Sem.1 2023/2024

SECD 2523 Database
Section #05

Phase 1: Project Proposal and Planning

IPRK System

Team: System Virtuoso

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1.0 Introduction

Malaysia is actively pursuing sustainability through initiatives such as the Low Carbon Cities Framework (LCCF), which aids cities in formulating low-carbon development strategies. Monitoring and addressing carbon dioxide emissions are pivotal in combating global warming. Carbon dioxide, a byproduct of normal cellular processes and fossil fuel combustion, poses health risks, including headaches and respiratory issues. In alignment with national efforts, the Johor government has crafted the Low Carbon Blueprint for Iskandar Malaysia 2025, outlining 281 strategies to achieve a 58 percent reduction in carbon intensity by 2025. This blueprint covers five local authorities, including Johor Bahru and Kulai Jaya districts, emphasizing the importance of collective action in promoting low carbon society.

2.0 Background Study

To align with the Low Carbon Blueprint for Iskandar Malaysia 2025, various government agencies in Johor have launched initiatives targeting specific user groups. The Iskandar Malaysia Eco Life Challenge (IMELC) program, for instance, focuses on raising awareness among students, teachers, and families about the principles of the Low Carbon Society (LCS). Simultaneously, the Johor Education Department's (JPNJ) e-Lestari system, initiated in 2022, integrates sustainability elements into the education system, facilitating sustainability education, energy audits, and program evaluation across 1180 schools. The Iskandar Puteri City Council (MBIP) plays a pivotal role in promoting the Low Carbon Society through its Iskandar Puteri Low Carbon (IPRK) initiative. However, the existing Iskandar Puteri Low Carbon Calendar Competition encountered challenges, prompting MBIP to propose the development of a new data collection and analysis platform to streamline processes and enhance community engagement in carbon reduction efforts. This platform aims to address previous challenges and expand its reach to various community categories, fostering a comprehensive and inclusive approach to carbon footprint management within the MBIP region. current issues, simplify carbon reduction, and get more community support for the ambitious carbon reduction goals in the Low Carbon Blueprint for Iskandar Malaysia 2025

3.0 Problem Statement

While Malaysia is committed to sustainable development, making the Iskandar region a Low Carbon Society (LCS) faces big challenges. Current efforts, like the Iskandar Puteri Low Carbon Calendar Competition by the Iskandar Puteri City Council (MBIP), show problems. Complicated data entry, lots of participant info needed, manual carbon reduction calculations, and no data analysis make the current approach less effective. Also,

different user types and communities not knowing how to use tools like Google Form add more problems. These challenges not only slow down carbon reduction but also make community involvement difficult. To fix this, MBIP suggests a new solution: a user-friendly platform for easy data collection and analysis. This aims to tackle current issues, simplify carbon reduction, and get more community support for the ambitious carbon reduction goals in the Low Carbon Blueprint for Iskandar Malaysia 2025.

4.0 Proposed Solutions

- Create a user-friendly online platform that makes data collection easier for participants. This could include an easy-to-use interface, clear instructions, and simple forms by applying features dropdown menus, checkboxes, and auto-populated fields to reduce manual data entry and errors.

- Create a centralized data analysis system that automates the calculation of carbon reduction metrics. This system should be capable of efficiently processing collected data and providing real-time feedback to participants. By integrating data visualization tools to presents results in a clear and easy format, transparency and engagement can be promoted

- Conducting workshops and training sessions can help educate different user groups such as students, teachers and community members regarding the effective use of the platform. Furthermore, by providing users with guides and tutorials to ensure they can comprehend well about their contributions to reduction in carbon emissions.

- Development of a mobile application, to allow more mobile participation and data submission which will increase accessibility and catch a larger audience.

- Implementation of a feedback mechanism within the platform to collect participant's suggestions to ensure constant improvement in the system based on user feedback.

1. Technical Feasibility:

- **Improved Data Collection Procedure:**

    A. Creating a user Interface that is intuitive and visually appealing for the data collection platform. Easily navigable menus can be used for a better user experience.
    B. It is possible to use smart form features such as autofill, dropdown menus and data validation to ensure the information submitted is correct.
    C. Progress indicators can be added to keep track of user's progress to encourage them to submit data on time.

- **Guidelines for users:**

    A. User Training Modules and resources can be made accessible through the platform to provide the users with step by step guidance on using the platform.
    B. An FAQ section can be created to address common questions.

- **Data Analysis Tools:**

    A. Automated calculations can be implemented for carbon reduction metrics, to speed up the process and reduce manual errors.
    B. Future reduction trends can be forecasted using the current data by implementing the use of predictive modeling algorithms.

2. Operational Feasibility:

- Engaging users by feedback mechanisms will help enhance user satisfaction and participation.
- Implementation of robust security measures will help protect user information.

3. Economical Feasibility:

Estimated Costs in RM	
Hardware	**12,000**
Software	**17,000**
Advertising and opening	**17,000**
Legal and rules	**6,000**
materials	**11,000 per year**
Employees	**22,000 per year**
Development	**13,000 per year**

Estimated Benefits in RM	
Carbon Reduced	6,000 per week

Assumptions	
Discount Rate	12%
Sensitivity Factor Cost	1.12
Sensitivity Factor Benefits	0.88
Annual Change in production cost	7%
Annual Change in Benefits	5%

Costs	Year 0	Year 1	Year 2	Year 3
Development Cost:				
-Hardware	13440			
-Software	19040			
-Advertising and oppening	19040			
-Legal and rules	6720			
Total	58240			

Production Cost:				
-materials		12,320	13182.4	14105.168
-Employees	24,640	26364.8	28210.336	
-Development	14,560	15579.2	16669.744	
Annual Production Cost: -	**51,520**	**55,126**	**58,985**	
(Present Value)	**46000**	**43946.42857**	**41984.53444**	
Accumulated Cost	**104240**	**148186.4286**	**190170.963**	
Benefits				
Carbon Reduced Cost		**274560**	**288288**	**302702.4**
(Present Value)		**245142.8571**	**229821.4286**	**215457.5893**
Accumulated benefits (Present Value)		**245142.8571**	**474964.2857**	**690421.875**

Gain or Loss		**140902.8571**	**326777.8571**	**500250.912**
Profitability Index	**8.589473077**			

5.0 Objectives:

Effective Data entry: Increasing operational efficiency by simplifying and streamlining the data entry procedure, ensuring that participants have a quick and error-free experience.

Optimized Participant Data: Lowering the amount of data needed from participants while increasing the impact on sustainability.

Automated Carbon Reduction: To avoid human mistakes in carbon reduction calculations.

Advanced Data Analysis: Providing strong data analysis capabilities to support goal achievement and well-informed decision-making.

User-Friendly Platform: Creating a platform that is adaptable to different user profiles in order to provide a better and more inclusive experience.

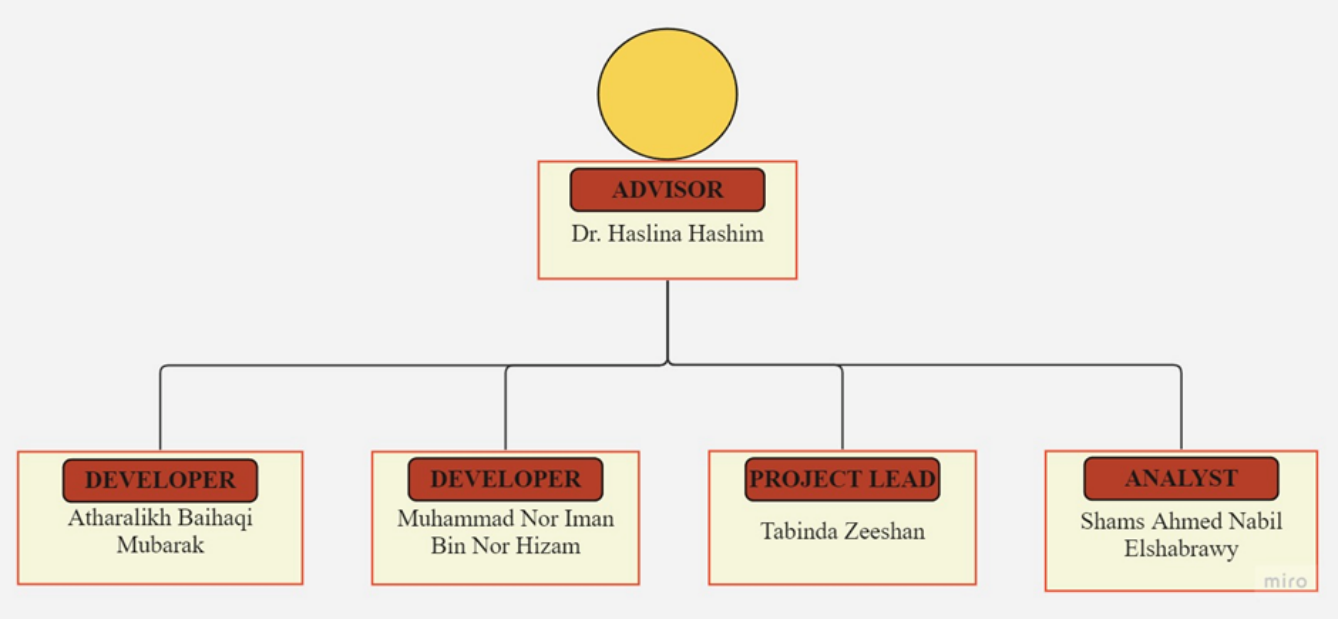
Enhanced User Experience: Addressing participation concerns and make improvements to accessibility and user experience.

6.0 Scope:

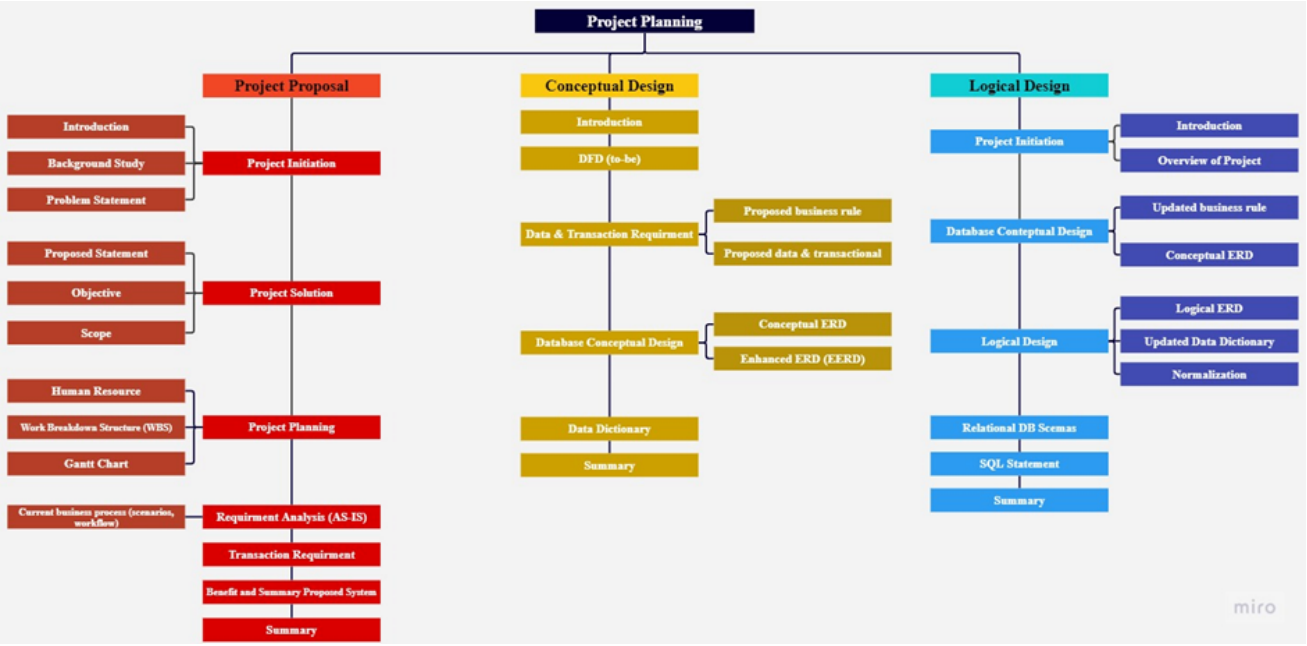
Targeting several community segments, the study focuses on creating a platform specifically designed for data collecting and analysis for MBIP's Iskandar Puteri Low Carbon projects. The scope includes finding communities with high CO2 emissions, mapping the carbon footprint, automating reduction calculations, and giving users access to a self-monitoring dashboard. The focus lies in promoting efficiency, inclusivity, and sophisticated data analysis to achieve significant sustainability outcomes.

7.0 Project Planning

7.1 Human Resources



7.2 Work Breakdown Structure (WBS)



- Project Proposal (planning)
    1. Project Initiation
        i. Introduction
        ii. Background Study
        iii. Problem Statement
    2. Project Solution
        i. Proposed Statement
        ii. Objective
        iii. Scope
    3. Project Planning
        i. Human Resources
        ii. Work Breakdown Structure (WBS)
        iii. Gantt Chart
    4. Requirement Analysts (AS-IS)
        i. Current Business Process (scenario, workflow)
    5. Transaction Requirement
    6. Benefit and Summary Proposed System
    7. Summary

- Conceptual Design
    1. Introduction
    2. DFD (to-be)
    3. Data and Transaction Requirement

i. Propose Business Rule

ii. Propose Data & Transactional

4. Database Conceptual Design

i. Conceptual ERD

ii. Enhanced ERD (EERD)

5. Data Dictionary
6. Project Summary

· Logic Design

1. Project initiation

i. Introduction

ii. Overview of Project

2. Database Conceptual Design

i. Updated Business Rule

ii. Conceptual ERD

3. Logical Design

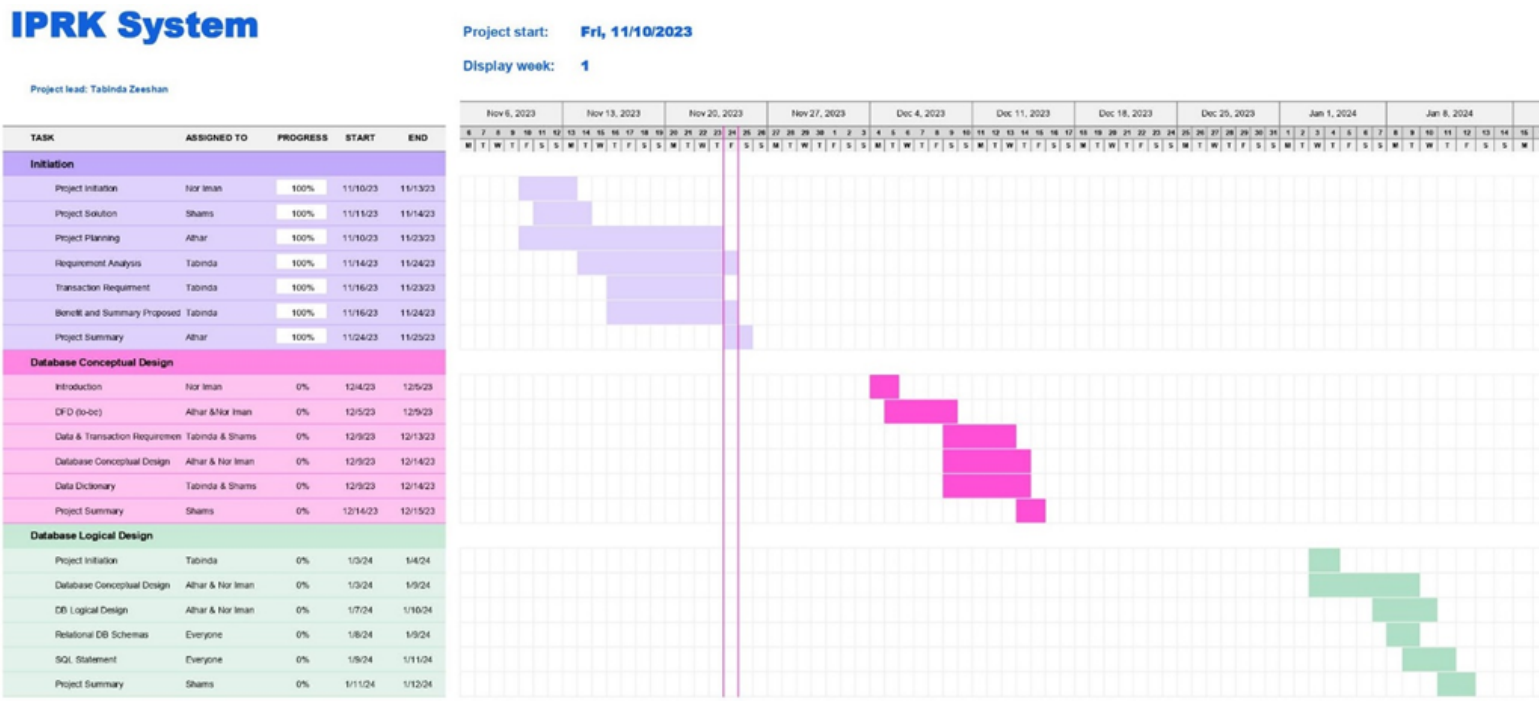
i. Logical ERD

ii. Updated Data Dictionary

iii. Normalization

4. Relational DB schemas (After Normalization)
5. SQL Statements (DDL & DML)
6. Project Summary

7.3 Gantt Chart



TASK	ASSIGNED TO	PROGRESS	START	END
Initiation				
Project Initiation	Nor Iman	100%	11/10/23	11/13/23
Project Solution	Shams	100%	11/11/23	11/14/23
Project Planning	Athar	100%	11/10/23	11/23/23
Requirement Analysis	Tabinda	100%	11/14/23	11/24/23
Transaction Requirment	Tabinda	100%	11/16/23	11/23/23
Benefit and Summary Proposed	Tabinda	100%	11/16/23	11/24/23
Project Summary	Athar	100%	11/24/23	11/25/23
Database Conceptual Design				
Introduction	Nor Iman	0%	12/4/23	12/5/23
DFD (lo-lo)	Athar &Nor Iman	0%	12/5/23	12/9/23
Data & Transaction Requiremen	Tabinda & Shams	0%	12/9/23	12/13/23
Database Conceptual Design	Athar & Nor Iman	0%	12/9/23	12/14/23
Data Dictionary	Tabinda & Shams	0%	12/9/23	12/14/23
Project Summary	Shams	0%	12/14/23	12/15/23
Database Logical Design				
Project Initiation	Tabinda	0%	1/3/24	1/4/24
Database Conceptual Design	Athar & Nor Iman	0%	1/3/24	1/9/24
DB Logical Design	Athar & Nor Iman	0%	1/7/24	1/10/24
Relational DB Schemas	Everyone	0%	1/8/24	1/9/24
SQL Statement	Everyone	0%	1/9/24	1/11/24
Project Summary	Shams	0%	1/11/24	1/12/24

8.0 Requirement Analysis

- **Time Consuming:**

  Current: Manual Calculations of carbon reductions.

  Challenge: Manual calculations are time consuming and increase the chance of human error.

  Requirement: Automation of calculations to prevent errors and save time.

- **Data Entry Procedure:**

  Current: Extensive Participant Information required

  Challenge: Users usually do not like to continue with the data entry process due to the extensiveness

  Requirement: Minimisation of the information required and the relevancy to the topic

- **Lack of Data Analysis capabilities:**

  Current: Lack of data analysis capabilities to analyze the data and forecast trends

Challenge: Council finds it hard to make decisions and sustainability goals.

Requirement: Use of more data analytical tools to allow a better understanding of the data and generation of analysis to make more informed decisions.

- **Unfamiliarity with Google Forms:**

  Current: MBIP set up kiosks to facilitate the users.

  Challenge: Users are not familiar with google forms so they find it difficult to deal with it.

  Requirement: Use of user guides and instructions to guide the users regarding all the steps.

8.1 Current Business Process

- **Time Consuming:**
  a. **Current:**

     Scenario: Calculations are done manually

  b. **Proposed:**

     Scenario: Calculations to be done automatically

     Workflow:

     1. The System will gather all the data entered
     2. The system will calculate the carbon reductions based on the collected data
- **Data entry procedure**
  a. **Current:**

     Scenario: Participants are required to add extensive information

  b. **Proposed:**

     Scenario: New users can register while existing users can log in reducing the amount of information required.

Workflow:

1. Users open the home page
2. Users either register or log in
3. Users answer all the basic questions
4. The data is stored by the system in the database

- **Lack of Data Analysis Capabilities**
  a. **Current:**

     Scenario: lack of analytical tools to analyze the data and forecast trends

  b. **Proposed:**

     Scenario: Use of more data analytical tools

     Workflow:

     1. Data is collected by the system
     2. Data is analyzed using analytical tools
     3. Trends are forecasted
     4. Informed decisions can be made
- **Unfamiliarity with Google forms:**
  a. **Current:**

     Scenario: MBIP set up kiosks to facilitate the users

  b. **Proposed:**

     Scenario: Users fill in Google forms

     Workflow:

     1. Users refer to instructions about how to fill up google forms
     2. Users fill in the forms

9.0 Transaction Requirements

- **Data Entry:**
    1. **Home Page:** Users can choose registration or log in options, select whether they are participants or Admin.
    2. **Registration or Login Page:** Users are required to fill in the respective details to register or login.
    3. **Data Usage Page:** Participants are required to enter their consumption data such as electricity and water bills, food wastage etc.
- **Data Update/Delete:**
    1. **User Profile update / delete:** Users can either modify their personal data in the system or even delete their profiles if they want to.
    2. **Data Usage update / delete:** Users can modify their data entered by either entering new values or deleting the already entered data.
- **Data Queries:**
    1. **Carbon reports**: Admins or participants can search the carbon reports and can get the full carbon report from the system regarding the carbon usage.
    2. **Participant profiles**: Admins can search about participants based on their information or any category.
    3. **FAQs** : Participants can search the FAQs and get the answer from the system regarding the particular question.

10.0 Benefits and Summary of Proposed Solutions

Continuous Improvement: Due to feedback mechanism, a commitment to continuous improvement is guaranteed. The system evolves over time by collecting and including participant suggestions, addressing user needs and improving functionality. This iterative process not only reflects responsiveness to user input, but also allows for ongoing improvement, ensuring that the platform remains flexible and successful in meeting the requirements. Continuous improvement becomes a core principle, fostering a system that is responsive, agile, and always evolving in order to optimize user experience and achieve long-term goals.

User-Centric Approach: The proposed solutions take a user-centric approach, placing participants' needs, preferences, and experiences first. User guides are all intended to empower users and improve their

comprehension of the platform. Furthermore, the feedback mechanism ensures that user suggestions guide system improvements, fostering a collaborative environment in which users feel heard and valued. This approach promotes active engagement. By prioritizing user needs, the solutions aim to create a platform that is not only effective in achieving carbon reduction goals, but also tailored to the user community's expectations and aspirations.

Informed Decision Making: Integrating a centralized data analysis system with automation and visualization tools provides decision-makers with the insights they need to make informed decisions. Admins gain a comprehensive understanding of the initiative's progress by automating carbon reduction calculations and providing real-time feedback. The data visualization tools present trends in a clear and understandable manner, allowing decision-makers to identify patterns, assess the impact of strategies, and make data-driven decisions. This method converts raw data into useful intelligence, allowing for a more informed and strategic approach to meeting the ambitious carbon reduction targets outlined in the Iskandar Puteri Low Carbon projects.

11.0 Summary

The project proposal's conclusion outlines the project's viability and prospective advantages while summarizing its main ideas. It also gives a quick rundown of the deliverables and project timetable.

In particular, the conclusion declares that the project is doable and may be undertaken with the help of an extensive Work Breakdown Structure (WBS) to efficiently handle the project's complexity. There are 3 phases in the WBS:

- Proposal (Planning)
- Conceptual Design
- Logic Design

The initiative will give MBIP all the knowledge and data it needs to decide on environmental tactics and accomplish the objective of lowering carbon emissions, according to the conclusion.

In addition, the conclusion offers an analysis of the proposal's evolution and highlights some important takeaways, including the necessity of a methodical approach while pursuing a project and the significance of creating user-friendly and effective data management systems. The initiative represents a commitment to learning and teamwork while advancing Iskandar Puteri's green future, the conclusion adds. It is more than just a plan