



### **Improving Public Transport for People with Disabilities in Kenya.**

Public transport plays a crucial role in the urban portability of Kenyan cities such as Nairobi and Mombasa. Therefore, most Kenyans rely on this form of transportation to move from one place to another. Transportation systems pose great difficulties in accessing public transport for most disabled persons. Many public transport services are not adapted to the needs of people with disabilities. **Main reasons being:**

- **In-accessible Vehicles:** this would include features such as lack of ramps, designated seating etc.
- **Lack of Information:** persons with disability don't have access to real time information routes, schedules etc
- **Limited Infrastructure:** In stop stations there is a shortage in necessary facilities ie signage in Braille that would accommodate people with disabilities

The project, therefore, develops and deploys a relational database system that would drive all efficiencies in respect of existing options in the improvement of the general experience of passengers with disabilities.

This database system tries to solve these challenges by providing one base where operation and optimization of public transport meant for people with disabilities can be done.

### **Alignment to Sustainable Development Goal (SDGS):**

The project will be implemented with the **SDG 10: Reduced Inequalities**, which acts upon nurturing the social, economic, and political inclusion of all people, including people with

disabilities. By improving the efficiency of public transport, we are promoting equal access to transportation, hence nurturing social inclusion. It nurtures independence among persons with disabilities, enabling full participation in society.

### **Relevance in the Kenyan Context**

The growth of people with disabilities in Kenya is highly significant, but this group faces systematic barriers in accessing public services, including transportation. The government of Kenya has made commitments in this area; these commitments, however, need proper practical solution implementation. This project would provide basic necessary support by implementing an accessible database system on public transport that should be able to facilitate improvement in access and meet the needs of this marginalized group for increased mobility and independence.

### **Scope and Objective of the Project:**

The scope of the project will mainly cover designing and implementing a relational database system that enhances the use of public transport concerning people with disabilities in Kenya. It will enable the management and service delivery and enhance the overall experience for these passengers more efficiently.

### **General Objectives:**

1. Information accessibility about accessible transport options and vehicle features
2. Real-time updates on routes and features to help passengers plan their journeys
3. User-friendly interface to allow passengers with disabilities to easily access information
4. Data Management of data related to accessible vehicles, routes and stops.
5. Reporting and Analytics to help transport authorities identify gaps in accessibility and improve services.

### **Main Functionalities and Fields:**

1. Registration of Buses for passengers with disabilities and its feedback mechanism on accessibility features

2. Access to All Details about Accessible Buses and their accessibility features, like ramps; manage information about accessible stations
3. Schedule Creation: Emphasize accessible transport options and make the schedules easy to access and update in real-time
4. Integration with GPS to provide the locations of accessible buses in real time and display the status of arrival at the stations

### **Stakeholders:**

1. **Disabled Passengers:** The database will provide information about accessible transport services therefore enhancing their ability to navigate public transport independently
2. **Transport Authorities:** The database will enable transport authorities to monitor and improve the accessibility of public transport.
3. **Operators of Buses:** The database will help operators understand the requirements for accessible transport, enabling them to make required adjustment
4. **Local Government:** The database will provide essential data to inform policy making and investments in accessible transport solutions.
5. **Groups Advocating for the Welfare of the Disabled:** The system will generate reports that can be used to advocate for better services and policies for people with disabilities
6. **Technology developers:** The project will provide developers with a defined scope, facilitating the creation of user-centric system focused on accessibility.

### **Conclusion**

Thus, in proposing a solution that caters to the needs of passengers with disabilities and availing technology in the quest to improve access to public transport, this project will go an extra mile in making a critical difference to one of the most marginalized groups in Kenya in their transportation experiences. Such a relational database system will, in turn, support various stakeholders in the realization of more accessible and inclusive public transports.

# E.R.D DIAGRAM

## ATTRIBUTES, ENTITIES, THEIR RELATIONSHIPS AND THE E.R.D

### **Commuter**

#### **Attributes:**

1. Commuter\_ID (Primary Key)
2. Commuter\_Name
3. Commuter\_Email
4. Account\_Balance
5. Payment\_Method
6. Accessibility\_Features

### **Driver**

#### **Attributes:**

1. Driver\_ID (Primary Key)
2. Driver\_Name
3. License\_Number
4. Vehicle\_ID (Foreign Key )

### **Vehicle**

#### **Attributes:**

1. Vehicle\_ID (Primary Key)
2. Model
3. Driver\_ID (Foreign Key )
4. GPS\_Tracker\_ID (Foreign Key)
5. Number\_Plate
6. Accessibility\_Features

### **Route**

#### **Attributes:**

1. Route\_ID (Primary Key)
2. Route\_Name
3. Fare\_Amount

### **Maintenance**

#### **Attributes:**

1. Maintenance\_ID (Primary Key)
2. Vehicle\_ID (Foreign Key)
3. Maintenance\_Cost

### **GPS\_Tracker**

#### **Attributes:**

1. GPS\_Tracker\_ID (Primary Key)
2. Vehicle\_ID (Foreign Key)

### **Payment**

#### **Attributes:**

1. Payment\_ID (Primary Key)
2. Commuter\_ID (Foreign Key )
3. Trip\_ID (Foreign Key)
4. Amount

## 5. Payment\_Method

### **Trip**

#### **Attributes:**

1. Trip\_ID (Primary Key)
2. Route\_ID (Foreign Key )
3. Vehicle\_ID (Foreign Key )
4. Status

### **Driver\_Training**

#### **Attributes:**

1. Training\_ID (Primary Key)
2. Description
3. Driver\_ID (Foreign Key )
4. Completion\_Date

### **Station**

#### **Attributes:**

1. Station\_ID (Primary Key)
2. Accessibility\_Features

### **Accessibility\_Features**

#### **Attributes:**

1. Features\_ID (Primary Key)
2. Description

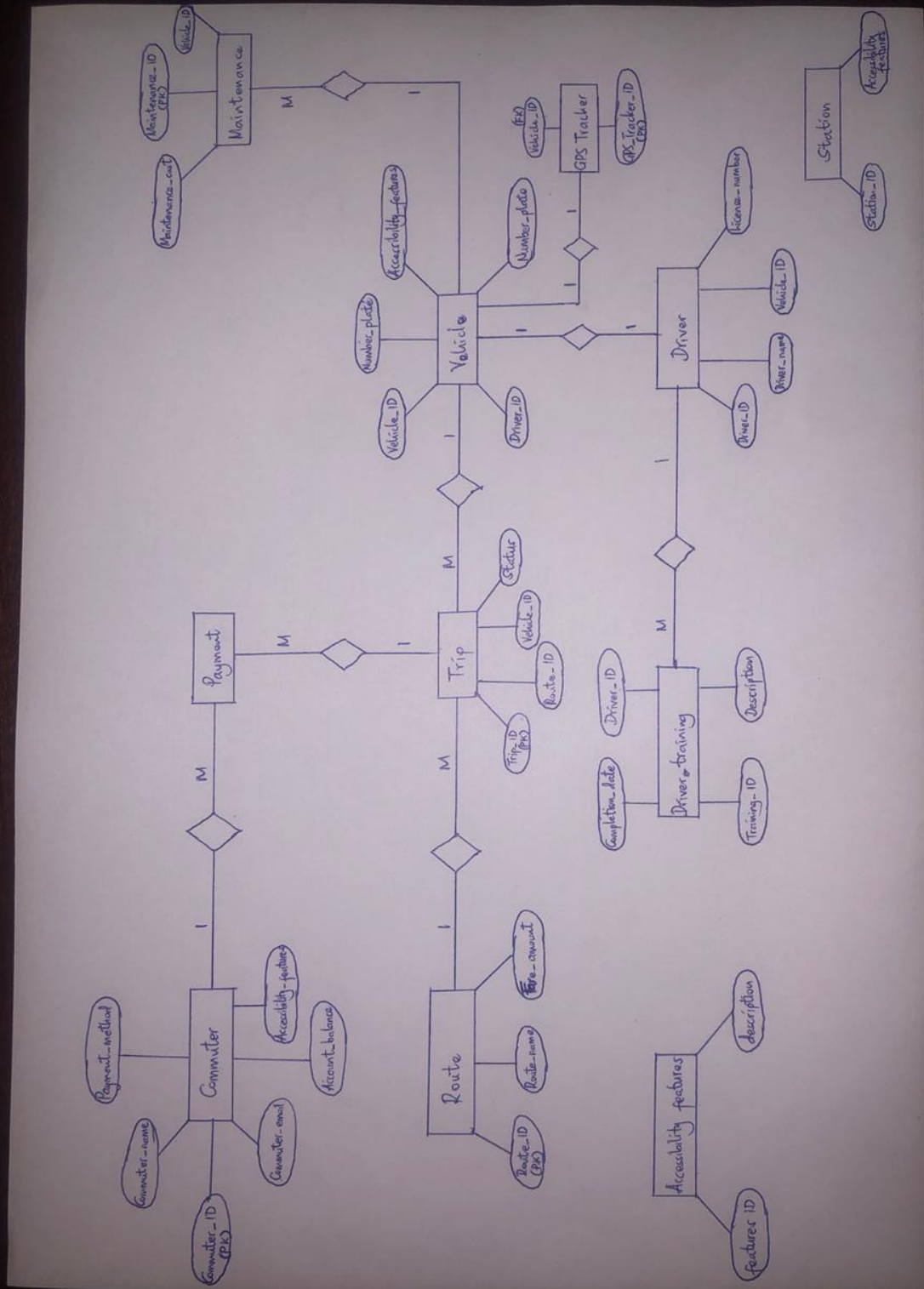
# RELATIONSHIPS

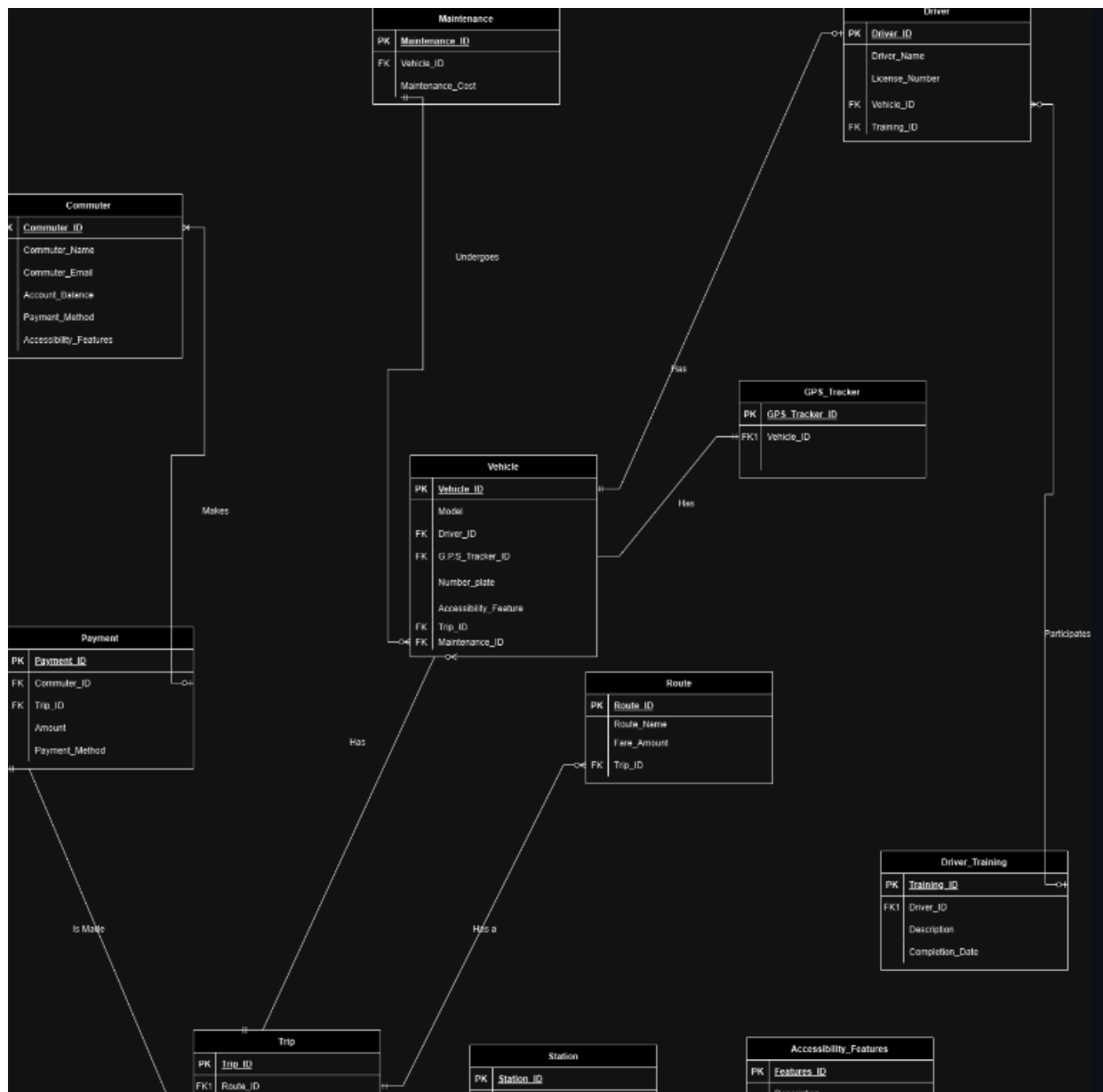
1. Commuter - Payment: A commuter can make multiple payments.  
Cardinality: One to many
2. Driver - Vehicle: A driver is assigned to one vehicle.  
Cardinality : One to one
3. Vehicle - GPS\_Tracker: Each vehicle has one GPS tracker.  
Cardinality : One to One
4. Vehicle - Maintenance: A vehicle can undergo multiple maintenance sessions.  
Cardinality : One to Many
5. Route - Trip: A route includes multiple trips.  
Cardinality : One to Many
6. Vehicle - Trip: A vehicle can conduct multiple trips.  
Cardinality : One to many
7. Payment - Trip: A payment is linked to a specific trip.  
Cardinality : One to One/Many to Many

8. Driver - Driver\_Training: A driver can have multiple training sessions.

Cardinality : One to Many

# DATABASE SCHEMA





## SQL CODE

```

CREATE TABLE Commuter(
Commuter_ID VARCHAR(100) PRIMARY KEY,
Commuter_Name VARCHAR(100) NOT NULL,
Commuter_Email VARCHAR(100) NOT NULL,
Account_Balance DECIMAL(10,2) NOT NULL,
Payment_Method VARCHAR(100) NOT NULL,
Accessibility_features VARCHAR(100)
);
  
```

```

CREATE TABLE Driver(
Driver_ID VARCHAR(100) PRIMARY KEY,
Driver_Name VARCHAR(100) NOT NULL,
License_Number VARCHAR(100) NOT NULL,
Vehicle_ID VARCHAR(100),
Training_ID VARCHAR(100),
FOREIGN KEY (Vehicle_ID) REFERENCES Vehicle (Vehicle_ID),
  
```



```
FOREIGN KEY (Training_ID) REFERENCES Driver_Training (Training_ID)
);
```

```
CREATE TABLE GPS_Tracker(
GPS_TRACKER_ID VARCHAR(100) PRIMARY KEY,
Vehicle_ID VARCHAR(100) UNIQUE
);
```

```
CREATE TABLE Vehicle(
Vehicle_ID VARCHAR(100) PRIMARY KEY,
Model VARCHAR(100) NOT NULL,
Driver_ID VARCHAR(100),
GPS_Tracker_ID VARCHAR(100),
Number_plate VARCHAR(100) NOT NULL,
Accessibility_features TEXT NOT NULL,
Trip_ID VARCHAR(100),
Maintenance_ID VARCHAR(100),
FOREIGN KEY (Driver_ID) REFERENCES Driver(Driver_ID),
FOREIGN KEY (GPS_Tracker_ID) REFERENCES GPS_Tracker(GPS_Tracker_ID),
FOREIGN KEY (Trip_ID) REFERENCES Trip (Trip_ID),
FOREIGN KEY (Maintenance_ID) REFERENCES Maintenance (Maintenance_ID)
);
```

```
CREATE TABLE Route(
Route_ID VARCHAR(100) PRIMARY KEY,
Route_Name VARCHAR(100) NOT NULL,
Fare_Amount INT NOT NULL,
Trip_ID VARCHAR(100),
FOREIGN KEY (Trip_ID) REFERENCES Trip(Trip_ID)
);
```

```
CREATE TABLE Maintenance(
Maintenance_ID VARCHAR(100) PRIMARY KEY,
Vehicle_ID VARCHAR(100),
Maintenance_Cost INT NOT NULL,
FOREIGN KEY (Vehicle_ID) REFERENCES Vehicle(Vehicle_ID)
);
```

```
CREATE TABLE Trip(
Trip_ID VARCHAR(100) PRIMARY KEY,
Route_ID VARCHAR(100),
Vehicle_ID VARCHAR(100),
Status VARCHAR(100) NOT NULL,
FOREIGN KEY (Route_ID) REFERENCES Route(Route_ID),
FOREIGN KEY (Vehicle_ID) REFERENCES Vehicle(Vehicle_ID)
);
```

```
CREATE TABLE Payment(
Payment_ID VARCHAR(100) PRIMARY KEY,
Commuter_ID VARCHAR(100),
Trip_ID VARCHAR(100),
Amount INT NOT NULL,
Payment_Method VARCHAR(100),
FOREIGN KEY (Commuter_ID) REFERENCES Commuter(Commuter_ID),
FOREIGN KEY (Trip_ID) REFERENCES Trip(Trip_ID)
);
```

```
CREATE TABLE Driver_Training(
Training_ID VARCHAR(100) PRIMARY KEY,
Description TEXT NOT NULL,
```

```
Driver_ID VARCHAR(100),
Completion_Date DATE NOT NULL,
FOREIGN KEY (Driver_ID) REFERENCES Driver(Driver_ID)
);
```

```
CREATE TABLE Station(
Station_ID VARCHAR(100) PRIMARY KEY,
Accessibility_Features VARCHAR(100) NOT NULL
);
```

```
CREATE TABLE AccessibilityFeatures(
Features_ID VARCHAR(100) PRIMARY KEY,
Description TEXT
);
```

```
INSERT INTO Commuter(Commuter_ID, Commuter_Name, Commuter_Email, Account_Balance,
Payment_Method, Accessibility_features)
VALUES
('COMM1','Alice Otieno', 'AliceOti@gmail.com', 10000.00,'M-Pesa','Wheelchair Ramp'),
('COMM2', 'Ruman Abdullahi', 'RumanAbdul@gmail.com', 15000.00,'Card','Audio Assistance'),
('COMM3', 'Daniella Wanjohi','Daniella Wanjohi@gmail.com', 23000.10, 'M-Pesa',NULL),
('COMM4', 'Benson Mwangi','BensonMwangi@diddy.com',2000.99,'Cash','Wheelchair Ramp'),
('COMM5', 'Natasha Mumbi','NatashaMumbi@yahoo.com',40000.23,'M-Pesa',NULL),
('COMM6', 'Emmanuel Mutinda','EmmanuelMutinda@gmail.com',210.22,'Card','Braille Labels');
```

```
INSERT INTO Driver(Driver_ID, Driver_Name, License_Number, Vehicle_ID, Training_ID)
VALUES
('DRV001','John Maina', 'LN4567',NULL,NULL),
('DRV002','Michael Oriama','LN8900',NULL,NULL),
('DRV003','Brian Onyango','LN8762',NULL,NULL),
('DRV004','Paul Kimanda','LN3210',NULL,NULL),
('DRV005','Elizabeth Moraa','LN8876',NULL,NULL),
('DRV006','Alejandro Grialdo','LN5400',NULL,NULL);
```

```
INSERT INTO GPS_Tracker(GPS_TRACKER_ID, Vehicle_ID)
VALUES
('GPS001', 'VEH001'),
('GPS002', 'VEH002'),
('GPS003', 'VEH003'),
('GPS004', 'VEH004'),
('GPS005', 'VEH005'),
('GPS006', 'VEH006');
```

```
INSERT INTO Vehicle(Vehicle_ID, Model, Driver_ID,GPS_Tracker_ID,Number_plate,
Accessibility_features,Trip_ID, Maintenance_ID)
VALUES
('VEH001', 'Toyota Hiace', 'DRV001', 'GPS001', 'KCB123A', 'Wheelchair Ramp',NULL,NULL),
('VEH002', 'Nissan NV350', 'DRV002', 'GPS002', 'KCA456B', 'Audio Assistance',NULL,NULL),
('VEH003', 'Toyota Coaster', 'DRV003', 'GPS003', 'KDA789C', 'Braille Labels',NULL,NULL),
('VEH004', 'Isuzu ', 'DRV004', 'GPS004', 'KCC123D', 'Elevator Access',NULL,NULL),
('VEH005', 'Mitsubishi Rosa', 'DRV005', 'GPS005', 'KBL456E', 'Audio Assistance',NULL,NULL),
('VEH006', 'Ford Transit', 'DRV006', 'GPS006', 'KDD789F', 'Wheelchair Ramp',NULL,NULL);
```

```
INSERT INTO Route(Route_ID, Route_Name,Fare_Amount)
VALUES
('RTE001', 'CBD to Westlands', 50),
('RTE002', 'CBD to Karen', 80),
('RTE003', 'CBD to Thika', 120),
('RTE004', 'CBD to Rongai', 100),
('RTE005', 'CBD to Embakasi', 60),
('RTE006', 'CBD to Mombasa Road', 70);
```

```
INSERT INTO Maintenance(Maintenance_ID, Vehicle_ID, Maintenance_cost)
VALUES
('MTN001', 'VEH001', 5000),
('MTN002', 'VEH002', 6000),
('MTN003', 'VEH003', 7000),
('MTN004', 'VEH004', 8000),
('MTN005', 'VEH005', 5500),
('MTN006', 'VEH006', 7500);
```

```
INSERT INTO Trip(Trip_ID, Route_ID, Vehicle_ID, Status)
VALUES
('TRP001', 'RTE001', 'VEH001', 'Completed'),
('TRP002', 'RTE002', 'VEH002', 'In Transit'),
('TRP003', 'RTE003', 'VEH003', 'Scheduled'),
('TRP004', 'RTE004', 'VEH004', 'Completed'),
('TRP005', 'RTE005', 'VEH005', 'In Transit'),
('TRP006', 'RTE006', 'VEH006', 'Scheduled');
```

```
INSERT INTO Payment(Payment_ID, Commuter_ID, Trip_ID, Amount, Payment_Method)
VALUES
('PAY001', 'COMM1', 'TRP001', 50, 'M-Pesa'),
('PAY002', 'COMM2', 'TRP002', 80, 'Cash'),
('PAY003', 'COMM3', 'TRP003', 120, 'Bank Transfer'),
('PAY004', 'COMM4', 'TRP004', 100, 'M-Pesa'),
('PAY005', 'COMM5', 'TRP005', 60, 'Credit Card'),
('PAY006', 'COMM6', 'TRP006', 70, 'Cash');
```

```
INSERT INTO Driver_Training(Training_ID, Description, Driver_ID, Completion_Date)
VALUES
('TRN001', 'Safety Training', 'DRV001', '2024-01-10'),
('TRN002', 'First Aid Training', 'DRV002', '2024-02-15'),
('TRN003', 'Defensive Driving', 'DRV003', '2024-03-20'),
('TRN004', 'Customer Service', 'DRV004', '2024-04-25'),
('TRN005', 'Vehicle Maintenance', 'DRV005', '2024-05-30'),
('TRN006', 'Safety Training', 'DRV006', '2024-06-05');
```

```
INSERT INTO Station(Station_ID, Accessibility_Features)
VALUES
('STN001', 'Wheelchair Ramp'),
('STN002', 'Elevator Access'),
('STN003', 'Braille Signs'),
('STN004', 'Audio Assistance'),
('STN005', 'Accessible Restrooms'),
('STN006', 'Seating for Elderly');
```

```
INSERT INTO AccessibilityFeatures(Features_ID, Description)
VALUES
('AF001', 'Wheelchair Ramp'),
('AF002', 'Elevator Access'),
('AF003', 'Braille Labels'),
('AF004', 'Audio Assistance'),
('AF005', 'Reserved Parking'),
('AF006', 'Lowered Ticket Counters');
```

```
UPDATE Driver
SET Vehicle_ID = 'VEH001', Training_ID = 'TRN001'
WHERE Driver_ID = 'DRV001';
```

```
UPDATE Driver
```

```
SET Vehicle_ID = 'VEH002' , Training_ID = 'TRN002'  
WHERE Driver_ID = 'DRV002';
```

```
UPDATE Driver  
SET Vehicle_ID = 'VEH003' , Training_ID = 'TRN003'  
WHERE Driver_ID = 'DRV003';
```

```
UPDATE Driver  
SET Vehicle_ID = 'VEH004' , Training_ID = 'TRN004'  
WHERE Driver_ID = 'DRV004';
```

```
UPDATE Vehicle  
SET Trip_ID = 'TRP001' , Maintenance_ID = 'MTN001'  
WHERE Vehicle_ID = 'VEH001';
```

```
UPDATE Vehicle  
SET Trip_ID = 'TRP002' , Maintenance_ID = 'MTN002'  
WHERE Vehicle_ID = 'VEH002';
```

```
UPDATE Vehicle  
SET Trip_ID = 'TRP003' , Maintenance_ID = 'MTN003'  
WHERE Vehicle_ID = 'VEH003';
```

```
UPDATE Vehicle  
SET Trip_ID = 'TRP004' , Maintenance_ID = 'MTN004'  
WHERE Vehicle_ID = 'VEH004';
```

```
SELECT * FROM Commuter;  
SELECT * FROM Driver;  
SELECT * FROM GPS_Tracker;  
SELECT * FROM Vehicle;  
SELECT * FROM Route;  
SELECT * FROM Maintenance;  
SELECT * FROM Trip;  
SELECT * FROM Payment;  
SELECT * FROM Driver_Training;  
SELECT * FROM Station;  
SELECT * FROM AccessibilityFeatures;
```

## GITHUB

Link to repository: <https://github.com/Kwendo-sean/DATABASE-PROJECT>

## SUMMARY OF OUR PROJECT

The goal of our project is to improve the availability of public transport to both abled and disabled passengers . Our system brings together important information like available routes and accessibility features to save on time.This will ensure efficiency in the Public transport sector.

The project is in line with the SDG 10 which focuses on reducing inequalities.By improving transport accessibility to disabled people it enhances social integration and equity.

The database contains Tables that capture and store information related to the transport system.This enables good storage of data as it is secure and reliable too.

This system will have a big impact on accessibility as its main focus together with operational

efficiency. Thus meeting all the users needs.