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# IT 211 - Final Project: Database Documentation

*First Semester, A.Y. 2025 - 2026*

PROJECT INFORMATION	
Course:	IT 211 - Database Management System
Project Title:	SUSTAINIFY
Year and Section	BSIT 2106
Group Number:	Group 5
Group Members:	<ul style="list-style-type: none"><li>- Fonte, Gwenn Ellese Z.</li><li>- Lajara, Gilian F.</li><li>- Sy Tamco, Jay Bian L.</li><li>- Vergara, Toni Cezhar L</li></ul>

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**1 INTRODUCTION**

**1.1 Overview of the system**

Sustainify is a web-based platform designed to promote responsible consumption by encouraging the reuse, exchange, and donation of items within the community. Many items that still have value are often disposed of due to the absence of a convenient system where people can share or acquire pre-owned goods. Sustainify addresses this need by providing an organized and accessible platform where users can post items they wish to sell, swap, or give away. Other users can then browse, search, and request these items based on their needs.

The system supports sustainability by making it easier for individuals to pass on items instead of discarding them. Through features such as image uploads, item descriptions, categories, and user communication, Sustainify helps reduce waste and encourages a more resource-conscious lifestyle. By aligning with Sustainable Development Goal (SDG) 12, the platform contributes to minimizing environmental impact and promoting responsible consumption in a practical and community-centered way.

**1.2 Purpose of database**

The database serves as the main storage system for all information used in Sustainify. It keeps records such as user profiles, item listings, images, categories, and transaction activities. By storing data in a central and organized manner, the database ensures that information remains accurate, consistent, and easy to retrieve at any time.

A well-structured database also reduces errors such as duplicate entries and missing records. It supports the system's ability to manage a growing number of users and items while maintaining smooth and efficient performance. Through proper data handling and secure storage practices, the database strengthens the reliability and overall functionality of the platform.

**1.3 Database type and tools used (XAMPP, MySQL, Flask)**

Sustainify uses a Relational Database, which organizes data into well-defined tables and relationships. This type of database is suitable for the system because it allows structured storage of users, items, and transactions while ensuring data integrity and efficient queries.



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**Database Type:** Relational Database (MySQL)

**Tools Used:**

- **XAMPP (Apache, PHP, MariaDB)** – for storing and managing structured data.
- **Flask** – as the backend framework responsible for server logic and communication between the website and the database.

### 1.4 Objectives of the project

The main goal of this project is to develop a web-based platform that supports responsible consumption by allowing users to exchange, donate, or repurpose items. By utilizing a well-designed database and organized system features, to encourage sustainable practices within the community.

- To design a relational database that efficiently manages user information, item listings, and transaction records.
- To apply normalization techniques to maintain clean, accurate, and well-organized data.
- To implement SQL operations for creating, updating, and managing database records.
- To integrate the database with a Flask-based backend for smooth and secure data processing.
- To maintain proper documentation and version control throughout the development process.
- To support SDG 12 by providing a digital platform that promotes reuse, reduces waste, and encourages responsible consumption.

## 2 ENTITY RELATIONSHIP DIAGRAM

This section introduces the structural blueprint of the database. It explains how entities interact, the relationships between them, and the overall organization of the system's data.

### 2.1 Entities

In the system titled “**Sustainify**” the researcher used the following entities to store data:

- **User entity**
- **Buyers entity**
- **Donations entity**
- **Items entity**



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- **Messages entity**
- **Notifications entity**
- **Ratings entity**
- **Swap\_details entity**
- **Swap\_request entity**
- **Transactions entity**
- **Supplier entity**
- **Inventory Transaction entity**

**2.2 Attributes**

This section shows the attributes of the project, it represents the specific details or properties that describe each entity with the “Sustainify” system.

**User Entity:**

- user\_id
- username
- password
- created\_at

**Buyers Entity:**

- buyers\_id
- item\_id
- name
- email
- phone
- quantity
- payment\_method
- delivery\_option
- note
- status
- created\_at
- delivery\_address

**Donations Entity:**

- donations\_id
- item\_id
- name
- email
- phone
- pickup\_address
- created\_at



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- pickup\_time
- note
- status

**Items Entity:**

- item\_id
- user\_id
- title
- description
- condition
- location
- category
- image\_path
- created\_at
- category
- type
- quantity
- price

**Messages Entity:**

- messages\_id
- sender\_id
- receiver\_id
- message
- created\_at

**Notifications Entity:**

- notification\_id
- user\_id
- message
- link
- read\_status
- created\_at

**Ratings Entity:**

- ratings\_id
- rater\_id
- rated\_id
- item\_id
- rating
- comment
- created\_at



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**Swap\_details Entity:**

- swap\_id
- item\_id
- name
- email
- phone
- offered\_item
- created\_at
- condition
- category
- note
- status

**Swap\_requests Entity:**

- swap\_request\_id
- item\_id
- swapper\_id
- offered\_item
- created\_at

**Transactions Entity:**

- transactions\_id (PRIMARY KEY)
- item\_id (FOREIGN KEY)
- type
- user\_from (FOREIGN KEY)
- user\_to (FOREIGN KEY)
- quantity
- status
- created\_at

**2.3 Primary Key and Foreign Key**

ENTITY	PRIMARY KEY	FOREIGN KEY
1. User Entity	user_id	—
2. Buyers Entity	buyers_id	item_id
3. Donation Entity	donation_id	item_id
4. Items Entity	item_id	user_id



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5. Messages Entity	message_id	sender_id, reiever_id
6. Notifications Entity	notifications_id	user_id
7. Ratings Entity	ratings_id	rater_id, rated_id, item_id
8. Swaps Details Entity	swap_id	item_id
9. Swaps Request Entity	swaps_request_id	item_id, swapper_id
10. Transactions Entity	transaction_id	Item_id, user_from, user_to

#### 2.4 Relationship

This section defines the logical structure of the database by illustrating how users, items, and transactions are connected through one-to-many and many-to-many relationships to ensure organized, efficient, and consistent data management.

1. **One- to- Many relationship** between User → Items
2. **One- to- Many relationship** between Item → Buyers
3. **One- to- Many relationship** between Item → Donations
4. **One- to- Many relationship** between Item → Swap Request
5. **One- to- Many relationship** between Swap Request → Swap Details
6. **One- to- Many relationship** between Item → Transactions
7. **One- to- Many relationship** between User → Messages
8. **One- to- Many relationship** between User → Notifications
9. **Many- to- Many relationship** between User ↔ User (via Ratings & Transactions)

#### 2.5 ERD

This ERD is a representation of an item exchange platform, which facilitates the sales, donation, and exchange of items. The user is able to post items with specifications like condition, category, price, and quantity. Other users can buy things, ask swaps or make donations which are stored in buyer, swap, donation and transaction tables. The system also enables user to user messaging, notifications as well as ratings to facilitate communication, trust and interaction. All in all, the database structure will provide adequate tracking of item listing, user activity, and transaction history in the platform.

This is the link for our ERD:

 [SUSTAINIFY\\_ERD.png](#)



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### 3 NORMALIZATION PROCESS

This chapter is a process involving dividing large tables into smaller, related tables to reduce data redundancy and improve data integrity.

#### 3.1 Unnormalized Form (UNF)

Unnormalized Form shows raw data where no normalization rules are applied. In this form, the tables contain multiple values in a single attribute and repeating groups, as seen in attributes like item title, condition, location, category, quantity, and price. The table also lacks a clear primary key, making records difficult to identify. Additionally, buyer and item information are stored together, causing data redundancy and increasing the risk of inconsistency.

This is the link for our Unnormalized Form (UNF):

 [Unnormalized Form \(UNF\) - Google Docs.pdf](#)

#### 3.2 First Normal Form (1NF)

First Normal Form, ensures that each table stores only atomic values with no repeating groups by separating data into distinct tables. Each table is uniquely identified, improving organization, though some data redundancy (such as repeated buyer information) may still exist.


This is the link for our First Normal Form (1NF):

 [First Normal Form \(1NF\) - Google Docs.pdf](#)

#### 3.3 Second Normal Form (2NF)

The Second Normal Form builds on 1NF by removing partial dependencies, ensuring that all non-key attributes depend on the entire primary key. Each entity table clearly defines primary keys and foreign keys. This structure prevents attributes from depending on only part of a key and reduces redundancy by keeping related data in its proper table.


This is the link for our Second Normal Form (2NF):

 [Second Normal Form \(2NF\) - Google Docs.pdf](#)

#### 3.4 Third Normal Form (3NF)

As for the Third Normal Form, it eliminates transitive dependencies so that non-key attributes depend only on the primary key. Also the User table was introduced to store account details, and other tables reference it using user\_id, reducing data duplication and improving data integrity and maintainability.

This is the link for our Third Normal Form (3NF):

 [Third Normal Form \(3NF\) - Google Docs.pdf](#)





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**4 DATA DICTIONARY**

This chapter contains the data dictionary, which defines and explains all the data elements used in the system.

**4.1 Table ‘User’**

Attribute	Data Type	Constraint	Default Values	PK/FK	Description
user_id	INT	Not Null, Auto Increment	None	PK	Unique ID of the user
username	Varchar(50)	Not null, Unique	None		User login name
email	Varchar(100)	Not null, Unique	None		User email
password	Varchar(100)	Not Null	None		Encrypted password
role	Varchar(20)	Not Null	‘user’		User role (admin/user)
created_at	Timestamp	Not Null	Current_time stamp		Account creation date/time

**4.2 Table ‘Buyer’**

Attribute Name	Data Type	Constraint	Default Values	PK/FK	Description
id	INT	Not Null, Auto Increment	None	PK	Unique identifier of the buyer record



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item_id	INT	Not Null	None	FK	References the item being purchased
buyer_name	Varchar(100)	Not Null	None		Full name of the buyer
buyer_email	Varchar(100)	Not Null	None		Email address of the buyer
buyer_phone number	Varchar(11)	Not Null	None		Contact number of the buyer
quantity	INT	Not Null	1		Number of items purchased
payment_method	Varchar(50)	Not Null	None		Method used for payment (e.g., GCash, COD)
delivery_option	Varchar(50)	Not Null	None		Type of delivery (pickup or delivery)



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note	Text	Null	None		Additional note from buyer
statues	Varchar(20)	Not Null	'Pending		Order status (pending, completed, cancelled)
delivery_address	Varchar(100)	Not Null	None		Delivery address of the buyer

**4.3 Table 'Item'**

Attribute Name	Data Type	Constraint	Default Values	PK/FK	Description
id	INT	Not Null, Auto Increment	None	PK	Unique identifier of the item
user_id	INT	Not Null	None	FK	User who owns or posted the item
title	Varchar(100)	Not Null	None		Title or name of the item
description	Text	Not Null	None		Detailed description of the item



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condition	Varchar(50)	Not Null	None		Physical condition of the item
location	Varchar(100)	Not Null	None		Location of the item
image_path	Varchar(200)	Not Null	None		Path or filename of the item image
creator_at	Timestamp	Not Null	Current_Timestamp		Date and time the item was posted
category	Varchar(100)	Not Null	None		Category of the item
type	Varchar(50)	Not Null	None		Type of item (swap, donation, sale)
quantity	INT	Not Null	1		Available quantity
price	Decimal(10, 2)	Not Null	0.00		Price of the item

**4.4 Table 'Donation'**

Attribute	Data Type	Constraint	Default Values	PK/FK	Description
id	INT	Not Null, Auto Increment	None	PK	Unique identifier of the donation record
item_id	INT	Not Null	None	FK	References the donated item



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donor_name	Varchar(100)	Not Null	None		Full name of the donor
donor_email	Varchar(100)	Not Null	None		Email address of the donor
donor_phone number	Varchar(11)	Not Null	None		Contact number of the donor
pickup_address	Varchar(50)	Not Null	None		Address where the item will be picked up
created_at	Timestamp	Not Null	Current Timestamp		Date and time the donation was created
pickup_time	Time	Not Null	None		Scheduled time for pickup
note	Text	Null	None		Additional note from the donor
status	Varchar(50)	Not Null	'Pending'		Donation status (pending, completed, cancelled)

**4.5 Table 'Messages'**

Attribute Name	Data Type	Constraint	Default Values	PK/FK	Description
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id	INT	Not Null, Auto Increment	None	PK	Unique identifier of the message
sender_id	INT	Not Null	None	FK	References the user who sent the message
reciever_id	INT	Not Null	None	FK	References the user who received the message
message	Text	Not Null	None		Content of the message
created_at	Timestamp	Not Null	Current_Tim estamp		Date and time the message was sen

**4.6 Table ‘Notification’**

Attribute Name	Data Type	Constraint	Default Values	PK/FK	Description
id	INT	Not Null, Auto Increment	None	PK	Unique identifier of the notification
user_id	INT	Not Null	None	FK	References the user who receives the notification
message	Text	Not Null	None		Notification message content



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link	Varchar(255)	Null	None		Optional link related to the notification
read_status	Varchar(50)	Not Null	'Unread'		Status of the notification (read/unread )
created_at	Timestamp	Not Null	Current_time stamp		Date and time the notification was created

**4.7 Table 'Ratings'**

Attribute	Data Type	Constraint	Default Values	PK/FK	Description
id	INT	Not Null, Auto Increment	None	PK	Unique rating ID
rater_id	INT	Not Null	None	FK	User who submitted the rating
rated_id	INT	Not Null	None	FK	User who received the rating
item_id	INT	Null	None	FK	Item associated with the rating
rating	INT	Not Null	0		Rating value (1–5)
comment	Text	Null	None		Optional comment or review



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created_at	Timestamp	Not Null	Current_Timestamp		Timestamp when the rating was created
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**4.8 Table ‘Swap Details’**

Attribute	Data Type	Constraint	Default Values	PK/FK	Description
swap_id	INT	Not Null, Auto Increment	None	PK	Unique Swap ID
item_id	INT	Not Null	None	FK	Item being offered for swap
swapper_name	Varchar(50)	Not Null	None		Name of the user offering the item
swapper_email	Varchar(100)	Not Null	None		Email of the swapper
swapper_phone number	Varchar(11)	Not Null	None		Phone number of the swapper
offered_item	Varchar(100)	Not Null	None		Name or description of the offered item
created_at	Timestamp	Not Null	Current_Timestamp		Date and time the swap was created
offered_item_condition	Varchar(50)	Null	None		Condition of the offered item (e.g., new, used)





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category	Varchar(50)	Null	None		Item category
note	Text	Null	None		Additional notes about the swap
status	Varchar(50)	Not Null	'Pending'		Status of the swap (pending/accepted/etc.)

**4.9 Table 'Swap Request'**

Attribute	Data Type	Constraint	Default Values	PK/FK	Description
request_id	INT	Not Null, Auto Increment	None	PK	Unique swap request ID
item_id	INT	Not Null	None	FK	Item requested for swapping
swapper_id	INT	Not Null	None	FK	User who sent the swap request
offered_item	Varchar(100)	Not Null	None		Item being offered in exchange
created_at	Timestamp	Not Null	Current_Timestamp		Date and time when the request was created

**4.10 Table 'Transaction'**

Attribute	Data Type	Constraint	Default	PK/FK	Description
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			Values		
id	INT	Not Null, Auto Increment	None	PK	Unique Transaction ID
item_id	INT	Not Null	None	FK	Item involved in the transaction
type	Varchar(50)	Not Null	None		Type of transaction (sale, swap, etc.)
user_from	INT	Not Null	None	FK	User who sent the item
user_to	INT	Not Null	None	FK	User who received the item
quantity	INT	Not Null	1		Number of items involved
quantity	Varchar(20)	Not Null	'Pending'		Current transaction status
created_at	Timestamp	Not Null	Current_Tim estamp		Date and time of transaction

**5 SAMPLE RECORDS/SQL SCRIPTS**

This is the link for our sample records:

[SAMPLE RECORDS/SQL SCRIPTS](#)



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**6 SQL QUERIES**

**6.1 Basic Queries**

This is the query for creating our student table: create table

**(Create users table)**

```
CREATE TABLE users (  
    id INT AUTO_INCREMENT PRIMARY KEY,  
    username VARCHAR(100),  
    password VARCHAR(100),  
    created_at TIMESTAMP DEFAULT CURRENT_TIMESTAMP  
);
```

**(Insert sample users)**

```
INSERT INTO users (username, password) VALUES  
( 'admin01', 'pass123'),  
( 'seller_jane', 'pass234'),  
( 'buyer_mark', 'pass345'),  
( 'donor_luis', 'pass456');
```

**(Insert sample items)**

```
INSERT INTO items (user_id, title, description, `condition`, location,  
category, type, quantity, price) VALUES  
(2, 'Wooden Chair', 'Slightly scratched', 'Used', 'Lipa City', 'Furniture', 'Sell', 1,  
350.00),  
(2, 'Old Textbooks', '5 IT books bundle', 'Used', 'Batangas', 'Books', 'Donate',  
5, 0.00),  
(1, 'Mouse', 'Good condition', 'Like New', 'Lipa City', 'Electronics', 'Swap', 1,  
0.00);
```

**(Select all users)**

```
SELECT * FROM users;
```

**(Change the quantity of an item)**

```
UPDATE items  
SET quantity = 2  
WHERE title = 'Wooden Chair';
```

**(Remove an item from the database)**

```
DELETE FROM items
```

```
WHERE title = 'Old Textbooks';
```



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### 6.2 Intermediate Queries

**(List all buyers with the item they bought and the seller's name)**

```
SELECT b.buyer_name, i.title AS item_name, u.username AS seller_name,  
b.quantity  
FROM buyers b  
JOIN items i ON b.item_id = i.id  
JOIN users u ON i.user_id = u.id;
```

**(Count how many items exist in each category)**

```
SELECT category, COUNT(*) AS total_items  
FROM items  
GROUP BY category;
```

### 6.3 Advanced Queries

**(List items that have never been bought)**

```
SELECT title  
FROM items  
WHERE id NOT IN (SELECT item_id FROM buyers);
```

## 7 SQL SCHEMA & VERSION CONTROL

### 7.1 Folder Structure

```
/database/  
  schema.sql  
  sustainify_seed.sql  
  sustainify_erd.png
```

### 7.2 Description per changes/version

#### Version 1.0 - Initial Database Creation

- Created the sustainify database.
- Added core tables: users, items, buyers, donations, swaps, swap\_requests, ratings, messages, notifications, and transactions.

#### Version 1.1 - Added Item, Buyer, and Donation Functionalities

- Added fields for item condition, location, image, category, type, price, and quantity.
- Added delivery handling fields such as payment method, delivery option, and delivery address for buyers.



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- Integrated pickup details for donations.

### Version 1.2 - Added Communication & Notifications

- Added message table for user to user chat.
- Added notification table to support alerts for transactions, messages, and updates.
- Implemented foreign key links between message, notification and users

### Version 1.3 - Added Swap and Rating Features

- Implemented the swap and swap\_request table to support item swapping.
- Added ratings table to allow users to rate each other after transactions, including comments and item references.
- Updated the ERD to reflect new relationships (swap, rating, message).

### Version 1.4 - Enhanced Transactions & Improved Data Integrity

- Added transaction table to log buying, swapping and donation activities.
- Added status tracking (Pending, Completed) for transactions.
- Updated foreign key constraints to ensure clean relational integrity between users, items and transactions.
- Improved ENUM definitions for status, item condition, payment method, and swap conditions.

### Version 1.5 - Data Seeding and SQL Query Testing

- Inserted sample users (admin, seller, buyer, donor).
- Inserted sample items (Sell, Donate, Swap categories).
- Added test operation such as UPDATE, DELETE, and sample data analysis queries.
- Executed JOIN queries to retrieve buyer information with seller details.
- Added summary queries such as item count per category and items without buyers.

## 7.3 Github repository

This is the link for our repository:

<https://github.com/tnczrvgr/ACP-AND-DATABASE-PROJECT>



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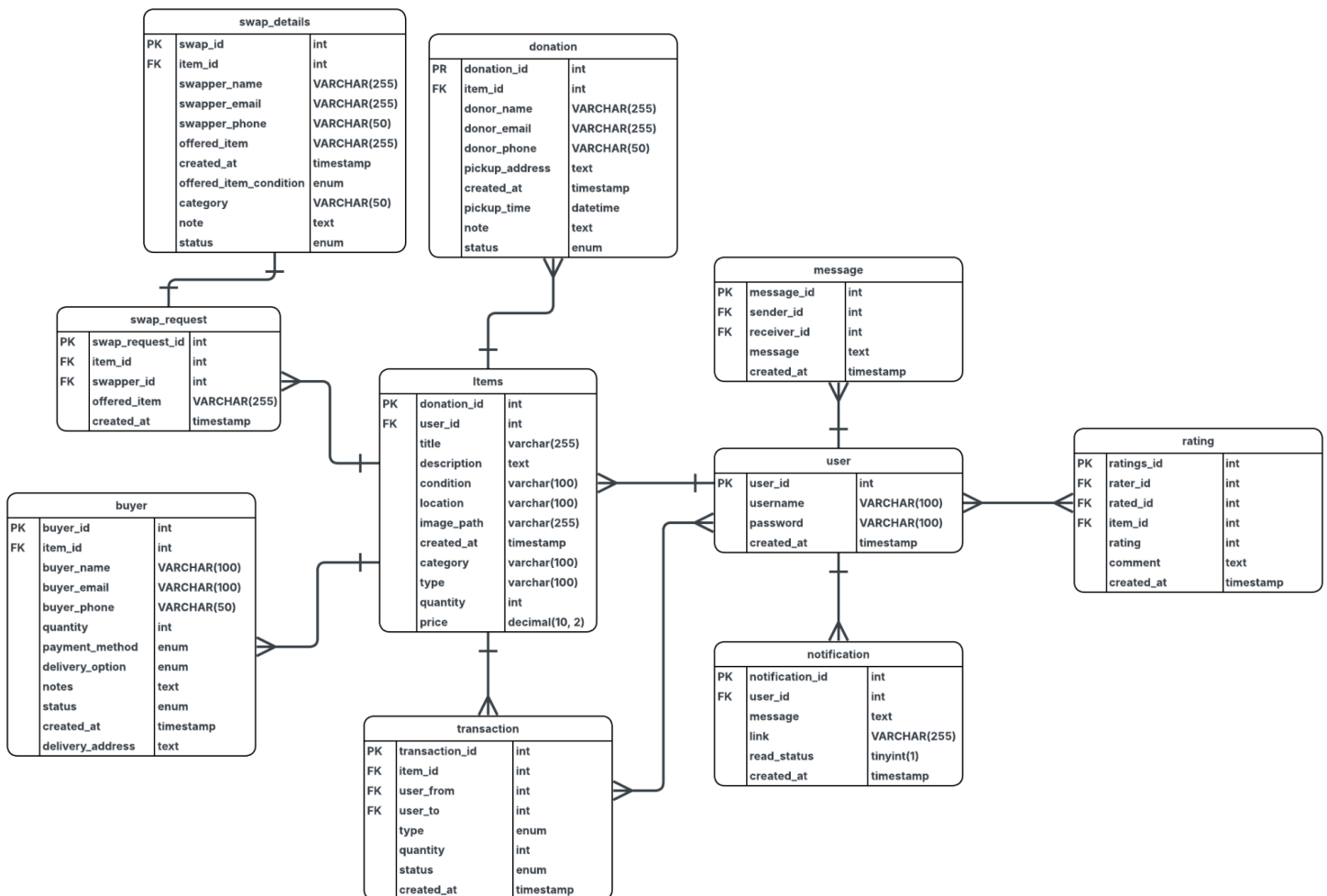
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**8 SCREENSHOTS**

**8.1 ERD Diagram**

Below is the Entity Relationship Diagram (ERD) for the database system. It illustrates all major entities, their attributes, primary and foreign keys, and the relationships between them. This ERD represents the overall structure of the system, including users, items, donations, transactions, swap operations, ratings, messages, buyers, and notifications.





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### 8.2 Database table/views

#### User Table:

#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
<input type="checkbox"/>	1 id	int(11)			No	None		AUTO_INCREMENT	<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	2 username	varchar(100)	utf8mb4_general_ci		Yes	NULL			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	3 password	varchar(100)	utf8mb4_general_ci		Yes	NULL			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	4 created_at	timestamp			No	current_timestamp()			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>

id	username	password	created_at
6	admin	admin1	2025-12-02 09:24:14
7	Toni	t1234	2025-12-06 19:29:31
8	acc1	1234	2025-12-09 16:09:07
9	acc2	1234	2025-12-09 16:09:15

#### Item Table:

#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
<input type="checkbox"/>	1 id	int(11)			No	None		AUTO_INCREMENT	<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	2 user_id	int(11)			Yes	NULL			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	3 title	varchar(255)	utf8mb4_general_ci		Yes	NULL			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	4 description	text	utf8mb4_general_ci		Yes	NULL			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	5 condition	varchar(100)	utf8mb4_general_ci		Yes	NULL			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	6 location	varchar(100)	utf8mb4_general_ci		Yes	NULL			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	7 image_path	varchar(255)	utf8mb4_general_ci		Yes	NULL			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	8 created_at	timestamp			No	current_timestamp()			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	9 category	varchar(100)	utf8mb4_general_ci		Yes	NULL			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	10 type	varchar(50)	utf8mb4_general_ci		Yes	NULL			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	11 quantity	int(11)			Yes	1			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	12 price	decimal(10,2)			Yes	NULL			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>

id	user_id	title	description	condition	location	image_path	created_at	category	type	quantity	price
21	8	sample 1	high quality and made in US	New	Banay banay 1st, san jose batangas	sample_1.jpg	2025-12-10 18:27:50	Clothing	Sell	1	1500.00
22	8	sample 2	high quality	Like New	Banay banay 1st, san jose batangas	download_1.jpg	2025-12-10 18:30:02	Electronics	Swap	1	0.00
23	8	sample 3	high quality	Like New	Banay banay 1st, san jose batangas	download_2.jpg	2025-12-10 18:30:43	Furniture	Donate	1	0.00

#### Buyers Table:

id	item_id	buyer_name	buyer_email	buyer_phone	quantity	payment_method	delivery_option	note	status	created_at	delivery_address
7	21	Toni	vergaratoni783@gmail.com	09152452679	1	Cash	Delivery		Pending	2025-12-10 18:32:28	purok 1, banay banay 1st, san jose, Batangas



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#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
<input type="checkbox"/>	1 id	int(11)			No	None		AUTO_INCREMENT	<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	2 item_id	int(11)			No	None			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	3 buyer_name	varchar(100)	utf8mb4_general_ci		Yes	NULL			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	4 buyer_email	varchar(100)	utf8mb4_general_ci		Yes	NULL			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	5 buyer_phone	varchar(50)	utf8mb4_general_ci		Yes	NULL			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	6 quantity	int(11)			Yes	1			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	7 payment_method	enum('Cash', 'GCash', 'Bank Transfer')	utf8mb4_general_ci		Yes	Cash			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	8 delivery_option	enum('Pickup', 'Delivery')	utf8mb4_general_ci		Yes	Pickup			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	9 note	text	utf8mb4_general_ci		Yes	NULL			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	10 status	enum('Pending', 'Completed', 'Cancelled')	utf8mb4_general_ci		Yes	Pending			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	11 created_at	timestamp			No	current_timestamp()			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	12 delivery_address	text	utf8mb4_general_ci		Yes	NULL			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>

### Swap Details Table:

#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
<input type="checkbox"/>	1 id	int(11)			No	None		AUTO_INCREMENT	<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	2 item_id	int(11)			Yes	NULL			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	3 swapper_name	varchar(255)	utf8mb4_general_ci		Yes	NULL			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	4 swapper_email	varchar(255)	utf8mb4_general_ci		Yes	NULL			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	5 swapper_phone	varchar(50)	utf8mb4_general_ci		Yes	NULL			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	6 offered_item	varchar(255)	utf8mb4_general_ci		Yes	NULL			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	7 created_at	timestamp			No	current_timestamp()			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	8 offered_item_condition	enum('New', 'Like New', 'Used')	utf8mb4_general_ci		Yes	Used			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	9 category	varchar(50)	utf8mb4_general_ci		Yes	NULL			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	10 note	text	utf8mb4_general_ci		Yes	NULL			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	11 status	enum('Pending', 'Accepted', 'Rejected')	utf8mb4_general_ci		Yes	Pending			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>

id	item_id	swapper_name	swapper_email	swapper_phone	offered_item	created_at	offered_item_condition	category	note	status
10	22	Toni	vergaratoni783@gmail.com	09152452679	gaming chair also but the brand is from other coun...	2025-12-10 19:14:25	Like New			Pending

### Swap Request Table:

#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
<input type="checkbox"/>	1 id	int(11)			No	None		AUTO_INCREMENT	<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	2 item_id	int(11)			No	None			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	3 swapper_id	int(11)			No	None			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	4 offered_item	varchar(255)	utf8mb4_general_ci		Yes	NULL			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	5 created_at	timestamp			No	current_timestamp()			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>

id	item_id	swapper_id	offered_item	created_at
3	22	9	gaming chair also but the brand is from other coun...	2025-12-10 19:14:25





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### Donation Table:

#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
<input type="checkbox"/>	1 id	int(11)			No	None		AUTO_INCREMENT	<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	2 item_id	int(11)			Yes	NULL			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	3 donor_name	varchar(255)	utf8mb4_general_ci		Yes	NULL			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	4 donor_email	varchar(255)	utf8mb4_general_ci		Yes	NULL			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	5 donor_phone	varchar(50)	utf8mb4_general_ci		Yes	NULL			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	6 pickup_address	text	utf8mb4_general_ci		Yes	NULL			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	7 created_at	timestamp			No	current_timestamp()			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	8 pickup_time	datetime			Yes	NULL			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	9 note	text	utf8mb4_general_ci		Yes	NULL			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	10 status	enum('Pending', 'Completed', 'Cancelled')	utf8mb4_general_ci		Yes	Pending			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
id	item_id	donor_name	donor_email	donor_phone	pickup_address	created_at	pickup_time	note	status
4	23	Toni	vergaratoni783@gmail.com	09152452679	banay banay 1st, san jose, Batangas	2025-12-10 19:17:49	2025-12-11 10:30:00		Pending

### Message Table:

#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
<input type="checkbox"/>	1 id	int(11)			No	None		AUTO_INCREMENT	<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	2 sender_id	int(11)			Yes	NULL			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	3 receiver_id	int(11)			Yes	NULL			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	4 message	text	utf8mb4_general_ci		Yes	NULL			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	5 created_at	timestamp			No	current_timestamp()			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
id	sender_id	receiver_id	message	created_at					
21	9	8	hello	2025-12-10 20:01:37					
22	8	9	hi	2025-12-10 20:01:51					

### Ratings Table

#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
<input type="checkbox"/>	1 id	int(11)			No	None		AUTO_INCREMENT	<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	2 rater_id	int(11)			No	None			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	3 rated_id	int(11)			No	None			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	4 item_id	int(11)			No	None			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	5 rating	int(11)			No	None			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	6 comment	text	utf8mb4_general_ci		Yes	NULL			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/>	7 created_at	timestamp			No	current_timestamp()			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
id	rater_id	rated_id	item_id	rating	comment	created_at			
13	9	8	21	5		2025-12-10 18:32:37			
14	9	8	22	5		2025-12-10 18:36:10			
15	9	8	22	5		2025-12-10 18:44:47			
16	9	8	22	4		2025-12-10 19:06:20			
17	9	8	22	5		2025-12-10 19:14:27			



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### Transactions Table:

#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
<input type="checkbox"/> 1	id	int(11)			No	None		AUTO_INCREMENT	<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/> 2	item_id	int(11)			No	None			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/> 3	type	enum('Buy', 'Swap', 'Donate')	utf8mb4_general_ci		Yes	NULL			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/> 4	user_from	int(11)			Yes	NULL			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/> 5	user_to	int(11)			Yes	NULL			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/> 6	quantity	int(11)			Yes	1			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/> 7	status	enum('Pending', 'Completed')	utf8mb4_general_ci		Yes	Pending			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/> 8	created_at	timestamp			No	current_timestamp()			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
id	item_id	type	user_from	user_to	quantity	status	created_at		
1	21		9	8	1500	Pending	2025-12-10 20:21:20		

### Notification Table:

#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
<input type="checkbox"/> 1	id	int(11)			No	None		AUTO_INCREMENT	<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/> 2	user_id	int(11)			Yes	NULL			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/> 3	message	text	utf8mb4_general_ci		Yes	NULL			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/> 4	link	varchar(255)	utf8mb4_general_ci		Yes	NULL			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/> 5	read_status	tinyint(1)			Yes	0			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
<input type="checkbox"/> 6	created_at	timestamp			No	current_timestamp()			<a href="#">Change</a> <a href="#">Drop</a> <a href="#">More</a>
id	user_id	message	link	read_status	created_at				
1	8	New purchase request for your item 'sample 1' /item/21		0	2025-12-10 20:33:48				

## 8.3 Query Results

### INSERT INTO:

```
1 INSERT INTO users (username, password) VALUES
2 ('admin01', 'pass123'),
3 ('seller_jane', 'pass234'),
4 ('buyer_mark', 'pass345'),
5 ('donor_luis', 'pass456');
```

id	username	password	created_at
10	admin01	pass123	2025-12-10 21:36:52
11	seller_jane	pass234	2025-12-10 21:36:52
12	buyer_mark	pass345	2025-12-10 21:36:52
13	donor_luis	pass456	2025-12-10 21:36:52



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```
1 INSERT INTO items (user_id, title, description, condition, location, category, type, quantity, price)
2 VALUES
3 (2, 'Wooden Chair', 'Slightly scratched', 'Used', 'Lipa City', 'Furniture', 'Sell', 1, 350.00),
4 (2, 'Old Textbooks', '5 IT books bundle', 'Used', 'Batangas', 'Books', 'Donate', 5, 0.00),
5 (1, 'Laptop Sleeve', 'Good condition', 'Like New', 'Lipa City', 'Accessories', 'Swap', 1, 0.00);
```

**SELECT:**

```
1 SELECT * FROM users;
```

				id	username	password	created_at
<input type="checkbox"/>		Edit		Copy		Delete	10 admin01 pass123 2025-12-10 21:36:52
<input type="checkbox"/>		Edit		Copy		Delete	11 seller_jane pass234 2025-12-10 21:36:52
<input type="checkbox"/>		Edit		Copy		Delete	12 buyer_mark pass345 2025-12-10 21:36:52
<input type="checkbox"/>		Edit		Copy		Delete	13 donor_luis pass456 2025-12-10 21:36:52

## 9 CONCLUSION

### 9.1 Summary of Accomplishment

Sustainify has managed to achieve its goal of creating an online system that promotes sustainability by the forces of sharing, swapping and reselling products. The team developed a working site, which can help individuals to easily add their items, read about existing offers, and interact with those who may be interested. The database design was carefully designed to handle user accounts, item records, category listings, transaction records and image storage security and effectively. Every functional aspect such as a posting of items, user profile, and status the monitoring of the items were all implemented and tested.

And throughout the database system development process, the team was able to come up with and develop a well-organized and efficient data management solution that met the specific needs of the project. The major achievements include development of a well-normalized database structure, creation of relational objects that promote the integrity of data and



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development of interfaces that will enable data retrieval, storage and manipulation in a smooth manner. This system was then put through the strict test on accuracy, reliability and performance hence ensuring that it was within the permissible requirements of the functionality, also confirming its suitability with regards to the goals defined in the project specifications. In general, the completed system is a solid ground on the effective and safe handling of information.

### 9.2 Learning Reflections

The team gained a lot of learning as it was exposed to the development process. We acquired more knowledge about the concepts of database design normalization, indexing, and entity-relationship modelling. Our experience with real-life situations enabled us to learn the significance of dealing with gaps in data, guaranteeing referential integrity, and query optimization to ensure high performance. Our technical skills were also enhanced in SQL, database management tools, and system documentation as a result of the project. In addition to technical knowledge, we were taught about the value of collaboration, troubleshooting, and iterative development all of which helped to make the workflow more organized and effective.

### 9.3 Importance of database in the system

In Sustainify, the database forms a fundamental element that will serve as a central point of connection of all data operations. It also stores important data entries, such as user profiles, item listings, item categories, swap or transaction, and uploaded images. Sustainify depends on the operational efficiency of the database to help it manage this information efficiently thus allowing it to expedite its retrieval, facilitate the posting of items and track the activities accurately. Without a carefully planned database, the users will experience latency, loss of data or inaccuracy in the posting or searching of the item. The database supports the principles of organization, consistency, and security, hence, creating confidence in the platform among users and working towards engaging in sustainable practice. As a result, the database provides Sustainify with the capacity to run efficiently and also makes the organization fulfill its mandate of minimizing waste and encouraging reuse among the population.