

## DATABASE DESIGN

### 1. ERD Documentation

#### Entities:

**Customer:** Stores customer details.

**Transaction:** Records financial transactions.

**Log:** Tracks system logs for transactions.

**Transaction\_categories:** Categorizes transactions.

#### Relationships:

**Customer to Transaction:** One-to-many.

**Transaction to Log:** One-to-many.

**Transaction to Transaction\_categories:** Many-to-one.

### 2. Design Rationale

**Primary and Foreign Keys:** Ensure data integrity.

**Data Types:** Appropriate types for each field (e.g., DECIMAL for monetary values).

**Normalization:** Tables are normalized to 3NF to minimize redundancy.

Entities	Key Columns	Descriptions
Customer	User id (PK), (UNIQUE)	Keep senders/receiver
Transaction	Transaction id (PK), sender user id (FK), receiver user id (FK)	Main transaction data
Transaction_categories	Category id (PK)	Category definitions
Log	log_ID(PK) TransactionID(FK)	Logs of processing

### 5. Sample SQL Queries

```
mysql> SELECT * FROM Customer;
```

customerId	first_name	last_name	phone_number	status	balance
1	Placide	Nkurunziza	25078765431	close	0.02
2	john	Pan	25078865431	close	0.02

2 rows in set (0.00 sec)

```
mysql> SELECT *
  transactions_deno  -> FROM transactions_denorm
    -> ORDER BY Amount DESC;
```

Transaction_id	external_txn_id	Amount	Sender_id	Receiver_id	Sender_name	Receiver_name	Timestamp	Currency	Status	Category_id
4	TXN001	300.00	1	2	Placide Nkurunziza	John Pan	2025-09-20 01:34:11	Frw	active	1

1 row in set (0.00 sec)

## 6. Unique Rules & Security

```
mysql> SHOW INDEX FROM transactions_denorm;
```

Table	Index_type	Non_unique	Key_name	Seq_in_index	Column_name	Collation	Cardinality	Sub_part	Packed
transactions_denorm	BTREE	0	PRIMARY	1	Transaction_id	A	1	NULL	NULL
transactions_denorm	BTREE	0	external_txn_id	1	external_txn_id	A	1	NULL	NULL
transactions_denorm	BTREE	1	Sender_id	1	Sender_id	A	1	NULL	NULL
transactions_denorm	BTREE	1	Receiver_id	1	Receiver_id	A	1	NULL	NULL
transactions_denorm	BTREE	1	Category_id	1	Category_id	A	1	NULL	NULL

5 rows in set (0.09 sec)