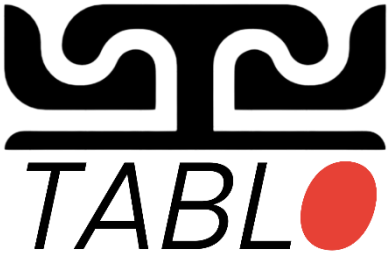
King Saud University
College of Computer and Information Sciences
Information Technology Department

Term-2 1445 H



IT 320 Project Release document

<TABLO>

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Second Term 1445 H

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Chapter 1: Introduction

Today's dining culture emphasizes more than just eating; it's about creating memorable experiences and fostering social connections. Tokyo, a Japanese restaurant, stands as a beacon of elegance and fine dining. Amidst its luxurious atmosphere and delectable offerings, however, Tokyo encounters a common challenge faced by many restaurants: difficulty in efficiently managing table reservations. This challenge hampers the overall dining experience for both customers and restaurant staff alike. The problem we're addressing in this project is the difficulty that Tokyo restaurant faces in efficiently managing table reservations. In Riyadh, securing a table at a restaurant can be quite challenging due to the lengthy reservation process and the need for multiple attempts. This leads to potential diners opting to dine elsewhere if obtaining a reservation proves too difficult. Additionally, Tokyo restaurant struggles with managing bookings without errors or overbooking, which can result in inefficient table turnover and empty tables for extended periods. Solving this problem is essential for enhancing the dining experience and optimizing restaurant operations. By introducing a technological solution in the business domine like a mobile application for Tokyo restaurant, we can revolutionize how reservations are made, saving time for customers, and streamlining operations for restaurant staff.

This document delves into the creation and deployment of the TABLO application, an advanced solution for the restaurant reservations aimed at making dining easier and better. By examining its functionalities, advantages, and real-life applications, whether it's making it faster for customers to book tables or helping the restaurant manage seating arrangements better, the app aims to make dining a more enjoyable experience for everyone involved.

The report sections provide exploration of the domain analysis, requirements engineering, and references crucial to the development of the TABLO application. It begins by elucidating the challenges faced by Tokyo restaurant in efficiently managing table reservations, highlighting the need for a solution to enhance the dining experience and optimize operational efficiency. Through a thorough domain analysis, including terminology, general domain knowledge, and competitor analysis, the groundwork is laid for understanding the context of the TABLO application. Subsequently, the requirement's engineering process is delineated, encompassing the identification of system users, a use case diagram, and formulation of the product backlog containing prioritized user stories with detailed specifications and acceptance criteria. Finally, appendices featuring interviews, questionnaires, enriching the overall development of the TABLO application.

1.1 The Problem

In today's fast-paced world, dining out is a popular choice. However, long wait times at restaurants, especially during busy hours, can lead to frustration and dissatisfaction for customers, the city center, Tokyo is a popular restaurant that is most of the time fully booked, with a long line of eager patrons waiting outside for their turn to be seated. The estimated wait time is 45 minutes to an hour. Despite the restaurant's appeal, potential customers passing by might choose to dine elsewhere due to the long wait. There is a need for a platform that assists individuals in locating and securing reservations for Tokyo restaurant tables.

2.1 The Solution

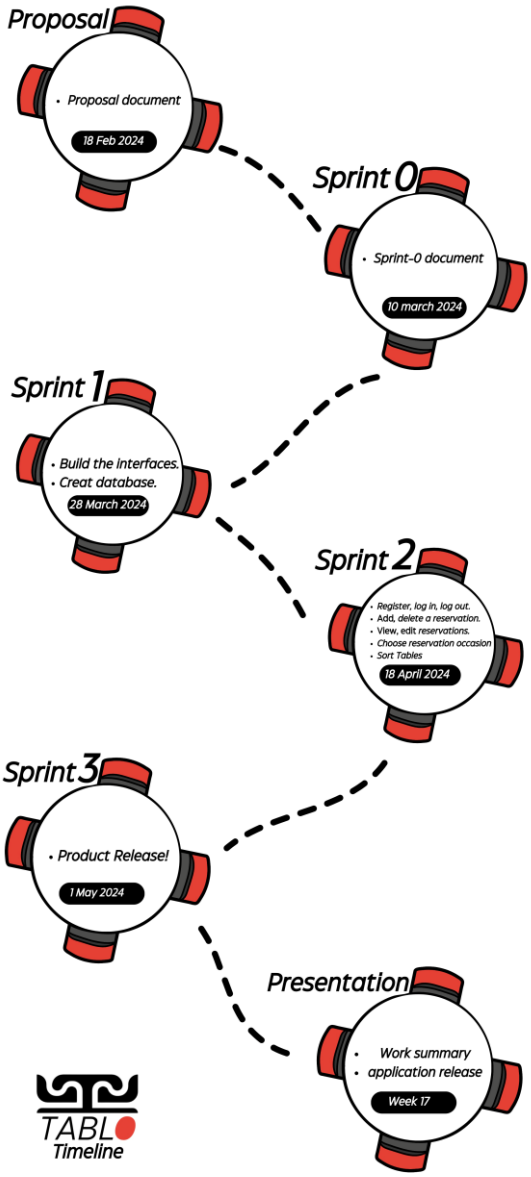
To address the issue of long waiting times at the restaurant, we'll develop a reservation app that allows customers to make table reservations in advance. TABLO benefits the customer by providing a seamless booking experience, reducing wait times, and allowing for better planning. Additionally, customers can customize their occasion, whether it is a birthday party or graduation celebration and so on, in addition, they will enjoy a more efficient dining experience. By streamlining the reservation process, moreover, manage the reservation process easily anytime and anywhere by adding, deleting, and editing options. Also, the app has a full registration function starting with creating an account. Then all the costumer’s reservation will be saved in their accounts as upcoming and previous reservations, reachable anytime. TABLO aims to enhance customer satisfaction and optimize restaurant operations, ultimately improving the overall dining experience for everyone involved.

1.3 The product

1.3.1 Product Vision

For Tokyo restaurant customers Who would need to book a table at Tokyo restaurant, the TABLO application is an Android mobile application that enable the user to book a reservation in Tokyo restaurant unlike MyTable application and other reservation apps. Our product allows users to choose the occasion and view their booking history easily.

1.3.2 Product Roadmap



1.3.3 Objectives

TABLO intends to simplify the table reservation experience for restaurant. In the past, securing a table often involved physically locating the restaurant, visiting in person, or making a phone call to make a reservation. Now, with just a few quick taps within the app, users can easily find and reserve the perfect restaurant table instantly. TABLO serves the customers by providing a user-friendly platform that enhances the overall dining experience. The app incorporates key features to streamline table management and ensure seamless reservation convenience. The App serves the restaurant owner and the customer. Also, it will consist of these main features:

Product (customer focus-value):

- Add/Book a reservation.
- Cancel a reservation.
- View the current and past reservations.
- Sort the tables in the restaurant (indoor/outdoor).
- Choose the occasion of their reservation.
- Create an account to register in the App and log in/out whenever they like.

Project (solution focus-plan):

- Domain Analysis
- Figure out the users' requirements.
- Design the interfaces.
- Develop the software.
- Test the software.

Learning (student focus):

- Use a new IDE [Android Studio, Visual Studio, Flatter].
- Use several tools that are completely new to us [Firebase - Git - GitHub].
- Use the agile methodology to develop our App.
- Learn how to test our App.

1.3.4 Scope

The in scope of the TABLO project is to develop a user-friendly mobile reservation application, specifically designed for the Android platform to ensure compatibility with a wide range of Android devices and support the English language. The app will provide account creation functionality, allowing users to register and log in/out at their convenience. TABLO will streamline the process for users to browse available reservation slots, select preferred timing, and seamlessly book tables within the app. Additionally, users will have the flexibility to specify the occasion for their reservation, such as birthdays, anniversaries, or business meetings, enabling restaurants to tailor the dining experience accordingly. Moreover, the app will incorporate features for users to view their upcoming and previous reservations, providing them with easy access to their booking history. Furthermore, the app will include a feature allowing users to cancel reservations after booking them, thus enhancing user flexibility and overall experience. TABLO app is exclusively available for users in Riyadh, Saudi Arabia.

On the other hand, our Out-of-scope considerations encompass several key areas. Firstly, the project will not involve the development or support of versions for platforms other than Android, such as iOS or web-based platforms. Additionally, while the app will support the English language, any efforts related to additional language such as Arabic. Multi-user functionalities, such as integration with Tokyo staff management systems, are also beyond the scope of this project.

1.4 Scrum Team

Scrum Team	
Product Owner: **(list name of the student designated as a PO for the project)**	Raghad Alharkan
Developers: (list all student names)	Raghad Alharkan Raseel Alrawdhan Majd Aljuraysi Lina Alharbi
Scrum Master (SM): **(list the name of your lab instructor)**	Ghaida Alfayez
Stakeholders: **(list the name of your lab instructor)**	Ghaida Alfayez

Chapter 2: Domain Analysis

Our project domine is the restaurant industry domain, particularly focusing on table reservation domain. We provide a table reservation application for Tokyo restaurant called TABLO aims to streamline the process of booking tables for Tokyo customers, enhancing their dining experience and save their time waiting for a table every time they go to the restaurant. To have better understanding about the domain we collect information from the similar existing software such as Mytable (https://mytable.sa/app-landing-page, n.d.) and Requeue (https://requeue.net/, n.d.).

2.1 Terminology

- **Host:** The person responsible for greeting and seating guests and managing reservations
- **Reservations:** Arrangements made in advance to secure a table at a restaurant for a specific date and time.
- **Location:** the location of the table that the customer wishes to book such as indoor and outdoor.
- **Indoor:** Relating to or situated inside a building or enclosure, typically protected from outdoor elements such as weather or environmental factors.
- **Outdoor:** Relating to or situated outside, in the open air, not enclosed within a building or structure

2.2 General Domain Knowledge

- Most bookings are on the weekend.
- Restaurants have a finite seating capacity based on factors such as table layout, size of the dining area.
- Restaurants often have reservation policies regarding cancellation fees, maximum reservation duration, and late arrivals.
- Reservation Confirmation: It is important to confirm reservations with customers to avoid no-shows and optimize table allocation.
- Accessibility: Ensuring accessibility for customers with special needs, including wheelchair access and accommodations for individuals with disabilities, when assigning tables.

2.3 Customers and Users in the Domain

Our target audience within the restaurant industry, in TABLO we target specifically Tokyo restaurant owners and managers who will purchase and utilize our software to streamline their operations. Additionally, we target individuals who want to make a reservation in Tokyo restaurant and mange there reservations easily to enhancing efficiency and customer service. we also see "Foods Gate" (https://foodsgate.sa/ , n.d.) company as potential users, which they own Tokyo restaurant in Saudi Arabia, they can use it for their other restaurants they own.

2.4 The Environment

TABLO is a mobile application that works on the Android platform, and it will be available for download on the Google play store. To use the application, users need to have an Android device.

2.5 Tasks and Procedures

Customers engage in various tasks and procedures when making table reservations.

- Some opt for the traditional approach, calling the restaurant to provide details such as their name, desired date, time, and the number of people, patiently awaiting confirmation.
- Others prefer the efficiency of online reservation platforms, leveraging the restaurant's website or third-party services to input details and receive instant confirmations, often with the added convenience of choosing preferred seating.
- Walk-in requests, a more spontaneous approach, involve arriving at the restaurant without prior reservations and waiting for an available table.

while special requests and modifications allow customers to personalize their dining experience. Whether canceling, modifying reservations, or inquiring about waiting lists, customers appreciate flexibility in managing their plans. Recognizing and accommodating these diverse customer behaviors and preferences is vital for designing a user-centric restaurant table reservation system.

2.6 Competing Software

Before developing our system, it is essential to conduct a competitive analysis of existing similar systems in the market. This analysis helps us understand the strengths and weaknesses of our competitors and identify key features that differentiate each product. Below is a comparison table outlining the features of several competing applications such as MyTable, Tarabiza and ReQueue, including our own system.

Feature	Mytable	Tarabiza	ReQueue	TABLO
View menu	NO	YES	YES	NO
History	YES	NO	YES	YES
Waiting list	NO	YES	YES	NO
Choose the Occasion	NO	YES	NO	YES

In this comparison table, we have identified three competitors in addition to our own system. Each competitor offers varying features.

2.7 Similarities Across Domains and Organizations

In our domain of restaurant reservation software, certain features may be considered generic, applicable across various industries and organizations. For example, the ability to make reservations, view current availability, that are fundamental to any reservation system, On the other hand, there are aspects that are specific to the restaurant industry and our target customer's organization. For instance, features like add reservation occasion option, sort tables (indoor/outdoor), user-friendly interfaces. These specific features distinguish our product within the market and cater to the specialized requirements of our users. Our domain of restaurant reservation software shares commonalities with other reservation systems across various industries, such as edit, delete, search reservations.

Chapter 3: Requirements Engineering

To fulfill our requirements engineering process, we'll proceed with documenting the requirements, pinpointing system users, crafting a use case diagram, and formulating the product backlog for the primary features. By adhering to these steps, we aim to attain a thorough grasp of the system's functionalities and guarantee the inclusion of all essential features in the eventual product.

To guarantee our software aligns with user needs and capitalizes on market opportunities, we'll undertake extensive research. This entails employing diverse methods like interviews, questionnaires, and user stories to gather insights. Additionally, we'll analyze competitor features, pinpointing strengths, and weaknesses to refine our own offerings and distinguish our software. Through this approach, we aim to tailor our software to our target market effectively, ensuring it fulfills user requirements and surpasses competitors.

During our interviews with potential users, we noticed that all interviewees had a difficulty during peak times (weekends) and couldn't find any tables in Tokyo restaurant, they expressed frustration with time and effort required to come to the restaurant and try to fine an available and suitable table for them. In response to these problems, we came with the idea of TABLO a new software solution that can help Tokyo customers in booking their tables. The interviewees showed us their enthusiasm for our application and gave us their expected features such as history and choose an occasion. Based on the outcomes of our questionnaire, we are committed to crafting a system that aligns with users' needs and preferences. The survey results revealed that an overwhelming majority of respondents, for 92.3% (figure 5), consider TABLO application would be important, and 76.9% (figure 2) believe that a user-friendly reservation app can enhance their dining experience, also we notice that major respondents for 69.2% (figure 4), interested in adding occasion for the reservation feature.

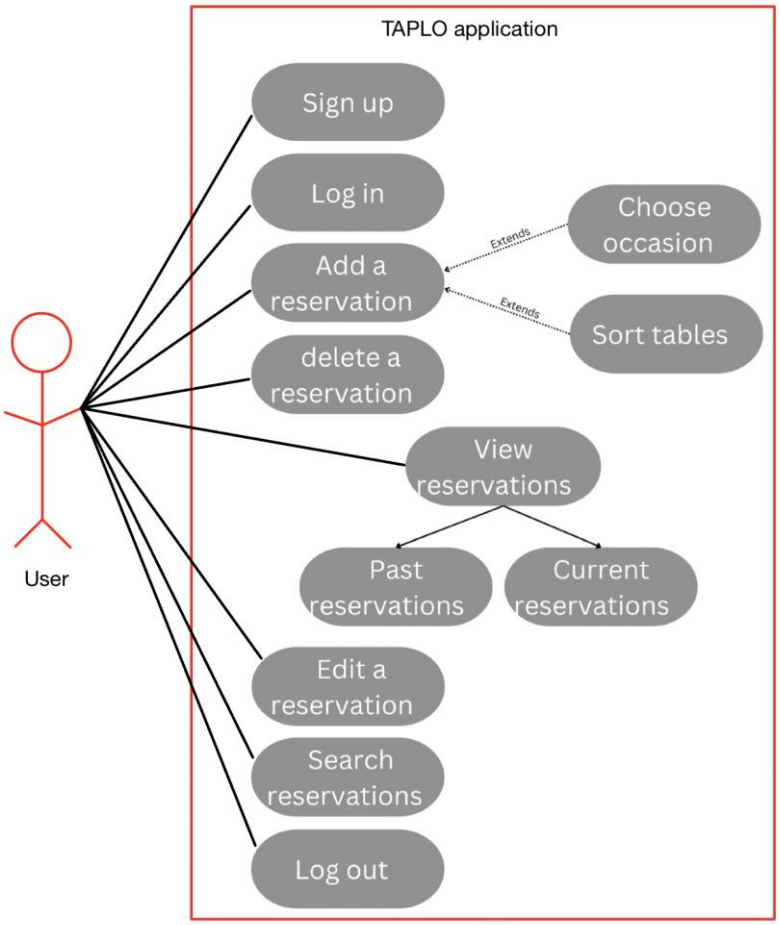
In conclusion, the requirement engineering process stands as a pivotal element in software development, encompassing tasks such as documenting requirements, identifying system users, crafting use case diagrams, and formulating product backlogs. Comprehensive research is imperative to ensure that the software effectively caters to user needs while considering market

dynamics. Through methods like interviews, questionnaires, and user stories, valuable insights are gathered, and competitor features are analyzed to pinpoint areas for enhancement. Our research revealed a demand for a more user-friendly and efficient table reservation solution, which guided the design of our software to deliver a satisfying user experience. Appendix A contains the interview transcript, while Appendix B presents the questionnaire results.

3.1 System Users

Our anticipated users consist of people regardless of gender who come to Tokyo restaurants frequently and face issues in finding a table easily due to the constant crowding in the restaurant. They must be at least 18 years old to make a reservation and they should have completed middle school or higher education and should have a good understanding of using mobile applications.

3.2 Use Case Diagram



3.3 Product Backlog

This section contains our product backlog, delineating the prioritized features of our project in user story format, with detailed specifications, including size estimations and acceptance criteria.

PBI	Size	Type	Acceptance Criteria
As a new user, I want to create an account on the app so that I can make reservations for Tokyo restaurant easily.	2	Feature	If the user fills in their information (name, age, email, password) in the registration page and clicks on the submit button, the system should verify that the user does not already exist in the database. If the user is new, then a confirmation message should appear, then the user should be redirected to the login page. If the user already exists, then a message will be displayed to suggest log in.
As a user, I want to log in to the app so that I can view and manage my reservations.	2	Feature	If the user enters their information (email and password) and clicked on the submit button, then the system should verify that the information already exists in the database before redirecting the user to the home page. If the information does not exist in the database, then an error message will be displayed to indicate that the user hasn’t registered.
As a user, I want to be able to add a new reservation with details such as date, time, and number of guests so that I can plan and organize my visits effectively.	3	Feature	If the user clicked on the "plus" button in the home page, then the user will be directed to a form consisting of (date*, time*, number of guests*, occasion, location) and a "Book" button, if user filled the required info and clicked the button, then the reservation will be added.
As a user, I want the ability to delete a reservation in case my plans change, or I no longer need the booking.	3	Feature	If the user clicks on the delete button next to the current reservation, then a pop-up message should appear to confirm the process. The message should have two options: 'confirm' and 'cancel'. If the user clicks 'confirm', then the reservation will be removed from the database.
As a user, I want to view a list of all my reservations, including current and previous ones, so that I can keep track of my visits.	3	Feature	If a user clicks on "my reservations" tab, then the user will be directed to a page showing user reservations classified into current and previous reservations.
As a user, I want to be able to edit the details of an existing reservation, such as the date, time, or the number of guests, to accommodate changes in my plans.	3	Feature	If a user clicks on "my reservations" tab, then the user will be directed to a page showing user reservations classified into current and previous reservations, if user has a current reservation, then an "edit" button will show next to it, if the user click the button, then the user can change the info and click on "confirm".
As a user, I want the option to specify the occasion for my reservation, such as a birthday, anniversary, or casual dining, to help the restaurant provide a personalized experience.	2	Feature	If the user clicked on the "plus" button in the home page, then the user will be directed to a form consisting of (date*, time*, number of guests*, location and occasion as a drop-down menu) and a "Book" button, if user filled the required info and clicked the button, then the reservation will be added with the selected occasion.

As a user, I want the ability to sort available tables based on criteria such as indoor/outdoor location, so that I can choose the most suitable table for my reservation.	3	Feature	If the user clicked on the "plus" button in the home page, then the user will be directed to a form consisting of (date*, time*, number of guests*, occasion, location) and a "Book" button, if user click on location, then will be redirected to a page showing the tables on the restaurant with a "sort" button including (all, indoor, outdoor) if user filled the required info and clicked the button, then the reservation will be added with the selected location.
As a user I want to have the ability to log out so that I can exit my account whenever I needed	2	Feature	If the user clicked on the logout button on the home page, then a pop-up message would appear to confirm, if the user chooses yes then the user will exit their account. If they choose no, then the user will remain in their account.
As a user I want to have the ability to search between my previous reservations so that I can find them easily.	3	Feature	If a user clicks on "my reservations" tab, then the user will be directed to a page showing user reservations classified into current and previous reservations, if user click on previous reservations, then will find the "search" button.
As a user I want the app to be easy to use and visually appealing, so that I can learn to use it within 7 minutes and not more than 2 errors per hour.	2	Feature	If the 10 selected users learned how to use the system in 7 minutes, then the errors they made in an hour should not exceed 2 for each user.
As a user, I expect the app to respond quickly to my interactions taking less than 50 seconds, so that I can have a smooth and responsive experience.	3	Feature	If the 10 selected users selected add reservation option from the app, then there should be a response within 50 seconds.

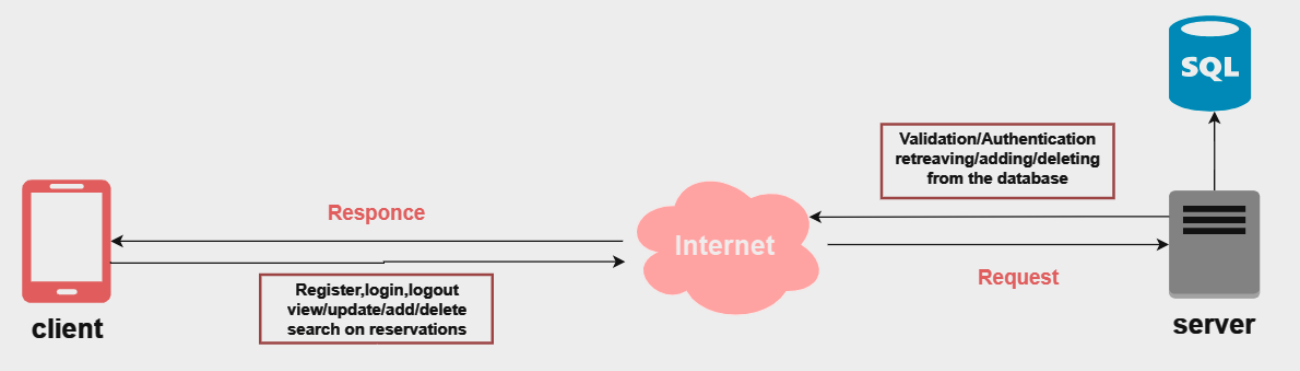
Example Definition of Ready	
☑	Business value is clearly articulated
☑	Details are sufficiently understood
☑	Dependencies are identified; no blocking dependencies exist
☑	Team is appropriately staffed relative to the PBI
☑	Estimated and small enough to be completed during sprint
☑	Acceptance criteria are clear and testable
☑	Performance criteria, if any, are defined and testable
☑	Team understands how to demo the completed PBI

Chapter 4: System Design

4.1 System Architecture

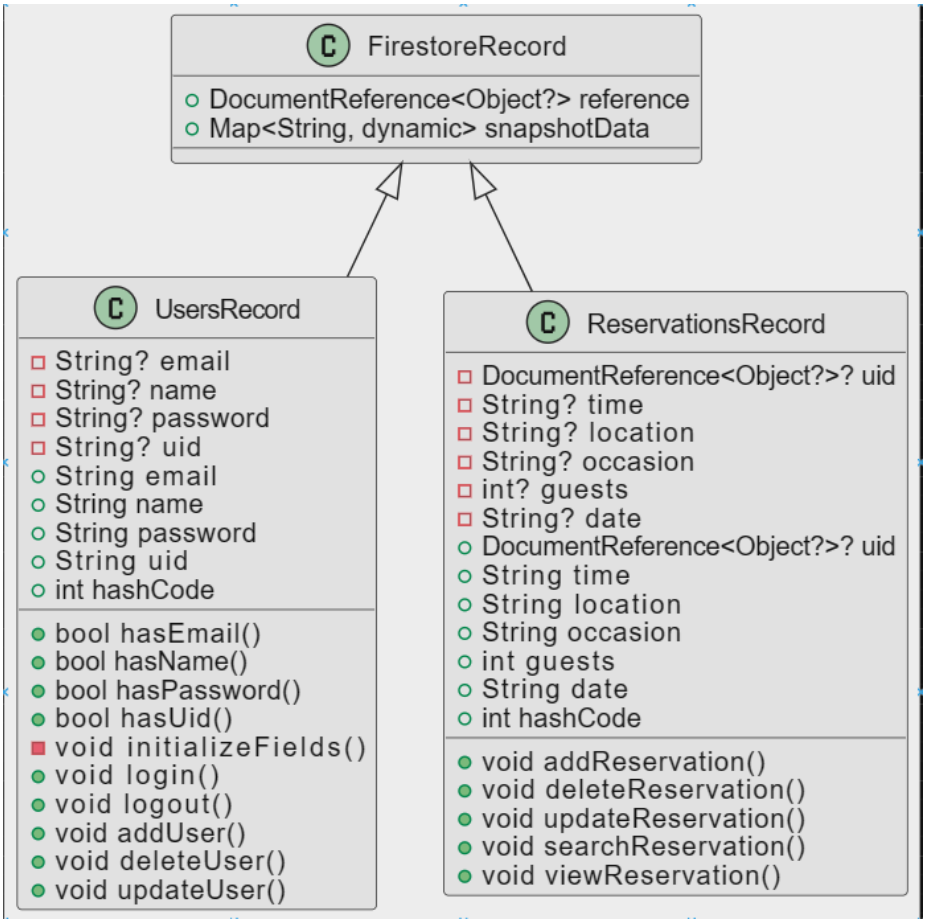
For our system we chose the client-server architecture which is consists of two main parts: the client and the server. The client initiates communication, requesting services or resources from the server, it typically includes user interfaces, input handling, and sometimes basic logic, operating as desktop, web, or mobile applications. The server processes client requests and provides appropriate responses, managing core business logic, databases, and data processing. We believe this architecture is suitable for our application because the client-side components will interact with the server-side components of the system to perform the necessary operations and manage data as required. The client side consist of the interface that will let the user use various of functions such as signup, login, add reservation, search on reservation, delete and edit a reservation. On the other hand, with the server's side there will be a database that store the user's information and reservation details, The server side will handle processing user requests, interacting with the database for data retrieval and updates, and executing the operations required by the application. implemented in Java, will consist of various modules and functions that manage the application's functionality.

We considered other architectural styles but chose not to use them for several reasons. Monolithic architecture, where all components are combined in one large application, often leads to tightly coupled systems that are challenging to scale and maintain, making it unsuitable for our needs. Peer-to-peer architecture, which distributes control among multiple nodes, doesn't fit our requirements due to its lack of centralized management for data and business logic. A distinct advantage of the client-server architecture is its simplicity in managing the clear separation between the client-side and server-side components. This separation allows independent development and scalability of both parts. For instance, the server can be scaled up to handle more requests without requiring any changes to the client side. This flexibility, combined with efficient data management, is crucial for our application to function efficiently and effectively.



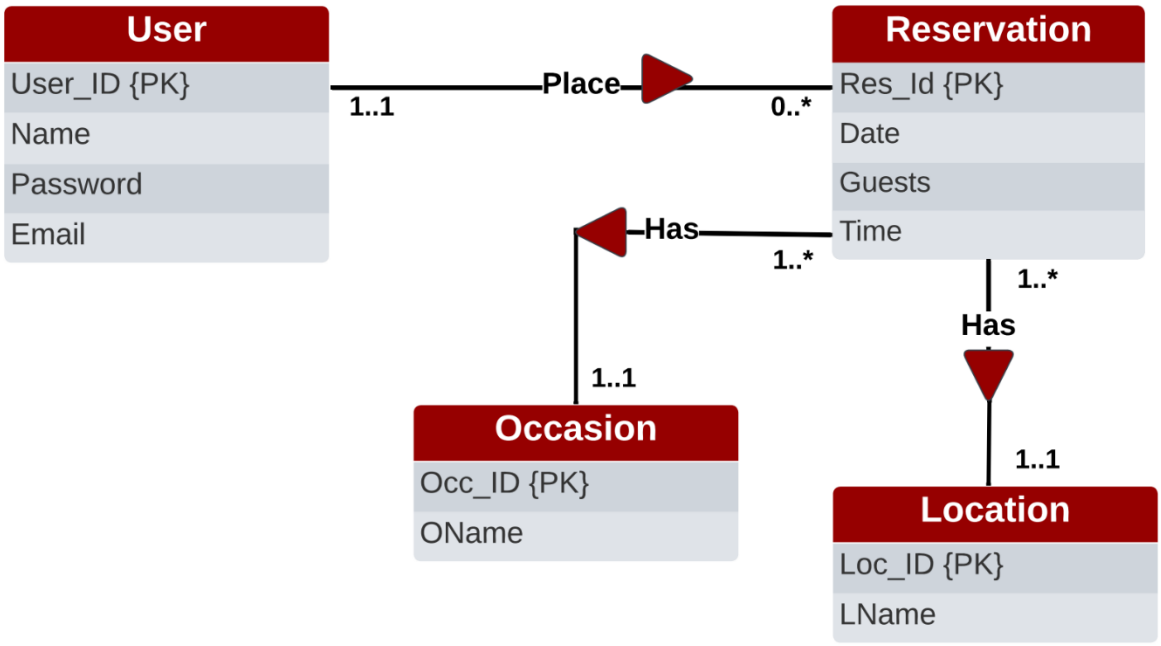
4.2 Class Diagram

Show the system classes, their interrelationships, and the methods and attributes of each class. The class diagram needs to precisely capture the structure of the code developed during implementation.



4.3 Data Design

- **EER diagram**



- **Schema**

User (User_Id, Name, Password, Email)
Primary key: User_Id

Reservation (Res_Id, Date, Guests, Time, User_Id, Loc_Id, Occ_Id)
Primary key: Res_Id
Foreign key: User_Id References Users (User_Id), Loc_Id References Location (Loc_Id), Occ_Id References Occasion (Occ_Id)

Location (Loc_Id, LName)
Primary key: Loc_id

Occasion (Occ_Id, OName)
Primary key: Occ_id

- **Data Dictionary**

- **Data Dictionary showing description of all entities:**

Entity Name	Description	Occurrence
Customer	the user who books the reservation	None or many reservations placed by one user.
Reservation	The request that the user askes	Each reservation has one Location. Each reservation has one Occasion.
Location	The Location of the table	One or Many reservation has one location.
Occasion	The Occasion of the reservation	One or Many reservation has one occasion.

- **Data Dictionary showing description of all relationships:**

Entity Name	Multiplicity	Relationship	Entity Name	Multiplicity
User	1..1	Place	Reservation	0..*
Reservation	1..* 1..*	Has Has	Location Occasion	1..1 1..1

- **Data Dictionary showing description of all attributes:**

Entity Name	Attribute	Description	Data Type	Length	Nulls	Multi-Value	Default-Value	Range	PK
User	User_Id	Unique id of the user	TEXT		NO	NO		NO	YES
	Name	User's name	TEXT	255	NO	NO		NO	
	Password	User's password	TEXT	255	NO	NO		NO	
	Email	User's email	TEXT	255	NO	NO		NO	
Reservation	Res_Id	Unique id of the reservation	TEXT		NO	NO		NO	YES
	Date	The date of the reservation	DATE		NO	NO		NO	
	Time	The time of the reservation	TIME		NO	NO		NO	
	Guests	Then number of guests in the table	INTE GER		NO	NO		NO	
Location	Loc_Id	Unique id of the location	TEXT	1	NO	NO		1-2	YES
	LName	The name of the Table Location	TEXT	7	NO	NO		-Indoor -Outdoor	
Occasion	Occ_Id	Unique id of the occasion	TEXT	1	NO	NO		1-4	YES
	OName	The name of the occasion	TEXT	15	NO	NO		Birthday Anniversaries Business meeting Graduation	

4.4 Component Design

Sprint number	PBI (user story)	User story tasks with effort estimates in hours				Sum of effort
1	As a user, I want to be able to add a new reservation with details such as date, time, and number of guests so that I can plan and organize my visits effectively.	Create Reservation table in the database to hold reservation information	Design "Reserve a Table" interface, navigation bar	Create form for user to input the reservation details and "Book" button	Validate user inputs, if its valid then a confirm message display and add it to Reservation table in the database	9
		1 hour	2 hours	3 hours	3 hours	
1	As a user, I want to be able to edit the details of an existing reservation, such as the date, time, or the number of guests, to accommodate changes in my plans.	Create "Edit" button and form filled with the selected reservation info and "update" button	Update new info in the reservation table in the database then display confirm message			6
		3 hours	3 hours			
1	As a user, I want the ability to delete a reservation in case my plans change, or I no longer need the booking.	Create "Delete" button and display a confirm message	Delete the selected reservation from the database and display a confirm message			5
		2 hour	3 hours			

-Add a reservation

Classification:

Function

Definition:

The user should be able to add a new reservation by providing its information.

Construction:

Inputs: Date, Time, Number of guests, Occasion, Location

Precondition: User must be signed in.

Postcondition: The reservation is added in the database and displayed in "homepage" under "current".

Pseudocode:

IF the user clicks the "Plus" button in the homepage:

DISPLAY "Reserve a Table" page

Read the Date, Time, Number of guests, Occasion, Location

WHILE any field is empty:
DISPLAY a message to the user asking to fill the field.
Read the field.
END WHILE
Add the reservation information to the database.
DISPLAY a message to confirm the addition.
DISPLAY the reservation in " Homepage " under "Current".
END IF

-Edit a reservation

Classification:
Function
Definition:
The user should be able to edit their reservation.
Construction:
Precondition: The user must be signed in and a reservation must already been added.
Postcondition: The reservation is updated in the database and display the updated information in the "homepage" under "current"
Pseudocode:
IF the user clicks the "Edit" button:
DISPLAY a form filled with the selected reservation information.
IF the user filled the form with new information AND click "update" button:
Update the reservation in the database
Display the reservation in the "homepage" under "current"
ELSE
Do nothing.
END IF
END IF

-Delete a reservation

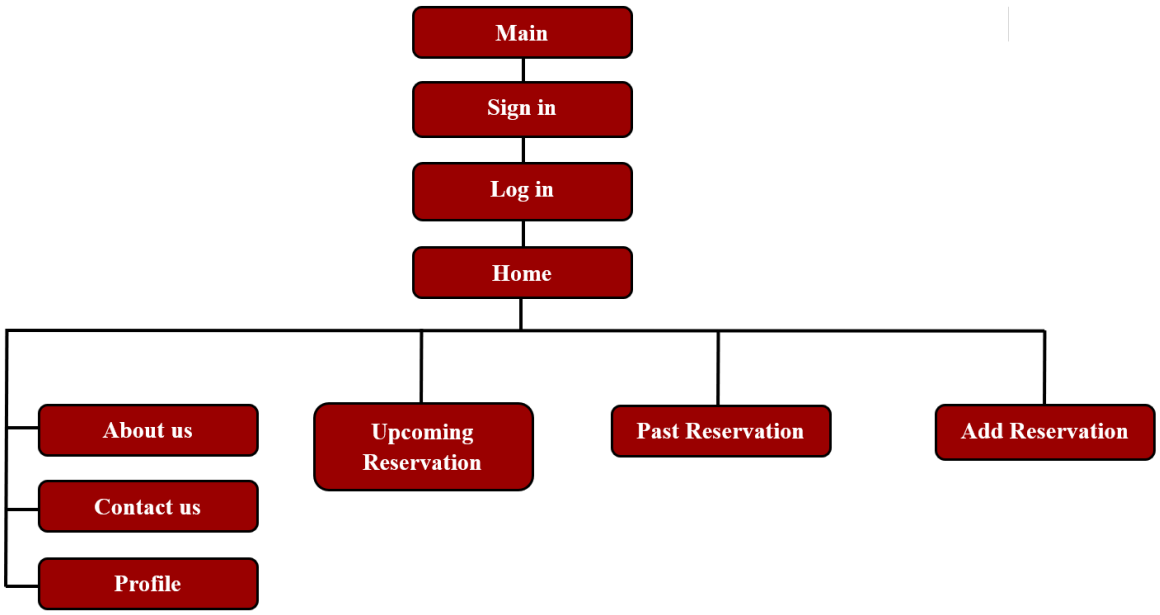
Classification:
Function
Definition:
The user should be able to delete their reservation.
Construction:
Precondition: The user must be signed in and a reservation must already been added.
Postcondition: The reservation is deleted from the database and removed from "homepage".
Pseudocode:

IF the user clicks the "Delete" button:
DISPLAY a message to the user asking him to confirm the deletion.
IF the user confirms the deletion:
Delete the reservation from the database.
Delete the reservation from the “homepage".
DISPLAY a confirmation message
ELSE
Do nothing.
END IF
END IF

4.5 Interface Design

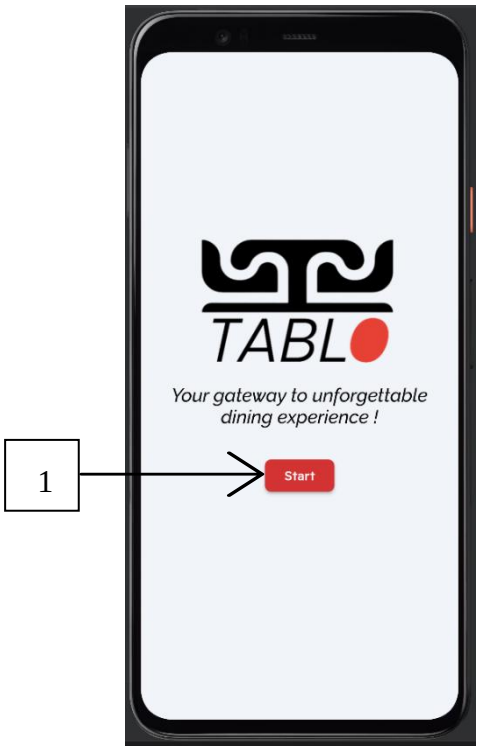
- UX Guidelines implemented for each interface:
  1. Prevent Errors.
  2. Ensure Consistency and Standards.
  3. Provide Flexibility and Efficiency in Usage.
  4. Offer Constructive Feedback.

- Diagram:



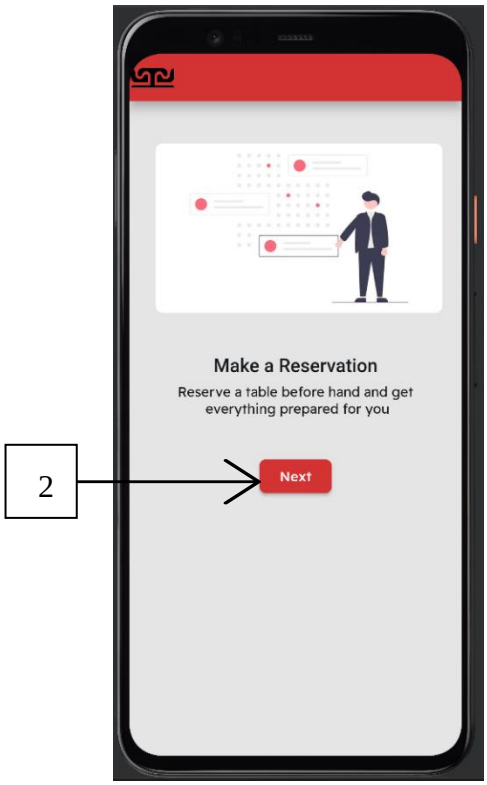
- User interfaces:

1. Main page



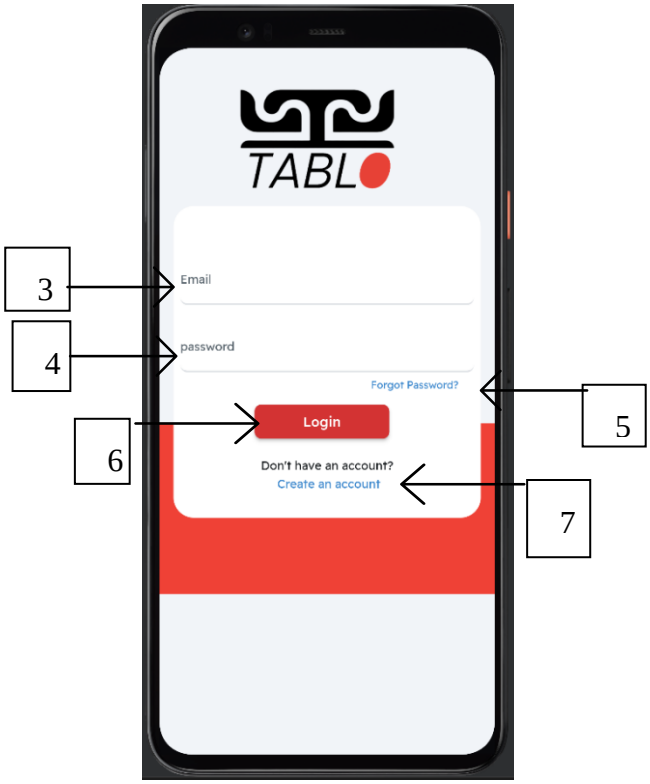
#	Description
1	Start button for unsigned users

2. Descriptive page (if user click on #1).



#	Description
2	Next button to direct to sign in page

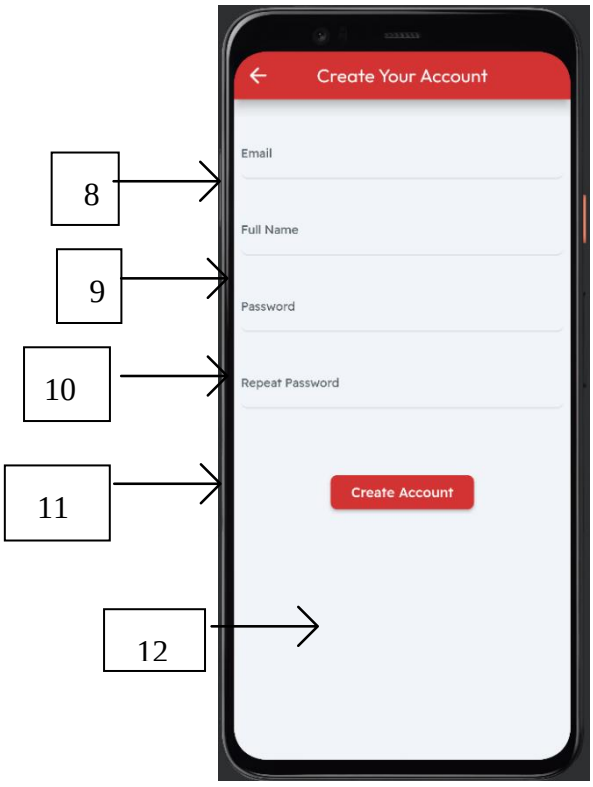
3. Log in page (if user click on #2).

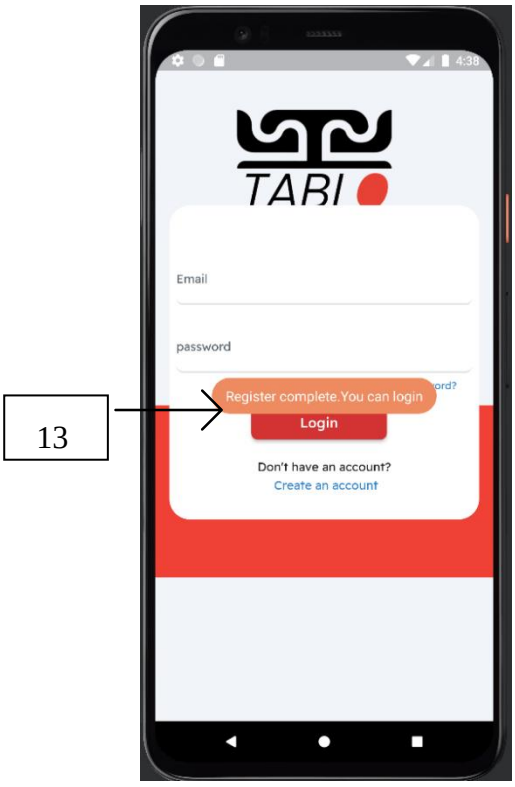


#	Description
3	User's email input filed
4	User's password input filed
5	Forget password link to (forget password page)
6	Login button transfer user to the homepage
7	Create account link transfer user to sign up page

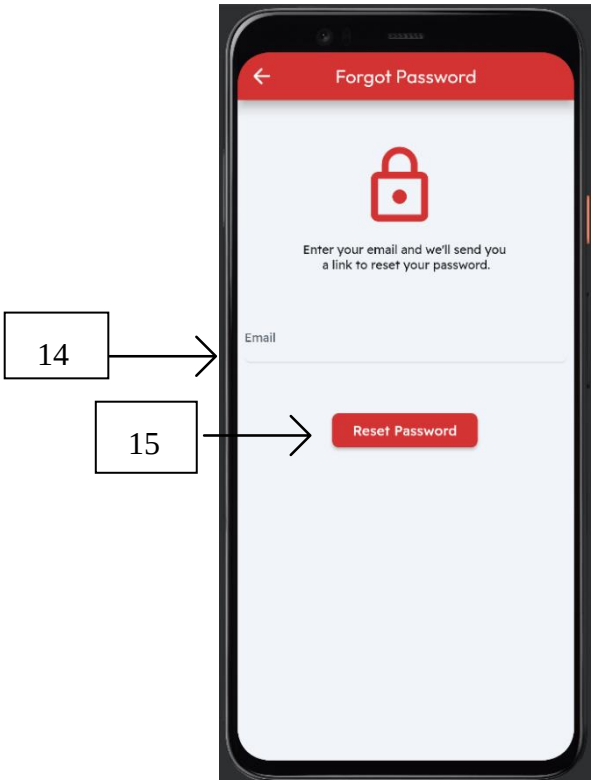
#	Description
8	User's email input filed
9	User's full name input filed
10	User's password input filed
11	Repeat password for confirmation
12	Create account button transfer user to login page
13	Confirmation message

4. Sign in page (if user click on #7).



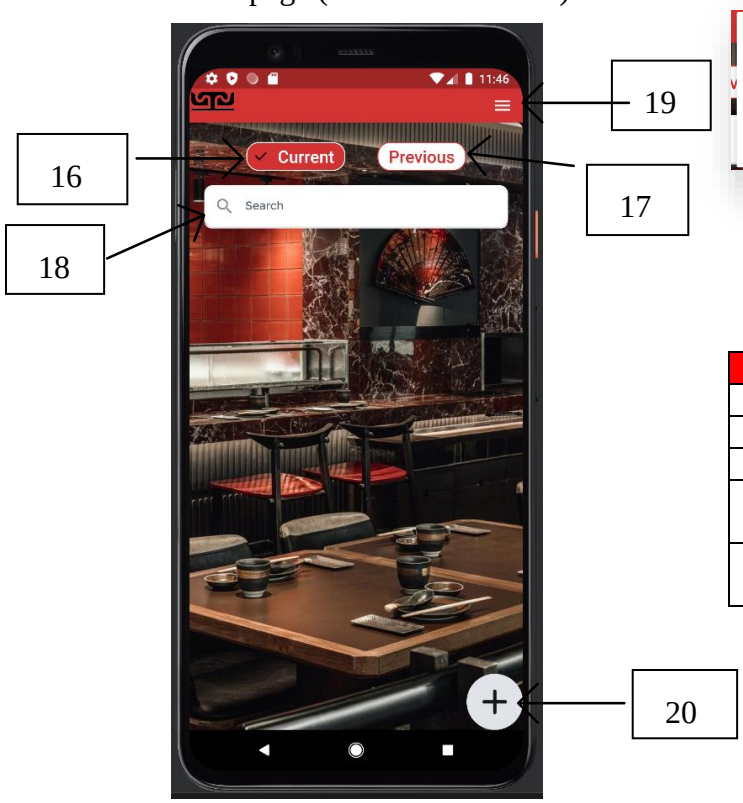


5. Forget password page (if user click on #5).



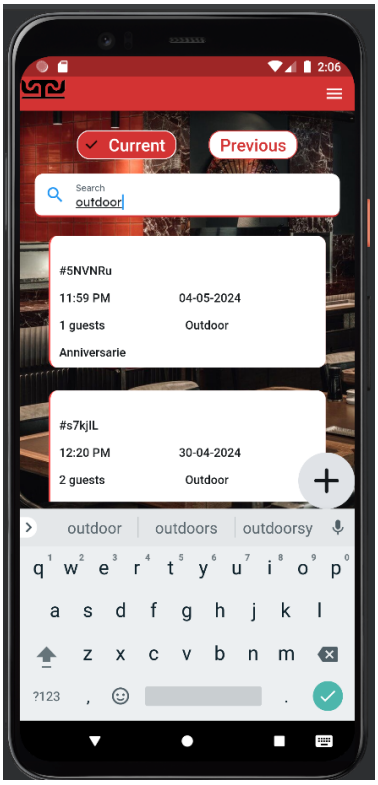
#	Description
14	User's email input filed
15	Reset password button

6. Home page (if user click on #6).

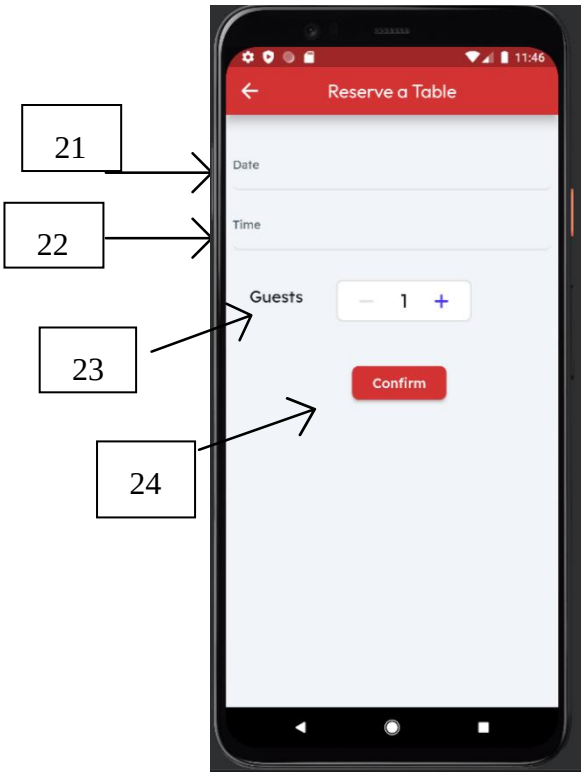


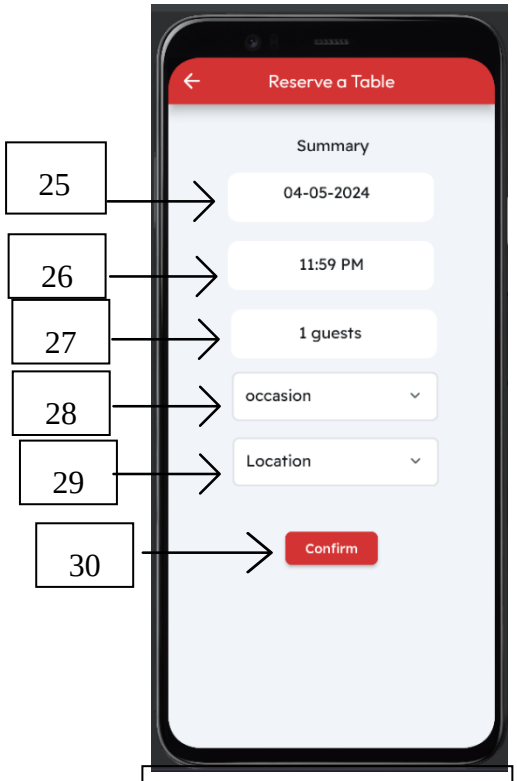
#	Description
16	"Current" button to view current reservations
17	"Previous" button to view previous reservations
18	Search bar to search on reservations
19	Drop down menu contains(profile, about us, contact us)
20	"Plus" button to transfare user to "Reserve a Table" page

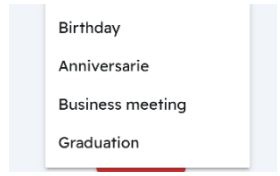
- Search function.



7. Reserve a Table page (if user click on #20).



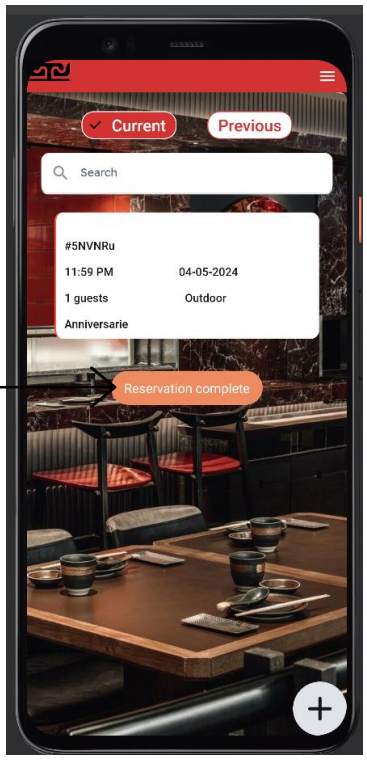




(If user click on #28)

(If user click on #29)

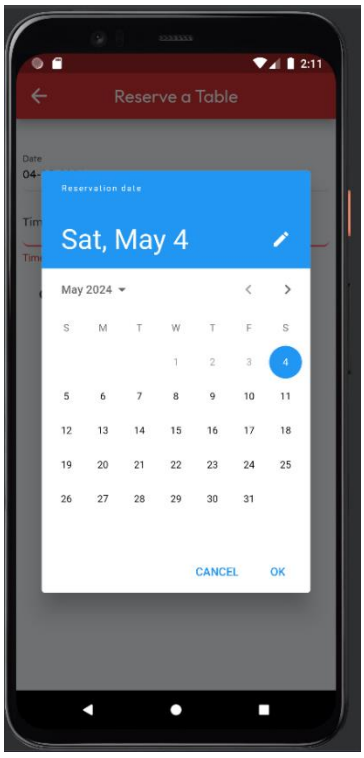
(If user click on #24)



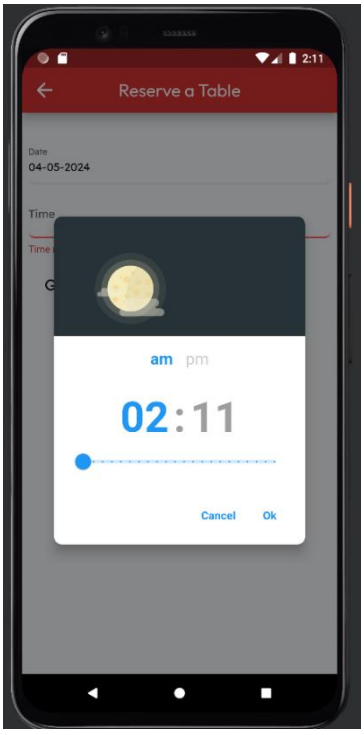
31

(If user click on #30)

#	Description
21	User's input for the date of the reservation
22	User's input for the time of the reservation
23	User's input for the number of guests
24	"Confirm" button transfer to summary page
25	User's selected date
26	User's selected time
27	User's selected number of guests
28	Drop down list to select an occasion
29	Drop down list to select the location of the table
30	"Confirm" button that will transfer to home page
31	Confirmation message

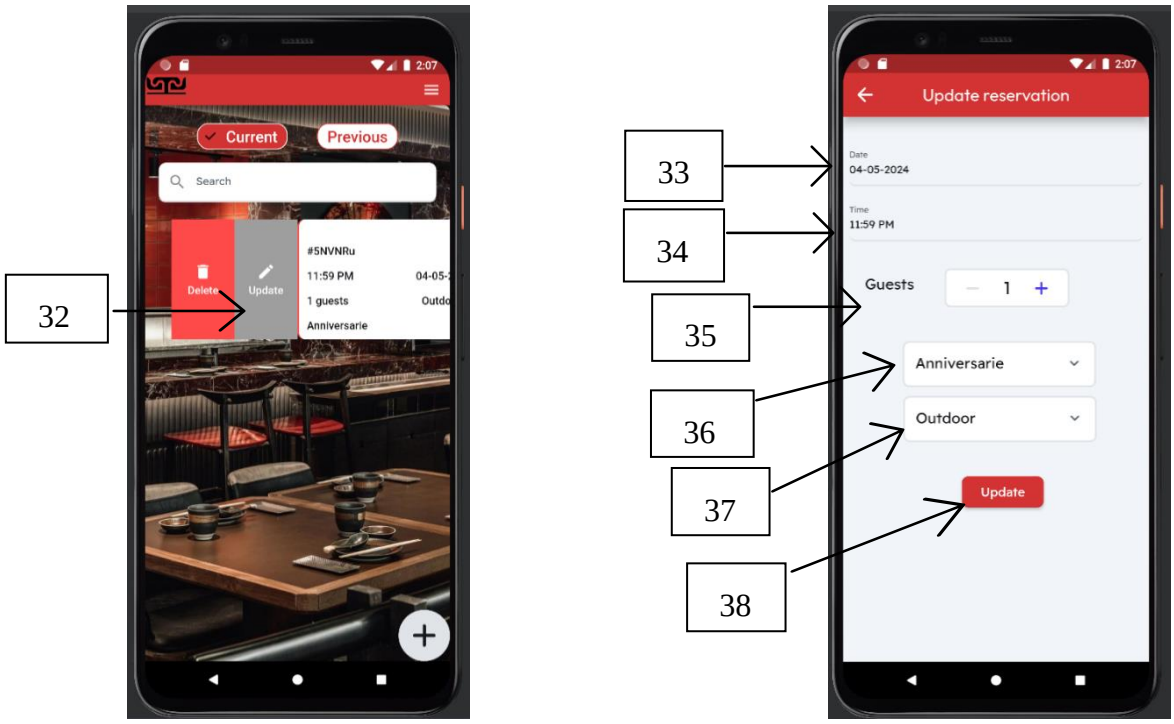


(If user click on #21 or #33)

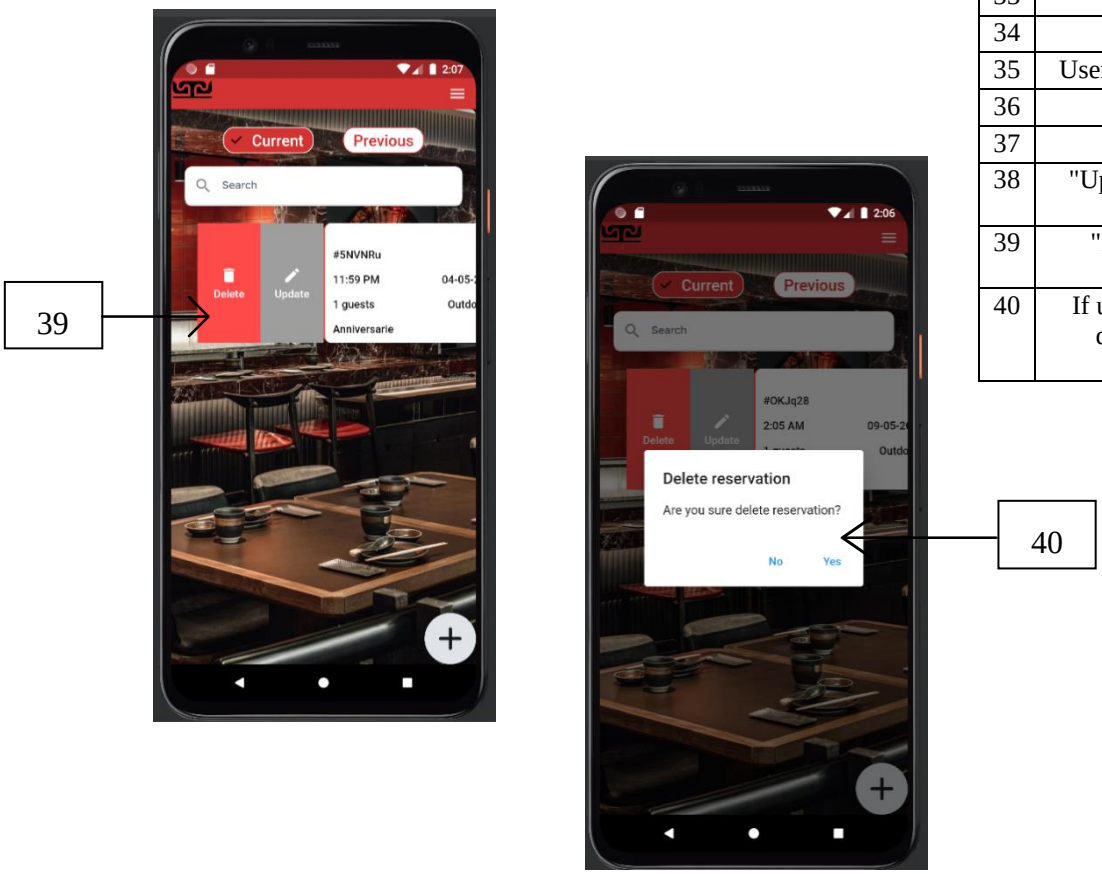


(If user click on #22 or #34)

8. Edit Function



9. Delete function.



#	Description
32	"Update" button that transfer to update reservation page for the selected reservation
33	User's selected date
34	User's selected time
35	User's selected number of guests
36	User's selected occasion
37	User's selected location
38	"Update" button for the user to click after change
39	"Delete" button next to the selected reservation
40	If user click on #39 a message display to ask the user for confirmation

Chapter 5 : Implementation

Our implementation of Tablo involved addressing several major and challenging aspects of the code. Here's a breakdown of the key implementation steps, components, challenges, and integrations:

1- **Requirement gathering:** The first stage involved communicating to stakeholders and conducting interviews to understand their requirements. This made it easier to determine the essential characteristics and functionality that the TABLO restaurant reservation software needed.

2- **Designing the User Interface:** Next, we focused on designing the user interface for Tablo. We created prototypes to visualize the app's layout and features, ensuring a seamless and intuitive user experience.

3- **Development:** Tablo's front-end and back-end components were built during this phase:
   - **Developing the Front-end:** Using Flutter Flow’s widget-based framework, we developed the front-end of the application, designing interactive screens and components for users to engage with.
   - **Developing the Back end:** With Flutter in Android Studio, we implemented the back-end logic using Dart, including server-side operations, data management, and authentication mechanisms. Using the database from firebase.

4- **Integration Testing:** To make sure that every component of the software functions as it should, testing for integration was carried out after development. To find and correct any defects or issues This involved user acceptance testing, user story acceptance testing, user interface interactions, and database operations.

Implementation Elements/Components

1- **Frontend:** The frontend component is built by using drag-drop in Flutter Flow which is responsible for presenting the user interface to the user and handling user interaction that define the layout, design, and functionality of the application's user interface.
2- **Backend:** This component is develop using Dart and Java includes the server-side logic of the application, handling requests from the frontend, processing data, interacting with the database, and implementation of all features and the validation codes.
3- **Database:** The rational database manages and stores the application's data, including customer information, reservation details, and other data.

Implementation Challenges:

1- **Error Handling and Logging:** Implementing robust error handling mechanisms to gracefully handle unexpected errors or edge cases and logging relevant information for troubleshooting and debugging purposes.

2- **Securing user data:** Our system collects and stores sensitive user information, in the Firebase database. Implementing robust security measures, such as encryption and access control, to protect this data from unauthorized access or breaches is a critical challenge.

In conclusion, the development of "Tablo" for handling reservations at Tokyo restaurant involved numerous crucial stages and obstacles that required attention. Through meticulous planning and execution during the development phase, we successfully crafted a top-notch reservation application that caters to user needs and provides a seamless experience. We expect continuous maintenance and updates to be necessary to uphold the app's security, performance, and adherence to legal and regulatory standards.

Link to GitHub: https://github.com/Linaeid/Tablo.git

Link to Jira: https://raghad-khaled.atlassian.net/jira/software/projects/SWE/boards/1/backlog?atlOrigin=eyJpIjoiM2VjNDRlYTM5ZGI4NDNiZTg5Zjk4ODcwODAxZjMzMmUiLCJwIjoiaiJ9

Chapter 6: Testing

6.1 User Story Acceptance Testing

In TABLO's software development process, the User Story Acceptance Testing holds a pivotal role, ensuring the app's quality aligns with user needs. Through testing from the user's perspective, we pinpoint any issues or bugs that could impact the user experience and promptly address them.

All outlined acceptance criteria in our user stories, including sign-up, log-in, reservation management (adding and deleting), etc., were thoroughly tested. Additionally, non-functional requirements such as app usability and speed were carefully evaluated.

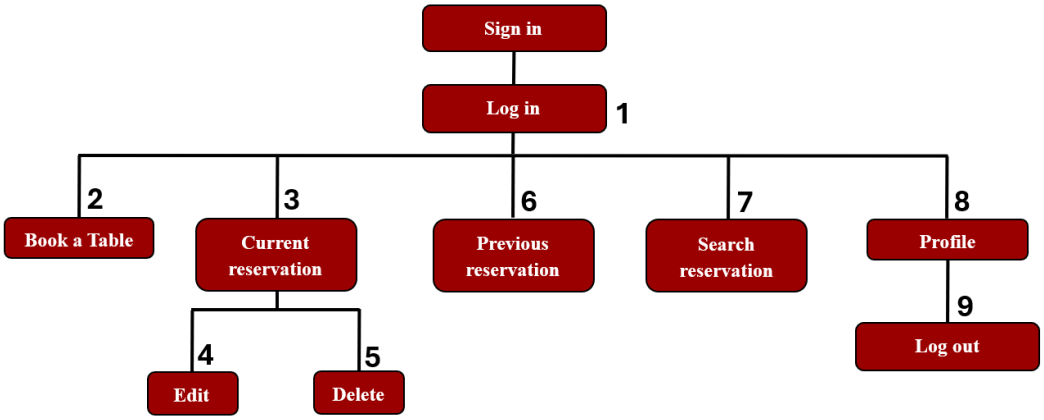
Our method involved meticulously preparing use cases for testing and executing them with real users from our target user group. Testing sessions were conducted in a tranquil environment to foster focus among participants. Throughout the process, we closely observed users to verify that all acceptance criteria were met.

Sprint #	User story	Acceptance criteria	Test action(s)	Pass?	Comment
2	As a new user, I want to create an account on the app so that I can make reservations for Tokyo restaurant easily.	If the user fills in their information (name, age, email, password) in the registration page and clicks on the submit button, the system should verify that the user does not already exist in the database. If the user is new, then a confirmation message should appear, then the user should be redirected to the login page. If the user already exists, then a message will be displayed to suggest log in.	1-Open “sign-up” page 2-Fill out the registration form with the required information including “Email, Full name, password “ 3-Click on “Create Account” button	Yes	
2	As a user, I want to log in to the app so that I can view and manage my reservations.	If the user enters their information (email and password) and clicked on the submit button, then the system should verify that the information already exists in the database before redirecting the user to the home page. If the information does not exist in the database, then an error message will be displayed to indicate that the user hasn’t registered	1- Open “log-in page “ 2-Fill the registration form with the required information including “Email, password” 3-Press the “log-in” button	Yes	

2	As a user, I want to be able to add a new reservation with details such as date, time, and number of guests so that I can plan and organize my visits effectively	If the user clicked on the "plus" button in the home page, then the user will be directed to a form consisting of (date*, time*, number of guests*, occasion, location) and a "Book" button, if user filled the required info and clicked the button, then the reservation will be added	1-Open “current page” and click on “+” 2-Fill out the Reserve Table including “Date, Time, number of guests 3-Click on “conform” button. 4-Open the Summary reserve a table. 5-Fill out the table including occasion and location 6-Click on “confirm” button	Yes	
2	As a user, I want the ability to delete a reservation in case my plans change, or I no longer need the booking.	If the user clicks on the delete button next to the current reservation, then a pop-up message should appear to confirm the process. The message should have two options: 'confirm' and 'cancel'. If the user clicks 'confirm', then the reservation will be removed from the database.	1-Open the “current page.” 2-Click on “current” 3-Click on the trash icon 4-Verify that a pop-up message appears on the screen that has two options: ‘confirm’ and ‘cancel’. 5-Click the 'cancel' option in the pop-up message. 6-Verify that the pop-up message disappears, and the reservation remains in the application and the database 7-Click the trash button. 8-Click the 'confirm' option in the pop-up message. 9-Verify that the pop-up message disappears, and the reservation is removed from the database and current page.	Yes	
2	As a user, I want to view a list of all my reservations, including current and previous ones, so that I can keep track of my visits.	If a user clicks on "my reservations" tab, then the user will be directed to a page showing user reservations classified into current and previous reservations.	1-Open “current page” 2-Click on current tab to view the current reservation 3-Click on previous tab to view the previous reservation	Yes	
2	As a user, I want to be able to edit the details of an existing reservation, such as the date, time, or the number of guests, to accommodate changes in my plans.	If a user clicks on "my reservations" tab, then the user will be directed to a page showing user reservations classified into current and previous reservations, if user has a current reservation, then an "edit" button will show next to it, if the user click the button, then the user can change the info and click on "confirm".	1-Open the current page 2-Click on the current tab 3-Click the edit “pencil” button 4-Fill out the form including “Date , Time , number of guests occasion and location 5-Click on “confirm” button	Yes	

2	As a user, I want the option to specify the occasion for my reservation, such as a birthday, anniversary, or casual dining, to help the restaurant provide a personalized experience.	If the user clicked on the "plus" button in the home page, then the user will be directed to a form consisting of (date*, time*, number of guests*, location and occasion as a drop-down menu) and a "Book" button, if user filled the required info and clicked the button, then the reservation will be added with the selected occasion.	1-Open “current page” and click on “+” 2-Fill out the Reserve Table including “Date , Time , number of guests 3-Click on “conform” button 4-Open the Summary reserve a table 5-Fill out the table including occasion and location 6-Click on “confirm” button	Yes	
2	As a user I want to have the ability to search between my previous reservations so that I can find them easily	If a user clicks on "my reservations" tab, then the user will be directed to a page showing user reservations classified into current and previous reservations, if user click on previous reservations, then will find the "search" button.	1-Open current page 2-Click on the previous tab to view your previous reservation 3-Click on the search tab 4-Write your search	Yes	
2	As a user I want the app to be easy to use and visually appealing, so that I can learn to use it within 7 minutes and not more than 2 errors per hour.	If the 10 selected users learned how to use the system in 7 minutes, then the errors they made in an hour should not exceed 2 for each user	1-Pick out 10 individuals who are new to the system. 2-Initiate a 10-minute timer and grant the users the freedom to navigate and utilize the system during this period. 3-Once the 10 minutes have elapsed, request the users to carry out a series of tasks using the system. 4-Monitor the users as they undertake the tasks, making note of any mistakes they encounter.	Yes	
2	As a user, I expect the app to respond quickly to my interactions taking less than 50 seconds, so that I can have a smooth and responsive experience.	If the 10 selected users selected add reservation option from the app, then there should be a response within 50 seconds.	1-Choose 10 users. 2-Instruct them to simultaneously access the "View Details" page. 3-Time how long it takes for the page to load for each user. Ensure that all users receive a response within 40 seconds.	Yes	

6.2 Integration Testing



System components	New component	Test case	Pass?	Comments
- Sign up in the system	Logging in the system	1-A user was signed up into the system successfully. 2-The signed-up user signed in the system.	Yes	
- Sign up in the system - Logging in in the system	Reserve a Table	1-A user was signed up into the system successfully. 2-The signed-up user signed the in the system. 3- The logged in user reserve a new table to the application	Yes	
- Sign up in the system - Logging in in the system - Reserve Table	Current reservation	1-A user was signed up into the system successfully. 2-The signed-up user signed the in the system. 3-The logged in user reserve a new table to the application 4- The logged in user view the current reservation that a Previously reserved.	Yes	
- Sign up in the system - Logging in in the system - Reserve a Table - Current reservation	Edit reservation	1-A user was signed up into the system successfully. 2-The signed-up user signed the in the system. 3-The logged in user reserve a new table to the application 4-The logged in user view the current reservation that a Previously reserved. 5- The logged in user edited a Previously reserved table from application	Yes	

- Sign up in the system - Logging in in the system - Reserve a Table - Current reservation -Edit reservation	Delete reservation	1-A user was signed up into the system successfully. 2-The signed-up user signed the in the system. 3-The logged in user reserve a new table to the application 4-The logged in user view the current reservation that a Previously reserved. 5-The logged in user edited a Previously reserved table from application 6- The logged in user deleted a Previously reserved table from application.	Yes	
- Sign up in the system - Logging in in the system - Reserve a Table - Current reservation -Edit reservation -Delete reservation	Previous reservation	1-A user was signed up into the system successfully. 2-The signed-up user signed the in the system. 3-The logged in user reserve a new table to the application 4-The logged in user view the current reservation that a Previously reserved. 5-The logged in user edited a Previously reserved table from application 6-The logged in user deleted a Previously reserved table from application. 7- The logged in user check the past reservation that is in the application.	Yes	
- Sign up in the system - Logging in in the system - Reserve a Table - Current reservation -Edit reservation -Delete reservation -Previous reservation	Search on reservation	1-A user was signed up into the system successfully. 2-The signed-up user signed the in the system. 3-The logged in user reserve a new table to the application 4-The logged in user view the current reservation that a Previously reserved. 5-The logged in user edited a Previously reserved table from application 6-The logged in user deleted a Previously reserved table from application. 7-The logged in user check the past reservation that is in the application. 8-The logged in user after making several reservations, will searches a table by date\location\occasion in the application.	Yes	

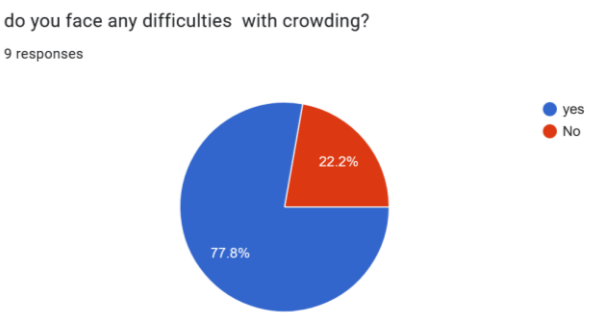
- Sign up in the system - Logging in in the system - Reserve a Table - Current reservation -Edit reservation -Delete reservation -Previous reservation -Search on reservation	view profile	1-A user was signed up into the system successfully. 2-The signed-up user signed the in the system. 3-The logged in user reserve a new table to the application 4-The logged in user view the current reservation that a Previously reserved. 5-The logged in user edited a Previously reserved table from application 6-The logged in user deleted a Previously reserved table from application. 7-The logged in user check the past reservation that is in the application. 8-The logged in user after making several reservations, will searches a table by date\location\occasion in the application. 9- The logged in user can view their information accurately.	Yes	
- Sign up in the system - Logging in in the system - Reserve a Table - Current reservation -Edit reservation -Delete reservation -Previous reservation -Search on reservation -view profile	Log out of system	1-A user was signed up into the system successfully. 2-The signed-up user signed the in the system. 3-The logged in user reserve a new table to the application 4-The logged in user view the current reservation that a Previously reserved. 5-The logged in user edited a Previously reserved table from application 6-The logged in user deleted a Previously reserved table from application. 7-The logged in user check the past reservation that is in the application. 8-The logged in user after making several reservations, will searches a table by date\location\occasion in the application. 9-The logged in user can view their information accurately. 10- The logged in user logs out of the system.	Yes	

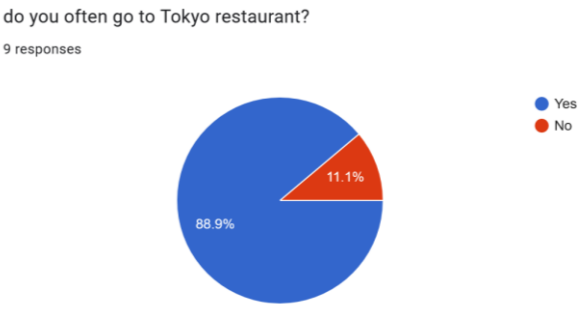
6.3 User Acceptance Testing

To test the app, we asked 9 people who knew a bit about using phone apps and fit our target audience to try it out. We gave them a scenario covering everything the app does, like signing up, logging in, and managing reservations. Before starting, they got 5 minutes to explore the app. Then, they followed the scenario and told us what they thought about the app and if they found any problems. We looked at their feedback to see if there were any issues with how easy the app was to use and to help us make it better in the future.

6.3.1 Demographics of participants

- Do you face any difficulties with crowding?
- Do you often go to Tokyo restaurant?



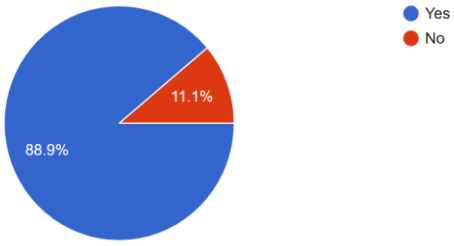


6.3.1 Questionnaire

- The sign-up and sign-in process was straightforward?
- Navigating through the app's sections was simple.
- I plan to utilize the app again in the future.
- The app's performance was smooth and responsive throughout my interaction.
- The app's features were well-organized, making it simple to locate desired functionalities.?

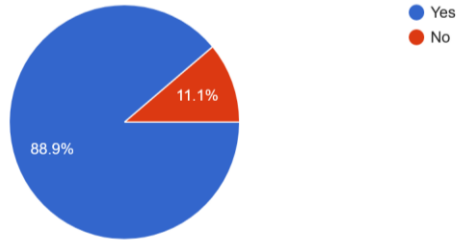
The sign-up and sign-in process was straightforward?

9 responses



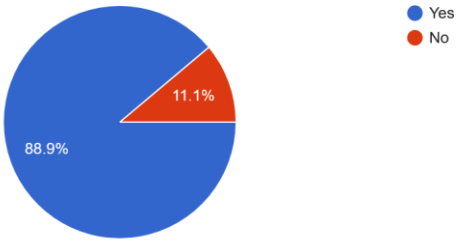
Navigating through the app's sections was simple ?

9 responses



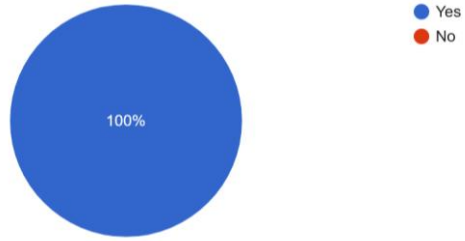
I plan to utilize the app again in the future ?

9 responses



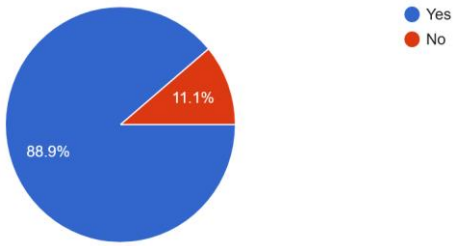
The app's performance was smooth and responsive throughout my interaction?

9 responses



The app's features were well-organized, making it simple to locate desired functionalities.?

9 responses



Chapter 7: Conclusion and Future Work

7.1 Conclusion

Developing TABLO using agile methodology presented both challenges and rewards. Our journey involved thorough research, meticulous planning, and iterative implementation to cater to users seeking restaurant table bookings in Tokyo. Embracing the agile approach facilitated adaptability to evolving requirements and user feedback.

We initiated the development process by gathering requirements, analyzing the business domain, and designing and developing using Flutter and FlutterFlow and various programming languages for front and back-end systems. Validation was ensured through rigorous testing, while breaking down tasks into manageable sprints expedited progress.

Throughout development, we encountered hurdles like time constraints and performance optimization. However, collaborative teamwork and leveraging individual strengths enabled us to surmount these obstacles, resulting in a robust and functional application.

TABLO offers essential features such as table reservation with detailed booking information, including date, time, and guest count, alongside options to edit, delete, and view all reservations, both current and past.

This journey has underscored the significance of meticulous planning, continuous testing, and user feedback in crafting a successful application. We eagerly anticipate TABLO's utilization and remain committed to its ongoing enhancement.

7.2 Future Work

In the future, there are several ways to enhance the Tokyo application. Firstly, there's a need to focus on improving the user experience by gathering continuous feedback from users. This feedback will be important in identifying areas for improvement in the app's interface, workflow, and overall usability. Furthermore, the app's user base will be further increased by making it available with platforms other than Android. Modifying the codebase will be necessary to guarantee stable performance on various operating systems. Lastly, exploring the integration of additional functions may significantly enhance the app's usability and attractiveness. Features such as personalized recommendations, seamless payment transactions through third-party gateways, and social sharing functionalities could be considered.

8 References

[1] GeeksforGeeks. Types of Software Architecture Patterns - GeeksforGeeks (accessed May 1, 2024).

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[3] Tarabiza, https://tarabiza.com/ (accessed Mar. 12, 2024).

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[5] FoodGate, https://foodsgate.sa/ (accessed Mar. 12, 2014).

Appendix A: interview

1. What difficulties or frustrations do you often face when trying to make a Tokyo restaurant reservation?
2. If there were an app specifically for restaurant table reservations, what functionalities would you expect it to offer?
3. When making reservations for dining out, what factors influence your decision between using an app versus calling the restaurant directly?
4. Do you prefer to book a table before you go, or you don’t use a table booking application and why?
5. Can you describe any past experiences where you felt particularly satisfied or dissatisfied with the reservation app or platform?

<table>
<tr><th colspan="2">Online interview (1)</th></tr>
<tr><td>Interviewee : Lama</td><td>Interviewer : Majd</td></tr>
<tr><td>Location/ medium : phone call</td><td>Appointement date : 9 March
Start time : 9:00 Am
End time : 9:50:10 Am</td></tr>
<tr><td>Objectives :
Identify common difficulties and frustrations users face when making restaurant reservations.
Explore user expectations and requirements for a dedicated restaurant table reservation app.</td><td>Reminder :

The interviewee had trouble using apps to make a table reservation</td></tr>
<tr><td>Agenda:
Introduction
Background in Project
Overview of interview
Topic to be covered
Permission to record
Question1
Question2
Question3
Question4
Question5
Summary of major points
Questions from interviewee
Closing</td><td>Approximate time :
5min
3min
1min
2min
10sec
5min
5min
3min
4min
5min
3min
4min
2min</td></tr>
<tr><td colspan="2">General observation :
The individual exhibited a noticeable level of enthusiasm towards our program, evident through their varied body language and tone of voice as they transitioned from one question to the next. Furthermore, it was apparent that they possessed a solid comprehension of the underlying concept.</td></tr>
<tr><td colspan="2">Unsolved issues, topic not covered :
Unfortunately, we were unable to delve into the detailed functionalities of the application</td></tr>
</table>

Online interview (1)	
Interviewee : lama	**Date :** 9 March
Questions :	**Answers and note:**
Q1: What difficulties or frustrations do you often face when trying to make a Tokyo restaurant reservations ?	One common frustration I encounter when making Tokyo reservations is the lack of availability, especially during peak hours or on weekends. It's frustrating when I can't secure a table at my preferred restaurant despite planning ahead. Observation: The user highlights the challenge of limited availability during busy times, which is a common frustration among diners.
Q2: If there were an app specifically for restaurant table reservations, what functionalities would you expect it to offer?	An essential functionality for me would be the option to customize reservation preferences like birthday parties .. etc. Observation: This user emphasizes the need for customization and accurate information
Q3: When making reservations for dining out, what factors influence your decision between using an app versus calling the restaurant directly?	I tend to call the restaurant directly if I have specific requests or need clarification on certain details. Direct communication allows me to ensure that my needs are understood and accommodated, especially for special occasions or dietary requirements. Observation, this user values direct communication with restaurant staff for personalized service and assurance, particularly for addressing specific needs or concerns.
Q4: Do you prefer to book a table before you go, or you don’t use a table booking application, and why?	I usually don't use a table booking application because I enjoy the spontaneity of exploring different dining options without prior commitments. I prefer to decide where to eat based on my mood and preferences now. Observation: this user values spontaneity and flexibility in dining decisions, opting not to use reservation apps to maintain the freedom to explore various dining options without prior arrangements.
Q5: Can you describe any past experiences where you felt particularly satisfied or dissatisfied with the reservation app or platform?	I had a negative experience with a reservation platform where the interface was cluttered and difficult to navigate. It was frustrating trying to find relevant information or make changes to my reservation, leading to a lack of trust in the platform's reliability. Observation: this user expresses dissatisfaction with a reservation platform due to usability issues, underscoring the importance of intuitive design and user-friendly interfaces in enhancing the user experience and building trust.

<table>
<tr><th colspan="2">Online interview (2)</th></tr>
<tr><td>Interviewee : Lina</td><td>Interviewer : Raghad</td></tr>
<tr><td>Location/ medium : phone call</td><td>Appointement date : 9 March
Start time : 10:00 Am
End time : 10:48:10 Am</td></tr>
<tr><td>Objectives :
Identify common difficulties and frustrations users face when making restaurant reservations.
Explore user expectations and requirements for a dedicated restaurant table reservation app.</td><td>Reminder :

The interviewee had some experirnce before.</td></tr>
<tr><td>Agenda:
Introduction
Background in Project
Overview of interview
Topic to be covered
Permission to record
Question1
Question2
Question3
Question4
Question5
Summary of major points
Questions from interviewee
Closing</td><td>Approximate time :
5min
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The individual exhibited a noticeable level of enthusiasm towards our program, evident through their varied body language and tone of voice as they transitioned from one qu
Unsolved issues, topic not covered :
Unfortunately, we were unable to delve into the detailed functionalities of the application estion to the next.</td></tr>
</table>

Online interview (2)	
Interviewee : Lina	**Date :** 9 March
Questions :	**Answers and note:**
Q1: What difficulties or frustrations do you often face when trying to make a Tokyo restaurant reservation?	I didn't face any difficulties before, but the reservations in the weekend always difficult. Observation: she didn't take a long time to answer this question about her difficulties.
Q2: If there were an app specifically for restaurant table reservations, what functionalities would you expect it to offer?	I would expect the app to allow me to see my reservation history to see my past reservations. Observation: The user emphasizes the importance and convenient history to streamline the reservation process.
Q3: When making reservations for dining out, what factors influence your decision between using an app versus calling the restaurant directly?	I prefer using an app for convenience and accessibility, especially when I'm on the go or need to make last-minute reservations. Observation: This user prioritizes convenience and efficiency when choosing between using an app or calling directly, highlighting the time-saving benefits of digital platforms
Q4: Do you prefer to book a table before you go, or you don't use a table booking application, and why?	I always prefer to book a table in advance using a reservation app because it guarantees that I'll have a table reserved for me, especially at popular restaurants. It also helps me plan my schedule and avoid long waits or disappointments. Observation: This user emphasizes the importance of advance bookings for securing preferred dining experiences and avoiding potential inconvenience, reflecting a preference for planning and certainty
Q5: Can you describe any past experiences where you felt particularly satisfied or dissatisfied with the reservation app or platform?	I had a very satisfying experience with a reservation app that offered a seamless interface and accurate real-time updates on table availability. The app also allowed me to easily modify or cancel reservations without any hassle. Observation: The user expresses satisfaction with a reservation app due to its user-friendly interface, reliability, and flexibility in managing reservations, highlighting the importance of a positive user experience in driving satisfaction.

Appendix B: Questionnaires

1. Have you ever faced difficulties in securing a last-minute reservation at Tokyo restaurant?

2. Do you believe a more user-friendly reservation app could enhance your overall dining experience?

3. Have you ever used an online reservation system for booking tables at a restaurant?

4. Would you be interested in a service that allows you to add the occasion of your reservation?

5. Would you prefer a reservation system that allows you to easily book a reservation, add info as the number of guests?

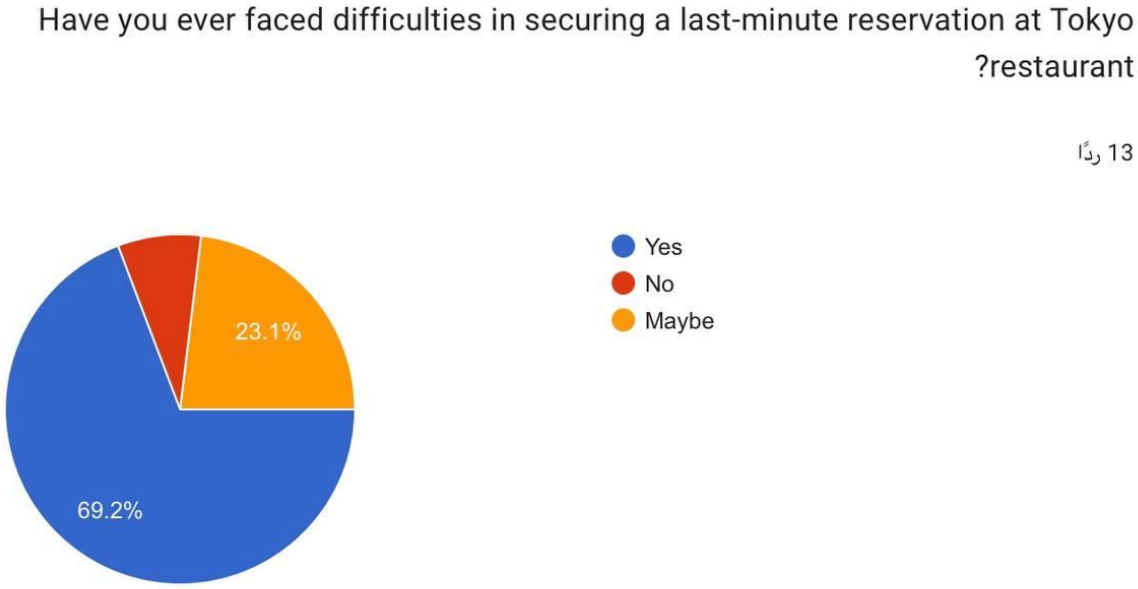


Figure 1

Do you believe a more user-friendly reservation app could enhance your overall dining ?experience

13 ردًا

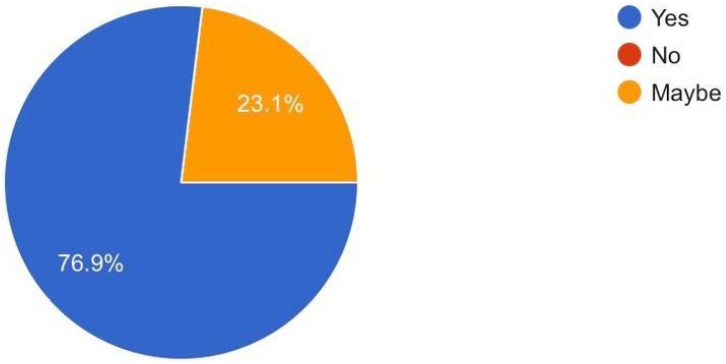


Figure 2

?Have you ever used an online reservation system for booking tables at a restaurant

13 ردًا

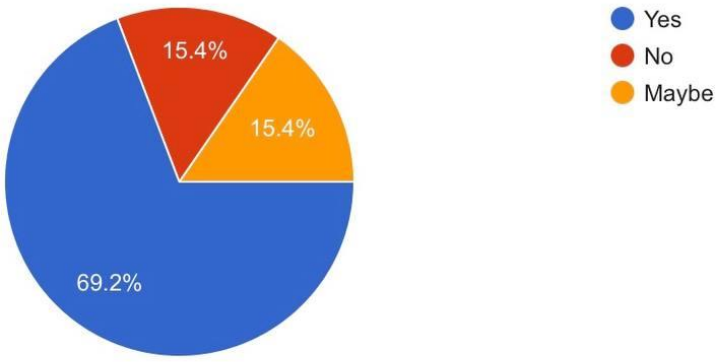


Figure 3

Would you be interested in a service that allows you to add the occasion of your ?reservation

13 ردًا

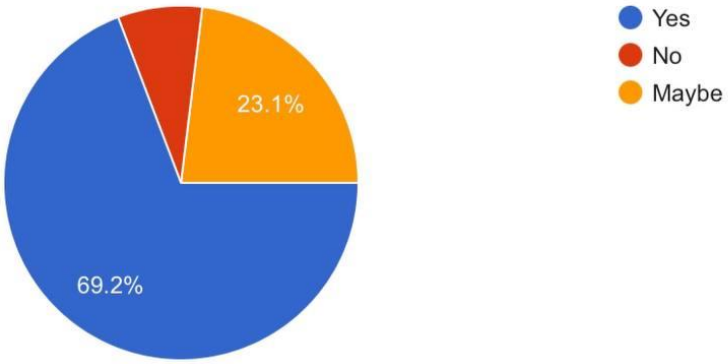


Figure 4

Would you prefer a reservation system that allows you to easily book a reservation, add ?info as the number of guests

13 ردًا

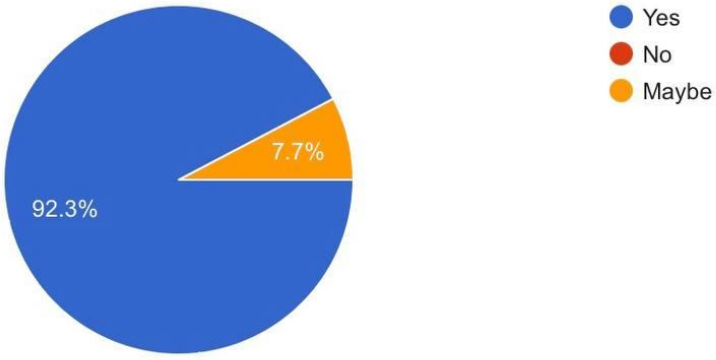
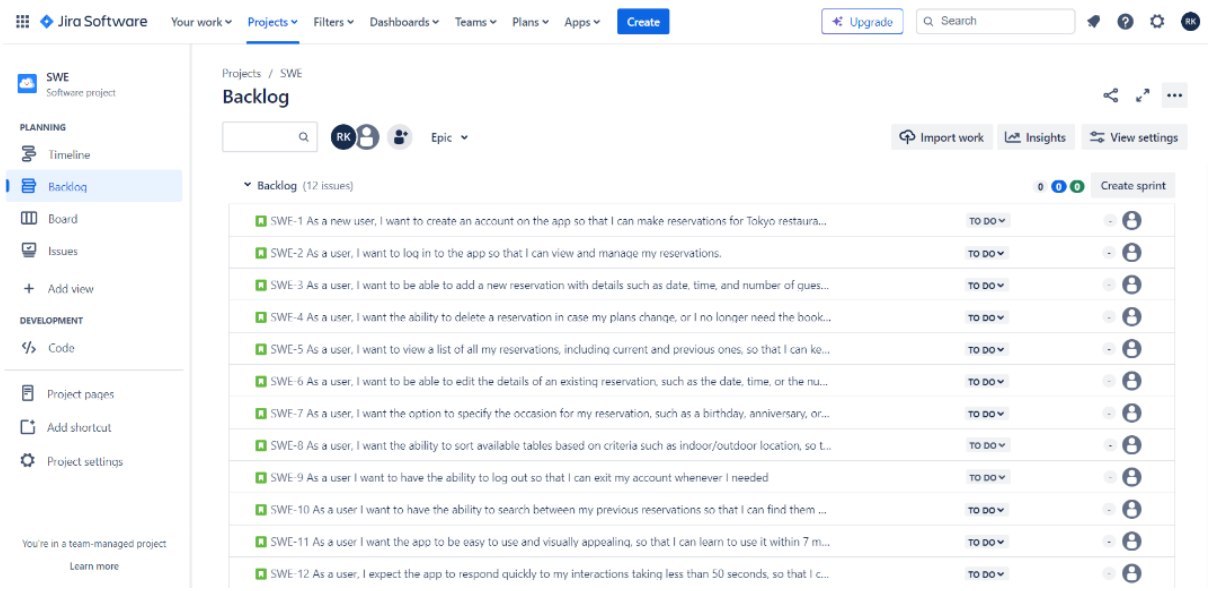


Figure 5

Appendix C: Jira

1- Product backlog



2- Sprint 2