



UNIVERSITI MALAYA

WIA2006 SYSTEM ANALYSIS & DESIGN SEMESTER 1 2023/2024

Topic : Enhancement in BusMalaya Application

Company Name : Harmony Fusion

Lecturer : Dr. Nurul Fazimidar binti Mohd Noor

Occurrence 5

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1.0 Introduction

In the ever-evolving landscape of technological advancements, the efficiency and functionality of information systems play a pivotal role in enhancing the overall experience for users. Among the myriad of applications tailored to meet the diverse needs of educational institutions, the University of Malaya Bus Application stands as a critical component in facilitating seamless transportation for students, staff, and faculty.

Regrettably, the current state of the University of Malaya Bus Application leaves much to be desired. Introduced in the past, the application has witnessed a decline in popularity and effectiveness, with reports of its diminished functionality surfacing since 2019. This decline can be attributed to a combination of factors, ranging from technical glitches and an outdated user interface to an overall lack of user engagement.

This report aims to delve into a comprehensive analysis of the existing University of Malaya Bus Application, identifying its shortcomings and proposing strategic enhancements to revive its utility. The objective is to breathe new life into a system that once played a crucial role in the transportation logistics of the university community.

Through this endeavor, we aspire to not only address the current issues but also to bring the University of Malaya Bus Application in line with contemporary standards, ensuring a user-friendly interface, robust functionality, and widespread acceptance among the university's populace. The subsequent sections of this report will delve into a systematic examination of the current state of the application, highlighting its deficiencies, and proposing a roadmap for transformation and revitalization.

As we embark on this journey of system analysis and design, the ultimate goal is to contribute to the University of Malaya's commitment to technological excellence, providing a reliable and efficient transportation solution for its stakeholders.

2.0 Planning

2.1 Fact Finding Conducted

In the preliminary stages of our project, the crucial Fact-Finding process was undertaken to gather comprehensive insights and requirements for the enhancement of the University of Malaya Bus Application. This phase involved engaging in a face-to-face interview with Mr. Faizal, the Assistant Administrative Officer of the JPPHP UM Transport Section, who graciously provided invaluable information.

2.1.1 Interview with Mr. Faizal

Upon contacting Mr. Faizal and articulating the purpose of our project, he expressed eagerness to collaborate and proposed a physical meeting for a more in-depth discussion. On 20 November 2023, our team convened with Mr. Faizal at the JPPHP office, conveniently located beside KK11 of UM. During this meeting, we delved into various aspects of the current bus system, obtaining insights into operational procedures, maintenance schedules, existing system challenges, and anticipated future requirements. Mr. Faizal's input proved invaluable, offering a firsthand perspective on the intricacies of how the buses operate, the frequency of maintenance routines, and key issues plaguing the current system. This interaction not only enriched our understanding but also provided essential data to inform the subsequent stages of our system enhancement project. As a testament to this collaboration, we documented the interview process through photographic evidence, ensuring transparency and authenticity in our information-gathering endeavors.

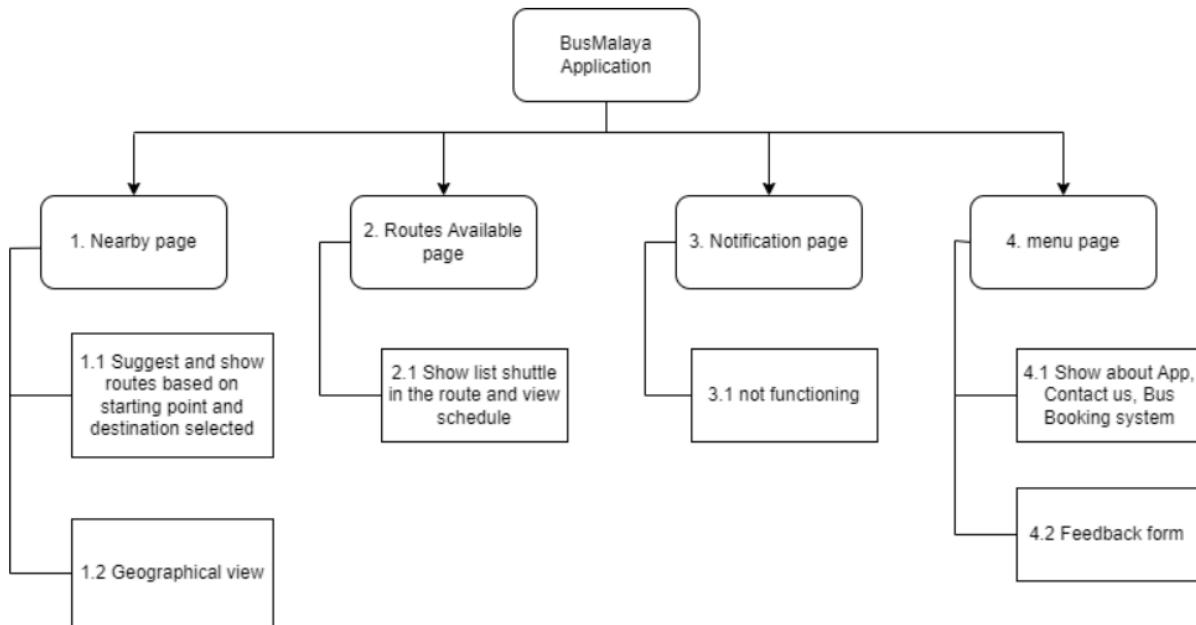
2.1.2 Observation Method

Recognizing the significance of the existing Bus Malaya application, our fact-finding methodology extended to an observation of the application in operation. This allowed us to scrutinize the functionality of the application, identify strengths, and pinpoint areas requiring improvement. The observation revealed certain shortcomings in the current version of the application, notably an outdated interface and insufficient information availability.

The amalgamation of the insights gained from the interview with Mr. Faizal and the observational analysis of the Bus Malaya application formed the cornerstone of our understanding of the current system landscape, guiding us toward an exploration of system requirements and elucidating the identified issues and shaping the revamp for the revitalization of the University of Malaya Bus Application.

2.2 Existing System Description (FDD)

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2.3 List the problem/limitation

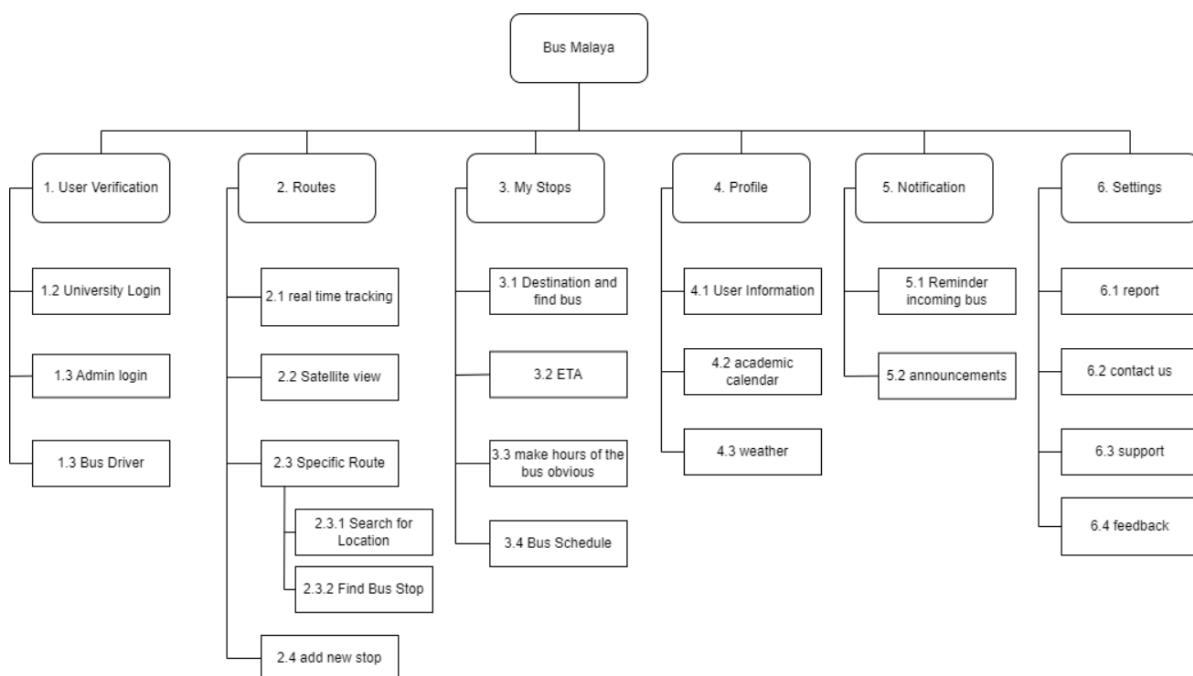
- The User Interface of the Bus Malaya application is not user-friendly and hard to understand
- The bus system currently lacks a secure authentication mechanism.
- Users are unable to track the buses' current locations.
- The bus system is limited in its geographic scope and primarily serves the immediate campus area.
- The bus schedules are not integrated with the academic calendar.
- The bus system does not integrate with a weather app, resulting in a lack of information about weather conditions that might impact bus schedules.
- The bus system lacks a comprehensive notification system.
- There is no formal mechanism for collecting user feedback.
- Users are unable to book buses for group tours, and there is no automated payment system in place.

2.4 List the suggestion

- Redesign the whole user interface of Bus Malaya application to be more user-friendly with a more consistent and better color code, change it to UM BUS
- Users are required to undergo an authentication process, according to their status whether they are
- Real-time tracking of each bus is available within the app.
- Add information seat availability on each bus
- Latest academic calendar will be integrated in the bus system so that users can
- Integration of 'Weather' app with the bus system, users can view the updated schedule that is affected by the weather
- The app will fully utilize the notification section, keeping the users with important news and updates. The notification will include bus arrivals time, delays or information updates.
- Users are able to leave feedback properly through the right channel, and the feedback will reach the correct authority.
- Booking services are available e.g. for group tours, users are able to make successful transactions through the app for the booking fee.

2.5 Proposed System FDD

<https://drive.google.com/file/d/1L5tPQF7ZApow0Ac0JektCVWmTCukFDdN/view?usp=sharing>

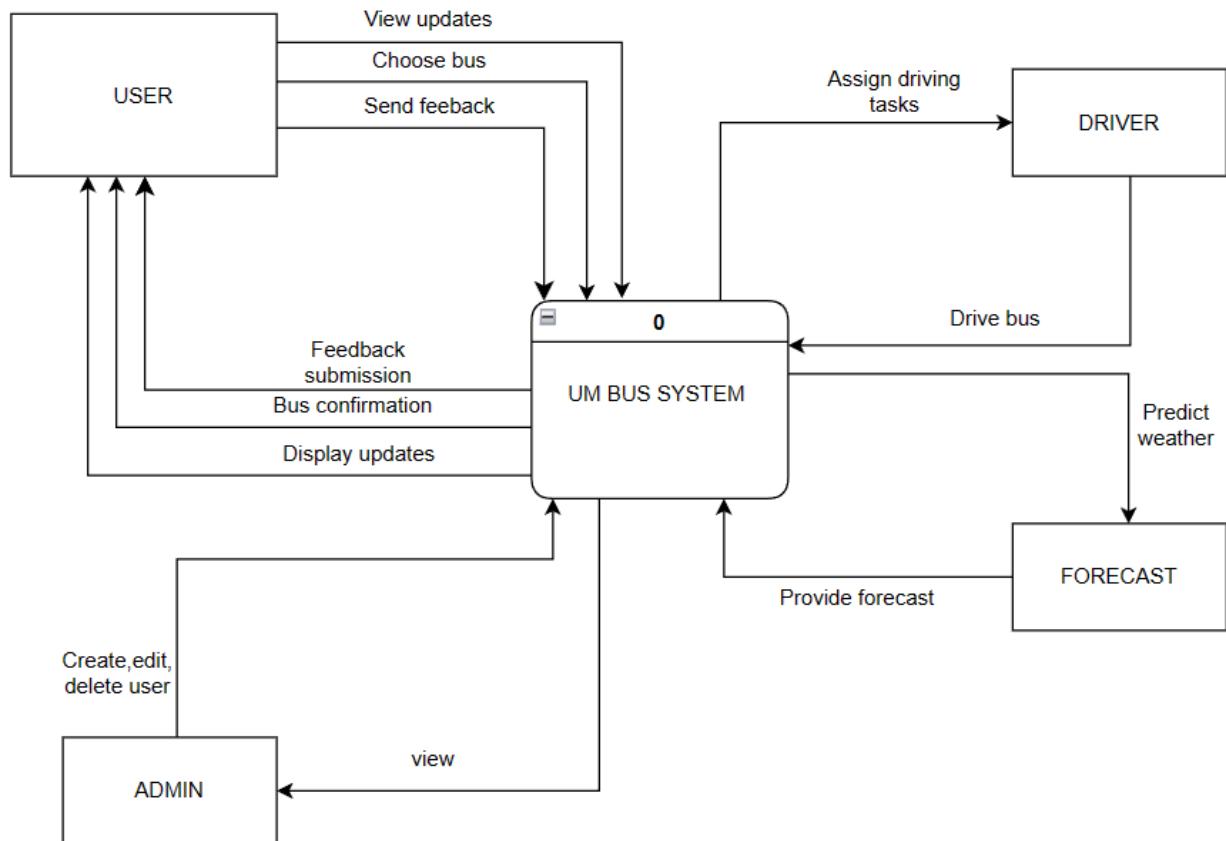


3.0 Analysis

3.1 DFD Diagrams

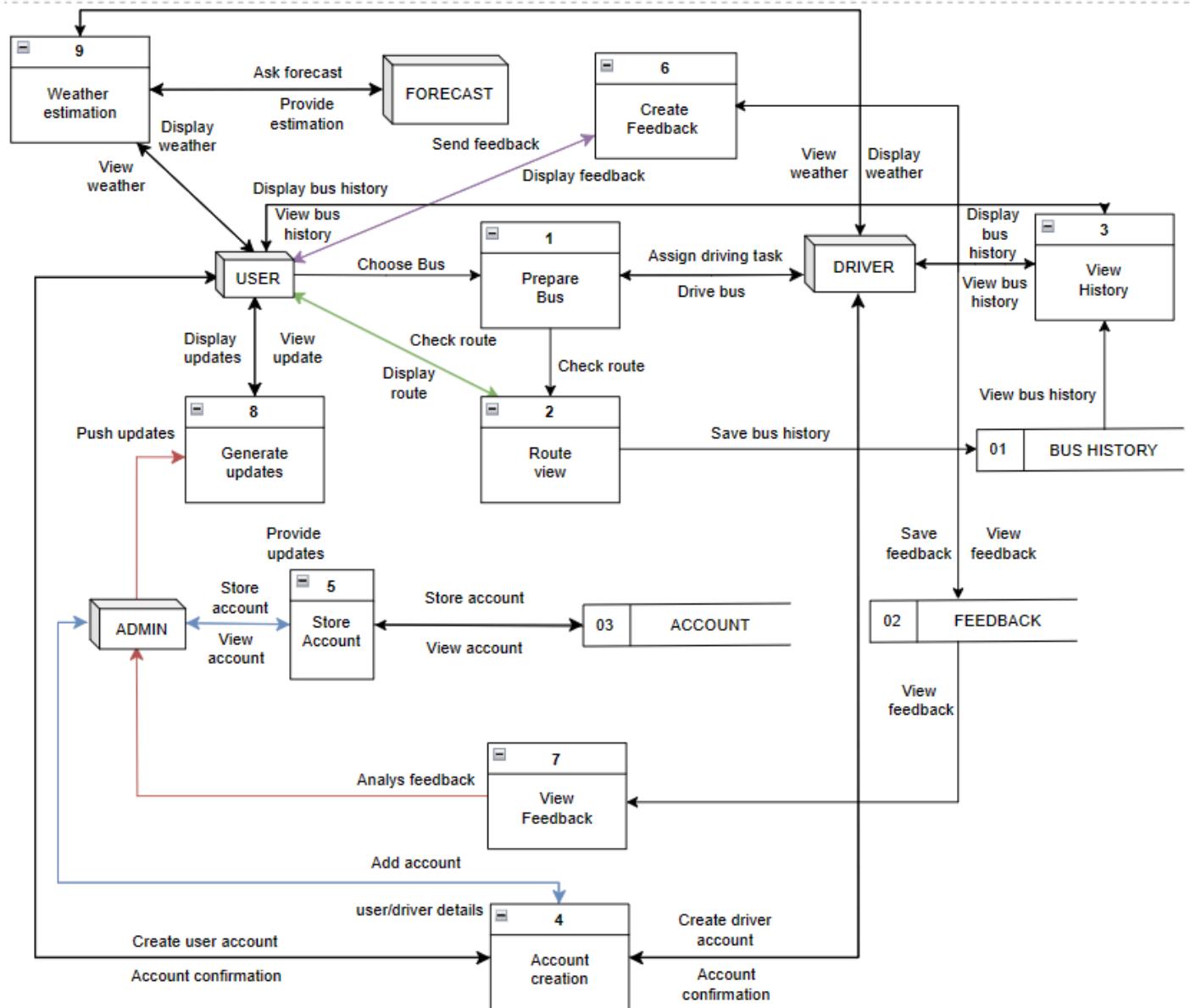
3.1.1 Context Diagram

- A context diagram is a top level view of an information system that shows the system's boundaries and scope
- Symbolizes all processing activity within a system with a single process symbol: **Process 0**
- Below is the context diagram for our UM BUS Application:



3.1.2 Diagram 0 DFD

- DFD is a visualization of the movement of data between external entities and the processes and data stores within a system.
- Below is our app DFD:



3.2 Data Dictionary

User

Field Name	Data Type	Data Format	Field Size	Description	Example
user_id	INT	#XXXX	5	Unique identification of user	#U001
username	varchar(50)	XXX	20	Name of user	Amirul
password	varchar(50)	xxXX?>!	320	User's password	@mirul%kacak01
user_status	varchar(50)	XXX	3	User's status(student/driver)	Student
email	varchar(50)	xxx@xxxx. com	320	User's personal email	Amirul@gmail.com

Admin

Field Name	Data Type	Data Format	Field Size	Description	Example
admin_id	INT	#XXXX	5	Unique identification of admin	#A017
username	varchar(50)	XXX	20	Name of admin	Hasan
password	varchar(50)	xxXX?>!	320	Admin's password	H@san_03
email	varchar(50)	xxx@xxxx. com	320	Admin's personal email	Hasan@gmail.com
permission	varchar(50)	xxXX?>!	320	Admin's permission	H@san_03

Admin Notification

Field Name	Data Type	Data Format	Field Size	Description	Example
admin_notification_id	INT	#XXXX	5	Unique identification of admin notification	#D010
message	varchar(50)	xxXX?>!	320	Admin's notification message	Access granted

Bus

Field Name	Data Type	Data Format	Field Size	Description	Example
bus_id	INT	#XXXX	5	Unique identification of bus	#B010
bus_no	INT	#XX	3	Bus Number	#06
current_location	varchar(50)	XXX	320	Bus current location	UM Library bus stop
current_passenger	INT	#XX	3	Current passenger number	34

Bus Tracking

Field Name	Data Type	Data Format	Field Size	Description	Example
tracking_id	INT	#XXXX	5	Unique identification of bus tracking	#T010
location	varchar(50)	XXX	320	Bus current location	UM Library bus stop

Timestamp

Field Name	Data Type	Data Format	Field Size	Description	Example
timestamp	varchar(50)	YYYY-MM-DD -HHMM	14	Timestamp including date and hour in 24-hour format	2023-19-12-1432

Weather

Field Name	Data Type	Data Format	Field Size	Description	Example
condition	varchar(50)	XXXX	50	Current weather condition	Mostly cloudy

Bus Schedule

Field Name	Data Type	Data Format	Field Size	Description	Example
schedule_id	INT	#XXXX	5	Unique identification of schedule	#S010
arrival_time	varchar(50)	HHMM	4	Time of arrival in 24-hour format	1500
delay	varchar(50)	HH-MM	5	Time of delay in 12-hour format	00-20

Academic Calendar

Field Name	Data Type	Data Format	Field Size	Description	Example
calendar_id	INT	#XXXX	5	Unique identification of calendar	#C010
event_name	varchar(50)	XXX	20	Name of event	Makanmakan
event_date	varchar(50)	YYYY-MM-DD	10	Date of event	2023-01-15
event_duration	varchar(50)	DD-HH-MM	8	Event duration in day,hour and minute.	01-12-00

Feedback

Field Name	Data Type	Data Format	Field Size	Description	Example
feedback_id	INT	#XXXX	5	Unique identification of feedback	#F002
feedback_text	varchar(50)	XXX	320	Feedback text	Very good app!
feedback_photo	image	JPEG	800x600 px	A photo that shows user feedback on app	feedback.jpeg

Notification

Field Name	Data Type	Data Format	Field Size	Description	Example
notification_id	INT	#XXXX	5	Unique identification of notification	#N002
message	varchar(50)	XXX	320	Notification message	Happy eid ul Fitri!

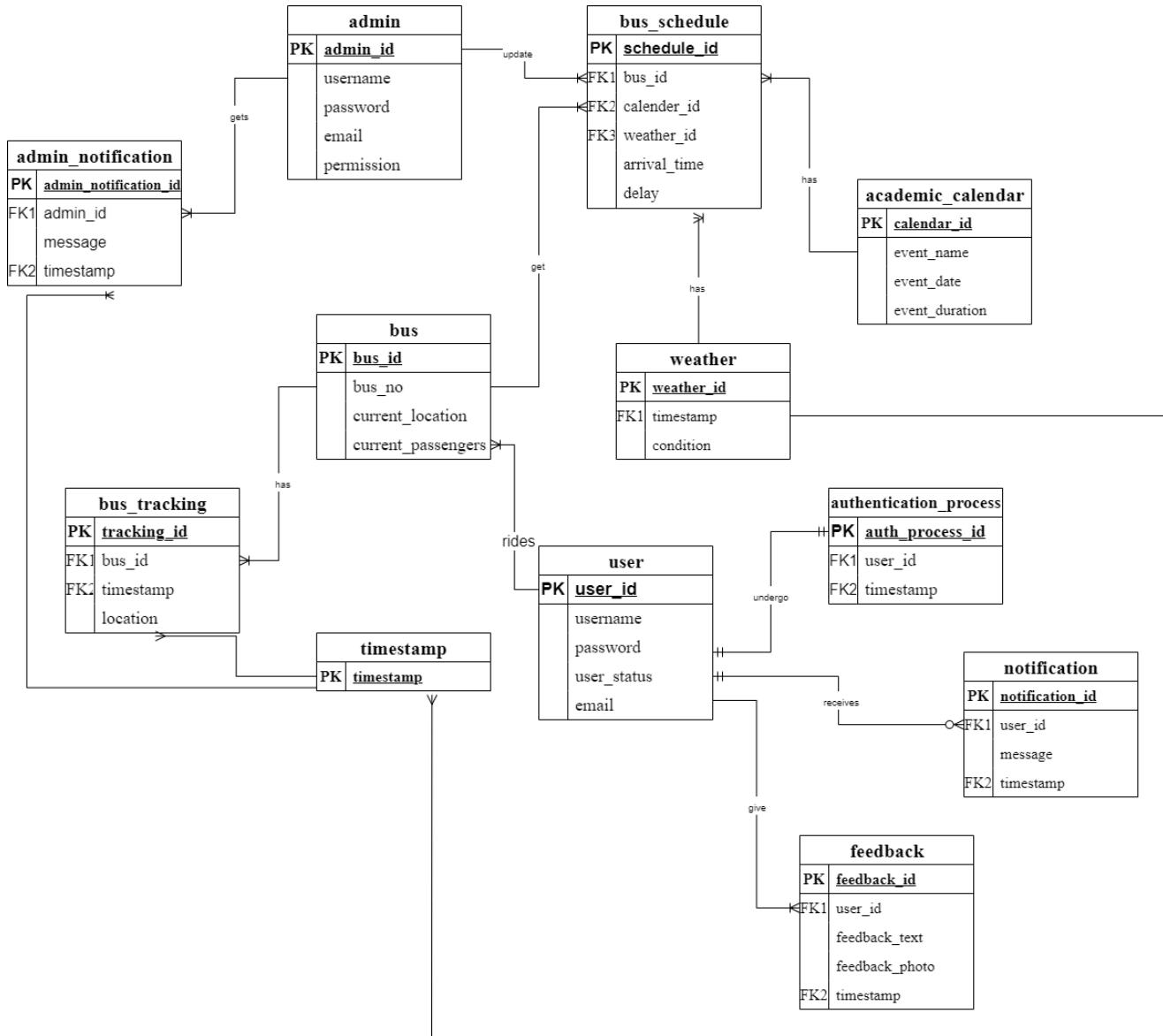
Authentication Process

Field Name	Data Type	Data Format	Field Size	Description	Example
auth_process_id	INT	#XXXX	5	Unique identification of authentication process	#E002

4.0 System Design

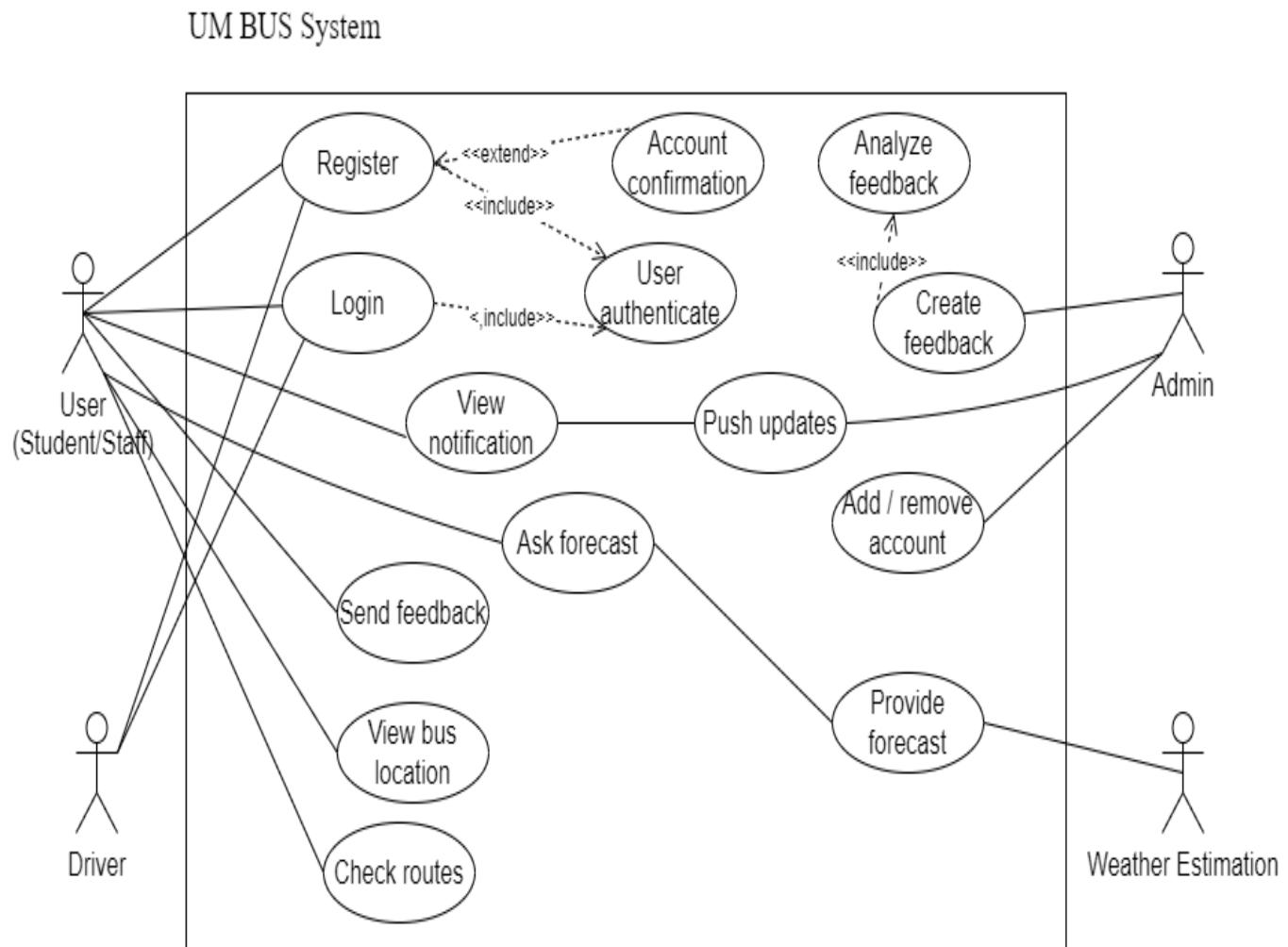
4.1 ERD

https://drive.google.com/file/d/1CxtA5nzd_BNGNeZKciq5CL7IkESCqefV/view?usp=sharing



4.2 Use-case Diagram

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5.0 Implementation

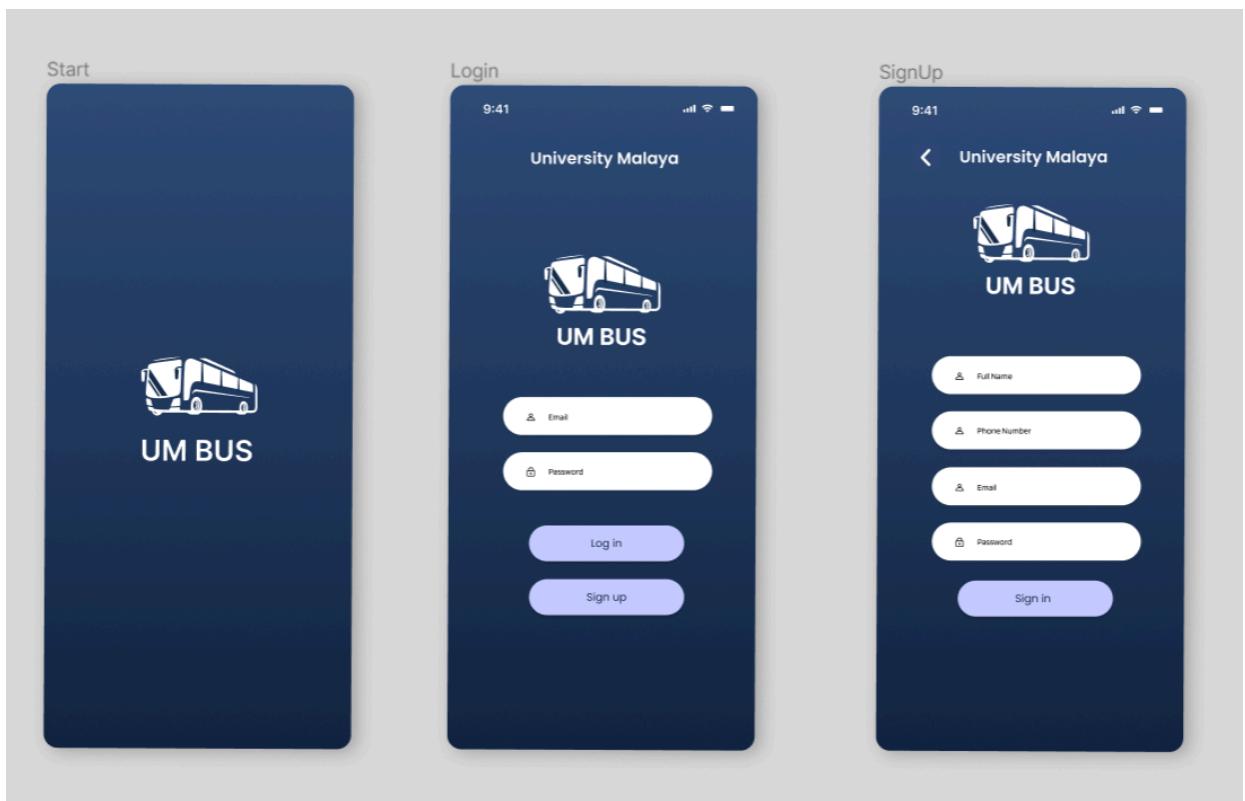
You may visit Harmony Fusion website and see how the new system functions. The website is developed using WIX.

<https://s2193685.wixsite.com/harmony-fusion>

Here's our implementation:

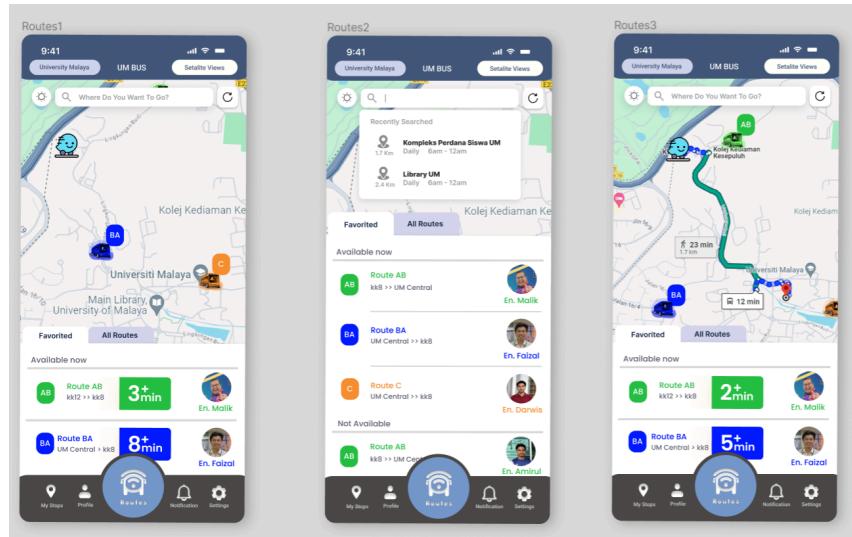
- **User verification**

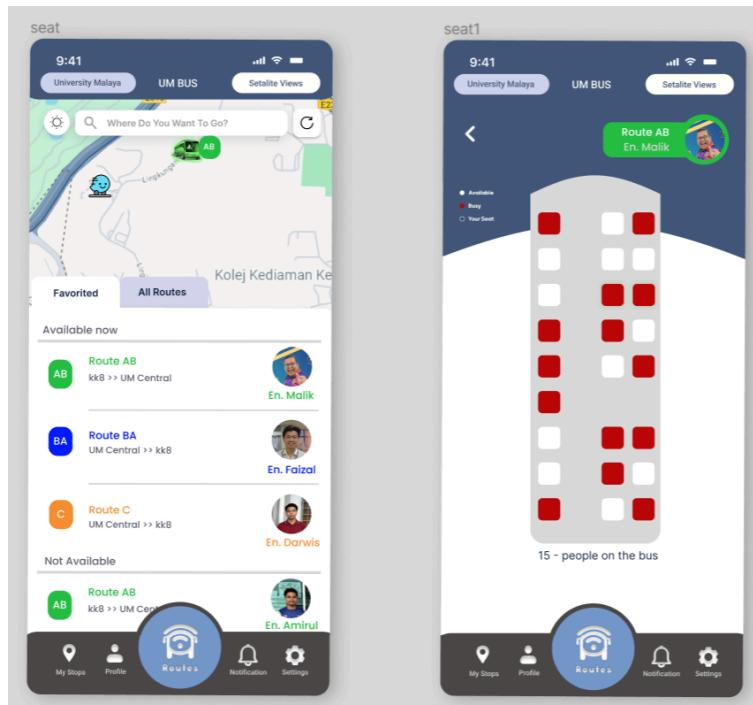
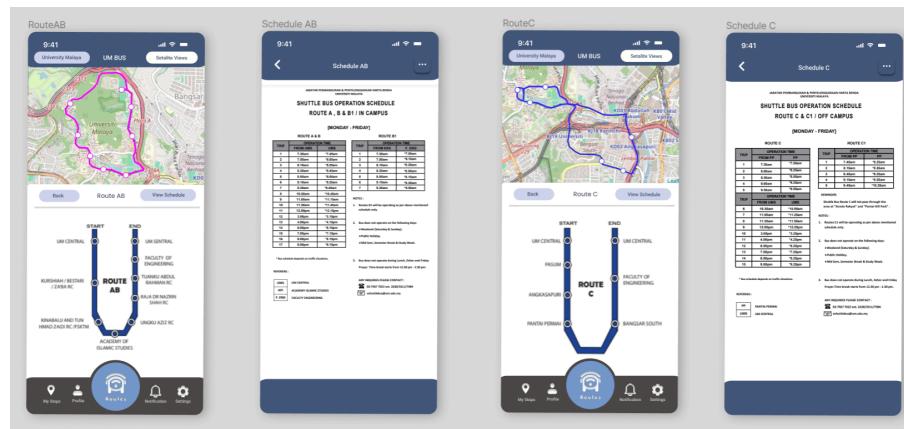
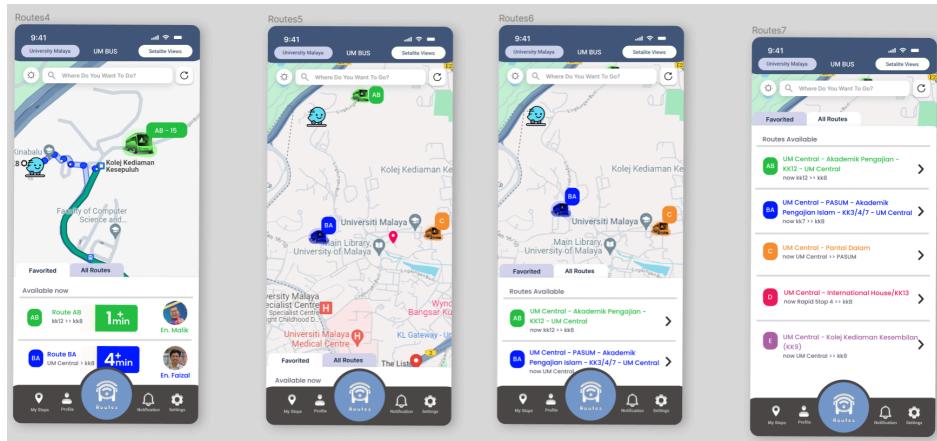
These pages serve as straightforward access points for user, admin, and driver logins. Streamline your experience with direct and efficient account access tailored to each role. Enhance convenience and security with our user-friendly login interfaces.



- **Routes**

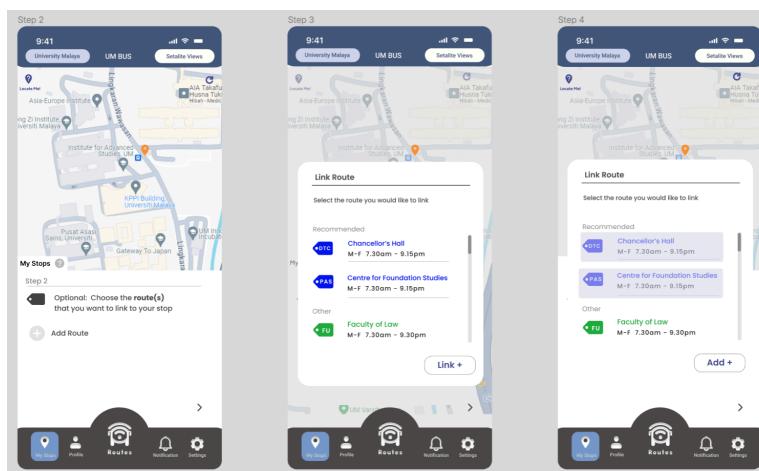
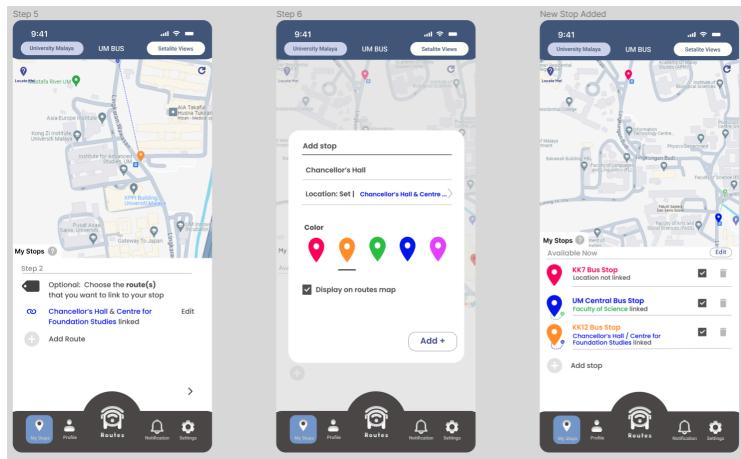
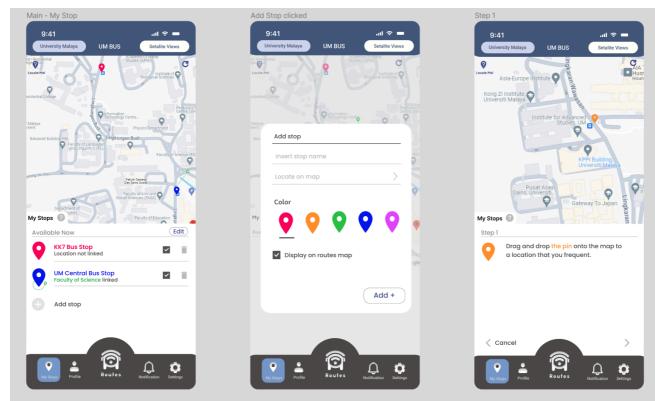
1. The app introduces a real-time tracking routes feature, granting users a time controller role for improved waiting bus efficiency. Beyond this, the map incorporates satellite demonstrations to pinpoint precise locations, enabling users to check the arrival status of their approaching bus. Elevate your experience with enhanced efficiency and accurate location tracking.
2. Our app offers a 'favorite' option and a comprehensive menu of all available routes, empowering users to effortlessly check various bus options. Similar to popular platforms like Grab or AirAsia, users can bookmark their frequently visited locations, enhancing decision-making effectiveness. Furthermore, the app provides estimated arrival times for different bus routes, ensuring users stay informed and can plan their journeys with confidence.
3. Aligned with the official UM campus school bus schedule obtained from our UM bus department, we have incorporated additional in-campus bus routes AB and C to cater to the majority of UM students and staff. Our platform ensures timely updates to the bus schedule, facilitating seamless coordination with our partners. This proactive approach helps prevent accidental changes to the bus schedule, providing reliable and up-to-date information for the convenience of UM students and staff.
4. Furthermore, users can preview the seating situation within the bus, providing valuable insights into the capacity of the target bus. This feature ensures users are well-informed about the available seating, allowing for smooth and efficient arrangements. Stay in control of your journey by making informed decisions based on real-time bus capacity information.



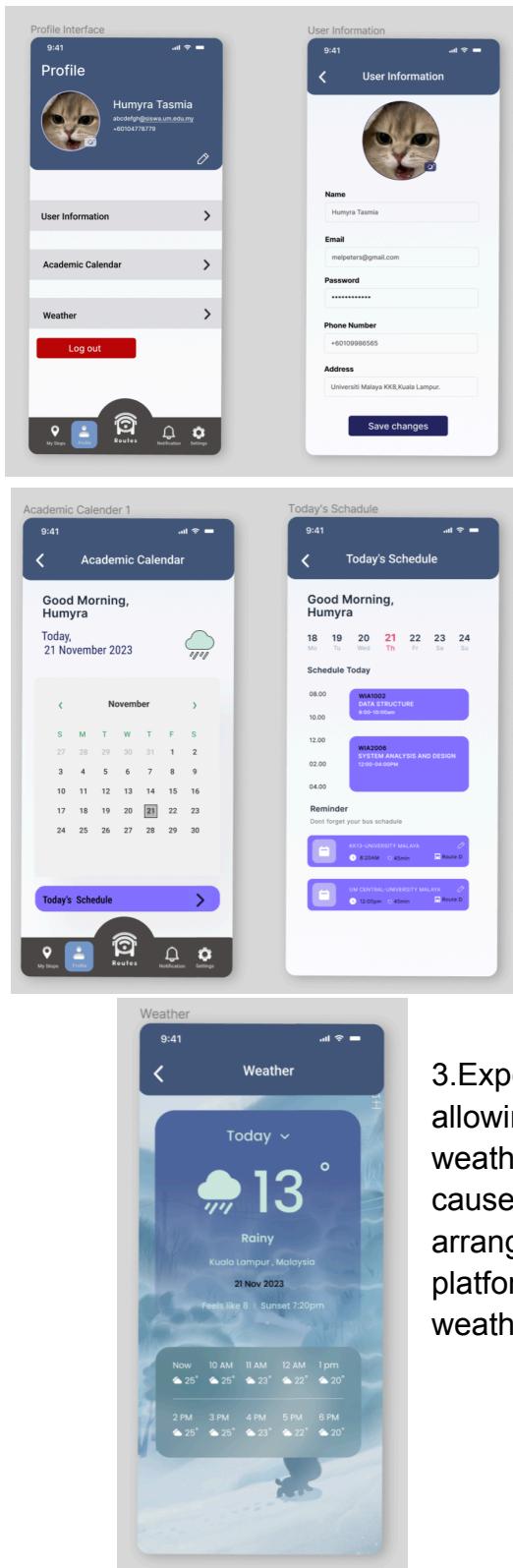


• My stops

These functional pages empower users to customize their journey by setting their stop station names. Ensuring precision in reaching their destination, the interface allows for intuitive interaction through dragging and selecting pinpoint locations. Simultaneously, users receive recommendations on linked routes, aiding them in determining the optimal way to reach their destination. Elevate your experience with user-friendly features that enhance customization and decision-making.



● Profile

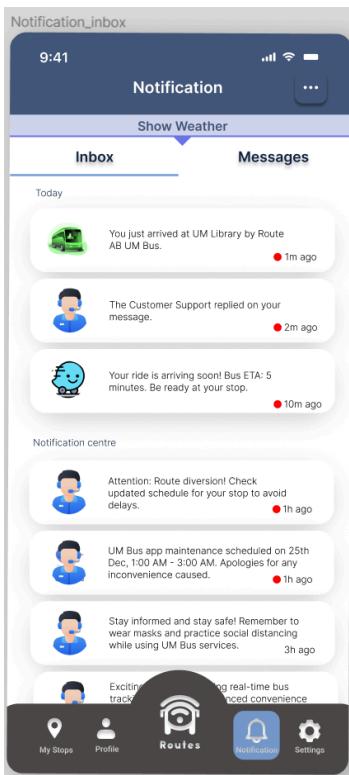


1. Empowering users with personalized access, this page facilitates secure login, enabling individuals to conveniently review and manage their own information. Enhance your experience by effortlessly accessing and updating your personal details through our user-friendly interface.

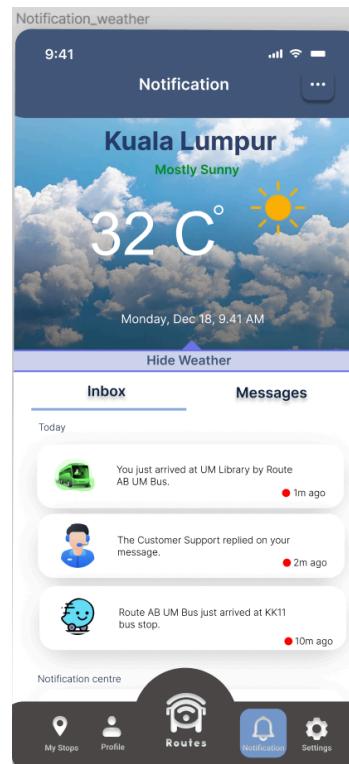
2. Facilitating efficient agenda management, our platform offers an organized presentation of 'Academic calendar' and 'Today's Schedule', providing users with a convenient tool to arrange their daily agenda. Stay on top of your commitments and manage your time effectively with our user-friendly interface.

3. Experience weather customization on this page, allowing users to proactively plan based on real-time weather conditions. Mitigate potential inconveniences caused by adverse weather by making informed arrangements. Stay ahead with our interactive platform, ensuring seamless adaptability to changing weather scenarios.

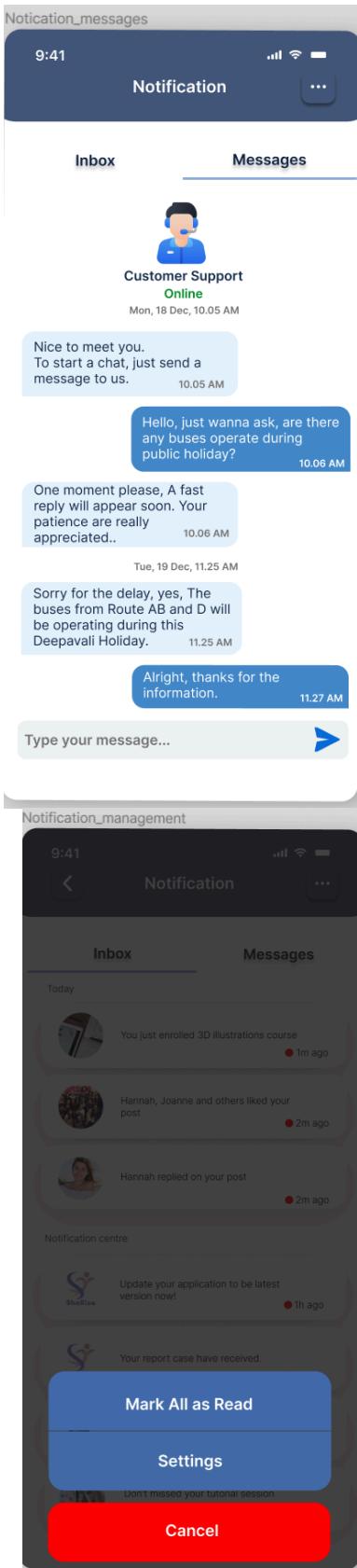
- **Notification**



1. Users are able to check notifications of incoming buses on this page. This function helps users arrange their time reasonably so as not to miss the ride time. Therefore, users can save more energy, time and fares.



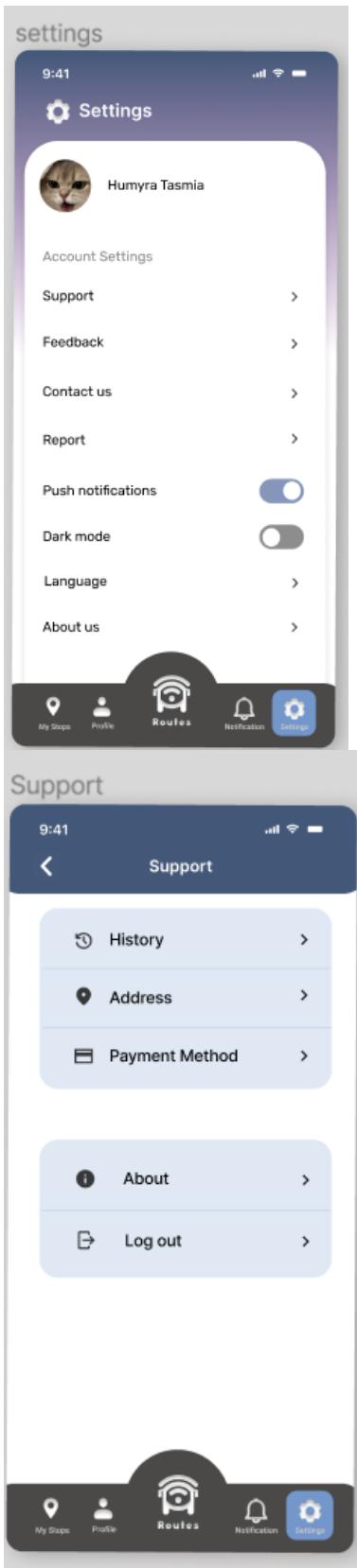
2. Users can also quickly check the weather conditions of the day to arrange their own time on this page.



3. At the same time, if users have arrangements for the bus schedule for the day, they can also find customer service on this page by clicking the “Message” button.

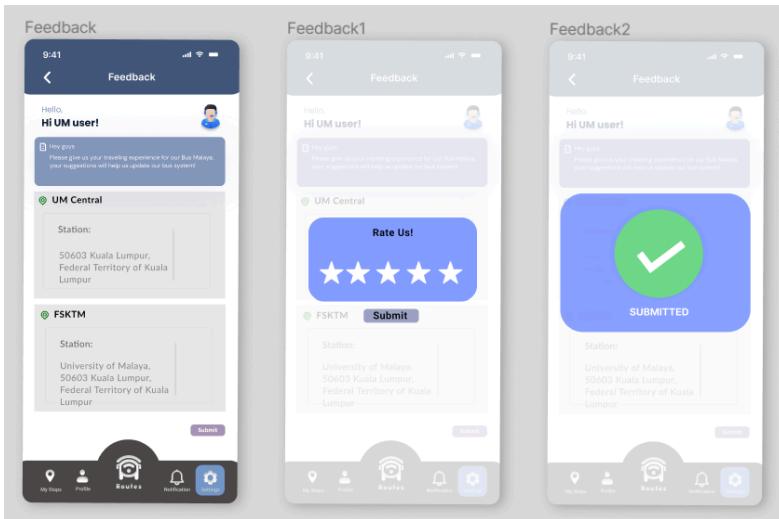
4. By clicking the “More” button (three dots button), users can choose “Mark all as Read”. “One-click mark as read” functionality helps users quickly organize and mark all unread messages as read with a simple click, enhancing efficiency, reducing stress, and providing a clear interface for a convenient and streamlined information management experience.

- **Setting**

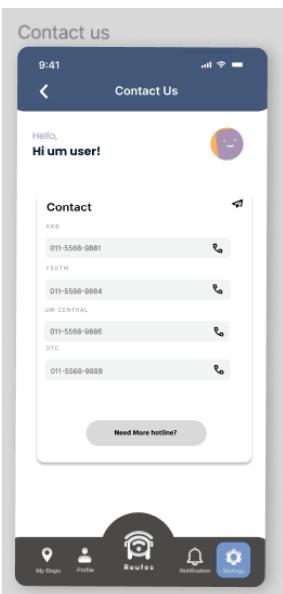


1. In the settings page, we have 4 main functions which are “Support”, “Feedback”, “Contact us” and “Report”. Users are able to edit the profile and log out their own account at this page as well.

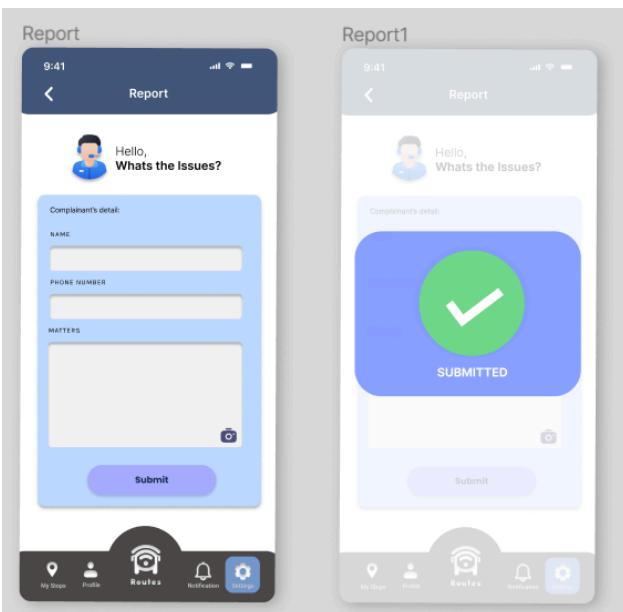
2. On the support page, users can view their ride history, saved addresses, and payment methods. Additionally, they can access information related to the software and log out of their account.



3. On the feedback page, users can rate our app from one to five stars based on their journey experience.



4. On the "Contact Us" page, users can find contact information for relevant staff as a means to file complaints or provide feedback.



5. On the "Report" page, users can report issues by providing some personal information and describing the incident in text format.

6.0 System Evaluation & Testing

System testing for the BusMalaya App is a critical phase in the software development lifecycle to ensure that all integrated components work seamlessly and meet the specified requirements. The simplified testing case plan for the BusMalaya App, covering Unit Testing, Integration Testing, and System Testing. Below is a detailed plan for system testing, covering various aspects of the app's functionality.

Test Case ID	Test Scenario	Test Steps	Expected Result	Pass/Fail
A001	Validate user authentication and access control.	Attempt login with valid credentials Attempt login with invalid credentials	Successful login with valid credentials, failure with invalid credentials.	pass
A002	Verify the accuracy of real-time bus tracking and ETA calculation.	Check the real-time location of a bus. Verify the accuracy of ETA calculations.	Accurate real-time tracking and reliable ETA calculations.	pass
A003	Notification Services Integration Test	Trigger notifications for different scenarios (bus arrival, delay, information update). Confirm that users receive notifications promptly.	Users receive timely and accurate notifications.	pass
A004	Performance Test	Simulate high user traffic. Monitor the app's response time and system resource usage.	App responds well under expected load and stress conditions.	Pass
A005	Usability Test	Assess the app's design, navigation, and	Intuitive design and a smooth user experience.	pass

		user interaction.		
A006	Compatibility Test	Test the app on various devices (smartphones, tablets, etc.). Verify compatibility with different browsers.	Consistent performance and appearance across different devices and browsers.	fail
A007	Offline Mode	Enable offline mode. Access bus schedules and route maps.	Users can access relevant information even without an internet connection.	pass
A008	Chat Support	Initiate a chat with customer support. Confirm real-time assistance is provided.	Users can communicate with customer support in real-time.	pass
A009	Booking Services	Initiate a group tour booking. Complete the payment process.	Successful booking and payment for group tours.	Fail
A010	Multilingual Support	Change the app language. Verify that the app content is displayed in the selected language.	App content is displayed correctly in the chosen language.	Fail

In conclusion, while the BusMalaya App showcases strengths in several key areas, there are notable areas of improvement identified during system testing. Addressing the issues related to compatibility, booking services, and multilingual support will be crucial to delivering a robust and user-friendly application.

7.0 Project Role

Position	Name	Task
Project Manager	Hassan Firdaus bin Hassan Murshid	<ul style="list-style-type: none"> - Coordinate and monitor the progress of the project to ensure the complement of the project. - Monitor the usage of resources to avoid over budget. - Resolve disagreements among team members. - Track the progress of each team member to make sure they complete their tasks in a timely and appropriate manner. - Arrange the tasks so that each team member is able to meet the previously stated project goals. - Determine, confront and resolve any potential risks that will arise throughout the project
Developer	Meilin Li Zhang Zhiyang	<ul style="list-style-type: none"> - Developing and implementing the app's functionality and features. - Collaborating with the UX designer and system analyst to ensure that the app is developed according to the requirements and design. - Optimizing the application for performance and scalability. - Continuously monitoring and evaluating the Application's performance and recommending changes to improve it. - Ensuring that the Application is accessible to different users and complies with app accessibility standards.
System Design	Mohamad Amirul Imran bin Fazilah Darwis Baqiri Bin Shahbudin	<ul style="list-style-type: none"> - Conducting user research to understand the needs, goals, and behavior of the app's users. - Developing wireframes and mockups to visualize the layout and functionality of the application - Developing wireframes and mockups to visualize the layout and functionality of the website - Collaborating with the apps developer to ensure that the design is technically

		<p>feasible and can be implemented within the project constraints.</p> <ul style="list-style-type: none"> - Collaborating with the apps developer to ensure that the design is technically feasible and can be implemented within the project constraints. - Conducting various types of testing such as functional testing, usability testing
System Analyst	Humyra Tasmia	<ul style="list-style-type: none"> - Identifying the needs of the stakeholders and users of the app. - Conducting research to understand the current system and identify any issues or opportunities for improvement. - Gathering and documenting requirements for the new website through interviews. - Analyzing the requirements to identify any gaps or inconsistencies. - Creating a detailed system design, including process flows, data models, and user interface design. - Collaborating with the project manager and other team members to ensure that the application is developed according to the requirements and design. - Participating in testing and deployment of the application, and ensuring that it meets the requirements of the stakeholders and users. - Continuously monitoring and evaluating the performance of the application and recommending changes as needed to improve its effectiveness.

8.0 Budget

One Time Cost

Item	Hours	Amount per hours (RM)	Subtotal (RM)
Workshop & Training	10	400	4000
Graphic design & visual elements	20	250	5000

System Development	25	350	8,750
User Training	8	200	1,600
Total:			19,350

Recurring Cost

Item	Amount per month (RM)	Subtotal (RM)
Standard - server	250	250
System Maintenance	350	350
Miscellaneous	200	200
Salary(6 members)	4500 per member	27,000
Total:		27,800

9.0 Project Timeline

Task	Duration (days)	Start Date	End Date
1. Project Initiation	16		
1.1 Form a Group	3	10/10/2023	13/10/2023
1.2 Choose a topic, purpose, goals	6	14/10/2023	20/10/2023
1.3 Discuss a suitable method & project scope	7	21/10/2023	27/10/2023
2. Project Planning	5		
2.1 Identify the work scope	1	28/10/2023	29/10/2023
2.2 Divide tasks among members	1	30/10/2023	31/10/2023
2.3 Gantt chart and work schedule establishment	3	1/11/2023	3/11/2023
3. Issue Analysis	22		
3.1 Observation on existing information system	4	4/11/2023	7/11/2023
3.2 List down limitation	4	8/11/2023	11/11/2023

3.3 Analyst the problem of application	3	12/11/2023	14/11/2023
3.4 Apply for interview	1	15/11/2023	16/11/2023
3.5 prepare interview questionnaire	6	17/11/2023	22/11/2023
3.6 Interview session	1	23/11/2023	24/11/2023
3.7 Finalized the requirement	3	25/11/2023	27/11/2023
4. System Design & Architecture	7		
4.1 Design application architecture	3	28/11/2023	30/11/2023
4.2 Design user interface	3	1/12/2023	3/12/2023
4.3 Design prototype	1	4/12/2023	4/12/2023
5. Implementation	23		
5.1 Data preparation	2	5/12/2023	6/12/2023
5.2 Data processing	4	7/12/2023	10/12/2023
5.3 Graphic interface development	8	11/12/2023	18/12/2023
5.4 Database Implementation	3	18/12/2023	20/12/2023
5.5 Features and functionality development	6	20/12/2023	25/12/2023
6. Maintenance	13		
6.1 System testing	2	26/12/2023	27/12/2023
6.2 Application launching	1	28/12/2023	28/12/2023
6.3 User training	4	28/12/2023	1/1/2024
6.4 Feedback from user	1	2/1/2024	3/1/2024
6.5 System evaluation & improvement	3	4/1/2024	6/1/2024
6.6 Documentation	2	7/1/2024	8/1/2024

10.0 References/Appendix

10.1. Evidence of Interview with Mr. Faizal, the Assistant Administrative Officer of the JPPHP UM Transport Section



MOHAMAD FAIZAL BIN MAT YUSOFF . <faizal91@um.edu.my>
to me, SYAHRUL, JULIA, Mohd, JPPHB ▾

Nov 20, 2023, 5:40 PM ★ ↵ ⋮

Salam saudara Hassan. Pihak kami sedia untuk membantu pelajar berkenaan dengan aplikasi Bas Malaya tersebut. Boleh nyatakan disini soalan yang bakal ditanya bagi pihak kami bersedia dengan awal jawapan yang akan diberikan. Bagi temujanji dengan saya boleh whatsapp saya di 012-3513910 untuk lebih mengetahui berkenaan operasi/aplikasi bas malaya. Sekian terima kasih.

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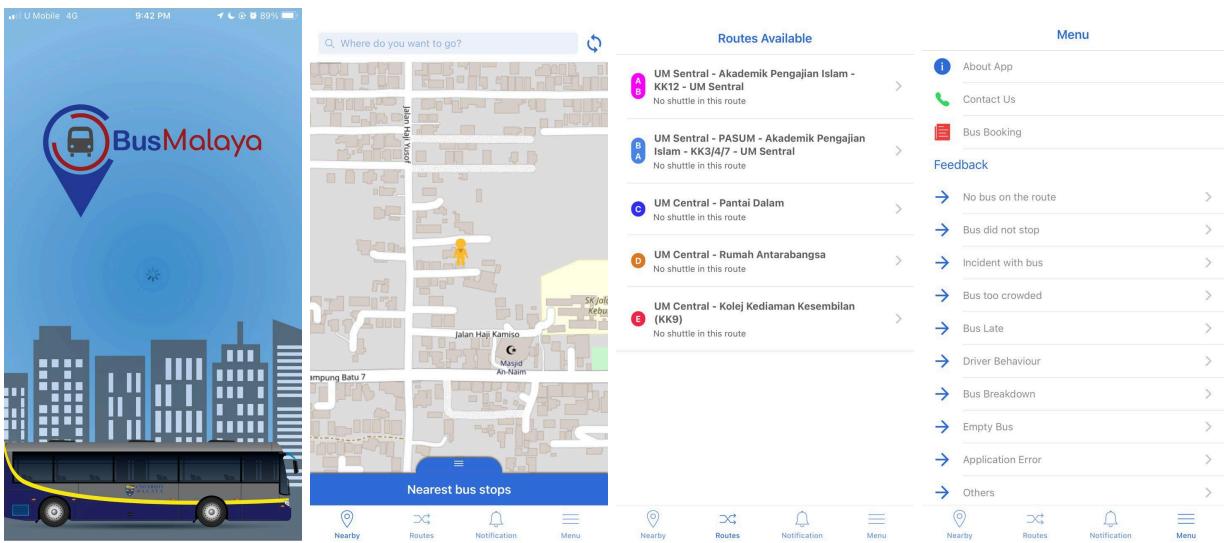


from the left Amirul, Mr Faizal, Hassan, Darwis

✉ INTERVIEW QUESTIONS (EN)

✉ Meeting Minute.docx

10.2 Observation on current system user interface



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