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**Sri Lanka Institute of Information Technology**

Information Technology Project (IT2080)

Online Travel Booking System

Project Proposal

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# **Introduction**

Travel management systems can provide several benefits to individuals or organizations, including streamlined booking processes, consolidated travel data, real-time travel information, and improved communication. There are several types of travel management systems available, each with its own features and benefits, and the specific system chosen will depend on the needs of the user. Overall, travel management systems can help improve the efficiency and effectiveness of travel management processes.

# **Client/company background**

# **Problem and Motivation**

1. Problem:

* Canceled, delayed, or unreliable transportation (1)

Motivation:

The use of travel management systems can automate the travel booking process, which can save time and reduce errors and access real-time travel information, such as flight delays or cancellations, which can help travelers adjust their plans accordingly. (2)

2. Problem:

* Finance managing problems (1)

Motivation:

As the use of computer-based system is very efficient and accurate than that of manual, it is easy to manage the finance functions such as payment management, income and expense report generation, calculation of loss and profits etc. (2)

3. Problem:

* Lack of marketing functionalities for service providers (1)

Motivation:

As there are many newly started businesses of service providers, they must compete with other people in the relevant fields. So, for those people this system will be a great platform to market their services and goods. (2)

# **Aims and Objectives**

**Convenience**.

Offering users, a simple and convenient method to reserve travel-related services is one of the main goals of a travel booking system. Users should be able to quickly search, compare, and book services using the system's variety of options.

**Timesaving.**

By providing all the required information in one location and enabling users to quickly and easily book their travel-related services without the need to visit multiple websites, a travel booking system should save users’ time.

**User-friendly.**

A booking system for travel should be simple to use and navigate, with feedback given to the user at each stage of the booking process and easy to understand directions.

**Secure.**

A travel booking system should be safe, with safeguards in place to safeguard user information and increase the users' online payment security.

**Cost-effective.**

By providing users with competitive pricing, exclusive offers, and discounts, a travel booking system should enable users to save money. Users should be able to compare prices from multiple services and select the most economical choice for their requirements.

**Comprehensive**.

To satisfy the various requirements of different users, a travel booking system should provide a wide range of services, including flights, hotels, rental cars, and packages.

# **System Overview**

## Hotel Management

Search: Users enter their travel dates and destination, and the website will display a list of available hotels in the area, with details such as location, room type, price, and amenities.

Filtering and Sorting: Users can narrow down the search results by using filters such as price, star rating, location, and amenities. They can also sort the results based on different criteria, such as price, distance from the city center, or guest ratings.

Room Selection: Once the users have found a hotel that meets their needs, they can view more details about the rooms, including photos, descriptions, and availability.

Booking: After selecting a room, the users can proceed to the booking process, which typically involves entering personal and payment information, and agreeing to the hotel's terms and conditions.

Confirmation: Upon completion of the booking process, the users will receive a confirmation email or a booking voucher with all the details of their reservation.

Extra features: Augmented reality images or Adding Virtual tours , So the clients can have another level of an experience. (3)

**Functional Requirements**

* Login to employee profile using username and password.
* View the hotels and their prices.
* Add new hotels and update and delete existing hotels.
* View hotel booking list.
* Check the hotel booking list.
* Inform customers about their bookings by email.

**Non-Functional Requirements**

* Usability.
* Reliability.
* Efficiency.
* Maintainability.

**Technical requirements**

* Web-based system
* Back end – Node JS
* Front end – React JS
* Database – Mongo DB

## Itinerary Management

The itinerary management system of a travel booking system is a feature that allows users to create, organize, and manage the different aspects of their trip in one place. This includes details such as flights, accommodation, transportation, and activities. The objective of the travel booking system with itinerary management is to provide users with a one-stop-shop for booking flights, hotels, and tours, as well as managing their itinerary in one place. The system also aims to provide users with up-to-date pricing and availability information from various travel service providers.

Admins are responsible for managing the itinerary management feature. They can add and update tour guides, delete tour guides if necessary, and add new places to the itinerary management feature. Users can explore different places and destinations available in the system and find information about the best things to do, the best time to visit, and other important details needed to plan their trip.

The system also offers additional features such as browsing featured and latest stories to get inspiration for their next adventure. An AI chat box is also available for users to ask questions and get further information about their trip. If users require more information or want to make changes to their itinerary, they can contact tour guides who are always available to aid. Overall, the itinerary management system of a travel booking system is designed to make trip planning and organization easier and more convenient for users. (4)

**Functional Requirements**

* **Trip Management**: The itinerary manager should allow users to create, edit and manage travel itineraries. This includes selecting destinations, travel dates, accommodation, transport, and activities.
* **Trip Management**: The itinerary manager should allow users to create, edit and manage travel itineraries. This includes selecting destinations, travel dates, accommodation, transport, and activities.
* **Reviews and Ratings**: The itinerary manager should allow users to write and read reviews and ratings of travel services, to help others make informed decisions.
* **Notifications**: The itinerary manager should notify users about their travel plans, booking confirmations, and any changes or cancellations

**Non-Functional Requirements**

* Usability.
* Reliability.
* Efficiency.
* Maintainability.

**Technical Requirements**

* Web-based system
* Back end – Node JS
* Front end – React JS
* Database – Mongo DB

## Car Rental Management

A car rental service is a type of service which provides customers with access to rental vehicles for a fee. Car rental services serve various purposes, such as providing transportation for travelers who are away from home and need a temporary vehicle or providing a car for residents who do not own a car or need an additional vehicle for a specific purpose, such as moving or running errands. Car rental services can also be used by businesses that need to provide transportation for employees or clients. Overall, the purpose of a car rental service is to offer a convenient and flexible transportation option to customers who need access to a vehicle for a temporary period.

Car rental service serves the importance of providing all kinds of transportation needs of the customers of our system. Through this service various types of functionalities are provided to the users. Vehicles can be reserved only by the registered customers. The service provides several functionalities to its users such as Vehicle selection, Reservation and booking, Pick-up and delivery, insurance coverage, GPS navigation, Roadside assistance, and One-Way rentals.

The customer will be able to choose from a variety of vehicles to meet their needs such as the number of seats that they need, Vehicle type such as compact cars, sedans, SUVs, Vans, and customers can also rent luxury vehicles for their special occasions. Make and the model of the vehicle can be also selected according to the users will. Customers can also choose vehicles with low carbon footprint such as Electric and Hybrid Vehicles. Through reservation and booking function the customers can reserve their desired vehicle online. During this process if the customer wishes to drive the car him-self then he/she can do so by providing a valid driving license online beforehand.

By the Pick-up and delivery function, Customers can choose to either pick up the car from the hotel itself or get it delivered to their location and by selecting One-way rentals customers will be able to rent a vehicle in one location and return it in another, providing greater flexibility and convenience for travelers/tourists. Some other functionalities such as Insurance coverage where the customers and their rental vehicles will be protected during the rental period, and roadside assistance which will provide the customers with a 24-hour roadside assistance will also be used.

The GPS navigation function will allow the function user to find a close to approximate location of all the rental vehicles. This will be primarily used for the customer safety and to ensure the drivers take the allocated routes unless an unavoidable circumstance occur. This will also help in better fuel management.

The primary function of a car rental service is to provide convenient and reliable transportation for individuals or groups in need of a vehicle. (5)

**Functional requirements**

* Login – customer, car rental system admin, finance manager
* Make reservation - customer.
* Cancel reservation - customer.
* Make the payments - customer, car rental system admin.
* Selecting vehicle - customer
* Select driver or drive by themselves – customer.
* Validate license – car rental system admin.
* Choose the destination - customer.
* Add and view reviews -customer.
* Generate payment reports – finance manager.
* Manage vehicle information – system user.
* Assign and Manage drivers – system user.
* Manage vehicle routes -system user.
* Manage and examine passenger information – car rental system admin.
* Manage reviews – car rental system admin.

**Non-functional requirements**

* User-friendliness – User interface should be developed in a way which is easy and enjoyable for the user to use.
* Accuracy – The details about available vehicles and vehicle information should be accurate.
* Speed – The reservations should be updated fast, and the reservation acknowledgment must be done swiftly.
* Security – he payments and the user information must not be visible to other third parties
* Maintainability – The system should be easy to maintain with less use of resources overall.
* Availability – The service must be always available to the user.
* Compatibility – Should allow users with different devices to access the service without any hinder.

**Technological requirements**

* Web based system.
* front-end - React.js
* back -end – Express.js and Node.js
* Database – MongoDB
* GitHub – source code, team collaborations and version control

## Employee Management

An employee management system is a tool that helps improve employee satisfaction and productivity to help a company achieve their overall goals. These tools help monitor, assess, and control employees' working hours and efficiently utilize human resources. All these factors strengthen the employer brand and become a competitive differentiator in the job market, which contributes to attracting and retaining talent. It helps create an environment that encourages communication and keeps employees and managers working together to meet company goals.

Employee can manipulate the data only by the Employee manager, whereas he can add a new employee, delete, update, and retrieve employee details when required. Manager would generate a unique employee id for each employee. Employee Management system records employees' full name, email address, contact number, address, NIC number and position. He is assigned with task of entering manually processed attendance data into the system and the salary is calculated subject to conditions of attendance data and would inform the finance manager to make payment to all the employees.

The employee self-service portal is another important function of this system. It is a digital platform that enables employees to access and manage their personal information, work schedules, benefits, and other employment-related details. Through the portal, employees can update their contact information, view their payroll history, request time off, and enroll in company-sponsored programs. The self-service portal allows employees to take more control of their work lives, reducing administrative burdens on HR teams and fostering greater employee engagement and satisfaction. (6)

**Functional Requirements**

* Login to employee profile using username and password.
* Enter self-service portal.
* Check Reports and Allowances.
* Change Password.
* Allow users to view, update, and delete their bio and profile picture.
* Generate monthly reports.
* Insert, view and update attendance details.
* Create and send payrolls.
* View and update candidate details.

**Non-functional requirements**

* Usability.
* Reliability.
* Efficiency.
* Maintainability.

**Technical requirements**

* Web-based system
* Back end – Node JS
* Front end – React JS
* Database – Mongo DB

## User Management

User management System is essential for providing a seamless and enjoyable experience to travelers. The system should be user-friendly, secure, and provide users with the necessary features to search, book, and manage their travel reservations, along with personalized recommendations and responsive customer support.

Users can be either registered or unregistered. Users who are not signed up can only view information about the places. They must register on the system with an email address and complete a registration form before making a reservation. After signing up for the system, the user can log in with their username and password.

Users should be able to manage their account information, such as updating their contact information, changing their password, and modifying their preferences. Once the user logged in, they should be able to search for available travel options based on their preferred dates, destinations, and other criteria, such as the number of passengers, preferred hotels. The system should allow users to make changes to their performance. For example, booking or cancelling reservations. The system should keep a record of users' booking history and provide users with the ability to track their past reservations. The system should provide users with personalized recommendations based on their past travel history. For example, users who travels frequently may be presented with special deals or promotions for the next reservation. (7)

**Functional Requirements.**

* Login to user profile using username and password.
* Allow update user profile.
* Allow users to search for travel destinations.
* Allow users to add bookings.
* Allow users to view, update, and cancel their travel bookings.
* Allow users to receive notifications about their travel bookings.
* Can get discounts for their travels.
* Can leave reviews for the travel services they have used.
* Allow to access customer support service.

**Non-functional requirements.**

* Usability.
* Reliability.
* Efficiency.
* Maintainability.

**Technical requirements.**

* Web-based system.
* Back end – Node JS.
* Front end – React.
* Database – Mongo DB.

## Finance Management

In this section system will be able to manage all the payments which are done through online travel booking system by the users.

All the payment processing like hotel payment, package payment, and flight payment are handled by the finance management. Under payment section, whenever user is going to pay a payment, that user will be redirected to the payment section. After user will find a form which is to enter name, bank name, card number and all the requested information for payment. At this time system will check (validation) card number and CVV code as front-end validation. Also, system will check (validation) payment amount as backend validation. After the user completes the payment system will display a successful message.

Once all the payments are processed at the end of the day, those payments will be recorded as income. (Category, amount, date, type) When the Employee manager request to make the salary payment finance manager will check and confirm the payment which will be recorded under expenses. (Category, amount, date, type)

If any record needs to be deleted that relevant payment will be erased from the database. Also, if any record needs to edit, that record will update in database as well. As well as finance manager can search records of former months.

Other than that, at the end of the month, monthly income is calculated from each management. As well as system will calculates the monthly cost. Finally, system will be able to generate reports and it will be analyzed annually. (8)

**Functional requirements**

* Log into the system.
* Show overview of financial transection happen.
* Analyze the monthly profit and income.
* Keep track on every month’s financial data.
* Add, remove, and update payment details.
* Calculate and get monthly income.
* Search records of former months.

**Non-Functional requirements**

* High security
* Usability
* Scalability
* Reliability
* Data integrity

**Technical requirements**

* Web- based system
* Backend – Node Js
* Frontend – React
* Database – Mongo DB

## Package Management

In this Function, if a person or company (package advertiser) wants to publish a package advertisement joint within Flights, hotels, and car rental services, first he/she must register on our website. Then he can give the details of packages.

Ex- Think Sri Lankan airlines and Hotel Cinnamon Garand and Kings rent a car want to joint and publish an advertisement about their special package on our site so they can give us their Advertisement.

He/ She can update if he wants to change the ad and extend the time of the package should be published further. We will provide an interface and methods for this Function and Information and packages are storing our Database.

Upon request of the package’s advertisement, the package advertisement will be relevant to our website and upon request of payment for the ad we will confirm the package advertisement and publish the ad on the pages where the package advertisement is to be published. In this case, the pages that need to be published on the package page or on the relevant pages if he/she has paid extra.

Ex-Think Sri Lankan airlines, Hotel Cinnamon Garand, and Kings car rental their joint package want to publish their package advertisement on our main page so they can do additional payment or if they only want to publish the package Ad so then Admin will publish the ad on package page.

When payments and Ad are all clear and send a confirmation email to package advertiser or when payments or Ad are not accepted so then send an email to package advertiser. And, if a traveler wants a package and she or he chooses a package then the traveler will receive an email about confirmation and package advertise will receive email about that they have a customer. And traveler can use the packages for desired quantity. (9)

**Functional requirements package manager**

* Login.
* Add new packages.
* View packages details.
* Update packages details.
* Delete packages.
* Generate report of packages.

**Non-Functional requirements for package manager**

* Speed
* Usability
* Availability
* Maintainability

**Technical requirement for package manager**

* Web-based system
* Back end - Node JS
* Front end - React
* Database – Mongo

## Flight Management

This allows the administrator to add, update, and delete information related to airlines, including their schedules, routes, and prices for tickets. This means that the administrator can ensure that the information available on the platform is always up-to-date and accurate.

In addition, the admin side of the system also allows the administrator to display various details about flights, including the routes available, the dates and times of flights, and the prices of tickets. This information helps travelers make informed decisions when booking their desired seats.

The platform also caters to foreign customers who can search for flights that they want and book their desired seats. They can also cancel their booking if they change their minds or need to make a change to their travel plans.

Furthermore, the admin side of the platform is responsible for showing offers and promotions that the airline is currently offering. This means that customers can take advantage of discounts and other special deals that the airline is offering.

Another important feature of the admin side is the ability to show reviews from customers who have used the platform before. This allows travelers to get a sense of the quality of service they can expect and make informed decisions about which airline to book.

Finally, the system also allows the administrator to inform customers about any changes in the airline's route or schedule which ensures that customers are always up to date with the latest information about their travel plans and can adjust accordingly. (10)

**Functional requirements**

* Customer and admin must login to the system
* Insert, update, and delete flight information
* Display the details of flights (routes, dates and times, prices for tickets)
* Update the seat charts in real time
* Search for flights
* Reserve seats
* Cancellation of a booking
* Pay for the tickets
* Generating virtual bills

**Non- functional requirement**

* User friendliness – Use of colors, images and fonts that are comfortable for the users of the system.
* Speed – Should update the seat charts as soon as possible when the customer reserve or cancel a booking.
* Accuracy – The information about the flights should be accurate otherwise the customers may be misled.
* Compatibility - Allows people who have different operating systems to use the same applications.

**Technological requirements**

* Web application
* React
* MongoDB
* GitHub

# **Literature Review**

There are several different types of travel management systems (TMS), each with its own unique approach to helping individuals or organizations manage their travel needs. There are several methods available to implement a TMS, including website method, mobile application method, and paperwork method etc.

1)Website method:

The website method involves using a web-based application to manage travel-related activities. According to Liu et al. (2019), the website method provides a centralized platform for managing travel-related activities, allowing users to book flights, hotels, and rental cars from a single platform. A web-based travel management system has several advantages and disadvantages, which are listed below:

Pros:

* Accessibility: A web-based travel management system can be accessed from anywhere with an internet connection, which means that users can access it from their computers or mobile devices.
* Real-time updates: Users can receive real-time updates on flight schedules, hotel bookings, and other travel-related information, making it easier to manage their itinerary.
* Centralized data: All travel-related data is stored in a centralized location, making it easier for users to access and manage their travel arrangements.
* Cost savings: A web-based travel management system can help businesses save money by consolidating their travel arrangements and negotiating better rates with travel vendors.
* Improved efficiency: The automation of travel-related tasks, such as booking flights and hotels, can help businesses save time and improve their overall efficiency.

Cons:

* Dependence on technology: A web-based travel management system requires a reliable internet connection and may be vulnerable to technical issues, which can disrupt travel plans.
* Data security: Travel-related data is sensitive and needs to be protected from unauthorized access. A web-based system can be vulnerable to cyber-attacks, which can compromise the security of users' personal information.
* Limited customization: Some web-based travel management systems may have limited customization options, which may not meet the specific needs of all users or businesses. (11)

2)Mobile application method:

The mobile application method involves using a mobile application to manage travel-related activities. According to Chen and Wu (2018), the mobile application method provides on-the-go access to travel-related information and services, improving the user experience.

Pros:

* Accessibility: Mobile applications for travel management systems can be accessed anywhere and anytime, making it easier for travelers to manage their itineraries on the go.
* Real-time updates: Mobile applications can provide real-time updates on travel information, such as flight delays or cancellations, enabling travelers to make informed decisions.
* Personalization: Mobile applications can personalize travel recommendations and suggestions based on a traveler's preferences and past behavior.
* Improved communication: Mobile applications allow for direct communication between travelers and travel service providers, making it easier to resolve any issues or concerns.

Cons:

* Reliance on technology: Mobile applications are dependent on technology and may not work properly if there are issues with the device or network connectivity.
* Security risks: Mobile applications may be vulnerable to security risks, such as hacking or identity theft, if they do not have adequate security measures in place.
* User adoption: Not all travelers may be comfortable or willing to use mobile applications, which could limit the effectiveness of the travel management system.
* Limited functionality: Mobile applications may have limited functionality compared to a full-fledged travel management system, which could be a disadvantage for travelers who require more comprehensive features.
* Cost: Developing and maintaining a mobile application can be costly, which may not be feasible for all travel management companies (12)

3)Paperwork method:

The paperwork method involves using traditional paper-based methods to manage travel-related activities. While this method may seem outdated, it is still prevalent in many organizations. According to Wang et al. (2017), the paperwork method can lead to inefficiencies and errors, such as lost receipts and duplicate expenses.

Pros:

* Easy to Use: Paper-based travel management systems are easy to use and require little training. Anyone can fill out a paper form or document and follow the process with minimal effort.
* Familiarity: Paper-based travel management systems have been in use for a long time and are familiar to many people. This makes it easy for employees to understand the process and follow the rules.
* Low Cost: Paper-based travel management systems are relatively inexpensive compared to other systems. They do not require any special equipment or software and can be implemented quickly.
* Accessibility: Paper-based travel management systems are accessible to everyone, regardless of their technical proficiency. Employees who do not have access to a computer or mobile device can still use a paper-based system.

Cons:

* Time Consuming: Paper-based travel management systems can be time-consuming, particularly when it comes to approvals and processing. Employees must manually complete forms and wait for approvals, which can delay travel arrangements.
* Risk of Loss: Paper-based travel management systems are susceptible to loss or damage, which can result in lost or delayed travel documents. This can be particularly problematic when employees are traveling internationally.
* Limited Reporting Capabilities: Paper-based travel management systems offer limited reporting capabilities, making it difficult to track travel expenses and identify trends or patterns.
* Environmental Impact: Paper-based travel management systems have a negative environmental impact due to the use of paper and printing resources. This can be mitigated by using recycled paper, but it still has a carbon footprint. (13)

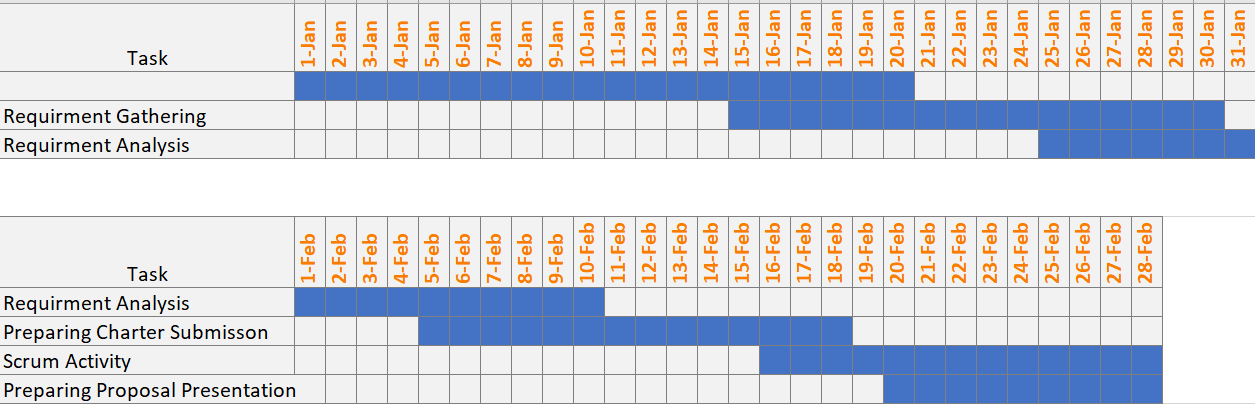
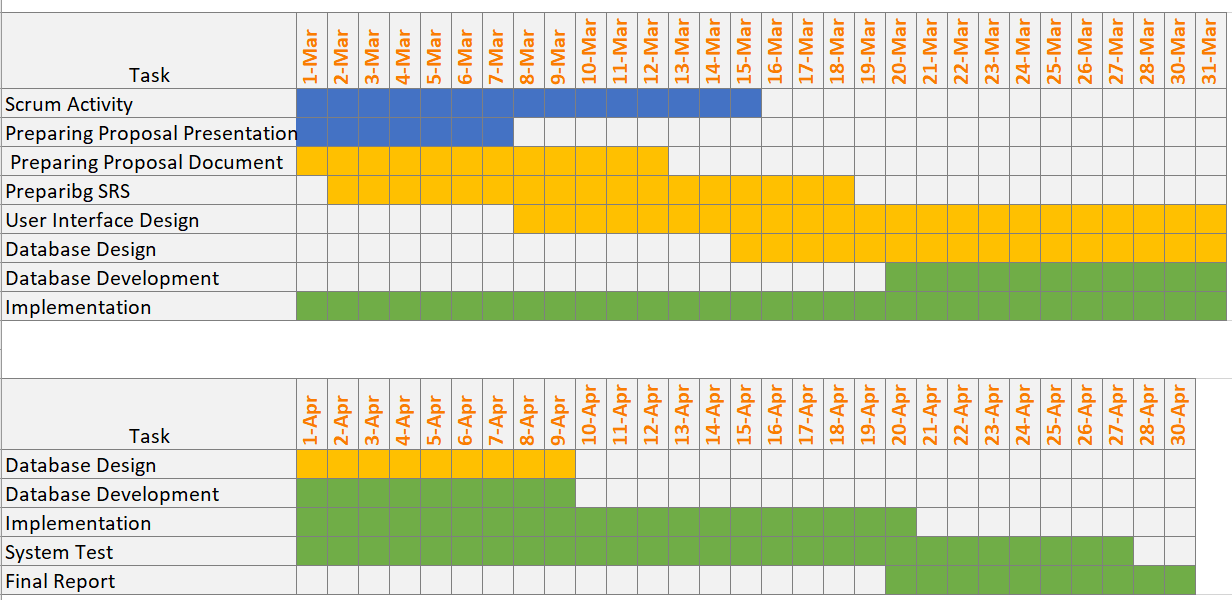
It is possible that there are additional methods for implementing a travel management system, such as cloud-based, desktop-based approaches etc.

# **Methodology**

* Identify the requirements:
  + The first step in developing a travel management system is to identify the requirements of the users. This involves understanding the needs of travelers, travel managers, and the company. This includes identifying the types of travel, the destinations, the budget, and the policies and procedures that need to be followed.
* Develop a system design:
  + After the requirements have been identified, the next step is to develop a system design. This involves designing the architecture of the system, including the user interface, database, and software components. It is important to ensure that the design is scalable and flexible enough to accommodate changes in the future.
* Select the appropriate technology:
  + The next step is to select the appropriate technology for developing the system. This includes selecting the programming language, the database management system, and the development tools. It is important to choose technology that is scalable, reliable, and easy to maintain.
    - Web-based system
    - Back end - Node JS
    - Front end - React
    - Database – Mongo
* Develop the system:
  + Once the design and technology have been selected, the next step is to develop the system. This involves writing the code, creating the database schema, and integrating the various components of the system. It is important to test the system thoroughly at this stage to ensure that it meets the requirements and is free of bugs.
* Implement the system:
  + After the system has been developed and tested, the next step is to implement the system. This involves deploying the system on the production servers and providing training to the users. It is important to ensure that the system is integrated with other systems used by the company, such as the accounting system and HR system.
* Maintain the system:
  + After the system has been implemented, the final step is to maintain the system. This involves monitoring the system for errors and performance issues, updating the software components, and making modifications to the system to accommodate changes in the requirements. It is important to ensure that the system is kept up-to-date and secure.

In conclusion, developing a travel management system involves identifying the requirements, designing the system, selecting the appropriate technology, developing the system, implementing the system, and maintaining the system. It is important to follow a structured methodology to ensure that the system meets the needs of the users and is easy to maintain in the long term. (14)

# **Evaluation Method**

Gantt Chart

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