



ALBUKHARY INTERNATIONAL UNIVERSITY

REQUIREMENT ENGINEERING INDIVIDUAL ASSIGNMENT

Course Code	CCE2233	Course Name	Requirements Engineering
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Course Learning Outcome (CLO)	CLO2: Describe software requirement engineering processes using appropriate tools and techniques (C2, PLO6)		

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Introduction

Project background

In today's digital era, the internet has led to an abundance of travel information¹, enabling travellers to quickly find details about timetables, routes, accommodations, and restaurants (Chiang & Huang, 2015). However, organizing a trip has become an increasingly intimidating, complex, and time-consuming process, especially with the trend of visiting multiple places in a single journey (Jafri et al., 2013). While Information and Communication Technology (ICT), including smartphones and their applications, has become an important component in trip planning (Jamal & Habib, 2019), the vast amount of information available can lead to information overload. Existing travel-related websites and web services often lack integration, are generally disjoint from each other, typically deal with only one or two aspects of travel planning, and offer limited customization options. This fragmentation compels travellers to consult multiple sources and manually consolidate the retrieved information, exacerbating the difficulty and time cost associated with planning (Jafri et al., 2013; Chiang & Huang, 2015).

There is a growing demand for centralized tools that streamline travel planning. A well-designed travel planner app can act as a personal assistant, helping users manage their travel logistics in one place while reducing the cognitive load. Systems like the Smart Travel Planner are described as web-based intelligent systems designed to facilitate this process by integrating necessary information and functions. Integrating features such as smart itinerary planning, which involves considering factors like attractions, modes of transportation, time arrangements, creating detailed daily schedules, and considering costs, is a key aspect previously addressed (Jafri et al., 2013; Chiang & Huang, 2015).

Coordinating trips with others is a planning activity for which smartphone applications are used, and existing tools like Triplt allow users to share itineraries (Jamal & Habib, 2019; Jafri et al., 2013). Emerging technologies like real-time data feeds (e.g., Google Places APIs) and AI-driven recommendation systems further improve the utility of travel apps by offering personalized, location-aware suggestions (Auditya, n.d.).

Ultimately, the integration of these comprehensive planning and information consolidation features aims to move towards a seamless, end-to-end travel experience by addressing the fragmentation and complexity of current planning methods (Jafri et al., 2013).

Objective of the report

This report outlines the planning and design of an integrated Travel Planner App, envisioned as a digital travel assistant for independent travellers. The app aims to consolidate essential planning components such as trip creation, itinerary scheduling, transportation tracking, budget estimation, packing checklists, reminders, and real-time currency conversion into a single, user-friendly mobile application. By reducing reliance on multiple disconnected tools, the app seeks to provide users with a stress-free and engaging planning experience.

The report focuses on applying core principles of Software Requirements Engineering to the development of the app, with the following specific objectives:

1. To apply software requirements engineering processes to a real-world travel planning solution.
2. To identify and document the key stakeholders of the system and analyse their needs.
3. To elicit, specify, and model both functional and non-functional system requirements.
4. To prioritize, trace, and validate requirements using appropriate techniques and tools.
5. To demonstrate the practical use of industry-standard tools to support the requirements engineering lifecycle.

Stakeholder Analysis

Table1. Stakeholder Description

Stakeholder	Role/Description	Needs/Interests
Traveller (User)	The primary user who plans and manages their trips using the app.	Easy trip creation, itinerary management, budget planning, reminders, packing checklist, offline access, and a user-friendly interface.
Developer	Responsible for developing the app based on documented requirements.	Clear, well-structured, and testable requirements to build the app efficiently.
UI/UX Designer	Designs the app's interface and user experience.	Understanding of user needs and use cases to create an intuitive and attractive design.
Product Owner / Business Stakeholder	Oversees product vision, feature prioritization, and business goals.	Clear communication of priorities, market fit, and user value to guide development.

* Administrator roles are not included as this app is primarily designed for independent travellers and does not involve multi-user management or content moderation.

* Since this is a solo travel-focused app, we do not consider group-travel-specific roles like co-travellers as stakeholders for now.

Requirement Elicitation and Documentation

Functional requirements (FRs)

Table 2. Functional Requirements

Rq ID	Requirements	Descriptions
FR01	Account Creation	The user shall be able to register, log in, and securely access their personalized travel data.
FR02	Trip Creation	The user shall be able to create a new trip by specifying the trip name, start and end dates, and destination.
FR03	Itinerary Planner	The user shall be able to add, edit, and delete daily activities in the itinerary for each trip.
FR04	Transportation Management	The user shall be able to add and manage transportation bookings (flights, trains, buses) within a trip.
FR05	Budget Planner	The user shall be able to input estimated and actual expenses for categories such as accommodation, food, transport, and activities.
FR06	Packing Checklist	The user shall be able to create and manage a packing checklist, marking items as packed or not.
FR07	Reminders and Countdown	The app shall provide reminders for important trip-related tasks and display a countdown to the trip start date.
FR08	Currency Converter	The user shall be able to convert currencies relevant to the trip destination within the app.
FR09	Travel Journal	The user shall be able to add notes and photos as journal entries for each trip.
FR10	Emergency Contact Access	The app shall provide emergency contact information relevant to the travel destination.

FR11	Location – based suggestions	The user will be able to view location - based suggestions
FR12	Collaborative Planning	Solo Users can collaborate with people with same plans

Non-functional requirements (NFRs)

Table 3. Non-Functional Requirements

Rq ID	Requirements	Descriptions
NFR01	Usability	The app shall have an intuitive and user-friendly interface accessible to users with varying technical skills.
NFR02	Performance	The app shall load trip data and itinerary within 2 seconds to ensure smooth user experience.
NFR03	Security	The app shall securely store user data and protect personal information from unauthorized access.
NFR04	Offline Access	The user shall be able to view trip details and itinerary offline without an internet connection.

Constraints

Table 4. Constraints

Constraint ID	Constraint	Description
C01	Platform Limitation	The app will initially be developed for Android only; iOS support may follow in a later phase.
C02	Internet Dependency	Some features like currency conversion and collaborative planning will require internet access.
C03	Budget Limitations	Development must adhere to a limited student project budget (e.g., using free/open-source tools).
C04	Data Storage	Offline data caching will be limited to trip-specific information to manage storage usage.

C05	Time Constraints	The MVP (Minimum Viable Product) must be completed within one academic semester.
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User Scenario

Alex, a 24-year-old university student, is planning a 10-day solo trip to Japan in December using the Travel Planner App. He begins by creating a new trip, entering the trip name “Winter in Japan,” destination, and travel dates. This sets up a workspace where Alex can manage every aspect of the trip. Under transportation, they add flight details and set reminders for airport check-ins.

Next, Alex uses the itinerary planner to schedule activities like visiting Meiji Shrine, Shibuya, and Mt. Fuji, dragging them into daily time slots for clarity. They input estimated expenses into the Budget Planner, which later compares actual spending through charts. A smart packing checklist is generated based on climate, duration, and activities, which Alex customizes with personal items.

Reminders are set for key tasks like visa checks and boarding pass printing, and a countdown widget shows days remaining. Alex uses the currency converter to check rates and adds emergency contacts for offline access. While traveling, Alex views the itinerary and checklist even without internet and optionally uses the journal to upload trip photos and notes.

After the trip, the app provides a summary of expenses, activities, and memories, and allows Alex to duplicate the plan for future use. This scenario highlights how the app supports users through every stage of travel—from planning and budgeting to on-trip usage and post-trip reflection.

Use Case Modelling

Table 5. Use Case Specification

Element	Example
Primary ACTOR	Traveller (User)
Secondary ACTOR	System Timer (For Reminders and Countdown), Authentication System,
Use Cases	
Use Case ID	Use Case Name
UC-01	Login User

UC-02	Register User
UC-03	Create New Trip
UC-04	Plan Itinerary
UC-05	Manage Transportation
UC-06	Budget Planner
UC-07	Packing checklist
UC-08	Set Reminders and Countdowns
UC-09	Currency Converter
UC-10	Travel Journal
UC-11	Emergency Contact Access
UC-12	View location-based suggestion
UC-13	Collaborative planning
UC-14	Logout

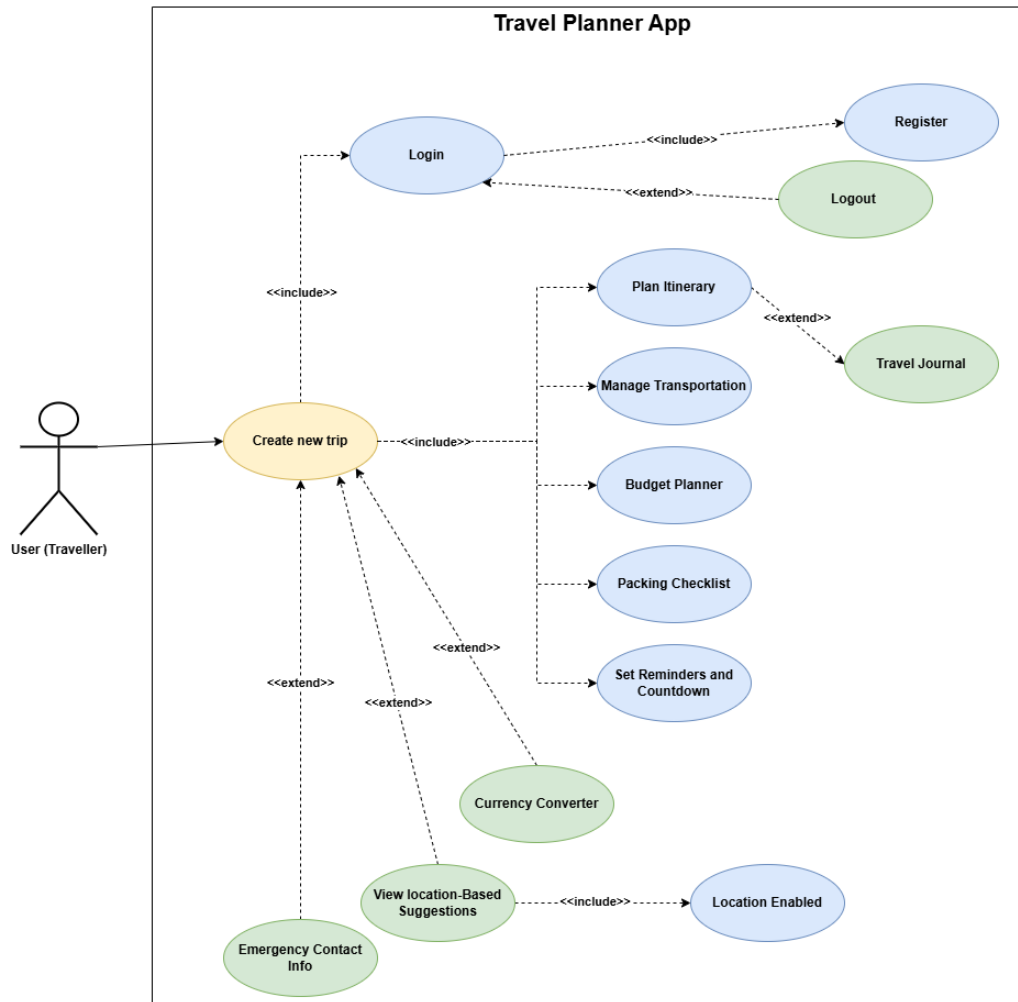


Figure 1. Use Case Diagram

As seen in Figure 1, the primary actor for this traveller planner system is the traveller which is the user of the app. The User can register themselves into the system which will then let them be able to login and logout if they wish to after. The primary use case is to create a new trip through which user can add the location and date of travel and such. After creation of this new trip, user should be able to plan their itinerary, manage their transportation, plan their budget for the trip, take note of their packing checklist and set reminders and countdowns for upcoming important dates. To be noted that the user may save pictures and notes from this whole trip as a way to journal. The user should also be able to check the currency rate if they are travelling overseas and save emergency contacts, while being able to view location-based suggestions if their location is enabled.

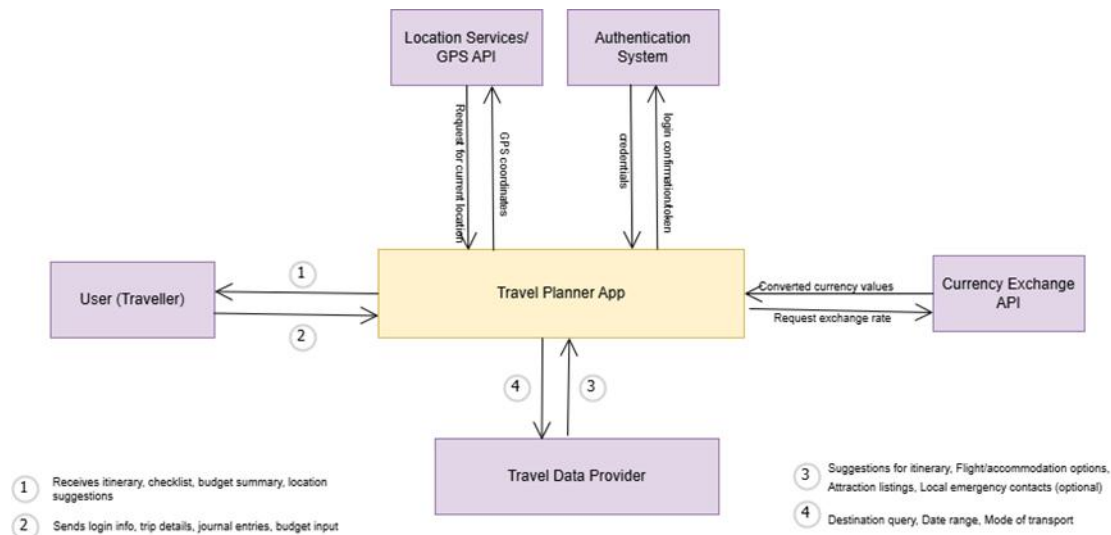


Figure 2. Context Diagram

The context diagram in Figure 2 has a view of the external systems with which data flows in and out of our travel planner app. We have the Location service provide for navigation, authentication system for authentication and credentials, currency exchange API for real time currency rates, user (traveller) that will be creating the trip by providing details and the travel data provider from external sources for suggestions.

Requirement Prioritization

The MoSCoW method, which categorizes requirements into Must have, Should have, Could have, and Won't have, offers several advantages and has been implemented in the requirements prioritization of this system. The method is straightforward, allowing stakeholders to quickly understand and apply it without extensive training (Vijayakumar et al., 2024).

Table 6. Requirement Prioritization

Rq ID	Type	MoSCoW	Justification
FR01	Functional	Must Have	Secures personal trip data; needed before accessing features
FR02	Functional	Must Have	Core feature to begin planning any trip
FR03	Functional	Must Have	Essential for organizing day-to-day activities

FR04	Functional	Must Have	Critical for booking and organizing transport details
FR05	Functional	Must Have	Helps manage estimated vs actual travel expenses
FR06	Functional	Must Have	Organizes packing; prevents forgetting essentials
FR07	Functional	Should Have	Improves preparedness by alerting users
FR08	Functional	Could Have	Useful for international travellers; not critical
FR09	Functional	Could Have	Enhances experience, but not core planning
FR10	Functional	Could Have	Adds safety layer, especially for solo travellers
FR11	Functional	Could Have	Offers convenience and ideas; not essential
FR12	Functional	Won't Have	Out of scope for solo-use design
NFR01	Non-Functional	Must Have	Ensures accessibility and intuitive user interaction
NFR02	Non-Functional	Must Have	Important for mobile app UX
NFR03	Non-Functional	Must Have	Protects user data and meets legal standards
NFR04	Non-Functional	Must Have	Enhances usability in areas with no internet

Traceability Matrix

Table 7: Traceability Matrix

Rq ID	Use Case ID	Use Case Name	Use Case Specification	Status
FR01	UC-01; UC-02; UC-14	Login and Register User; Logout	UC01_LoginUser; UC02_RegisterUser; UC14_LogoutUser	Implemented
FR02	UC-03	Create New Trip	UC03_CreateTrip	Proposed
FR03	UC-04	Plan Itinerary	UC04_PlanItinerary	Proposed
FR04	UC-05	Manage Transportation	UC05_ManageTransportation	Proposed
FR05	UC-06	Budget Planner	UC06_BudgetPlanner	Proposed
FR06	UC-07	Packing checklist	UC07_PackingChceklist	Approved
FR07	UC-08	Set reminders and countdown	UC08_SetReminders	Proposed
FR08	UC-09	Currency Converter	UC09_CurrencyConverter	Proposed
FR09	UC-10	Travel Journal	UC10_TravelJournal	Proposed
FR10	UC-11	Emergency Contact Access	UC11_EmergencyContact	Proposed
FR11	UC-12	View location-based suggestion	UC12_Suggestions	Proposed
FR12	UC-13	Collaborative planning	UC13_Collaborative Planning	Proposed

Change logs

Table 8. Record for Changed Logs

Version	Date	Author	Change Description
v1.0	2025-04-25	Thinley	Initial draft – functional, non-functional, and constraint requirements added.
v1.1	2025-05-14	Thinley	Updated requirements and traceability matrix based on peer review.
V1.2	2025-05-30	Thinley	Added Use Case Diagram and Use Case Specification

Tool Usage Explanation

Table 9. Justification for Tools Used

Tool Used	Justification	Link/ Screenshot Figures
Word Document	Used to draft and compile the report, including requirement descriptions, user stories, and tool explanations, as well as their cross-referencing feature.	-
Draw.io	Use case diagram and context modelling: <ul style="list-style-type: none">– Free, web-based tool with drag-and-drop support.– Prebuilt UML symbols and templates.– Easy image exports.	Figure 1. Use Case Diagram Figure 2. Context Diagram
GitHub wiki	Documented and maintained evolving requirements in a structured format for collaboration and version control.	Figure 3. GitHub Wiki; Document Requirements https://github.com/ThinleyYC/Travel-Planner-Requirements/wiki/Requirements-Specification
GitHub Issues & Labels	Managing requirements as individual issues with labels (e.g., FR, NFR, enhancement).	Figure 4. GitHub Issues and Labels

	Enables tracking and discussion.	
GitHub Project Board	Used Kanban board for visualizing requirement statuses (To Do, In Progress, Done). Helps track progress across features.	Figure 5. GitHub Project board (Karbon)

ActionsProjectsWikiSecurityInsightsSettings

Requirements Specification

Thinley Yeshey Choden edited this page yesterday · 1 revision

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https://github.com/ThinleyVC/Travel-Planner

Travel Planner System

Functional Requirements • FR01: The system shall allow users to register, log in, and securely access their personalized travel data. • FR02: The system shall allow users to create a new trip by specifying the trip name, start and end dates, and destination. • FR03: The system shall allow users to add, edit, and delete daily activities in the itinerary for each trip. • FR04: The system shall allow users to add and manage transportation bookings (flights, trains, buses) within a trip. • FR05: The system shall allow an admin to input estimated and actual expenses for categories such as accommodation, food, transport, and activities. • FR06: The system shall allow users to create and manage a packing checklist, marking items as packed or not. • FR07: The system shall provide reminders for important trip-related tasks and display a countdown to the trip start date. • FR08: The system shall allow users to convert currencies relevant to the trip destination within the app. • FR09: The system shall allow users to add notes and photos as journal entries for each trip. • FR10: The system shall provide emergency contact information relevant to the travel destination. • FR11: The system shall allow users to view location - based suggestions • FR12: The system shall allow users can collaborate with people with same plans

Non-Functional Requirements • NFR01: The system should have an intuitive and user-friendly interface accessible to users with varying technical skills. • NFR02: The system shall load trip data and itinerary within 2 seconds to ensure smooth user experience. • NFR03: The system shall securely store user data and protect personal information from unauthorized access. • NFR04: The system shall be able to view trip details and itinerary offline without an internet connection.

```
graph TD
    User[User Traveller] -- "1: Receives itinerary, checklist, budget summary, location suggestions" --> App[Travel Planner App]
    App -- "2: Sends login info, trip details, journal entries, budget input" --> User
    App -- "Request for current location" --> Location[Location Services/ GPS API]
    Location -- "GPS coordinates" --> App
    App -- "login credentials" --> Auth[Authentication System]
    Auth -- "authenticated" --> App
    App -- "Request exchange rate" --> Currency[Currency Exchange API]
    Currency -- "Converted currency values" --> App
    App -- "3: Suggestions for itinerary: Flight/accommodation options, Attraction listings, Local emergency contacts (optional)" --> Data[Travel Data Provider]
    Data -- "4: Destination query, Date range, Mode of transport" --> App
```

1: Receives itinerary, checklist, budget summary, location suggestions

2: Sends login info, trip details, journal entries, budget input

3: Suggestions for itinerary: Flight/accommodation options, Attraction listings, Local emergency contacts (optional)

4: Destination query, Date range, Mode of transport

Figure 3. GitHub Wiki; Document Requirements

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is:issue state:open		Q	Labels	Milestones	New issue
<input type="checkbox"/> Open	16	<input type="radio"/> Closed	0	Author ▾	Labels ▾
				Projects ▾	Milestones ▾
				Assignees ▾	⌵ Newest ▾
<input type="checkbox"/>	<input checked="" type="radio"/>	NFR04	priority: high	type: non-functional	
		#16 · ThinleyYC opened in 1 minute			
<input type="checkbox"/>	<input checked="" type="radio"/>	NFR03	priority: high	type: non-functional	
		#15 · ThinleyYC opened in 50 seconds			
<input type="checkbox"/>	<input checked="" type="radio"/>	NFR02	priority: high	type: non-functional	
		#14 · ThinleyYC opened in 35 seconds			
<input type="checkbox"/>	<input checked="" type="radio"/>	NFR01	priority: high	type: non-functional	
		#13 · ThinleyYC opened in 21 seconds			
<input type="checkbox"/>	<input checked="" type="radio"/>	FR12	priority: low	type: functional	
		#12 · ThinleyYC opened now			
<input type="checkbox"/>	<input checked="" type="radio"/>	FR11	priority: low	type: functional	
		#11 · ThinleyYC opened now			
<input type="checkbox"/>	<input checked="" type="radio"/>	FR10	priority: low	type: functional	
		#10 · ThinleyYC opened now			
<input type="checkbox"/>	<input checked="" type="radio"/>	FR09	priority: low	type: functional	
		#9 · ThinleyYC opened 1 minute ago			
<input type="checkbox"/>	<input checked="" type="radio"/>	FR08	priority: low	type: functional	
		#8 · ThinleyYC opened 1 minute ago			
<input type="checkbox"/>	<input checked="" type="radio"/>	FR07	priority: medium	type: functional	
		#7 · ThinleyYC opened 2 minutes ago			
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		#6 · ThinleyYC opened 3 minutes ago			
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		#5 · ThinleyYC opened 3 minutes ago			
<input type="checkbox"/>	<input checked="" type="radio"/>	FR04	priority: high	type: functional	
		#4 · ThinleyYC opened 3 minutes ago			
<input type="checkbox"/>	<input checked="" type="radio"/>	FR03	priority: high	type: functional	
		#3 · ThinleyYC opened 4 minutes ago			
<input type="checkbox"/>	<input checked="" type="radio"/>	FR02	priority: high	type: functional	
		#2 · ThinleyYC opened 5 minutes ago			
<input type="checkbox"/>	<input checked="" type="radio"/>	FR01	priority: high	type: functional	
		#1 · ThinleyYC opened 6 minutes ago			

Figure 4. GitHub Issues and Labels

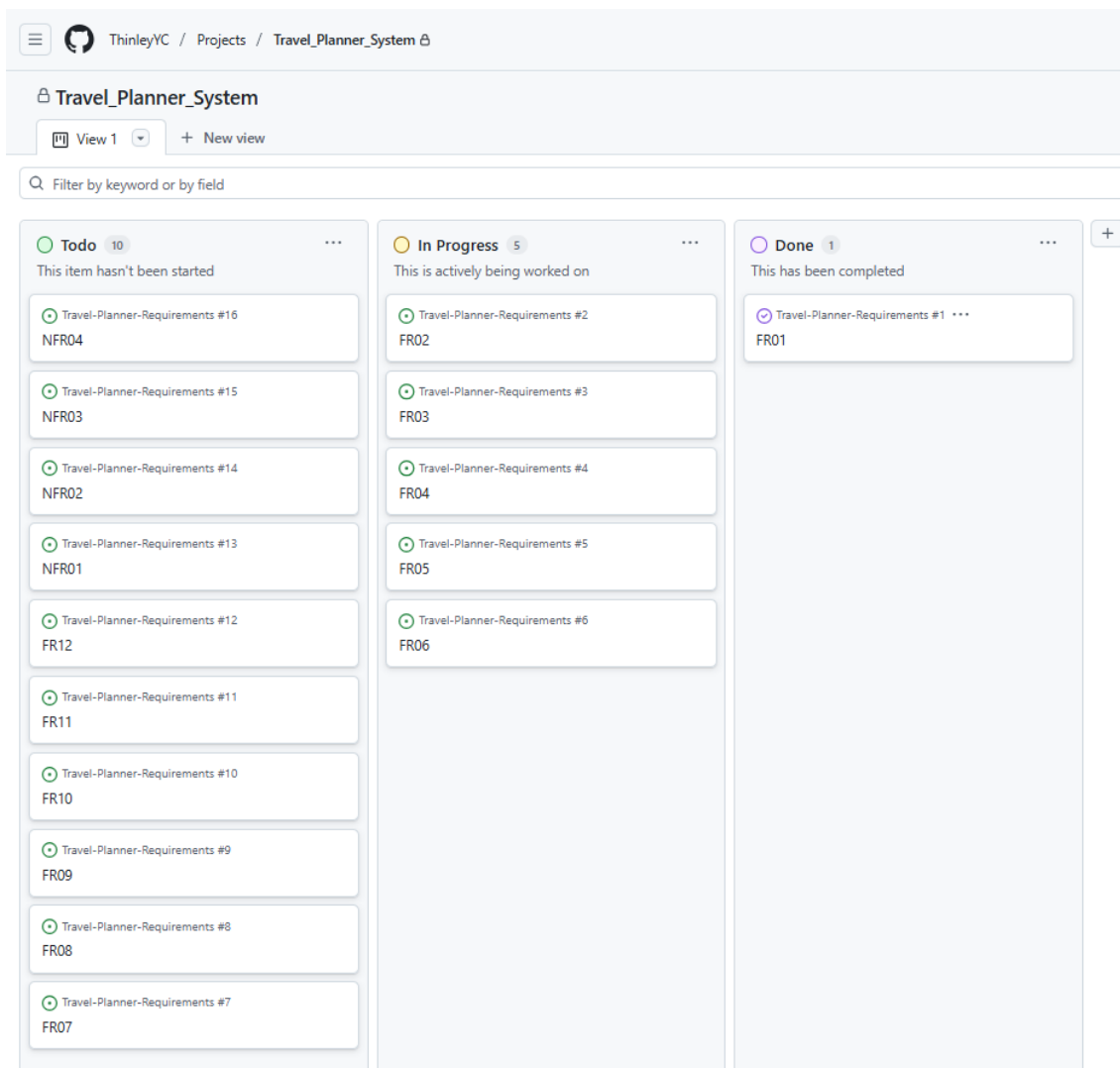


Figure 5. GitHub Project board (Kanban)

Reflection

[https://github.com/ThinleyYC/Travel-Planner-Requirements/wiki/Reflection Travel Planner](https://github.com/ThinleyYC/Travel-Planner-Requirements/wiki/Reflection%20Travel%20Planner)

Working on this travel planner app project has provided valuable insights into the real-world process of requirements engineering and software design. From stakeholder analysis to documenting functional and non-functional requirements, each step highlighted the importance of clear communication and structured planning in building a user-centric system.

One of the key takeaways was understanding how user needs must drive the design of system features. Creating the user scenario helped me put myself in the user's shoes, ensuring the app's flow and functions aligned with real-life travel planning experiences. Additionally, learning to use tools like Draw.io and GitHub for modelling and documentation improved my ability to collaborate and organize requirements systematically.

This process also introduced me to common constraints and limitations like time, platform scope, and feature prioritization that development teams often face. Managing these factors while still aiming to build a useful and intuitive product was both challenging and rewarding.

Overall, this project strengthened my technical and analytical skills while reinforcing the value of user-centred thinking in software development. It has prepared me to approach future projects with more structure, empathy, and attention to detail.

Conclusion

This report outlined the end-to-end process of designing a travel planner app, from identifying stakeholder needs to documenting requirements, modelling use cases, and selecting appropriate tools. Through structured elicitation and clear documentation, I developed a system that addresses key user goals such as trip creation, itinerary planning, budgeting, and offline access.

By combining functional and non-functional requirements with a realistic user scenario, I ensured the system design was both practical and user-friendly. The traceability matrix further helped maintain consistency between requirements and design elements, ensuring nothing essential was overlooked.

Overall, this project demonstrated the importance of thorough requirement engineering in building effective, user-centred software solutions. With a strong foundation now established, the app can be further enhanced and expanded based on future feedback, testing, and iterative development.

References

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