UNIVERSITI TEKNOLOGI MALAYSIA

FACULTY OF COMPUTER, UTM JOHOR BAHRU

SEMESTER I, SESSION 2023/2024

Phase 3:

Database Conceptual Design (ERD)

SECD2523: Database

Section 06

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Submission Date	:	16th November, 2023	
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1.0 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.

2.0 Overview of project

2.1 Problem Statement

In Iskandar Malaysia, existing sustainability initiatives show a strong commitment to low-carbon development. However, key challenges hinder their effectiveness, leading to the need for a Low Carbon Initiatives Community Monitoring System.

1. Data Fragmentation and Accessibility:

Current initiatives like IMELC, JPNJ's e-Lestari, and MBIP's IPRK operate independently, causing fragmented data. This makes it difficult to assess overall performance and understand the collective impact of various initiatives.

2. User Engagement and Experience:

Challenges in the Iskandar Puteri Low Carbon Calendar Competition include a complex data entry process, extensive participant information requirements, and unfamiliarity with online forms. This reduces community engagement and hampers the accuracy of data collection.

3. Lack of Data Analysis Capabilities:

Initiatives lack robust data analysis capabilities, particularly in the IPRK initiative, leading to challenges in deriving meaningful insights. Manual calculations and reporting are time-consuming and error-prone.

4. Varied User Profiles:

Diverse user groups involved in initiatives introduce variations in user profiles. A standardized system is crucial for seamless data collection and analysis across different user types.

5. Inefficient Community Data Mapping:

Mapping the carbon footprint within the MBIP region needs a more efficient approach. The current process lacks the ability to identify high CO2 emission communities, hindering targeted interventions.

6. Limited Community Involvement:

Despite incentives like the Iskandar Puteri Low Carbon Calendar Competition, community involvement remains low due to logistical challenges and user-unfriendly interfaces. An improved platform should encourage active participation and promote a sense of collective responsibility.

2.2 Project Objectives

The aim of this project is to address the challenges faced by existing sustainability initiatives in Iskandar Malaysia through the development and implementation of a comprehensive Low Carbon Initiatives Community Monitoring System. This system seeks to enhance the effectiveness of ongoing initiatives, promote community engagement, and provide valuable insights for informed decision-making in the pursuit of low-carbon development goals.

2.3 Project Description

Key Features and Solutions:

1. Integrated Data Management:

Develop an integrated platform that consolidates data from existing initiatives, such as IMELC, JPNJ's e-Lestari, and MBIP's IPRK. This solution will overcome data fragmentation, enabling a holistic assessment of district performance and a better understanding of the collective impact of various initiatives.

2. Streamlined User Experience:

Implement user-friendly interfaces and simplify data entry processes, overcoming challenges identified in initiatives like the Iskandar Puteri Low Carbon Calendar Competition. This will improve community engagement and ensure the accuracy and efficiency of data collection.

3. Enhanced Data Analysis Capabilities:

Integrate robust data analysis tools within the system, addressing the limitations observed in existing initiatives, particularly the IPRK initiative. This enhancement will facilitate the derivation of meaningful insights from collected data, eliminating manual and error-prone processes.

4. Standardized User Profiles:

Design a standardized system to accommodate diverse user profiles, including students, teachers, residents, and institutions. This will ensure seamless data collection and analysis across different user types.

5. Efficient Community Data Mapping:

Implement an efficient and comprehensive approach to mapping the carbon footprint within the MBIP region. This solution will identify communities with high CO2 emissions, enabling targeted interventions for maximum impact.

6. Promoting Community Involvement:

Enhance community involvement by addressing logistical challenges and improving user interfaces. The platform will encourage active participation through features that promote a sense of collective responsibility, building on the lessons learned from initiatives like the Iskandar Puteri Low Carbon Calendar Competition.

2.4 Project Scope

1. System Development
   - Design and develop a comprehensive data collection and analysis platform for monitoring low carbon initiatives within the Iskandar Puteri region.
   - Incorporate user-friendly interfaces for various community categories, ensuring accessibility for residents, institutions, MBIP divisions, and staff.
   - Implement features to facilitate mapping of the carbon footprint, calculating carbon reductions, and identifying high CO2 emission communities.

2. Community Engagement
   - Establish channels for effective communication and engagement with community members.
   - Develop strategies to encourage participation and awareness regarding low carbon initiatives.
   - Conduct training sessions to educate users on the new system and its functionalities.

3. Data Collection and Mapping
   - Design a robust system capable of collecting and managing data related to electricity, water, waste, and recycled cooking oil consumption.
   - Develop mapping capabilities to visualize the carbon footprint within the MBIP region.

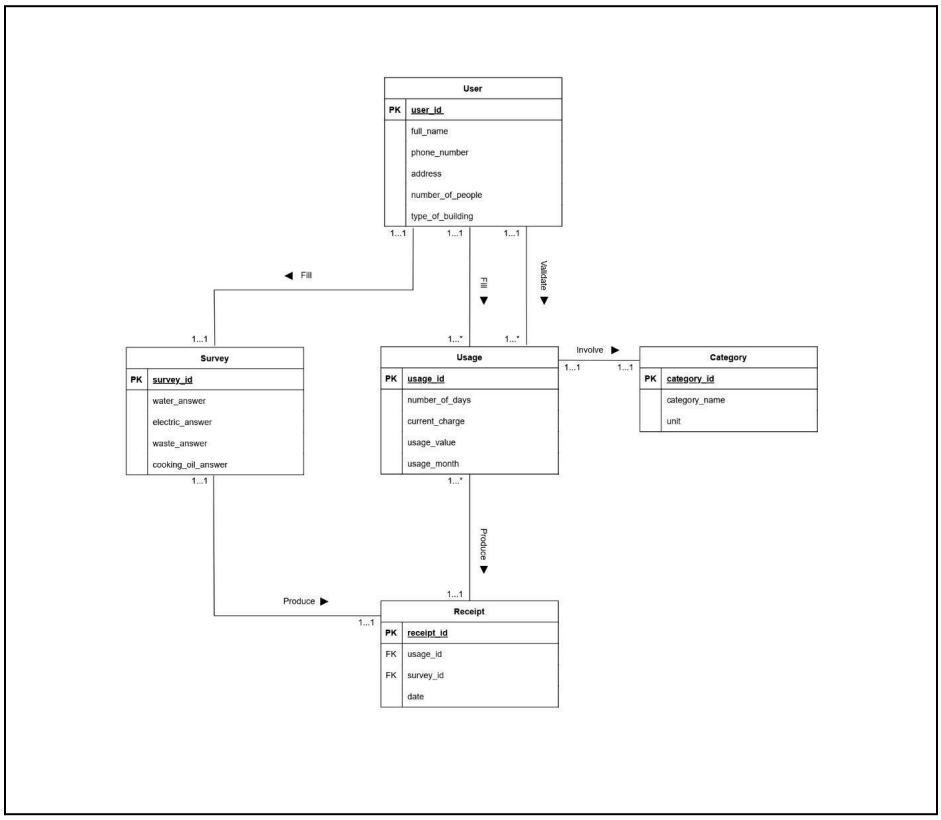
4. Carbon Reduction Calculation
   - Implement algorithms for accurate calculation of carbon reductions associated with various activities, including electricity and energy consumption, waste management, and recycling efforts.
   - Ensure transparency in calculations to build trust among users.

3.0 Database conceptual design

3.1 Updated business rule

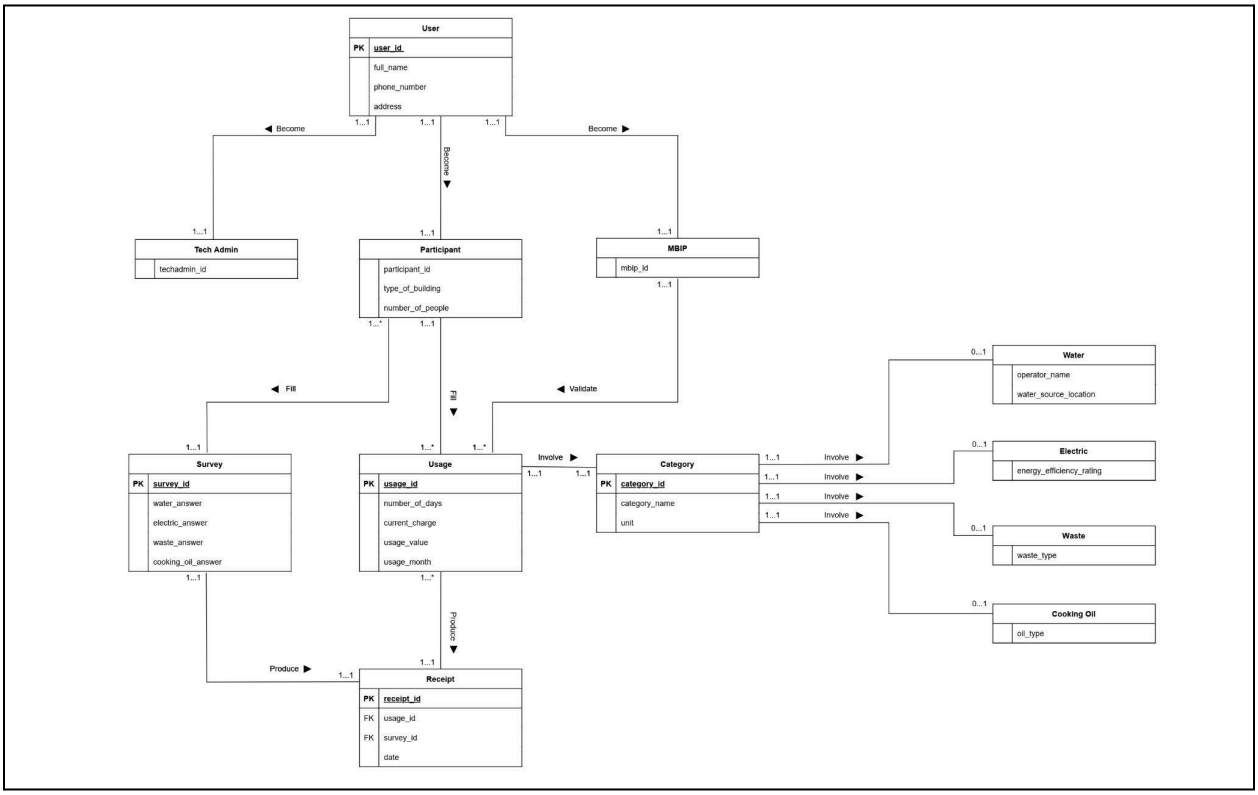
- A user can become a participant and a participant must be user.
- A user can become a tech admin and a techadmin must be user.
- A user can become a MBIP and a MBIP must be from user.
- A participant can fill one survey and each survey can only be filled by one participant.
- A participant can fill many usages and each usage can only be filled by one participant.
- A MBIP can validate many usages and each usage can be only filled by one MBIP.
- A survey can produce one receipt and each receipt can only be produced by one survey.
- A usage can produce one receipt and each receipt can only be produced by many usages.
- A usage can involve one category and each category can only be involved by one usage.
- A category can involve whether water or not and water must involve in one category.
- A category can involve whether electric or not and electric must involve in one category.
- A category can involve whether waste or not and waste must involve in one category.
- A category can involve whether oil or not and oil must involve in one category.

3.2 Conceptual ERD



4.0 DB logical design

4.1 Logical ERD



4.2 Updated Data Dictionary

TechAdminParticipantMBIP(user_id, techadmin_id, full_name, phone_number, address, participant_id, type_of_building, number_of_people, mbip_id)
PK: user_id

Survey(survey_id, water_answer, electric_answer, waste_answer, cooking_oil_answer)
PK: survey_id

Usage(usage_id, number_of_days, current_charge, usage_value, usage_month)
PK: usage_id

Receipt(receipt_id, survey_id, usage_id, date)
PK:receipt_id
FK: survey_id referencing to Survey, usage_id referencing to Usage

Water(category_id, unit, operator_name, water_source_location)
PK: category_id

Electric(category_id, unit, waste_type)
PK: category_id

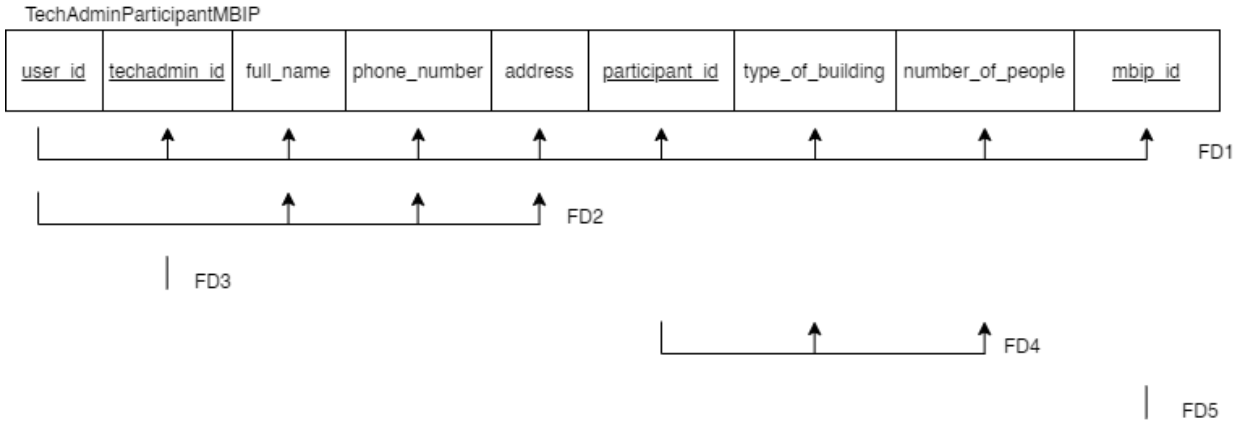
Waste(category_id, unit, waste_type)

Cooking Oil(category_id, unit, oil_type)
PK: category_id

4.3 Normalization

TechAdminParticipantMBIP(user_id, techadmin_id, full_name, phone_number, address, participant_id, type_of_building, number_of_people, mbip_id)
PK: user_id

Functional Dependencies:



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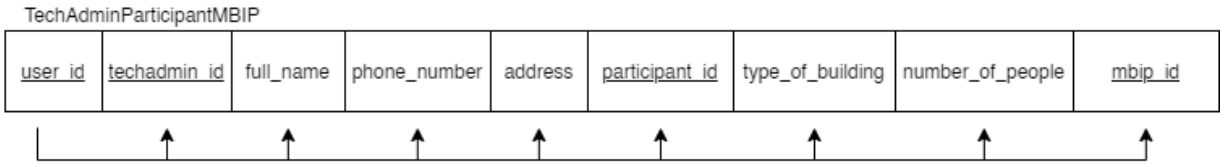

TechAdminParticipantMBIP(user_id, techadmin_id, full_name, phone_number, address, participant_id, type_of_building, number_of_people, mbip_id)
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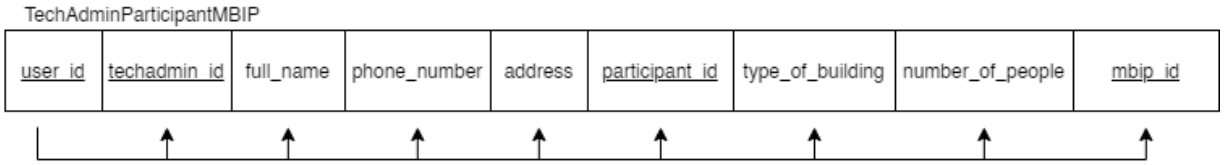

TechAdminParticipantMBIP(user_id, techadmin_id, full_name, phone_number, address, participant_id, type_of_building, number_of_people, mbip_id)
PK: user_id

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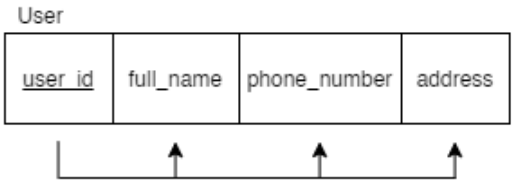
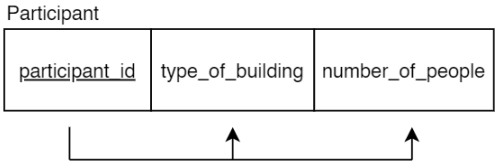


User(User_id, phone_number, address)
PK: user_id



Participant(participant_id, type_of_building, number_of_people)
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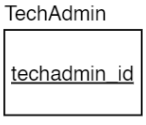

Techadmin (techadmin_id)
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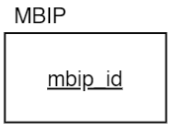
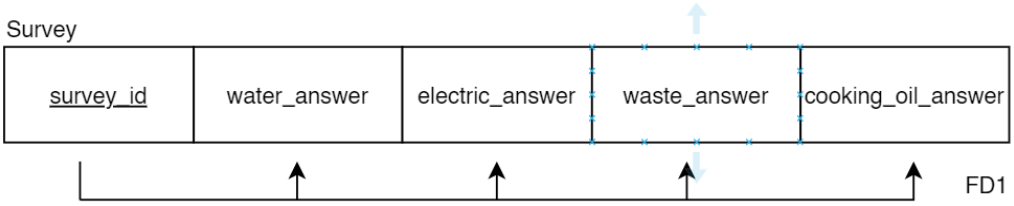


MBIP(mbip_id)
PK: mbip_id

Survey(survey_id, water_answer, electric_answer, waste_answer, cooking_oil_answer)
PK: survey_id

Functional Dependencies



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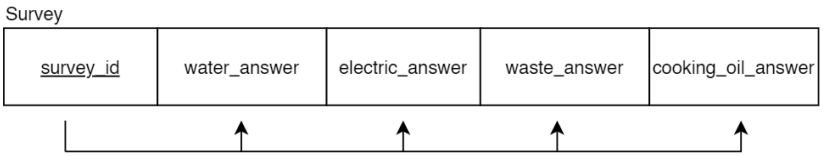

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PK: survey_id

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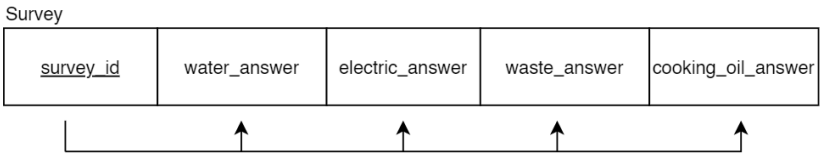

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PK: survey_id

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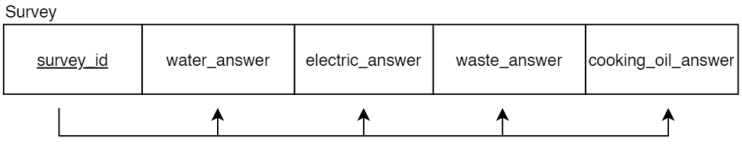
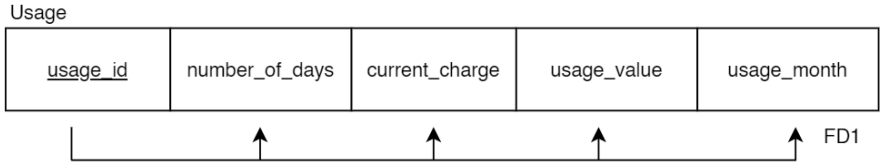


Survey(survey_id, water_answer, electric_answer, waste_answer, cooking_oil_answer)
PK: survey_id

Usage(usage_id, number_of_days, current_charge, usage_value, usage_month)
PK: usage_id

Functional Dependencies



Usage(usage_id, number_of_days, current_charge, usage_value, usage_month)
PK: usage_id

Normalization

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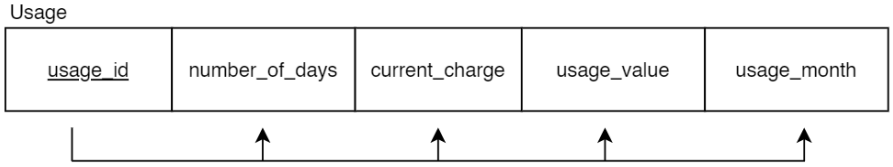

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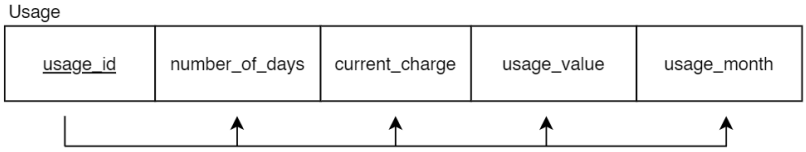

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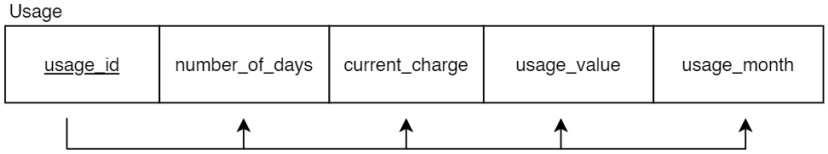

Usage(usage_id, number_of_days, current_charge, usage_value, usage_month)
PK: usage_id

Receipt(receipt_id, survey_id, usage_id, date)
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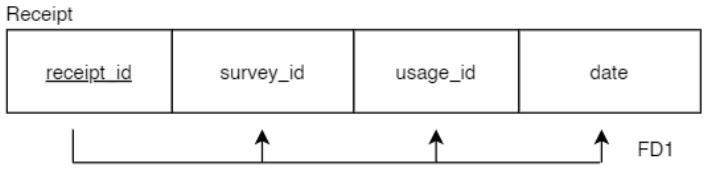
Functional Dependencies



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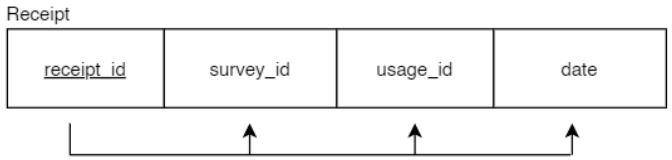

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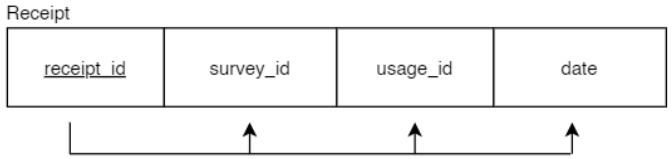

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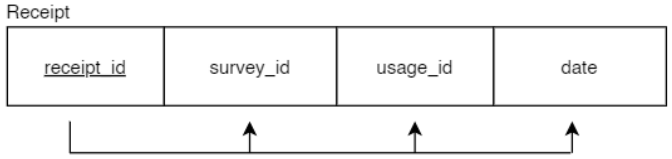

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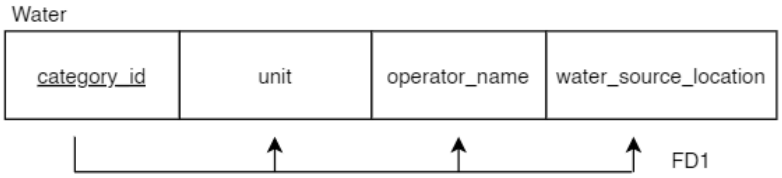
Water(category_id, unit, operator_name, water_source_location)
PK: category_id

Functional Dependencies



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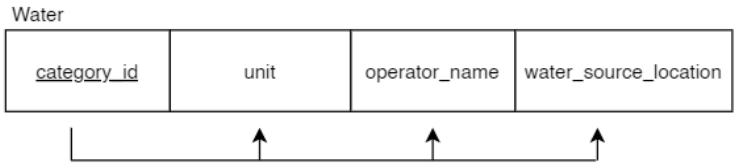

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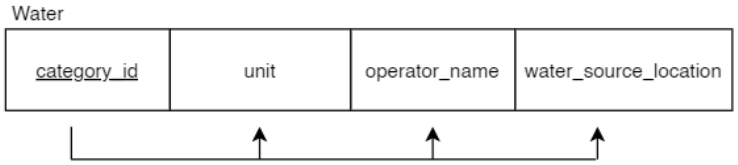

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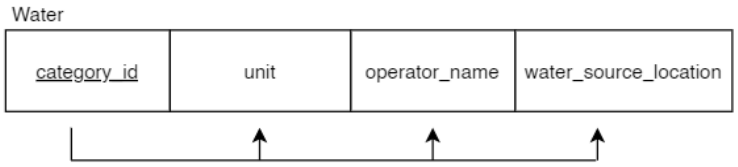

Water(category_id, unit, operator_name, water_source_location)
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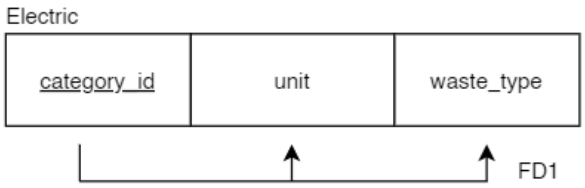
Electric(category_id, unit, waste_type)
PK: category_id

Functional Dependencies



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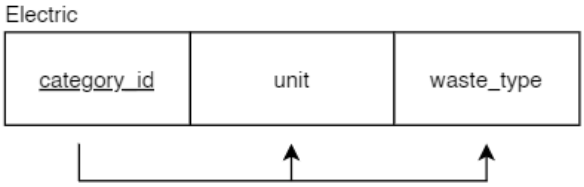

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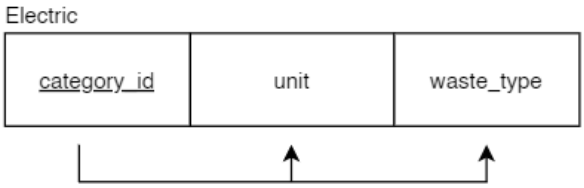

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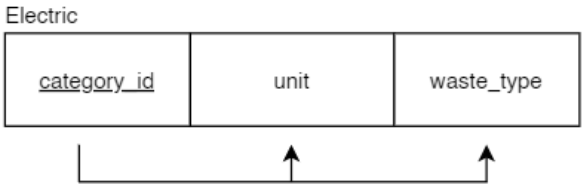

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Waste(category_id, unit, waste_type)
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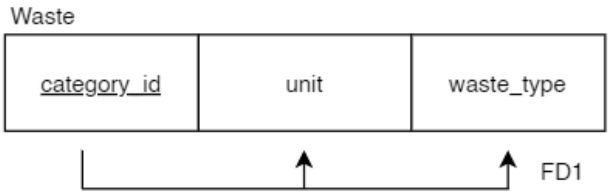
Functional Dependencies



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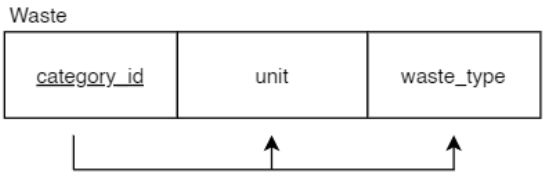

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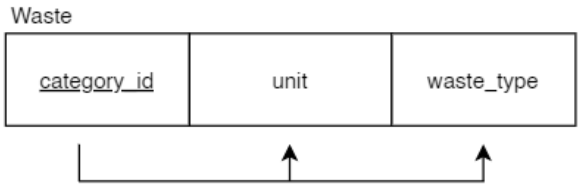

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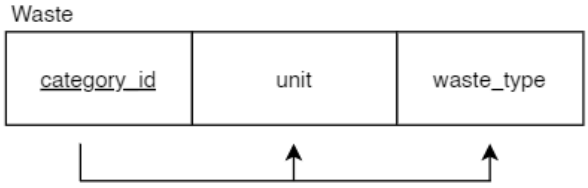

Waste(category_id, unit, waste_type)
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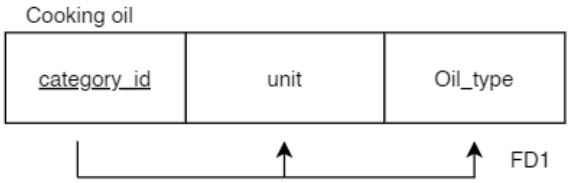
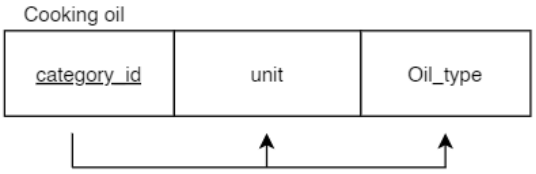
Cooking Oil(category_id, unit, oil_type)
PK: category_id

Functional Dependencies



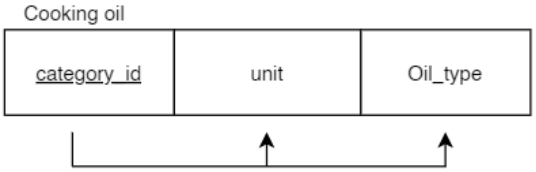
Normalization

1NF



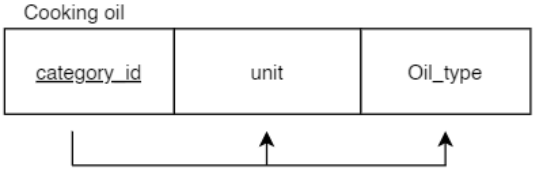
Cooking Oil(category_id, unit, oil_type)
PK: category_id

2NF



Cooking Oil(category_id, unit, oil_type)
PK: category_id

3NF



Cooking Oil(category_id, unit, oil_type)
PK: category_id

5.0 Relational DB Schemas (after normalization)

User(User_id, phone_number, address)
PK: user_id

Participant(participant_id, type_of_building, number_of_people)
PK: participant_id

Techadmin (techadmin_id)
PK: techadmin_id

MBIP(mbip_id)
PK: mbip_id

Survey(survey_id, water_answer, electric_answer, waste_answer, cooking_oil_answer)
PK: survey_id

Usage(usage_id, number_of_days, current_charge, usage_value, usage_month)
PK: usage_id

Receipt(receipt_id, survey_id, usage_id, date)
PK:receipt_id
FK: survey_id referencing to Survey, usage_id referencing to Usage

Water(category_id, unit, operator_name, water_source_location)
PK: category_id

Electric(category_id, unit, waste_type)
PK: category_id

Waste(category_id, unit, waste_type)
PK: category_id

Cooking Oil(category_id, unit, oil_type)
PK: category_id

6.0 SQL Statements (DDL & DML)

6.1 Create Table Users

```
CREATE TABLE users (
   user_id VARCHAR(15) NOT NULL,
   full_name VARCHAR(30) NOT NULL,
   phone_number VARCHAR(15) NOT NULL,
   address VARCHAR(50) NOT NULL,
   CONSTRAINT user_pk PRIMARY KEY ( user_id )
);
```

6.2 Create Table Tech Admin

```
CREATE TABLE techadmin (
   techadmin_id VARCHAR(15) NOT NULL,
   user_id VARCHAR(15) NOT NULL,
   CONSTRAINT techadmin_pk PRIMARY KEY ( techadmin_id ),
   CONSTRAINT techadmin_users_fk FOREIGN KEY (user_id) REFERENCES users (user_id)
);
```

6.3 Create Table Participant

```
CREATE TABLE participant (
   participant_id VARCHAR(15) NOT NULL,
   user_id VARCHAR(15) NOT NULL,
   CONSTRAINT participant_pk PRIMARY KEY ( participant_id ),
   CONSTRAINT participant_users_fk FOREIGN KEY (user_id) REFERENCES users (user_id)
);
```

6.4 Create Table MBIP

```
CREATE TABLE mbip (
   mbip_id VARCHAR(15) NOT NULL,
   user_id VARCHAR(15) NOT NULL,
   CONSTRAINT mbip_pk PRIMARY KEY ( mbip_id ),
   CONSTRAINT mbip_users_fk FOREIGN KEY (user_id) REFERENCES users (user_id)
);
```

6.5 Create Table Usages

```
CREATE TABLE usages (
   usage_id VARCHAR(15) NOT NULL,
   number_of_days NUMBER(10) NOT NULL,
   current_charge FLOAT(10) NOT NULL,
   usage_value FLOAT(10) NOT NULL,
   usage_month VARCHAR (15) NOT NULL,
   CONSTRAINT usage_pk PRIMARY KEY ( usage_id )
);
```

6.6 Create Table Survey

```
CREATE TABLE survey (
   survey_id VARCHAR(15) NOT NULL,
   water_answer VARCHAR(50) NOT NULL,
   electric_answer VARCHAR(50) NOT NULL,
   waste_answer VARCHAR(50) NOT NULL,
   oil_answer VARCHAR (50) NOT NULL,
   CONSTRAINT survey_pk PRIMARY KEY ( survey_id )
);
```

6.7 Create Table Receipt

```
CREATE TABLE receipt (
   receipt_id VARCHAR(15) NOT NULL,
   usage_id VARCHAR(15) NOT NULL,
   survey_id VARCHAR(15) NOT NULL,
   receipt_date DATE NOT NULL,
   CONSTRAINT receipt_pk PRIMARY KEY ( receipt_id ),
   CONSTRAINT receipt_usages_fk FOREIGN KEY (usage_id) REFERENCES usages
(usage_id),
   CONSTRAINT receipt_survey_fk FOREIGN KEY (survey_id) REFERENCES survey
(survey_id)
);
```

6.8 Create Table Category

```
CREATE TABLE category (
   category_id VARCHAR(15) NOT NULL,
   category_name VARCHAR(15) NOT NULL,
   unit VARCHAR(20) NOT NULL,
   CONSTRAINT category_pk PRIMARY KEY ( category_id )
);
```

6.9 Create Table Water

```
CREATE TABLE water (
   category_id VARCHAR(15) NOT NULL,
   operator_name VARCHAR(25) NOT NULL,
   water_source_location VARCHAR(35) NOT NULL,
   CONSTRAINT water_category_pk FOREIGN KEY ( category_id ) REFERENCES category
(category_id)
);
```

6.10 Create Table Electric

```
CREATE TABLE electric (
   category_id VARCHAR(15) NOT NULL,
   energy_efficiency_rating VARCHAR(35) NOT NULL,
   CONSTRAINT electric_category_pk FOREIGN KEY ( category_id ) REFERENCES category
(category_id)
);
```

6.11 Create Table Waste

```
CREATE TABLE waste (
   category_id VARCHAR(15) NOT NULL,
   waste_type VARCHAR(35) NOT NULL,
   CONSTRAINT waste_category_pk FOREIGN KEY ( category_id ) REFERENCES category
(category_id)
);
```

6.12 Create Table Oil

```
CREATE TABLE oil (
   category_id VARCHAR(15) NOT NULL,
   oil_type VARCHAR(35) NOT NULL,
   CONSTRAINT oil_category_pk FOREIGN KEY ( category_id ) REFERENCES category
(category_id)
);
```

6.13 Insert Data Table Users

```
INSERT INTO users (user_id, full_name, phone_number, address)
VALUES ('340906336831', 'Thia Thaqif', '0137905947', '123 Main Street');

INSERT INTO users (user_id, full_name, phone_number, address)
VALUES ('240427446505', 'Mohamad Azafri', '0198066437', '456 Oak Avenue');

INSERT INTO users (user_id, full_name, phone_number, address)
VALUES ('521227168429', 'Syed Naufal', '0179020566', '789 Elm Lane');

INSERT INTO users (user_id, full_name, phone_number, address)
VALUES ('990621169298', 'Johanis Umayra', '0197641541', '567 Pine Road');

INSERT INTO users (user_id, full_name, phone_number, address)
VALUES ('071021297020', 'Huang Bosheng', '01168744225', '890 Cedar Lane');

INSERT INTO users (user_id, full_name, phone_number, address)
VALUES ('750413112433', 'Eva White', '0120926004', '234 Birch Street');

INSERT INTO users (user_id, full_name, phone_number, address)
VALUES ('870726312257', 'George Wilson', '0149610810', '678 Maple Avenue');

INSERT INTO users (user_id, full_name, phone_number, address)
VALUES ('140709348697', 'Helen Taylor', '0191511447', '901 Oak Street');

INSERT INTO users (user_id, full_name, phone_number, address)
VALUES ('890606549437', 'Ian Miller', '0145801652', '345 Pine Lane');

INSERT INTO users (user_id, full_name, phone_number, address)
VALUES ('990730571398', 'Karen Turner', '0122448016', '678 Elm Avenue');

INSERT INTO users (user_id, full_name, phone_number, address)
VALUES ('710205144396', 'Larry Adams', '0139725761', '123 Oak Road');

INSERT INTO users (user_id, full_name, phone_number, address)
VALUES ('970605522046', 'Megan Moore', '0192177060', '456 Cedar Lane');

INSERT INTO users (user_id, full_name, phone_number, address)
VALUES ('880703311740', 'Olivia Hall', '0129063514', '234 Pine Street');

INSERT INTO users (user_id, full_name, phone_number, address)
VALUES ('870912539029', 'Peter Reed', '0102196942', '567 Elm Avenue');

INSERT INTO users (user_id, full_name, phone_number, address)
```

```
VALUES ('580127092132', 'Quincy Lee', '0104304478', '890 Cedar Street');

INSERT INTO users (user_id, full_name, phone_number, address)
VALUES ('401101067785', 'Rachel Scott', '0164883526', '123 Birch Road');

INSERT INTO users (user_id, full_name, phone_number, address)
VALUES ('441007113178', 'Samuel Carter', '0178278317', '456 Oak Lane');

INSERT INTO users (user_id, full_name, phone_number, address)
VALUES ('660703822348', 'Tina Perez', '0198365402', '789 Maple Avenue');

INSERT INTO users (user_id, full_name, phone_number, address)
VALUES ('120531509184', 'Ulysses Martinez', '0143929049', '901 Elm Lane');

INSERT INTO users (user_id, full_name, phone_number, address)
VALUES ('720121829309', 'Vera Garcia', '0147311157', '234 Oak Street');

INSERT INTO users (user_id, full_name, phone_number, address)
VALUES ('890909148820', 'Mark Taylor', '0160856014', '456 Pine Road');

INSERT INTO users (user_id, full_name, phone_number, address)
VALUES ('701109293987', 'Nicole Miller', '0182869698', '123 Cedar Avenue');

INSERT INTO users (user_id, full_name, phone_number, address)
VALUES ('140201035961', 'Oscar White', '0174849994', '678 Elm Street');

INSERT INTO users (user_id, full_name, phone_number, address)
VALUES ('030217297086', 'Patricia Adams', '01120085743', '901 Birch Lane');

INSERT INTO users (user_id, full_name, phone_number, address)
VALUES ('791009584198', 'Quentin Turner', '0186299534', '234 Oak Avenue');

INSERT INTO users (user_id, full_name, phone_number, address)
VALUES ('301213242828', 'Rose Davis', '0126661965', '567 Maple Lane');

INSERT INTO users (user_id, full_name, phone_number, address)
VALUES ('060110119103', 'Xander King', '0136314754', '789 Cedar Road');

INSERT INTO users (user_id, full_name, phone_number, address)
VALUES ('310126339003', 'Yolanda Rodriguez', '0176902979', '123 Pine Lane');

INSERT INTO users (user_id, full_name, phone_number, address)
VALUES ('681130145495', 'Zachary Turner', '0107654563', '456 Elm Avenue');

INSERT INTO users (user_id, full_name, phone_number, address)
```

```
VALUES ('020523823227', 'Martin Logan', '0107654563', '789 Elm Avenue');
```

6.14 Insert Data Table Tech Admin

```
INSERT INTO techadmin (techadmin_id, user_id)
VALUES ('TA01', '750413112433');

INSERT INTO techadmin (techadmin_id, user_id)
VALUES ('TA02', '870726312257');

INSERT INTO techadmin (techadmin_id, user_id)
VALUES ('TA03', '140709348697');

INSERT INTO techadmin (techadmin_id, user_id)
VALUES ('TAO4', '890606549437');

INSERT INTO techadmin (techadmin_id, user_id)
VALUES ('TA05', '990730571398');

INSERT INTO techadmin (techadmin_id, user_id)
VALUES ('TA06', '710205144396');

INSERT INTO techadmin (techadmin_id, user_id)
VALUES ('TA07', '970605522046');

INSERT INTO techadmin (techadmin_id, user_id)
VALUES ('TA08', '880703311740');

INSERT INTO techadmin (techadmin_id, user_id)
VALUES ('TA09', '870912539029');

INSERT INTO techadmin (techadmin_id, user_id)
VALUES ('TA10', '580127092132');

INSERT INTO techadmin (techadmin_id, user_id)
VALUES ('TA11', '401101067785');

INSERT INTO techadmin (techadmin_id, user_id)
VALUES ('TA12', '441007113178');

INSERT INTO techadmin (techadmin_id, user_id)
VALUES ('TA13', '660703822348');
```

```
INSERT INTO techadmin (techadmin_id, user_id)
VALUES ('TA14', '120531509184');

INSERT INTO techadmin (techadmin_id, user_id)
VALUES ('TA15', '720121829309');

INSERT INTO techadmin (techadmin_id, user_id)
VALUES ('TA16', '890909148820');

INSERT INTO techadmin (techadmin_id, user_id)
VALUES ('TA17', '701109293987');

INSERT INTO techadmin (techadmin_id, user_id)
VALUES ('TA18', '140201035961');

INSERT INTO techadmin (techadmin_id, user_id)
VALUES ('TA19', '030217297086');

INSERT INTO techadmin (techadmin_id, user_id)
VALUES ('TA20', '791009584198');
```

6.15 Insert Data Table Participant

```
INSERT INTO participant (participant_id, user_id)
VALUES ('P01', '340906336831');

INSERT INTO participant (participant_id, user_id)
VALUES ('P02', '240427446505');

INSERT INTO participant (participant_id, user_id)
VALUES ('P03', '521227168429');

INSERT INTO participant (participant_id, user_id)
VALUES ('P04', '990621169298');

INSERT INTO participant (participant_id, user_id)
VALUES ('P05', '071021297020');

INSERT INTO participant (participant_id, user_id)
VALUES ('P06', '750413112433');

INSERT INTO participant (participant_id, user_id)
VALUES ('P07', '870726312257');

INSERT INTO participant (participant_id, user_id)
VALUES ('P08', '140709348697');

INSERT INTO participant (participant_id, user_id)
VALUES ('P09', '890606549437');

INSERT INTO participant (participant_id, user_id)
VALUES ('P10', '990730571398');

INSERT INTO participant (participant_id, user_id)
VALUES ('P11', '710205144396');

INSERT INTO participant (participant_id, user_id)
VALUES ('P12', '970605522046');

INSERT INTO participant (participant_id, user_id)
VALUES ('P13', '880703311740');

INSERT INTO participant (participant_id, user_id)
VALUES ('P14', '870912539029');

INSERT INTO participant (participant_id, user_id)
```

```
VALUES ('P15', '580127092132');

INSERT INTO participant (participant_id, user_id)
VALUES ('P16', '401101067785');

INSERT INTO participant (participant_id, user_id)
VALUES ('P17', '441007113178');

INSERT INTO participant (participant_id, user_id)
VALUES ('P18', '660703822348');

INSERT INTO participant (participant_id, user_id)
VALUES ('P19', '120531509184');

INSERT INTO participant (participant_id, user_id)
VALUES ('P20', '720121829309');

INSERT INTO participant (participant_id, user_id)
VALUES ('P21', '890909148820');

INSERT INTO participant (participant_id, user_id)
VALUES ('P22', '701109293987');

INSERT INTO participant (participant_id, user_id)
VALUES ('P23', '140201035961');

INSERT INTO participant (participant_id, user_id)
VALUES ('P24', '030217297086');

INSERT INTO participant (participant_id, user_id)
VALUES ('P25', '791009584198');

INSERT INTO participant (participant_id, user_id)
VALUES ('P26', '301213242828');

INSERT INTO participant (participant_id, user_id)
VALUES ('P27', '060110119103');

INSERT INTO participant (participant_id, user_id)
VALUES ('P28', '310126339003');

INSERT INTO participant (participant_id, user_id)
VALUES ('P29', '681130145495');

INSERT INTO participant (participant_id, user_id)
```

```
VALUES ('P30', '020523823227');
```

6.16 Insert Data Table MBIP

```
INSERT INTO mbip (mbip_id, user_id)
VALUES ('MBIP01', '340906336831');

INSERT INTO mbip (mbip_id, user_id)
VALUES ('MBIP02', '240427446505');

INSERT INTO mbip (mbip_id, user_id)
VALUES ('MBIP03', '521227168429');

INSERT INTO mbip (mbip_id, user_id)
VALUES ('MBIP04', '990621169298');

INSERT INTO mbip (mbip_id, user_id)
VALUES ('MBIP05', '071021297020');
```

6.17 Insert Data Table Usages

```
INSERT INTO usages (usage_id, number_of_days, current_charge, usage_value, usage_month)
VALUES ('USG01', 31, 10.0, 15.0, 'April');

INSERT INTO usages (usage_id, number_of_days, current_charge, usage_value, usage_month)
VALUES ('USG02', 20, 30.0, 45.0, 'January');

INSERT INTO usages (usage_id, number_of_days, current_charge, usage_value, usage_month)
VALUES ('USG03', 25, 35.5, 53.25, 'February');

INSERT INTO usages (usage_id, number_of_days, current_charge, usage_value, usage_month)
VALUES ('USG04', 18, 28.0, 42.0, 'February');

INSERT INTO usages (usage_id, number_of_days, current_charge, usage_value, usage_month)
VALUES ('USG05', 22, 32.5, 48.75, 'March');

INSERT INTO usages (usage_id, number_of_days, current_charge, usage_value, usage_month)
VALUES ('USG06', 17, 26.0, 39.0, 'March');

INSERT INTO usages (usage_id, number_of_days, current_charge, usage_value, usage_month)
VALUES ('USG07', 21, 31.0, 46.5, 'April');

INSERT INTO usages (usage_id, number_of_days, current_charge, usage_value, usage_month)
VALUES ('USG08', 19, 29.5, 44.25, 'April');

INSERT INTO usages (usage_id, number_of_days, current_charge, usage_value, usage_month)
VALUES ('USG09', 24, 34.0, 51.0, 'May');


INSERT INTO usages (usage_id, number_of_days, current_charge, usage_value, usage_month)
VALUES ('USG010', 16, 24.5, 36.75, 'May');

INSERT INTO usages (usage_id, number_of_days, current_charge, usage_value, usage_month)
VALUES ('USG11', 23, 33.0, 49.5, 'June');

INSERT INTO usages (usage_id, number_of_days, current_charge, usage_value, usage_month)
VALUES ('USG12', 18, 28.0, 42.0, 'June');

INSERT INTO usages (usage_id, number_of_days, current_charge, usage_value, usage_month)
VALUES ('USG13', 20, 30.5, 15.25, 'July');

INSERT INTO usages (usage_id, number_of_days, current_charge, usage_value, usage_month)
VALUES ('USG14', 15, 25.0, 37.5, 'July');
```

```
INSERT INTO usages (usage_id, number_of_days, current_charge, usage_value, usage_month)
VALUES ('USG15', 19, 29.0, 43.5, 'August');

INSERT INTO usages (usage_id, number_of_days, current_charge, usage_value, usage_month)
VALUES ('USG16', 22, 32.5, 48.75, 'August');

INSERT INTO usages (usage_id, number_of_days, current_charge, usage_value, usage_month)
VALUES ('USG17', 21, 31.0, 46.5, 'September');

INSERT INTO usages (usage_id, number_of_days, current_charge, usage_value, usage_month)
VALUES ('USG18', 17, 26.5, 39.75, 'September');

INSERT INTO usages (usage_id, number_of_days, current_charge, usage_value, usage_month)
VALUES ('USG19', 23, 33.0, 49.5, 'October');

INSERT INTO usages (usage_id, number_of_days, current_charge, usage_value, usage_month)
VALUES ('USG20', 18, 28.5, 42.75, 'October');

INSERT INTO usages (usage_id, number_of_days, current_charge, usage_value, usage_month)
VALUES ('USG21', 20, 30.0, 45.0, 'November');

INSERT INTO usages (usage_id, number_of_days, current_charge, usage_value, usage_month)
VALUES ('USG22', 24, 34.5, 51.75, 'November');

INSERT INTO usages (usage_id, number_of_days, current_charge, usage_value, usage_month)
VALUES ('USG23', 16, 24.0, 36.0, 'December');

INSERT INTO usages (usage_id, number_of_days, current_charge, usage_value, usage_month)
VALUES ('USG24', 19, 29.0, 43.5, 'December');

INSERT INTO usages (usage_id, number_of_days, current_charge, usage_value, usage_month)
VALUES ('USG25', 21, 31.5, 47.25, 'January');

INSERT INTO usages (usage_id, number_of_days, current_charge, usage_value, usage_month)
VALUES ('USG26', 17, 26.0, 39.0, 'January');

INSERT INTO usages (usage_id, number_of_days, current_charge, usage_value, usage_month)
VALUES ('USG27', 22, 32.0, 48.0, 'February');

INSERT INTO usages (usage_id, number_of_days, current_charge, usage_value, usage_month)
VALUES ('USG28', 18, 28.5, 42.75, 'February');

INSERT INTO usages (usage_id, number_of_days, current_charge, usage_value, usage_month)
VALUES ('USG29', 20, 30.0, 45.0, 'March');
```

```
INSERT INTO usages (usage_id, number_of_days, current_charge, usage_value, usage_month)
VALUES ('USG30', 15, 25.5, 38.25, 'March');
```

6.18 Insert Data Table Survey

```
INSERT INTO survey (survey_id, water_answer, electric_answer, waste_answer, oil_answer)
VALUES ('SRV01', 'Shower', 'Aircond', 'Good', 'Yes');

INSERT INTO survey (survey_id, water_answer, electric_answer, waste_answer, oil_answer)
VALUES ('SRV02', 'Washing', 'Dryer', 'Average', 'Yes');

INSERT INTO survey (survey_id, water_answer, electric_answer, waste_answer, oil_answer)
VALUES ('SRV03', 'Cooking', 'Heater', 'Excellent', 'Yes');

INSERT INTO survey (survey_id, water_answer, electric_answer, waste_answer, oil_answer)
VALUES ('SRV04', 'Drink', 'Washing Machine', 'Bad', 'No');

INSERT INTO survey (survey_id, water_answer, electric_answer, waste_answer, oil_answer)
VALUES ('SRV05', 'Cleaning', 'Fan', 'Very Bad', 'No');

INSERT INTO survey (survey_id, water_answer, electric_answer, waste_answer, oil_answer)
VALUES ('SRV06', 'Shower', 'Charger', 'Excellent', 'No');

INSERT INTO survey (survey_id, water_answer, electric_answer, waste_answer, oil_answer)
VALUES ('SRV07', 'Cooking', 'Oven', 'Very Bad', 'Yes');

INSERT INTO survey (survey_id, water_answer, electric_answer, waste_answer, oil_answer)
VALUES ('SRV08', 'Cleaning', 'Refridgerator', 'Bad', 'No');

INSERT INTO survey (survey_id, water_answer, electric_answer, waste_answer, oil_answer)
VALUES ('SRV09', 'Drinking', 'Electric Kettle', 'Average', 'No');

INSERT INTO survey (survey_id, water_answer, electric_answer, waste_answer, oil_answer)
VALUES ('SRV10', 'Washing', 'Television', 'Good', 'Yes');

INSERT INTO survey (survey_id, water_answer, electric_answer, waste_answer, oil_answer)
VALUES ('SRV11', 'Washing', 'Refridgerator', 'Average', 'Yes');

INSERT INTO survey (survey_id, water_answer, electric_answer, waste_answer, oil_answer)
VALUES ('SRV12', 'Drinking', 'Aircond', 'Bad', 'No');

INSERT INTO survey (survey_id, water_answer, electric_answer, waste_answer, oil_answer)
```

```
VALUES ('SRV13', 'Cooking', 'Washing Machine', 'Good', 'Yes');

INSERT INTO survey (survey_id, water_answer, electric_answer, waste_answer, oil_answer)
VALUES ('SRV14', 'Shower', 'Heater', 'Very Bad', 'No');

INSERT INTO survey (survey_id, water_answer, electric_answer, waste_answer, oil_answer)
VALUES ('SRV15', 'Cleaning', 'Dryer', 'Excellent', 'Yes');

INSERT INTO survey (survey_id, water_answer, electric_answer, waste_answer, oil_answer)
VALUES ('SRV16', 'Cleaning', 'Electric Kettle', 'Good', 'No');

INSERT INTO survey (survey_id, water_answer, electric_answer, waste_answer, oil_answer)
VALUES ('SRV17', 'Shower', 'Fan', 'Excellent', 'No');

INSERT INTO survey (survey_id, water_answer, electric_answer, waste_answer, oil_answer)
VALUES ('SRV18', 'Washing', 'Oven', 'Very Bad', 'Yes');

INSERT INTO survey (survey_id, water_answer, electric_answer, waste_answer, oil_answer)
VALUES ('SRV19', 'Cooking', 'Charger', 'Bad', 'Yes');

INSERT INTO survey (survey_id, water_answer, electric_answer, waste_answer, oil_answer)
VALUES ('SRV20', 'Drinking', 'Television', 'Average', 'No');

INSERT INTO survey (survey_id, water_answer, electric_answer, waste_answer, oil_answer)
VALUES ('SRV21', 'Washing', 'Electric Kettle', 'Bad', 'No');

INSERT INTO survey (survey_id, water_answer, electric_answer, waste_answer, oil_answer)
VALUES ('SRV22', 'Shower', 'Oven', 'Average', 'Yes');

INSERT INTO survey (survey_id, water_answer, electric_answer, waste_answer, oil_answer)
VALUES ('SRV23', 'Cleaning', 'Fan', 'Very Bad', 'No');

INSERT INTO survey (survey_id, water_answer, electric_answer, waste_answer, oil_answer)
VALUES ('SRV24', 'Cooking', 'Television', 'Excellent', 'Yes');

INSERT INTO survey (survey_id, water_answer, electric_answer, waste_answer, oil_answer)
VALUES ('SRV25', 'Cleaning', 'Aircond', 'Good', 'Yes');

INSERT INTO survey (survey_id, water_answer, electric_answer, waste_answer, oil_answer)
VALUES ('SRV26', 'Shower', 'Dryer', 'Very Bad', 'No');

INSERT INTO survey (survey_id, water_answer, electric_answer, waste_answer, oil_answer)
VALUES ('SRV27', 'Washing', 'Washing Machine', 'Good', 'No');

INSERT INTO survey (survey_id, water_answer, electric_answer, waste_answer, oil_answer)
```

```
VALUES ('SRV28', 'Drinking', 'Charger', 'Excellent', 'Yes');

INSERT INTO survey (survey_id, water_answer, electric_answer, waste_answer, oil_answer)
VALUES ('SRV29', 'Cleaning', 'Refridgerator', 'Average', 'Yes');

INSERT INTO survey (survey_id, water_answer, electric_answer, waste_answer, oil_answer)
VALUES ('SRV30', 'Cooking', 'Heater', 'Bad', 'No');
```

6.19 Insert Data Table Receipt

```
INSERT INTO receipt (receipt_id, usage_id, survey_id, receipt_date)
VALUES ('RCPT01', 'USG01', 'SRV30', TO_DATE('01-Jan-2024', 'DD-MM-YYYY'));

INSERT INTO receipt (receipt_id, usage_id, survey_id, receipt_date)
VALUES ('RCPT02', 'USG02', 'SRV29', TO_DATE('03-Jan-2024', 'DD-MM-YYYY'));

INSERT INTO receipt (receipt_id, usage_id, survey_id, receipt_date)
VALUES ('RCPT03', 'USG03', 'SRV28', TO_DATE('05-Jan-2024', 'DD-MM-YYYY'));

INSERT INTO receipt (receipt_id, usage_id, survey_id, receipt_date)
VALUES ('RCPT04', 'USG04', 'SRV27', TO_DATE('07-Jan-2024', 'DD-MM-YYYY'));

INSERT INTO receipt (receipt_id, usage_id, survey_id, receipt_date)
VALUES ('RCPT05', 'USG05', 'SRV26', TO_DATE('09-Jan-2024', 'DD-MM-YYYY'));

INSERT INTO receipt (receipt_id, usage_id, survey_id, receipt_date)
VALUES ('RCPT06', 'USG06', 'SRV25', TO_DATE('11-Jan-2024', 'DD-MM-YYYY'));

INSERT INTO receipt (receipt_id, usage_id, survey_id, receipt_date)
VALUES ('RCPT07', 'USG07', 'SRV24', TO_DATE('13-Jan-2024', 'DD-MM-YYYY'));

INSERT INTO receipt (receipt_id, usage_id, survey_id, receipt_date)
VALUES ('RCPT08', 'USG08', 'SRV23', TO_DATE('15-Jan-2024', 'DD-MM-YYYY'));

INSERT INTO receipt (receipt_id, usage_id, survey_id, receipt_date)
VALUES ('RCPT09', 'USG09', 'SRV22', TO_DATE('17-Jan-2024', 'DD-MM-YYYY'));

INSERT INTO receipt (receipt_id, usage_id, survey_id, receipt_date)
VALUES ('RCPT10', 'USG10', 'SRV21', TO_DATE('19-Jan-2024', 'DD-MM-YYYY'));

INSERT INTO receipt (receipt_id, usage_id, survey_id, receipt_date)
VALUES ('RCPT11', 'USG11', 'SRV20', TO_DATE('21-Jan-2024', 'DD-MM-YYYY'));
```

```
INSERT INTO receipt (receipt_id, usage_id, survey_id, receipt_date)
VALUES ('RCPT12', 'USG12', 'SRV19', TO_DATE('23-Jan-2024', 'DD-MM-YYYY'));

INSERT INTO receipt (receipt_id, usage_id, survey_id, receipt_date)
VALUES ('RCPT13', 'USG13', 'SRV18', TO_DATE('25-Jan-2024', 'DD-MM-YYYY'));

INSERT INTO receipt (receipt_id, usage_id, survey_id, receipt_date)
VALUES ('RCPT14', 'USG14', 'SRV17', TO_DATE('27-Jan-2024', 'DD-MM-YYYY'));

INSERT INTO receipt (receipt_id, usage_id, survey_id, receipt_date)
VALUES ('RCPT15', 'USG15', 'SRV16', TO_DATE('29-Jan-2024', 'DD-MM-YYYY'));

INSERT INTO receipt (receipt_id, usage_id, survey_id, receipt_date)
VALUES ('RCPT16', 'USG16', 'SRV15', TO_DATE('30-Jan-2024', 'DD-MM-YYYY'));

INSERT INTO receipt (receipt_id, usage_id, survey_id, receipt_date)
VALUES ('RCPT17', 'USG17', 'SRV14', TO_DATE('28-Jan-2024', 'DD-MM-YYYY'));

INSERT INTO receipt (receipt_id, usage_id, survey_id, receipt_date)
VALUES ('RCPT18', 'USG18', 'SRV13', TO_DATE('26-Jan-2024', 'DD-MM-YYYY'));

INSERT INTO receipt (receipt_id, usage_id, survey_id, receipt_date)
VALUES ('RCPT19', 'USG19', 'SRV12', TO_DATE('24-Jan-2024', 'DD-MM-YYYY'));

INSERT INTO receipt (receipt_id, usage_id, survey_id, receipt_date)
VALUES ('RCPT20', 'USG20', 'SRV11', TO_DATE('22-Jan-2024', 'DD-MM-YYYY'));

INSERT INTO receipt (receipt_id, usage_id, survey_id, receipt_date)
VALUES ('RCPT21', 'USG21', 'SRV10', TO_DATE('20-Jan-2024', 'DD-MM-YYYY'));

INSERT INTO receipt (receipt_id, usage_id, survey_id, receipt_date)
VALUES ('RCPT22', 'USG22', 'SRV09', TO_DATE('18-Jan-2024', 'DD-MM-YYYY'));

INSERT INTO receipt (receipt_id, usage_id, survey_id, receipt_date)
VALUES ('RCPT23', 'USG23', 'SRV08', TO_DATE('16-Jan-2024', 'DD-MM-YYYY'));

INSERT INTO receipt (receipt_id, usage_id, survey_id, receipt_date)
VALUES ('RCPT24', 'USG24', 'SRV07', TO_DATE('14-Jan-2024', 'DD-MM-YYYY'));

INSERT INTO receipt (receipt_id, usage_id, survey_id, receipt_date)
VALUES ('RCPT25', 'USG25', 'SRV06', TO_DATE('12-Jan-2024', 'DD-MM-YYYY'));

INSERT INTO receipt (receipt_id, usage_id, survey_id, receipt_date)
VALUES ('RCPT26', 'USG26', 'SRV05', TO_DATE('10-Jan-2024', 'DD-MM-YYYY'));
```

```
INSERT INTO receipt (receipt_id, usage_id, survey_id, receipt_date)
VALUES ('RCPT27', 'USG27', 'SRV04', TO_DATE('08-Jan-2024', 'DD-MM-YYYY'));

INSERT INTO receipt (receipt_id, usage_id, survey_id, receipt_date)
VALUES ('RCPT28', 'USG28', 'SRV03', TO_DATE('06-Jan-2024', 'DD-MM-YYYY'));

INSERT INTO receipt (receipt_id, usage_id, survey_id, receipt_date)
VALUES ('RCPT29', 'USG29', 'SRV02', TO_DATE('04-Jan-2024', 'DD-MM-YYYY'));

INSERT INTO receipt (receipt_id, usage_id, survey_id, receipt_date)
VALUES ('RCPT30', 'USG30', 'SRV01', TO_DATE('02-Jan-2024', 'DD-MM-YYYY'));
```

6.20 Insert Data Table Category

```
INSERT INTO category (category_id, category_name, unit)
VALUES ('CG01', 'Water', 'Litre');

INSERT INTO category (category_id, category_name, unit)
VALUES ('CG02', 'Electric', 'Kilowatt');

INSERT INTO category (category_id, category_name, unit)
VALUES ('CG03', 'Waste', 'Kilogram');

INSERT INTO category (category_id, category_name, unit)
VALUES ('CG04', 'Oil', 'Litre');

INSERT INTO category (category_id, category_name, unit)
VALUES ('CG05', 'Water', 'Liter');

INSERT INTO category (category_id, category_name, unit)
VALUES ('CG06', 'Water', 'Litre');

INSERT INTO category (category_id, category_name, unit)
VALUES ('CG07', 'Electric', 'Kilowatt');

INSERT INTO category (category_id, category_name, unit)
VALUES ('CG08', 'Waste', 'Kilogram');

INSERT INTO category (category_id, category_name, unit)
VALUES ('CG09', 'Oil', 'Litre');

INSERT INTO category (category_id, category_name, unit)
VALUES ('CG10', 'Electric', 'Kilowatt');
```

```
INSERT INTO category (category_id, category_name, unit)
VALUES ('CG11', 'Water', 'Litre');

INSERT INTO category (category_id, category_name, unit)
VALUES ('CG12', 'Electric', 'Kilowatt');

INSERT INTO category (category_id, category_name, unit)
VALUES ('CG13', 'Waste', 'Kilogram');

INSERT INTO category (category_id, category_name, unit)
VALUES ('CG14', 'Oil', 'Litre');

INSERT INTO category (category_id, category_name, unit)
VALUES ('CG15', 'Waste', 'Kilogram');

INSERT INTO category (category_id, category_name, unit)
VALUES ('CG16', 'Water', 'Litre');

INSERT INTO category (category_id, category_name, unit)
VALUES ('CG17', 'Electric', 'Kilowatt');

INSERT INTO category (category_id, category_name, unit)
VALUES ('CG18', 'Waste', 'Kilogram');

INSERT INTO category (category_id, category_name, unit)
VALUES ('CG19', 'Oil', 'Litre');

INSERT INTO category (category_id, category_name, unit)
VALUES ('CG20', 'Oil', 'Litre');

INSERT INTO category (category_id, category_name, unit)
VALUES ('CG21', 'Water', 'Litre');

INSERT INTO category (category_id, category_name, unit)
VALUES ('CG22', 'Electric', 'Kilowatt');

INSERT INTO category (category_id, category_name, unit)
VALUES ('CG23', 'Waste', 'Kilogram');

INSERT INTO category (category_id, category_name, unit)
VALUES ('CG24', 'Oil', 'Litre');

INSERT INTO category (category_id, category_name, unit)
VALUES ('CG25', 'Water', 'Liter');
```

```
INSERT INTO category (category_id, category_name, unit)
VALUES ('CG26', 'Water', 'Litre');

INSERT INTO category (category_id, category_name, unit)
VALUES ('CG27', 'Electric', 'Kilowatt');

INSERT INTO category (category_id, category_name, unit)
VALUES ('CG28', 'Waste', 'Kilogram');

INSERT INTO category (category_id, category_name, unit)
VALUES ('CG29', 'Oil', 'Litre');

INSERT INTO category (category_id, category_name, unit)
VALUES ('CG30', 'Electric', 'Kilowatt');
```

6.21 Insert Data Table Water

```
INSERT INTO water (category_id, operator_name, water_source_location)
VALUES ('CG01', 'SAJ', 'Johor');

INSERT INTO water (category_id, operator_name, water_source_location)
VALUES ('CG05', 'SYABAS', 'Selangor');

INSERT INTO water (category_id, operator_name, water_source_location)
VALUES ('CG06', 'SAINS', 'Negeri Sembilan');

INSERT INTO water (category_id, operator_name, water_source_location)
VALUES ('CG11', 'SAMB', 'Melaka');

INSERT INTO water (category_id, operator_name, water_source_location)
VALUES ('CG16', 'SATU', 'Terengganu');

INSERT INTO water (category_id, operator_name, water_source_location)
VALUES ('CG21', 'SADA', 'Kedah');

INSERT INTO water (category_id, operator_name, water_source_location)
VALUES ('CG25', 'SAJ', 'Johor');

INSERT INTO water (category_id, operator_name, water_source_location)
VALUES ('CG26', 'SYABAS', 'Selangor');
```

6.22 Insert Data Table Electric

```
INSERT INTO electric (category_id, energy_efficiency_rating)
VALUES ('CG02', '5 Star');

INSERT INTO electric (category_id, energy_efficiency_rating)
VALUES ('CG07', '5 Star');

INSERT INTO electric (category_id, energy_efficiency_rating)
VALUES ('CG10', '2 Star');

INSERT INTO electric (category_id, energy_efficiency_rating)
VALUES ('CG12', '4 Star');

INSERT INTO electric (category_id, energy_efficiency_rating)
VALUES ('CG17', '3 Star');

INSERT INTO electric (category_id, energy_efficiency_rating)
VALUES ('CG22', '1 Star');

INSERT INTO electric (category_id, energy_efficiency_rating)
VALUES ('CG27', '2 Star');

INSERT INTO electric (category_id, energy_efficiency_rating)
VALUES ('CG30', '3 Star');
```

6.23 Insert Data Table Waste

```
INSERT INTO waste (category_id, waste_type)
VALUES ('CG03', 'Industrial Waste');

INSERT INTO waste (category_id, waste_type)
VALUES ('CG08', 'Agricultural Waste');

INSERT INTO waste (category_id, waste_type)
VALUES ('CG13', 'Domestic Waste');

INSERT INTO waste (category_id, waste_type)
VALUES ('CG15', 'Commercial Waste');

INSERT INTO waste (category_id, waste_type)
VALUES ('CG18', 'Domestic Waste');

INSERT INTO waste (category_id, waste_type)
VALUES ('CG23', 'Industrial Waste');

INSERT INTO waste (category_id, waste_type)
VALUES ('CG28', 'Commercial Waste');
```

6.13 Insert Data Table Oil

```
INSERT INTO oil (category_id, oil_type)
VALUES ('CG04', 'Olive Oil');

INSERT INTO oil (category_id, oil_type)
VALUES ('CG09', 'Coconut Oil');

INSERT INTO oil (category_id, oil_type)
VALUES ('CG14', 'Avocado Oil');

INSERT INTO oil (category_id, oil_type)
VALUES ('CG19', 'Peanut Oil');

INSERT INTO oil (category_id, oil_type)
VALUES ('CG20', 'Sunflower Oil');

INSERT INTO oil (category_id, oil_type)
VALUES ('CG24', 'Vegetable Oil');

INSERT INTO oil (category_id, oil_type)
VALUES ('CG29', 'Canola Oil');
```

7.0 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.