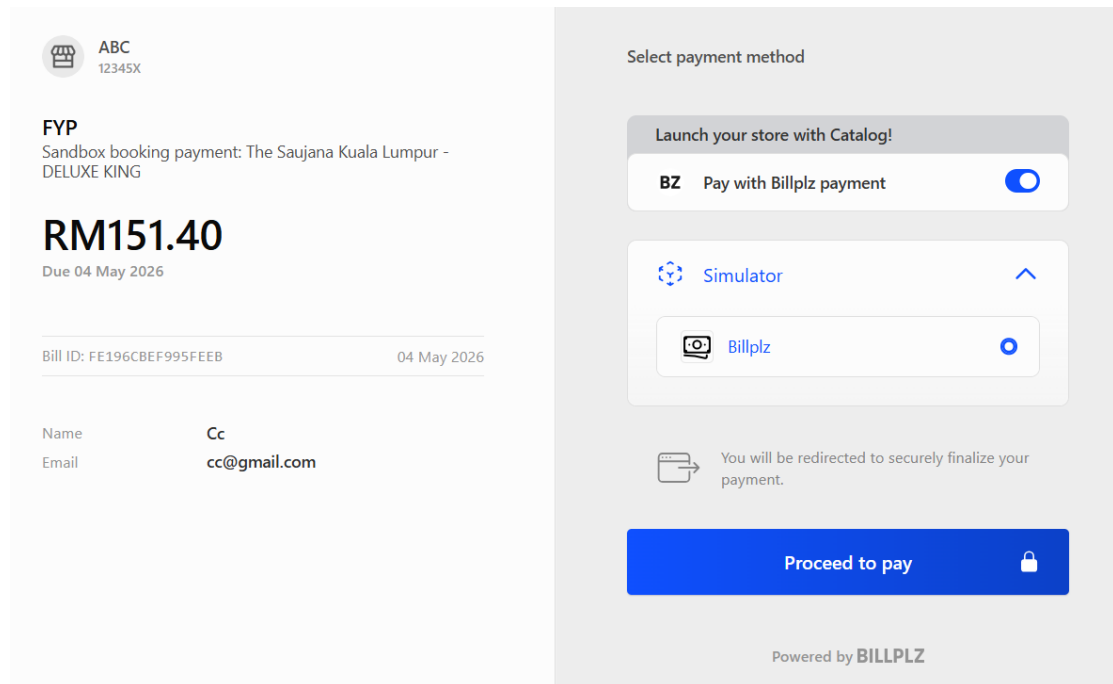


Figure 5.3.8.1 Billplz Page

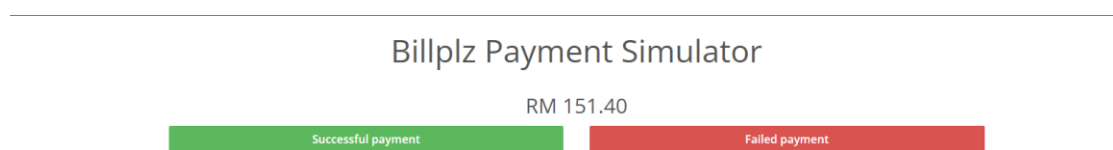


Figure 5.3.8.2 Billplz Payment Simulator

The system uses a Billplz sandbox payment simulation to demonstrate the payment process. After users confirm the booking, they are redirected to the Billplz payment interface, where the booking details such as amount, bill ID, and user information are displayed.

Users can proceed by clicking the “Proceed to pay” button. Since this is a simulation, the system provides a payment simulator where users can choose either “Successful payment” or “Failed payment”.

Based on the selected outcome, the system will update the booking status accordingly. This allows the system to simulate real payment scenarios without involving actual financial transactions.

— Back to Trip

HOTEL ROOM DETAILS

Room Details

Review the saved hotel room details before confirming sandbox payment.

Payment receipt is not available yet. Complete sandbox payment to view the receipt.

ROOM DETAILS

The Saujana Kuala Lumpur
Jalan Lapangan Terbang Subang
Room / package: DELUXE KING

ROOM TYPE
DELUXE KING

BOARD / BREAKFAST
See room package details

REFUNDABILITY
Cancellation policy depends on room rate

SOURCE / PROVIDER
billplz sandbox

CHECK-IN
1 Jun 2026

CHECK-OUT
3 Jun 2026

NIGHTS
2 night(s)

ROOMS / GUESTS
1 room(s) - 2 guest(s)

Room price summary

Price per unit RM 75.70
Total amount **RM 151.40**

PAYMENT PROVIDER
Billplz Sandbox

PAYMENT STATUS
Added to Cart

BILLPLZ BILL ID
fe196cbeff92feb

Confirm Sandbox Payment

Back to Trip

This page is generated by the app for sandbox booking simulation. No real hotel reservation is made.

Figure 5.3.8.3 Payment Failed

[Back to Trip](#)

HOTEL BOOKING RECEIPT

Payment Receipt

Your sandbox payment has been completed. This receipt is generated for FVP demonstration only.

RECEIPT
HTL-20260503-8136

Payment proof for sandbox booking

REFERENCE NO.
HTL-20260503-8136

PAYMENT STATUS
paid_simulated

PAYMENT PROVIDER
internal sandbox

PAID DATE
4 May 2026

HOTEL
The Soujana Kuala Lumpur

ROOM TYPE
DELUXE KING

CHECK-IN
1 Jun 2026

CHECK-OUT
3 Jun 2026

LINKED TRIP
Standalone booking

TOTAL AMOUNT PAID
RM 151.40

Guest information

GUEST NAME
Sharon Liew

NATIONALITY
Malaysia

EMAIL
sharon@gmail.com

PHONE
011-26214127

Payment summary

Price per unit
RM 75.70

Total amount
RM 151.40

PAYMENT PROVIDER
Internal Sandbox

PAYMENT STATUS
Paid

BILLPLZ BILL ID
fe196cbe985feb

[View Room Details](#)

[Back to Trip](#)

This page is generated by the app for sandbox booking simulation. No real hotel reservation is made.

Figure 5.3.8.4 Payment Success

When the payment is not completed or failed, the system keeps the booking in an “Added to Cart” or pending state. The Room Details page will display a message indicating that the payment receipt is not available yet. Users can still review the booking details and proceed by clicking “Confirm Sandbox Payment” to retry the payment.

When the payment is successful, the system updates the booking status to Paid and generates a Payment Receipt page. This page shows the receipt number, payment status, payment date, total amount paid, and guest information. Users can use this page as proof of the completed sandbox booking.

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5.3.9 Booking History Page

JomTrip Routes · hotels · sandbox bookings				Explore	Trip Templates	My Trips	Hotels	Payments / History	Admin	Logout
PAYMENTS & BOOKINGS										
Booking history Open any row for the full receipt or room details. Trip-linked and standalone hotel bookings appear together.										
The Saujana Kuala Lumpur - DELUXE KING HTL-20260504-7503 · Jalan Lapangan Terbang Subang 1 Jun 2026 – 3 Jun 2026 Trip: Kuala Lumpur 3D2N								RM 151.40 In cart		>
The Saujana Kuala Lumpur - DELUXE KING HTL-20260503-8136 · Jalan Lapangan Terbang Subang 1 Jun 2026 – 3 Jun 2026 Trip: Kuala Lumpur 3D2N								RM 151.40 Paid		>
KSL Resort - SUPERIOR KING HTL-20260503-5751 · Jalan Seladang, 33 1 Jun 2026 – 3 Jun 2026 Trip: Kuala Lumpur 3D2N								RM 952.00 Paid		>
KSL Resort - SUPERIOR KING HTL-20260503-9071 · Jalan Seladang, 33 1 Jun 2026 – 3 Jun 2026 Trip: Kuala Lumpur 3D2N								RM 952.00 pending		>
The Face Suites - 1 Bedroom Superior HTL-20260503-8673 · Jalan Sultan Ismail, 1020 1 Jun 2026 – 3 Jun 2026 Trip: Kuala Lumpur 3D2N								RM 226.38 Paid		>
The Face Suites - 1 Bedroom Superior HTL-20260502-1051 · Jalan Sultan Ismail, 1020 13 May 2026 – 19 May 2026 Trip: 7D6N Penang								RM 585.30 Paid		>
Tropika Garden Hotel Kulai by ZUZU - Standard Twin HTL-20260502-9768 · Jalan Tropika Utama, 302 13 May 2026 – 14 May 2026 Trip: 7D6N Penang								RM 136.00 Paid		>

Figure 5.3.9.1 Booking History Page

The system provides a Booking History page where users can view all their hotel bookings in one place. This page displays both trip-linked bookings and standalone bookings together.

Each booking entry shows key information such as the hotel name, room type, location, booking reference number, stay dates, and the associated trip. The total amount is also displayed, along with the booking status, such as In Cart, Pending, or Paid.

Users can click on any booking to view more details, including the full receipt or room information. This page allows users to easily track their booking records and payment status within the system.

5.3.10 Admin Page

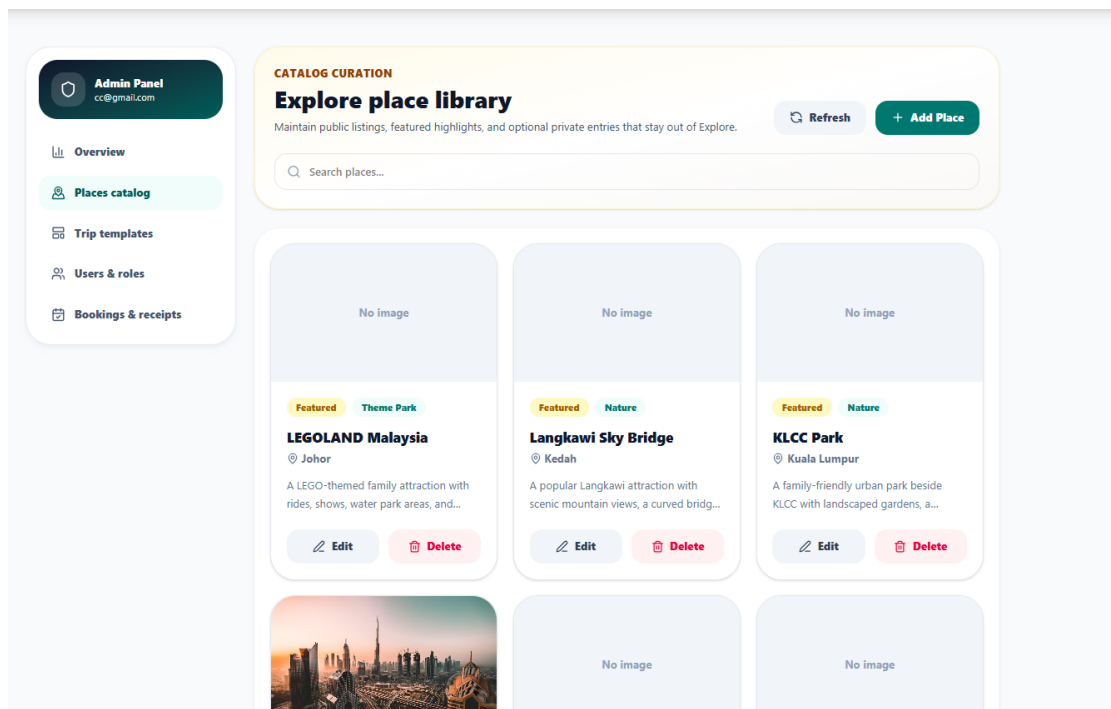


Figure 5.3.10.1 Admin Place Management Page

The system provides an Admin Place Management page that allows administrators to manage the place library used in the Explore section. This page displays a list of places in a card layout, where each place includes its name, location, category, description, and status such as featured.

Administrators can use the search bar to quickly find specific places. They are also able to add new places, edit existing place details, or delete places from the system. A refresh option is available to reload the latest data.

This page helps administrators maintain and update the place database, ensuring that users are provided with accurate and relevant travel information.

Trip templates
Create starter itineraries using a simple form instead of JSON.

Create template

TITLE

STATE / DESTINATION LABEL

DURATION LABEL

302N

DESCRIPTION

IMAGE URL

Optional image URL

☐ Featured template

ITINERARY DAYS

+ Add day

Day 1

DAY TITLE

Day 1

NOTES

Optional notes for this day

ADD PLACE

Search Place

+ Create template

TEMPLATE	STATE	DAYS	PLACES	ACTIONS
Kuala Lumpur city break City lanes, shopping pockets, and a relaxed second day before departure. Featured	Kuala Lumpur	2 day(s)	2 place(s)	Edit Delete
Penang heritage & food Slow days around George Town, local food, and a flexible coastal or hill add-on. Featured	Penang	3 day(s)	2 place(s)	Edit Delete

Figure 5.3.10.2 Admin Trip Template Page

The system provides an Admin Trip Templates page that allows administrators to create and manage predefined travel itineraries in a user-friendly form interface. Instead of using complex JSON input, administrators can enter basic information such as the template title, destination, duration, description, and optional image.

The itinerary is organized into day-based sections, where each day includes a title, optional notes, and the ability to add places. Administrators can dynamically add more days using the “Add day” button, making the template flexible and easy to build.

Below the form, existing templates are displayed in a table showing the template name, destination, number of days, and number of places included. Administrators can edit or delete templates as needed.

This page enables administrators to prepare ready-made itineraries that users can quickly use when planning their trips.

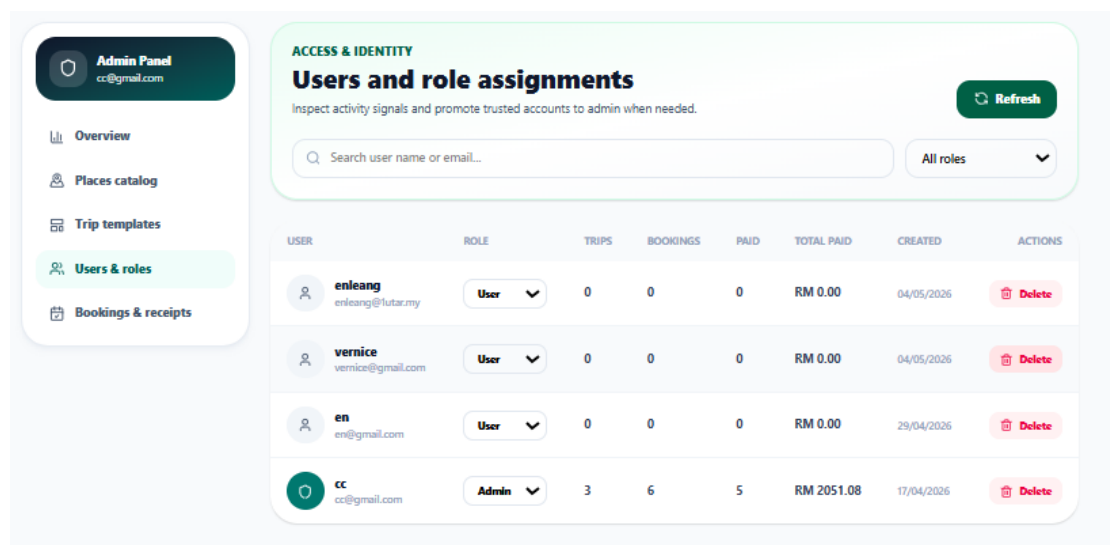


Figure 5.3.10.3 Admin Users and Roles Page

The system provides an Admin Users and Roles page that allows administrators to manage user accounts and assign roles. This page displays a list of registered users along with their basic information, including username, email, number of trips, bookings, payment activity, total amount paid, and account creation date.

Administrators can use the search bar to find specific users and filter them by role. Each user has a role selection dropdown, allowing the admin to change their role (e.g., User or Admin) directly from the table.

Additionally, administrators have the option to delete user accounts when necessary. This page helps maintain system security and manage user access by controlling permissions and monitoring user activity.

Admin Panel

cc@gmail.com

Overview

Places catalog

Trip templates

Users & roles

Bookings & receipts

COMMERCE AUDIT TRAIL

Bookings, carts, and receipts

Drill into sandbox hotel reservations with guest payloads, payment provider, and Billplz metadata when present.

Search booking, user, reference, hotel...

All payments

All status

All types

Refresh

BOOKING	USER	TRIP	DATES	PAYMENT	STATUS	TOTAL
The Saujana Kuala Lumpur - DELUXE KING HTL-20260503-8136 Jalan Lapangan Terbang Subang	cc cc@gmail.com	Kuala Lumpur 3D2N Malaysia	1 Jun 2026 - 3 Jun 2026	paid_simulated	confirmed	RM 151.40
KSL Resort - SUPERIOR KING HTL-20260503-5751 Jalan Seladang, 33	cc cc@gmail.com	Kuala Lumpur 3D2N Malaysia	1 Jun 2026 - 3 Jun 2026	paid_simulated	confirmed	RM 952.00
KSL Resort - SUPERIOR KING HTL-20260503-9071 Jalan Seladang, 33	cc cc@gmail.com	Kuala Lumpur 3D2N Malaysia	1 Jun 2026 - 3 Jun 2026	pending	confirmed	RM 952.00
The Face Suites - 1 Bedroom Superior HTL-20260503-8673 Jalan Sultan Ismail, 1020	cc cc@gmail.com	Kuala Lumpur 3D2N Malaysia	1 Jun 2026 - 3 Jun 2026	paid_simulated	confirmed	RM 226.38
The Face Suites - 1 Bedroom Superior HTL-20260502-1051 Jalan Sultan Ismail, 1020	cc cc@gmail.com	7D6N Penang Malaysia	13 May 2026 - 19 May 2026	paid_simulated	confirmed	RM 585.30
Tropika Garden Hotel Kulai by ZUZU - Standard Twin HTL-20260502-9768 Jalan Tropika Utama, 302	cc cc@gmail.com	7D6N Penang Malaysia	13 May 2026 - 14 May 2026	paid_simulated	confirmed	RM 136.00

Figure 5.3.10.4 Admin Bookings and Receipts Page

The system provides an Admin Bookings and Receipts page that allows administrators to monitor all hotel bookings within the system. This page displays detailed booking records, including hotel name, user information, associated trip, stay dates, payment type, booking status, and total amount.

Administrators can use the search bar to find specific bookings and apply filters based on payment status, booking status, and booking type. Each record also shows the payment state, such as paid (simulated) or pending, along with the confirmation status.

This page acts as a central audit trail, enabling administrators to track booking activities, review payment simulations, and manage overall system transactions efficiently.

Chapter 6: System Evaluation and Discussion

6.1 System Testing and Performance Metrics

System testing was conducted to verify the overall functionality, stability, and performance of the Tourism Web Application. This testing phase was important to ensure that all features behave as intended, produce accurate results, and provide a smooth user experience.

The testing process focused on both **functional testing** and **non-functional testing**. Functional testing was used to verify whether each feature worked according to the system requirements, while non-functional testing was used to evaluate the system's performance, usability, reliability, and responsiveness.

The system was tested using a **manual test case-based testing approach**. In this approach, each module was tested based on prepared test cases that included test scenarios, expected outcomes, actual outcomes, and pass or fail status. The testing was conducted from the user and administrator perspectives to ensure that the system functions correctly for different types of users.

Each module was tested by using valid and invalid input values to observe whether the system produced the expected output or displayed suitable error messages. This approach was selected because the Tourism Web Application involves various user interactions, such as account login, tourism place exploration, trip planning, itinerary management, map viewing, hotel searching, and payment processing.

Therefore, the testing approach helped to validate whether the system behaves correctly, handles errors properly, and meets the functional and non-functional requirements of the project.

6.1.1 Functional Testing

Functional testing was conducted to ensure that each function of the Tourism Web Application works according to the system requirements. The main purpose of functional testing is to verify that the system can process valid input correctly and reject invalid input without causing system errors, crashes, or incorrect data storage.

Both positive and negative test cases were applied during functional testing. Positive test cases were used to test correct input, while negative test cases were used to test invalid, incomplete, or incorrect input.

Module	Test Coverage / Description
User Authentication	Verified user registration, login, logout, JWT authentication, protected route access, and error handling for invalid credentials.
Explore Page	Verified that users can view tourism places, search places, filter places by state or category, and access place details.
Place Details	Verified that selected tourism place information, images, location, opening hours, and contact details are displayed correctly.
Trip Management	Verified that users can create, view, update, and delete trips with optional travel dates.
Itinerary Management	Verified that users can add places into selected trips/days, remove places, reorder itinerary items, and save itinerary changes.
Map and Route Display	Verified that selected places are displayed on the map using markers and that routes between destinations are generated correctly.
Route Optimization	Verified that the system can optimize travel sequence using nearest-route calculation based on place coordinates.
Custom Place / Location Search	Verified that users can search custom addresses using OpenStreetMap Nominatim and add valid locations into the itinerary.
Hotel Search and Booking	Verified that hotel information, availability, pricing, and booking details can be retrieved through the Hotelbeds API.

Payment Processing	Verified that Billplz API can generate payment bills and handle successful, failed, or cancelled payment simulation results.
Admin Place Management	Verified that admin users can add, edit, delete, and manage tourism place records.
API Testing and Documentation	API Testing and Documentation

Table 6.1.1.1: Functional Testing Coverage

6.1.2 Non-Functional Testing

Non-functional testing was conducted to evaluate how well the Tourism Web Application performs in terms of speed, usability, stability, reliability, and browser compatibility. This testing ensures that the system not only functions correctly but also provide a smooth and efficient experience for users in real-world conditions.

Metric	Description / Result
Page Loading Time	Main pages such as Explore, My Trips, Login, Register, and Itinerary loaded within an acceptable time under normal internet connection.
Screen Responsiveness	The user interface adjusted properly across different screen sizes, including laptop and smaller browser widths.
Navigation Responsiveness	Navigation between pages occurred smoothly without noticeable delays.
API Response Handling	Backend APIs returned appropriate responses for valid and invalid requests. Errors were handled with suitable messages.
Database Performance	User, place, trip, itinerary, booking, and payment-related data were stored and retrieved correctly from MongoDB Atlas.

Map Performance	Map markers and routes were displayed correctly. The system handled invalid or missing coordinates without crashing.
External API Reliability	Hotelbeds and Billplz API responses were handled properly, including successful responses and failed request scenarios.
Input Validation	Empty, invalid, or incomplete form inputs were handled with proper validation messages.
Browser Compatibility	The system was tested on Google Chrome and Microsoft Edge, and all major functions worked correctly.
Crash and Stability Testing	The system was used continuously with different features such as searching, itinerary editing, map viewing, and booking simulation without major crashes.
Usability	The system interface was understandable and easy to use, allowing users to explore places, plan trips, and manage itineraries efficiently.

Table 6.1.2: Non-Functional Testing Metrics

6.2 Test Cases & Result

6.2.1 Test Cases for Authentication Module

ID	Scenario	Expected Outcome	Actual Outcome	Pass / Fail
1	Register with valid name, email, and password.	Account is created successfully.	Account is created successfully.	Pass
2	Register with empty required fields.	System prevents registration.	Registration is rejected.	Pass
3	Register with existing email address.	Error message is displayed.	Error message is displayed.	Pass
4	Login with valid email and password.	User is redirected to home page.	User is redirected to home page.	Pass
5	Login with invalid email or password.	Error message is displayed.	Error message is displayed.	Pass
6	Continue as guest.	User enters the system as guest.	Guest access is granted.	Pass
7	Request forgot password with valid email.	Reset password instruction is processed.	Reset password process is displayed.	Pass
8	Reset password with valid token and password.	Password is updated successfully.	Password is updated successfully.	Pass
9	Reset password with invalid or expired token.	Error message is displayed.	Error message is displayed.	Pass
10	Logout from the system.	User session ends successfully.	User is logged out successfully.	Pass

Table 6.2.1 Test Cases for Authentication Module

6.2.2 Test Cases for Explore and Place Module

ID	Scenario	Expected Outcome	Actual Outcome	Pass / Fail
1	View home page.	Main navigation and quick access sections are displayed.	Home page is displayed correctly.	Pass
2	View Explore page.	Tourism places are displayed.	Tourism places are displayed.	Pass
3	Search tourism place by keyword.	Matching places are displayed.	Matching places are displayed.	Pass
4	Filter places by state.	Places from selected state are displayed.	Filtered places are displayed.	Pass
5	Filter places by category.	Places from selected category are displayed.	Filtered places are displayed.	Pass
6	View featured places.	Featured tourism places are displayed.	Featured places are displayed.	Pass
7	View state travel guide page.	State description and related places are displayed.	State guide is displayed correctly.	Pass
8	Open selected place details.	Place details page is displayed.	Place details page is displayed.	Pass
9	View place information.	Description, image, location, opening hours, and contact details are displayed.	Place information is displayed correctly.	Pass
10	Add place to trip from Explore or Place Detail page.	Place is added to selected trip/day.	Place is added successfully.	Pass

Table 6.2.2 Test Cases for Explore and Place Module

6.2.3 Test Cases for Trip and Template Module

ID	Scenario	Expected Outcome	Actual Outcome	Pass / Fail
1	View My Trips page while logged in.	User's trip list is displayed.	Trip list is displayed.	Pass
2	Access My Trips without login.	System asks user to log in.	Login message is displayed.	Pass
3	Create trip with valid details.	Trip is created successfully.	Trip is created successfully.	Pass
4	Create trip with empty trip name.	Error message is displayed.	Error message is displayed.	Pass
5	Create trip with end date earlier than start date.	System rejects invalid date range.	Invalid date range is rejected.	Pass
6	Delete selected trip.	Trip is removed successfully.	Trip is removed successfully.	Pass
7	View trip templates.	Available templates are displayed.	Templates are displayed.	Pass
8	Create trip from template with selected start date.	New trip is created based on template.	Trip is created from template.	Pass
9	Create trip from template without login.	User is redirected to login page.	Redirected to login page.	Pass
10	Open created template trip.	User is redirected to Trip Detail page.	Trip Detail page is displayed.	Pass

Table 6.2.3 Test Cases for Trip and Template Module

6.2.4 Test Cases for Itinerary and Map Module

ID	Scenario	Expected Outcome	Actual Outcome	Pass / Fail
1	Open Trip Detail page.	Trip details and daily itinerary are displayed.	Trip Detail page is displayed.	Pass
2	Add place to selected day.	Place is added into the selected itinerary day.	Place is added successfully.	Pass
3	Remove place from itinerary.	Place is removed from the selected day.	Place is removed successfully.	Pass
4	Reorder places using drag and drop.	Itinerary order is updated.	Itinerary order is updated.	Pass
5	Add note to itinerary stop.	Note is saved under selected place.	Note is saved successfully.	Pass
6	Edit existing note.	Note content is updated.	Note is updated successfully.	Pass
7	Delete existing note.	Note is removed.	Note is removed successfully.	Pass
8	Search custom address.	Address suggestions are displayed.	Address suggestions are displayed.	Pass
9	Add custom location to itinerary.	Custom place is added with coordinates.	Custom location is added successfully.	Pass
10	View itinerary map.	Map markers are displayed.	Map markers are displayed correctly.	Pass
11	Generate route between places.	Route line is displayed on the map.	Route is displayed successfully.	Pass
12	Handle invalid or missing coordinates.	System handles error without crashing.	Error is handled properly.	Pass

Table 6.2.4 Test Cases for Itinerary and Map Module

6.2.5 Test Cases for Hotel Booking Module

ID	Scenario	Expected Outcome	Actual Outcome	Pass / Fail
1	Open hotel search page.	Hotel search form and hotel list are displayed.	Hotel search page is displayed.	Pass
2	Search hotels with valid destination and dates.	Available hotels are displayed.	Hotel results are displayed.	Pass
3	Search hotels without check-in or check-out date.	Error message is displayed.	Error message is displayed.	Pass
4	Search hotels with check-out date before check-in date.	System rejects invalid date selection.	Invalid date is rejected.	Pass
5	Filter hotels by price range.	Hotels within selected price range are displayed.	Filtered hotels are displayed.	Pass
6	Sort hotels by price or rating.	Hotel list is sorted correctly.	Hotel list is sorted correctly.	Pass
7	View hotel room options.	Available rooms are displayed.	Room options are displayed.	Pass
8	Select hotel room.	User is redirected to checkout page.	Checkout page is displayed.	Pass
9	Submit checkout form with valid guest details.	Booking is created successfully.	Booking is created successfully.	Pass
10	Submit checkout form with missing guest details.	Error message is displayed.	Error message is displayed.	Pass
11	Confirm booking with internal sandbox payment.	Booking is confirmed successfully.	Booking is confirmed successfully.	Pass
12	Use Billplz sandbox payment option.	Billplz payment process is started or fallback is shown.	Payment flow is handled correctly.	Pass

Table 6.2.5 Test Cases for Hotel Booking Module

6.2.6 Test Cases for Booking and Receipt Module

ID	Scenario	Expected Outcome	Actual Outcome	Pass / Fail
1	Open booking history while logged in.	User booking records are displayed.	Booking records are displayed.	Pass
2	Open booking history without login.	System asks user to log in.	Login message is displayed.	Pass
3	View booking history when no record exists.	No booking message is displayed.	No booking message is displayed.	Pass
4	Select booking record from history.	Booking receipt or room details page is opened.	Booking detail page is displayed.	Pass
5	View unpaid or cart booking details.	Room details are displayed before payment.	Room details are displayed.	Pass
6	View paid booking receipt.	Receipt details are displayed.	Receipt is displayed correctly.	Pass
7	Confirm sandbox payment from booking detail page.	Payment status changes to paid.	Payment status is updated.	Pass
8	Open invalid booking record.	Booking not found message is displayed.	Booking not found message is displayed.	Pass
9	Return from booking receipt page.	User is redirected to trip page or booking history.	Navigation works correctly.	Pass

Table 6.2.6 Test Cases for Booking and Receipt Module

6.2.7 Test Cases for Admin Management Module

ID	Scenario	Expected Outcome	Actual Outcome	Pass / Fail
1	Login with valid admin account.	Admin dashboard is displayed.	Admin dashboard is displayed.	Pass
2	Access admin page using normal user account.	Access is denied.	Access is denied.	Pass

3	View admin dashboard statistics.	Total users, places, trips, bookings, and payment summary are displayed.	Statistics are displayed.	Pass
4	View places catalog management page.	Tourism place list is displayed.	Place list is displayed.	Pass
5	Add new tourism place with valid details.	New place is created successfully.	Place is created successfully.	Pass
6	Add place with missing required fields.	Error message is displayed.	Error message is displayed.	Pass
7	Edit existing tourism place.	Place information is updated successfully.	Place is updated successfully.	Pass
8	Delete existing tourism place.	Selected place is removed.	Place is removed successfully.	Pass
9	Create new trip template.	Template is created successfully.	Template is created successfully.	Pass
10	Create template with invalid days JSON.	System rejects invalid template data.	Invalid data is rejected.	Pass
11	Edit existing trip template.	Template is updated successfully.	Template is updated successfully.	Pass
12	Delete trip template.	Template is removed successfully.	Template is removed successfully.	Pass
13	View users and roles page.	User list is displayed.	User list is displayed.	Pass
14	Search user by name or email.	Matching users are displayed.	Matching users are displayed.	Pass
15	Update user role.	User role is updated successfully.	User role is updated successfully.	Pass
16	Delete selected user.	User account is removed.	User account is removed successfully.	Pass
17	View admin bookings and receipts page.	Booking records are displayed.	Booking records are displayed.	Pass
18	Filter bookings by payment status.	Filtered booking records are displayed.	Filtered records are displayed.	Pass

19	Filter bookings by booking status or type.	Matching booking records are displayed.	Matching records are displayed.	Pass
20	View selected booking details.	Booking details and payment metadata are displayed.	Booking details are displayed.	Pass

Table 6.2.7 Test Cases for Admin Management Module

6.3 Testing Setup and Result

The testing phase of this system was conducted in a development environment using a personal computer running the Windows 11 operating system. The system was developed using modern web technologies, where React (Vite) and Tailwind CSS were used for the front-end, while Node.js and Express.js were used for the back-end. The database was managed using MongoDB Atlas.

The system was accessed and tested using web browsers such as Google Chrome and Microsoft Edge to ensure compatibility and consistent performance across different platforms.

For backend and API testing, Postman was used to send and verify HTTP requests, while Swagger (OpenAPI) was used to document and test API endpoints. External services such as Hotelbeds API and Billplz API were also tested to ensure proper integration and response handling.

Manual testing was performed for each module, including user and admin functionalities. Test cases were designed with specific scenarios, expected outcomes, and actual outcomes to evaluate whether the system behaves as intended. Both valid and invalid input values were used during testing to ensure proper validation and error handling.

Based on the test cases executed, all major functionalities of the system performed as expected. The actual outcomes matched the expected results in all scenarios, indicating that the system is functioning correctly and reliably.

6.4 Project Challenges

Several challenges were encountered during the development of the Tourism Web Application.

One of the main challenges was selecting a suitable third-party travel API for the hotel booking feature. During the early stage, Amadeus API was considered. However, Amadeus announced that its Self-Service APIs portal for developers will be decommissioned on **17 July 2026**, while Enterprise APIs remain available through the Enterprise portal. This made Amadeus less suitable for this project because the system was developed as an academic project and did not have access to enterprise-level travel API services.

In addition, many travel-related APIs require a registered company account, business verification, or production approval before full booking services can be used. Therefore, the system adopted sandbox-based solutions and alternative API integrations to support hotel search, booking simulation, and payment demonstration.

Another challenge was integrating external APIs such as Hotelbeds and Billplz. Understanding the API documentation, managing API keys, handling sandbox environments, and processing different API responses required careful implementation. The system also needed to handle failed requests, unavailable hotel results, and fallback payment flows properly.

The implementation of map and routing functionality also posed a challenge. Leaflet requires accurate latitude and longitude coordinates to display markers and generate routes. However, users normally search or enter locations using addresses instead of coordinates. Therefore, address data had to be converted into coordinates using geocoding services before the location could be displayed on the map. This required additional validation to ensure invalid or incomplete address results would not cause map errors.

Lastly, maintaining system performance and user experience was challenging, especially when handling dynamic data such as itinerary updates, map rendering, hotel search results, booking records, and API responses. Continuous improvements were made to ensure that the system remained responsive, stable, and user-friendly.

6.4 Objectives Evaluation

All the objectives of this project have been successfully achieved.

The main objective of this project was to develop a Tourism Web Application that allows users to explore tourism destinations, plan trips, manage itineraries, and simulate booking and payment processes.

Based on the testing results, all system functionalities are working as intended. Users are able to register and log in, explore tourism places, view detailed information, create and manage trips, and organize itineraries effectively.

The integration of map functionality enables users to visualize locations and routes, improving the overall trip planning experience. Additionally, the system successfully integrates external services such as **Hotelbeds API** for hotel search and **Billplz API** for payment simulation.

The system also provides administrative features for managing tourism places, ensuring that the content remains updated and relevant.

Overall, the system meets the defined objectives and provides a user-friendly, functional, and reliable platform for tourism exploration and trip planning.

Chapter 7: Conclusion and Recommendation

7.1 Conclusion

In conclusion, the Tourism Web Application has been successfully designed and developed to achieve its intended objectives. The system provides a comprehensive platform for users to explore tourism destinations, plan trips, and manage itineraries efficiently.

Throughout the development process, modern web technologies such as React, Node.js, and MongoDB were utilized to build a scalable and interactive system. The integration of external services, including the Hotelbeds API and Billplz API, further enhanced the functionality of the application by enabling hotel search and payment simulation features.

The system allows users to perform key functions such as account registration and login, exploring tourism places, viewing detailed information, creating trips, organizing itineraries, and visualizing routes using map features. These functionalities contribute to a more convenient and structured trip planning experience.

Based on the testing and evaluation conducted in Chapter 6, the system performs reliably and meets the specified requirements. All major modules function correctly, and the system is able to handle user interactions effectively.

Overall, the Tourism Web Application successfully fulfils its objectives and demonstrates the practical application of web technologies in solving real-world tourism planning problems.

7.2 Recommendation

Firstly, the hotel booking and payment features can be extended to support actual real-world transactions. Currently, the booking and payment process is mainly designed for simulation and demonstration purposes. In future development, the system can integrate with production-level booking services and real payment gateways so that users can complete actual hotel reservations and payments.

Secondly, the system can include a **travel review and rating feature**, where users can share their experiences, rate tourism places, and provide feedback after visiting a destination. This would help other users make better decisions when planning their trips.

In addition, the system can allow users to **share their trips as public templates**. Users can publish their planned itineraries so that other users can view, reuse, and customize them. This would enhance the system by creating a community-based travel planning environment.

Another possible improvement is to enhance the **search and recommendation system**. For example, the system can suggest places based on user preferences, previous trips, or popular destinations. This would make the trip planning process more efficient and personalized.

Finally, the system can be further improved by enhancing performance and scalability, especially when handling a larger number of users, tourism places, bookings, and API requests. This can be achieved through database optimization, caching strategies, and improving API response efficiency.

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APPENDIX

Poster



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DESIGN AND DEVELOPMENT OF A TOURISM PROMOTION WEB APPLICATION



01 Introduction

An all-in-one travel website that helps users search for destinations, customize travel packages, and plan trips with integrated maps and real-time support.

02 Objective

To simplify travel planning by combining destination search, booking, itinerary creation, and customer support into a single platform.

03 Proposed Method

Frontend Development: HTML, CSS, Bootstrap for responsive layout
Database: MongoDB to store user data, travel packages, and bookings
API: Google Maps API for travel route and itinerary planning
Development Tools: Visual Studio Code

04 Why It's Better

- Customizable travel packages
- Real-time route planning

05 Conclusion

A smart travel planning tool that improves user experience by offering convenience, flexibility, and real-time assistance.

