# **Software Requirements Specification**

# **PRJ566 – Fall 2024**

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| PRJ566 – Team No.7 | Team Members |
| Name of Project:  Tanken GO Travel Planning Web Application  Project Leader: Julian Huang  Last updated: 2024/09/11 | 1. Julian Huang  2. Rong Chen  3. Hsien-Ting Liao  4. Shan-Yun Wang |

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# **1 - Introduction/Overview - Document Information**

## 1.1 Document Authors

* Julian Huang
* Rong Chen
* Hsien-Ting Liao
* Shan-Yun Wang

## 1.2 Revision History

|  |  |
| --- | --- |
| Week 03 | 1. Introduction/Overview: (ongoing)  1.1 Document Authors: Completed  1.2 Revision History (ongoing)  1.3 Document Conventions: Completed  1.4 Document Purpose: Completed  1.5 Intended Audience: Completed  1.6 Group Agreement: Completed  2.1 Project Proposal: Completed |
| Week 04 | 2.2 Stakeholders and Users  2.5 Project Scope  2.6 System Risks  2.7 Operating Environment |
| Week 05 | 2.3 Functional Requirements  2.4 Nonfunctional Requirements  3.1 UML/DFD Modeling |
| Week 06 | 2.8 UI/UXD Interface Mock-ups  3.1 Activity Diagram |
| Week 07 | 3.2 Business Rules  3.3 Use Case Specifications with corresponding interface mockups: |
| Week 08 | Finalize PPT System Wireframe and Video Development |
| Week 09 | 4. Domain Class Diagram |
| Week 10 | 5. Database |
| Week 11 | 6. WBS  7. Milestones |
| Week 12 | 8. Implementation Schedule |
| Week 13 | Final revision to all sections for clarity and correction |

## 1.3 Document Conventions

* Main heading font size 20, sub heading size 16, body text size 12
* Any text in red indicates an exception or error
* Any text in blue is in-progress
* Any text highlighted in yellow or **bold** is an important point
* Any text in green was recently added
* Any text *italicized* represents definitions
* Any text with ~~strike-through~~ is deleted

## 1.4 Document Purpose

The purpose of this document is to provide a comprehensive overview of the requirements, functionalities, and structure for the development of the **Tanken GO** Travel Planning Web Application. It outlines the goals, intended features, user needs, and technical specifications, serving as a guide for developers, stakeholders, and project managers to ensure the successful implementation and delivery of the project. The document also defines the *project scope*, *system risks, and design elements*, helping to align the development process with the expected outcomes.

## 1.5 Intended Audience

* **Project team members** (developers, designers, and project managers) will use this specification as a guideline for the development and implementation of the **Tanken GO** Travel Planning Web Application.
* **Stakeholders** include the **CEO**, project sponsor, and other key personnel who require an understanding of the *project’s scope*, *objectives, and functional requirements*.
* **End-users** who are interested in understanding how the system will address their needs.
* **Faculty** and **project supervisors** overseeing the progress and ensuring the project meets academic and professional standards.

## 1.6 Group Agreement

**TEAM AGREEMENT**

**Team #: 7**

**Project Title: Tanken Go Travel Planning Web Application**

**Project Time Frame:**

**Team Members: Julian Huang | Rong Chen | Hsien-Ting Liao | Shan-Yun Wang**

**Team Leadership: Julian Huang**

**Team Functions:**

* We will share information through MS Teams, OneDrive, WhatsApp, e-mails, and meetings
* We will communicate progress and share files through MS SharePoint
* We will manage project documentation and track changes using GitHub for collaborative editing and version control

**Team Meetings:**

**Mandatory Meeting Every Monday12:40pm**

* Discuss next week’s deliverables and clear up inquiries

**Optional Meeting Every Wednesday 12:40**

* If needed

**Team Problems:**

* Should conflicts occur, a resolution should be reached upon private discussions or on Monday’s meetings. A common consensus should be decided before further work is to be completed.

**Team Commitment:**

The undersigned members agree to work together on the project until the end of the PRJ666 next Semester. They recognize that as a team and individually they are responsible for the quality of all deliverables.

**Name**  **Date**

|  |  |
| --- | --- |
| **Julian Huang** | 2024/09/11 |
| **Rong Chen** | 2024/09/11 |
| **Hsien-Ting Liao** | 2024/09/11 |
| **Shan-Yun Wang** | 2024/09/11 |

ShapeShapeShapeShapeShapeShape2 - Project Overview

## 2.1 Project Proposal

### Project Background

As self-planned trips gain popularity, many existing travel platforms overwhelm users with cluttered interfaces and lack personalization. Travelers today seek simple, intuitive tools that provide tailored recommendations for a seamless planning experience.

**Tanken GO** was created to meet this need by offering an AI-powered platform that simplifies trip planning. It provides customized itineraries, interactive maps, and real-time cost estimations, addressing the growing demand for personalized, user-friendly travel solutions.

### Problem Statement

|  |  |
| --- | --- |
| **The Problem of:** | Planning a trip through existing platforms can be overwhelming, time-consuming, and lacks personalization, making it difficult for travelers to create a customized travel experience that meets their specific needs. |
| **Affects:** | Travelers who prefer self-planning but struggle with the complexity of traditional travel websites, as well as stakeholders such as travel businesses and service providers looking to offer personalized experiences. |
| **The impact of which is:** | Users face frustration due to overwhelming options, poor user interface, and a lack of tailored recommendations, leading to dissatisfaction and inefficient trip planning. |
| **A successful solution would:** | Provide a simplified, AI-powered platform that offers personalized trip recommendations, customized itineraries, and intuitive navigation, enhancing the overall travel experience by saving time, reducing stress, and ensuring the trip aligns with individual preferences. |

### Product Vision

|  |  |
| --- | --- |
| **For** | Travelers who prefer customized trip planning can use AI to create personalized travel itineraries. |
| **Who** | Have difficulty navigating complex and cluttered travel planning websites and desire a more efficient, user-friendly solution that caters to their specific travel preferences. These travelers seek a platform that simplifies the planning process, offering tailored recommendations and seamless trip management. |
| **The Product Name** | **Tanken GO** - Travel Planning Web Application |
| **That** | Provides AI-powered trip recommendations, customizable itineraries, interactive maps, and cost estimations. |
| **Unlike** | Traditional travel websites that are cluttered and difficult to navigate. |
| **Our product** | Offers a simplified, personalized, and community-driven approach to travel planning. |

## 2.2 Stakeholders and Users

|  |  |
| --- | --- |
| **Stakeholder Name/Identifier** | **Category** |
| Julian Huang  Rong Chen  Hsien-Ting Liao  Shan-Yun Wang | Developer |

## 2.3 Functional Requirements

**1. User Registration and Authentication**

* **1.1 Create User Profile**
  + **1.1.1 System provides the user with the option to register.**
    - **1.1.1.1** User clicks the "Sign Up" button.
    - **1.1.1.2** System displays a registration form.
* **1.2 User registers using Email.**
  + **1.2.1 System provides input fields for email registration.**
    - **1.2.1.1** Fields include Name, Email, Password, Confirm Password.
    - **1.2.1.2** System validates the email format and password strength.
    - **1.2.1.3** System displays error messages for invalid inputs.
    - **1.2.1.4** System sends a verification email.
* **1.3 User confirms or cancels registration.**
  + **1.3.1 System handles user actions.**
    - **1.3.1.1** If the user cancels, the system clears input data.
    - **1.3.1.2** If the user submits, the system validates and saves data.
    - **1.3.1.3** System creates a user profile and redirects to the home screen.
* **1.4 User logs in to their account.**
  + **1.4.1** User enters their email and password to log in.
  + **1.4.2** System validates the credentials and grants access.
  + **1.4.3** User can reset their password if forgotten.
* **1.5 User Profile Interactions.**
  + **1.5.1 System allows users to view and edit their profiles.**
    - **1.5.1.1** User navigates to the "Profile" section.
    - **1.5.1.2** System displays profile details such as Name, Email, and Saved Trips.
    - **1.5.1.3** User edits their profile information (e.g., Name, Profile Picture).
    - **1.5.1.4** System saves changes and updates the profile.
  + **1.5.2** User can view their saved trips under the profile section.

#### **2. Trip Planning**

* **2.1 Manual Trip Planning**
  + **2.1.1 System provides a trip planner module.**
    - **2.1.1.1** User navigates to the "Trip Planner" module.
    - **2.1.1.2** System displays filters and popular destinations.
    - **2.1.1.3** User enters destination, city, category, from, to, budget, and system provides autocomplete suggestions.
    - **2.1.1.4** System displays destination details.
  + **2.1.2 System allows users to add locations to their itinerary.**
    - **2.1.2.1** User selects a location.
    - **2.1.2.2** Location is added to the itinerary and displays the estimated total cost.
* **2.2 AI-Generated Trip Planning**
  + **2.2.1 System generates trips based on user preferences.**
    - **2.2.1.1** User provides input (e.g., destination, budget, dates, style).
    - **2.2.1.2** System displays a suggested itinerary with costs and travel routes.
    - **2.2.1.3** System adds the suggested itinerary to the user’s itinerary.
  + **2.2.2 System allows users to customize AI-generated trips.**
    - **2.2.2.1** User accepts the plan or modifies it by adding/removing activities.
* **2.3 Itinerary Editing**
  + **2.3.1** User can remove a location from the itinerary.
  + **2.3.2** User can add a new day to their itinerary.
  + **2.3.3** User can drag and reorder the locations in their itinerary.
* **2.4 Integrated Google Maps**
  + **2.4.1** System displays locations on an integrated Google Map.
  + **2.4.2** User clicks on pins to view details like pictures, reviews, and descriptions.
  + **2.4.3** User can navigate between locations directly on the map.
* **2.5 Currency Conversion**
  + **2.5.1** User selects to change currency.
  + **2.5.2** System automatically applies real-time exchange rates.
  + **2.5.3** System changes original to converted currencies.

#### **3. Customizable Itineraries**

* **3.1 System provides features to create and modify itineraries.**
  + **3.1.1** User navigates to their profile to view their saved itineraries.
  + **3.1.2** User clicks on an itinerary to view and edit.
  + **3.1.3** System brings the user to the "Plan a Trip" page where they can interact with the itinerary.
  + **3.1.4** System displays the itinerary with an estimated cost.
  + **3.1.5** System allows the user to add notes to locations or days.

#### **4. Social Sharing and Community Features**

* **4.1 System provides options to share trip plans.**
  + **4.1.1** User selects "Share Trip" and chooses a sharing method.
  + **4.1.2** System generates the link or navigates to the corresponding platform.
* **4.2 Explore Public Trip Plans**
  + **4.2.1** System displays public trips in the "Explore" section.
  + **4.2.2** User clicks on a trip to view its details, including:
    - **4.2.2.1** Photos of the trip locations.
    - **4.2.2.2** A map showing all trip locations.
    - **4.2.2.3** An overview of the itinerary with activities and costs.
  + **4.2.3** User duplicates a public trip to their own account for customization.
* **4.3 Community Interactions**
  + **4.3.1** User likes, comments, or favorites public trips.
  + **4.3.2** System notifies post creators of new interactions (e.g., "User liked your trip").

## 2.4 Nonfunctional Requirements

#### **1. Operational Requirements**

* The application should be available 24/7, ensuring that users can access the service at any time. Scheduled maintenance should be communicated to users in advance.

#### **2. Performance Requirements**

* The system should respond to user requests within a few seconds of all transactions, including loading pages, submission, and retrieving recommendations.

**3. Security Requirements**

* **Data Protection**: All user data, including personal information and payment details, must be encrypted both at rest and in transit using industry-standard encryption protocols
* **Compliance**: The system must comply with relevant data privacy regulations

#### **4. Usability Requirements**

* **User Interface (UI)**: The UI must be intuitive and easy to navigate, with a consistent layout across all pages. The design should follow best practices for accessibility to ensure all users, including those with disabilities, can effectively use the application.
* **Documentation**: Provide comprehensive user documentation, including FAQs, tutorials, and troubleshooting guides, to assist users in understanding and utilizing the application features.

#### **5. Reliability Requirements**

* **Uptime**: The system should maintain its service, with a plan in place for disaster recovery and data backup to prevent data loss in case of failures.
* **Error Handling**: Implement robust error handling to gracefully manage unexpected issues, providing users with meaningful error messages and recovery options.

#### **6. Maintainability Requirements**

* **Code Quality**: The codebase should adhere to established coding standards and best practices to facilitate future maintenance and scalability.
* **Documentation**: All system components, including APIs, user interfaces, and backend processes, should be thoroughly documented to aid future development and maintenance efforts.

2.5 Project Scope

**1. Project Objectives:**

To develop a user-friendly web application that empowers travelers to plan their own trips efficiently, providing personalized recommendations and essential tools for trip management

**2. Deliverables:**

* **Functional Website**: A fully operational web application for trip planning
* **Reports**: Excel and PDF reports Business Proposal, Software Requirements Specification, Data Models such as activity diagram and program flow, and Video Presentation

**3. Project Boundaries:**

* **Included Features:** 
  + **Multi-Channel User Registration**
    - Users can easily register via Google, Facebook, or email, ensuring a seamless onboarding process
  + **Comprehensive Search & Filter for Points of Interest**
    - Users can search for points of interest with advanced filters, allowing them to effortlessly add locations to their trip plans based on preferences such as likes or budget
  + **Interactive Google Map Integration**
    - The platform includes an interactive map powered by Google Maps, enabling users to visualize and explore potential travel destinations in real-time
  + **AI-Powered Trip Planner**
    - Users can ask for personalized trip recommendations via a ChatGPT-integrated AI-powered trip planning assistant, which could provide but not limited to the following suggestions:
      * Popular Destinations
      * Packing Recommendations
      * Itinerary Suggestions
      * FAQ-Based Interaction
      * Best Travel Times
      * Restaurant/Hotel Suggestions
  + **Trip Sharing and Customization**
    - Users can share their trip plans with others on the website, allowing other users to select from popular trips suited to their preferences
  + **Community Feedback**
    - Users can engage with the community by liking and commenting on other trip plans. Popular trip plans are sorted based on likes, giving users insight into trending travel ideas
  + **Transportation Mode Filters**
    - Users can filter their trip plans by their preferred mode of transportation (e.g., car, train, walk), allowing for tailored itineraries that fit their needs and preferences
  + **Trip Cost Estimation**
    - The platform includes a trip cost calculator that estimates total expenses, including transportation, food, and attractions, helping users stay within their budget
* **Excluded Features:**
  + Booking of flights and hotels at the destinations, the app is solely focused on trip planning

**4. Project Constraints:**

* **Data Privacy Compliance**: The web application must adhere to data privacy regulations regarding user information collection and storage from third-party services
* **Technical Limitations**: Constraints imposed by third-party APIs, such as data availability

**5. Project Assumptions:**

* **API Functionality**: It is assumed that all third-party integrations (Google Maps, OpenAI) will function as intended without significant downtime.
* **Team Availability**: Team members will be available and committed throughout the project timeline

**6. Key Stakeholders:**

* **Internal Stakeholders**:
* **Julian Huang (Team Leader)**: Overall project oversight and coordination.
* **Rong Chen (Developer)**: Development of user interaction features and AI integration.
* **Hsien-Ting Liao (Developer)**: Backend development, focusing on security and cost estimation features.
* **Shan-Yun Wang (Developer)**: Front-end design and user experience enhancements.
* **External Stakeholders**:
* **Professor Yasser Elmankabady:** Providing guidance and feedback throughout the project
* **Potential Users** - Actively participating in testing phases to ensure the application functionality meets user needs and expectations

**7. Project Timeline:**

|  |  |
| --- | --- |
| Week 3 | Project Overview |
| Week 5 | Requirements Elicitation: Functional & non-functional |
| Week 6 | Activity Diagram and Wireframes/Mock-ups |
| Week 7 | User stories, use case specifications, mockups, and system use case diagrams |
| Week 8 | Finalized PPT System Mockups/wireframes (Prototype) and Video Development |
| Week 10 | Database design: ERD and Data Dictionary |
| Week 12 | Waterfall Implementation Schedule using MS Project tool |
| Week 13 | Final video presentation |

**8. Project Risks:**

* **Lack of Experience with Development Tools**:
* The team lacks experience with AWS deployment and cost management methodologies. This may lead to difficulties in optimizing cloud infrastructure and controlling costs. Completing the current AWS course by the end of the semester will help mitigate these risks before full-scale project development begins
* **Unforeseen Delays in Milestones**:
* Project timelines may be affected by team members’ availability, technical challenges, or unexpected complications, which could cause delays in reaching key project milestones
* **Scope Creep**:
* As the project progresses, there may be a tendency to introduce additional features or expand the project beyond its original scope. This could lead to increased development time, budget overruns, and difficulties in meeting the original deadlines if not carefully managed

**9. Resource Requirements:**

* **Personnel**: Julian Huang, Rong Chen, Hsien-Ting Liao, and Shan-Yun Wang (developer and designer)
* **Equipment**: AWS for hosting, OpenAI for AI functionalities, and GitHub for version control
* **Material**: Course templates and any necessary design software for prototyping

**10. Quality Standards:**

* **Usability**: Follow best design practices to ensure intuitive user navigation and interaction.
* **Testing**: All unit tests must pass with minimal bugs, ensuring system stability and performance.
* **Security**: Implement security best practices to protect user data and ensure the safe use of AI functionalities.

**11. Approval Criteria:**

* The project meets all functional and non-functional requirements as outlined
* The project is reviewed and approved by the project stakeholders, including the CEO and faculty members
* The system passes all user acceptance tests and security evaluations

**12. Communication Plan:**

* Weekly team meetings every Wednesday at 12:40 pm.
* Regular updates through MS Teams and WhatsApp.
* Documentation and project progress tracked via GitHub and MS SharePoint
* Urgent updates will be communicated through emails to all team members and stakeholders.

**13. Change Control Process:**

1. Member request to modify the project plan.
2. Key stakeholders will review the request and ensure that is executable
3. Approval the requirement and implement the change into the project plan

**14. Dependencies:**

* **Software**: Dependencies on external platforms like AWS, OpenAI, or APIs for specific functionalities
* **Resource availability**: Dependencies on other teams or departments for resources such as additional developers, testers, or hardware

**15. Exit Criteria:**

* All deliverables, including the system, documentation, and reports, must be completed and handed over
* The final working system will be delivered to users, with adequate training and support provided to ensure effective usage

## 2.6 System Risks

|  |  |
| --- | --- |
| **Risk** | **Response** |
| Real-time Google Map may lead to dependency on their APIs, introducing issues such as availability or up-to-date information | Implement robust error handling for API calls and set up notifications to alert the team of any integration failures. Establish caching mechanisms to store essential data temporarily when APIs are down. Regularly monitor external API services for changes and update the platform accordingly |
| If the user base grows the backend architecture may not be able to handle increased traffic | Ensure backend services are easily scalable by utilizing cloud services |
| The system collects and processes sensitive user data, including through third-party integrations (e.g., Google, Facebook). If the platform fails to comply with data privacy regulations (e.g., GDPR, CCPA), it may lead to legal issues, financial penalties, or loss of user trust | Implement strict data encryption and anonymization practices. Regularly audit the system for compliance with relevant regulations. Ensure that user consent is clearly obtained for any data sharing. Set up monitoring tools to identify and address any potential vulnerabilities in real-time |
| The AI-Powered Trip Planner may produce inaccurate or incomplete trip planning results, which could lead to user frustration and loss of trust in the platform's functionality | Continuously improve and train the AI model based on user feedback and data collection. Ensure that fallback solutions (e.g., manual trip planning tools) are available in case the AI-generated results are not satisfactory. Conduct thorough testing on AI predictions with various scenarios before full deployment |

## 2.7 Operating Environment

**Hardware:**

* **Client**:
  + Desktop and mobile devices with modern web browsing capabilities, supporting HTML5, JavaScript, and CSS3
  + Recommended Screen Resolutions: 1920x1080 or higher for desktops; adaptive layout for mobile devices
* **Server**:
  + Cloud-based servers (e.g., AWS EC2 instances) with the necessary capacity to handle traffic, API requests, and storage for trip data
  + Backup servers for redundancy and high availability, especially for critical services like the database

#### **Software:**

* **Client**:
  + **Web Browsers**: Latest versions of Chrome, Safari, Firefox, Edge, or Brave, supporting ES6+ JavaScript standards
* **Server**:
  + **Backend**: Node.js with Express.js for managing API requests and handling business logic
  + **Database**: Cloud-hosted PostgreSQL for relational data, or MongoDB for NoSQL requirements, providing scalability and flexibility
  + **AI Integration**: Python (e.g., Flask or FastAPI) for running AI algorithms, interfacing with the Node.js backend
  + **Authentication**: OAuth 2.0 or JWT for secure user authentication and authorization, using services like Google, Facebook, or email-based sign-ups

#### **Network Connection:**

* **Client**:
  + **Internet**: Minimum 4G connectivity for mobile devices; broadband (10 Mbps or higher) recommended for desktop usage to handle real-time data updates and map rendering.
* **Server**:
  + **Network Speed**: High-speed, reliable internet (with low latency) for API calls, cloud database access, and real-time interaction with external services (e.g., Google Maps, AI services).
  + **Uptime & Latency**: Ensure 99.9%+ uptime and latency under 100 ms for optimal user experience.

#### **Cloud Services:**

* **AWS**:
  + **Compute**: EC2 instances for hosting the backend and AI components.
  + **Storage**: S3 for storing user data and media (e.g., trip photos, saved itineraries).
  + **Database**: RDS or DynamoDB for hosting the database.
  + **Scaling**: Auto-scaling groups to manage traffic surges.
* **OpenAI**:
  + **AI Services**: Use OpenAI’s APIs for generating AI-powered trip recommendations, integrated into the backend.

## 2.8 UI/UXD Interface Mock-ups

1. Main Page:
   * Wireframe: <https://wireframe.cc/qhjfMb>
   * UI:<https://www.figma.com/design/K4bJNaFJFdhEus73J5UIDU/Taken-Go_community-(Copy)?node-id=2001-51&node-type=canvas&t=83P4YvRjidaQbiPS-0>
2. Register Page:
   * Wireframe: <https://wireframe.cc/ESQUiy>
   * UI: <https://www.figma.com/design/mPsoUwfuc2G07ERshfcf6t/Register?node-id=0-1&t=iKLpLs8Y5SbHxNxh-1>
3. Community Page:

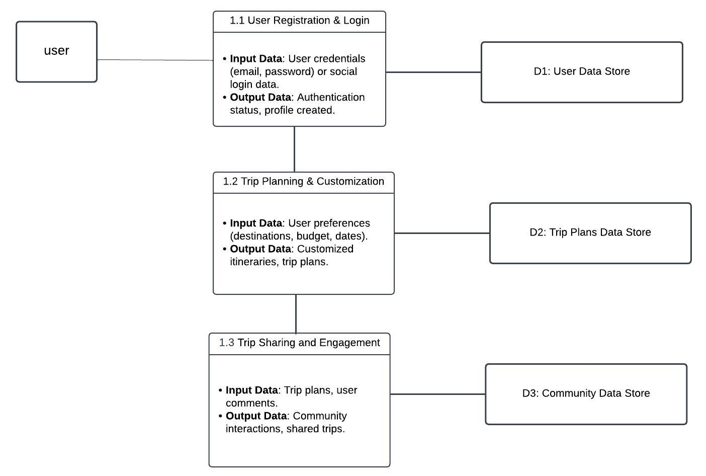
* Wireframe: <https://wireframe.cc/4kiJT7>
* UI: <https://www.figma.com/design/x3lkLSKB0zkRKZRez67bcq/Taken-Go_community?node-id=0-1&t=APfLRfXF4mf8geI6-1>

1. Community Detail Page:
   * Wireframe: <https://wireframe.cc/GHm6tM>
   * UI: <https://www.figma.com/design/pjrHNlIzkppXJBx6cXzT00/Tanken-Go_community_detail?node-id=0-1&t=vDKjCK0bqaH570CP-1>
2. Trip Planning Page:
   * Wireframe: <https://wireframe.cc/W2cMJg>
   * UI: <https://www.figma.com/design/y2jnrEckbMT9iL5J9z9cD1/Trip-Planning-Page?node-id=0-1&node-type=canvas&t=SfHN2pEjFkCm17AQ-0>

# **3 - Process and Data Modeling**

## 3.1 UML/DFD Modeling and Data Modeling

### Data Flow diagram



### Activity Diagrams

1. Main Page:

<https://lucid.app/lucidchart/323b3782-5dcf-4028-b8b2-f6353d2f1f09/edit?viewport_loc=-781%2C-1353%2C1532%2C1694%2C0_0&invitationId=inv_bd867745-d794-428c-9750-aa78c122d0f8>

1. Register Page:

<https://lucid.app/lucidchart/fb0eed88-5fe2-4020-91ba-149293496652/edit?viewport_loc=-929%2C-988%2C1859%2C2056%2C0_0&invitationId=inv_86200769-41aa-4f22-a14c-8c9a360a1d6d>

1. Community Page: <https://drive.google.com/file/d/1WvEYsY58oIdl5dZPpr_YIQ8ZJk0Byjj0/view?usp=sharing>
2. Community Page Detail: <https://drive.google.com/file/d/1bofOWnwjcj5ZuGvmcbgAT6Y_QwFw0oXK/view?usp=sharing>
3. Trip Planning Page: <https://lucid.app/lucidchart/a7f5facc-85b0-4bcf-93a0-2119f9330a6c/edit?viewport_loc=-2636%2C-1159%2C4661%2C2057%2C0_0&invitationId=inv_725222b1-01b5-4f1c-adc7-f7bcb3364f9a>

## 3.2 Business Rules

|  |  |  |
| --- | --- | --- |
| Business Rule Number | Business Rule Description | Related UC |
| BR01 | The "Start Planning" button must be functional, redirecting users to the trip planning page without delays or errors. | UC01 |
| BR02 | The navigation bar and footer must be visible and accessible on all pages, ensuring users can explore the system without being stuck or lost. | UC01 |
| BR03 | Users must provide a username, email address, password, and phone number to register for the app. | UC02 |
| BR04 | Passwords entered must match during the registration process. | UC02 |
| BR05 | The phone number must be valid and confirmed using a security code sent via SMS. | UC02 |
| BR06 | Users must accept the privacy policy before completing the registration. | UC02 |
| BR07 | Invalid data (e.g., unmatched passwords, incorrect security code) will trigger an error message, and the registration cannot proceed until corrected. | UC02 |
| BR08 | Only registered users can access the trip planning page | UC03 |
| BR09 | Users can add multiple destinations to their trip plan, with the total cost of selected destinations constrained by the budget set in the filter. The system will prevent destinations that cause the plan to exceed the user’s specified budget by notifying the user on screen | UC03 |
| BR10 | Each destination must lead to a dedicated page which summarizes its location and reason of choice | UC03 |
| BR11 | User should be able to navigate back and forth and retain their search preferences | UC03 |
| BR12 | As users adjust filters (like budget, date, or activities), the list of available destinations updates dynamically without needing to refresh the page, providing instant feedback on available options | UC03 |
| BR13 | The date range for planned trips must fall within a one-year window from the current date. Users cannot plan trips too far into the future. | UC03 |
| BR14 | Only registered users can access the community page. | UC04 |
| BR15 | Users can browse trips posted by other users, including trip details like itinerary, location, and experiences. | UC04 |
| BR16 | Users can search for trips by keywords, location, and date. | UC04 |
| BR17 | The "Load More" button must retrieve additional trip cards if more trips are available. | UC04 |
| BR18 | Users can "favorite" trips to save them for future reference. | UC04 |
| BR19 | Each trip card must display the username of the creator, trip title, thumbnail image, and location. | UC04 |
| BR20 | Clicking on a trip card redirects to the detailed trip page for that specific trip. | UC04 |

## 3.3 Use Case Specifications with corresponding interface mockups:

1. [Use Case - User Registration Page](https://seneca-my.sharepoint.com/:w:/g/personal/hliao25_myseneca_ca/EWakZrkKeM5Fm4eRaMHq4RUBCJhiQK9pALaIeYCoDU-Sug?e=HrfgeM)

1.1 [Create User Profile](https://seneca-my.sharepoint.com/:w:/g/personal/hliao25_myseneca_ca/Ea0LCNLfw2pHj97MPE1B9aMBxw6t6VdZkzfYoa9q9tOBlw?e=8XOYbo)

1.2 [User registers using Email](https://seneca-my.sharepoint.com/:w:/g/personal/hliao25_myseneca_ca/EfIo6xG7RWRDnCa_UXXOcpkB2vhO-dR3G0fov2K1ZS5ScA?e=pLTco1)

1.3 [User confirms or cancels registration](https://seneca-my.sharepoint.com/:w:/g/personal/hliao25_myseneca_ca/EUAdJDyN275Hl5W0YOAHzkAB8JWEgh7Sx649qRXaEDBSIQ?e=1OLprd)

1.4 [User logs in to their account](https://seneca-my.sharepoint.com/:w:/g/personal/hliao25_myseneca_ca/EaM5f9dJ-TJFl106SG0x49YBaQvEXkB-o8wylSFASCkRVg?e=Zk0WXk)

1.5 [User Profile Interactions](https://seneca-my.sharepoint.com/:w:/g/personal/rchen104_myseneca_ca/EVjlQtE25OdIuyxNh_8ILU8BBJFohrLnd1PKt56MdG4yVQ?e=dsaCaz)

1. [Use Case - Trip Planning Page](https://seneca-my.sharepoint.com/:w:/g/personal/jhuang279_myseneca_ca/EcmeoRSnuGJDiTMzQezYqWUB9DezypV8r0zN9nHxmRd9xQ?e=tUJwQd)

2.1 [Manual Trip Planning](https://seneca-my.sharepoint.com/:w:/g/personal/jhuang279_myseneca_ca/EdWFHmYNGmxKh0Kk_OCJKd4Bv6STTmAeL2uvEkJ2ImBqVg?e=sfM3px)

2.2 [AI Trip Planning](https://seneca-my.sharepoint.com/:w:/g/personal/jhuang279_myseneca_ca/EX-WFwhDgHxPrj5KW3YwTz4Bu9BLaBlDqFES5hWFCqr-qQ?e=RdaAKL)

2.3 [Itinerary Editing](https://seneca-my.sharepoint.com/:w:/g/personal/rchen104_myseneca_ca/EQ7nDHUJ0YVGnzjKN9HGGtwBkWgTHcsYQutxr9UZIMoNHQ?e=zJ1lTE)

2.4 [Integrated Google Maps](https://seneca-my.sharepoint.com/:w:/g/personal/rchen104_myseneca_ca/EZG14NvKWztCmMIDgnB3_1wB5Y2QAb6NohEz31P4s6wXNA?e=78Gvzs)

2.5 [Currency Conversion](https://seneca-my.sharepoint.com/:w:/g/personal/rchen104_myseneca_ca/EcK43vjIa_hBsG6yPGtOkRcB0YvYhhqv1Jug0vdbOHODfg?e=Ee4sDH)

1. [Create and Modify Itinerary](https://seneca-my.sharepoint.com/:w:/g/personal/jhuang279_myseneca_ca/Ea0EJN3eLJVDjxt2uN-n2jMBsPPIFWrZtGOl6SejEYXhqQ?e=MdAUmP)
2. [Use Case Specifications - community page.docx](https://seneca-my.sharepoint.com/:w:/g/personal/swang308_myseneca_ca/EZ2VqNXDTmhBpnAzXuw3OEoB_zy9IDlUPbnmTlxQNF2m0w?e=SSuQrf)

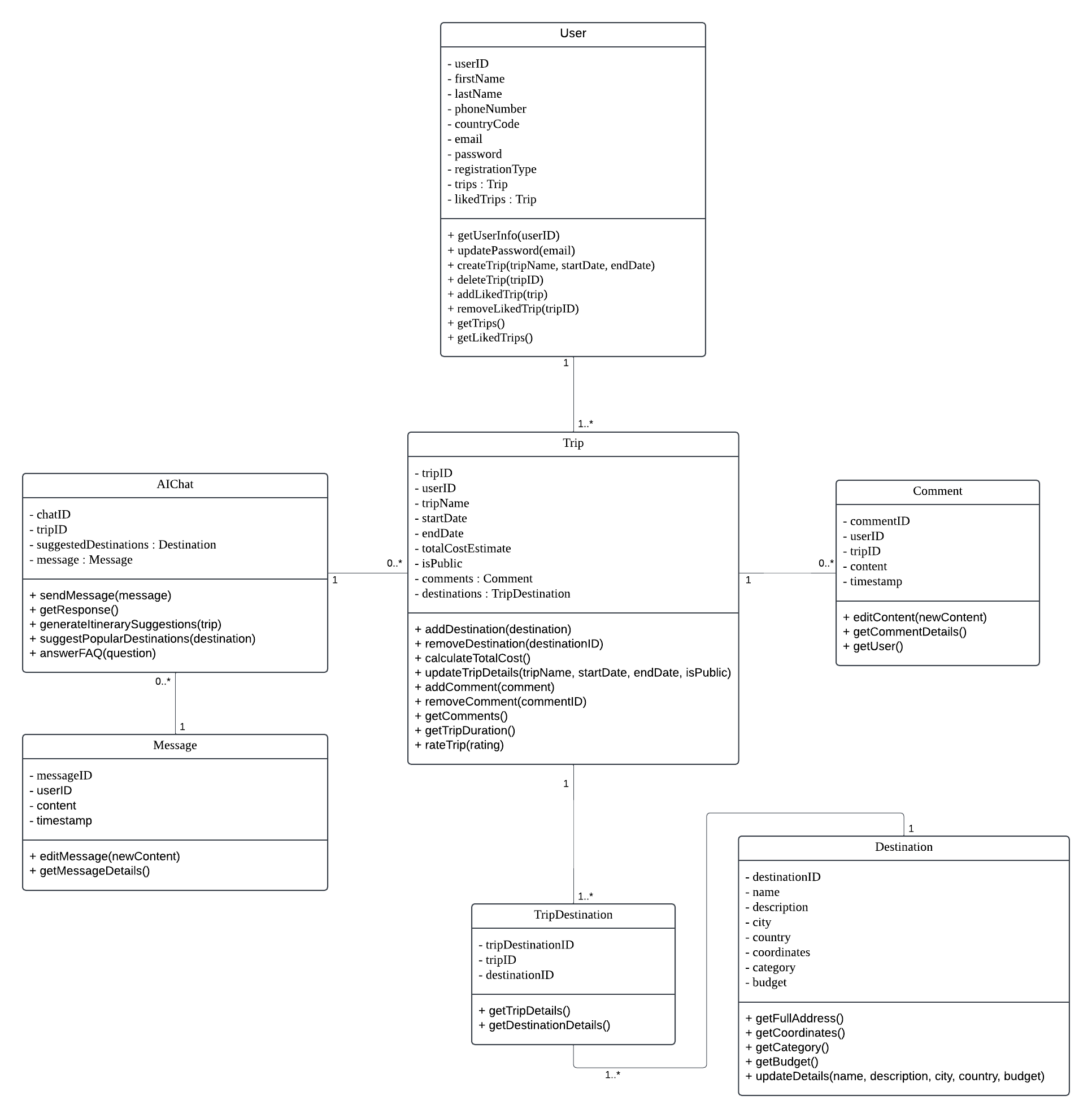
4.1 [Social Sharing & Community Features](https://seneca-my.sharepoint.com/:w:/g/personal/swang308_myseneca_ca/EXF4m3cCNnlDlFDhHz_2mk8BBEB-DKMoK1nVcbt2H5opeQ?e=QEzFiv)

4.2 [Browse Community Trips](https://seneca-my.sharepoint.com/:w:/g/personal/swang308_myseneca_ca/EWtYsj6I1DZAp82lI22ryDoBsrQLzPXfcMms9DIpsmTO8g?e=5rcwHU)

4.3 [Community Interaction](https://seneca-my.sharepoint.com/:w:/g/personal/swang308_myseneca_ca/EYIsCrdj90lGg1lQjnw-p_UB0QWzSt4ye4PMkktJsGE7JA?e=fUqHAV)

# 4 - Domain Class Diagram

<https://lucid.app/lucidchart/c5ea63ce-1c82-425e-9a57-25f218bd8eb8/edit?viewport_loc=-2994%2C-749%2C5713%2C2770%2C0_0&invitationId=inv_2469f33a-edd2-4fbd-bc0e-8930ae8eb35e>



# 5 – Database

// Tanken-Go JSON

{

// User

"user": {

"userID": "user\_001",

"firstName": "Doris",

"lastName": "Liao",

"phoneNumber": "1234567890",

"countryCode": "1",

"email": "12345@gmail.com",

"password": "@Dd1234567",

"registrationType": "Standard",

"likedTrips": ["trip\_002"]

},

// Trip

"trip": {

"tripID": "trip\_001",

"userID": "user\_001",

"tripName": "European Adventure",

"startDate": "2024-06-01",

"endDate": "2024-06-15",

"totalCostEstimate": 3000.0,

"isPublic": true,

"comments": [ //Comment

{

"commentID": "comment\_001",

"userID": "user\_456",

"tripID": "trip\_001",

"content": "Amazing trip! Can't wait to do this again.",

"timestamp": "2024-06-16T10:30:00Z"

}

],

"destinations": [ // TripDestination

{

"tripDestinationID": "trip\_dest\_001",

"tripID": "trip\_001",

"destinationID": "dest\_001"

},

{

"tripDestinationID": "trip\_dest\_002",

"tripID": "trip\_001",

"destinationID": "dest\_002"

}

]

},

//TripDestination

"tripDestination": {

"tripDestinationID": "trip\_dest\_001",

"tripID": "trip\_001",

"destinationID": "dest\_001"

},

// Destination

"destination": {

"destinationID": "dest\_001",

"name": "Paris",

"description": "The city of lights and love.",

"city": "Paris",

"country": "France",

"coordinates": {

"latitude": 48.8566,

"longitude": 2.3522

},

"category": "Romantic",

"budget": 2000.0

},

// AIChat

"aiChat": {

"chatID": "chat\_001",

"tripID": "trip\_001",

"suggestedDestinations": [

{

"destinationID": "dest\_003",

"name": "Rome",

"description": "The Eternal City.",

"city": "Rome",

"country": "Italy",

"coordinates": {

"latitude": 41.9028,

"longitude": 12.4964

},

"category": "Historic",

"budget": 1500.0

}

]

},

"messages": //Message

{

"messageID": "msg\_001",

"userID": "user\_001",

"content": "What are the top destinations in Europe?",

"timestamp": "2024-06-01T10:00:00Z"

},

{

"messageID": "msg\_002",

"userID": "ai\_001",

"content": "Consider visiting Paris, Rome, and Barcelona.",

"timestamp": "2024-06-01T10:00:05Z"

},

{

"messageID": "msg\_003",

"userID": "user\_001",

"content": "How much will this trip cost?",

"timestamp": "2024-06-01T10:01:00Z"

},

{

"messageID": "msg\_004",

"userID": "ai\_001",

"content": "The estimated cost for a 2-week trip is $3000.",

"timestamp": "2024-06-01T10:01:05Z"

}

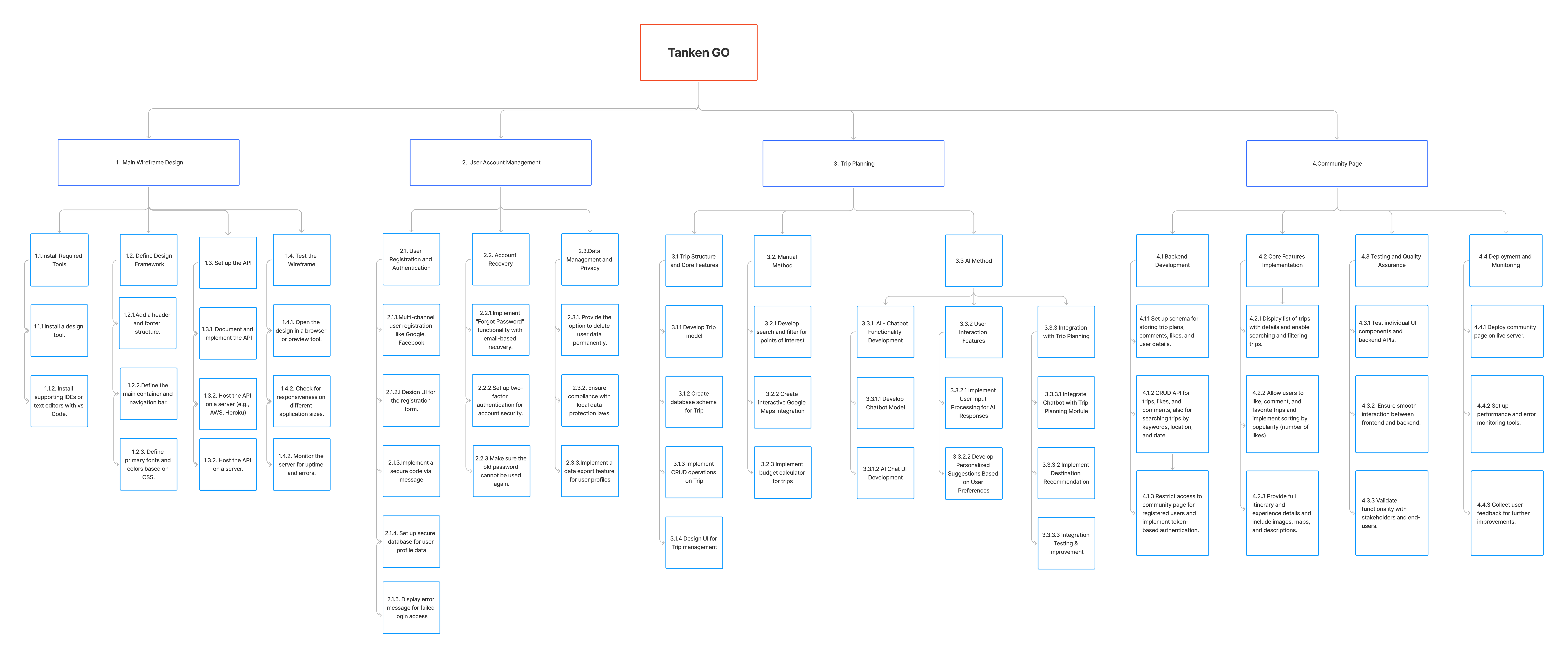
]

}

# 6 - Work Breakdown Structure (WBS)

## 6.1 Work Breakdown Structure

<https://www.figma.com/board/PeEGrrwafOTDRPEr5prG8v/Work-Breakdown-Structure?node-id=0-1&t=O7nghABGykCz7tot-1>



# 7 - Milestones and Acceptance Criteria

1. **User Registration and Authentication System**
   * **Definition**

* Set up the secure database for storing user profile and authentication details.
  + **Acceptance Criteria**
* Database schema supports storing user data, including name, email, hashed password, and profile information.
* Provide clear, real-time password strength indicators through the phone number.
* Backups are implemented with a disaster recovery plan in place.

1. **Data Management and Privacy**
   * **Definition**

* Align the system with applicable data protection laws.
  + **Acceptance Criteria**
* Privacy policy is updated to reflect compliance with local laws.
* Sensitive information is encrypted including email address and password.
* User can login to webpage and update their profile information
* Sensitive information is encrypted including email address and password.
* APIs validate inputs to prevent injection attacks or invalid data processing.

1. **Home Wireframe Design**
   * **Definition**

* Design and implement a responsive home page with key sections including a Navbar, Features and Footer.
  + **Acceptance Criteria**
* Navbar is responsive and adjusts gracefully on all devices
* Includes navigation links to different page (Home, Community Page, Trip Plan and Contact)
* Displays trip features using icons or images and concise description
* Display the contact information and social media link on the footer.
* CSS and JavaScript files are minified to enhance performance.

1. **Community Page Core Functionality**
   * **Definition**

* Implement the core features of the community page, including trip browsing, interactions, and trip detail display.
  + **Acceptance Criteria**
* Users can browse trips with details such as username, trip title, thumbnail, and location displayed on cards.
* Trip cards can be sorted by popularity (number of likes).
* “Load More” button dynamically fetches additional trip cards.
* Users can search and filter trips by keyword, location, and date.

1. **Trip Interaction Features**
   * **Definition**

* Enable users to engage with the community by liking, commenting, and favoring trips.
  + **Acceptance Criteria:**
* Users can like trips, with the like count updating in real-time.
* Comments can be added to trips, and they are displayed below trip details.
* Users can “favorite” trips to save them for future reference, and saved trips appear in their profile.

1. **Trip Details Page Integration** 
   * **Definition**

* Develop a detailed trip page that displays the full itinerary, images, and user interactions.
  + **Acceptance Criteria**
* Clicking on a trip card redirects to the trip detail page.
* The trip details page displays the complete itinerary, images, and descriptions accurately.
* Users can interact with the trip by liking, commenting, or favoring it on the detail page.

1. **Design UI for Manual Trip Planning**
   * **Definition**

* Develop the user interface for manual trip planning, allowing users to filter options, set budgets, and build itineraries interactively.
  + **Acceptance Criteria**
* The UI includes sections for filters, budget input, interactive map, and trip details.
* The layout is responsive, adapting to various device sizes.
* Users can navigate through the page without encountering errors or glitches.

#### **Implement Filter and Search Options**

* + **Definition**
* Add filtering and search functionalities to help users refine their trip options based on their preferences.
  + **Acceptance Criteria**
* Filters apply correctly to search results.
* Search works for keywords, location, and categories.
* No errors or unexpected results when using filters.

#### **Budget Calculator Integration**

* + **Definition**
* Implement a tool that helps users set budgets and tracks costs dynamically as they build their trip plans.
  + **Acceptance Criteria**
* Users can input a budget and view real-time cost tracking for their trip.
* Visual indicators display when the budget limit is exceeded.
* Budget calculations are accurate and adjust for selected options.

#### **Itinerary Builder**

* + **Definition**
* Provide functionality for users to create and customize their trip itineraries, including activities, destinations, and accommodations.
  + **Acceptance Criteria**
* Users can add, edit, and remove destinations, activities, and accommodations from their itinerary.
* Drag-and-drop functionality works for reordering itinerary items.
* The itinerary summary dynamically updates with accurate costs and durations.
* UI remains stable even with extensive modifications to the itinerary.

1. **Integrate AI Trip Customization**
   * **Definition**

* Enable AI-powered trip generation based on user preferences such as dates, interests, group size, and constraints like budget.
  + **Acceptance Criteria**
* Users can input preferences and receive a full itinerary, including destinations, activities, and accommodations.
* AI-generated itineraries are feasible and meet user constraints.
* Errors or failures in itinerary generation are minimized.

#### **User Interaction with AI Suggestions**

* + **Definition**
* Allow users to edit and customize AI-generated trip plans while maintaining the base suggestions.
  + **Acceptance Criteria**
* Users can modify AI-generated trips (e.g., add/remove items).
* Changes made by users are reflected immediately without overwriting the original AI-generated plan.
* User feedback on AI-generated plans is collected and stored.

#### **AI Personalization Enhancements**

* + **Definition**
* Improve AI to tailor trip plans based on previous user preferences and contextual factors.
  + **Acceptance Criteria**
* AI-generated itineraries adapt based on user preferences and history.
* Real-time factors are integrated into AI suggestions.
* AI suggestions remain aligned with user constraints.

1. **Interactive Map Integration**
   * **Definition**

* Integrate an interactive map to display selected destinations and routes for the trip plan.
  + **Acceptance Criteria**
* Map displays selected destinations and routes accurately.
* Clicking map markers shows relevant information.
* Map integrates seamlessly with both manual and AI trip planning options.
* Map performance is smooth even with multiple points of interest.

1. **Testing and Quality Assurance**
   * **Definition**

* Perform comprehensive testing of all platform functionalities, focusing on usability, performance, and security.
  + **Acceptance Criteria**
* Ensure all features work as intended, resolving major bugs.
* Users can navigate and interact with ease, with positive feedback.
* User data is secure, with no critical vulnerabilities.
* Platform maintains smooth performance under different loads.

1. **Final presentation and delivery**
   * **Definition**

* Present Tanken GO’s features and finalize deployment to production.
  + **Acceptance Criteria**
* Showcase platform features, demonstrate a complete user journey, and address stakeholder feedback.
* Deploy production and verify functionality.
* Deliver project, technical documentation, and training to stakeholders

# 8 - Implementation Schedule

**Sprint 1 (Week 1 ~ Week 3)**

* As a user, I want to view and interact with the main page of the Tanken-Go website so I can start planning my trips easily and efficiently

**Description**  
The Tanken-Go main page is designed to be user-friendly and visually appealing, setting the tone for a seamless travel planning experience. The page includes a hero section with an inspiring background image, a prominent "Start Plan" call-to-action button, and a clear navigation menu, helping users get started immediately. The main page also introduces key features, such as browsing available trips, AI suggestions, and links to the community blog, all of which contribute to an intuitive and engaging interface.

**Acceptance Criteria**

* The hero section prominently displays an engaging background image that represents travel and adventure.
* The "Start Plan" button must be highly visible, centered, and redirect users to the trip customization page.
* The navigation bar provides direct access to essential features: Blogs, Community, and Contact Information.
* The navigation bar must adjust responsively to different screen sizes and devices.
* Each main page element (hero image, navigation, call-to-action button) is optimized for usability and accessibility.
* The page includes links to explore trips, AI features, and community content to engage users effectively.

**Testing Criteria**

* Verify that the hero section displays correctly across all devices and screen resolutions.
* Test the responsiveness of the navigation bar, ensuring consistent performance on both desktop and mobile devices.
* Check that the "Start Plan" button redirects users to the correct page and functions as expected.
* Validate that all links (blogs, community, and contact) are functional and lead to the intended sections.
* Test for proper loading times of images and text, ensuring a smooth user experience.

**Sprint 2 (Week 4 ~ Week 6)**

* As a user, I want to register an account of the Tanken-Go website, so my personal data is recorded, and I can manage my profile

**Description**

The User Registration system securely stores user information, including name, email, and hashed passwords, ensuring data privacy through encryption. It offers real-time password strength indicators, allowing users to create robust credentials. With responsive design, it enables seamless account creation, login, and profile management, complying with modern security and privacy standards.

**Acceptance Criteria**

* The database schema supports the storage of Username, emails, phone numbers, and passwords.
* Sensitive information is encrypted including email address and password.
* The system supports the login process and allows users to update profile details securely.
* APIs validate all inputs to prevent invalid data processing or injection attacks.
* A documented disaster recovery plan is available and tested for restoring the system.
* The personal information can be revised after creating an account

**Testing Criteria**

* Create a new user account with valid inputs.
* Make sure the profile information can be changed after being updated.
* Verify password strength indicators displayed in real-time based on input complexity.
* Simulate data loss and restore the system using backup data.
* Test the accessibility of the responsive register page on all devices.

**Sprint 3 (Week 7 ~ Week 9)**

* As a user, I want to easily plan an itinerary for my trip, so I save the hassle of searching

**Description**

Two methods of trip planning will be implemented. Manual, and AI. The user can use either one to plan for their trip or use the other to modify their trips.

* **Manual**  
  Website will present user with various filtering options, where the filters will be provided to AI to generate fitting destination choices upon confirming their choices.
* **AI**  
  Website will present user with a chat box, where user can interact with the AI (ChatGPT) model. User is able to "ask" the AI for trip suggestions, and AI will populate the itinerary for the user, or modify the itinerary upon further chat continuation.

**Acceptance Criteria**

* **Manual**
  + Users can access a variety of filters, including destination, budget, categories, travel date, and more.
  + Filters are presented in an intuitive interface.
  + AI generates a list of destinations based on selected filters.
  + The recommendations align with at least 85% of user-defined criteria.
  + Each destination provides detailed information, including photos, descriptions, and activity highlights.
  + Users can save their selected destinations to an itinerary for further editing or confirmation.
  + Budget tracker reflects itinerary choice to show current estimated total
* **AI**
  + Users can interact with the AI via a responsive chat box interface.
  + AI understands and responds to natural language queries.
  + AI generates an initial itinerary based on user input.
  + AI can modify the itinerary based on additional user requests.
  + Changes to the itinerary reflect immediately and visibly in the user interface.
  + User satisfaction with AI interactions meets a target usability score of 85% or higher during testing.
  + Budget tracker reflects itinerary choice to show current estimated total

**Testing Criteria**

* **Manual**
  + Validate that each filter correctly modifies the list of suggested destinations.
  + Conduct tests to ensure the AI provides relevant destinations (at least 85%).
  + Perform user tests to confirm filters are intuitive and easy to use.
  + Test saving, editing, and deleting items from the itinerary.
* **AI**
  + Test AI responses with a variety of query formats, ensuring appropriate and context-aware replies.
  + Verify that modifications to the itinerary via chat are accurately reflected in real-time.
  + Simulate high-volume interaction scenarios to ensure stability and response time under load.
  + Conduct user ratings during testing to measure user satisfaction with AI-generated suggestions and interactions.

**Sprint 4 (Week 10 ~ Week 12)**

* As a user, I want to access and engage with a community page in order to explore and interact with travel content

**Description**  
A community page will be developed to allow users to interact with travel plans shared by others. Users will be able to view, like, comment, and filter trips by popularity, location, or date. The system will have full-stack implementation, involving a robust backend for storing data and an intuitive frontend for user engagement. Token-based authentication will restrict access to registered users.

**Acceptance Criteria**

* Users should be able to log in to access the community page.
* A list of trips should be displayed with filters for location, date, and popularity.
* Users can like, comment on, and favorite trips.
* Full trip details (including images, maps, and descriptions) should be provided.
* The backend should include APIs for CRUD operations on trips, comments, and likes.
* Access to the page should be restricted to authenticated users.

**Testing Criteria**

* Test trip display with different sorting and filtering options (e.g., by location, popularity).
* Verify CRUD functionality for trips, likes, and comments.
* Test token-based authentication for both registered and non-registered users.
* Simulate user actions (liking, commenting, filtering) and ensure data consistency.
* Ensure smooth interaction between frontend and backend.

This sprint will focus on building the community page, a feature aimed at enabling user interaction around travel plans. The development will include setting up backend APIs, designing a responsive UI, and ensuring a seamless user experience. Token-based authentication will be implemented to secure access.

# 9 - Client / Faculty Sign-off

**Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

X .

Name of Client/Rep/Professor