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FACULTY OF COMPUTER, UTM JOHOR BAHRU

SEMESTER I, SESSION 2023/2024

Phase 2:

Database Conceptual Design (ERD)

SECD2523: Database

Section 06

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1. INTRODUCTION

This project proposal envisions the creation of a transformative initiative, the Low Carbon Initiatives Community Monitoring System, in response to Malaysia's strong commitment to sustainability, as demonstrated by initiatives such as the Low Carbon Cities Framework (LCCF) and the Johor government's visionary Low Carbon Blueprint for Iskandar Malaysia 2025.

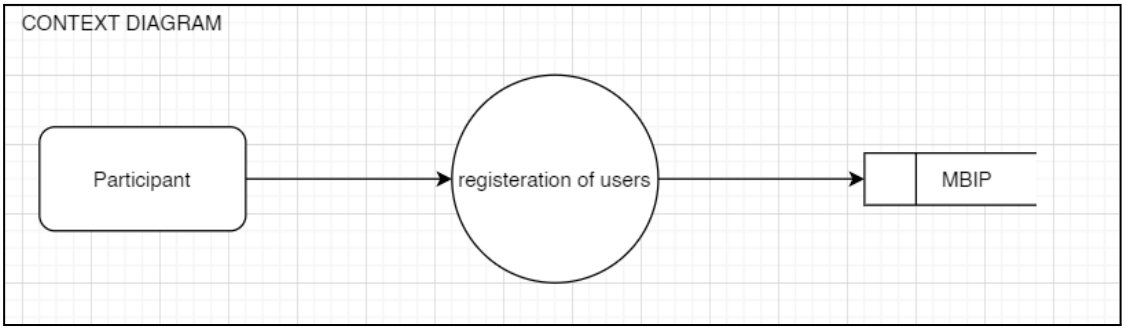
It is essential to regularly monitor and measure carbon dioxide (CO2) emissions in light of the necessity to address climate change and counteract global warming. The Low Carbon Blueprint, which encompasses five local authorities, including the districts of Johor Bahru and Kulai Jaya, sets an admirable goal of reducing carbon intensity by 58 percent by 2025 as compared to the baseline year of 2005.

This proposal addresses the particular difficulties that MBIP's Iskandar Puteri Low Carbon Calendar Competition ran into, including problems with participant engagement, data input, and data analysis capabilities. Similar to the successful e-Lestari system, MBIP plans to create a complete Low Carbon Initiatives Community Monitoring System to solve these issues. Targeting people, institutions, MBIP divisions, and staff are some of the community segments that this innovative platform hopes to reach.

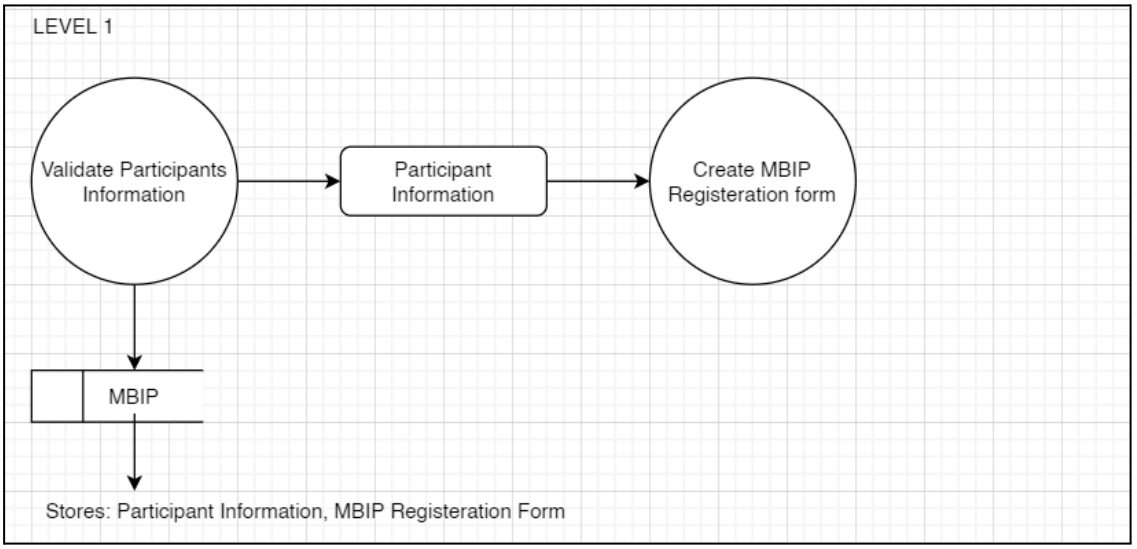
Mapping the carbon footprint within the MBIP region, calculating carbon reductions across multiple dimensions (electricity, water, waste, and recycled cooking oil consumption), identifying high-emission communities, and developing a self-monitoring dashboard for users are just a few of the ambitious and significant goals of the proposed system. The platform will be made to function in Bahasa Melayu, guaranteeing inclusion and accessibility.

2. DFD (to-be)

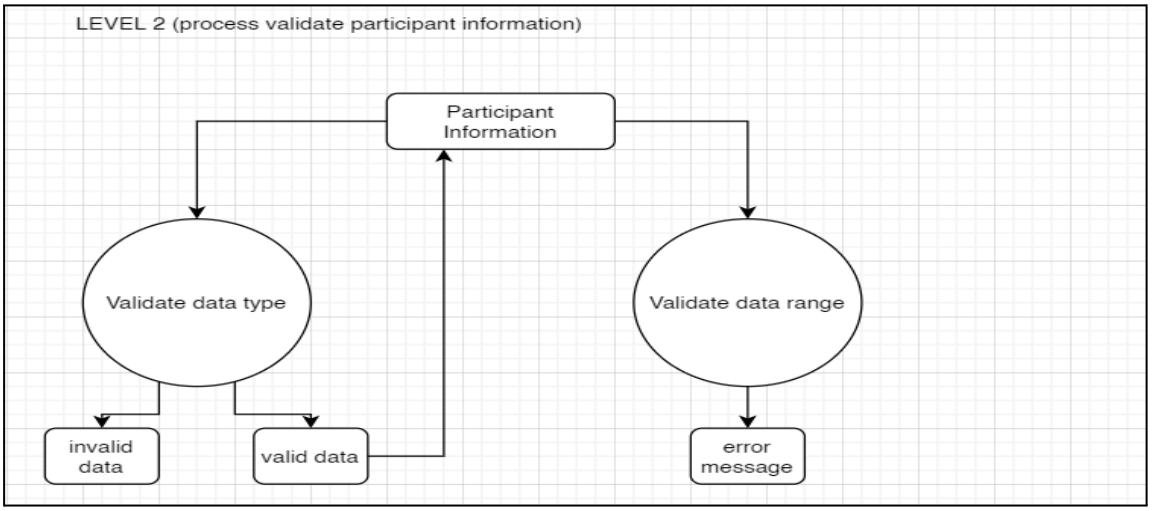
Context Diagram



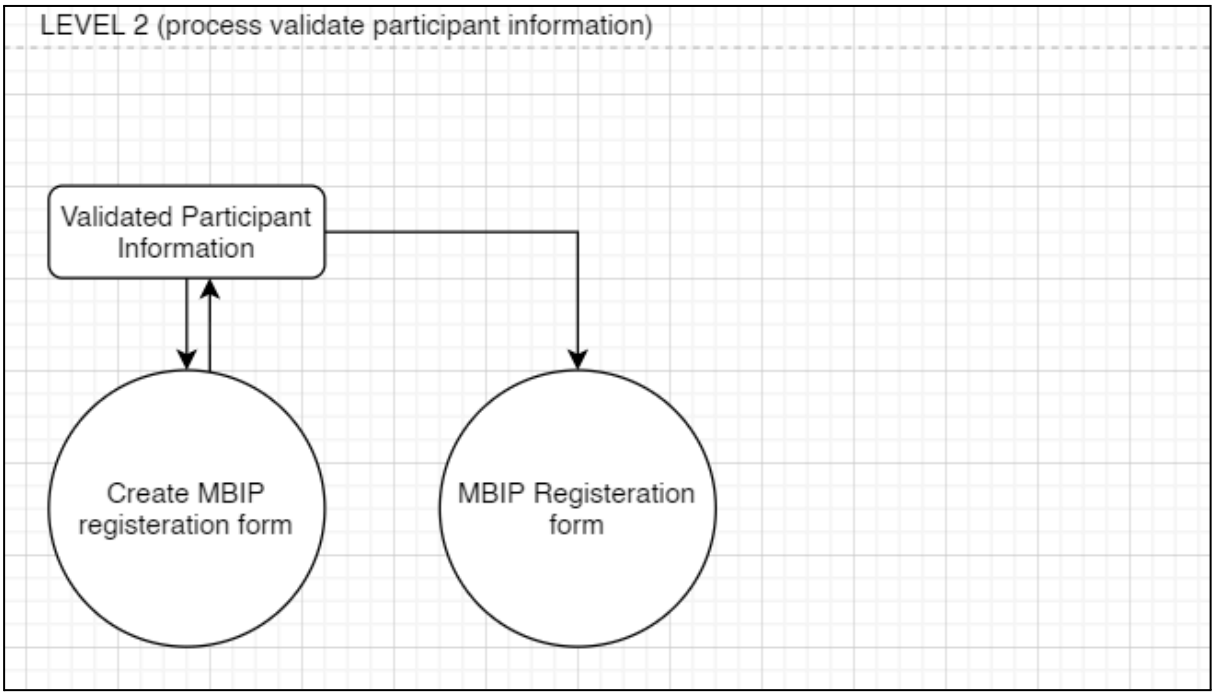
LEVEL 1



LEVEL 2 (Process to Validate Participant Information)



LEVEL 2 (Process to Validate Participant Information)



3. DATA & TRANSACTION REQUIREMENT

3.1. PROPOSED BUSINESS RULE

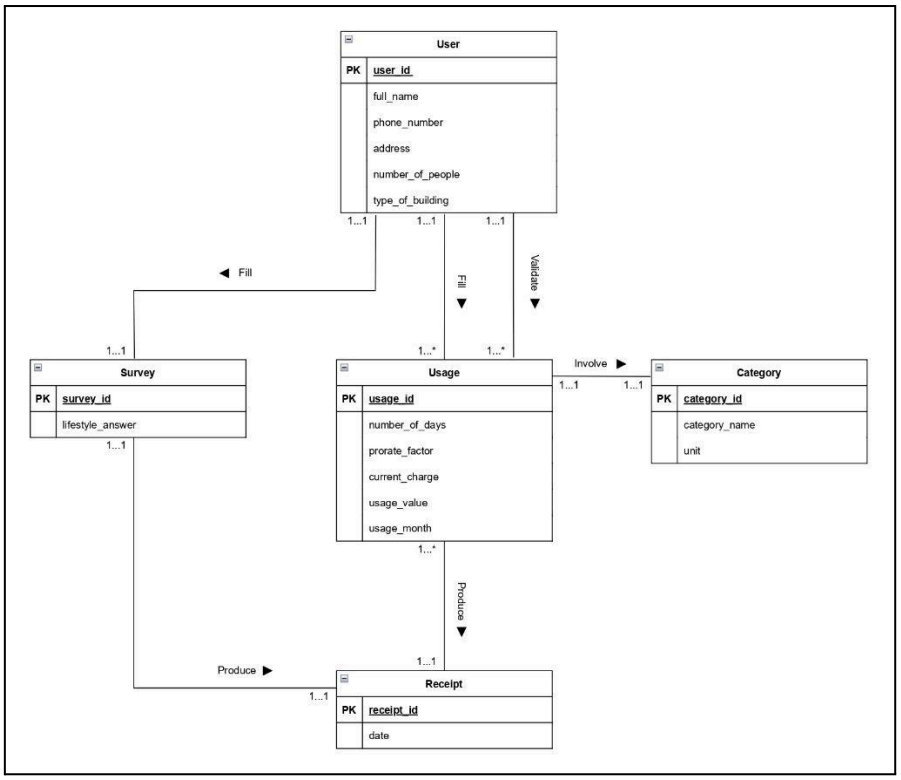
i. A participant can fill one survey and each survey can only be filled by a participant.
ii. A survey can produce one receipt and each receipt can only produce one survey.
iii. A participant must fill one to many usages and each usage can only be filled by a participant.
iv. A usage can produce one receipt and each receipt can be produced by one to many usages.
v. A MBIP can validate one to many usages and each usage can only be validated by one MBIP.
vi. A usage can only involve one category and each category can only involve one usage.

3.2. PROPOSED DATA & TRANSACTIONAL

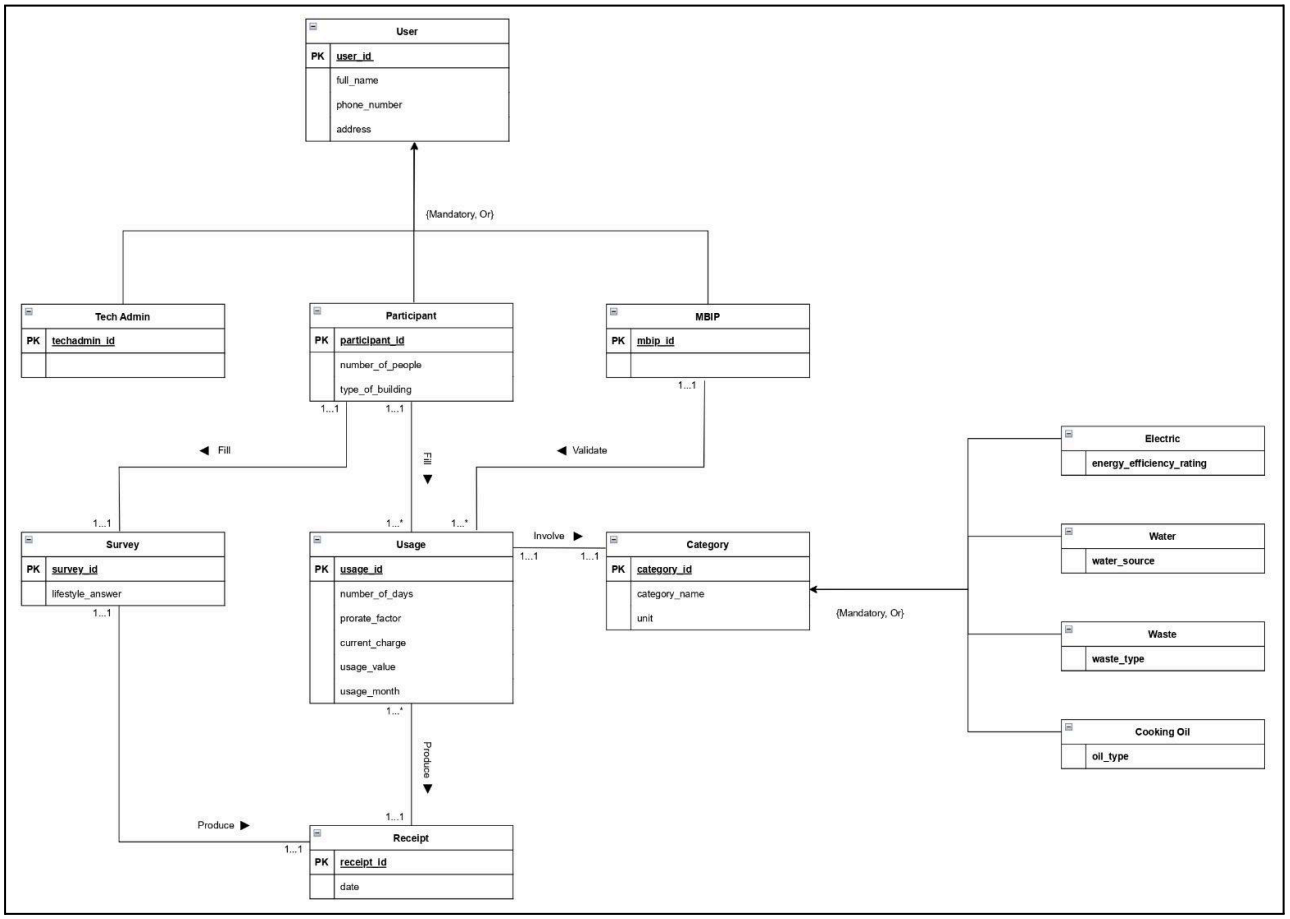
i. Get participant’s usage and survey data.
ii. Validate participant’s usage data.
iii. Produce receipt
iv. Commit transaction data

4. DATABASE CONCEPTUAL DESIGN

4.1 CONCEPTUAL ERD



4.2 ENHANCED ERD (EERD)



5. DATA DICTIONARY

Tech Admin(user_id, full_name, phone_number, address, techadmin_id)

Participant(user_id, number_of_people, type_of_building, participant_id)

MBIP(user_id, full_name, phone_number, address, mbip_id)

Survey(survey_id, user_id, lifestyle_answer)

FK: user_id references Participant(user_id)

Usage(usage_id, user_id, number_of_days, prorate_factor, current_charge, usage_value, usage_month)

FK: user_id references Participant(user_id)

Receipt(receipt_id, survey_id, usage_id, date)

FK: survey_id references Survey(survey_id)

FK: usage_id references Usage(usage_id)

Electric(category_id, category_name, unit, energy_efficiency_rating)

Water(category_id, category_name, unit, water_source)

Waste(category_id, category_name, unit, waste_type)

Cooking Oil(category_id, category_name, unit, oil_type)

6. SUMMARY

In summary, the study discusses the importance of carbon in the environment, focusing on how understanding the carbon cycle is crucial for preventing climate change and maintaining ecological balance. To track, measure, and control carbon dioxide (CO2) levels, the MBIP developed the Low Carbon Emission Monitoring System.

The proposed business rules ensure a link between participants and their usage consumption and also a link between participants and surveys. The project defines the data and transactional needs, including getting participants' usage and survey data, validating participants' data, producing receipts, and committing transaction data.

Data Flow Diagrams (DFDs) illustrate how data moves through the Low Carbon Emission Monitoring System's processes, data storage, and external entities from input to output. The database design is visually represented by the Entity Relationship Diagram (ERD) and Enhanced Erd (EERD).

Furthermore, the extensive reference handbook, the Data Dictionary, lists important entities, attributes, descriptions, data types, and lengths for the Low Carbon Emission Calculation System. Participant, tech admin, MBIP, survey, usage, receipt and usage on electric, water, waste and cooking oil.

Finally, this phase offers a comprehensive system to monitor and control carbon emissions in order to guarantee the effective operation of the Low Carbon Emission Monitoring System for MBIP. Business rules, data flow diagrams, conceptual and improved ERDs, and an extensive data dictionary are all included.