UTM

UNIVERSITI TEKNOLOGI MALAYSIA

SEM 1 2023/2024

SECD2523 DATABSE

SECTION 05

P1 PROJECT SUBMISSION

SYSTEM NAME: CARBON TRACK PRO SYSTEM

TEAM NAME: ECODYNAMOS

TEAM MEMBERS:

A'ISYAH MAWADDAH BINTI MOHD RODUAN	A22EC0129
ADAM ISKANDAR BIN NORSHAM	A22EC8025
HANAN OSAMA HUSSEIN SALAH	A22EC4042
ZHANG ZIYUAN	A22EC4018

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1.0 INTRODUCTION

This Project is spearheaded by the Johor government, with the invaluable assistance of various governmental entities . These entities, in conjunction with the Johor government, play a pivotal role in this project, ensuring its seamless execution and maintenance. The governmental agencies involved are crucial partners in driving the success of this initiative.

The Iskandar Malaysia Eco Life Challenge (IMELC) program, organized since 2013 by the Johor State Education Department (JPNJ) and Universiti Teknologi Malaysia (UTM), has had a significant impact. This high-impact initiative aims to enhance awareness about the importance of fostering a Low Carbon Society (LCS) among diverse public communities through educational platforms. The IMELC program is dedicated to engaging and educating individuals about sustainable practices and low-carbon emissions.

The Iskandar Puteri City Council (MBIP), also known as Majlis Bandaraya Iskandar, plays a pivotal role in the administration of Iskandar Puteri City, operating as an agency under the Johor state government. Recognized as MBIP (Majlis Bandaraya Iskandar Puteri), this council is entrusted with critical responsibilities, overseeing public health, sanitation, and general maintenance functions of urban infrastructure. The collective efforts of these agencies reflect a commitment to the advancement and sustainability of the region.

2.0 BACKGROUND STUDY

The Johor government has outlined its own prospective course of action. Multiple governmental departments have introduced various initiatives Including the Iskandar Malaysia Eco Life Challenge (IMELC) program, the Johor Education Department and the JPNJ e-Lestar system, and more recently, the Iskandar Puter City Council (Majlis Bandaraya Iskandar Putri) - MBIP.

Among the commendable accomplishments of MBIP is the initiation of the Iskandar Puteri Low Carbon Calendar Competition, featuring a generous total prize pool of RM30000. The aim is to minimize waste and coalesce efforts to curtail energy and electricity usage.

Notwithstanding, the competition encountered several challenges, such as managing intricate and convoluted data. For instance, there were stringent standards for participant data and the arduous process of computing carbon reductions. To address these issues, MBIP intends to establish a platform akin to the e-Lestar system for the purpose of collating and analyzing data. This novel platform is also poised to cater to several community sectors.

MBIP anticipates that the data and analysis will necessitate mapping the area and assessing the carbon footprint, calculating carbon dioxide emissions stemming from waste, water, electricity, and recycled cooking oil consumption, identifying communities with high CO2 emissions, and crafting a user monitoring panel for carbon dioxide emissions.

The government's commitment to these efforts is commendable, as it showcases their dedication to environmental sustainability and the reduction of carbon emissions. By implementing innovative programs, such as the Iskandar Puteri Low Carbon Calendar Competition, they are actively encouraging individuals, communities, and industries to adopt more eco-friendly practices.

The establishment of a platform for data collation and analysis not only addresses the challenges faced by the competition but also paves the way for more efficient and accurate measurement of carbon footprints and the identification of areas for improvement. With the participation and support of the community, these initiatives have the potential to make a significant impact in reducing carbon dioxide emissions and creating a more sustainable future for Johor.

3.0 PROBLEM STATEMENT

In the analysis of this system, the problems have been identified as stated below.

- **Time-consuming and inconvenient data entry procedure**
  In the Iskandar Puteri Low Carbon Calendar Competition, the process of data collection by the organizer（MBIP） is very time-consuming and user-unfriendly. The way of data collection will greatly impact the user's experience. Furthermore, extensive participant information requirements may lead to participants not wanting to be involved throughout the process of data collection.

- **Carbon reductions must be manually calculated and reported.**
  Participants are required to manually calculate and report carbon reduction, the fact that some participants are not yet aware of how to make correct calculations and reports, could increase the risks of data errors in the system, which can negatively impact the process of the contest.

- **Difficulty in extracting valuable information**
  The system of the contest is unable to analyze and process data, making it difficult to extract valuable information out of complex information. Those pieces of information are collected from a variety of user sources, which vary widely. It was difficult to analyze the user group.

- **Other issues of the current system**
  Some of the participants often did something wrong when they used Google Forms because they were unfamiliar with it. Furthermore, the application's language restriction prevents utilization and is an obstacle to inclusivity, particularly for people whose first language is not Malay.

4.0 PROPOSED SOLUTIONS (INCLUDE FEASIBILITY STUDY)

4.1 PROPOSED SOLUTIONS

Proposed requirements for future systems will focus on more comprehensive data collection and analysis to improve efficiency and understanding of carbon emissions management.

1. The community-wide coverage

The new system will be for different communities, including residents of multi-story and landed houses, institutions, MBIP departments, and MBIP staff. The new system will provide a comprehensive carbon emissions picture and develop more accurate carbon emissions reduction strategies.

2. Meet the requirements for data analysis

The system will meet the needs of multi-purpose data analysis, including some functions for mapping carbon footprints, calculating carbon consumption in electricity, water, waste, and recycling cooking oil consumption, identifying communities with high carbon emissions, and creating a self-monitoring dashboard for users to track their carbon emissions

3. Primary Language

In order to better serve local residents and non-local residents, the primary language of the new system will be Malay and English. This will help improve the interactivity of the system and ensure that it is easier for users to understand and utilize the system functions**.**

4.2 FEASIBILITY STUDY

4.2.1 TECHNICAL FEASIBILITY

Carbon Track Pro System is a system used to track carbon emissions from the community. This system will use hardware such as a CPU, server, internet access, and much more. After assembling the necessary components, we install software that will help us collect, analyze, and calculate the data that has been inputted into the system. A database will also be needed for the system to collect the data monthly.

4.2.2 OPERATIONAL FEASIBILITY

The system will then be advertised to the masses for them to use it and will also need monthly maintenance. Hence, a monthly salary needs to be used to pay the workers in charge of the system.

4.2.3 ECONOMICAL FEASIBILITY

Below is the CBA for the system:

Assumptions	
Discount rate	3.75 %
Sensitivity Factor (Cost)	1.0375
Sensitivity Factor (Benefit)	0.9625
Annual change in costs	7%
Annual change in benefits	5%

Estimated Benefits	
Data on carbon emissions	RM 2000.00 per week

Cost	Year 0	Year 1	Year 2	Year 3	Year 4
Development Cost (RM)					
Hardware	18590.00				
Software	6270.00				
Total	25220.00				
Production cost (RM)					
Advertisement		2750.00	2942.02	3147.96	3368.32
Salary		22000.00	23540.00	25187.80	26950.95
Maintenance		2750.00	2942.02	3147.96	3368.32
Annual Production Cost (PV)		27550.00	29424.04	31483.72	33687.59
		26506.02	27335.44	28191.72	29074.85
Accumulated Cost (RM)		51726.02	79061.46	107253.18	136328.03

Benefit	Year 0	Year 1	Year 2	Year 3	Year 4
Reduced Data costs (RM)		100100.00	105105.00	110360.25	115878.26
		96481.92	97644.36	98820.8	100011.41
Accumulated benefits (PV)		96481.92	194126.28	292947.08	392958.49
Gain or Loss		44755.90	115064.82	185693.90	256630.46
Profitability Index	10.1757				

From the table above, the profitability index is 10.1517, this shows that it is a good investment because its index is greater than 1. Thus, this system will give a good profit.

5.0 OBJECTIVES

- **Design a user-friendly, simplified process data entry interface**
  Creating an interface for data entry that is easy to use and efficient is essential to raising participant engagement. In that case, developing a new data input procedure is necessary to improve the user experience since the current procedures are time-consuming and complex.

- **Automatic Carbon Reduction Calculations**
  One major improvement to our system is the addition of automated carbon reduction calculations. We are able to improve the precision and accuracy of carbon reduction tracking by automating carbon reduction calculations for participants. This will promote a responsible approach to sustainable development by enabling participants to accurately monitor and analyze their progress in reducing their carbon intensity.

- **Improve the system's ability to analyze the information**
  The integration of data visualization tools and analytics capabilities is essential to enhance the system's ability to handle and analyze information in order to extract valuable information more effectively. This includes but is not limited to, tools for visualizing vast volumes of information, such as dashboards, charts, and trend analysis. Users can easily recognize trends and relationships between the information through visualization, which helps them make better decisions.

- **Other solutions:**
  We will provide a comprehensive user guide to assist participants in quickly getting familiar with Google Forms, as some participants may not be familiar with these kinds of tools. Additionally, our system will offer multi-language support to ensure openness in addressing language limitation

6.0 SCOPE

The Iskandar Malaysia Eco Life Challenge (IMELC) program stands as a testament to the concerted efforts of the Johor government and various key governmental entities. Their collaboration is integral to the seamless execution and ongoing maintenance of this visionary project, highlighting a shared commitment to the region's advancement and sustainability. This multifaceted initiative, spearheaded by the Johor government, gains invaluable support from diverse governmental agencies, each playing a pivotal role in driving the success of the IMELC program.

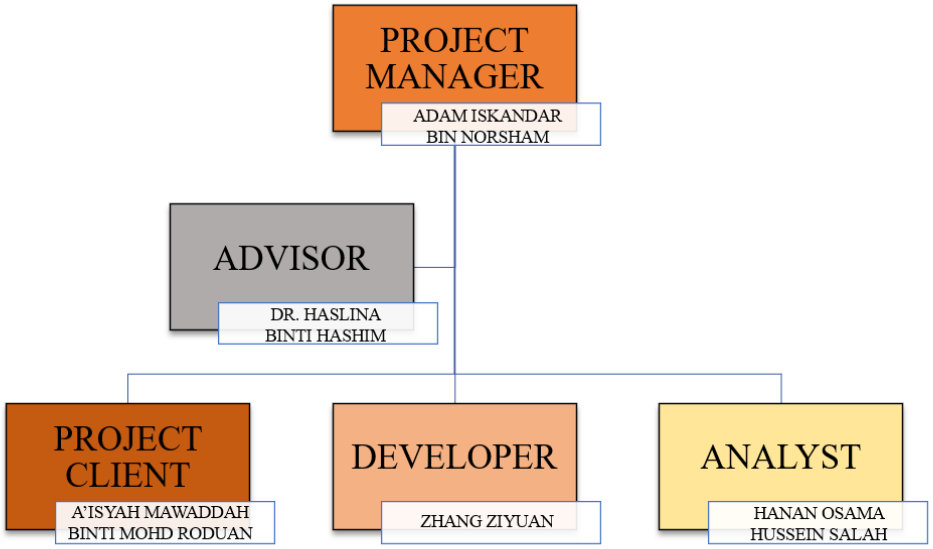
Since its inception in 2013, the IMELC program has been a flagship endeavor orchestrated by the Johor State Education Department (JPNJ) in collaboration with Universiti Teknologi Malaysia (UTM). The program's overarching goal is to foster awareness about the significance of cultivating a Low Carbon Society (LCS) within various public communities. It achieves this objective through robust educational platforms designed to engage and enlighten individuals on sustainable practices and the imperative to reduce carbon emissions.

At the heart of this endeavor is the Iskandar Puteri City Council (MBIP), also known as Majlis Bandaraya Iskandar. Functioning as a critical agency under the Johor state government, MBIP is entrusted with key responsibilities in the administration of Iskandar Puteri City. Operating under the acronym MBIP, the council assumes a central role in overseeing essential aspects such as public health, sanitation, and the general maintenance of urban infrastructure. In essence, MBIP is a cornerstone in the collective efforts aimed at propelling the region towards a sustainable and thriving future.

The collaborative synergy between the Johor government, JPNJ, UTM, and MBIP underscores a unified vision for the advancement and sustainability of Iskandar Malaysia. By combining resources, expertise, and a shared commitment to environmental consciousness, these entities contribute significantly to the success and enduring impact of the Iskandar Malaysia Eco Life Challenge program. As the region strives towards a Low Carbon Society, this collaborative initiative serves as a beacon, illuminating the path towards a greener, more sustainable future.

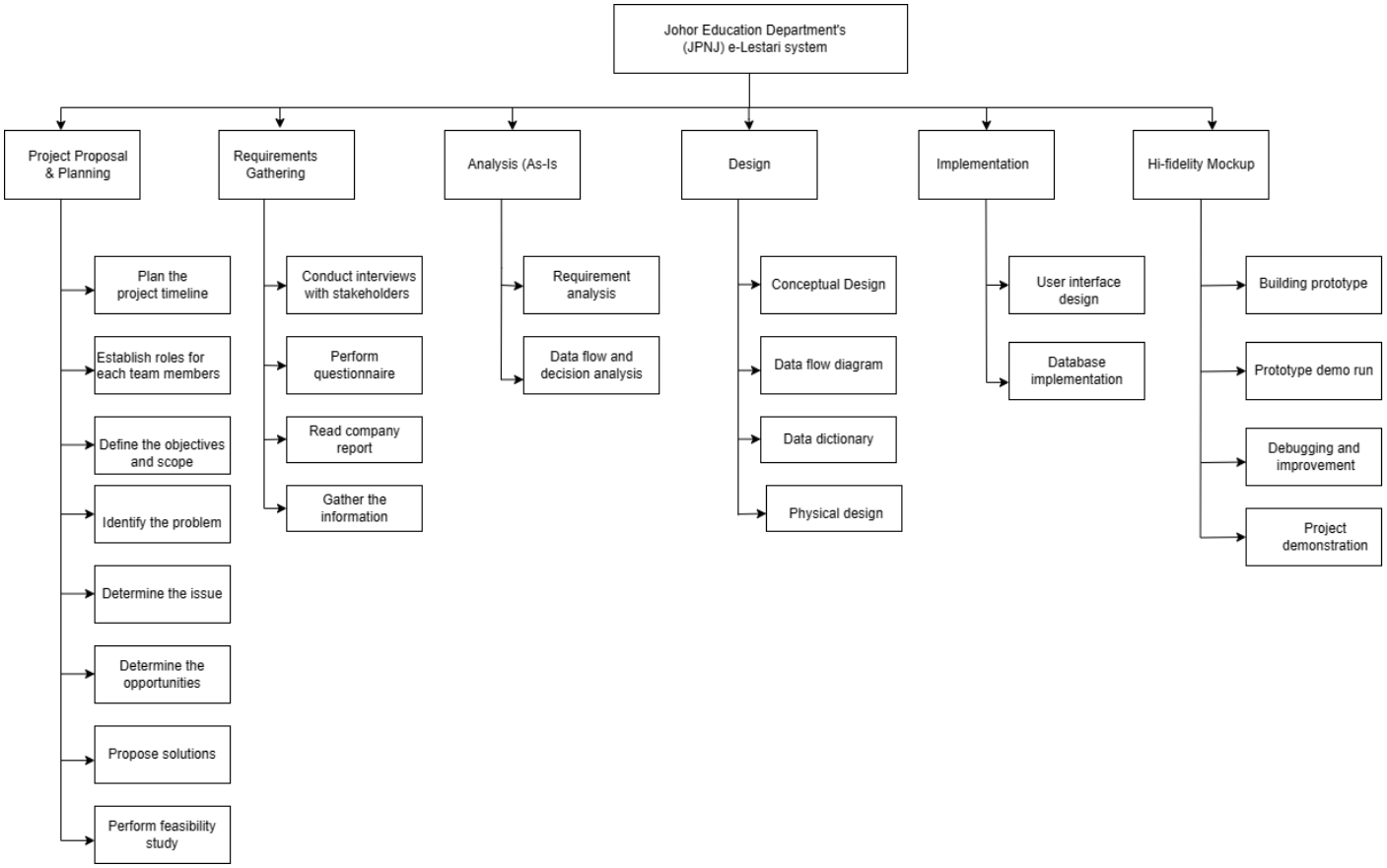
7.0 PROJECT PLANNING

7.1 HUMAN RESOURCE



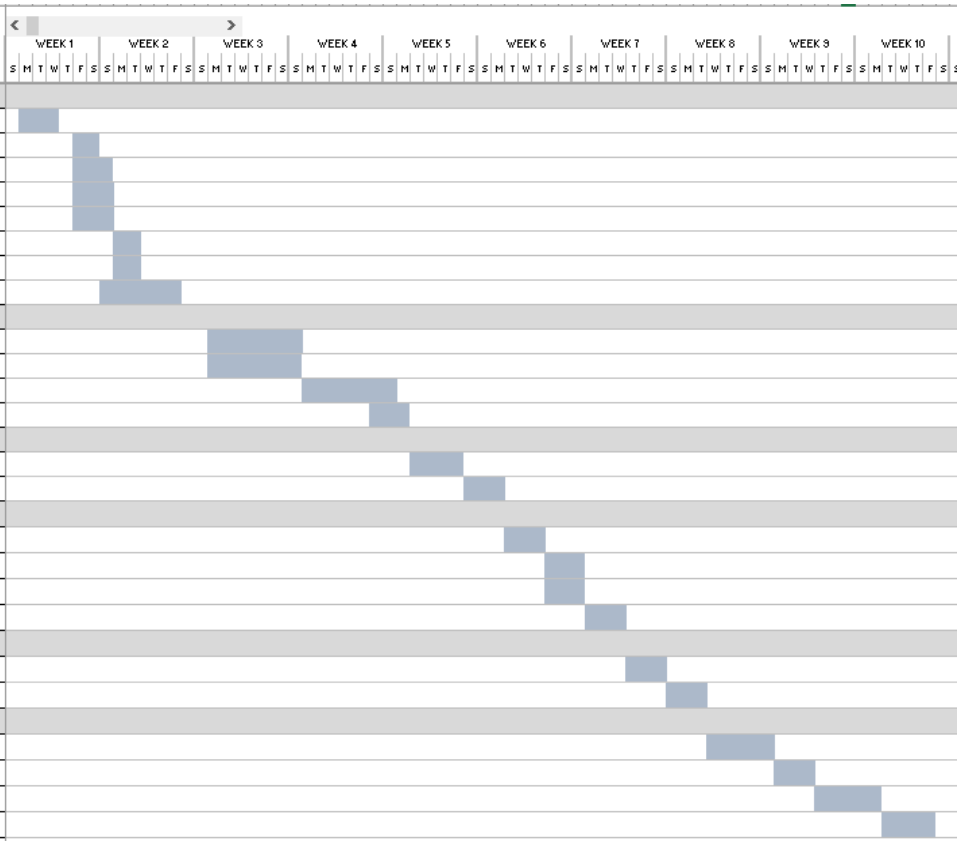
ROLE	PERSON IN CHARGE	RESPONSIBILITY
PROJECT MANAGER	ADAM ISKANDAR BIN NORSHAM	• Plan the project timeline • Monitor team's progress • Manage tasks for each member
ADVISOR	DR. HASLINA BINTI HASHIM	• Review progress for each phase in this project • Give comment on improvement for every submission
PROJECT CLIENT	A'ISYAH MAWADDAH BINTI MOHD RODUAN	• Provide business information and rules • Request for changes • Give project budget
DEVELOPER	ZHANG ZIYUAN	• Develop data • Test data • Fix problem and bugs
ANALYST	HANAN OSAMA HUSSEIN SALAH	• Project analysis • Manage data • Manage troubleshooting

7.2 WORK BREAKDOWN STRUCTURE (WBS)



7.3 GANTT CHART

WBS	TASK	START	END	DAYS	% DONE	WORK
1	**Project Proposal & Planning**					
1.1	Plan the project timeline	30/10/2023	1/11/2023	3	100%	
1.2	Establish roles for each team member	3/11/2023	4/11/2023	2	100%	
1.3	Define the objectives and scope	3/11/2023	5/11/2023	3	100%	
1.4	Identify the problem	3/11/2023	5/11/2023	3	100%	
1.5	Determine the issue	3/11/2023	5/11/2023	3	100%	
1.5	Determine the opportunities	6/11/2023	7/11/2023	2	100%	
1.6	Propose solutions	6/11/2023	7/11/2023	2	100%	
1.7	Perform feasibility study	5/11/2023	10/11/2023	6	100%	
2	**Requirements Gathering**					
2.1	Conduct interviews with stakeholders	13/11/2023	19/11/2023	7	0%	
2.2	Read company report	13/11/2023	19/11/2023	7	0%	
2.3	Perform questionnaire	20/11/2023	26/11/2023	7	0%	
2.4	Gather the information	25/11/2023	27/11/2023	3	0%	
3	**Analysis (As-Is)**					
3.1	Requirement analysis	28/11/2023	01/12/2023	4	0%	
3.2	Data flow and decision analysis	02/12/2023	04/12/2023	2	0%	
4	**Design**					
4.1	Conceptual Design	05/12/2023	07/12/2023	3	0%	
4.2	Data flow diagram	08/12/2023	10/12/2023	3	0%	
4.3	Data dictionary	08/12/2023	10/12/2023	3	0%	
4.4	Physical design	11/12/2023	13/12/2023	3	0%	
5	**Implementation**					
5.1	User interface design	14/12/2023	16/12/2023	3	0%	
5.2	Database implementation	17/12/2023	19/12/2023	3	0%	
6	**Hi-fidelity Mockup**					
6.1	Building prototype	20/12/2023	24/12/2023	5	0%	
6.2	Prototype demo run	25/01/2024	27/01/2024	3	0%	
6.3	Debugging and improvement	28/12/2023	01/01/2024	4	0%	
6.4	Project demonstration	02/01/2023	05/01/2024	4	0%	



8.0 BENEFIT AND SUMMARY OF PROPOSED SYSTEM

To address issues with earlier initiatives, a new system is being proposed for the Iskandar Puteri Low Carbon initiative. It offers a self-monitoring dashboard for users, automated data analysis, and a simplified data entry process. The system strives to increase accessibility and inclusivity by supporting the local language and focusing on different community categories. Effective update and deletion procedures guarantee data accuracy, and thorough data queries offer insightful information for well-informed decision-making. All things considered, the system is well-positioned to promote sustainable practices, increase community engagement, and help the Johor government reach its target of 58 percent lower carbon intensity by 2025.

The new platform targets a variety of community categories, including residents, institutions, MBIP divisions, and staff, and provides a streamlined data entry process. Additionally, it automates data analysis, which decreases human labor and increases precision. To track their carbon emissions, users can access a self-monitoring dashboard, which encourages accountability and ownership. Through targeted initiatives and incentives like the Iskandar Puteri Low Carbon Calendar Competition, the system also improves community engagement. Additionally, the system offers effective update/deletion procedures that guarantee the accuracy and integrity of the data. Extensive data queries are offered for evaluating survey results, progress, and carbon footprints, offering insightful information about user behaviors, lifestyle decisions, and carbon reduction efforts. In the Low Carbon initiative, these features aid in the facilitation of targeted interventions and well-informed decision-making.

9.0 SUMMARY

Throughout the Phase 1 project, we learned some valuable lessons and we reflect back on our progress from the beginning until the end of Phase 1.

Lesson learned from Phase 1:

- **Importance of project planning**

Project planning is a very important step in project development. It provides a roadmap with tasks, milestones, and timelines. It also involves a thorough risk assessment and mitigation strategy, allowing our team to develop contingency plans to minimize the impact of unforeseen issues on project timelines. Additionally, project planning aids in effective time management by breaking down the project into tasks and assigning realistic timelines, ensuring each phase is completed on schedule and preventing delays that could jeopardize the project's overall timeline.

- **Importance of defining precise problem definition**

Accurately defining the problem is essential to designing a successful solution. It offers a clear road map for creating focused, effective solutions that deal with problems at their core and provide significant, long-lasting outcomes. Additionally, by minimizing ambiguity, this strategy lowers the possibility of misunderstandings among stakeholders, team members, and the project itself. A well-defined problem definition facilitates mutual comprehension, directing endeavors towards shared goals and guaranteeing a more efficient and successful resolution.

Reflection of what we gained from Phase 1:

- **Importance of effective communication**

Clear communication can promote team unity in goals and the purpose of the project. Team members will have the same understanding of project goals thus reducing ambiguity and misunderstanding that could lead to failure of the project. Having the same understanding about the project could lead to effective problem solving discussion and exchanging of ideas. By having an open discussion, we can collectively combined the intelligence of each team member, leading to innovative solutions and informed decision-making.

- **Strategic task allocation for each member**

The initial phase in any project is that we have to identify necessary human resources in our team members, such as their skills and expertise and assign each member to respective tasks based on skills and expertise. By using Gantt Chart we can strategically allocate tasks to each member and monitor their progress. The Gantt Chart help to visualize the task allocation, planning for the overall project, and timeline making it easier to keep track of our group's tasks throughout the project. Using Gantt Chart for project planning promotes clear communication and coordination between team members thus leading to effective collaboration. (Gilmore, 2016)

10.0 REFERENCES

Gilmore, N. (2016, August 15). *The Purpose & Benefits of Gantt Charts*. TeamGantt. Retrieved November 10, 2023, from https://www.teamgantt.com/blog/10-benefits-of-using-a-gantt-chart-of-your-next-project

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