UTM UNIVERSITI TEKNOLOGI MALAYSIA

SCHOOL OF COMPUTING
Faculty of Engineering

Group Project

SECD2613 SYSTEM ANALYSIS AND DESIGN

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Title: UTM Transport System

Stage: Phase 1

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1.0 INTRODUCTION: BACKGROUND STUDY

The UTM Transport System presents an innovative solution aimed at revolutionizing student transportation within the university environment. Recognizing the critical role transportation plays in facilitating academic pursuits and campus life, this project endeavours to introduce a comprehensive platform that seamlessly connects students in need of transportation with willing drivers within the university area. By harnessing the power of mobile technology, this system aims to enhance accessibility, efficiency, and safety while providing students with greater flexibility and control over their transportation needs.

This project entails the development of mobile applications tailored for both students and drivers, empowering users to request, manage, and track rides with ease. Through the implementation of advanced features, such as ride customization, fare negotiation, and ride scheduling, students can enjoy a personalized transportation experience that aligns with their preferences and schedules. Additionally, drivers are equipped with tools to efficiently manage ride requests, ensuring timely and reliable service delivery.

Furthermore, this system prioritizes safety and security, incorporating measures to verify drivers, safeguard financial transactions, and comply with regulatory standards. By fostering transparency and accountability in financial processes and implementing robust security protocols, the system aims to instil confidence in users and uphold their trust.

Overall, the UTM Transport System represents a significant step forward in enhancing the transportation infrastructure within the university community. By providing students with convenient, affordable, and safe transportation options, this project seeks to enrich the overall student experience and contribute to a thriving campus environment.

3.0 PROBLEM STATEMENT

1. **Insufficient Flexibility:**
   The university-provided bus service lacks punctuality and operates strictly within predetermined schedules, resulting in inconvenience for students who require transportation outside of these fixed timings.
2. **Affordability Concerns:**
   Taxi and Grab services within the university premises often command prices that are beyond the financial means of many students, rendering them unaffordable for a significant portion of the student body.
3. **Limited Mobility Options:**
   A considerable number of students do not possess their own means of transportation, thereby restricting their ability to commute to classes or other university activities.
4. **Time Mismanagement:**
   Students are frequently required to arrive early at bus stops to ensure they do not miss their scheduled transportation. This waiting time can be significant, leading to potential disruptions to their academic schedules if buses are missed.
5. **Financial Constraints:**
   At the end of the month, many students find themselves with limited funds, making it challenging to allocate resources for essential projects and necessary software purchases.
6. **Safety Concerns:**
   Instances have been reported where students, particularly women traveling alone, have encountered safety risks due to immoral behaviour from some external drivers taking advantage of their vulnerability.
7. **Lack of Real-Time Updates:**
   The current bus system occasionally lacks accuracy or fails to arrive altogether, particularly in more severe instances. This could be attributed to bus breakdowns or other unforeseen issues that occur without students' awareness.

4.0 PROPOSED SOLUTIONS

UTM Transport System introduces a novel approach to student transportation, offering rides to any location within the university area. This system enables students to request rides at their convenience, provided there is a willing driver available. It includes features such as real-time availability updates for both car and motorcycle drivers, as well as accurate live bus schedule updates based on driver locations, ensuring students are well-informed about transportation options.

Furthermore, students can utilize the application to communicate with drivers and negotiate fares, thereby offering them flexibility in pricing arrangements, ensuring affordability for those facing financial constraints, especially during adverse weather conditions. Unlike other transportation apps that may implement surge pricing during peak times or traffic congestion, the UTM Transport System maintains consistent fares regardless of demand fluctuations.

Additionally, students have the option to book motorcycle rides, provided both if the student and driver are of the same gender, with helmets provided for safety. This feature helps to reduce transportation costs for student if they are alone.

Rather than relying on on-the-spot bookings, the system allows students to schedule rides in advance based on driver availability. Students can specify their preferred date and time, ensuring punctual pick-ups, with notifications sent to both students and drivers to prevent missed rides. All the booking, destination history dan payment are recorded able to view by both students and drivers.

Recognizing the financial challenges students face, the system offers opportunities for students with personal vehicles to become drivers, provided they possess a valid license and UTM vehicle sticker. This not only allows students to earn extra income to support their studies but also ensures passenger safety through driver examination and background checks, particularly for women passengers.

In addition, UTM administration and Academic Advisor can access all the driver's activity and location when on duty. If any of the driver did not perform in their assignment or examination, they could get warning or fired as a driver. This precaution is to ensure that students priorities academic before finding side-income.

Moreover, event organizers have the capability to input changes in the event calendar, including updates to the location and date of specific events. This functionality serves to alert both students and drivers about potential traffic delays during the event. Additionally, students can oversee their bookings and make cancellations if necessary up to one day prior to the booking, as all reservations will be visible in their calendar and ensuring smooth process.

Finally, the system will incorporate all crucial dates such as exams and their respective locations based on the student's subject and section. Prior to exams, students will receive notifications estimating traffic conditions and advising them to arrive at least 30 minutes early. This feature aims to guarantee that every student can attend their exams punctually without any risk of lateness or oversight.

FEASIBILITY STUDIES

Operational Feasibility

Based on current students experience and comments, the current bus provided by UTM does not fulfil the requirement needed by students. Students often need to move from college to faculty faster if they are located further compared to those who are nearby which resulting inconvenience to ride a bus for their daily transportation as it is time consuming. Moreover, the transportation always on high demand during heavy rain as almost all students need a transport to attend their classes. Hence, the dependency on this system would be a great alternative for students who wants affordable and express ride and great time management. This system would be a long-term project as it requires more time to produce new application and enhancing it.

Technical Feasibility

From a technical perspective, implementing a new transportation system at UTM is not only feasible but also necessary due to the absence of a reliable existing system. Given the lack of available options for upgrading the current infrastructure, the development of a new system is imperative. Fortunately, UTM possesses adequate manpower and resources to spearhead the development of a solution that will significantly benefit the university community. The technical feasibility of the UTM Transport System involves assessing its viability from a technological standpoint. These are some key aspects to consider:

1. **Software Development:**
   The development of a user-friendly mobile application or web platform is essential for students to book rides, view real-time updates, and communicate with drivers. The feasibility relies on the availability of skilled software developers capable of creating and maintaining such a system.
2. **GPS Integration:**
   The system's functionality depends on GPS integration to track driver locations, provide accurate live updates of bus schedules, and facilitate efficient routing. Ensuring reliable GPS signal coverage throughout the university campus is crucial for the system's effectiveness.
3. **Server Infrastructure:**
   Robust server infrastructure is needed to support the scalability and reliability of the UTM Transport System. This includes servers capable of handling high volumes of user requests, as well as data storage solutions for storing user information, ride history, and driver profiles securely.
4. **Mobile Compatibility:**
   The system should be compatible with various mobile devices and operating systems to cater to a diverse student population. Compatibility testing across different devices and platforms is essential to ensure a seamless user experience.
5. **Data Security:**
   Implementing a driver verification process, including license validation and background checks, to ensure passenger safety and access the system's compliance with data privacy regulations to protect students' personal information and transaction data.

6. **Integration with Existing Systems:**
   Integrating the UTM Transport System with existing university systems, to retrieve student details, academic schedules, and exam information and integrating event management systems to receive updates on event locations and dates, ensuring seamless communication with students and drivers.
7. **Scalability:**
   The system should be designed to accommodate future growth and expansion, considering factors such as increasing student enrolment and evolving transportation needs. Scalability testing is necessary to assess the system's ability to handle growing demand without compromising performance.
8. **Real Time Updates and Notifications**
   Assess the viability of integrating real-time updates and notifications within the UTM transport system, covering aspects such as the availability of cars and motorcycles, booking schedules, bus locations, and communication alerts. Considering the utilization of push notifications, email, and other messaging channels, as well as the reliability and speed of data transmission.
9. **Maintenance and Support:**
   Implementing monitoring tools to track system performance, identify issues, and ensure uptime. Providing user support services to address technical issues, answer queries, and handle feedback from students, drivers, and administrators.

Economic Feasibility

COST		**Year 0**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**
Development Cost (One-time)							
Hardware	15000	**16500**					
Software	17000	**18700**					
Total (Development Cost)		**35200**					
Production Cost							
Advertising	1000		1100	1177	1259	1348	1442
Salary	35000		38500	41195	44079	47164	50466
Maintanence	3000		3300	3531	3778	4043	4326
Annual Production Costs			**42900**	**45903**	**49116**	**52554**	**56233**
(PRESENT VALUE)			39000	37936	36902	39485	42249
ACCUMULATED COSTS			**74200**	**112136**	**149038**	**188523**	**230772**

BENEFITS	**Year 0**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**
Increase Profits		72000	64800	68040	71442	75014
Increase App Stability		10000	9000	9450	9923	10419
(PRESENT VALUE)		**60741**	**54667**	**57400**	**60270**	**63284**
ACCUMULATED BENEFITS		60741	115407	172807	233077	296361
GAIN OR LOSS		-13459	3271	23769	44554	65589
PROFITABLE INDEX	**1.8633**					

The profitable index is 1.8633, showing that this project is a good investment as the index is more than one.

5.0 OBJECTIVES

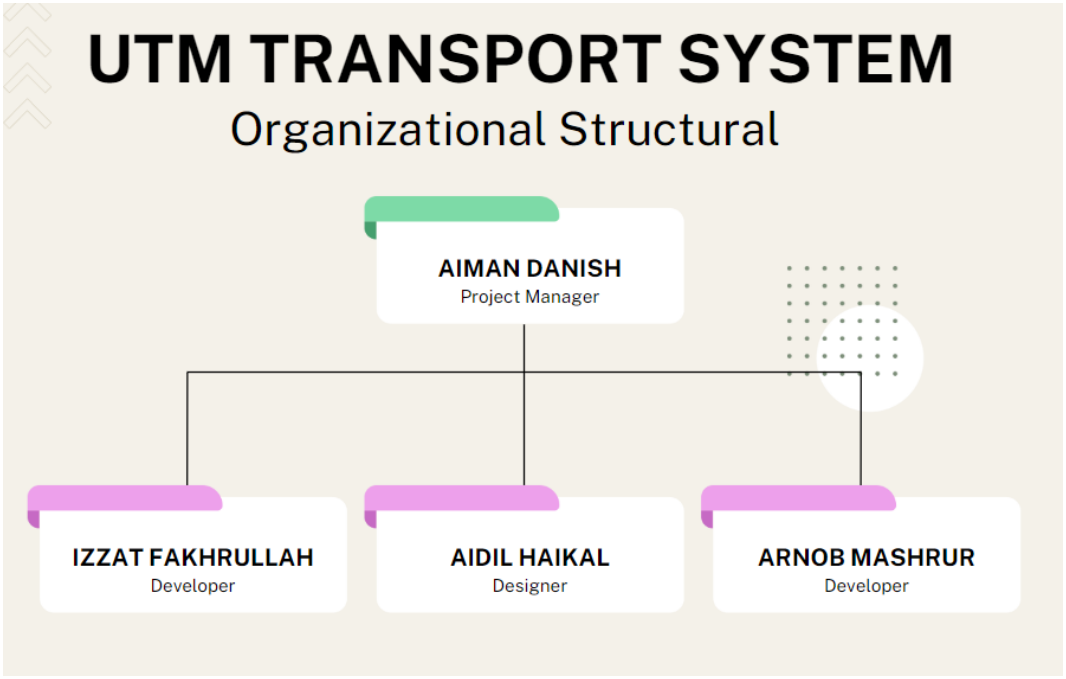
1. **To Enhance Campus Mobility:**
   Improve the overall transportation experience for students within the university campus.
2. **To Increase Accessibility:**
   Ensure that all areas within the university are easily accessible to students, regardless of their mode of transportation.
3. **To Optimize Resource Utilization:**
   Efficiently utilize available transportation resources to minimize waiting times and maximize service coverage.
4. **To Improve Students Satisfaction:**
   Enhance the satisfaction levels of students and other users by providing a reliable, convenient, and affordable transportation service.
5. **To Promote Safety:**
   Prioritize the safety and security of passengers by implementing rigorous driver screening processes and safety protocols.
6. **To Facilitate Financial Accessibility:**
   Provide cost-effective transportation solutions that cater to the diverse financial needs of students, particularly those facing financial constraints.
7. **To Enhance Technological Integration:**
   Integrate advanced technological features, such as real-time tracking, route optimization, and mobile booking capabilities, to streamline the transportation process.
8. **To Support Student Employment:**
   Create opportunities for students to earn supplementary income by participating as drivers in the transportation system, thus contributing to their financial stability.
9. **To Ensure Sustainability:**
   Establish a sustainable transportation framework that can adapt to future changes in student population, transportation trends, and technological advancements.
10. **To Facilitate Academic Success:**
    Support students' academic pursuits by integrating exam schedules and event calendars into the system, providing timely notifications, and ensuring punctual transportation to exams and other academic commitments.

6.0 SCOPE OF THE PROJECT

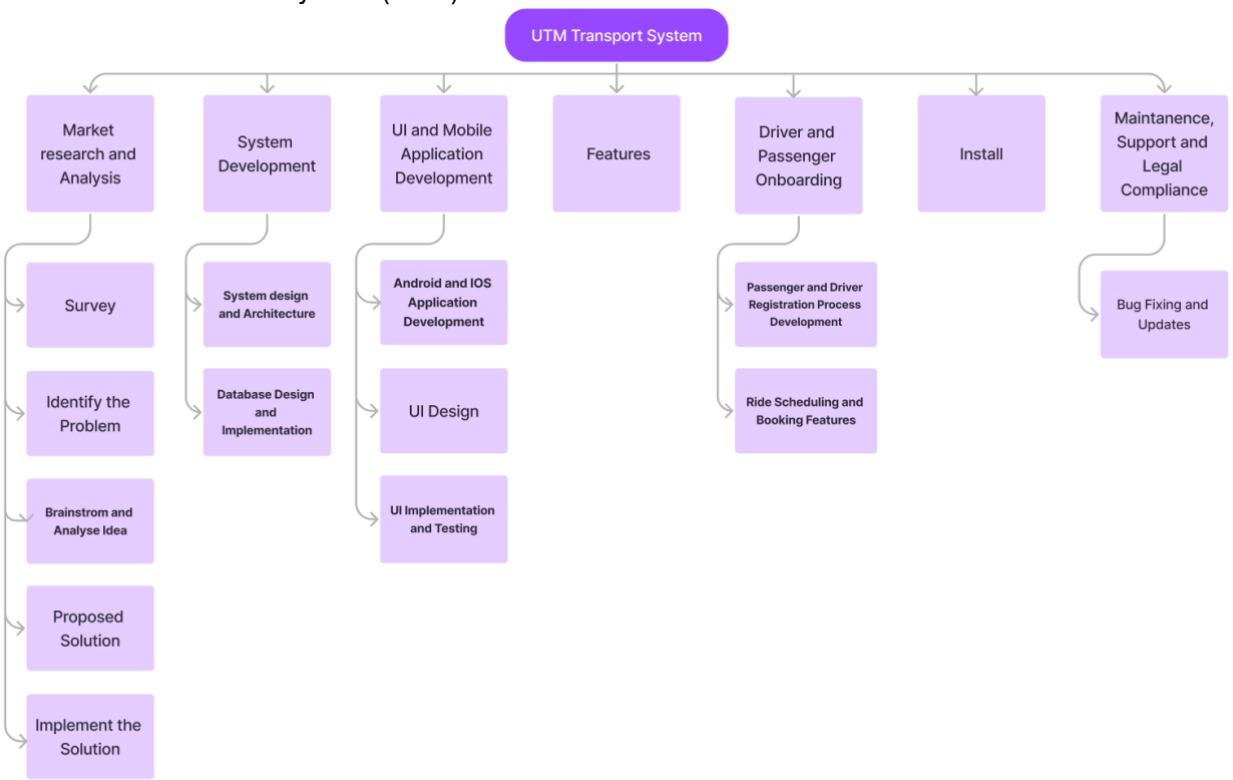
1. **Ride Request and Management System:**
   Creating mobile applications tailored for students and drivers to request, oversee, and monitor rides within the confines of the university. Incorporating functionalities empowering students to outline ride preferences, engage in fare negotiations, and arrange rides ahead of time contingent on driver availability.
2. **Safety and Security Measures**
   Safety is the top priority, by taking several steps to ensure the well-being of all students. Carefully screen drivers and regularly check vehicles to make sure they're safe. Provision of helmet for motorcycle rides, clear safety guidelines will be provided for passengers to follow, and emergency procedures will be in place to handle any unexpected situations. The app will include safety features to assist users in emergencies, and passengers will have the option to choose gender-specific preferences for added comfort and security. These measures are designed to make sure everyone feels safe and secure when using the transportation system.
3. **Financial Management**
   Creating functionalities within the application to facilitate communication between students and drivers, enabling fare negotiation and secure payment processing. Developing a comprehensive system to manage fare payments, driver earnings, and financial transactions with precision and security. Stringent security protocols will be enacted to safeguard financial information, ensuring compliance with regulatory frameworks and industry standards. Integration with external systems will optimize operational workflows, enabling seamless financial management within the transportation service.
4. **Integration with Academic Systems:**
   Integration with the university's student information system to retrieve exam schedules, academic calendars, and student information for seamless scheduling and notification management. Collaboration with event management systems to receive updates on event locations, dates, and traffic advisories to facilitate transportation planning and coordination.
5. **Real-Time Updates and Notifications:**
   Integration of real-time updates for ride availability, bus schedules, and event changes to ensure students and drivers are well-informed. Implementation of a notification system to alert users about ride confirmations, event updates, and exam reminders via push notifications, email, and in-app messages.
6. **Administrative Oversight and Monitoring:**
   Implementation of administrative tools for UTM administration and academic advisors to monitor driver activities, view booking history, and ensure compliance with policies and regulations. Development of reporting and analytics features to track system usage, analyse performance metrics, and identify areas for improvement.
7. **User Support and Feedback**
   Offering continuous assistance to users, aiding in booking, addressing inquiries, and gathering feedback to enhance the system based on user experiences and suggestions. This encompasses providing timely assistance to users navigating the booking process, resolving any inquiries or issues they may encounter, and actively seeking feedback to identify areas for improvement. The goal is to ensure a positive user experience and continuously refine the system to better meet user needs and preferences.

7.0 PROJECT PLANNING

7.1 Human Resource

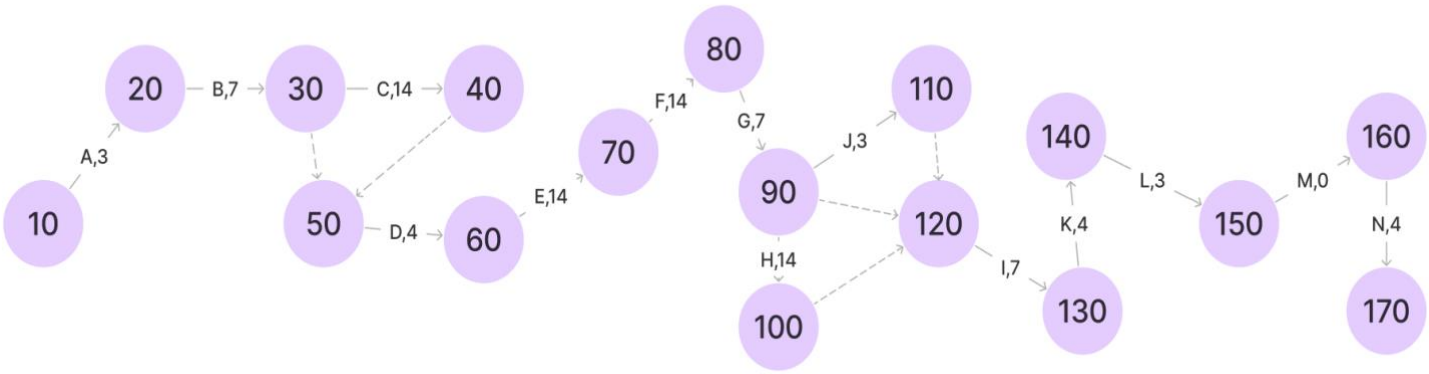


7.2 Work Breakdown System (WBS)

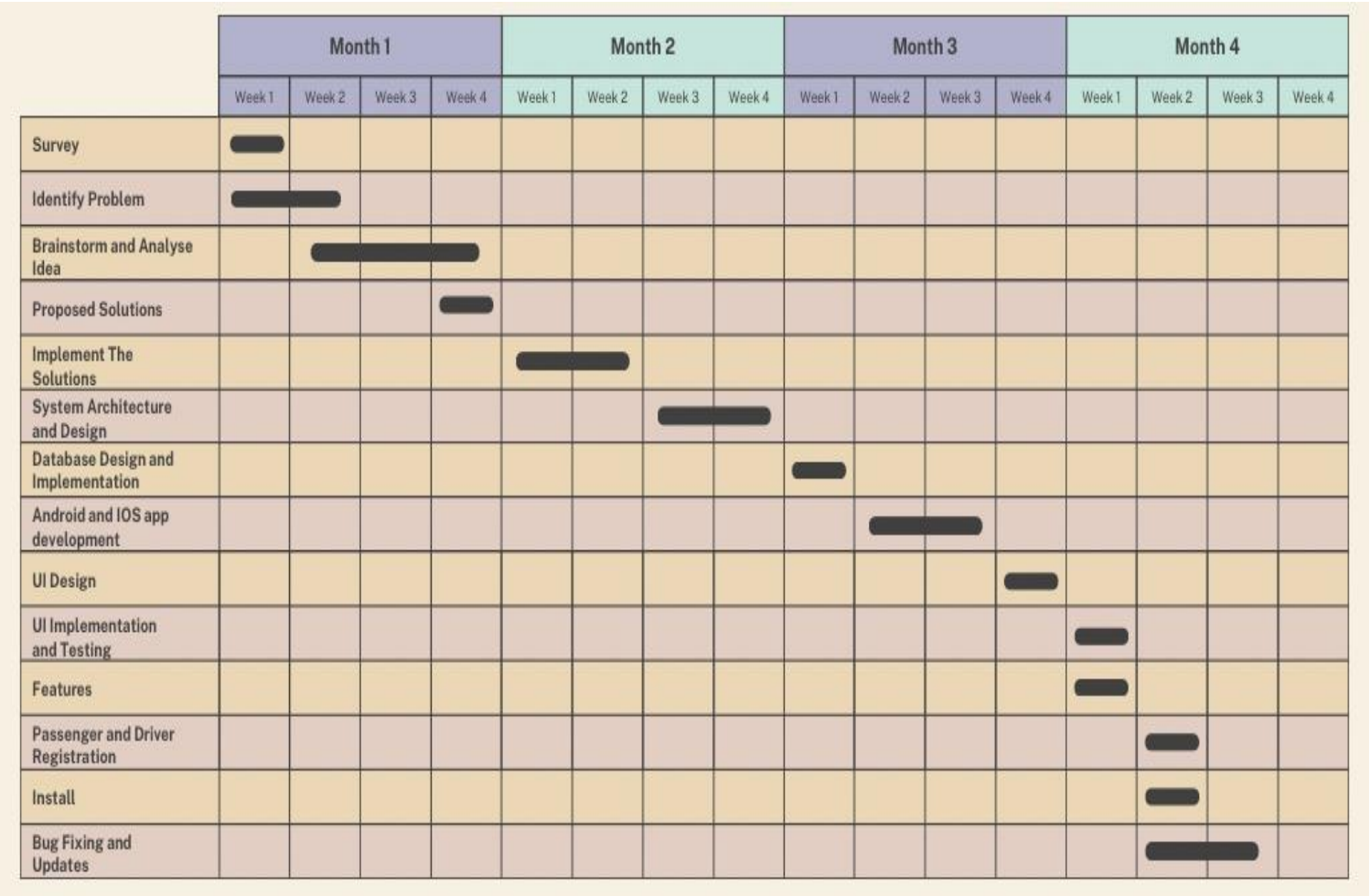


7.3 PERT Chart

Activities	Predecessor	Duration
A. survey	**None**	**3**
B. identify the problem	**A**	**7**
C. Brainstorm and Analyse Idea	**B**	**14**
D. Proposed solutions	**B,C**	**4**
E. Implement the Solution	**D**	**14**
F. System design and Architecture	**E**	**14**
G. Database Design Implementation	**F**	**7**
H. Android and IOS App Development	**G**	**14**
I. UI Design	**G,H,J**	**7**
J. UI implementation and Testing	**G**	**3**
K. Features	**I**	**4**
L. Passenger and Driver Registration Process Development	**K**	**3**
M. Install	**L**	**0**
N. Bug Fixing and Updates	**M**	**4**



7.4 Gantt Chart



8.0 BENEFIT AND OVERALL SUMMARY OF PROPOSED SYSTEM

This system will benefit the student by enhancing their mobility by saving time and energy, which can be redirected towards academic and extracurricular activities. Other than that, it will improve student accessibility by increasing the increasing the number of transportation options catering to diverse needs, making all areas of the university easily reachable, and fostering inclusivity and participation in campus events and facilities. Increasing student satisfaction is also one of the benefits that students get. This system will help students provide reliable, convenient, and affordable services that enhance the overall student experience, leading to higher satisfaction levels and a positive campus environment. This system also helps students facilitate their academic success. By integrating academic schedules and providing timely transportation to exams and events, the system supports students in meeting their academic commitments, reducing stress, and enhancing overall academic performance. Another benefit is that it will help students' employment. It is because this system supports student employment by offering opportunities for student employment as drivers, which not only supplements their income but also fosters a sense of community and responsibility within the student body. This system also benefits the environment through technological integration. It will help increase productivity because it is a modern system that uses Advanced features like real-time tracking and mobile booking streamline the transportation process, enhancing convenience and responsiveness to student needs. It also optimised resource utilisation by minimising waiting times and maximising service coverage; resources were utilised efficiently, reducing operational costs and environmental impact. This will help the user or student do their routine without fearing wasting time.

From all the benefit that user gain, we can concluded that this system help user or student a lot by saving their time and also help them improve their academic by make them can easily reach all facilities in the university area . This system also helps on the financial side by helping students earn some money to join the crew or other job positions. It also promotes an advanced system or modern style by implementing advanced features in the system. This system also likeably makes a good impression by focusing on the user or customer to get a satisfying result.

URL of the GitHub Repository:

https://github.com/AimanDanishh/Quadro_Project1_SAD_20232024