UTM

UNIVERSITI TEKNOLOGI MALAYSIA

PROJECT: PHASE 1

SECD2523 - DATABASE
SEMESTER I, SESSION 2023/2024

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1. Introduction

Suggest evidences that increasing of CO2 can pose directs for human health Some observer said preliminary evidence concerning the potential health risks of chronic exposure to environmentally relevant elevations in ambient CO2, including inflammation, reductions in higher-level cognitive abilities, bone demineralization, kidney calcification, oxidative stress and endothelial dysfunction.

In Malaysia, they have made great progress in resolving issues related to the environment. Many cities in Malaysia use the Low Carbon Cities Framework that helps create low-carbon development strategies. Unfortunately, the Iskandar Puteri Low Carbon Calendar Competition, a part of the IPRK initiative, faced several serious challenges including a masive data entry process, vast participant information requirements, manual carbon reduction calculations, a lack of data analysis capabilities, varied user profiles and participants' unfamiliarity with the Google Form.

Therefore, MBIP plans to develop a data collection and analysis platform similar to the e-Lestari system. This new platform will be directed at different groups in the community. The name of the system is **Carbon Emission Monitoring System**. For example, landed and multi-story home owners, institutions, MBIP divisions and staff members. This system will be used in monitoring, calculating and regulating the amount of carbon emissions in our environment. In this system also they will gather the information from each client and also institutions. The info that they will gather are such as **consumption of waste, water and also electricity**. In addition, they will also **calculate the carbon footprint** that will be generated from the community.

In this phase, we will display the **Data Flow Diagram (DFD)** on how our system works. We will also show where the data that we gather will be stored and also other information. Then, our group also will provide **the business rules** and our **entity relationship diagram (ERD)**. Other than that, we also have the **data dictionary** that will be the reference for us. The data that we will provide are what is the primary key (PK), foreign key (FK), entity name, relationship and also descriptions.

2. DFD (to-be)

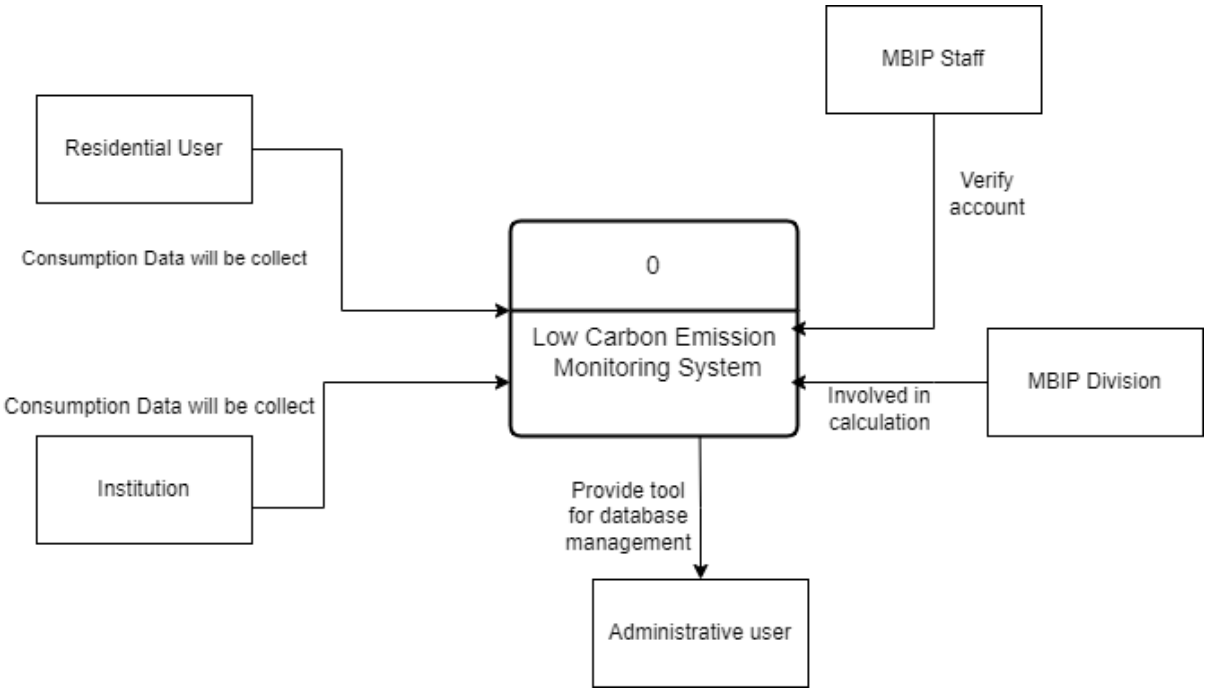


Figure 1: Context diagram

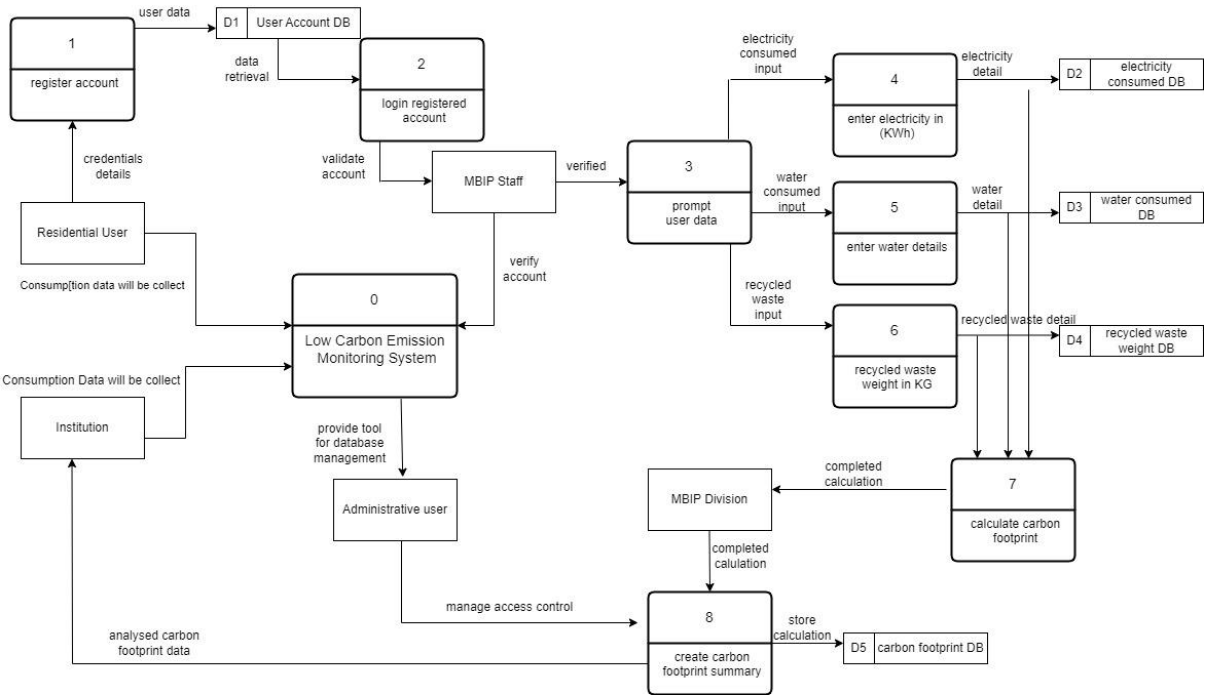


Figure 2: Level 0 diagram

3. Data & Transaction Requirements

3.1 Proposed Business Rule

Entities

1. **ResidentialUsers:**
    - Attributes:
        i. UserID (PK)
        ii. TypeOfHouse
        iii. ElectricityConsumption
        iv. WaterConsumption
        v. RecycledCookingOilConsumption
2. **Institutions:**
    - Attributes:
        i. InstitutionID (PK)
        ii. EnergyConsumption
        iii. ResourceConsumption
        iv. DataFeasibility
3. **DivisionsMBIP:**
    - Attributes:
        i. DivisionID (PK)
        ii. DataContribution
        iii. DigitalCarbonFootprint
4. **StaffMBIP:**
    - Attributes:
        i. StaffID(PK)
        ii. DivisionID (FK)
        iii. PersonalCarbonFootprint
        iv. CorporateCarbonFootprint
5. **AdministrativeUsers:**
    - Attributes:
        i. AdminID (PK)
        ii. AccessControl
        iii. SystemConfiguration

Relationships

ResidentialUsers - Institutions:

- ResidentialUser will contribute its data to Institutions.
- **Business Rule:**
  i. Many residential users may contribute their data to many institutions.

DivisionsMBIP - Institutions:

- DivisionsMBIP will contribute its data to Institutions.
- **Business Rule:**
  i. Many institutions may contribute their data to at most one MBIP division.

StaffMBIP - DivisionsMBIP:

- Both StaffMBIP are associated with DivisionsMBIP.
- **Business Rule:**
  i. At least one or more MBIP Staff must be associated with only one MBIP division.

AdministrativeUsers

- Have access to most of the entities which are Institutions, DivisionMBIP, and StaffMBIP.
- **Business Rule:**
  i. Many administrative users may have access to more than one institution.
  ii. Many administrative users may have access to more than one MBIP division.
  iii. Many administrative users may have access to more than one MBIP staff.

3.2 Proposed Data & Transactional

(i) Residential Users

UserID	TypeOfHouse	ElectricityConsumption	WaterConsumption	RecycledCookingOilConsumption
A001	Multi-Story	250 kWh	200 gallons	4 liters
A002	Landed	300 kWh	150 gallons	2 liter

(ii) Institutions

InstitutionID	EnergyConsumption	ResourceConsumption	DataFeasibility
101	4000 kWh	3500 kg	Medium
102	5000 kWh	1500 kg	High

(iii) DivisionsMBIP

DivisionID	DataContribution	DigitalCarbonFootprint
D001	Medium	2500 kg
D002	High	3000 kg

(iv) StaffMBIP

StaffID	DivisionID	PersonalCarbonFootprint	CorporateCarbonFootprint

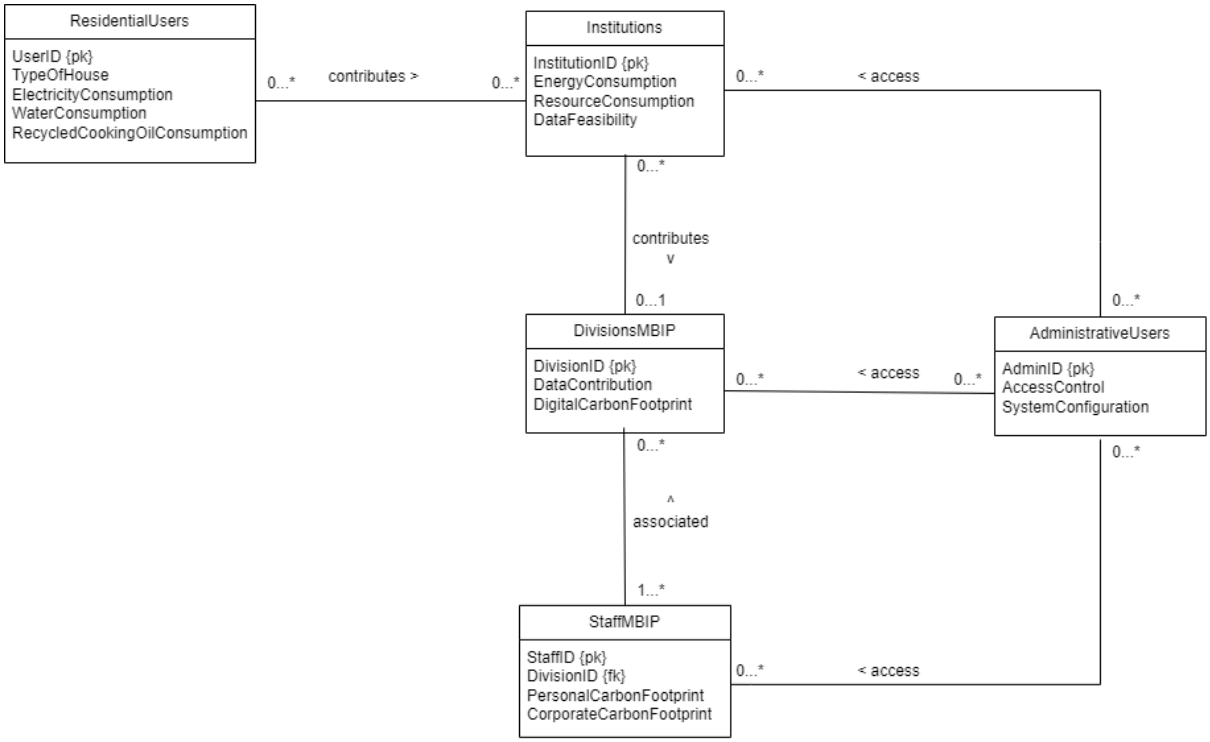
S001	D001	30 kg	250 kg
S002	D002	45 kg	350 kg

(v) AdministrativeUsers

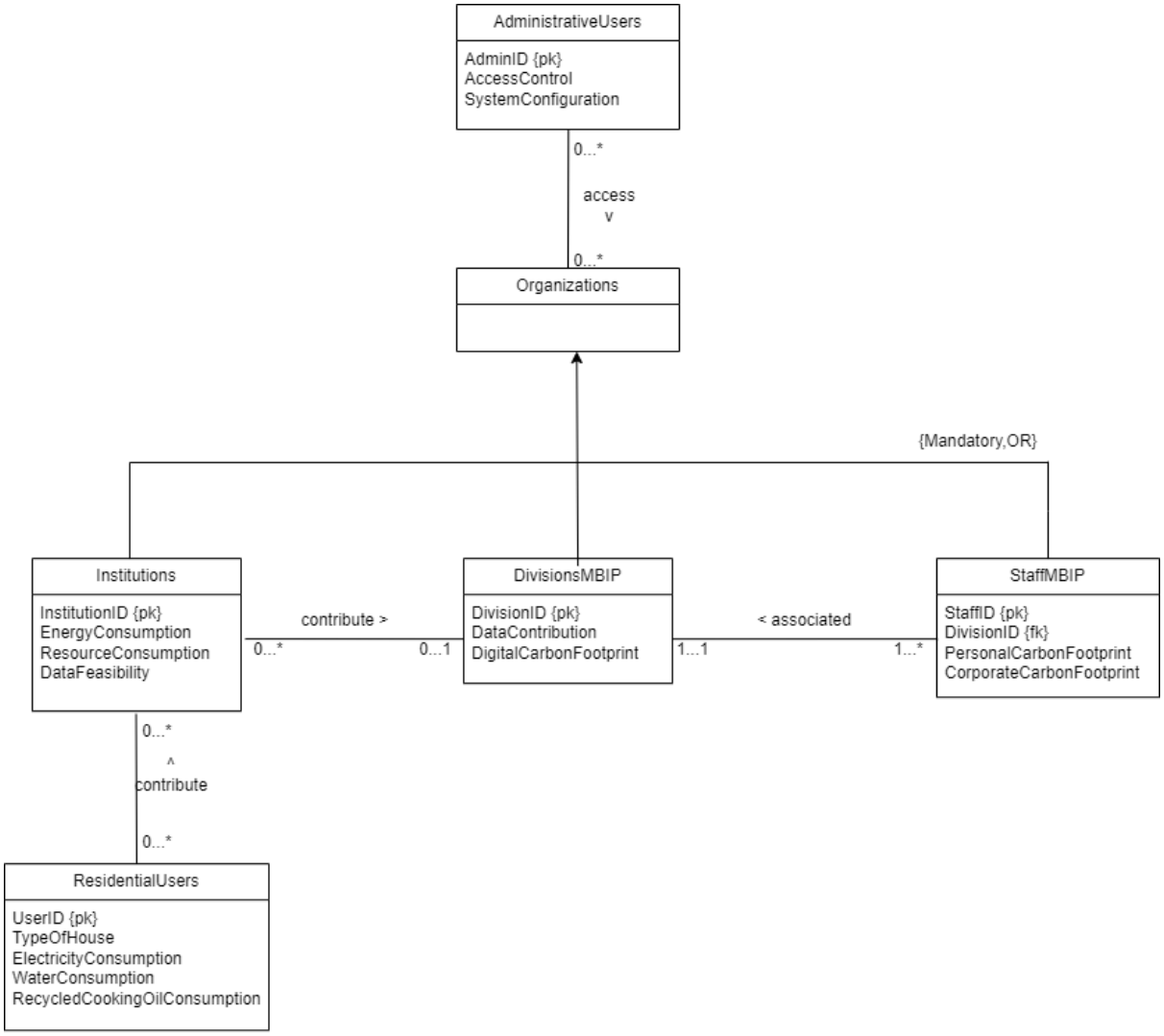
AdminID	AccessControl	SystemConfiguration
A001	Medium	Enhanced
A002	High	Standard

4. Database Conceptual Design

4.1 Conceptual ERD



4.2 Enhanced ERD (EERD)



5. Data Dictionary

Entity Name	Attributes	Data Type & Length	Constraint	Description
ResidentialUsers	UserID	VARCHAR2 (30)	Primary Key	Uniquely identifies user
	TypeOfHouse	VARCHAR2 (15)	NOT NULL	Identify user's house type
	ElectricityConsumption	INTEGER(10)	NOT NULL	Electricity detail
	WaterConsumption	INTEGER(10)	NOT NULL	Water detail
	RecycledCookingOilConsumption	INTEGER(10)	NOT NULL	Recycled waste weight detail
Institutions	InstitutionID	VARCHAR2 (30)	Primary Key	Uniquely identify institution
	EnergyConsumption	INTEGER(10)	NOT NULL	Energy detail
	ResourceConsumption	INTEGER(10)	NOT NULL	Resouce detail
	DataFeasibility	VARCHAR2 (30)	NOT NULL	Identify the feasibility data in institution
DivisionsMBIP	DivisionID	VARCHAR2 (10)	Primary Key	Uniquely identify MBIP division
	DataContribution	VARCHAR2 (30)	NOT NULL	Calculate carbon footprint in community
	DigitalCarbonFootprint	VARCHAR2 (30)	NOT NULL	Display carbon footprint in the system
StaffMBIP	StaffID	VARCHAR2 (20)	Primary Key	Uniquely identify MBIP staff
	DivisionID	VARCHAR2 (10)	Foreign Key	Uniquely identify staff's division in the system
	PersonalCarbonFootpri	VARCHAR2	NOT NULL	Display staff's calculated

	nt	(20)		carbon footprint manually
	CorporateCarbonFootprint	VARCHAR2 (20)	NOT NULL	Display MBIP latest carbon footprint summary
AdministrativeUsers	AdminID	VARCHAR2 (10)	Primary Key	Uniquely identify user admin
	AccessControl	VARCHAR2 (20)	NOT NULL	Manage the access control
	SystemConfiguration	VARCHAR2 (20)	NOT NULL	Update and maintain the system features

6. Summary

In summary, this project is all about improving the old system into a new better one. All the problems that occurred in the previous system such as manual carbon reduction calculations, a lack of data analysis capabilities and varied user profiles, all will be improved. The project also aims to address the existing challenges in the low-carbon initiatives program by developing a comprehensive monitoring system, involving various stakeholders and user groups, and ensuring the system's feasibility and practicality.

In addition to phase 2, the system will show how the data will be collected such as water, waste, oil and electricity. A Data Flow Diagram will be provided to show how the system moves the data from one process to another. Data dictionary also lists the entities, the attributes, data type and also description for the system. Apart from that, this phase also will provide the business rule and ERD (conceptual & enhanced).