COS20031: COMPUTING TECHNOLOGY DESIGN PROJECT

FINAL REPORT & PRODUCT DELIVERABLE

Project Title: Transportation Management System
Client: ITL Logistics Corporation
Team: Team 15 – Akatsuki
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Campus: Ho Chi Minh
Date: November 24th, 2024 (Fall Semester)
Prepared for: Lecturer – Dr. Thomas Hang

COS20031 – Computing Technology Project

Homepage

Welcome to Team 15

Team metrics

Cycle Time
Updated Nov 24, 2024
ON TRACK

Team Satisfaction
Updated Nov 24, 2024
ON TRACK

Defect Density
Updated Nov 24, 2024
ON TRACK

About

Welcome to the Homepage of the Software Development Project for the ITL Transportation Management System (TMS). This page provide concise information about our team members, each with their respective role and responsibilities. To support with the process of understanding and exploring our project, a Quick Navigation is supplemented with links to corresponding pages. To keep the stakeholders updated about the progress of this project. Latest contributions are updated and displayed in the homepage as soon as they are made. In summary, this homepage encapsulates our efforts in designing, developing, and implementing an effective Software Solution for ITL Corporation's TMS needs.

Meet the team

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Quick Navigation

Resources

Restrict search to this space's space key.

Search Search

Where to find us

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1049936162@student.swin.edu.au
(+84) 906072005

Featured resources

Jira Timeline
Request for Proposal
ITL Corporation

Latest updates

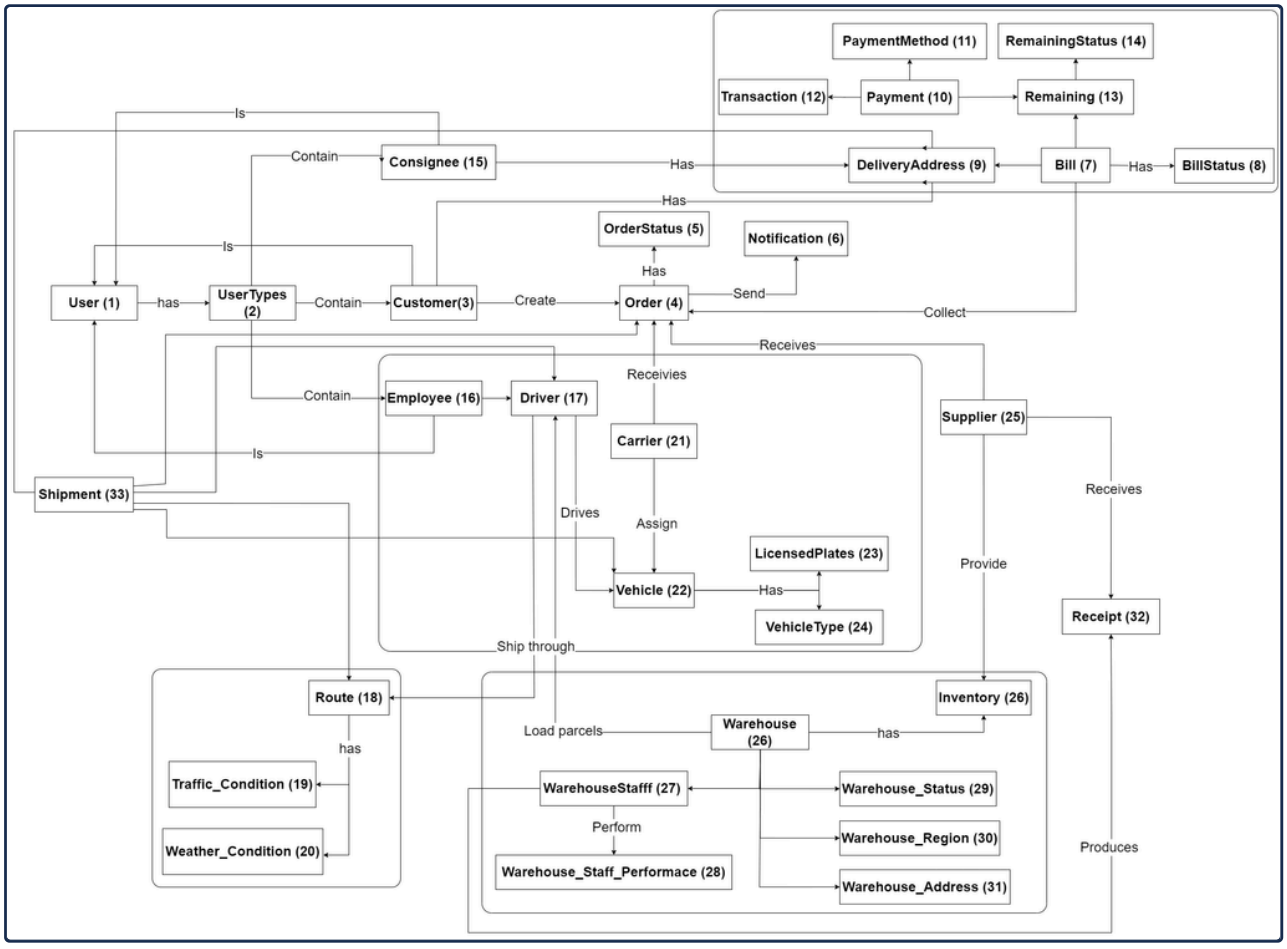
Recent updates
Dummy Data
2 minutes ago • contributed by Nguyễn Hoàng Trung
Data Management
3 minutes ago • contributed by Nguyễn Hoàng Trung

🗺️ Entities Relationship Diagram (ERD)

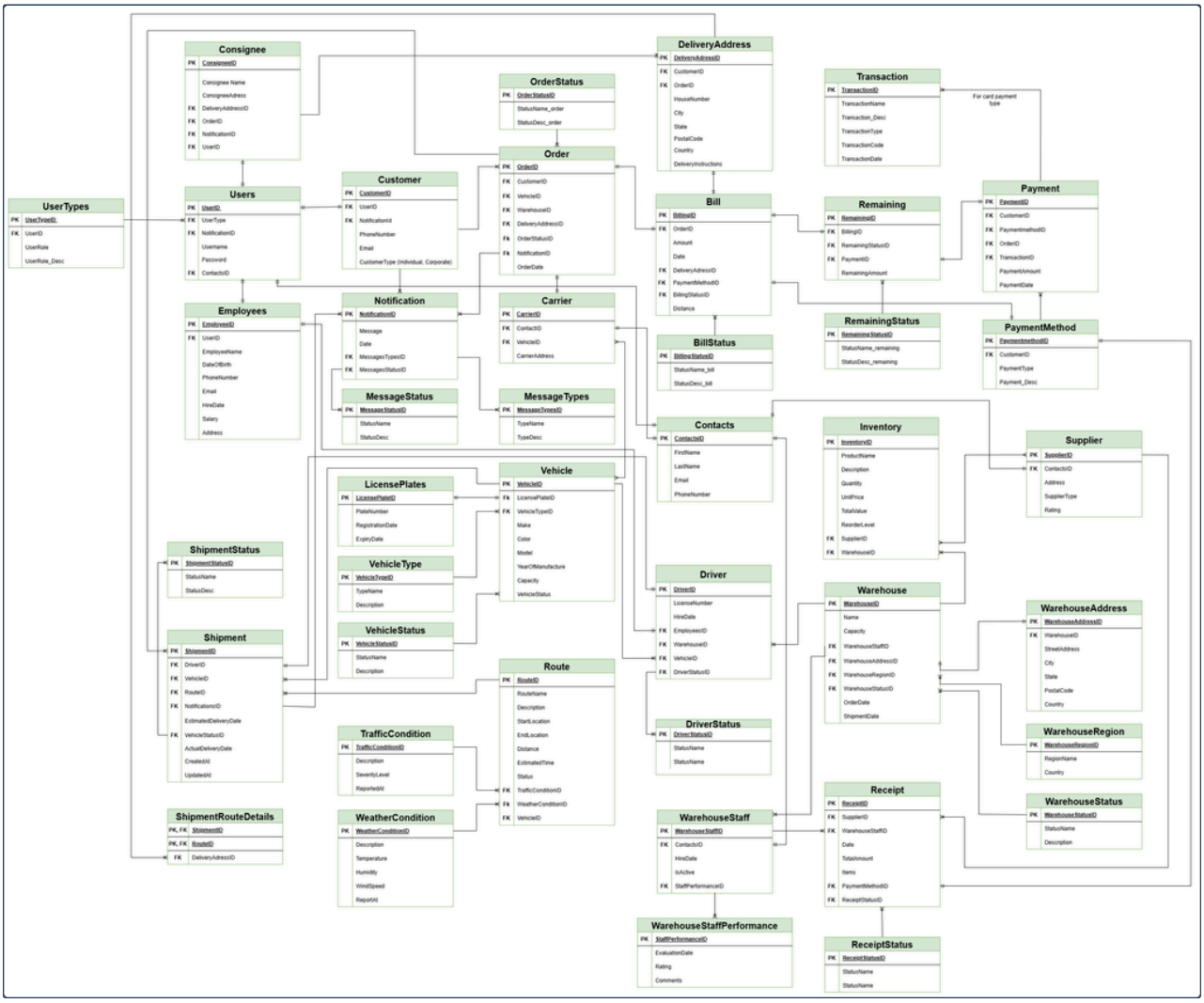
Following a comprehensive evaluation of the requirements for a Transportation Management System (TMS), we have identified the core entities, along with their associated attributes and cardinalities. Below is the Entity-Relationship Diagram (ERD) that has been constructed based on this analysis.

After thoroughly assessing the requirements for the Transportation Management System (TMS), we have also created a Data Flow Diagram (DFD) to visualize how information moves between the various components of the system and external entities. This DFD outlines the flow of data across processes and interactions, ensuring a clear understanding of how the system operates at each stage.

Conceptual ERD Diagram



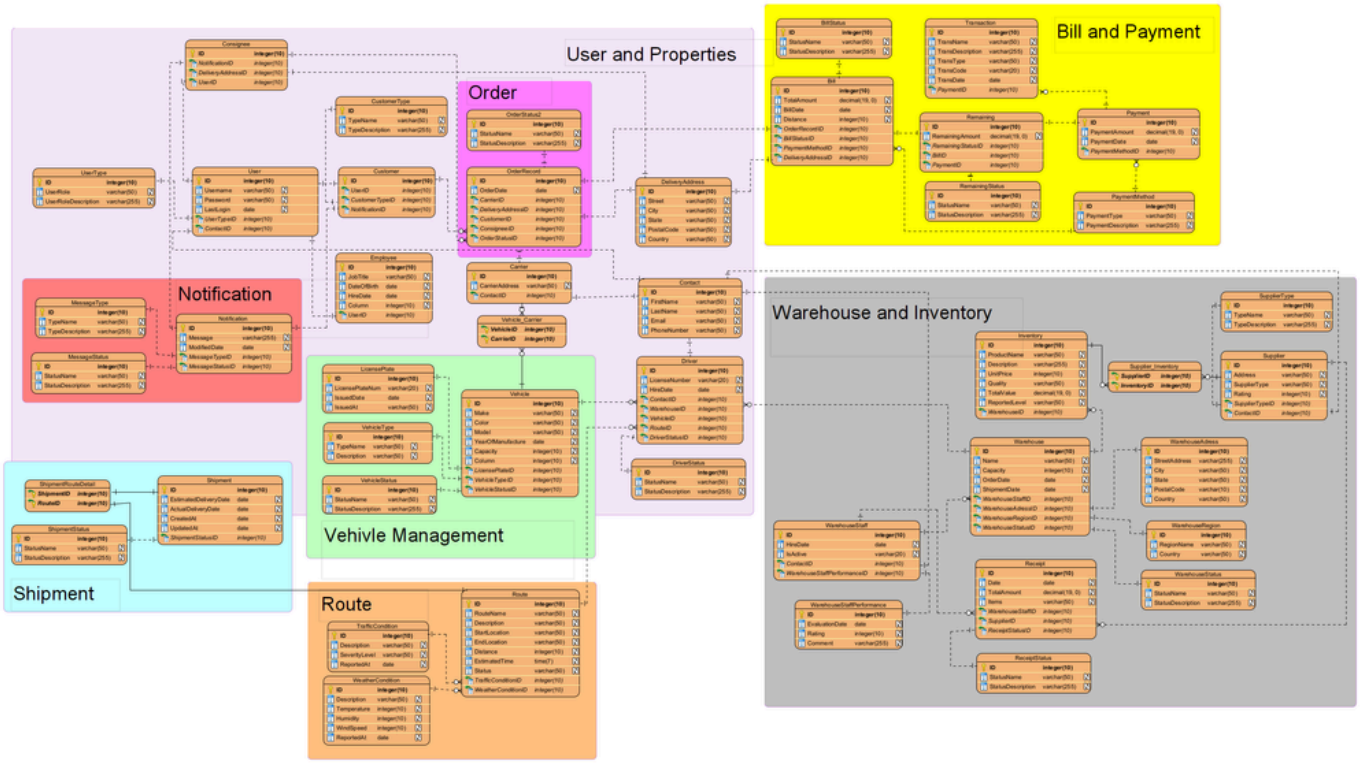
Logical ERD Diagram



Physical ERD Diagram

This version of Physical ERD contains data types and constraints. It is a detailed schematic of the main parts of the transportation management system for logistics organizations.

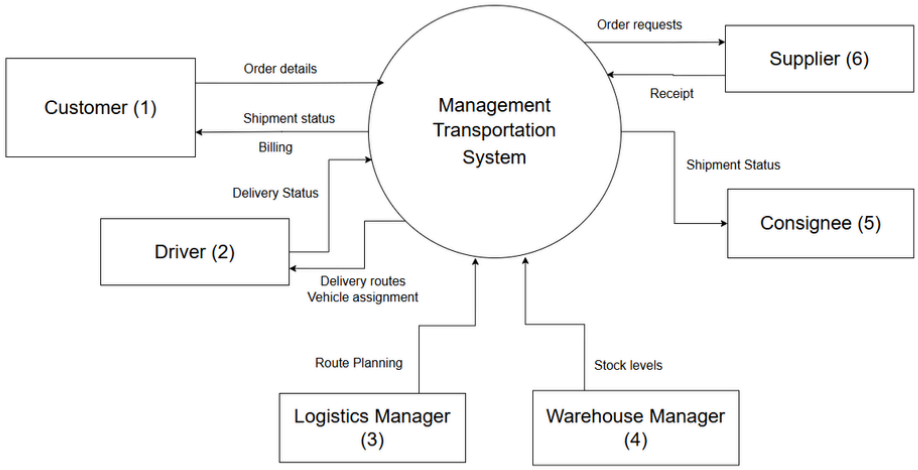
To create this Physical ERD Diagram, we used Visual Paradigm as our tool.



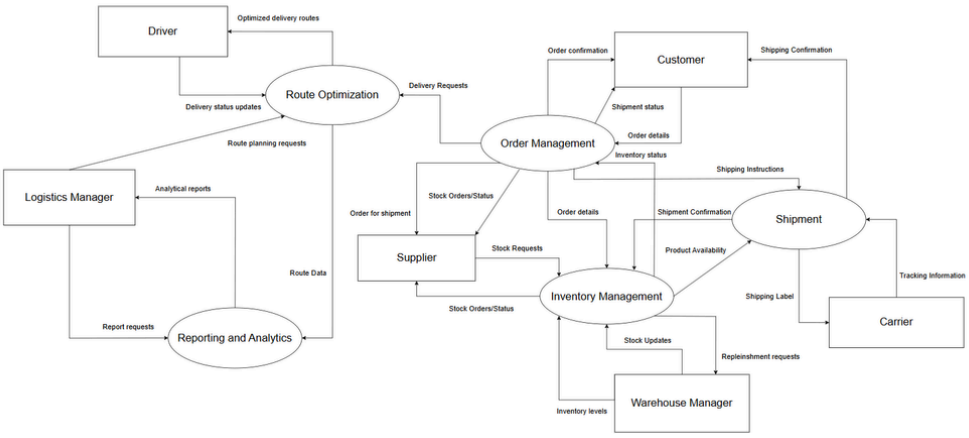
Data Flow Diagram

A Data Flow Diagram (DFD) maps out the flow of information of any process or system

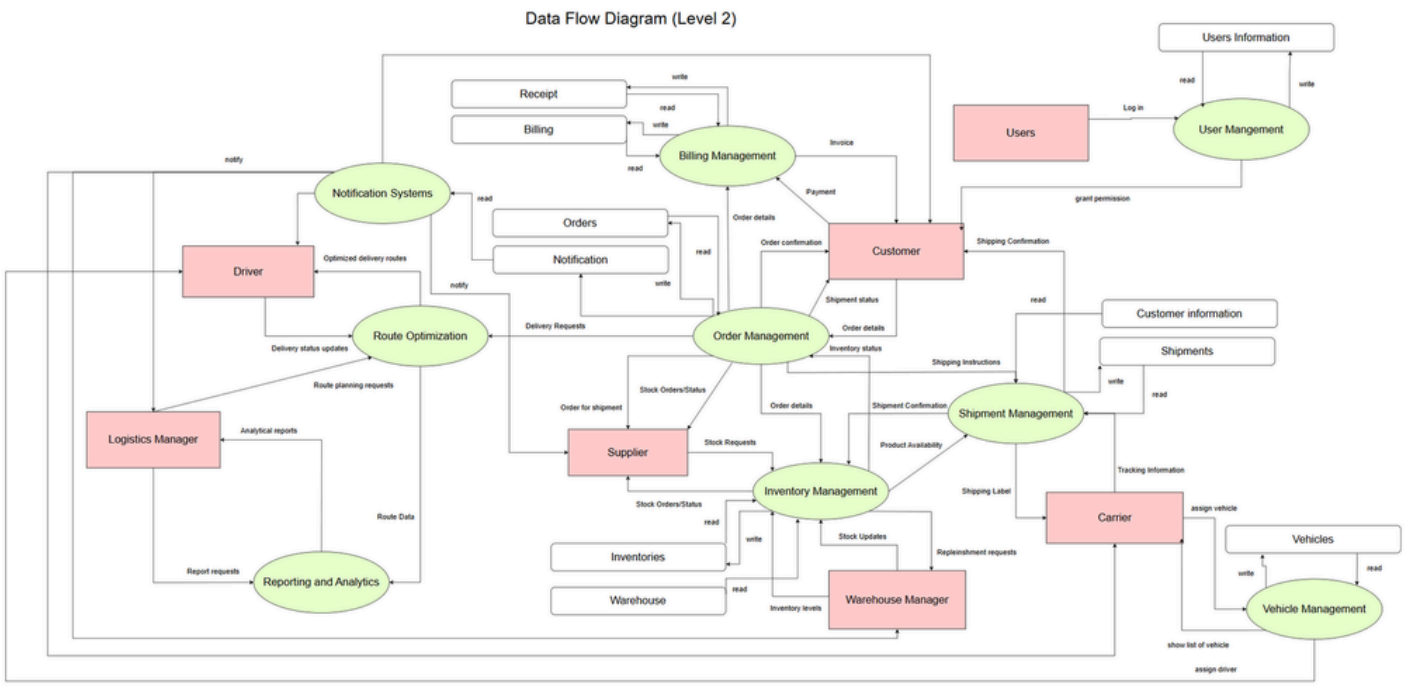
DFD Level 0



DFD Level 1



DFD Level 2


Data Flow Diagram (Level 2)
Users Information
Receipt
Billing
Billing Management
Users
User Mangement
Notification Systems
Orders
Notification
Customer
Driver
Route Optimization
Order Management
Customer information
Shipments
Logistics Manager
Supplier
Shipment Management
Inventory Management
Carrier
Vehicles
Inventories
Warehouse
Warehouse Manager
Reporting and Analytics
Vehicle Management
write
read
Log in
Invoice
Payment
grant permission
notify
Order details
Order confirmation
Shipping Confirmation
Optimized delivery routes
Shipment status
Delivery Requests
Inventory status
Shipping Instructions
Delivery status updates
Route planning requests
Stock Orders/Status
Order for shipment
Shipment Confirmation
Analytical reports
Stock Requests
Product Availability
Tracking Information
Shipping Label
assign vehicle
Route Data
Stock Updates
Replenishment requests
Report requests
Inventory levels
show list of vehicle
assign driver

Data Management

This document provides a detailed overview of the different stages involved in managing a database, primarily using MySQL within MySQL Workbench.

Create Database Statement

The database query for creating table and setting up the relationship between tables.

This work below is acknowledged by Yao, R. (2024). *MySQL Cheat Sheet: (Cover all Basic MySQL Syntaxes, More Than 300 Examples)*.

```sql
DROP DATABASE IF EXISTS TransportationManagementSystem;
CREATE DATABASE TransportationManagementSystem;

USE TransportationManagementSystem;


-- Notifications ------------------------------------------------------------

-- Define the MessageTypes table to categorize different types of messages
CREATE TABLE MessageTypes (
    message_type_id INT PRIMARY KEY,          -- Unique identifier for the message type
    type_name VARCHAR(50) NOT NULL,           -- The name of the message type (e.g., "Alert", "Reminder")
    type_description VARCHAR(255) NOT NULL    -- A description of the message type
);

-- Define the MessageStatuses table to track the status of messages
CREATE TABLE MessageStatuses (
    message_status_id INT PRIMARY KEY,        -- Unique identifier for the message status
    status_name VARCHAR(50) NOT NULL,         -- Name of the message status (e.g., "Sent", "Failed", "Read")
    status_description VARCHAR(255) NOT NULL  -- A description of the status (e.g., "Message was successfully sent")
);

-- Define the Notifications table to store messages and their associated metadata
CREATE TABLE Notifications (
    notification_id INT PRIMARY KEY,          -- Unique identifier for the notification
    message VARCHAR(255) NOT NULL,            -- The content of the notification message
    message_type_id INT,                      -- References the MessageTypes table to specify the type of message
    message_status_id INT,                    -- References the MessageStatuses table to track the status of the message
    modified_date DATE NOT NULL,              -- Date when the notification was last modified
    FOREIGN KEY (message_type_id) REFERENCES MessageTypes(message_type_id),  -- Link to MessageTypes
    FOREIGN KEY (message_status_id) REFERENCES MessageStatuses(message_status_id)  -- Link to MessageStatuses
);

-- ----------------------------------------------------------------------------

-- Users and Contact Information --------------------------------------------

-- Define the Contacts table to store information about contacts (e.g., customers, employees)
CREATE TABLE Contacts (
    contact_id INT PRIMARY KEY,                                  -- Unique identifier for the contact
    first_name VARCHAR(50) NOT NULL CHECK (first_name REGEXP '^[A-Z][a-z]*$'),  -- First name, starts with a capital letter
    last_name VARCHAR(50) NOT NULL CHECK (last_name REGEXP '^[A-Z][a-z]*$'),    -- Last name, starts with a capital letter
    email VARCHAR(100) UNIQUE NOT NULL CHECK (email REGEXP '^[A-Za-z0-9._%+-]+@[A-Za-z0-9.-]+\\.[A-Za-z]{2,}$'), -- Valid email address with check constraint
    phone_number VARCHAR(15) NOT NULL UNIQUE CHECK (phone_number REGEXP '^[+][0-9]{1,3}-[0-9]{3}-[0-9]{3}-[0-9]{4}$')  -- Valid phone number format with check
constraint
);

-- Define the UserTypes table to categorize users based on their role
CREATE TABLE UserTypes (
    usertype_id INT PRIMARY KEY,                    -- Unique identifier for the user type
    user_role VARCHAR(50),                          -- Role name (e.g., "Admin", "Customer")
    user_role_description VARCHAR(255)              -- Description of the role
);

-- Define the Users table to store user account details
CREATE TABLE Users (
    user_id INT PRIMARY KEY,                        -- Unique identifier for each user
    contact_id INT,                                 -- References the Contacts table for the user's contact details
    usertype_id INT,                                -- References the UserTypes table for the user role
    username VARCHAR(50) NOT NULL UNIQUE,           -- Unique username
    password VARCHAR(50) NOT NULL,                  -- User password
    last_login TIMESTAMP NOT NULL,                  -- Timestamp of the last login
    FOREIGN KEY (usertype_id) REFERENCES UserTypes(usertype_id),  -- Links to the UserTypes table
    FOREIGN KEY (contact_id) REFERENCES Contacts(contact_id)      -- Links to the Contacts table
);

-- Define the Employees table to store employee details
CREATE TABLE Employees (
    employee_id INT PRIMARY KEY,                    -- Unique identifier for the employee
    user_id INT UNIQUE,                             -- References the Users table for the user associated with the employee
    job_title VARCHAR(50) NOT NULL,                 -- Job title (e.g., "Manager", "Technician")
    date_of_birth DATE NOT NULL,                    -- Date of birth of the employee
    hire_date DATE NOT NULL,                        -- Date when the employee was hired
```

```sql
    FOREIGN KEY (user_id) REFERENCES Users(user_id)  -- Links to the Users table
);

-- Define the CustomerTypes table to store different types of customers (e.g., "VIP", "Regular")
CREATE TABLE CustomerTypes (
    customer_type_id INT PRIMARY KEY,                -- Unique identifier for the customer type
    type_name VARCHAR(50) NOT NULL,                   -- Name of the customer type (e.g., "VIP", "Regular")
    type_description VARCHAR(255) NOT NULL            -- Description of the customer type
);

-- Define the Customers table to store customer details
CREATE TABLE Customers (
    customer_id INT PRIMARY KEY,                     -- Unique identifier for the customer
    customer_type_id INT,                            -- References the CustomerTypes table for the customer type
    user_id INT,                                     -- References the Users table for the user associated with the customer
    notification_id INT,                             -- References the Notifications table for the customer's notifications
    FOREIGN KEY (customer_type_id) REFERENCES CustomerTypes(customer_type_id),  -- Links to the CustomerTypes table
    FOREIGN KEY (notification_id) REFERENCES Notifications(notification_id)     -- Links to the Notifications table
);

-- ---------------------------------------------------------------------------

-- Warehouse and Inventory ----------------------------------------------------

-- Define the WarehouseStaffPerformances table to track the performance evaluations of warehouse staff
CREATE TABLE WarehouseStaffPerformances (
    staff_performance_id INT PRIMARY KEY,            -- Unique identifier for the performance evaluation
    evaluation_date DATE NOT NULL,                   -- The date when the performance was evaluated
    rating INT NOT NULL CHECK (rating >= 0 AND rating <= 5),  -- Performance rating between 0 and 5
    comments VARCHAR(225) NOT NULL                   -- Comments about the staff performance
);

-- Define the WarehouseStaffs table to store information about warehouse staff members
CREATE TABLE WarehouseStaffs (
    warehouse_staff_id INT PRIMARY KEY,              -- Unique identifier for the warehouse staff member
    contact_id INT,                                  -- References the Contacts table for the staff member's contact information
    staff_performance_id INT,                        -- References the WarehouseStaffPerformances table for performance evaluations
    hire_date DATE NOT NULL,                         -- Date when the staff member was hired
    is_active ENUM('Yes', 'No'),                     -- Indicates if the staff member is active ('Yes' or 'No')
    FOREIGN KEY (contact_id) REFERENCES Contacts(contact_id),  -- Links to the Contacts table
    FOREIGN KEY (staff_performance_id) REFERENCES WarehouseStaffPerformances(staff_performance_id)  -- Links to the WarehouseStaffPerformances table
);

-- Define the WarehouseAddresses table to store warehouse address information
CREATE TABLE WarehouseAddresses (
    warehouse_address_id INT PRIMARY KEY,            -- Unique identifier for the warehouse address
    street VARCHAR(50) NOT NULL,                     -- Street name for the warehouse address
    city VARCHAR(50) NOT NULL,                       -- City for the warehouse address
    state VARCHAR(50) NOT NULL,                      -- State for the warehouse address
    postal_code VARCHAR(10) NOT NULL,                -- Postal code for the warehouse address
    country VARCHAR(50) NOT NULL                     -- Country for the warehouse address
);

-- Define the WarehouseRegions table to store information about warehouse regions
CREATE TABLE WarehouseRegions (
    warehouse_region_id INT PRIMARY KEY,             -- Unique identifier for the warehouse region
    region_name VARCHAR(50) NOT NULL,                -- Name of the region (e.g., "North", "South")
    country VARCHAR(50) NOT NULL                     -- Country for the warehouse region
);

-- Define the WarehouseStatuses table to store the status of the warehouse
CREATE TABLE WarehouseStatuses (
    warehouse_status_id INT PRIMARY KEY,             -- Unique identifier for the warehouse status
    status_name VARCHAR(50) NOT NULL,                -- Status name (e.g., "Active", "Closed")
    status_description VARCHAR(255) NOT NULL         -- Description of the warehouse status
);

-- Define the Warehouses table to store warehouse information
CREATE TABLE Warehouses (
    warehouse_id INT PRIMARY KEY,                    -- Unique identifier for the warehouse
    warehouse_name VARCHAR(50) NOT NULL,             -- Name of the warehouse
    warehouse_capacity INT NOT NULL CHECK (warehouse_capacity >= 0),  -- Capacity of the warehouse
    warehouse_staff_id INT,                          -- References the WarehouseStaffs table for warehouse staff
    warehouse_address_id INT,                        -- References the WarehouseAddresses table for the warehouse address
    warehouse_region_id INT,                         -- References the WarehouseRegions table for the warehouse region
    warehouse_status_id INT,                         -- References the WarehouseStatuses table for the warehouse status
    FOREIGN KEY (warehouse_staff_id) REFERENCES WarehouseStaffs(warehouse_staff_id),  -- Links to the WarehouseStaffs table
    FOREIGN KEY (warehouse_address_id) REFERENCES WarehouseAddresses(warehouse_address_id),  -- Links to the WarehouseAddresses table
    FOREIGN KEY (warehouse_region_id) REFERENCES WarehouseRegions(warehouse_region_id),  -- Links to the WarehouseRegions table
    FOREIGN KEY (warehouse_status_id) REFERENCES WarehouseStatuses(warehouse_status_id)  -- Links to the WarehouseStatuses table
);

-- Define the SupplierTypes table to store different types of suppliers (e.g., Manufacturer, Distributor)
```

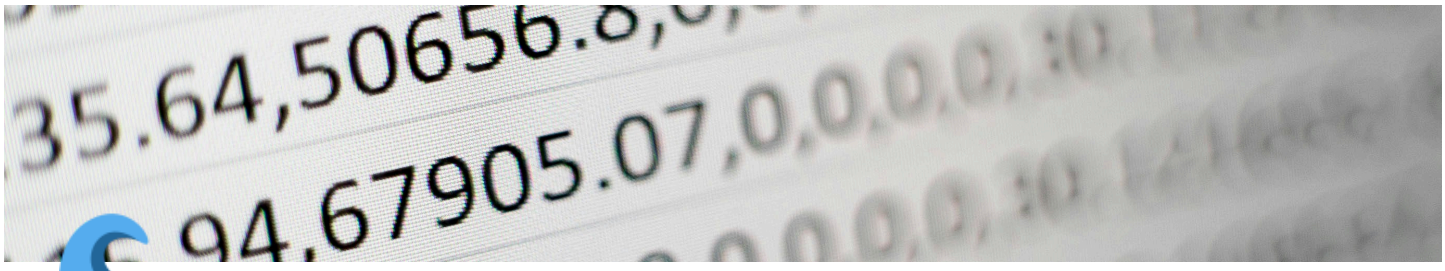
```sql
CREATE TABLE SupplierTypes (
    supplier_type_id INT PRIMARY KEY,                -- Unique identifier for the supplier type
    type_name VARCHAR(50) UNIQUE NOT NULL,            -- Name of the supplier type (e.g., "Manufacturer", "Distributor")
    type_description VARCHAR(255) NOT NULL            -- Description of the supplier type
);

-- Define the Suppliers table to store supplier information
CREATE TABLE Suppliers (
    supplier_id INT PRIMARY KEY,                     -- Unique identifier for the supplier
    supplier_type_id INT,                            -- References the SupplierTypes table for the supplier type
    contact_id INT,                                  -- References the Contacts table for the supplier's contact information
    rating INT CHECK (rating >= 0 AND rating <= 5),    -- Supplier rating between 0 and 5
    FOREIGN KEY (supplier_type_id) REFERENCES SupplierTypes(supplier_type_id),  -- Links to the SupplierTypes table
    FOREIGN KEY (contact_id) REFERENCES Contacts(contact_id)  -- Links to the Contacts table
);

-- Define the Inventories table to store inventory details in the warehouse
CREATE TABLE Inventories (
    inventory_id INT PRIMARY KEY,                    -- Unique identifier for the inventory item
    product_name VARCHAR(50) NOT NULL,                -- Name of the product
    product_description VARCHAR(255) NOT NULL,        -- Description of the product
    quantity INT NOT NULL,                           -- Quantity of the product in stock
    unit_price INT NOT NULL,                         -- Unit price of the product
    total_value INT NOT NULL,                        -- Total value of the inventory (quantity * unit_price)
    reorder_level VARCHAR(50) NOT NULL,               -- Reorder level for the product (e.g., "Low", "Medium", "High")
    supplier_id INT,                                 -- References the Suppliers table for the supplier
    warehouse_id INT,                                -- References the Warehouses table for the warehouse
    FOREIGN KEY (supplier_id) REFERENCES Suppliers(supplier_id),  -- Links to the Suppliers table
    FOREIGN KEY (warehouse_id) REFERENCES Warehouses(warehouse_id)  -- Links to the Warehouses table
);

-- Define the InventoryTransactions table to track inventory transactions (e.g., Restock, Shipping)
CREATE TABLE InventoryTransactions (
    inventory_transaction_id INT PRIMARY KEY,        -- Unique identifier for the inventory transaction
    inventory_id INT,                                -- References the Inventories table for the inventory item
    transaction_type ENUM('Restock', 'Shipping', 'Adjustment') NOT NULL,  -- Type of transaction (e.g., "Restock", "Shipping")
    transaction_date TIMESTAMP NOT NULL DEFAULT CURRENT_TIMESTAMP,  -- Date and time when the transaction occurred
    quantity INT NOT NULL,                           -- Quantity involved in the transaction
    transaction_amount DECIMAL(15, 2) NOT NULL CHECK (transaction_amount >= 0),  -- Amount of the transaction
    reason VARCHAR(255) NOT NULL,                     -- Reason for the transaction (e.g., "Restock", "Damaged")
    FOREIGN KEY (inventory_id) REFERENCES Inventories(inventory_id)  -- Links to the Inventories table
);


-- ---------------------------------------------------------------------------

-- Vehicle Management ---------------------------------------------------------

-- Define the VehicleStatuses table to store the statuses of vehicles (e.g., available, in repair)
CREATE TABLE VehicleStatuses (
    status_id INT PRIMARY KEY,                    -- Unique identifier for each vehicle status
    status_name VARCHAR(50) NOT NULL,             -- Name of the status (e.g., "Available", "In Maintenance")
    status_description VARCHAR(255) NOT NULL      -- Description of the vehicle status
);

-- Define the VehicleTypes table to store vehicle type information (e.g., Truck, Van)
CREATE TABLE VehicleTypes (
    vehicle_type_id INT PRIMARY KEY,              -- Unique identifier for each vehicle type
    type_name VARCHAR(50) NOT NULL,               -- Name of the vehicle type (e.g., "Truck", "Van")
    type_description VARCHAR(255) NOT NULL        -- Description of the vehicle type
);

-- Define the Vehicles table to store vehicle information
CREATE TABLE Vehicles (
    vehicle_id INT PRIMARY KEY,                   -- Unique identifier for each vehicle
    vehicle_type_id INT,                          -- References VehicleTypes table for the vehicle type
    vehicle_status_id INT,                        -- References VehicleStatuses table for the vehicle status
    year_of_manufacture DATE NOT NULL,            -- The year the vehicle was manufactured
    color VARCHAR(50) NOT NULL,                   -- The color of the vehicle
    model VARCHAR(50) NOT NULL,                   -- The model of the vehicle
    capacity INT NOT NULL CHECK (capacity > 0),   -- Capacity of the vehicle (e.g., number of passengers or weight limit)
    FOREIGN KEY (vehicle_type_id) REFERENCES VehicleTypes(vehicle_type_id),  -- Links to the VehicleTypes table
    FOREIGN KEY (vehicle_status_id) REFERENCES VehicleStatuses(status_id)   -- Links to the VehicleStatuses table
);

-- Define the LicensePlates table to store license plate details for vehicles
CREATE TABLE LicensePlates (
    license_plate_id INT PRIMARY KEY,             -- Unique identifier for each license plate
    vehicle_id INT,                               -- References Vehicles table for the vehicle
    license_plate_num VARCHAR(20) NOT NULL UNIQUE,     -- License plate number (must be unique)
    issued_date DATE NOT NULL,                    -- Date when the license plate was issued
    issued_at VARCHAR(100) NOT NULL CHECK (issued_at REGEXP '^[A-Z][a-z]*$'),  -- Place of issuance (must match format)
    FOREIGN KEY (vehicle_id) REFERENCES Vehicles(vehicle_id)  -- Links to the Vehicles table
```

```sql
);

-- Define the Carriers table to store carrier information, including contact details and vehicle assignments
CREATE TABLE Carriers (
    carrier_id INT PRIMARY KEY,                     -- Unique identifier for each carrier
    contact_id INT,                                 -- References Contacts table for the carrier's contact
    vehicle_id INT,                                 -- References Vehicles table for the vehicle assigned to the carrier
    carrier_address VARCHAR(50) NOT NULL,            -- Address of the carrier
    FOREIGN KEY (contact_id) REFERENCES Contacts(contact_id),  -- Links to the Contacts table
    FOREIGN KEY (vehicle_id) REFERENCES Vehicles(vehicle_id)   -- Links to the Vehicles table
);

-- ----------------------------------------------------------------------------

-- Route -----------------------------------------------------------------------

-- Define the TrafficConditions table to store traffic condition information
CREATE TABLE TrafficConditions (
    traffic_condition_id INT PRIMARY KEY,           -- Unique identifier for each traffic condition
    condition_description VARCHAR(255) NOT NULL,    -- Description of the traffic condition (e.g., "Heavy traffic", "Clear roads")
    severity_level ENUM('Good', 'Bad'),             -- Severity level of the traffic condition (Good or Bad)
    reported_at DATE NOT NULL                       -- Date when the traffic condition was reported
);

-- Define the WeatherConditions table to store weather condition information
CREATE TABLE WeatherConditions (
    weather_condition_id INT PRIMARY KEY,           -- Unique identifier for each weather condition
    condition_description VARCHAR(255) NOT NULL,    -- Description of the weather condition (e.g., "Rainy", "Clear sky")
    temperature INT NOT NULL CHECK (temperature >= -50 AND temperature <= 50),  -- Temperature in Celsius, between -50 and 50 degrees
    humidity INT NOT NULL CHECK (humidity >= 0 AND humidity <= 100),           -- Humidity percentage, between 0 and 100
    wind_speed INT NOT NULL CHECK (wind_speed >= 0 AND wind_speed <= 300),     -- Wind speed in km/h, between 0 and 300 km/h
    reported_at DATE NOT NULL                       -- Date when the weather condition was reported
);

-- Define the Routes table to store route information
CREATE TABLE Routes (
    route_id INT PRIMARY KEY,                       -- Unique identifier for each route
    route_name VARCHAR(50) NOT NULL,                 -- Name of the route
    start_location VARCHAR(50) NOT NULL,             -- Starting location of the route
    end_location VARCHAR(50) NOT NULL,               -- Ending location of the route
    distance INT NOT NULL CHECK (distance > 0),      -- Distance of the route in kilometers, must be positive
    estimated_time TIME NOT NULL,                    -- Estimated time to travel the route
    route_status ENUM('Active', 'Inactive') NOT NULL CHECK (route_status IN ('Active', 'Inactive')),  -- Status of the route (Active or Inactive)
    traffic_condition_id INT,                        -- References TrafficConditions table for the traffic condition associated with the route
    weather_condition_id INT,                        -- References WeatherConditions table for the weather condition associated with the route
    vehicle_id INT,                                  -- References Vehicles table for the vehicle associated with the route
    FOREIGN KEY (traffic_condition_id) REFERENCES TrafficConditions(traffic_condition_id),  -- Links to the TrafficConditions table
    FOREIGN KEY (weather_condition_id) REFERENCES WeatherConditions(weather_condition_id),  -- Links to the WeatherConditions table
    FOREIGN KEY (vehicle_id) REFERENCES Vehicles(vehicle_id)                            -- Links to the Vehicles table
);


-- ----------------------------------------------------------------------------

-- Driver Management -----------------------------------------------------------

-- Define the DriverStatuses table to store status information for drivers
CREATE TABLE DriverStatuses (
    driver_status_id INT PRIMARY KEY,               -- Unique identifier for each driver status
    status_name VARCHAR(50) NOT NULL,                -- Name of the driver status (e.g., "Active", "On Duty")
    status_description VARCHAR(255) NOT NULL         -- Detailed description of the driver status
);

-- Define the Drivers table to store details about the drivers
CREATE TABLE Drivers (
    driver_id INT PRIMARY KEY,                      -- Unique identifier for each driver
    employee_id INT,                                -- References Employees table for the driver's employee record
    warehouse_id INT,                               -- References Warehouses table for the assigned warehouse
    vehicle_id INT,                                 -- References Vehicles table for the assigned vehicle
    route_id INT,                                   -- References Routes table for the assigned route
    driver_status_id INT,                           -- References DriverStatuses table for the current status of the driver
    driver_license VARCHAR(15) UNIQUE NOT NULL,     -- Unique driver license number for identification
    FOREIGN KEY (employee_id) REFERENCES Employees(employee_id),       -- Links to the Employees table
    FOREIGN KEY (warehouse_id) REFERENCES Warehouses(warehouse_id),    -- Links to the Warehouses table
    FOREIGN KEY (vehicle_id) REFERENCES Vehicles(vehicle_id),          -- Links to the Vehicles table
    FOREIGN KEY (route_id) REFERENCES Routes(route_id),                -- Links to the Routes table
    FOREIGN KEY (driver_status_id) REFERENCES DriverStatuses(driver_status_id) -- Links to the DriverStatuses table
);

-- ----------------------------------------------------------------------------

-- Order -----------------------------------------------------------------------

```

```sql
-- Define the DeliveryAddresses table to store customer delivery address information
CREATE TABLE DeliveryAddresses (
    delivery_address_id INT PRIMARY KEY,       -- Unique identifier for each delivery address
    street VARCHAR(50) NOT NULL,               -- Street name or address
    city VARCHAR(50) NOT NULL,                 -- City name
    state VARCHAR(50) NOT NULL,                -- State or province
    postal_code VARCHAR(10) NOT NULL,          -- Postal code for the address
    country VARCHAR(50) NOT NULL               -- Country of the delivery address
);

-- Define the OrderStatuses table to store status information for orders
CREATE TABLE OrderStatuses (
    order_status_id INT PRIMARY KEY,           -- Unique identifier for each order status
    status_name VARCHAR(50),                   -- Name of the order status (e.g., "Pending", "Shipped")
    status_description VARCHAR(255)            -- Description of the order status
);

-- Define the OrderRecords table to store order details made by customers
CREATE TABLE OrderRecords (
    order_id INT PRIMARY KEY,                  -- Unique identifier for each order
    customer_id INT,                           -- References Customers table for the customer placing the order
    warehouse_id INT,                          -- References Warehouses table for the warehouse processing the order
    delivery_address_id INT,                   -- References DeliveryAddresses table for the delivery address
    order_status_id INT,                       -- References OrderStatuses table for the status of the order
    notification_id INT NULL,                  -- References Notifications table for optional notification related to the order
    order_date DATE NOT NULL,                  -- Date the order was placed
    FOREIGN KEY (customer_id) REFERENCES Customers(customer_id),       -- Links to the Customers table
    FOREIGN KEY (warehouse_id) REFERENCES Warehouses(warehouse_id),    -- Links to the Warehouses table
    FOREIGN KEY (delivery_address_id) REFERENCES DeliveryAddresses(delivery_address_id), -- Links to the DeliveryAddresses table
    FOREIGN KEY (order_status_id) REFERENCES OrderStatuses(order_status_id),           -- Links to the OrderStatuses table
    FOREIGN KEY (notification_id) REFERENCES Notifications(notification_id)            -- Links to the Notifications table
);

-- ---------------------------------------------------------------------------

-- Billing and Payment -------------------------------------------------------

-- Define the PaymentMethods table to store different types of payment methods
CREATE TABLE PaymentMethods (
    payment_method_id INT PRIMARY KEY,                  -- Unique identifier for each payment method
    payment_type VARCHAR(50) NOT NULL,                  -- Type of payment (e.g., Credit Card, Cash)
    payment_description VARCHAR(255) NOT NULL           -- Detailed description of the payment method
);

-- Define the BillStatuses table to store status information for bills
CREATE TABLE BillStatuses (
    bill_status_id INT PRIMARY KEY,             -- Unique identifier for each bill status
    status_name VARCHAR(50) NOT NULL,           -- Name of the status (e.g., "Paid", "Pending")
    status_description VARCHAR(255) NOT NULL    -- Description of the bill status
);

-- Define the Transactions table to store information about financial transactions
CREATE TABLE Transactions (
    transaction_id INT PRIMARY KEY,                     -- Unique identifier for each transaction
    trans_name VARCHAR(50) NOT NULL,                    -- Name of the transaction (e.g., "Payment", "Refund")
    trans_description VARCHAR(255) NOT NULL,            -- Detailed description of the transaction
    trans_type VARCHAR(50) NOT NULL,                    -- Type of the transaction (e.g., "Debit", "Credit")
    trans_code VARCHAR(10) UNIQUE NOT NULL,             -- Unique transaction code for identification
    trans_date DATE NOT NULL                            -- Date when the transaction occurred
);

-- Define the Payments table to store details of customer payments
CREATE TABLE Payments (
    payment_id INT PRIMARY KEY,                     -- Unique identifier for each payment
    customer_id INT,                                -- References Customers table for the customer making the payment
    payment_method_id INT,                          -- References PaymentMethods table for the payment method used
    order_id INT,                                   -- References OrderRecords table for the associated order
    transaction_id INT,                             -- References Transactions table (optional) for transaction details
    payment_amount DECIMAL(15, 2) NOT NULL,         -- Amount paid by the customer
    payment_date DATE NOT NULL,                     -- Date the payment was made
    FOREIGN KEY (customer_id) REFERENCES Customers(customer_id),           -- Links to the Customers table
    FOREIGN KEY (payment_method_id) REFERENCES PaymentMethods(payment_method_id),   -- Links to the PaymentMethods table
    FOREIGN KEY (order_id) REFERENCES OrderRecords(order_id),              -- Links to the OrderRecords table
    FOREIGN KEY (transaction_id) REFERENCES Transactions(transaction_id)   -- Links to the Transactions table
);

-- Define the Bills table to store information related to customer bills
CREATE TABLE Bills (
    bill_id INT PRIMARY KEY,                        -- Unique identifier for each bill
    order_id INT,                                   -- References OrderRecords table for the associated order
    delivery_address_id INT,                        -- References DeliveryAddresses table for the delivery location
    payment_method_id INT,                          -- References PaymentMethods table for the payment method used
    bill_status_id INT,                             -- References BillStatuses table for the status of the bill
```

```
    total_amount DECIMAL(15, 2) NOT NULL,                -- Total amount of the bill
    bill_date DATE NOT NULL,                             -- Date the bill was created
    distance INT NOT NULL CHECK (distance >= 0),         -- Delivery distance for the order (must be non-negative)
    FOREIGN KEY (order_id) REFERENCES OrderRecords(order_id),                       -- Links to the OrderRecords table
    FOREIGN KEY (delivery_address_id) REFERENCES DeliveryAddresses(delivery_address_id), -- Links to the DeliveryAddresses table
    FOREIGN KEY (payment_method_id) REFERENCES PaymentMethods(payment_method_id),   -- Links to the PaymentMethods table
    FOREIGN KEY (bill_status_id) REFERENCES BillStatuses(bill_status_id)            -- Links to the BillStatuses table
);

-- Define the ReceiptStatuses table to store status information for receipts
CREATE TABLE ReceiptStatuses (
    receipt_status_id INT PRIMARY KEY,               -- Unique identifier for each receipt status
    status_name VARCHAR(50) NOT NULL,                -- Name of the status (e.g., "Received", "Pending")
    status_description VARCHAR(255) NOT NULL         -- Description of the receipt status
);

-- Define the Receipts table to store details of supplier receipts
CREATE TABLE Receipts (
    receipt_id INT PRIMARY KEY,                      -- Unique identifier for each receipt
    supplier_id INT,                                 -- References Suppliers table for the supplier providing the goods
    payment_method_id INT,                           -- References PaymentMethods table for the payment method used
    warehouse_staff_id INT,                          -- References WarehouseStaffs table for the staff handling the receipt
    receipt_date DATE NOT NULL,                      -- Date the receipt was issued
    total_amount DECIMAL(15, 2) NOT NULL CHECK (total_amount >= 0), -- Total amount of the receipt
    items VARCHAR(255) NOT NULL,                     -- List of items included in the receipt
    receipt_status_id INT,                           -- References ReceiptStatuses table for the status of the receipt
    FOREIGN KEY (supplier_id) REFERENCES Suppliers(supplier_id),              -- Links to the Suppliers table
    FOREIGN KEY (payment_method_id) REFERENCES PaymentMethods(payment_method_id), -- Links to the PaymentMethods table
    FOREIGN KEY (warehouse_staff_id) REFERENCES WarehouseStaffs(warehouse_staff_id), -- Links to the WarehouseStaffs table
    FOREIGN KEY (receipt_status_id) REFERENCES ReceiptStatuses(receipt_status_id) -- Links to the ReceiptStatuses table
);

-- Define the RemainingStatuses table to store status information for remaining payments
CREATE TABLE RemainingStatuses (
    remaining_status_id INT PRIMARY KEY,             -- Unique identifier for each remaining payment status
    status_name VARCHAR(50) NOT NULL,                -- Status name (e.g., Partial, Pending)
    status_description VARCHAR(255) NOT NULL         -- Description of the remaining payment status
);

-- Define the RemainingPayments table to store information about remaining amounts to be paid
CREATE TABLE RemainingPayments (
    remaining_id INT PRIMARY KEY,                    -- Unique identifier for each remaining payment
    bill_id INT,                                     -- References Bills table for the associated bill
    remaining_status_id INT,                         -- References RemainingStatuses table for the status of the remaining payment
    payment_id INT,                                  -- References Payments table for the payment made towards the remaining amount
    remaining_amount DECIMAL(15, 2) NOT NULL,        -- Amount left to be paid
    FOREIGN KEY (bill_id) REFERENCES Bills(bill_id),              -- Links to the Bills table
    FOREIGN KEY (remaining_status_id) REFERENCES RemainingStatuses(remaining_status_id), -- Links to the RemainingStatuses table
    FOREIGN KEY (payment_id) REFERENCES Payments(payment_id)     -- Links to the Payments table
);

-- Define the Consignees table to store information of consignee
CREATE TABLE Consignees (
    consignee_id INT PRIMARY KEY,       -- Unique identifier for each shipment
    user_id INT,                        -- user_id associate with Log in user
    delivery_address_id INT,            -- delivery_address_id associate with address to deliver
    order_id INT,                       -- order_id associate with each order
    notification_id INT NULL,           -- notification_id associate with notification sent to consignee
    FOREIGN KEY (user_id) REFERENCES Users(user_id),         -- Linking consignee with user account
    FOREIGN KEY (delivery_address_id) REFERENCES DeliveryAddresses(delivery_address_id), -- Linking consignee address with address table
    FOREIGN KEY (order_id) REFERENCES OrderRecords(order_id), -- Linking consignee with their order
    FOREIGN KEY (notification_id) REFERENCES Notifications(notification_id) -- Linking consignee notification with notification table
);

-- ------------------------------------------------------------------------------

-- Shipment ----------------------------------------------------------------------

-- Define the ShipmentStatuses table to store status information for shipments
CREATE TABLE ShipmentStatuses (
    shipment_status_id INT PRIMARY KEY,              -- Unique identifier for each shipment status
    status_name VARCHAR(50) NOT NULL,                -- Name of the status (e.g., "In Transit")
    status_description VARCHAR(255) NOT NULL         -- Description of the status
);


-- Define the Shipments table to store information about each shipment
CREATE TABLE Shipments (
    shipment_id INT PRIMARY KEY,                     -- Unique identifier for each shipment
    route_id INT,                                    -- Route associated with the shipment
    driver_id INT,                                   -- Driver associated with the shipment
    shipment_status_id INT,                          -- Status of the shipment (linked to ShipmentStatuses)
    notification_id INT,                             -- Notification ID for updates related to the shipment
```

```
    estimated_delivery_date DATE,                       -- Estimated delivery date
    actual_delivery_date DATE,                          -- Actual delivery date (if available)
    created_at TIMESTAMP DEFAULT CURRENT_TIMESTAMP,     -- Timestamp for when the shipment record is created
    updated_at TIMESTAMP DEFAULT CURRENT_TIMESTAMP ON UPDATE CURRENT_TIMESTAMP,  -- Timestamp for the last update of the shipment record
    FOREIGN KEY (driver_id) REFERENCES Drivers(driver_id),     -- Linking the driver to the shipment
    FOREIGN KEY (shipment_status_id) REFERENCES ShipmentStatuses(shipment_status_id),
    FOREIGN KEY (route_id) REFERENCES Routes(route_id),    -- Linking the shipment to a specific route
    FOREIGN KEY (notification_id) REFERENCES Notifications(notification_id) -- Links notification with shipment
);

-- Define the ShipmentRouteDetails table to link shipments with routes and delivery addresses
CREATE TABLE ShipmentRouteDetails (
    shipment_id INT,                                    -- Shipment identifier
    route_id INT,                                       -- Route associated with the shipment
    delivery_address_id INT,                            -- Delivery address for the shipment
    PRIMARY KEY (shipment_id, route_id),                -- Composite primary key to ensure unique shipment-route pairs
    FOREIGN KEY (shipment_id) REFERENCES Shipments(shipment_id), -- Links to the Shipments table
    FOREIGN KEY (route_id) REFERENCES Routes(route_id),          -- Links to the Routes table
    FOREIGN KEY (delivery_address_id) REFERENCES DeliveryAddresses(delivery_address_id) -- Links to the DeliveryAddresses table
);

-------------------------------------------------------------------------------
```



Dummy Data

Dummy data refers to fake or placeholder data used for testing, demonstrating and or development purposes. In this page, we document the dummy data genrated by Mockaroo that we have inserted into our tables to test run our queries, use cases and indexes. Although the data are meaningless, they have been a great help in testing and understanding the overal functionality of our software application.

MessageTypes

message_type_id	type_name	type_description
1	Reminder	Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Mauris viverra diam vitae quam. Suspendisse potenti.
2	Reminder	Proin at turpis a pede posuere nonummy. Integer non velit.
3	Reminder	Vestibulum sed magna at nunc commodo placerat. Praesent blandit.
4	Alert	In sagittis dui vel nisl.
5	Reminder	Quisque id justo sit amet sapien dignissim vestibulum. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Nulla dapibus dolor vel est.
6	Reminder	Mauris lacinia sapien quis libero. Nullam sit amet turpis elementum ligula vehicula consequat.
7	Alert	Donec semper sapien a libero. Nam dui.
8	Alert	Morbi non quam nec dui luctus rutrum.
9	Reminder	Suspendisse potenti.

10	Reminder	Nulla facilisi. Cras non velit nec nisi vulputate nonummy.
11	Alert	Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus.
12	Reminder	Mauris sit amet eros. Suspendisse accumsan tortor quis turpis.
13	Reminder	Morbi quis tortor id nulla ultrices aliquet.
14	Alert	Proin at turpis a pede posuere nonummy.
15	Alert	Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Donec pharetra, magna vestibulum aliquet ultrices, erat tortor sollicitudin mi, sit amet lobortis sapien sapien non mi. Integer ac neque.
16	Alert	Morbi a ipsum.
17	Reminder	Morbi odio odio, elementum eu, interdum eu, tincidunt in, leo. Maecenas pulvinar lobortis est.
18	Reminder	Mauris enim leo, rhoncus sed, vestibulum sit amet, cursus id, turpis.
19	Reminder	In hac habitasse platea dictumst.
20	Alert	Integer ac leo.

MessageStatuses

message_status_id	status_name	status_description
1	Failed	Aliquam augue quam, sollicitudin vitae, consectetuer eget, rutrum at, lorem. Integer tincidunt ante vel ipsum. Praesent blandit lacinia erat.
2	Failed	Nunc rhoncus dui vel sem.
3	Sent	Vivamus metus arcu, adipiscing molestie, hendrerit at, vulputate vitae, nisl. Aenean lectus. Pellentesque eget nunc.
4	Read	Nulla facilisi.
5	Failed	Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Proin interdum mauris non

		ligula pellentesque ultrices. Phasellus id sapien in sapien iaculis congue.
6	Sent	Curabitur in libero ut massa volutpat convallis. Morbi odio odio, elementum eu, interdum eu, tincidunt in, leo.
7	Sent	Nunc purus. Phasellus in felis.
8	Read	In tempor, turpis nec euismod scelerisque, quam turpis adipiscing lorem, vitae mattis nibh ligula nec sem. Duis aliquam convallis nunc.
9	Sent	Integer tincidunt ante vel ipsum. Praesent blandit lacinia erat. Vestibulum sed magna at nunc commodo placerat.
10	Read	Donec ut mauris eget massa tempor convallis. Nulla neque libero, convallis eget, eleifend luctus, ultricies eu, nibh. Quisque id justo sit amet sapien dignissim vestibulum.
11	Sent	Fusce consequat.
12	Failed	Curabitur in libero ut massa volutpat convallis. Morbi odio odio, elementum eu, interdum eu, tincidunt in, leo.
13	Read	Aliquam quis turpis eget elit sodales scelerisque. Mauris sit amet eros. Suspendisse accumsan tortor quis turpis.
14	Read	Quisque porta volutpat erat. Quisque erat eros, viverra eget, congue eget, semper rutrum, nulla. Nunc purus.
15	Sent	Quisque id justo sit amet sapien dignissim vestibulum.
16	Failed	Aliquam sit amet diam in magna bibendum imperdiet. Nullam orci pede, venenatis non, sodales sed, tincidunt eu, felis.
17	Failed	Quisque erat eros, viverra eget, congue eget, semper rutrum, nulla. Nunc purus.
18	Sent	Donec ut dolor. Morbi vel lectus in quam fringilla rhoncus.
19	Read	Fusce lacus purus, aliquet at, feugiat non, pretium quis, lectus.
20	Read	Nullam varius.

Notifications

notification_id	message	message_type_id	message_status_id	modified_date
1	Aliquam sit amet diam in magna bibendum imperdiet. Nullam orci pede, venenatis non, sodales sed, tincidunt eu, felis.	1	1	2/28/2024
2	In blandit ultrices enim. Lorem ipsum dolor sit amet, consectetuer adipiscing elit.	2	2	11/23/2023
3	Duis ac nibh. Fusce lacus purus, aliquet at, feugiat non, pretium quis, lectus. Suspendisse potenti.	3	3	3/24/2024
4	Vestibulum sed magna at nunc commodo placerat. Praesent blandit. Nam nulla.	4	4	2/29/2024
5	Nulla tellus.	5	5	4/16/2024
6	In hac habitasse platea dictumst. Morbi vestibulum, velit id pretium iaculis, diam erat fermentum justo, nec condimentum neque sapien placerat ante. Nulla justo.	6	6	9/16/2024
7	Sed sagittis.	7	7	2/1/2024
8	In tempor, turpis nec euismod scelerisque, quam turpis adipiscing lorem, vitae mattis nibh ligula nec sem. Duis aliquam convallis nunc. Proin at turpis a pede posuere nonummy.	8	8	10/4/2024
9	Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Donec pharetra, magna	9	9	9/13/2024

	vestibulum aliquet ultrices, erat tortor sollicitudin mi, sit amet lobortis sapien sapien non mi. Integer ac neque.			
10	Nulla neque libero, convallis eget, eleifend luctus, ultricies eu, nibh.	10	10	7/9/2024
11	Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Donec pharetra, magna vestibulum aliquet ultrices, erat tortor sollicitudin mi, sit amet lobortis sapien sapien non mi. Integer ac neque. Duis bibendum.	11	11	3/10/2024
12	Nulla suscipit ligula in lacus.	12	12	6/11/2024
13	Nunc purus. Phasellus in felis.	13	13	1/4/2024
14	Vestibulum ac est lacinia nisi venenatis tristique. Fusce congue, diam id ornare imperdiet, sapien urna pretium nisl, ut volutpat sapien arcu sed augue. Aliquam erat volutpat.	14	14	8/22/2024
15	Nulla ac enim. In tempor, turpis nec euismod scelerisque, quam turpis adipiscing lorem, vitae mattis nibh ligula nec sem.	15	15	5/23/2024
16	Vestibulum quam sapien, varius ut, blandit non, interdum in, ante.	16	16	5/11/2024
17	Duis aliquam convallis nunc.	17	17	2/7/2024
18	Cras mi pede, malesuada in, imperdiet et, commodo vulputate, justo.	18	18	4/1/2024

19	Donec semper sapien a libero.	19	19	3/12/2024
20	Duis consequat dui nec nisi volutpat eleifend.	20	20	3/23/2024

Contacts

contact_id	first_name	last_name	email	phone_number
1	Howey	Cossans	hcossans0@zimbio.com	`+30-384-403-3508`
2	Khang	PhungGia	efeatherbie1@usnews.com	`+57-222-758-1608`
3	Lelia	Berndtssen	lberndtssen2@tuttocitta.it	`+58-791-167-8889`
4	Blinni	Syer	bsyer3@guardian.co.uk	`+1-801-819-6887`
5	Wolfy	Brodie	wbrodie4@sphinn.com	`+39-807-228-9610`
6	Templeton	Karys	tkarys5@sitemeter.com	`+7-613-325-0636`
7	Mathe	Moggan	mmoggan6@dagondesign.com	`+63-415-723-8071`
8	Tait	Lomaz	tlomaz7@thetimes.co.uk	`+86-804-374-2887`
9	Merrill	Berkeley	mberkeley8@usa.gov	`+420-848-443-7772`
10	Winfield	Duffy	wduffy9@fc2.com	`+62-729-887-5449`
11	Gillie	Luckey	gluckeya@auda.org.au	`+81-109-765-2437`
12	Christie	Louis	clouisb@cdbaby.com	`+92-998-609-4968`
13	Desdemona	Valenti	dvalentic@naver.com	`+970-831-776-0399`
14	Aurea	Broadbury	abroadburyd@chron.com	`+880-619-647-0001`
15	Audy	Braniff	abraniffe@123-reg.co.uk	`+506-765-306-4870`
16	Clayborne	Boreland	cborelandf@fc2.com	`+86-173-418-8263`
17	Aloysius	McKnish	amcknishg@w3.org	`+504-252-620-7971`
18	Denice	Moline	dmolineh@businessinsider.com	`+86-623-389-2138`
19	Eldin	Rymer	erymeri@amazon.de	`+263-748-299-1269`
20	Nester	Anstee	nansteej@noaa.gov	`+46-888-558-1566`

UserTypes

usertype_id	user_role	user_role_description
1	Admin	Donec odio justo, sollicitudin ut, suscipit a, feugiat et, eros.
2	Admin	Morbi ut odio.
3	Admin	Donec posuere metus vitae ipsum.
4	Customer	Donec ut mauris eget massa tempor convallis.
5	Admin	Donec posuere metus vitae ipsum.
6	Customer	Nam congue, risus semper porta volutpat, quam pede lobortis ligula, sit amet eleifend pede libero quis orci. Nullam molestie nibh in lectus.
7	Customer	Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Donec pharetra, magna vestibulum aliquet ultrices, erat tortor sollicitudin mi, sit amet lobortis sapien sapien non mi. Integer ac neque.
8	Admin	Cras non velit nec nisi vulputate nonummy.
9	Customer	Aliquam augue quam, sollicitudin vitae, consectetuer eget, rutrum at, lorem. Integer tincidunt ante vel ipsum.
10	Customer	Curabitur gravida nisi at nibh.
11	Admin	Maecenas ut massa quis augue luctus tincidunt. Nulla mollis molestie lorem.
12	Customer	Morbi quis tortor id nulla ultrices aliquet.
13	Customer	Morbi ut odio.
14	Customer	Integer aliquet, massa id lobortis convallis, tortor risus dapibus augue, vel accumsan tellus nisi eu orci.
15	Admin	Vivamus tortor. Duis mattis egestas metus.
16	Admin	Proin interdum mauris non ligula pellentesque ultrices. Phasellus id sapien in sapien iaculis congue.
17	Customer	Fusce consequat. Nulla nisl.

18	Admin	Mauris lacinia sapien quis libero. Nullam sit amet turpis elementum ligula vehicula consequat.
19	Customer	Nam nulla.
20	Admin	Duis aliquam convallis nunc.

Users

user_id	contact_id	usertype_id	username	password	last_login
1	1	1	msanton0	jX9(D51/dp<ir%	`2024-03-30 02:31:29`
2	2	2	svermer1	eS2+'%q5GK485K1	`2007-06-11 18:39:08`
3	3	3	bbowditch2	aL5&'|Fj	`2004-12-31 21:10:15`
4	4	4	cgurrado3	tI2$im&<q)v	`2015-03-29 15:11:59`
5	5	5	mlaible4	fD9#NclY0<q'kAX	`2005-10-07 09:03:48`
6	6	6	hbalbeck5	qS1&}rO%G	`2005-11-18 21:30:59`
7	7	7	mmacadam6	rR0'X+E{)2	`2002-06-16 17:51:48`
8	8	8	aglitherow7	wI4!C4r_MT	`2020-10-11 06:28:05`
9	9	9	lgossage8	nR8}*5b}V4HM!M	`2009-09-14 06:00:28`
10	10	10	dcaston9	cE7.xprg.,W	`2015-11-27 15:06:54`
11	11	11	pradbanda	lR0MOaj*a&	`2018-04-25 11:09:12`
12	12	12	sedgerb	sI6'.#)k@*!ZAV<	`2018-12-06 04:33:50`
13	13	13	ccossansc	jH5+xa#~`DQPHHEU	`2017-01-17 16:11:34`
14	14	14	eholdworthd	oK7/W.bO	`2015-06-07 19:32:45`
15	15	15	cgumeye	jR9@gy7LQ1oit@|	`2022-10-24 09:15:38`
16	16	16	melsief	hW5(~Wy%poWi6S	`2022-05-04 14:34:24`

17	17	17	kevertg	pF4RIXYUH	`2019-01-09 12:48:58`
18	18	18	emaiseyh	zY0<bh*8@4$,	`2015-01-24 08:04:13`
19	19	19	fribyi	qU6#A>k`wvhqB_2	`2009-08-25 06:53:06`
20	20	20	dstogillj	lU9)/ZB0mJ	`2021-04-24 21:41:02`

Employees

employee_id	user_id	job_title	date_of_birth	hire_date
1	1	Analyst Programmer	3/11/1983	11/15/2018
2	2	Sales Associate	1/11/1990	12/22/2000
3	3	Legal Assistant	1/4/1976	8/6/2008
4	4	Financial Advisor	9/14/1974	5/8/2007
5	5	Senior Quality Engineer	8/19/1988	7/5/2003
6	6	Sales Associate	12/8/1981	11/13/2009
7	7	Sales Associate	1/20/1971	6/15/2003
8	8	Budget/Accounting Analyst II	9/21/1977	3/5/2006
9	9	Health Coach IV	3/29/1988	8/10/2006
10	10	Payment Adjustment Coordinator	1/14/1983	11/28/2012
11	11	Biostatistician I	11/3/1976	6/7/2003
12	12	Occupational Therapist	6/1/1990	3/12/2003
13	13	Account Representative I	9/18/1973	4/11/2006
14	14	Food Chemist	11/4/1972	5/26/2010
15	15	Assistant Professor	1/30/1983	10/1/2019
16	16	Account Representative I	1/23/1975	1/2/2020
17	17	VP Quality Control	5/6/1974	12/16/2012

18	18	Physical Therapy Assistant	10/30/1976	10/29/2009
19	19	Chemical Engineer	2/2/1981	2/13/2011
20	20	VP Product Management	11/11/1978	1/28/2023

CustomerTypes

customer_type_id	type_name	type_description
1	Vip	Maecenas leo odio, condimentum id, luctus nec, molestie sed, justo. Pellentesque viverra pede ac diam.
2	Regular	Praesent blandit lacinia erat.
3	Vip	Curabitur in libero ut massa volutpat convallis.
4	Vip	Ut tellus. Nulla ut erat id mauris vulputate elementum.
5	Regular	Nulla tellus. In sagittis dui vel nisl.
6	Regular	Nunc rhoncus dui vel sem. Sed sagittis.
7	Vip+	Maecenas ut massa quis augue luctus tincidunt.
8	Regular	Curabitur gravida nisi at nibh. In hac habitasse platea dictumst.
9	Regular	Aliquam non mauris. Morbi non lectus.
10	Vip	Curabitur at ipsum ac tellus semper interdum.
11	Vip	Nunc nisl.
12	Vip	Mauris sit amet eros.
13	Vip+	Vestibulum ac est lacinia nisi venenatis tristique.
14	Vip	Duis mattis egestas metus.
15	Vip+	Nullam orci pede, venenatis non, sodales sed, tincidunt eu, felis.
16	Vip	Donec ut dolor. Morbi vel lectus in quam fringilla rhoncus.
17	Regular	Vivamus in felis eu sapien cursus vestibulum.

18	Vip+	Nulla justo. Aliquam quis turpis eget elit sodales scelerisque.
19	Vip+	Proin risus. Praesent lectus.
20	Regular	Integer ac leo. Pellentesque ultrices mattis odio.

Customers

customer_id	customer_type_id	user_id	notification_id
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9
10	10	10	10
11	11	11	11
12	12	12	12
13	13	13	13
14	14	14	14
15	15	15	15
16	16	16	16
17	17	17	17
18	18	18	18
19	19	19	19
20	20	20	20

WarehouseStaffPerformances

staff_performance_id	evaluation_date	rating	comments
1	6/23/2008	1	Fusce consequat.
2	2/8/2000	4	Integer non velit.
3	3/2/2007	4	Nunc rhoncus dui vel sem. Sed sagittis.
4	5/24/2002	3	Aliquam non mauris.
5	5/3/2007	5	Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Proin interdum mauris non ligula pellentesque ultrices.
6	7/23/2001	2	Duis consequat dui nec nisi volutpat eleifend.
7	1/21/2017	5	Proin at turpis a pede posuere nonummy.
8	7/1/2018	3	In blandit ultrices enim.
9	7/22/2019	3	Donec dapibus.
10	8/20/1998	1	Nullam orci pede, venenatis non, sodales sed, tincidunt eu, felis.
11	7/13/1998	5	Phasellus in felis. Donec semper sapien a libero.
12	8/29/2003	2	Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Nulla dapibus dolor vel est.
13	2/4/2012	1	Nulla ac enim.
14	7/1/2019	5	Nullam porttitor lacus at turpis.
15	12/5/2007	2	Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Duis faucibus accumsan odio. Curabitur convallis.
16	5/6/2023	3	Integer a nibh. In quis justo.
17	5/26/2017	4	Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Nulla dapibus dolor vel est.
18	6/9/2013	4	Phasellus sit amet erat. Nulla tempus.
19	3/6/2000	5	Nam tristique tortor eu pede.

20	1/13/2009	5	Sed accumsan felis.

WarehouseStaffs

warehouse_staff_id	contact_id	staff_performance_id	hire_date	is_active
1	1	1	3/20/1993	Yes
2	2	2	12/21/2013	No
3	3	3	1/11/1999	Yes
4	4	4	7/18/2001	No
5	5	5	6/25/2005	No
6	6	6	8/20/2020	No
7	7	7	5/27/2008	Yes
8	8	8	5/11/2017	No
9	9	9	5/3/2000	No
10	10	10	9/19/1991	No
11	11	11	8/22/1992	Yes
12	12	12	7/14/2019	Yes
13	13	13	11/27/2006	Yes
14	14	14	3/29/1992	Yes
15	15	15	6/7/2001	Yes
16	16	16	9/4/2006	Yes
17	17	17	10/12/2016	No
18	18	18	9/25/2010	No
19	19	19	5/10/2001	No
20	20	20	11/21/2010	Yes

WarehouseAddresses

warehouse_address_id	street	city	state	postal_code	country
1	Red Cloud	Lat Lum Kaeo	mmcdade0@flickr.com	12140	Thailand

2	Dahle	Bang Na	vgrix1@fotki.com	10260	Thailand
3	Carberry	Xiang Ngeun	yrainford2@cbc.ca	25230	Laos
4	Claremont	ChÆ° SÃª	pvaux3@epa.gov	14890	Vietnam
5	Pond	Long ThÃ nh	fnealey4@zdnet.com	70000	Vietnam
6	Park Meadow	Kampong Speu	hcapini5@is.gd	98410	Cambodia
7	Texas	Pong	qzamora6@de.vu	56140	Thailand
8	Coolidge	Udon Thani	lgaskell7@patch.com	24000	Thailand
9	Bashford	Si Satchanalai	zmartignoni8@reference.com	64130	Thailand
10	Coleman	Uthai Thani	calstead9@360.cn	26000	Thailand
11	Gina	Thá»‹ Trấn Bắc HÃ	rboowa@facebook.com	49465	Vietnam
12	Donald	Si Prachan	rsemmensb@abc.net.au	72140	Thailand
13	Ridge Oak	Ban Talat Bueng	rbickerdickec@imgur.com	20170	Thailand
14	Brentwood	Nong Don	lwhinneyd@princeton.edu	50320	Thailand
15	Transport	Phu Luang	broizne@mapquest.com	42230	Thailand
16	Alpine	Sathing Phra	ajoddinsf@mediafire.com	44150	Thailand
17	Green Ridge	Thá»‹ Trấn HÃ¹ng Quá»‘c	dgaytorg@amazon.de	18414	Vietnam
18	Dayton	Thá»›i BÃ¬nh	evoletth@ehow.com	15915	Vietnam
19	Sundown	HÃ²a BÃ¬nh	jbartolijni@forbes.com	15684	Vietnam
20	Holmberg	Nam Som	tmilellaj@mashable.com	41210	Thailand

WarehouseRegions

warehouse_region_id	region_name	country
1	East	Thailand

2	East	Thailand
3	North	Thailand
4	West	Thailand
5	East	Vietnam
6	East	Vietnam
7	East	Vietnam
8	South	Thailand
9	South	Thailand
10	South	Thailand
11	North	Thailand
12	West	Thailand
13	West	Vietnam
14	East	Thailand
15	North	Thailand
16	West	Vietnam
17	East	Thailand
18	South	Myanmar
19	West	Thailand
20	South	Thailand

WarehouseStatuses

warehouse_status_id	status_name	status_description
1	Closed	Cras in purus eu magna vulputate luctus.
2	Closed	Vivamus vestibulum sagittis sapien.
3	Active	Nullam sit amet turpis elementum ligula vehicula consequat.
4	Active	Nam tristique tortor eu pede.
5	Closed	Nulla facilisi.
6	Active	Vivamus in felis eu sapien cursus vestibulum.
7	Active	Duis bibendum, felis sed interdum venenatis, turpis enim blandit mi, in porttitor pede justo eu massa. Donec dapibus.

8	Closed	Ut tellus. Nulla ut erat id mauris vulputate elementum.
9	Active	Integer tincidunt ante vel ipsum. Praesent blandit lacinia erat.
10	Closed	Nam ultrices, libero non mattis pulvinar, nulla pede ullamcorper augue, a suscipit nulla elit ac nulla. Sed vel enim sit amet nunc viverra dapibus.
11	Closed	Quisque erat eros, viverra eget, congue eget, semper rutrum, nulla.
12	Active	Donec ut dolor.
13	Active	Integer ac neque.
14	Closed	Maecenas ut massa quis augue luctus tincidunt. Nulla mollis molestie lorem.
15	Closed	Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus.
16	Active	Nam congue, risus semper porta volutpat, quam pede lobortis ligula, sit amet eleifend pede libero quis orci. Nullam molestie nibh in lectus.
17	Closed	Sed ante. Vivamus tortor.
18	Closed	Nunc nisl. Duis bibendum, felis sed interdum venenatis, turpis enim blandit mi, in porttitor pede justo eu massa.
19	Closed	Nulla tempus. Vivamus in felis eu sapien cursus vestibulum.
20	Active	Nunc purus.

Warehouses

warehouse_id	warehouse_name	warehouse_capacity	warehouse_staff_id	warehouse_address_id	warehouse_region_id	warehouse_status_id
1	Johnston and Sons	3255	1	1	1	1
2	Marquardt, McCullough and Fay	4348	2	2	2	2

3	Stehr, Koch and Shanahan	4080	3	3	3	3
4	Nolan Inc	4438	4	4	4	4
5	Ziemann-Cremin	3919	5	5	5	5
6	Bergnaum LLC	4162	6	6	6	6
7	Jacobs Inc	3759	7	7	7	7
8	Ratke, Bergstrom and Howe	4891	8	8	8	8
9	Harris, Welch and Rempel	4809	9	9	9	9
10	Cummerata-Paucek	4803	10	10	10	10
11	Nader, Medhurst and Harber	3005	11	11	11	11
12	Wilkinson Group	3796	12	12	12	12
13	Beier-Jerde	4446	13	13	13	13
14	Ortiz-Brakus	4957	14	14	14	14
15	Kihn-Stracke	4977	15	15	15	15
16	Hayes-Auer	4862	16	16	16	16
17	Blanda-O'Reilly	3190	17	17	17	17
18	Ullrich Inc	4520	18	18	18	18
19	Ankunding, Jast and Ferry	3982	19	19	19	19
20	Abshire-Beatty	4212	20	20	20	20

SupplierTypes

supplier_type_id	type_name	type_description
1	Manufacturer	Nam ultrices, libero non mattis pulvinar, nulla pede ullamcorper augue, a suscipit nulla elit ac nulla. Sed vel enim sit amet nunc viverra dapibus.
2	Manufacturer	Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus.
3	Manufacturer	Vivamus in felis eu sapien cursus vestibulum. Proin eu mi.

4	Distributor	In quis justo. Maecenas rhoncus aliquam lacus.
5	Manufacturer	Curabitur in libero ut massa volutpat convallis.
6	Manufacturer	In hac habitasse platea dictumst.
7	Manufacturer	Nam dui.
8	Distributor	Vivamus vel nulla eget eros elementum pellentesque. Quisque porta volutpat erat.
9	Distributor	Phasellus in felis. Donec semper sapien a libero.
10	Manufacturer	Suspendisse potenti. In eleifend quam a odio.
11	Manufacturer	Nulla suscipit ligula in lacus. Curabitur at ipsum ac tellus semper interdum.
12	Distributor	Vestibulum rutrum rutrum neque. Aenean auctor gravida sem.
13	Manufacturer	In hac habitasse platea dictumst. Etiam faucibus cursus urna.
14	Distributor	Duis consequat dui nec nisi volutpat eleifend. Donec ut dolor.
15	Manufacturer	Duis bibendum, felis sed interdum venenatis, turpis enim blandit mi, in porttitor pede justo eu massa. Donec dapibus.
16	Distributor	Praesent lectus.
17	Manufacturer	Sed ante.
18	Manufacturer	Morbi sem mauris, laoreet ut, rhoncus aliquet, pulvinar sed, nisl.
19	Distributor	Aliquam augue quam, sollicitudin vitae, consectetuer eget, rutrum at, lorem.
20	Manufacturer	Donec posuere metus vitae ipsum. Aliquam non mauris.

Suppliers

supplier_id	supplier_type_id	contact_id	rating
1	1	1	1
2	2	2	4

3	3	3	5
4	4	4	5
5	5	5	4
6	6	6	2
7	7	7	3
8	8	8	2
9	9	9	5
10	10	10	3
11	11	11	2
12	12	12	2
13	13	13	5
14	14	14	1
15	15	15	4
16	16	16	4
17	17	17	4
18	18	18	1
19	19	19	2
20	20	20	5

Inventories

inventory_id	product_name	product_description	quantity	unit_price	total_value	reorder_level	supplier_id	warehouse_id
1	Ecolab - Ster Bac	Supplement Left Lacrimal Bone with Synth Sub, Open Approach	209	157	32925	Low	1	1
2	English Muffin	Vestibular Treatment using Vestibular / Balance Equipment	731	217	45838	Low	2	1

3	Cheese - Taleggio D.o.p.	Reposition Lumbar Spinal Cord, Perc Endo Approach	884	65	20076	Medium	3	1
4	Broom - Push	Bypass L Com Iliac Art to R Int Ilia w Autol Art, Perc Endo	954	46	43387	Low	4	1
5	Milkettes - 2%	Destruction of Cul-de-sac, Percutaneous Approach	879	434	46785	Low	5	3
6	Wine - Riesling Dr. Pauly	Replacement of R Hand Art with Autol Sub, Perc Endo Approach	424	151	34228	Low	6	3
7	Mushroom - Morels, Dry	Exercise Trmt Integu Up Back/UE w Electrotherap Equip	310	140	45057	Medium	7	3
8	Remy Red	Repair Bilateral Inguinal Region, Perc Endo Approach	393	369	45466	Medium	8	3
9	White Baguette	Inspection of Liver, External Approach	630	372	20869	Medium	9	5
10	Tamarind Paste	Release Duodenum, Percutaneous Approach	552	229	47774	Medium	10	5
11	Wine - Red, Gamay Noir	Release Right Hepatic Duct, Percutaneous Approach	369	238	26151	High	11	5

12	Puree - Passion Fruit	Supplement L Brach Art with Nonaut Sub, Open Approach	203	341	20659	Low	12	5
13	Uniform Linen Charge	Supplement Vulva with Synthetic Substitute, Open Approach	423	242	28326	Low	13	7
14	Sauce - Bernaise, Mix	Bypass Left Ureter to Right Ureter, Perc Endo Approach	464	498	32225	High	14	7
15	Vinegar - Tarragon	Insert Limb Length Dev in R Femur Shaft, Perc Endo	780	76	43092	High	15	7
16	Brownies - Two Bite, Chocolate	Destruction of Colic Vein, Percutaneous Endoscopic Approach	730	166	27081	High	16	7
17	External Supplier	Plain Radiography of L Low Extrem Art using Oth Contrast	737	48	24790	Medium	17	9
18	Jameson - Irish Whiskey	Occlusion Low Esophag w Intralum Dev, Perc Endo	450	136	41740	Low	18	9
19	Hipnotiq Liquor	Reposition Left Lacrimal Bone, Perc Endo Approach	372	340	24129	High	19	9

20	Soap - Mr.clean Floor Soap	Drainage of Cervicothoracic Vertebral Joint, Open Approach	897	261	39717	Low	20	9

InventoryTransactions

status_id	status_name	status_description
1	In Maintenance	Phasellus sit amet erat. Nulla tempus.
2	In Maintenance	Duis aliquam convallis nunc. Proin at turpis a pede posuere nonummy.
3	Available	Integer tincidunt ante vel ipsum. Praesent blandit lacinia erat.
4	Available	Donec dapibus. Duis at velit eu est congue elementum.
5	Available	Vivamus vel nulla eget eros elementum pellentesque.
6	In Maintenance	Nam nulla.
7	Available	Fusce posuere felis sed lacus.
8	In Maintenance	Maecenas ut massa quis augue luctus tincidunt.
9	Available	Cras in purus eu magna vulputate luctus.
10	Available	Vivamus vel nulla eget eros elementum pellentesque. Quisque porta volutpat erat.
11	Available	Maecenas tristique, est et tempus semper, est quam pharetra magna, ac consequat metus sapien ut nunc.
12	In Maintenance	Quisque arcu libero, rutrum ac, lobortis vel, dapibus at, diam. Nam tristique tortor eu pede.
13	Available	Phasellus id sapien in sapien iaculis congue. Vivamus metus arcu, adipiscing molestie, hendrerit at, vulputate vitae, nisl.
14	In Maintenance	Nulla ac enim.
15	Available	Integer a nibh.
16	In Maintenance	Morbi quis tortor id nulla ultrices aliquet. Maecenas leo odio, condimentum id, luctus nec, molestie sed, justo.
17	Available	Ut tellus. Nulla ut erat id mauris vulputate elementum.
18	In Maintenance	Donec semper sapien a libero. Nam dui.

19	In Maintenance	Nam tristique tortor eu pede.
20	Available	Proin interdum mauris non ligula pellentesque ultrices.

VehicleStatuses

status_id	status_name	status_description
1	In Maintenance	Phasellus sit amet erat. Nulla tempus.
2	In Maintenance	Duis aliquam convallis nunc. Proin at turpis a pede posuere nonummy.
3	Available	Integer tincidunt ante vel ipsum. Praesent blandit lacinia erat.
4	Available	Donec dapibus. Duis at velit eu est congue elementum.
5	Available	Vivamus vel nulla eget eros elementum pellentesque.
6	In Maintenance	Nam nulla.
7	Available	Fusce posuere felis sed lacus.
8	In Maintenance	Maecenas ut massa quis augue luctus tincidunt.
9	Available	Cras in purus eu magna vulputate luctus.
10	Available	Vivamus vel nulla eget eros elementum pellentesque. Quisque porta volutpat erat.
11	Available	Maecenas tristique, est et tempus semper, est quam pharetra magna, ac consequat metus sapien ut nunc.
12	In Maintenance	Quisque arcu libero, rutrum ac, lobortis vel, dapibus at, diam. Nam tristique tortor eu pede.
13	Available	Phasellus id sapien in sapien iaculis congue. Vivamus metus arcu, adipiscing molestie, hendrerit at, vulputate vitae, nisl.
14	In Maintenance	Nulla ac enim.
15	Available	Integer a nibh.
16	In Maintenance	Morbi quis tortor id nulla ultrices aliquet. Maecenas leo odio, condimentum id, luctus nec, molestie sed, justo.

17	Available	Ut tellus. Nulla ut erat id mauris vulputate elementum.
18	In Maintenance	Donec semper sapien a libero. Nam dui.
19	In Maintenance	Nam tristique tortor eu pede.
20	Available	Proin interdum mauris non ligula pellentesque ultrices.

VehicleTypes

vehicle_type_id	type_name	type_description
1	Containeer	In hac habitasse platea dictumst. Maecenas ut massa quis augue luctus tincidunt.
2	Van	Pellentesque at nulla. Suspendisse potenti.
3	Truck	Proin at turpis a pede posuere nonummy. Integer non velit.
4	Truck	Aenean auctor gravida sem. Praesent id massa id nisl venenatis lacinia.
5	Containeer	Vivamus tortor.
6	Van	Pellentesque at nulla.
7	Van	Aenean lectus.
8	Truck	Integer ac neque. Duis bibendum.
9	Truck	Nulla ac enim.
10	Truck	Maecenas tristique, est et tempus semper, est quam pharetra magna, ac consequat metus sapien ut nunc. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Mauris viverra diam vitae quam.
11	Van	Pellentesque ultrices mattis odio. Donec vitae nisi.
12	Truck	Vivamus vestibulum sagittis sapien.
13	Van	Duis mattis egestas metus. Aenean fermentum.
14	Truck	Praesent blandit. Nam nulla.
15	Truck	In hac habitasse platea dictumst.
16	Van	Nullam varius.

17	Containeer	Nulla nisl. Nunc nisl.
18	Van	Vestibulum ac est lacinia nisi venenatis tristique. Fusce congue, diam id ornare imperdiet, sapien urna pretium nisl, ut volutpat sapien arcu sed augue.
19	Truck	Maecenas tincidunt lacus at velit. Vivamus vel nulla eget eros elementum pellentesque.
20	Containeer	Integer a nibh. In quis justo.

Vehicles

vehicle_id	vehicle_type_id	vehicle_status_id	year_of_manufacture	color	model	capacity
1	1	1	8/14/2009	Puce	850	455
2	2	2	5/15/2010	Fuscia	Vandura 1500	416
3	3	3	9/15/1996	Orange	XK Series	420
4	4	4	3/9/1997	Turquoise	Altima	383
5	5	5	4/1/2018	Purple	Blazer	358
6	6	6	12/31/2009	Crimson	Supra	474
7	7	7	11/11/2016	Crimson	Integra	373
8	8	8	8/27/1999	Aquamarine	Precis	377
9	9	9	7/20/2002	Pink	Aerio	337
10	10	10	10/18/2021	Blue	SC	461
11	11	11	2/6/2000	Mauv	Eurovan	421
12	12	12	6/20/2013	Aquamarine	Ram 2500 Club	384
13	13	13	6/6/1992	Aquamarine	V8 Vantage S	384
14	14	14	6/9/2000	Mauv	C8 Spyder	461
15	15	15	4/24/2017	Orange	Lancer Evolution	498
16	16	16	5/9/1996	Pink	Caravan	471
17	17	17	11/28/2013	Red	XT	472
18	18	18	4/21/2022	Green	GTO	436
19	19	19	5/26/2021	Khaki	MDX	312
20	20	20	5/17/2006	Green	E350	437

LicensePlates

license_plate_id	vehicle_id	license_plate_num	issued_date	issued_at
1	1	91-779-1921	8/31/1994	Killdeer
2	2	60-038-3413	9/2/2017	Forest
3	3	31-297-0274	1/21/2018	Eastlawn
4	4	79-186-6539	3/23/1999	Anthes
5	5	68-282-4322	1/15/2013	Mendota
6	6	67-024-1848	12/15/2012	Ilene
7	7	93-365-6540	11/6/2011	Gale
8	8	84-674-2499	6/30/2017	Magdeline
9	9	81-530-9821	7/3/2003	Dawn
10	10	89-660-8160	3/19/2005	Village
11	11	74-455-3570	4/22/2007	Forest
12	12	80-877-6621	10/24/2002	Walton
13	13	26-906-7746	9/10/2016	Service
14	14	50-562-6118	6/30/2004	Vidon
15	15	86-461-4720	4/6/2020	NewCastle
16	16	33-431-2943	9/18/2012	Carpenter
17	17	42-405-8632	12/13/2010	Corscot
18	18	02-658-8131	5/5/2011	Dovetail
19	19	16-294-2068	5/9/2004	Duke
20	20	59-292-1004	7/14/1994	Prairieview

Carriers

carrier_id	contact_id	vehicle_id	carrier_address
1	1	1	878 Stoughton Point
2	2	2	832 Cambridge Drive
3	3	3	0986 Algoma Court
4	4	4	668 Eagle Crest Avenue

5	5	5	859 Shasta Circle
6	6	6	1113 Reinke Place
7	7	7	88631 Springview Drive
8	8	8	91 South Terrace
9	9	9	83 Forest Run Place
10	10	10	045 Ludington Road
11	11	11	183 Stuart Pass
12	12	12	0681 Mitchell Place
13	13	13	314 Prairieview Circle
14	14	14	9419 Lindbergh Avenue
15	15	15	36169 Graceland Point
16	16	16	3 Kim Point
17	17	17	13 Center Drive
18	18	18	6 Corscot Hill
19	19	19	2137 Raven Circle
20	20	20	79782 Cordelia Terrace

TrafficConditions

traffic_condition_id	condition_description	severity_level	reported_at
1	Heavy traffic	Bad	1/1/2003
2	Heavy traffic	Bad	4/23/2002
3	Heavy traffic	Good	6/22/2020
4	Heavy traffic	Good	2/26/2011
5	Heavy traffic	Good	4/25/2020
6	Clear roads	Good	3/5/2023
7	Heavy traffic	Good	5/5/2005
8	Clear roads	Good	9/3/2003
9	Clear roads	Bad	8/1/2016
10	Heavy traffic	Good	6/22/2016
11	Clear roads	Good	2/15/2018
12	Clear roads	Bad	2/3/2004

13	Heavy traffic	Bad	2/29/2004
14	Clear roads	Bad	12/18/2008
15	Heavy traffic	Good	10/6/2019
16	Heavy traffic	Good	2/7/2016
17	Heavy traffic	Bad	8/20/2023
18	Clear roads	Bad	9/4/2018
19	Heavy traffic	Bad	7/22/2018
20	Heavy traffic	Good	4/3/2014

WeatherConditions

weather_condition_id	condition_description	temperature	humidity	wind_speed	reported_at
1	Clear sky	38	11	290	11/14/2010
2	Clear sky	14	34	142	1/8/2008
3	Rainy	13	32	269	1/24/2010
4	Clear sky	5	99	263	1/9/2011
5	Clear sky	13	2	224	10/5/2007
6	Clear sky	39	68	123	2/20/2012
7	Rainy	17	15	260	8/26/2021
8	Rainy	37	86	15	2/17/2004
9	Clear sky	15	51	224	2/3/2020
10	Rainy	36	13	68	2/23/2024
11	Clear sky	37	57	199	6/14/2021
12	Clear sky	22	79	200	3/19/2003
13	Rainy	29	61	35	11/29/2002
14	Rainy	38	54	139	8/8/2008
15	Clear sky	27	18	140	10/27/2018
16	Rainy	14	77	285	7/18/2024
17	Clear sky	27	71	22	11/11/2004
18	Rainy	9	33	143	5/31/2020
19	Rainy	5	22	290	3/11/2022

20	Clear sky	19	37	182	3/26/2001

Routes

route_id	route_name	start_location	end_location	distance	estimated_time	route_status	traffic_condition_id	weather_condition_id	vehicle_id
1	Helena	4 Mitchell Park	21 Truax Pass	65	20:42:00	Inactive	1	1	1
2	Dexter	25 Luster Point	2 Sachs Place	97	17:05:00	Active	2	2	2
3	Anniversary	8980 Blackbird Center	94 Swallow Place	48	17:32:00	Inactive	3	3	3
4	Golden Leaf	56898 Porter Plaza	07706 Fairview Point	84	9:35:00	Inactive	4	4	4
5	Schmedeman	736 Leroy Way	3 Sutherland Avenue	47	3:08:00	Inactive	5	5	5
6	Hagan	17 East Court	3 Lukken Plaza	50	17:45:00	Inactive	6	6	6
7	Declaration	81288 Union Hill	5138 Susan Pass	25	16:43:00	Inactive	7	7	7
8	Nancy	71895 Washington Crossing	8151 Ridgeview Alley	72	4:41:00	Active	8	8	8
9	Annamark	0 Carey Street	2612 Pearson Street	98	22:55:00	Active	9	9	9
10	Melody	7262 Kensington Street	79 Hoard Avenue	95	8:58:00	Active	10	10	10
11	Judy	322 Hanson Way	63948 Swallow Center	74	7:34:00	Active	11	11	11
12	Pankratz	4 Jay Circle	40 Lakeland Parkway	79	1:52:00	Inactive	12	12	12
13	Fulton	1 Eagan Point	8602 Bartelt	60	10:13:00	Inactive	13	13	13

			Court						
14	Monument	59 Killdeer Lane	2 Artisan Avenue	91	1:03:00	Inactive	14	14	14
15	Melody	6 Waxwing Street	81 Farmco Street	69	20:57:00	Active	15	15	15
16	Gateway	3009 Killdeer Junction	115 Moose Street	63	0:07:00	Active	16	16	16
17	Morning	388 Arrowood Way	2163 Sommers Park	91	20:20:00	Active	17	17	17
18	Ilene	09 Pleasure Park	6179 Jenna Pass	83	5:42:00	Inactive	18	18	18
19	Golden Leaf	13670 4th Park	6172 Meadow Ridge Drive	14	13:10:00	Active	19	19	19
20	Raven	0845 Crowley Plaza	654 Kipling Avenue	85	11:06:00	Inactive	20	20	20

DriverStatuses

driver_status_id	status_name	status_description
1	Active	In blandit ultrices enim.
2	Active	Donec ut mauris eget massa tempor convallis. Nulla neque libero, convallis eget, eleifend luctus, ultricies eu, nibh.
3	Active	Vestibulum ac est lacinia nisi venenatis tristique. Fusce congue, diam id ornare imperdiet, sapien urna pretium nisl, ut volutpat sapien arcu sed augue. Aliquam erat volutpat.
4	Active	Morbi non quam nec dui luctus rutrum. Nulla tellus. In sagittis dui vel nisl.
5	On Duty	Nulla tempus.
6	Active	Proin risus.
7	Active	In congue.

8	Active	Donec ut mauris eget massa tempor convallis. Nulla neque libero, convallis eget, eleifend luctus, ultricies eu, nibh.
9	Active	Ut at dolor quis odio consequat varius. Integer ac leo.
10	Active	Morbi ut odio.
11	On Duty	Vestibulum quam sapien, varius ut, blandit non, interdum in, ante. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Duis faucibus accumsan odio.
12	On Duty	Donec semper sapien a libero. Nam dui.
13	On Duty	Etiam pretium iaculis justo.
14	On Duty	Fusce lacus purus, aliquet at, feugiat non, pretium quis, lectus. Suspendisse potenti. In eleifend quam a odio.
15	Active	Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Donec pharetra, magna vestibulum aliquet ultrices, erat tortor sollicitudin mi, sit amet lobortis sapien sapien non mi.
16	Active	Ut at dolor quis odio consequat varius. Integer ac leo. Pellentesque ultrices mattis odio.
17	Active	Morbi vel lectus in quam fringilla rhoncus.
18	On Duty	Integer a nibh. In quis justo. Maecenas rhoncus aliquam lacus.
19	Active	Maecenas tincidunt lacus at velit. Vivamus vel nulla eget eros elementum pellentesque.
20	Active	Donec semper sapien a libero. Nam dui.

Drivers

driver_id	employee_id	warehouse_id	vehicle_id	driver_status_id	driver_license
1	1	1	1	1	2466986418
2	2	2	2	2	1958125148
3	3	3	3	3	5042419055
4	4	4	4	4	8379582209

5	5	5	5	5	9264800689
6	6	6	6	6	6768043447
7	7	7	7	7	7944496934
8	8	8	8	8	2663299642
9	9	9	9	9	8235633213
10	10	10	10	10	3806049297
11	11	11	11	11	8428441340
12	12	12	12	12	7367296981
13	13	13	13	13	221849491
14	14	14	14	14	2300252090
15	15	15	15	15	8388218530
16	16	16	16	16	9007269461
17	17	17	17	17	3879846197
18	18	18	18	18	1720463816
19	19	19	19	19	8579231817
20	20	20	20	20	4738842587

DeliveryAddresses

delivery_address_id	street	city	state	postal_code	country
1	Cherokee	Kyaikto	Thai Binh	73353	Myanmar
2	Lakeland	Ban LÅng	Ho Chi Minh	71685	Cambodia
3	Oneill	Kae Dam	Can Tho	79478	Thailand
4	Badeau	NhÃ BÃ¨	Da Nang	73829	Vietnam
5	Toban	Thá»‹ Trấn Viá»‡t Quang	Thai Binh	70624	Vietnam
6	Jana	Takeo	Ha Noi	78698	Cambodia
7	Dunning	Nong Bua Daeng	Thai Binh	77839	Thailand
8	Clarendon	Yangon	Da Nang	77016	Myanmar
9	Esch	Taunggyi	Tri Ton	71011	Myanmar
10	Pearson	PhÃ´ngsali	Ha Noi	78542	Laos
11	Debra	Pyapon	Ha Noi	72291	Myanmar
12	Myrtle	Tha Ruea	Da Nang	79749	Thailand

13	Vahlen	Thá»‹ Tráº¥n TrÃ¹ng KhÃ¡nh	Ho Chi Minh	70301	Vietnam
14	Hauk	PhÆ°á»›c An	Hue	74633	Vietnam
15	Pennsylvania	Si Thep	Tri Ton	70350	Thailand
16	Jackson	Kabin Buri	Can Tho	77939	Thailand
17	Old Gate	Chá»£ Chu	Thai Binh	70189	Vietnam
18	Artisan	Wang Thonglang	Can Tho	70858	Thailand
19	Northwestern	Phra Pradaeng	Can Tho	71863	Thailand
20	Atwood	Phu Kam Yao	Da Nang	74294	Thailand

OrderStatuses

order_status_id	status_name	status_description
1	Shipped	Duis mattis egestas metus.
2	Shipped	Vivamus metus arcu, adipiscing molestie, hendrerit at, vulputate vitae, nisl. Aenean lectus.
3	Pending	Mauris sit amet eros. Suspendisse accumsan tortor quis turpis.
4	Shipped	Vestibulum ac est lacinia nisi venenatis tristique.
5	Shipped	Nulla tempus. Vivamus in felis eu sapien cursus vestibulum.
6	Shipped	Fusce consequat. Nulla nisl.
7	Pending	Ut at dolor quis odio consequat varius.
8	Shipped	Morbi sem mauris, laoreet ut, rhoncus aliquet, pulvinar sed, nisl. Nunc rhoncus dui vel sem.
9	Shipped	Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Nulla dapibus dolor vel est.
10	Pending	Curabitur gravida nisi at nibh. In hac habitasse platea dictumst.
11	Shipped	Morbi odio odio, elementum eu, interdum eu, tincidunt in, leo.

12	Pending	Mauris lacinia sapien quis libero.
13	Pending	Morbi odio odio, elementum eu, interdum eu, tincidunt in, leo. Maecenas pulvinar lobortis est.
14	Pending	Nam dui.
15	Shipped	Cras in purus eu magna vulputate luctus.
16	Shipped	Pellentesque viverra pede ac diam.
17	Shipped	Cras non velit nec nisi vulputate nonummy. Maecenas tincidunt lacus at velit.
18	Pending	Suspendisse accumsan tortor quis turpis.
19	Pending	Aliquam quis turpis eget elit sodales scelerisque.
20	Shipped	Donec diam neque, vestibulum eget, vulputate ut, ultrices vel, augue.

OrderRecords

order_id	customer_id	warehouse_id	delivery_address_id	order_status_id	notification_id	order_date
1	1	1	1	1	1	12/31/2000
2	2	2	2	2	2	11/9/2006
3	3	3	3	3	3	1/28/2015
4	4	4	4	4	4	11/11/2001
5	5	5	5	5	5	4/21/2012
6	6	6	6	6	6	4/26/2003
7	7	7	7	7	7	1/20/2004
8	8	8	8	8	8	5/29/2012
9	9	9	9	9	9	7/5/2016
10	10	10	10	10	10	9/25/2010
11	11	11	11	11	11	9/20/2019
12	12	12	12	12	12	6/27/2012
13	13	13	13	13	13	6/1/2008
14	14	14	14	14	14	6/9/2003
15	15	15	15	15	15	9/30/2017

16	16	16	16	16	16	4/28/2015
17	17	17	17	17	17	11/30/2020
18	18	18	18	18	18	8/19/2011
19	19	19	19	19	19	10/16/2010
20	20	20	20	20	20	5/5/2008

PaymentMethods

payment_method_id	payment_type	payment_description
1	Cash	Cras pellentesque volutpat dui.
2	Credit Card	Morbi porttitor lorem id ligula.
3	Credit Card	In eleifend quam a odio.
4	Cash	Nam nulla. Integer pede justo, lacinia eget, tincidunt eget, tempus vel, pede.
5	Cash	Duis bibendum, felis sed interdum venenatis, turpis enim blandit mi, in porttitor pede justo eu massa. Donec dapibus.
6	Credit Card	Donec quis orci eget orci vehicula condimentum.
7	Cash	Donec semper sapien a libero. Nam dui.
8	Cash	Integer pede justo, lacinia eget, tincidunt eget, tempus vel, pede. Morbi porttitor lorem id ligula.
9	Credit Card	Vivamus vel nulla eget eros elementum pellentesque. Quisque porta volutpat erat.
10	Cash	Praesent lectus. Vestibulum quam sapien, varius ut, blandit non, interdum in, ante.
11	Credit Card	Ut at dolor quis odio consequat varius. Integer ac leo.
12	Cash	Nullam molestie nibh in lectus. Pellentesque at nulla.
13	Cash	Morbi vel lectus in quam fringilla rhoncus.
14	Cash	Vivamus tortor.
15	Credit Card	Nulla ac enim. In tempor, turpis nec euismod scelerisque, quam turpis adipiscing lorem, vitae mattis nibh ligula nec sem.

16	Cash	Pellentesque viverra pede ac diam. Cras pellentesque volutpat dui.
17	Credit Card	Cras in purus eu magna vulputate luctus. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus.
18	Credit Card	Morbi non lectus.
19	Cash	Aenean sit amet justo.
20	Credit Card	Donec posuere metus vitae ipsum.

BillStatuses

bill_status_id	status_name	status_description
1	Pending	In hac habitasse platea dictumst.
2	Pending	Vivamus vel nulla eget eros elementum pellentesque.
3	Paid	Proin at turpis a pede posuere nonummy.
4	Pending	Sed vel enim sit amet nunc viverra dapibus.
5	Pending	Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Proin interdum mauris non ligula pellentesque ultrices.
6	Pending	Praesent lectus. Vestibulum quam sapien, varius ut, blandit non, interdum in, ante.
7	Pending	Lorem ipsum dolor sit amet, consectetuer adipiscing elit.
8	Pending	Nullam orci pede, venenatis non, sodales sed, tincidunt eu, felis. Fusce posuere felis sed lacus.
9	Pending	Proin eu mi. Nulla ac enim.
10	Pending	Sed vel enim sit amet nunc viverra dapibus. Nulla suscipit ligula in lacus.
11	Paid	Aliquam erat volutpat. In congue.
12	Pending	Proin risus. Praesent lectus.
13	Paid	Mauris ullamcorper purus sit amet nulla.
14	Paid	Mauris ullamcorper purus sit amet nulla.

15	Paid	Nulla neque libero, convallis eget, eleifend luctus, ultricies eu, nibh.
16	Pending	Phasellus in felis.
17	Pending	Vivamus vel nulla eget eros elementum pellentesque.
18	Paid	Donec quis orci eget orci vehicula condimentum.
19	Paid	Proin interdum mauris non ligula pellentesque ultrices. Phasellus id sapien in sapien iaculis congue.
20	Pending	Quisque porta volutpat erat. Quisque erat eros, viverra eget, congue eget, semper rutrum, nulla.

Transactions

transaction_id	trans_name	trans_description	trans_type	trans_code	trans_date
1	Payment	Morbi ut odio.	Debit	15-631-5092	3/24/2010
2	Refund	Nullam sit amet turpis elementum ligula vehicula consequat.	Debit	66-894-7125	5/28/2014
3	Payment	Aliquam non mauris.	Debit	72-026-5417	4/11/2008
4	Payment	In congue.	Credit	41-854-9274	2/27/2005
5	Payment	Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus.	Debit	62-456-6433	2/26/2009
6	Payment	Maecenas pulvinar lobortis est. Phasellus sit amet erat.	Credit	69-594-6041	4/26/2021
7	Payment	Sed vel enim sit amet nunc viverra dapibus. Nulla suscipit ligula in lacus.	Credit	81-277-9559	6/5/2013
8	Payment	Donec quis orci eget orci vehicula condimentum.	Credit	50-627-9721	12/17/2016

9	Refund	Nulla ac enim. In tempor, turpis nec euismod scelerisque, quam turpis adipiscing lorem, vitae mattis nibh ligula nec sem.	Debit	28-161-1537	8/8/2024
10	Payment	Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Proin interdum mauris non ligula pellentesque ultrices.	Credit	19-911-9142	5/2/2023
11	Payment	Etiam pretium iaculis justo.	Debit	71-727-2362	2/24/2024
12	Payment	Curabitur convallis. Duis consequat dui nec nisi volutpat eleifend.	Debit	55-431-2013	9/29/2016
13	Refund	Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Duis faucibus accumsan odio.	Credit	47-137-8250	10/17/2013
14	Payment	Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus.	Credit	70-539-7770	9/29/2008
15	Refund	Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Donec pharetra, magna vestibulum aliquet ultrices, erat tortor sollicitudin mi, sit amet lobortis sapien sapien non mi. Integer ac neque.	Credit	00-720-5028	7/1/2024
16	Refund	Fusce lacus purus, aliquet at, feugiat	Debit	98-714-3748	5/20/2011

		non, pretium quis, lectus. Suspendisse potenti.			
17	Refund	Aliquam sit amet diam in magna bibendum imperdiet. Nullam orci pede, venenatis non, sodales sed, tincidunt eu, felis.	Credit	56-572-3302	9/9/2005
18	Payment	In eleifend quam a odio.	Credit	40-025-1172	6/27/2022
19	Payment	Maecenas tristique, est et tempus semper, est quam pharetra magna, ac consequat metus sapien ut nunc. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Mauris viverra diam vitae quam.	Debit	18-105-6847	6/29/2020
20	Payment	Donec odio justo, sollicitudin ut, suscipit a, feugiat et, eros.	Debit	45-924-8384	3/22/2017

Payments

payment_id	customer_id	payment_method_id	order_id	transaction_id	payment_amount	payment_date
1	1	1	1	1	1577.8	11/4/2005
2	2	2	2	2	4630.6	4/7/2013
3	3	3	3	3	2932.9	5/21/2005
4	4	4	4	4	421.9	2/8/2009
5	5	5	5	5	3798.3	5/11/2024
6	6	6	6	6	1567.4	1/22/2015
7	7	7	7	7	4851.6	8/4/2006
8	8	8	8	8	3563.8	3/12/2019

9	9	9	9	9	1901.8	1/11/2009
10	10	10	10	10	4726.8	6/20/2004
11	11	11	11	11	3112.5	9/8/2020
12	12	12	12	12	1193.3	12/21/2022
13	13	13	13	13	2289.9	12/5/2008
14	14	14	14	14	2289.6	6/29/2008
15	15	15	15	15	4395.6	6/23/2006
16	16	16	16	16	1610.3	9/13/2022
17	17	17	17	17	4061.9	8/19/2010
18	18	18	18	18	3594.4	8/5/2011
19	19	19	19	19	1318.5	11/23/2001
20	20	20	20	20	4327.5	12/14/2006

Bills

bill_id	order_id	delivery_address_id	payment_method_id	bill_status_id	total_amount	bill_date	distance
1	1	1	1	1	806.6	1/8/2011	40
2	2	2	2	2	2902.51	4/6/2019	54
3	3	3	3	3	4813.18	12/27/2012	63
4	4	4	4	4	4377.6	7/26/2006	37
5	5	5	5	5	1190.6	3/8/2019	12
6	6	6	6	6	2844.37	5/20/2018	36
7	7	7	7	7	2142.96	10/27/2019	66
8	8	8	8	8	1742.39	9/8/2011	79
9	9	9	9	9	4852.86	4/21/2024	51
10	10	10	10	10	4752.47	4/21/2020	40
11	11	11	11	11	1931.13	7/22/2012	57
12	12	12	12	12	2751.82	7/13/2024	60
13	13	13	13	13	1002.69	3/29/2017	24
14	14	14	14	14	1390.84	6/30/2017	33
15	15	15	15	15	2271.1	3/14/2014	18

16	16	16	16	16	4991.26	11/25/2018	30
17	17	17	17	17	2016.64	4/17/2020	40
18	18	18	18	18	2752.48	9/19/2012	28
19	19	19	19	19	2298.09	10/21/2001	58
20	20	20	20	20	1465.18	9/26/2024	25

ReceiptStatuses

receipt_status_id	status_name	status_description
1	Pending	Ut tellus.
2	Received	Suspendisse potenti.
3	Pending	Mauris ullamcorper purus sit amet nulla. Quisque arcu libero, rutrum ac, lobortis vel, dapibus at, diam.
4	Received	In est risus, auctor sed, tristique in, tempus sit amet, sem. Fusce consequat.
5	Pending	Suspendisse accumsan tortor quis turpis.
6	Received	Fusce lacus purus, aliquet at, feugiat non, pretium quis, lectus. Suspendisse potenti.
7	Pending	Sed vel enim sit amet nunc viverra dapibus.
8	Received	Pellentesque eget nunc. Donec quis orci eget orci vehicula condimentum.
9	Pending	Morbi vestibulum, velit id pretium iaculis, diam erat fermentum justo, nec condimentum neque sapien placerat ante. Nulla justo.
10	Received	Morbi sem mauris, laoreet ut, rhoncus aliquet, pulvinar sed, nisl.
11	Pending	Nullam orci pede, venenatis non, sodales sed, tincidunt eu, felis.
12	Pending	Curabitur convallis.
13	Pending	Suspendisse accumsan tortor quis turpis. Sed ante.
14	Received	Pellentesque viverra pede ac diam.
15	Received	Nulla tellus.

16	Received	Lorem ipsum dolor sit amet, consectetuer adipiscing elit.
17	Received	Donec ut dolor.
18	Pending	Duis aliquam convallis nunc.
19	Received	Curabitur at ipsum ac tellus semper interdum.
20	Received	Nam nulla.

Receipts

receipt_id	supplier_id	payment_method_id	warehouse_staff_id	receipt_date	total_amount	items	receipt_status_id
1	1	1	1	1/31/2021	4933.1	eget eros elementum pellentesque quisque porta	1
2	2	2	2	10/19/2009	4605.53	eleifend quam a odio in hac habitasse	2
3	3	3	3	4/7/2004	351.62	mauris laoreet ut rhoncus aliquet pulvinar sed nisl nunc rhoncus	3
4	4	4	4	11/7/2015	2264.61	ligula nec sem duis aliquam convallis nunc	4
5	5	5	5	8/10/2002	1923.48	eget orci vehicula condimentum curabitur in libero ut massa volutpat	5
6	6	6	6	8/6/2002	1389.6	pede malesuada in imperdiet et commodo vulputate justo in blandit	6
7	7	7	7	5/12/2003	3285.89	posuere nonummy integer non	7

						velit donec diam neque vestibulum eget	
8	8	8	8	3/7/2013	3197.07	vulputate elementum nullam varius nulla facilisi cras non	8
9	9	9	9	1/5/2012	378.81	eget elit sodales scelerisque mauris	9
10	10	10	10	3/11/2019	4685.69	morbi a ipsum integer a nibh in quis justo	10
11	11	11	11	2/7/2017	3471.63	in imperdiet et commodo vulputate justo in	11
12	12	12	12	12/20/2010	1812.88	eget eleifend luctus ultricies eu nibh quisque id justo sit	12
13	13	13	13	8/5/2004	2736.99	ipsum dolor sit amet consectetuer adipiscing elit	13
14	14	14	14	7/11/2007	4594.15	id pretium iaculis diam erat	14
15	15	15	15	2/26/2022	2648.52	est quam pharetra magna ac consequat metus sapien	15
16	16	16	16	11/4/2017	1813.99	quam turpis adipiscing lorem vitae mattis	16
17	17	17	17	2/11/2009	4166.99	nonummy integer non velit donec diam neque	17

18	18	18	18	2/2/2003	807.45	nunc proin at turpis a pede posuere nonummy	18
19	19	19	19	12/23/2016	311.6	sapien sapien non mi integer ac neque duis	19
20	20	20	20	4/1/2014	131.31	ut massa quis augue luctus tincidunt	20

RemainingStatuses

remaining_status_id	status_name	status_description
1	Partial	Nam ultrices, libero non mattis pulvinar, nulla pede ullamcorper augue, a suscipit nulla elit ac nulla.
2	Partial	Vestibulum ac est lacinia nisi venenatis tristique. Fusce congue, diam id ornare imperdiet, sapien urna pretium nisl, ut volutpat sapien arcu sed augue.
3	Partial	Sed accumsan felis.
4	Pending	Quisque id justo sit amet sapien dignissim vestibulum.
5	Pending	Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Donec pharetra, magna vestibulum aliquet ultrices, erat tortor sollicitudin mi, sit amet lobortis sapien sapien non mi.
6	Partial	Morbi porttitor lorem id ligula.
7	Partial	Morbi a ipsum.
8	Partial	Nam dui.
9	Pending	Vestibulum quam sapien, varius ut, blandit non, interdum in, ante. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Duis faucibus accumsan odio.
10	Partial	Fusce congue, diam id ornare imperdiet, sapien urna pretium nisl, ut volutpat sapien arcu sed augue. Aliquam erat volutpat.
11	Partial	Donec diam neque, vestibulum eget, vulputate ut, ultrices vel, augue.

12	Partial	Mauris lacinia sapien quis libero. Nullam sit amet turpis elementum ligula vehicula consequat.
13	Partial	Mauris lacinia sapien quis libero. Nullam sit amet turpis elementum ligula vehicula consequat.
14	Partial	Quisque ut erat.
15	Partial	Ut tellus. Nulla ut erat id mauris vulputate elementum.
16	Pending	Morbi non quam nec dui luctus rutrum.
17	Partial	Donec ut mauris eget massa tempor convallis. Nulla neque libero, convallis eget, eleifend luctus, ultricies eu, nibh.
18	Partial	Suspendisse accumsan tortor quis turpis.
19	Partial	Donec semper sapien a libero.
20	Pending	Donec odio justo, sollicitudin ut, suscipit a, feugiat et, eros.

RemainingPayments

remaining_id	bill_id	remaining_status_id	payment_id	remaining_amount
1	1	1	1	261.66
2	2	2	2	842.53
3	3	3	3	551.96
4	4	4	4	967.82
5	5	5	5	777.62
6	6	6	6	142.53
7	7	7	7	694.22
8	8	8	8	183.09
9	9	9	9	614.22
10	10	10	10	929.93
11	11	11	11	928.07
12	12	12	12	377.79
13	13	13	13	607.49
14	14	14	14	502.68

15	15	15	15	51.83
16	16	16	16	717.42
17	17	17	17	412.76
18	18	18	18	641.49
19	19	19	19	20.54
20	20	20	20	908.44

Consignees

consignee_id	user_id	delivery_address_id	order_id	notification_id
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9
10	10	10	10	10
11	11	11	11	11
12	12	12	12	12
13	13	13	13	13
14	14	14	14	14
15	15	15	15	15
16	16	16	16	16
17	17	17	17	17
18	18	18	18	18
19	19	19	19	19
20	20	20	20	20

ShipmentStatuses

shipment_status_id	status_name	status_description
1	Delivered	Donec ut dolor. Morbi vel lectus in quam fringilla rhoncus.
2	Wait for delivery	Aliquam quis turpis eget elit sodales scelerisque. Mauris sit amet eros.
3	Delivered	Nunc rhoncus dui vel sem. Sed sagittis.
4	Delivered	Nulla suscipit ligula in lacus.
5	Delivered	Maecenas ut massa quis augue luctus tincidunt. Nulla mollis molestie lorem.
6	In Transit	Donec ut mauris eget massa tempor convallis.
7	Wait for delivery	Donec dapibus. Duis at velit eu est congue elementum.
8	In Transit	Maecenas ut massa quis augue luctus tincidunt. Nulla mollis molestie lorem.
9	In Transit	Phasellus sit amet erat.
10	In Transit	Aliquam sit amet diam in magna bibendum imperdiet. Nullam orci pede, venenatis non, sodales sed, tincidunt eu, felis.
11	In Transit	Praesent lectus. Vestibulum quam sapien, varius ut, blandit non, interdum in, ante.
12	In Transit	Aliquam quis turpis eget elit sodales scelerisque.
13	Wait for delivery	Aliquam non mauris. Morbi non lectus.
14	Wait for delivery	Suspendisse potenti.
15	Late	Nulla neque libero, convallis eget, eleifend luctus, ultricies eu, nibh. Quisque id justo sit amet sapien dignissim vestibulum.
16	Delivered	Nullam varius.
17	Delivered	Donec ut dolor. Morbi vel lectus in quam fringilla rhoncus.
18	Late	Vivamus metus arcu, adipiscing molestie, hendrerit at, vulputate vitae, nisl.
19	Delivered	Vestibulum rutrum rutrum neque. Aenean auctor gravida sem.

20	Late	Proin leo odio, porttitor id, consequat in, consequat ut, nulla.

Shipments

shipment_id	route_id	driver_id	shipment_status_id	notification_id	estimated_delivery_date	actual_delivery_date	created_at	updated_at
1	1	1	1	1	10/12/2011	6/30/2015	5/11/2023 14:23	9/11/2001 8:12
2	2	1	2	2	10/2/2009	8/17/2011	11/10/2002 2:57	11/18/2024 15:29
3	3	1	3	3	6/10/2011	2/13/2015	3/27/2002 6:36	11/18/2024 15:29
4	4	2	4	4	9/28/2023	11/4/2006	4/19/2010 11:21	11/18/2024 15:29
5	5	2	5	5	8/6/2018	4/3/2009	2/23/2002 10:50	11/18/2024 15:29
6	6	2	6	6	12/10/2015	8/21/2018	3/20/2009 12:53	11/18/2024 15:29
7	7	2	7	7	4/17/2013	4/2/2000	10/31/2022 13:53	11/18/2024 15:29
8	8	3	8	8	2/26/2008	4/14/2012	9/9/2021 9:09	11/18/2024 15:29
9	9	3	9	9	6/8/2017	4/10/2002	6/20/2007 13:42	11/18/2024 15:29
10	10	3	10	10	9/7/2014	8/16/2009	12/23/2021 1:47	11/18/2024 15:29
11	11	3	11	11	7/26/2010	1/23/2014	2/25/2024 8:11	11/18/2024 15:29
12	12	3	12	12	9/25/2001	3/4/2016	2/3/2008 19:59	11/18/2024 15:29
13	13	4	13	13	3/8/2018	5/28/2009	12/17/2018 5:49	11/18/2024 15:29
14	14	4	14	14	11/25/2019	1/6/2015	7/4/2004 18:32	11/18/2024 15:29
15	15	4	15	15	11/18/2015	1/18/2015	9/28/2004 1:08	11/18/2024 15:29
16	16	5	16	16	12/23/2009	2/3/2006	7/30/2021 0:03	11/18/2024 15:29

17	17	5	17	17	4/21/2014	########	11/1/2002 6:02	11/18/2024 15:29
18	18	5	18	18	11/20/2019	3/11/2021	3/22/2002 19:45	11/18/2024 15:29
19	19	5	19	19	2/2/2009	1/12/2000	11/25/2015 21:20	11/18/2024 15:29
20	20	6	20	20	5/14/2013	8/30/2019	10/3/2004 21:51	11/18/2024 15:29

ShipmentRouteDetails

shipment_id	route_id	delivery_address_id
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	8	8
9	9	9
10	10	10
11	11	11
12	12	12
13	13	13
14	14	14
15	15	15
16	16	16
17	17	17
18	18	18
19	19	19
20	20	20

Use Cases (Query statements)

This page summarizes typical inquiries frequently made by managers of different departments in the TMS. These inquiries not only provide stakeholders with invaluable insights into the operation of the management in detail but also aid them in making well-informed decisions.

Customer and Order Insights

1. **Top 50 Clients with the most amount of Orders**

Scenario: The Sales Department wants to identify the most valuable customers to create a personalized marketing campaign. By knowing the top 50 clients, managers can offer loyalty programs, discounts, or exclusive deals to retain them and encourage further engagement.

```
SELECT
  cu.customer_id,
  CONCAT(con.first_name, ' ', con.last_name) AS customer_name,
  COUNT(o.order_id) AS total_orders
FROM
  Customers cu
JOIN
  Users u ON cu.user_id = u.user_id
JOIN
  OrderRecords o ON cu.customer_id = o.customer_id
JOIN
  Contacts con ON u.contact_id = con.contact_id
GROUP BY
  cu.customer_id, customer_name
ORDER BY
  total_orders DESC
LIMIT 50;
```

2. **All Customers and their Contact information**

Scenario: The Customer Support Team needs quick access to customer contact details to address queries or resolve issues efficiently. Having consolidated information also helps in sending notifications for promotions or important updates.

```
SELECT
  C.customer_id,
  CONCAT(Con.first_name, ' ', Con.last_name) AS customer_name,
  Con.email,
  Con.phone_number
FROM
  Customers C
JOIN
  Users U ON C.user_id = U.user_id
JOIN
  Contacts Con ON U.contact_id = Con.contact_id;
```

3. **All Orders with late Shipment**

Scenario: The Transportation Manager aims to minimize delays by analyzing late shipments. This helps identify problems in the transportation phase such as traffic issues, insufficient resources, or vehicle breakdowns, enabling the Manager to correct those errors.

```
SELECT
```

```
  O.order_id, O.customer_id, O.order_date,
  S.shipment_id,
  SS.status_name AS shipment_status,
  S.estimated_delivery_date,
  S.actual_delivery_date
FROM
  OrderRecords O
JOIN
  Shipments S ON O.notification_id = S.notification_id
JOIN
  ShipmentStatuses SS ON S.shipment_status_id = SS.shipment_status_id
WHERE
  SS.status_name = 'Late';
```

Warehouse Management

1. **All Warehouses with > 70% of their capacity occupied**

Scenario: The warehouse managers often need to check the status of the warehouses' utility to prevent overstocking. With this use case, the warehouses whose utility is nearly at max will be listed, this will be a useful source of information for the notification service to notify the warehouse managers of warehouses and inventories that require actions to be taken.

```
SELECT
  W.warehouse_id,
  W.warehouse_name,
  W.warehouse_capacity AS capacity,
  SUM(I.quantity) AS total_inventory,
  (SUM(I.quantity) / W.warehouse_capacity) * 100 AS utility_percentage
FROM
  Warehouses W
JOIN
  Inventories I ON W.warehouse_id = I.warehouse_id
GROUP BY
  W.warehouse_id, W.warehouse_name, W.warehouse_capacity
HAVING
  (SUM(I.quantity) / W.warehouse_capacity) * 100 > 70;
```

2. **List all warehouse staff and their relevant information**

   Scenario: Warehouse managers, or HR managers often have to check on their warehouse staffs for performance evaluation, workforce allocation, punishment and awards to resolve discrepancies in work schedule and attendance, or task distributions.

```
SELECT
  WS.warehouse_staff_id,
  W.warehouse_id,
  WS.hire_date,
  WS.is_active AS warehouse_staff_status,
  CONCAT(Con.first_name, ' ', Con.last_name) AS warehouse_staff_name,
  CON.email,
  CON.phone_number
FROM
  WarehouseStaffs WS
JOIN
  Warehouses W ON WS.warehouse_staff_id = W.warehouse_staff_id
JOIN Contacts Con ON WS.contact_id = Con.contact_id;
```

Delivery and Shipment

1. **List all shipments with their status, routes, and conditions**

Scenario: Logistics Managers need an overview of all shipments to ensure timely deliveries. Insights into route conditions (e.g., traffic and weather) help in real-time adjustments and better planning for future deliveries. This helps improves route planning and optimization, resulting in more on-time deliveries and as a result higher customer and driver satisfaction.

```sql
SELECT
  S.shipment_id,
  S.shipment_status_id,
  SS.status_name AS shipment_status,
  R.route_name,
  R.distance,
  R.estimated_time,
  TC.condition_description,
  WC.condition_description
FROM
  Shipments S
JOIN
  ShipmentStatuses SS ON S.shipment_status_id = SS.shipment_status_id
JOIN
  Routes R ON S.route_id = R.route_id
JOIN
  TrafficConditions TC ON R.traffic_condition_id = TC.traffic_condition_id
JOIN
  WeatherConditions WC ON R.weather_condition_id = WC.weather_condition_id;
```

2. **List all Drivers based on their timeliness and number of deliveries**

Scenario: at the end of each quarter, the company would nominate and award drivers and employees with outstanding performance. To do this, it is helpful to have a use case that list all drivers based on their performance. Specifically, drivers' performance will be measured by the total amount of deliveries they have performed in the past, and proportion of late deliveries out of the total amount.

```sql
-- List all Drivers based on their timeliness and number of deliveries
SELECT
  D.driver_id,
  CONCAT(Con.first_name, ' ', Con.last_name),
  COUNT(S.shipment_id) AS total_deliveries,
  -- Calculate total number of late deliveries
  SUM(CASE
      WHEN SS.status_name = 'Late' THEN 1
      ELSE 0
      END) AS late_deliveries,
  -- (1 - (late/total)) * 100% = on time percentage
  (1 -
    (SUM
      (CASE WHEN SS.status_name = 'Late' THEN 1 ELSE 0 END)
    / COUNT(S.shipment_id))
  ) * 100 AS on_time_percentage
FROM
  Drivers D
JOIN
  Shipments S ON D.driver_id = S.driver_id
JOIN
  ShipmentStatuses SS ON S.shipment_status_id = SS.shipment_status_id
JOIN
  Employees E ON E.employee_id = D.employee_id
JOIN
```

```
  Users U ON U.user_id = E.user_id
JOIN
  Contacts Con ON Con.contact_id = U.contact_id
GROUP BY
  D.driver_id
ORDER BY on_time_percentage DESC, total_deliveries DESC;
```

Billing and Invoicing

1. Show Payment history for a specific Customer

   Scenario: The accountant wants to quickly access a customer's payment history to verify account status, generate billing, or prepare invoices. This use case helps in manage outstanding balances and avoid large debts accumulation.

```
SELECT
  P.payment_id,
  PM.payment_type AS payment_method,
  P.payment_amount,
  P.payment_date,
  O.order_id
FROM
  Payments P
JOIN
  Customers C ON P.customer_id = C.customer_id
JOIN
  OrderRecords O ON P.order_id = O.order_id
JOIN
  PaymentMethods PM ON P.payment_method_id = PM.payment_method_id
WHERE
  C.customer_id = 'your_customer_id'; -- fill in your customer id
```

2. **List all Bills and their Payment status from highest amount to lowest**

Scenario: Stakeholders track the operation of the budgets management by reviewing billing statuses and prioritize collecting payments on higher-value bills. This enables efficient resource allocation for collections and financial forecasting.

```
SELECT
  B.bill_id,
  B.total_amount,
  BS.status_name AS billing_status,
  PM.payment_type AS payment_method
FROM
  Bills B
JOIN
  PaymentMethods PM ON B.payment_method_id = PM.payment_method_id
JOIN
  BillStatuses BS ON B.bill_status_id = BS.bill_status_id
ORDER BY
  B.total_amount DESC;
```

3. **List unpaid bills and Remaining Balances by Customers**

Scenario: ITL Corporation often needs to manually keep records of customers' bills, payments and their conditions. Clear visibility into unpaid bills ensures timely collection, reduces the risk of bad debts, and improves cash flow.

```
SELECT
  C.consignee_id,
  CONCAT(Con.first_name, ' ', Con.last_name) AS consignee_name,
  B.bill_id,
```

```
  BS.status_name,
  B.total_amount,
  RP.remaining_amount,
  B.bill_date
FROM
  Consignees C
JOIN
  Users U ON C.user_id = U.user_id
JOIN
  Contacts Con ON Con.contact_id = U.contact_id
JOIN
  Bills B ON B.order_id = C.order_id
JOIN
  RemainingPayments RP ON B.bill_id = RP.bill_id
JOIN
  BillStatuses BS ON B.bill_status_id = BS.bill_status_id
WHERE
  BS.status_name = 'Pending'
ORDER BY
  B.bill_date;
```

1 2 3 4 Index Statements

Index statements provide a way to optimize and increase the engine's search speed when executing SQL queries.

1. **Top 50 Clients with the most amount of Orders**

```sql
-- Speed up search on customer table
CREATE INDEX idx_optimize_customer_user_id
  ON Customers(user_id);
-- Optimize the JOIN between Users and Contacts
CREATE INDEX idx_optimize_users_contact_id
  ON Users(contact_id);
-- Speed up the search on names in Contacts
CREATE INDEX idx_optimize_contacts_name
  ON Contacts(first_name, last_name);
```

Proof of optimization

```sql
EXPLAIN SELECT cu.customer_id, CONCAT(con.first_name, ' ', con.last_name) AS customer_name,COUNT(o.order_id) AS total_orders
FROM Customers cu JOIN Users u ON cu.user_id = u.user_id JOIN OrderRecords o ON cu.customer_id = o.customer_id JOIN Contacts con ON u.contact_id = con.contact_id
GROUP BY cu.customer_id, customer_name
ORDER BY total_orders DESC
LIMIT 50;
```

id	select_type	table	partitions	type	possible_keys	key	key_len	ref	rows	filtered	Extra
1	SIMPLE	o	NULL	index	customer_id	customer_id	5	NULL	20	100.00	Using where; Using index; Using tempora
1	SIMPLE	cu	NULL	eq_ref	PRIMARY,idx_optimize_customer_user_id	PRIMARY	4	TransportationManagementSystem.o.customer_id	1	100.00	Using where
1	SIMPLE	u	NULL	eq_ref	PRIMARY,idx_optimize_users_contact_id	PRIMARY	4	TransportationManagementSystem.cu.user_id	1	100.00	Using where
1	SIMPLE	con	NULL	eq_ref	PRIMARY	PRIMARY	4	TransportationManagementSystem.u.contact_id	1	100.00	NULL

Analysis

- The query uses the indexes when performing the JOIN between specified tables, which optimizes the JOIN operations
- In the “Extra” column, the description “Using where” indicates that WHERE statements are effectively using the indexes
- The search on the user_id field in the Customers table speed has also been increased

2. **All Customers and their Contact information**

```sql
-- Speed up the search in Customers table
CREATE INDEX idx_optimize_customer_user_id
  ON Customers(user_id);
-- Optimize the JOIN between Users and Contacts
CREATE INDEX idx_optimize_users_contact_id
  ON Users(contact_id);
-- Speed up the search for contacts details
CREATE INDEX idx_optimize_contacts_details
  ON Contacts(first_name, last_name);
```

Proof of optimization

```sql
EXPLAIN SELECT C.customer_id,CONCAT(Con.first_name, ' ', Con.last_name) AS customer_name,Con.email,Con.phone_number
FROM Customers C JOIN Users U ON C.user_id = U.user_id JOIN Contacts Con ON U.contact_id = Con.contact_id;
```

select_type	table	partitions	type	possible_keys	key	key_len	ref	rows	filtered	Extra
SIMPLE	C	NULL	index	idx_optimize_customer_user_id	idx_optimize_customer_user_id	5	NULL	20	100.00	Using where; Using index
SIMPLE	U	NULL	eq_ref	PRIMARY,idx_optimize_users_contact_id	PRIMARY	4	TransportationManagementSystem.C.user_id	1	100.00	Using where
SIMPLE	Con	NULL	eq_ref	PRIMARY	PRIMARY	4	TransportationManagementSystem.U.contact_id	1	100.00	NULL

Analysis

- The query uses the indexes when performing the JOIN between specified tables, which optimizes the JOIN operations

- In the “Extra” column, the description “Using where” indicates that WHERE statements are effectively using the indexes
- The search on the user_id field in the Customers table speed has also been increased

3. **All Orders with late Shipment**

```
-- Optimize the search for shipment status name
CREATE INDEX idx_optimize_status
  ON ShipmentStatuses(status_name);
-- Optimize the JOIN between ShipmentStatuses and Notifications
CREATE INDEX idx_shipments_status_notification
  ON Shipments(shipment_status_id, notification_id);
-- Optimize the JOIN between OrderRecords and Notifications
CREATE INDEX idx_order_records_notification
  ON OrderRecords (notification_id);
```

Proof of optimization

```
EXPLAIN SELECT O.order_id, O.customer_id, O.order_date,S.shipment_id,SS.status_name AS shipment_status,S.estimated_delivery_date,S.actual_delivery_date
FROM OrderRecords O JOIN Shipments S ON O.notification_id = S.notification_id JOIN ShipmentStatuses SS ON S.shipment_status_id = SS.shipment_status_id
WHERE SS.status_name = 'Late';
```

id	select_type	table	partitions	type	possible_keys	key	key_len	ref	rows	filtered	Extra
1	SIMPLE	SS	NULL	ref	PRIMARY,idx_optimize_status	idx_optimize_status	202	const	3	100.00	Using index
1	SIMPLE	S	NULL	ref	notification_id,idx_shipments_status_id,idx_shi...	idx_shipments_status_id	5	TransportationManagementSystem.SS.shipmen...	1	100.00	Using where
1	SIMPLE	O	NULL	ref	idx_order_records_notification	idx_order_records_notification	5	TransportationManagementSystem.S.notificatio...	1	100.00	NULL

Analysis

- The query uses the indexes when performing the JOIN between Shipments and Notifications tables; Shipments and ShipmentStatus tables. This optimizes the JOIN operations.
- In the “Extra” column, the description “Using where” indicates that WHERE statements are effectively using the indexes
- The search speed on the status_name field in the ShipmentStatus table has also been increased

4. **All Warehouses with >70% of their capacity occupied**

```
-- Optimize the search for Inventories quantity
CREATE INDEX idx_inventory_warehouse_quantity
  ON Inventories(warehouse_id, quantity);
```

Proof of optimization

```
EXPLAIN SELECT W.warehouse_id, W.warehouse_name, W.warehouse_capacity AS capacity, SUM(I.quantity) AS total_inventory,
    (SUM(I.quantity) / W.warehouse_capacity) * 100 AS utility_percentage
FROM Warehouses W JOIN Inventories I ON W.warehouse_id = I.warehouse_id
GROUP BY W.warehouse_id, W.warehouse_name, W.warehouse_capacity
HAVING (SUM(I.quantity) / W.warehouse_capacity) * 100 > 70;
```

select_type	table	partitions	type	possible_keys	key	key_len	ref	rows	filtered	Extra
SIMPLE	I	NULL	index	idx_inventory_warehouse_quantity	idx_inventory_warehouse_quantity	9	NULL	20	100.00	Using where; Using index; Using
SIMPLE	W	NULL	eq_ref	PRIMARY	PRIMARY	4	TransportationManagementSystem.I.warehous...	1	100.00	NULL

Analysis

- The query uses the indexes when performing the JOIN between Warehouses and Inventories tables, which optimizes the JOIN operations.

5. **List all Warehouse staff and their relevant information**

```
-- Optimize the JOIN between WarehouseStaffs and Contacts table
CREATE INDEX idx_warehouse_staff_contact
  ON WarehouseStaffs(warehouse_staff_id, contact_id);
-- Optimize the JOIN between WarehouseStaffs and Warehouses
CREATE INDEX idx_warehosue_staff_id
```

```
  ON Warehouses(warehouse_staff_id);
```

Proof of optimization

```
EXPLAIN SELECT WS.warehouse_staff_id, W.warehouse_id, WS.hire_date, WS.is_active AS warehouse_staff_status,
    CONCAT(Con.first_name, ' ', Con.last_name) AS warehouse_staff_name, CON.email, CON.phone_number
FROM WarehouseStaffs WS JOIN Warehouses W ON WS.warehouse_staff_id = W.warehouse_staff_id JOIN Contacts Con ON WS.contact_id = Con.contact_id;
```

table	partitions	type	possible_keys	key	key_len	ref	rows	filtered	Extra
I	NULL	index	idx_inventory_warehouse_quantity	idx_inventory_warehouse_quantity	9	NULL	20	100.00	Using where; Using index; Using temporary
W	NULL	eq_ref	PRIMARY	PRIMARY	4	TransportationManagementSystem.I.warehous...	1	100.00	NULL

Analysis

- The query uses the indexes when performing the JOIN between WarehouseStaffs and Warehouses tables; WarehouseStaffs and Contacts, which optimizes the JOIN operations.

6. **List all shipments with their status, routes, and conditions**

```
-- Optimize the JOIN between Shipments and ShipmentStatuses
CREATE INDEX idx_shipment_status_id
  ON Shipments(shipment_status_id);
-- Optimize the JOIN between Routes and TrafficConditions
CREATE INDEX idx_trafic_conditions_route
  ON Routes(traffic_condition_id;
-- Optimize the JOIN between Routes and WeatherConditions
CREATE INDEX idx_weather_conditions_route
  ON Routes(weather_condition_id);
```

Proof of optimization

```
EXPLAIN SELECT S.shipment_id, S.shipment_status_id, SS.status_name AS shipment_status, R.route_name, R.distance, R.estimated_time,
    TC.condition_description, WC.condition_description
FROM Shipments S JOIN ShipmentStatuses SS ON S.shipment_status_id = SS.shipment_status_id JOIN Routes R ON S.route_id = R.route_id
JOIN TrafficConditions TC ON R.route_id = TC.route_id JOIN WeatherConditions WC ON R.route_id = WC.route_id;
```

id	select_type	table	partitions	type	possible_keys	key	key_len	ref	rows	filtered	Extra
1	SIMPLE	S	NULL	ALL	route_id,idx_shipments_status_id,idx_shipment...	NULL	NULL	NULL	20	100.00	Using where
1	SIMPLE	SS	NULL	eq_ref	PRIMARY	PRIMARY	4	TransportationManagementSystem.S.shipment...	1	100.00	NULL
1	SIMPLE	R	NULL	eq_ref	PRIMARY,idx_trafic_conditions_route,idx_weat...	PRIMARY	4	TransportationManagementSystem.S.route_id	1	100.00	Using where
1	SIMPLE	TC	NULL	eq_ref	PRIMARY	PRIMARY	4	TransportationManagementSystem.R.traffic_co...	1	100.00	NULL
1	SIMPLE	WC	NULL	eq_ref	PRIMARY	PRIMARY	4	TransportationManagementSystem.R.weather_...	1	100.00	NULL

Analysis

- The query uses the indexes when performing the JOIN between Shipments and ShipmentStatus tables; Routes and TrafficConditions tables; Routes and WeatherConditions table, which optimizes the JOIN operations.

7. **List all Drivers based on their timeliness and number of deliveries**

```
-- Optimize the JOIN between Shipments and Drivers
CREATE INDEX idx_shipments_driver_id
  ON Shipments(driver_id);
-- Optimize the JOIN between Shipments and ShipmentStatuses
CREATE INDEX idx_shipments_status_id
  ON Shipments(shipment_status_id);
```

Proof of optimization

```
EXPLAIN SELECT D.driver_id, CONCAT(Con.first_name, ' ', Con.last_name), COUNT(S.shipment_id) AS total_deliveries,
    SUM(CASE WHEN SS.status_name = 'Late' THEN 1 ELSE 0 END) AS late_deliveries,
    (1 - (SUM(CASE WHEN SS.status_name = 'Late' THEN 1 ELSE 0 END) / COUNT(S.shipment_id))) * 100 AS on_time_percentage
FROM Drivers D JOIN Shipments S ON D.driver_id = S.driver_id JOIN ShipmentStatuses SS ON S.shipment_status_id = SS.shipment_status_id
    JOIN Employees E ON E.employee_id = D.employee_id JOIN Users U ON U.user_id = E.user_id
    JOIN Contacts Con ON Con.contact_id = U.contact_id
GROUP BY D.driver_id
ORDER BY on_time_percentage DESC, total_deliveries DESC;
```

id	select_type	table	partitions	type	possible_keys	key	key_len	ref	rows	filtered	Extra
1	SIMPLE	S	NULL	ALL	idx_shipments_driver_id,idx_shipments_status_...	NULL	NULL	NULL	20	100.00	Using where; Using temporary; Using
1	SIMPLE	D	NULL	eq_ref	PRIMARY,driver_license,employee_id,warehous...	PRIMARY	4	TransportationManagementSystem.S.driver_id	1	100.00	Using where
1	SIMPLE	E	NULL	eq_ref	PRIMARY,user_id	PRIMARY	4	TransportationManagementSystem.D.employee...	1	100.00	Using where
1	SIMPLE	SS	NULL	eq_ref	PRIMARY	PRIMARY	4	TransportationManagementSystem.S.shipment...	1	100.00	NULL
1	SIMPLE	U	NULL	eq_ref	PRIMARY,idx_optimize_users_contact_id	PRIMARY	4	TransportationManagementSystem.E.user_id	1	100.00	Using where
1	SIMPLE	Con	NULL	eq_ref	PRIMARY	PRIMARY	4	TransportationManagementSystem.U.contact_id	1	100.00	NULL

Analysis

- The query uses the indexes when performing the JOIN between
  - Shipments and ShipmentStatus tables
  - Shipments and Drivers tables
  - Drivers and Employees tables
  - Employees and Users tables
  - Users and Contacts tables
- The search for the driver_id in the Drivers table is also sped up by using indexes

8. **Show Payment history for a specific Customer**

```sql
-- Optimize the JOIN between Payments and Customers
CREATE INDEX idx_payments_customer
  ON Payments(customer_id);
-- Optimize the JOIN between Payments and OrderRecords
CREATE INDEX idx_payments_order
  ON Payments(order_id);
-- Optimize the JOIN between Payments andn PaymentsMethod
CREATE INDEX idx_payments_method
  ON Payments(payment_method_id)
```

Proof of optimization

```sql
EXPLAIN SELECT P.payment_id, PM.payment_type AS payment_method, P.payment_amount, P.payment_date, O.order_id
FROM Payments P JOIN Customers C ON P.customer_id = C.customer_id JOIN OrderRecords O ON P.order_id = O.order_id
JOIN PaymentMethods PM ON P.payment_method_id = PM.payment_method_id
WHERE C.customer_id = '14';
```

select_type	table	partitions	type	possible_keys	key	key_len	ref	rows	filtered	Extra
SIMPLE	C	NULL	const	PRIMARY	PRIMARY	4	const	1	100.00	Using index
SIMPLE	P	NULL	ref	idx_payments_customer,idx_payments_order,i...	idx_payments_customer	5	const	1	100.00	Using index condition; Using w
SIMPLE	O	NULL	eq_ref	PRIMARY	PRIMARY	4	TransportationManagementSystem.P.order_id	1	100.00	Using index
SIMPLE	PM	NULL	eq_ref	PRIMARY	PRIMARY	4	TransportationManagementSystem.P.payment_...	1	100.00	NULL

Analysis

- The query uses the indexes when performing the JOIN between:
  - Payments and Customers and OrderRecords tables
  - Payments and PaymentsMethods tables
- In the “Extra” column, the description “Using where” indicates that WHERE statements are effectively using the indexes

9. **List all Bills and their Payment status from highest amount to lowest**

```sql
-- Optimize the JOIN between Bills and PaymentMethods
CREATE INDEX idx_bill_payment_methods
  ON Bills(payment_method_id);
-- Optimize the JOIN between Bills and BillStatuses
CREATE INDEX idx_bill_status
  ON Bills(bill_status_id);
-- Optimize the Ordering by total_amount
CREATE INDEX idx_total_amount
  ON Bills(total_amount);
```

Proof of optimization

```sql
SELECT B.bill_id, B.total_amount, BS.status_name AS billing_status, PM.payment_type AS payment_method
FROM Bills B JOIN PaymentMethods PM ON B.payment_method_id = PM.payment_method_id JOIN BillStatuses BS ON B.bill_status_id = BS.bill_status_id
ORDER BY B.total_amount DESC;
```

select_type	table	partitions	type	possible_keys	key	key_len	ref	rows	filtered	Extra
SIMPLE	PM	NULL	ALL	PRIMARY	NULL	NULL	NULL	20	100.00	Using temporary; Using filesort
SIMPLE	B	NULL	ref	idx_bill_payment_methods,idx_bill_status	idx_bill_payment_methods	5	TransportationManagementSystem.PM.paymen...	1	100.00	Using where
SIMPLE	BS	NULL	eq_ref	PRIMARY	PRIMARY	4	TransportationManagementSystem.B.bill_status...	1	100.00	NULL

Analysis

- The query uses the indexes when performing the JOIN between:
  - Bills and PaymentMethods tables
  - Bills and BillStatuses tables
- The speed of the search on the field total_amount is also increased and optimized with the idx_total_amount index in the Bills table

10. **List unpaid bills and Remaining Balances by Customers**

```sql
-- Optimize the JOIN between Customers and Users
CREATE INDEX idx_customer_user_id
  ON Customers(user_id);
-- Optimize the JOIN between Bills and RemainingPayments
CREATE INDEX idx_bills_payments
  ON RemainingPayments(bill_id);
-- Optimize the filter of remaining_amount
CREATE INDEX idx_remaining_amount
  ON RemainingPayments(remaining_amount);
-- Optimize the Ordering by due_date
CREATE INDEX idx_due_date
  ON Bills(due_date);
```

Proof on optimization

```sql
EXPLAIN SELECT C.consignee_id, CONCAT(Con.first_name, ' ', Con.last_name) AS consignee_name,
    B.bill_id, BS.status_name, B.total_amount, RP.remaining_amount, B.bill_date
FROM Consignees C JOIN Users U ON C.user_id = U.user_id JOIN Contacts Con ON Con.contact_id = U.contact_id
JOIN Bills B ON B.order_id = C.order_id JOIN RemainingPayments RP ON B.bill_id = RP.bill_id
JOIN BillStatuses BS ON B.bill_status_id = BS.bill_status_id
WHERE BS.status_name = 'Pending'
ORDER BY B.bill_date;
```

select_type	table	partitions	type	possible_keys	key	key_len	ref	rows	filtered	Extra
SIMPLE	BS	NULL	ALL	PRIMARY	NULL	NULL	NULL	20	10.00	Using where; Using temporary; Using filesor
SIMPLE	B	NULL	ref	PRIMARY,order_id,idx_bill_status	idx_bill_status	5	TransportationManagementSystem.BS.bill_stat...	1	100.00	Using where
SIMPLE	RP	NULL	ref	idx_bills_payments	idx_bills_payments	5	TransportationManagementSystem.B.bill_id	1	100.00	NULL
SIMPLE	C	NULL	ref	user_id,order_id	order_id	5	TransportationManagementSystem.B.order_id	1	100.00	Using where
SIMPLE	U	NULL	eq_ref	PRIMARY,idx_optimize_users_contact_id	PRIMARY	4	TransportationManagementSystem.C.user_id	1	100.00	Using where
SIMPLE	Con	NULL	eq_ref	PRIMARY	PRIMARY	4	TransportationManagementSystem.U.contact_id	1	100.00	NULL

Analysis

- The query uses the indexes when performing the JOIN between:
  - Customers and Users tables
  - Users and Contacts tables
  - Bills and Customers tables
  - Bills and RemainingPayments
  - Bills and BillStatuses
- In the “Extra” column, the description “Using where” indicates that WHERE statements are effectively using the indexes
- The search for the bill_date in the Bills table is also sped up by using indexes

💻 Major-specific Work

1. Artificial Intelligence - AI

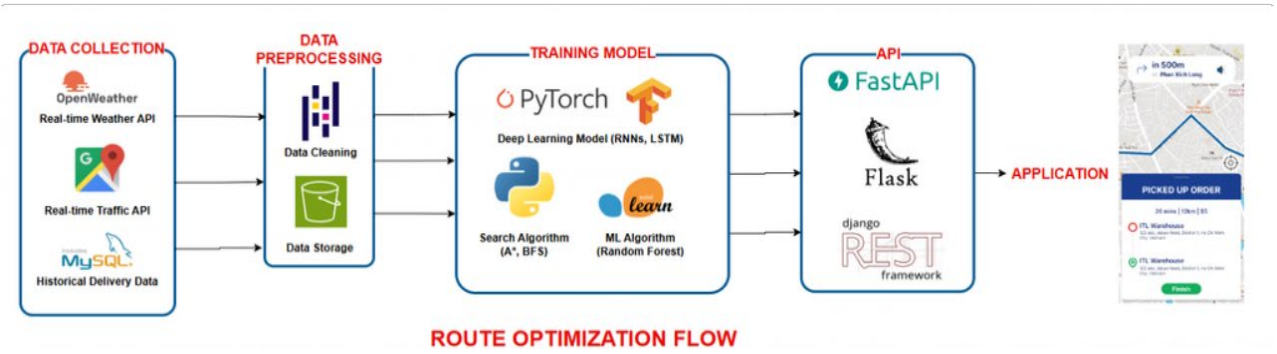
1. Introduction

I am Toan, an AI Engineer at Akatsuki, leading the advanced artificial intelligence technologies integrated into enterprise solutions such as TMS for ITL Corporation. My work involves the deployment of state-of-the-art techniques like predictive analytics, machine learning, deep learning, and computer vision to optimize processes for innovation. Aligning modern technology with business objectives is crucial. I aim to provide solutions that enhance operational efficiency, leverage the automation, and position the company at the edge of technological leadership in the logistics industry. My mission is to ensures the seamless integration of AI to create measurable value and competitive advantage.

2. Plan to apply major to the project

1. Route Optimization

It offers an AI-powered Route Optimization Flow to improve the efficiency in logistics operations by combining real-time data collection, machine learning, and deep learning models. This uses weather, traffic, historical delivery data, and more using high-level AI techniques to compute the most efficient routes and presents valuable insights through an API that can be used in website or application.



Route Optimization Flow

Here is the breakdown of entire process:

a) Data Collection:

- Real-time weather API through OpenWeather: Current and forecasted weather to take into account any delays or obstacle that can result from bad weather conditions, such as storms or rain.
- Real-time traffic API through Google Maps: Traffic jam and road closure information for real-time route adjustment.
- Historical delivery data through MySQL: Aggregated and stored past delivery records to identify patterns and trends, such as high delivery volume times or repeated deliveries.

b) Data Preprocessing

- Data Cleaning: Ensures that the gathered information is devoid of inconsistencies, missing values, and noise, therefore increasing the reliability of the model training process.

- Data Storage: Organize and save cleaned data for further analysis and modeling. A MySQL database acts as the storage backbone for large datasets.

c) Training Model

- Deep Learning Models: Using PyTorch, the RNNs and LSTM will be trained to make predictions of delivery times and route optimization by learning temporal patterns in data. (Zhang, 2024)
- Search Algorithms:Implementation of informed and breadth-first search techniques to perform pathfinding and optimize shortest routes through various points of delivery.
- Machine Learning Algorithms: Random Forest with scikit-learn, utilizing both historical and real-time data.

d) API

- FastAPI/Flask/Django REST Framework: These are used in the backend to expose APIs and integrate trained models with an application

2. Vehicle Management

The idea for vehicle management stems from the need to effectively monitor the available vehicles in the garage. Overall, ITL's carrier owns multiple garages distributed across different regions. As a result, the cost of managing these garages is quite high. To minimize costs, a solution integrating computer vision has been proposed. Our team aims to use a pre-trained object detection model, YOLOv5, and fine-tune it to detect various types of trucks and vehicles in the garage. YOLOv5 is a state-of-the-art object detection model known for its speed and accuracy, leveraging deep learning to detect and classify objects in images and videos in real-time. (Zhang et al., 2022) With the integration of cameras, managers can now remotely access the system to monitor the number of vehicles available in the garage and develop effective strategies for distributing these vehicles for work. It is also a way to enhance the security of garage by detecting carrier's staffs distinguish from the stranger to notify whenever an intrusion occurred.

2. Front-end Development

Nguyễn Hoàng Trung

1. Introduction

Hello! I'm Trung, a software developer with a strong focus on front-end development. I thrive on bringing creative ideas to life by building visually appealing and user-friendly digital experiences. With a keen eye for detail and a passion for intuitive design, I am dedicated to transforming complex concepts into interactive, efficient, and engaging interfaces. My work is driven by the ever-evolving nature of technology, pushing me to continuously refine my skills and stay at the forefront of the field. I am committed to crafting innovative solutions that bridge the gap between design and functionality, delivering exceptional user experiences.

2. Plan to apply major to the project

1. UI/UX Enhancement:

Creating visually appealing and user-friendly interfaces is a primary objective of front-end development. A well-designed and intuitive interface plays a crucial role in capturing user attention and promoting engagement. This leads to increased traffic and client interaction with the service. Moreover, an enhanced user experience (UX) goes beyond aesthetics—it makes the interface easy to navigate and straightforward to use, ultimately boosting productivity, reducing errors, and increasing user satisfaction. In the context of logistics, this means designing interfaces that help personnel efficiently manage tasks and access information seamlessly.

2. Performance Optimization:

Ensuring fast-loading and responsive interfaces is essential for user retention and satisfaction. Optimizing front-end performance reduces latency and provides users with smooth interactions. Techniques such as code splitting, lazy loading, and efficient asset management play a pivotal role in speeding up the application. These strategies contribute to better performance, helping logistics professionals get real-time updates and rapid access to critical data without delays, improving overall operational efficiency.

1. Error Handling and Feedback:

Effective error handling and user feedback mechanisms are integral to creating a reliable front-end experience. Implementing clear and concise error messages and notifications guides users through problem resolution without frustration. This helps prevent workflow disruptions and improves user trust in the system. In logistics applications, timely feedback and error handling allow personnel to address issues promptly and keep operations running smoothly, reducing downtime and minimizing the impact of errors on productivity.

3. Back-end Development

Phùng Gia Khang

1. Introduction

Hi, my name is Khang, I play the role of a back-end developer in our team. It is my responsibility to ensure the seamless operation and scalable architecture of the Transportation Management System for ITL Corporation. Moreover, I guarantee that the TMS functions efficiently and securely by creating the core logic, handling data flow, and maintaining system reliability. From designing databases to implementing APIs and ensuring secure, efficient data handling, I am responsible for the backbone of the application that powers various functionalities across the Transportation Management System. By leveraging modern frameworks and tools, I aim to deliver reliable, high-performance solutions in response to the logistics needs of ITL Corporation.

2. Plan to apply major to the project

a) Database management and design

- Design and structure relational databases to manage complex data, including shipment details, delivery schedules, customer information, warehouse and inventory capacity, staff and employees, and supplier information and performance history.
- Develop normalized schemas that incorporate data consistency, reduce redundancy, and optimize query performance.
- Write queries for different use cases and scenarios that help stakeholders gain valuable insights into the operation of the system, helping them make well-informed decisions.
- Collect, manage, and generate tables of valuable data to be fed into formulas which serve as the base for data analysis.
- Securing storage, input, and retrieval of data.

b) API Development and management

- Build RESTful APIs to facilitate smooth communication between the front-end and back-end systems.
- FastAPI, Django REST Framework, Flask
- Provide APIs for vehicle monitoring to communicate between different logistics departments.
- Build a scalable system that supports the development of third-party applications.

c) Authentication and Authorization

- Using JWT (JSON Web Tokens) and OAuth to manage user sessions with token-based authentication.
- Implement role-based access control to restrict and allow data and function authority based on users' roles.
- Implement security methods against various types of attacks such as CSRF, SQL injection, brute force attack, and cross-site scripting.

4. Data Science and Analysis

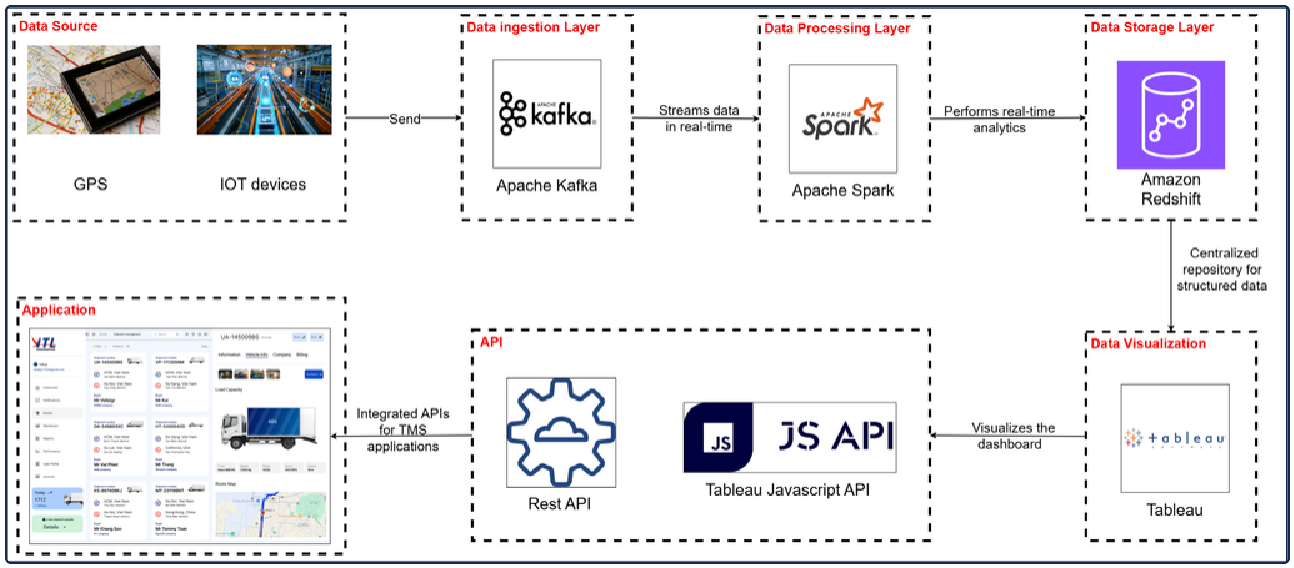
Đinh Việt Phát

1. Introduction

Hello. My name is Phat, and I am a data scientist and analyst for the TMS solution for ITL Corporation. Moreover, my role is an important component of Transportation Management Systems (TMS), driving advanced logistics through data-driven insights for the customer. Therefore, the core function of data is to streamline operations, enhance decision-making processes, and optimize resource allocation by utilizing both real-time and historical datasets. This project also includes some crucial functions of using data such as route optimization algorithms, demand forecasting models, driver performance metrics, etc. Additionally, the real-time data monitoring of key performance indicators (KPIs) enables rapid problem identification and resolution.

2. Plan to apply major to the project

In this TMS solution for ITL, I have constructed a scalable architecture with some technologies such as Apache Kafka for real-time data streaming/ingesting and Apache Spark for large-scale data processing. Then, the cleaned and processed data will be stored in the data warehouse, where advanced analytics and machine learning models provide insights with the combination of historical and real-time data, such as route optimization and delivery forecasts. Additionally, Tableau for data visualization through interactive dashboards embedded into TMS applications using APIs. Moreover, this tool improved operational efficiency, significant cost savings, and heightened customer satisfaction with the TMS solution. Ultimately, this approach not only increases the logistics processes' efficiency but also supports the development of strategic insights that propel future growth and innovation in transportation management.



a) Data Ingestion:

Apache Kafka

- **Role**: Kafka is the backbone for real-time data ingestion from multiple sources of data source like GPS systems, IoT sensors on vehicles, warehouse systems, and customer platforms.
- **Features**:
  - Handles high-velocity streams of data **(real-time data)** and ensures fault-tolerant processing.
  - Provides **partitions** for parallel processing, enabling scalability across distributed systems.
  - Guarantees ordered data streams, essential for accurate tracking of shipments.

- **Examples in TMS:**
  - Capturing real-time traffic data for route optimization.
  - Using real-time data streaming for live fleet tracking.
  - Sending customer notifications about delivery status updates.
- **Opportunities for Updating/Management:**
  - Leverage Kafka Streams for real-time data transformations, enhancing data quality before it reaches downstream systems.
  - Integrate with Schema Registry to uphold data quality standards and improve governance.
  - Implement support for event replay and time-based processing to enable advanced workflows and facilitate historical data checks.

b) Data Analysis/Processing:

Apache Spark

- **Role**: The processing engine for analyzing real-time and large-scale batch data.
- **Features**:
  - **Streaming API/Real-Time Analytics**: Processes live data from Kafka, like shipment status or vehicle location updates.
  - **MLlib**: Trains and applies machine learning models for route optimization and ETA predictions.
  - **Scalability**: Processes massive datasets / big data with the bulk synchronous data parallel processing system.
  - **GraphX**: Analyzes transportation networks for detecting bottlenecks or improving route designs.
- **Examples in TMS**:
  - Generating predictive delivery schedules based on traffic and weather data.
  - Performing batch analysis on shipment history for performance benchmarking.
  - Identifying delays, inefficiencies, and external problems using real-time operational data.
- **Opportunities for Updating/Management:**
  - Implement **Delta Lake** to unify batch and streaming data pipelines with strong consistency guarantees.
  - Transition to **Databricks** for managed Spark services, improving performance and reducing operational overhead

c) Data Warehouse:

Amazon Redshift

- **Role**: Amazon Redshift is an enterprise-grade data warehouse optimized for complex queries and long-term storage of structured and semi-structured data.
- **Features**:
  - **Columnar Storage:** Optimized for analytical queries, allowing TMS to derive actionable insights from historical data and reducing I/O cost overhead.
  - **Scalability:** Handles high query loads (from terabytes to petabytes of data) without compromising performance (minimal downtime)
- **Examples in TMS**:
  - Storing historical and real-time shipment, employees, and customer data for long-term analysis and reporting.
- **Opportunities for Updating/Management**:
  - Enable **Materialized Views** to enhance the performance of repetitive queries.
  - Leverage **Amazon Redshift Spectrum** to directly query data stored in S3, eliminating the need to load it into the data warehouse.
  - Integrate with **AWS Glue** to streamline your extract, transform, and load (ETL) workflows, making the creation of data pipelines simpler and more efficient.

d) Data Visualization:

Tableau

- **Role**: Displays actionable insights through dynamic dashboards for operational, financial, and strategic decision-making.
- **Features**:
  - **Real-Time Updates:** Seamlessly connects to live data sources such as Spark or the data warehouse, ensuring up-to-date information.

- **Custom Dashboards:** Offers tailored insights specifically designed for stakeholders, including fleet managers, logistics analysts, and decision-makers.
- **Advanced Analytics:** Delivers statistical insights, identifies trends, and generates predictions to enhance planning efforts.
- **Intuitive Interface:** Features a user-friendly drag-and-drop functionality, simplifying the process of building visualizations.

- **Examples in TMS**:
  - Dashboards for real-time shipment tracking, allowing for effective monitoring of delivery progress.
  - Cost analysis and performance benchmarking dashboards designed for stakeholders, including warehouse staff, drivers, and others.
- **Opportunities for Updating/Management**:
  - Deploy **Tableau Server** or **Tableau Online** to enhance collaboration at the enterprise level.

5. Cloud Solution Architect

1. Introduction

Le Nguyen Thai Son

My name is Son, and I am a Cloud Architect with the Akatsuki team. In my role, I am responsible for designing and building the cloud architecture for ITL (Indo Trans Logistics Corporation). My focus is on creating scalable, efficient, and secure cloud solutions that support the company's technological infrastructure. With a strong background in cloud computing and architecture design, I work to ensure that ITL's cloud-based systems meet both current and future business needs, optimizing performance and driving innovation in the logistics industry.

2. Plan to apply major to the project

1. Design and Optimization of Cloud Architecture

I will assess ITL’s current IT infrastructure and design a cloud architecture that supports scalability, flexibility, and performance. This involves choosing the right cloud service models (IaaS, PaaS, SaaS) and designing solutions that enhance business operations across logistics, inventory management, and transportation. The optimized cloud infrastructure will reduce costs by increasing efficiency and improving resource management, helping ITL scale operations faster while maintaining high service levels.

2. Security and Compliance

Implement robust security measures, such as encryption, multi-factor authentication, and identity management solutions, to ensure the safety and privacy of ITL’s data. Additionally, I will ensure that ITL’s cloud systems comply with industry regulations and standards. These security measures will safeguard ITL’s data, protect against cyber threats, and ensure compliance with relevant regulations, building trust with customers and partners while avoiding costly security breaches.

3. Integration and Innovation

I will help integrate cloud-based tools and services with ITL’s existing systems, allowing for smoother data flow and enabling the company to take advantage of emerging technologies like IoT and AI to enhance logistics and supply chain operations. By adopting these advanced technologies, ITL can enhance its decision-making capabilities, improve logistics optimization, predict trends, and provide innovative services that set it apart from competitors.

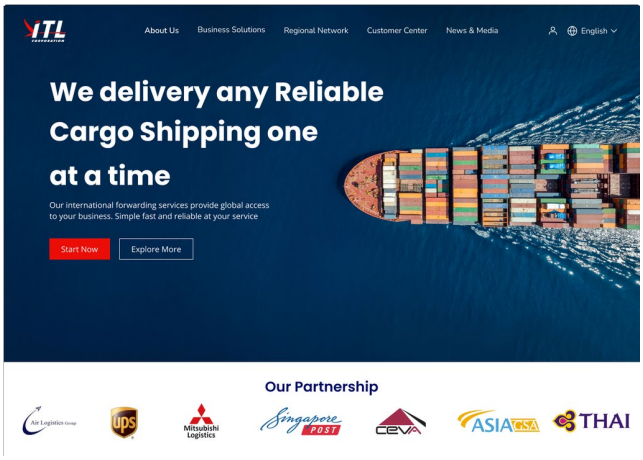
4. Continuous Monitoring and Optimization

Post-deployment, I will continuously monitor the cloud systems to ensure they are operating at peak efficiency. This includes performance tuning, troubleshooting, and optimizing resources based on real-time needs. Continuous monitoring ensures minimal downtime and optimal system performance, allowing ITL to maintain smooth operations and provide reliable services to its clients.

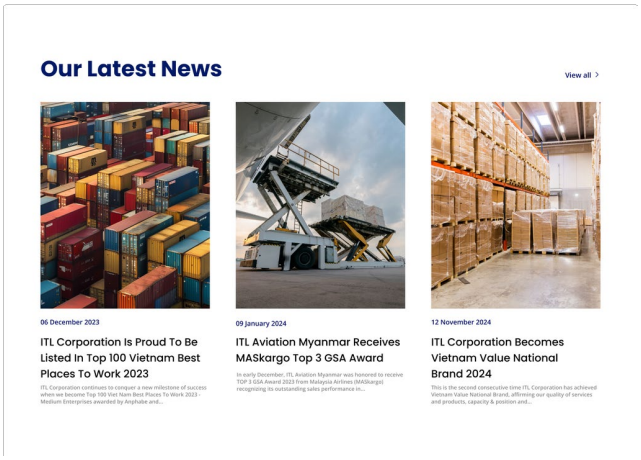
6. Procedure for Applying Project Work that Incorporates Major-Specific Elements:

A) Front-End Development

Landing Page

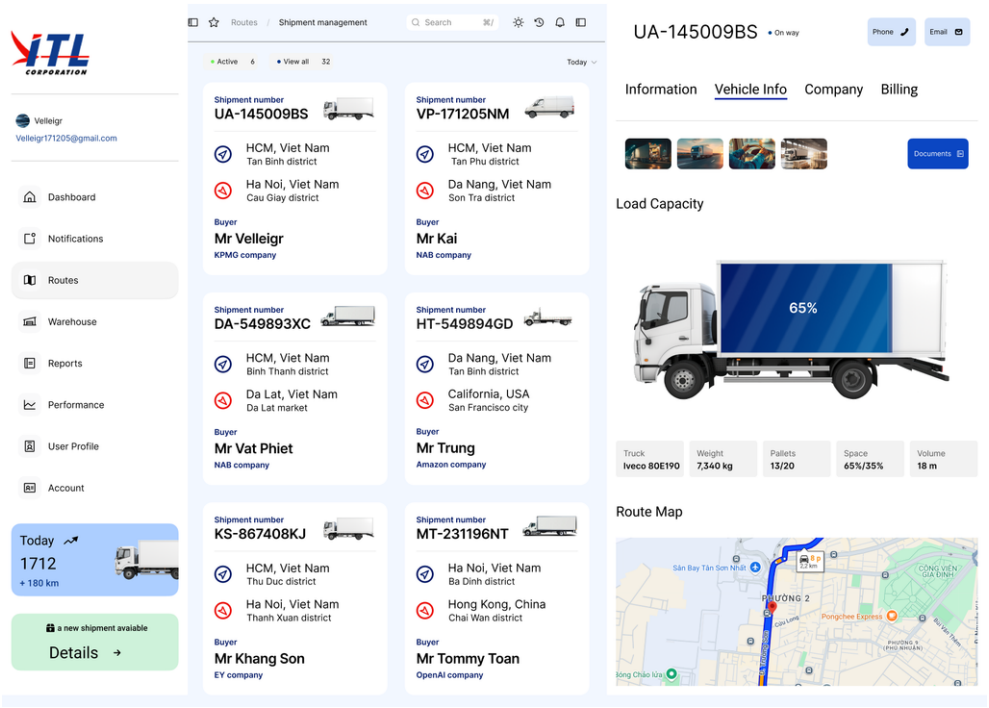


Heading of Landing Page



Latest News of ITL Corporation

Admin Page

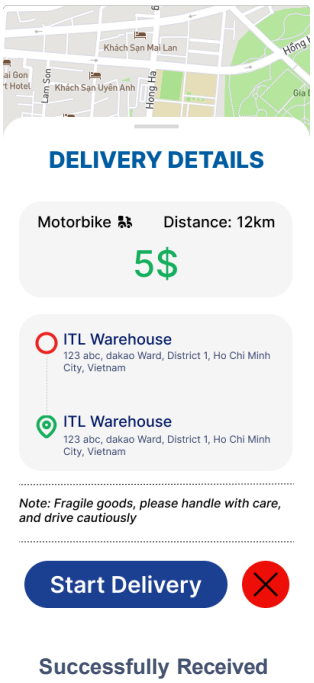


Admin Dashboards

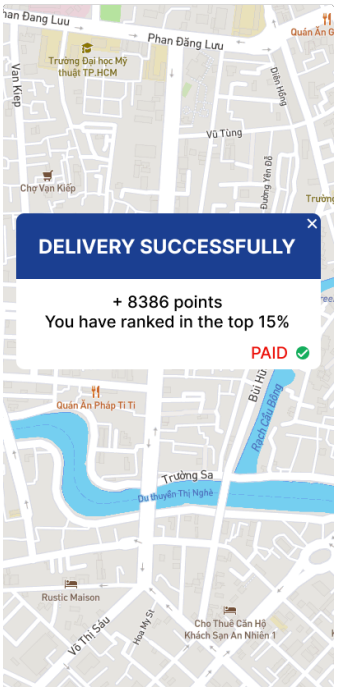
Shipper Pages

Loading Page

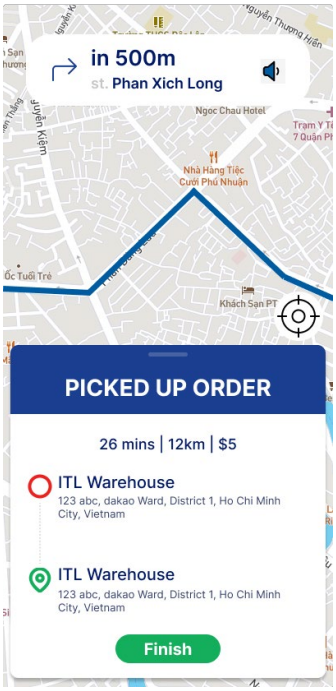
Receiving Order



Successfully Received

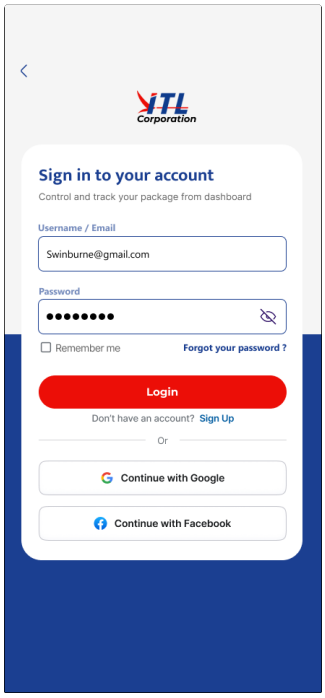


Successfully Delivery



Route Tracking

User Pages

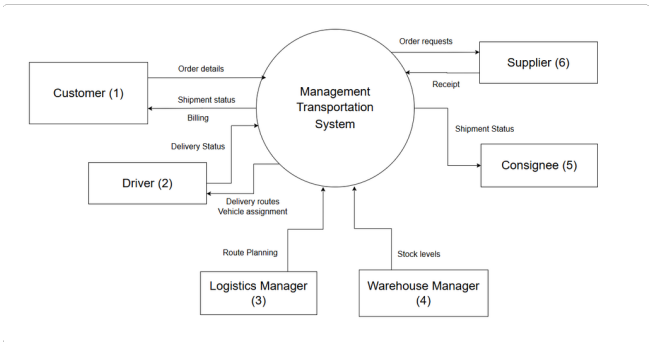


User Login Page

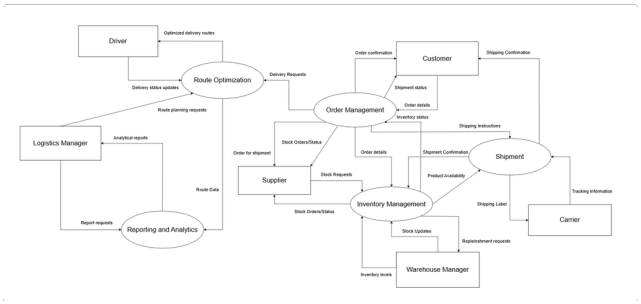
Homepage

B) Back-End Development

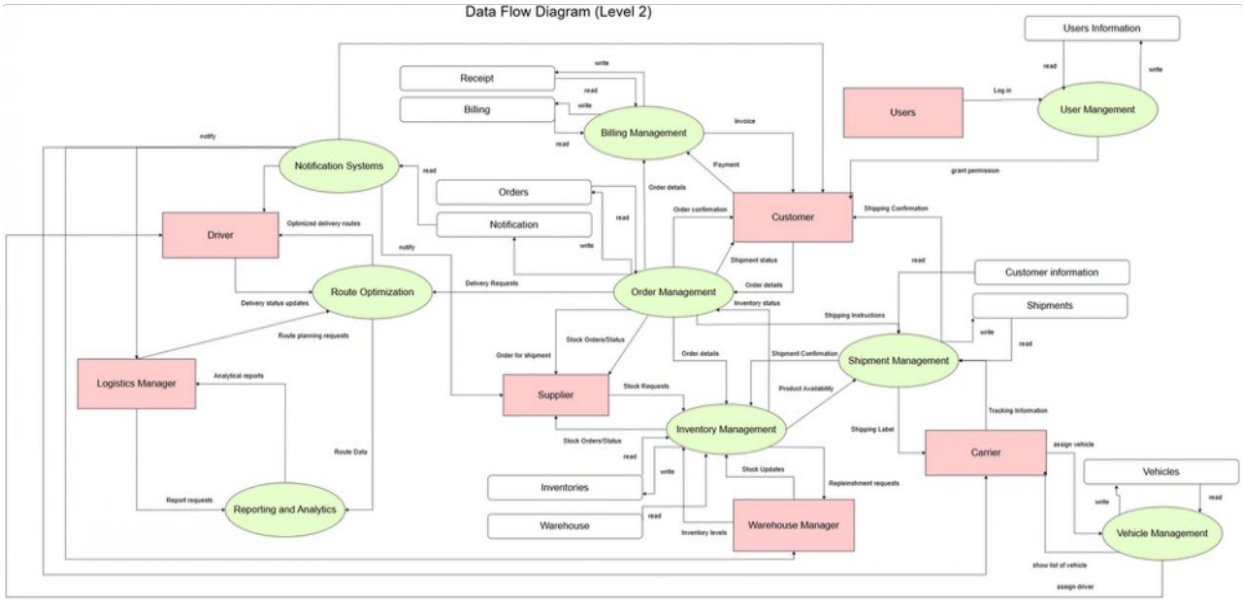
Data Flow Diagrams



Data Flow Diagram Level 0



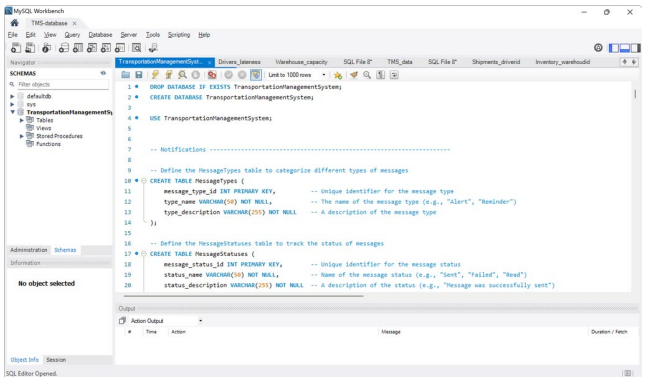
Data Flow Diagram Level 1

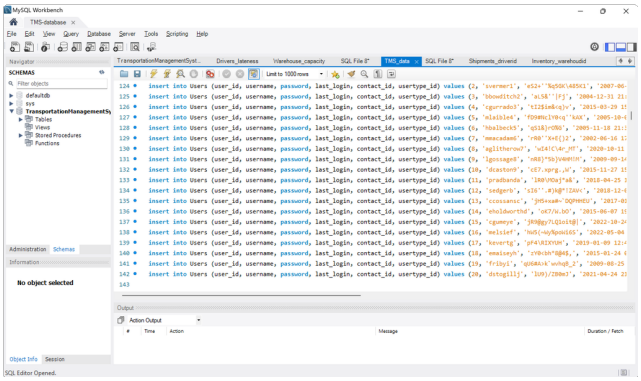


Data Flow Diagram Level 2

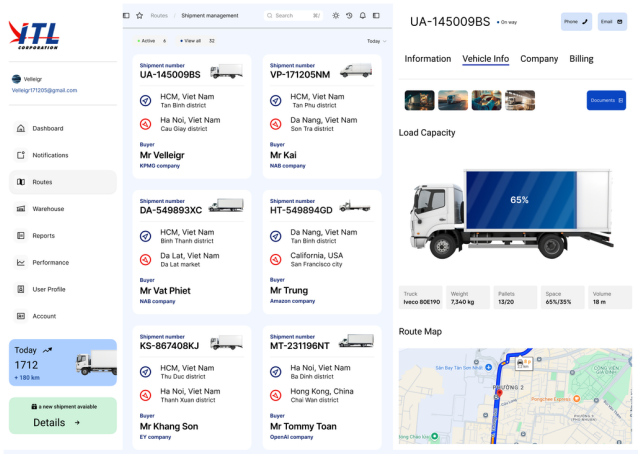
C) Data Scientist

Database creation and management

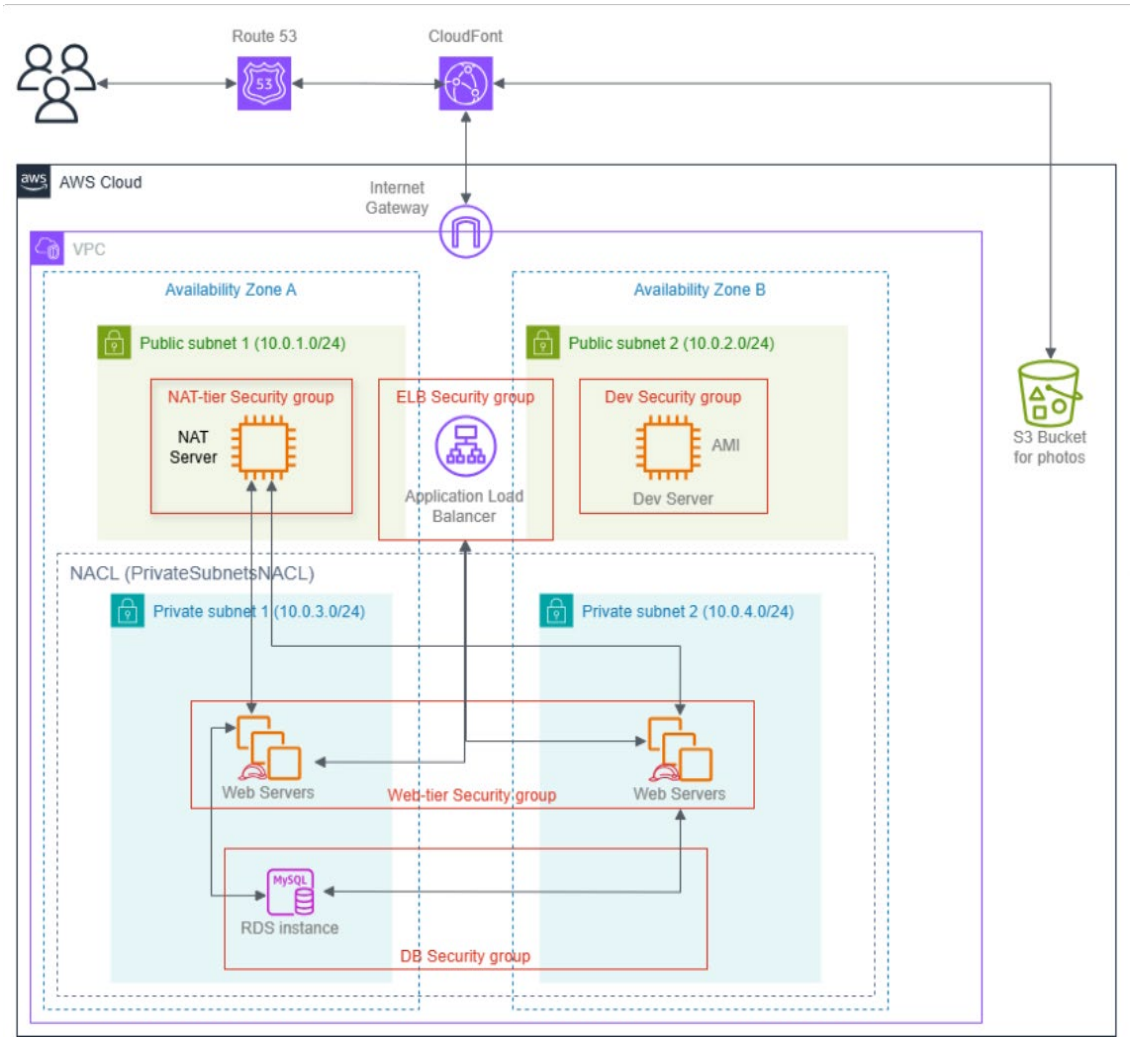




Data Science and Analytics



D) Cloud Solution Architect



Team Reflection

📋 Overview

Reflect back on what you and your team learned and what motivates the group to succeed by following the instructions for the 4Ls Retrospective Play.

Team	Team 15 - Akatsuki
Team members	• Nguyen Hoang Trung • Truong Le Minh Toan • Le Nguyen Thai Son • Phung Gia Khang • Dinh Viet Phat
Date	Nov 22, 2024
Retrospective period	Fall Semester (September - November 2024)

4Ls retrospective

Milestones	Loved	Longed for	Loathed	Learned
Important milestones	List what you loved about your work	List what you wished you had while working	List what you didn't like about your work	List what you have learned
Project Launch: The team was briefed on the project and introduced to the client, ITL Logistic Company.	@Trương Lê Minh Toàn I has chance to interview the customer from ITL Corporation, and understanding their insight. @Nguyễn Hoàng Trung This project is a new journey because I had a chance to work on	@Trương Lê Minh Toàn The process of preparing and planning before interviewing client must be conducted more carefully by conducting meetings between members. @Lê Nguyễn Thái Sơn I wished I had a clear	@Trương Lê Minh Toàn There are lack of clarity of the initial goals due to the challenge of balancing academic and project priorities. @Phung Gia Khang At first, I was a little lost when approaching a new project that I was	@Trương Lê Minh Toàn Using agile framework to collaborate between member, especially the SCRUM framework is what I learned a lot when launching this project @Phung Gia Khang Business knowledge

	creating an application, database for a huge corporation. @Phung Gia Khang I was excited to start my journey on a new project for a real business and ready to embrace the knowledge that I was going to earn. @Đinh Việt Phát I was look forward to to work on a new project for a real business and case of problems for ITL Corporation in logistic industry, besides I really eager to embrace the new and practical knowledge for Computer Science industry. @Lê Nguyễn Thái Sơn Meeting the client, ITL Logistics Company, was a highlight, as it provided valuable insights into their operations and made the project feel impactful. Diving into the logistics industry was exciting, especially tackling challenges like inventory accuracy, operational efficiency, and sustainability.	and detailed set of client requirements to better understand their needs. A well-defined timeline with specific milestones and some buffer time for unforeseen challenges would have been helpful. @Phung Gia Khang I wish I had conducted better research on the company, along with its hardships, current conditions, and room for improvements	unfamiliar with, I had a hard time getting myself used to SDLC concepts and stages. @Nguyễn Hoàng Trung The project requirements lacked sufficient information, making it difficult for us to clearly understand what to do or where to start at the beginning. @Lê Nguyễn Thái Sơn Limited resources, such as tools or data, occasionally hindered efficiency and optimal solution delivery. Communication gaps within the team or with the client sometimes led to delays and the need for additional clarification.	about logistics and transportation management systems, the use of collaboration tools to improve teamwork efficiency. @Nguyễn Hoàng Trung We learned how to form and organize a team by leveraging each member's strengths to support one another effectively. Additionally, we gained skills in gathering information and understanding the business scenario of the corporation we were working with. @Lê Nguyễn Thái Sơn I learned how to communicate more effectively with both the team and the client to align goals and clarify expectations. I developed strong problem-solving techniques, particularly in addressing complex logistical challenges like optimizing workflows and managing disruptions.
Team Role Assignment: Roles were assigned based on each member's strengths.	@Nguyễn Hoàng Trung This milestone helped us define our roles based on our strengths. This ensured that everyone understood their own strengths and the skills they could contribute to the team for this project. @Lê Nguyễn Thái Sơn I loved that roles were assigned based on our strengths. I enjoyed collaborating with a	@Trương Lê Minh Toàn While our role is fixed for the consistency of the entire project, I wish that we can flexibly change the roles mid-project if needed to promote strengths in many fields for all members @Phung Gia Khang I wished I was more active in role-choosing. A lack of advanced knowledge of a specific	@Trương Lê Minh Toàn In our team, some roles felt more demanding than others, and having only one person in one position will lead to work overload. @Đinh Việt Phát Because of the complexity relationship between the various components of our solution requires close collaboration from each	@Trương Lê Minh Toàn I learned about the importance of aligning roles with strengths to reduce conflicts and lead to team success. @Phung Gia Khang I learned a great deal of knowledge about my role: team leader and back-end developer. As the driver of the project, it is important to make sure the team sees eye to eye in the most harsh

	supportive team and seeing how each person's unique skills contributed to our progress. @Trương Lê Minh Toàn My strength and our teammates' strength are recognized and being assigned role associate with our strength. @Phung Gia Khang Our team recognized and analyzed each members' strengths and weaknesses carefully before assigning the most suitable role for them. @Đinh Việt Phát By assigning roles according to our strengths, we can enhance our technical skills at a deeper level, so leading to improved solutions with better and practical idea.	major has led me to become hesitant in this phase. @Đinh Việt Phát I wish I had the ability to flexibly change roles in order to gain more knowledge across various fields. This would allow us to enhance our skills in both technical and theoretical aspects. @Nguyễn Hoàng Trung I wished that we could help defined our role's responsibilities clearer, so that everyone could know what to do the beginning of the project. @Lê Nguyễn Thái Sơn I wished for access to more advanced tools or software that could have streamlined tasks and improved efficiency. Clearer role definitions would have minimized overlap and confusion, ensuring a smoother workflow.	role. For instance, Backend and Frontend developers must work in parallel, which requires significant time dedicated to communication and adaptation to each other's role requirements. @Phung Gia Khang Each role plays an important part in the overall result of the project. However, some roles are more tiresome to fulfill. Therefore, apart from our own part, each team member should have supported others with their tasks in tense situations willingly, instead of abide strictly by the tasks distribution dashboard. @Lê Nguyễn Thái Sơn The lack of access to necessary tools or information sometimes made it challenging to complete tasks efficiently. Certain repetitive tasks felt monotonous and detracted from the more strategic and engaging parts of the project.	situations and get them to communicate and exchange ideas to generate innovations. Moreover, as a back-end developer, I earned useful experience in database management and API applications. @Đinh Việt Phát I could learn how to apply my strengths as a Scrum Solution Architect which focuses on optimizing team processes, ensuring that each member is effectively tracked, and assisting teammates in managing Product Backlog items. Additionally, it involves defining the Product Goal and achieving the Definition of Done. @Nguyễn Hoàng Trung This milestone taught us to find our strength and skills that would be useful for the team. @Lê Nguyễn Thái Sơn I realized the importance of clearly defining roles early on to avoid confusion and ensure everyone knows their responsibilities. This approach builds trust within the team, as each member feels confident in their contributions.
Persona Interview and Pain Point Analysis: User personas were created, and key pain points were identified through interviews.	@Đinh Việt Phát I had the opportunity to meet with an expert in the logistics industry to listen to their experiences and needs, gaining valuable insights that will inform our solution. @Nguyễn Hoàng Trung This was the	@Trương Lê Minh Toàn I wish that I will have more chance to explore diverse user groups for a broader perspective, and also understand deeper about the ITL Corporation in different perspectives.	@Trương Lê Minh Toàn My communication skill is quite bad when I meet face-to-face with the client. Therefore, I am quite embarrassed, which leads to the inefficient in communicating.	@Trương Lê Minh Toàn I learns about multitasking between different work during the preparing phase. While researching about our client - ITL Corporation, I also contact with them and planning for interviewing.

most interesting milestone because we had the chance to meet our personas, which varied from CEOs and managers to drivers. Through these personas, we were able to interview, learn, and gain insights to help us create and improve our project.

@Trương Lê Minh Toàn Gaining deeper insights into logistics industry, which is a field that I never thought that I will have chance to explore.

@Phung Gia Khang We went to ITL Corporation's office near our base and even took a picture there when we were interviewing personas. Not only was it a valuable experience, but it was also fun and memorable.

@Lê Nguyễn Thái Sơn I loved the process of creating user personas, as it allowed me to gain a deeper understanding of the target audience and their unique needs. Conducting interviews was also a valuable experience, as it provided direct insights into the challenges and pain points faced by users.

@Phung Gia Khang It is vital to have a persona that effectively represents the group of people that persona is in. However, we could not interview many different people and had to apply our knowledge to form a persona where information is lacking.

@Đinh Việt Phát I wish I had more opportunities to conduct interviews and gather insights (pain point) from a broader user group because this would enable me to develop a more comprehensive and better persona that reflects the diverse perspectives within ITL Corporation.

@Nguyễn Hoàng Trung Although the interview with my persona, a driver from ITL Corporation, went well, I wish I had prepared the questions more carefully to gain deeper insights from him.

@Lê Nguyễn Thái Sơn I wish I had more time to do more in-depth, personal interviews with a larger number of users so that we could have gotten more diverse insights and discovered more pain points.

@Lê Nguyễn Thái Sơn I struggled with the limited time available, which made it difficult to gather in-depth insights. I often felt nervous during interviews, which sometimes disrupted the flow of conversation.

@Phung Gia Khang It was tough for me to think of questions to ask our personas. To avoid taking up to much of our interviewees' time, we did not ask many questions in the interview section. Therefore, I struggled with keeping the question list short and precise to make sure valuable insights about their key pain points can be drawn from the interviews.

@Đinh Việt Phát The most challenging for me is the process to identify the relevant and suitable insights from our persona's responses. Therefore, I need to make informed decisions about which pain points are the most critical and essential for each persona for our solution.

@Đinh Việt Phát I can develop essential soft skills for my future career path, including research skills for question formulation, effective communication, and strategic planning.

@Nguyễn Hoàng Trung From the interviews and the insights gained from the personas, I learned the importance of carefully crafting our questions to focus on key areas. This approach allowed us to uncover meaningful answers and address the uncertainties that were critical to improving our project.

@Lê Nguyễn Thái Sơn I learned how to identify user needs and priorities through effective questioning. I realized the importance of active listening in understanding pain points and building rapport with users. I also discovered the value of adapting my communication style to make users feel more comfortable and open during discussions. Analyzing responses helped me recognize patterns and underlying issues in user pain points.

@Phung Gia Khang I learned what a persona is in the scope of a software development project. I had a chance to understand their roles and the significance of the solution that our

				team was working on. I was enthusiastic to learn that the actual business needs were quite different from what I had expected.
Project Setup: The team set up team workspace, team document, and project plan.	@Trương Lê Minh Toàn I love the way that our documents is organized in Confluence, which help us a lot in collaboration as well as synthesize documents after finishing. @Đinh Việt Phát I truly appreciate the templates available in Confluence, as they significantly reduce the time required to create new, specific pages, such as 4L reflections, team member profiles, etc. @Phung Gia Khang Our team logically organized our workload with Jira and documented our pages with Confluence. These tools were useful to keep our progress on the right track and follow the plan. @Nguyễn Hoàng Trung This milestone was very useful for us as it provided lessons on setting up and using Jira and Confluence, tools that enhance group collaboration. @Lê Nguyễn Thái Sơn Establishing a team document was particularly satisfying because it provided a central hub for organizing all project-related information, making it accessible to everyone.	@Nguyễn Hoàng Trung I wish the documents had been more organized, as we missed some pages that could have been useful for the report. @Trương Lê Minh Toàn I hope that we had a Confluence and Jira workshop for all team members so that we do not waste many times for learning these tools. @Phung Gia Khang I learned about Atlassian tools mainly on LinkedIn Learning. It was a helpful platform to study. However, I wish there were more practical lessons where we could apply a wider range of these management tools with detailed instructions. @Lê Nguyễn Thái Sơn Had more time to refine the structure of the team workspace to ensure it was fully optimized for collaboration from the start. I also wished for more advanced project management tools to better organize tasks, track progress, and manage deadlines.	@Trương Lê Minh Toàn Initial confusion about how to use tools for collaboration such as Jira, Confluence @Đinh Việt Phát Because there are new collaboration tools such as Jira, Confluence,.. for me, so I dedicated time to watching the tutorial videos form LinkedIn Learning and shadowing step by step the processes to learn how to create content effectively using these tools. @Phung Gia Khang The collaboration tools available at hand were vast and each of them is a whole large topic to learn about. Studying them and applying them to our project were challenges for me. Moreover, the initial project plan we formed has occurred a lot of changes to adapt to the development of the project. @Lê Nguyễn Thái Sơn The team workspace took longer to organize than anticipated, and it was challenging to ensure that all members were fully comfortable with the tools and structure.	@Trương Lê Minh Toàn Using Confluence and Jira is the biggest thing that I learned. I learn about how to use templates for documentation to save setup time. @Phung Gia Khang Jira and Confluence were really helpful tools. Not only did we apply them to this project, but they are sure to be an important part of our skills when we start our career path and work as an employee of companies or as a developer of a larger team. @Nguyễn Hoàng Trung The most important thing I learned in this milestone is how to use Jira and Confluence. Knowing how to use these collaboration tools will be a significant advantage for us when working in groups. @Lê Nguyễn Thái Sơn The importance of having a well-organized team workspace that fosters collaboration and keeps everyone on the same page. I realized that a central team document is crucial for storing key information, but it needs to be structured properly to

				avoid clutter and ensure easy navigation.
Define Product Requirements: The team held several meetings with the customer to understand their requirements for the project and product.	@Trương Lê Minh Toàn I had chance to engage in deep discussions with the client to understand their vision. @Phung Gia Khang The process through which we came up with our software product was logical and reasonable. We started with our personas, analyzed their key pain points to understand the companies' issues and finalize the improvements that our solution needed to make.	@Trương Lê Minh Toàn The process of defining product requirements is just in several weeks but I thought that we need more than it for brainstorming more potential features with the client. @Phung Gia Khang I thought of this as the most important step in the entire project. However, it was in this step that we were still kick-starting our journey on learning about project and SDLC, and were lacking experience.	@Trương Lê Minh Toàn There are lack of immediate feedback from client on proposed ideas so that it delays our work. @Phung Gia Khang As this is our first software development project, I struggled with recognizing the most important aspects and requirements for the project.	@Đinh Việt Phát This is the process for me to learn how to translate the insights and pain points of customers or stakeholders into product requirements that align with ITL needs @Trương Lê Minh Toàn I learned a lot about how to balance the user needs with technical feasibility and the value of client collaboration in refining a product vision @Phung Gia Khang I learned about how to define the requirements for a software development project and identify which solutions are effective for dealing with which pain points, and that the solutions that we provide must respond to and follow strictly our customer's needs.
System Architecture Design: The team started to work on three different levels of ER Diagram and Data Flow Diagram.	@Đinh Việt Phát This is a chance for me to apply the theoretical concepts from the document into practical applications, such as normalizing data tables, establishing keys, and defining their relationships, etc. @Nguyễn Hoàng Trung This milestone allowed me to bridge the gap between theory and practice. I had the opportunity to apply key concepts such as normalizing data tables, defining relationships between entities, and	@Trương Lê Minh Toàn I wish that during the process of drawing we had guidance from an experienced mentor in database and system design, which is the field that we do not understand in depth. @Nguyễn Hoàng Trung I hope we could have made the relationships between entities tighter, as this would have improved the ER diagram. @Lê Nguyễn Thái Sơn More time to review the	@Trương Lê Minh Toàn There are some part of the requirements that do not provide enough clarity so that we need to propose other suitable options. @Lê Nguyễn Thái Sơn I found it difficult to represent certain complex interactions in a clear and concise way, which sometimes made the diagram look cluttered.	@Đinh Việt Phát I explored various three-level Entity-Relationship Diagrams (ERDs) to understand their differences, how to update through each level. Additionally, I identified and evaluated the tables that are most suitable for our solution. @Nguyễn Hoàng Trung In this milestone, I learned how to visualize a database through three different levels of ER diagrams. I also learned how to normalize data and

	creating an ER diagram with three different levels. These tasks provided valuable experience and helped me gain a deeper understanding of how to effectively structure and manage data in a practical setting. @Trương Lê Minh Toàn I has chance to explore more about the Data Flow Diagram, and how to conduct as well as develop it for the visualization of data in our system	system requirements in depth would have allowed me to identify potential gaps in the flow and improve the overall diagram.		make the relationships between entities more concise and clearer. @Trương Lê Minh Toàn I learned a lot about how to create detailed Data Flow Diagram in different level of complexity, and understanding the value of iterative refinement in producing high-quality designs. @Lê Nguyễn Thái Sơn I gained a deeper appreciation for the iterative nature of designing DFDs, as feedback from the team helped refine the diagram and ensure it accurately depicted the system's behavior.
System Development Phase: The team started working on creating database statement on MySQL Workbench.	@Nguyễn Hoàng Trung I loved working and practicing with query statements in MySQL Workbench. @Phung Gia Khang I enjoyed learning and practicing with queries in MySQL and Workbench. It was fun to learn that behind each query, there is a lot to analyze and understand. Although SQL is easy to learn, it is difficult to master and used professionally.	@Phung Gia Khang There was a course on LinkedIn Learning called *SQL Essential Training.* It was a collection of detailed and comprehensible lectures in videos and practice challenges that helped me a lot with database concepts, SQL queries, and environment setup. It was such a pity I only learned of it near the final of the project.	@Phung Gia Khang There were 3 main phases from creation to function and testing of the database: Table creation, dummy data generation, and use case writing. The mismatch in datatype, table fields, and relationships among these phases was a challenge that took me a large amount of time to work on.	@Đinh Việt Phát Through the tutorial videos available in the LinkedIn Learning Course, I can get acquainted with some fundamental MySQL queries, including “SELECT,” “INSERT,” and “JOIN.”,…. @Nguyễn Hoàng Trung I learned how to work with query in SQ. Therefore, I learned how to create database, table, etc. @Phung Gia Khang Firstly, I learned a lot of important concepts about database and data management such as First Normal Form, Second Normal Form, and Third Normal Form.
System Testing Phase: The team tested the database to ensure all	@Nguyễn Hoàng Trung This milestone was the most	@Lê Nguyễn Thái Sơn while I managed the creation of dummy data	@Đinh Việt Phát Because of MySQL Workbench run the	@Nguyễn Hoàng Trung From this testing phase, I gained a deeper

queries worked properly and all tables were created. Then, we tested the database with dummy data using Mockaroo.	challenging for me, but I still enjoyed it a lot because we had opportunities to test the query that we had created.	using Mockaroo, I wished I had automated testing scripts to quickly verify the database's functionality and integrity. It would have been helpful to have a detailed set of test cases to ensure all scenarios, including edge cases, were covered.	queries each line, so I spend most of time working with Trung to identify and organize all the tables. This collaboration was essential to ensure that the queries executed successfully, creating tables with all the necessary keys and avoiding any errors. @Nguyễn Hoàng Trung I didn't like how MySQL worked during this phase because it runs queries line by line, which made each test take a lot of time. This slow process was frustrating and inefficient.	understanding of how MySQL works. We faced many challenges initially, but through extensive testing, I gained valuable experience and was able to create a flawless database.
System Performance Optimization: We applied indexing statements based on various use cases to improve database performance, resulting in better performance outcomes.	@Phung Gia Khang I enjoyed the fact that each use case is aligned with a business scenario and serves an operational purpose in the bigger picture.	@Phung Gia Khang I wish I had more business knowledge and experience, which give me valuable insights and write use cases that are tightly aligned with the needs of different departments in ITL Corporation	@Phung Gia Khang The greatest challenge that I faced was the difficulty in thinking of queries capable of improving database performance in specific and software applications in general.	@Phung Gia Khang Writing use cases and indexes for the database was where I learned the most. To write use cases that are both effective when running and meaningful for generating data that can be fed for data analysis, I had explored in details the operation of logistics and tranportation of different companies.
Major-specific Work Assessment: The team assigned tasks based on each member's major and strengths. Then, we built a complete system by integrating various technologies.	@Trương Lê Minh Toàn Exploring innovative AI applications like vehicle detection and route optimization Applying machine learning and deep learning techniques to solve real-world problems. Contributing unique AI expertise of myself to enhance the Transportation Management System.	@Đinh Việt Phát I look forward to having more chances to practice with MySQL, such as hosting databases, developing use cases and indexes, and creating dummy data, among other tasks. @Nguyễn Hoàng Trung Actually, I only designed the interface, and I wish I could have created a fully functional application. Doing so	@Trương Lê Minh Toàn Limited time to fully implement advanced features, such as dynamic route optimization, and difficulty integrating AI models with the overall system due to compatibility issues. @Phung Gia Khang During the back-end work, I encountered several challenges such	@Đinh Việt Phát Although I cannot engage in more activities to practice MySQL, I can conduct research for the Data Scientist role focused on TMS solutions. Therefore, this will allow me to gather extensive information and insights into the data industry, including technologies such as Apache Spark and

	@Nguyễn Hoàng Trung In this milestone, we had the opportunity to apply our major to the project, which was exciting. As a front-end developer, I was able to design the interface for our application and website, making the project more functional and user-friendly. @Phung Gia Khang It was exciting to learn about the role of a back-end developer in a software application. I had a chance to apply various skills such as database management and API development that works as the backbone of the whole application. Since our software application is designed for a logistics company, the role of a back-end developer becomes even more important. @Lê Nguyễn Thái Sơn The opportunity to apply my expertise in cloud architecture to the project, as it allowed me to design and implement scalable, reliable, and secure cloud solutions. Integrating cloud technologies with other components of the system was particularly rewarding, as it demonstrated how different technologies can work together seamlessly to create a cohesive whole.	would have made the project even more complete and perfect. @Trương Lê Minh Toàn During the phase of training model and deploying it, I wish that I had access to high-quality datasets for training and testing AI models, and also expert guidance or mentorship in implementing complex AI algorithms. @Phung Gia Khang In this project, I focused mainly the database management and query optimization. However, I did not pay much attention to the security of the applications. I have researched security measures against common types of attacks but did not have the chance to implement them to protect our database from breaches. @Lê Nguyễn Thái Sơn Closer collaboration with the development and database teams could have ensured better alignment between the cloud infrastructure and the overall system architecture.	as minimizing database query times, API response latency, and server processing times, researching about different types of security breaches and measures to tackle them was also challenging. @Lê Nguyễn Thái Sơn One challenge was managing the complexity of integrating cloud services with other technologies, as it sometimes led to unforeseen issues that slowed down progress.	Kafka, as well as tools like Tableau… @Trương Lê Minh Toàn I learned way to apply AI concepts like computer vision and optimization to logistics, and transforming traditional systems into smarter solution, which catch up with the technology trends. @Nguyễn Hoàng Trung I learned how to visualize our customers' needs and incorporate all the necessary functions into our application and website to meet their requirements. @Phung Gia Khang I learned a great deal about SQL and queries, handling of databases and schemas as well as database hosting options that are available online. @Lê Nguyễn Thái Sơn I learned how to optimize cloud resources for cost efficiency while maintaining performance and availability. The process taught me how to anticipate potential bottlenecks and address them proactively, ensuring a smoother deployment process.
Demo Application Presentation: The team presented the project	@Đinh Việt Phát I appreciate the opportunity to share our	@Nguyễn Hoàng Trung As I mentioned earlier, since I did not	@Trương Lê Minh Toàn There is limited time for detailed	@Trương Lê Minh Toàn Skill for presentation and public

and the product to Dr. Thomas Hang and the client. And then we completed the process and product video.	ideas with true experts in the technology industry. Additionally, their constructive feedback will be invaluable in refining our solution for the final report. @Lê Nguyễn Thái Sơn I loved showcasing the product and seeing how the team's hard work came together to meet the client's needs. Engaging directly with Dr. Thomas Hang and the client was rewarding, as it gave me the chance to receive valuable feedback. @Trương Lê Minh Toàn I had chance to sharing our work with the industry experts and Dr. Thomas Hang and gaining insight as well as constructive feedbacks from them. @Phung Gia Khang A presentation has always been where I shine. Moreover, I enjoyed exhibiting the work my team had worked on for nearly three months. The feedback we received from our project supervisor and industry expert were helpful to improve our solution.	complete the actual application, I was unable to showcase it. I wish I had finished it, as it would have allowed us to receive more valuable feedback from our lecturer. @Trương Lê Minh Toàn I wish that during the sharing session we can have constructive feedbacks from the audience to enhance the diversity of perspectives. @Đinh Việt Phát I hope that during the presentation session, we can have more time to share the details of our solution and receive constructive feedback from the peers for other perspective. @Phung Gia Khang We prepared for the presentation in such a rash we did not have much time practicing together. As a consequence, the transition between each speaker in the presentation was not really smooth.	explanations of complex features so that we just can explain in general concept of all the system. @Phung Gia Khang Designing slides has always been an important part of preparing for a presentation. However, I often struggle with designing, and this time was no exception.	speaking are the most valuable things that I learned through the sharing session with the experts. @Đinh Việt Phát The most important and essential skills that I can learn from this section is publics speaking and critical thinking to answer all questions from the expert and Mr Thomas to evaluate our TMS solution. @Phung Gia Khang With the help of my teammates, I learned a great deal about slides making with tools like Canva and Figma. I also learned to keep the content of the slides precise and concise, while most will be given in my speech.
Project Finalization: Review all the document pages on Confluence and the products of the team for the final submismsion	@Nguyễn Hoàng Trung This is the final milestone, marking the culmination of our efforts in this project. We have done our best to provide the best solution possible. I am truly proud of my team and myself for the work we've accomplished.	@Trương Lê Minh Toàn We wish that we has more time to refine and enhance the final deliverables. @Đinh Việt Phát We really want to have more sharing or presentation section to receive the feedback from Mr Thomas to improve our	@Trương Lê Minh Toàn I experienced significant stress during the final stages of the project due to some last-minute changes that disrupted our workflow and required immediate adjustments. The tight deadlines added further pressure, making it challenging to allocate	@Trương Lê Minh Toàn I learned the importance of teamwork and persistence in achieving our project goals, as each member's contributions and dedication played a crucial role in our success. Working under tight time constraints taught me how to stay

@Trương Lê Minh Toàn Not only working hard, after work we also bonding with other teammates for celebrating for the success of project and seeing the positive impact of the system on ITL Corporation.

@Đinh Việt Phát I really proud of all things which I have done for our TMS solution. Furthermore, I had the opportunity to network with industry experts and strengthen the bonds with my teammates.

@Phung Gia Khang Reaching this key milestone meant our project was coming to an end. I was looking forward to a break from work and going on a vacation. Nevertheless, we still had some work to do. It is now time to look back on all the work we have done and prepare for a final submission.

@Lê Nguyễn Thái Sơn This final milestone represents the culmination of all our hard work on this project. We have put forth our best efforts to deliver the best possible solution. I am genuinely proud of both my team and myself for everything we've achieved.

TMS solution before give this to the client.

@Nguyễn Hoàng Trung I still hope that we have more time to review and enhance our project, so that I can give the best project to our client as well as our lecturer.

@Phung Gia Khang I hoped we would have a chance to build a complete software application for real together and see how far we can get with our knowledge and skills.

@Lê Nguyễn Thái Sơn I hope we had more time to thoroughly review and refine our project. This would allow me to ensure that I deliver the best possible result for both our client and our lecturer.

sufficient time for polishing and refining the deliverables

@Phung Gia Khang The final submission includes more content than we have ever delivered. There were so many sections we needed to revise and troubleshoot. It was exhausting.

focused and deliver a comprehensive, client-ready system despite challenges. Additionally, I understood how building strong relationships with the client can foster trust and open opportunities for future collaborations.

@Nguyễn Hoàng Trung In this milestone, I learned the importance of collaboration and teamwork in reviewing and refining a project before delivery. We worked together as a team to thoroughly review the entire Transportation Management System, ensuring that all aspects met the requirements and expectations. I also learned how crucial it is to incorporate feedback and make final adjustments to deliver a polished product to the client. This milestone taught me the value of continuous improvement and the satisfaction of completing a project to the best of our ability.

@Phung Gia Khang In this project, I have explored many SDLC concepts, and how to effectively manage a project from planning, designing, implementing, and testing. However, the most important thing that I have learned is the teamwork experience I had with my teammates. From how to host a meeting, how to effectively transmit my ideas, and how to

				convince other people and protect my suggestions. I learned that communication was key to effective teamwork and we should report our progress actively and constantly to monitor the quality of our work and see if any member needed help, or if task allocation was unreasonable and required adjustments. @Lê Nguyễn Thái Sơn I have learned the importance of teamwork and persistence in achieving our project goals, where every member's contribution and dedication was important to its success. Working on this with a very tight time constraint taught me how to keep focus and be able to deliver a comprehensive system, client-ready despite challenges. I also learned how developing good relations with the client can bring about trust and open up avenues for future collaboration.

⚡Action plan

Action	Owner	Due date	Action items
Establish a pre-launch checklist to ensure all tools, communication channels, and initial resources are in place before the first meeting (Project Launch)	@Phung Gia Khang	Nov 22, 2024	1. **Jira setup** ◦ Create a Jira project and invite all team members to the project ◦ Add initial tasks and pre-launch checklist to Jira, assign each task to team members 2. **Confluence setup** ◦ Create a Confluence space and invite all team members to join the space ◦ Add Confluence pages about Persona, Project plan, Team agreement, and Team member profile.

			3. **Chat and meeting channels** ◦ Create a Zalo group chat and invite all team members and the project supervisor to join ◦ Setup a group in Microsoft Teams and add all members to this platform for online meetings
Conduct a strengths and weaknesses analysis (e.g., via a survey) to ensure that roles are optimally assigned based on individual expertise and interest. (Team Role Assignment)	@Đinh Việt Phát	Nov 22, 2024	1. **Design and distribute the survey to each member:** ◦ Design a comprehensive survey with suitable questions to target the key areas of expertise (e.g., technical skills, management abilities, communication strengths,...) and personal interests for each role of TMS solution. ◦ Include both qualitative and quantitative questions for a balanced analysis. ◦ Use online survey tools like Google Forms to facilitate distribution and data collection with chart visualization 2. **Encourage Honest and Thorough Responses:** ◦ Share to member of the team the purpose and importance of the survey in assigning roles effectively for getting the honest response. ◦ Reassure team members that their responses will be kept in anonymous type for promoting an environment of openness and trust. 3. **Analyze Survey Data:** ◦ Review the survey results to classify and evaluate patterns related to individual strengths, weaknesses, and preferences. ◦ Use visual tools such as charts from Google Form to display skill distributions for each team member. 4. **Identify Core Roles and Responsibilities:** ◦ Break down the project into small tasks and solutions for each major roles (e.g., project manager, data analyst, UI/UX designer, backend or frontend developer). ◦ Align roles with survey results by considering both expertise and expressed interest. This approach will help maximize engagement and enhance overall effectiveness. 5. **Consult with Team Members:** ◦ Organize a team meeting to share the initial role assignments derived based on the analysis of survey.

			◦ Allow team members to provide feedback or suggest adjustments to their roles, ensuring alignment with their strength and preferences. 6. **Assign Roles and Document the Process:** ◦ Clearly define each team member's responsibilities and finalize role assignments to ensure effective collaboration and accountability within the team. ◦ Create the new “Roles” page to write the main responsibilities and specific tasks for each role in a shared platform such as Jira and Confluence. 7. **Establish Role Review Mechanisms:** ◦ Establish regular reviews to guarantee that roles are consistently aligned with project requirements and support individual development. ◦ Make necessary adjustments based on team feedback or changing project requirements. 8. **Develop a Skills Development Plan:** ◦ Identify the lack of skills in expertise highlighted by the survey and provide relevant resources or training opportunities such as tutorial videos from LinkedIn Learning to address these deficiencies. ◦ Encourage cross-functional learning together to foster a more flexible team. 9. **Evaluate and Reflect:** ◦ At the conclusion of the project, evaluate the effectiveness of each role process to build a constructive environment that promotes continuous improvement through every project. ◦ Gather feedback to enhance our strategy for upcoming projects. 10. **Monitor Team Dynamics:** ◦ Sharing the problems to each other member for proactively address to maintain a harmonious and efficient team environment. ◦ Monitor team interactions and productivity to ensure all member enhance collaboration and improve overall output.
Rotate minor responsibilities periodically to provide members opportunities to learn new skills while maintaining focus on their primary roles. (Team Role Assignment)	@Trương Lê Minh Toàn	Nov 22, 2024	1. **Identify Minor Responsibilities**: ◦ Create a comprehensive list of minor responsibilities that can be rotated, ensuring they align with team objectives and provide learning opportunities. 2. **Develop a Rotation Schedule**:

			- Establish a clear rotation schedule, specifying the duration for each responsibility (e.g., bi-weekly or monthly) and communicate this plan to the team. 3. **Facilitate Skill Development**: - Provide training sessions or resources for team members to develop the necessary skills related to their new responsibilities. This could include workshops, online courses, or mentorship opportunities. 4. **Set Clear Expectations**: - Define the expectations and outcomes for each minor responsibility to ensure team members understand their roles and can measure their success. 5. **Encourage Peer Support**: - Foster a culture of collaboration by pairing team members during their rotations. This will allow them to support each other and share insights. 6. **Gather Feedback**: - After each rotation cycle, collect feedback from team members about their experiences, challenges faced, and skills gained. Use this information to adjust future rotations.
Incorporate a feedback loop where initial personas are reviewed and validated by the client to confirm their accuracy. (Persona Interview and Pain Point Analysis)	@Nguyễn Hoàng Trung	Nov 22, 2024	1. **Conduct Persona Interviews:** - Interview representatives from the target audience (such as users, clients, or stakeholders) to gather firsthand insights about their behaviors, needs, pain points, and goals. These interviews will help shape the initial personas. 2. **Create Initial Personas:** - Develop initial personas based on the interview findings, along with any other relevant research or data. These personas should represent the key characteristics, motivations, and challenges of the target audience. 3. **Present Personas to the Client:** - Share the drafted personas with the client for review and validation, ensuring that they accurately reflect the real needs, behaviors, and characteristics of the target audience. 4. **Gather Client Feedback:** - Collect detailed feedback from the client regarding the accuracy and relevance of the personas. Ask for specific insights on any discrepancies or additional information that should be incorporated.

			5. **Analyze Feedback:**
			   - Review the client's feedback and compare it against the original persona interviews. Identify areas where the personas need adjustment or further clarification, ensuring they align with the client's understanding of the target audience.
			6. **Revise Personas:**
			   - Update and refine the personas based on the feedback received from the client, incorporating any necessary changes to better reflect the audience's true behaviors, motivations, and pain points.
			7. **Validate Personas Through Further Interviews:**
			   - Conduct additional persona interviews (if needed) to validate the updated personas. This may include speaking with new interviewees or revisiting previous ones to confirm accuracy after adjustments are made.
			8. **Iterate and Validate:**
			   - Present the revised personas to the client for a final review to ensure they accurately align with both the client's expectations and real-world data. This iterative feedback process helps ensure a more refined and validated persona.
			9. **Ensure Alignment with Pain Points:**
			   - Cross-check the personas with the pain points identified during interviews and analysis to ensure they represent not only the audience's behaviors and needs but also the challenges they face.
			10. **Document the Process:**
			   - Keep a record of the entire feedback loop process, including all interviews, feedback, and revisions made to the personas, for transparency and future reference.

Develop an onboarding workshop for new members or stakeholders to quickly understand the project's scope, tools, and goals. (Project Setup)	@Lê Nguyễn Thái Sơn	Nov 22, 2024	1. **Project Overview:**
			   - Delivered a detailed presentation of the project's mission and vision.
			   - Clarified the project's scope and the key deliverables for each milestone, ensuring that everyone understood the boundaries and expectations.
			2. **Roles and Responsibilities:**
			   - Explained each team member's role, emphasizing how individual tasks contribute to the overall success.

			◦ Defined communication channels and provided an overview of how the team collaborates effectively. 3. **Tools and Technologies:** ◦ Conducted walkthroughs for key project tools such as project management platforms, document sharing tools, and version control systems. ◦ Provided practical demonstrations to help new members get comfortable with tools like Jira, Google Drive, GitHub, or any other project-specific software. 4. **Project Workflow & Processes:** ◦ Explained the Agile methodology used in the project and the daily stand-up meeting structure. ◦ Guided new members through the process of task breakdown, prioritization, and sprint planning to ensure smooth collaboration. 5. **Key Goals & Success Criteria:** ◦ Outlined the project's goals and explained the key performance indicators (KPIs) and success criteria. ◦ Shared potential risks and strategies for mitigation, aligning the team with the project's main objectives and client expectations.
Hold collaborative workshops using frameworks like *MoSCoW* (Must-have, Should-have, Could-have, Won't-have) to prioritize requirements. (Define Product Requirements)	@Nguyễn Hoàng Trung	Nov 22, 2024	1. **Define Requirements:** • Gather all product requirements from team members and stakeholders before the workshop. • Ensure all requirements are clearly stated and understood by the group. 2. **Prioritize Using MoSCoW:** During the workshop, categorize the requirements into four groups: ◦ **Must-have:** Essential requirements that are critical to the product's success. ◦ **Should-have:** Important requirements, but not critical for initial launch. ◦ **Could-have:** Desirable features that can be included if resources and time permit. ◦ **Won't-have:** Features that are not necessary for the current phase of the project. 3. **Discuss and Align:** ◦ Encourage open discussions among team members and stakeholders to agree on the classification of each requirement.

			◦ Use the MoSCoW framework to ensure alignment on priorities and focus on the most critical tasks 4. **Review and Refine:** ◦ Regularly revisit the MoSCoW priorities during the project to ensure the requirements remain aligned with the project goals and resources.
Conduct peer reviews of architectural diagrams to identify potential design flaws before implementation begins (System Architecture Design)	@Đinh Việt Phát	Nov 22, 2024	1. **Define Objectives:** ◦ Define the goals of the peer review of architectural diagrams, focusing on identifying design flaws, optimizing performance, and ensuring scalability and compliance with requirements. 2. **Prepare Architectural Diagrams:** ◦ Ensure that the system architecture diagrams are comprehensive, precise, and adhere to industry-standard notations such as DFD, ERD,… 3. **Create a Review Checklist:** ◦ Create a checklist that addresses essential elements, including system scalability, fault tolerance, security, maintainability, and alignment with business objectives. 4. **Assign Peer Review for each Roles:** ◦ Distribute the architectural diagrams to reviewers according to their expertise in relevant fields, such as cloud architecture, security, or database design. This approach will enable us to create the most effective architecture diagram for our solution prior to building the project. 5. **Schedule Review Meetings and Get Feedbacks:** ◦ Arrange a meeting dedicated to discussing the architecture diagrams. ◦ Receive the feedbacks from teammates and Mr. Thomas to enhance the diagram of architecture in TMS solution 6. **Categorize Feedback:** ◦ Organize feedback into distinct categories, including critical issues, minor suggestions, and potential improvements. 7. **Revise Diagrams** ◦ Update architectural diagrams based on the feedback received during the review section with the priority of critical issues. ◦ Validate the changes with the team to confirm that all concerns have been thoroughly addressed.

			8. **Create the page for Review Process:**
			  ◦ Record all the feedback has been provided, revisions have been made,…
			  ◦ Use this documentation as a reference for future projects.
			9. **Reflection process:**
			  ◦ Evaluate the effectiveness of the peer review process for architecture diagram and collect suggestions for improvement.
			10. **Monitor the Process:**
			  ◦ Address the problems promptly to avoid technical wrong or project delays of underperformance member.

Adopt version control practices (e.g., Git) to manage database development collaboratively and track changes. (System Development Phase)	@Lê Nguyễn Thái Sơn	Nov 22, 2024	**Initialize Git Repository:** I initialized a Git repository in the project directory that contains all MySQL Workbench files (including schema, tables, and scripts). **Database Modeling:** I used MySQL Workbench and Modeling tools to design and visualize the database schema. This visual representation was exported as an `.csv` file, which I then committed to the Git repository. **Version Control for Schema Changes:** When making changes to the database schema (e.g., adding new tables or modifying columns), I updated the corresponding `.sql` scripts (for table creation, updates, or deletions) and committed those changes to the Git repository. **Developing and Testing Locally:** I used MySQL Workbench to develop and test the database schema changes locally, including creating new tables, updating relationships, or modifying data types. **Pull Requests for Code Review:** Once a feature branch was ready, I opened a pull request (PR) to merge the changes into the main branch. This PR included a description of the changes and allowed the team to review the database schema modifications before they were merged into the production schema. **Peer Review and Conflict Resolution:** Team members reviewed the changes via PRs, and I resolved any conflicts in the schema (e.g., duplicate table names or conflicting column names) before merging the changes. **Tracking Changes via Git Log:** We used Git's log functionality to review the history of changes made to the database schema, allowing us to track who made which changes and when.

Automate repetitive testing processes using scripts or tools like Selenium for database query validation. (System Testing Phase)	@Trương Lê Minh Toàn	Nov 23, 2024	1. **Identify Repetitive Test Cases**:
			   - Review existing test documentation to pinpoint frequently executed tests.
			   - Engage with team members to gather insights on pain points in the current testing process.
			   - Prioritize test cases based on their impact and complexity for automation.
			2. **Select Automation Tools**:
			   - Evaluate tools like Selenium for web-based applications and assess their compatibility with your tech stack.

			◦ Consider additional tools for database testing, such as SQL Server Management Studio or DBUnit, if necessary. ◦ Select tools that offer good community support and documentation for easier troubleshooting. 3. **Develop Automation Scripts**: ◦ Utilize best practices in coding to ensure scripts are maintainable and reusable. ◦ Include assertions to validate database query results against expected outputs. ◦ Organize scripts logically, grouping similar tests for better management. 4. **Set Up Testing Environment**: ◦ Ensure the testing environment mirrors the production environment as closely as possible. ◦ Configure access permissions and security settings to reflect production conditions. ◦ Set up a version control system for the testing environment to track changes. 5. **Integrate with CI/CD Pipeline**: ◦ Use tools like Jenkins or GitLab CI to automate the execution of tests with each build. ◦ Configure notifications for test failures to prompt immediate attention from the team. ◦ Ensure that test results are logged and accessible for review and analysis.
Perform stress testing to evaluate database performance under high user loads and adjust indexing strategies accordingly. (System Performance Optimization)	@Phung Gia Khang	Nov 23, 2024	1. **Business scenarios analysis:** ◦ Do extensive research about logistics and transportation management companies to understand their operation and processes. ◦ Analyze personas and different departments in a company and come up with scenarios that are often encountered by the company's staff ◦ Draw conclusions about use cases that are helpful for ITL Corporation 2. **Use case writing:** ◦ Pick out the 10 most representative business scenarios to write use cases about. ◦ Test run the use cases on the tables and dummy data generated in the preceding steps. ◦ Troubleshoot any issues and errors that occur during the tests. 3. **Index writing**

			◦ Analyze the 10 queries written for the use cases and spot any performance that can be improved in speed such as SELECT and JOIN statements ◦ Create indexes for those queries ◦ Test run those indexes by adding the EXPLAIN keyword before each of the 10 queries and see if the created indexes are used in the explanation of those queries
Document all optimization techniques applied for future projects to build on lessons learned. (System Performance Optimization)	@Đinh Việt Phát	Nov 23, 2024	1. **Establish Documentation Goals:** ◦ Clearly define the purpose of documenting optimization techniques, ensuring the focus is on improving system performance and enhancing operational efficiency. ◦ Objectives should include knowledge sharing, creating a reference for future projects. 2. **Record Performance Metrics:** ◦ Checking some basic metrics like response times, throughput, resource utilization, and error rates. ◦ Use monitoring tools to collect accurate and detailed pre-optimization data. 3. **Identify Optimization Chance:** ◦ Analyze system performance to identify areas that require enhancement, for example, resource-heavy processes,… 4. **Build the details list of Optimization Techniques:** ◦ Create thorough records for each optimization applied, including: ▪ **Problem Description:** Define the issue being addressed. ▪ **Methodology:** Outline the steps or strategies implemented. ▪ **Tools Used:** List technologies and frameworks that supported the optimization. ▪ **Challenges Encountered:** Highlight obstacles and solutions. ▪ **Results:** Compare pre- and post-optimization metrics 5. **Review and Validate Optimizations:** ◦ Conduct peer reviews to assess the effectiveness of various techniques. ◦ Incorporate feedback from team members or Mr Thomas to enhance the quality of optimization techniques. 6. **Emphasize Reusable Techniques:**

			◦ Highlight some optimization techniques which can be reused for the future project. 7. **Evaluate Long-Term Impact:** ◦ Regularly evaluate optimizations to guarantee ongoing benefits and relevance. ◦ Monitor the performance of TMS systems to identify any deviations or emerging issues. 8. **Update Continuously:** ◦ Continuously review and refresh the documentation to keep pace with the evolving technologies and techniques. ◦ Establish quarterly reviews to check that all the content stays relevant and accurate. 9. **Reflection process:** ◦ Evaluate lessons learned from each optimization effort with all challenges faced, unexpected outcomes, and new insights that can guide future projects.
Host skill-sharing sessions where team members can teach others about the unique aspects of their contributions, broadening the team's expertise. (Major-specific Work Assessment)	@Đinh Việt Phát	Nov 23, 2024	1. **Define Objectives for Skill Sharing:** ◦ Set clear objectives for the sessions, focusing on enhancing team expertise, promoting collaboration, and ensuring alignment with project outcomes. ◦ Share these objectives for each member of team to ensure alignment and engagement. 2. **Identify Contributors or Speaker of the session :** ◦ Select team members with specialized skills or unique contributions relevant to the project. ◦ Ensure a diverse content of expertise, such as , plaining technical, analytical, or design skills,… 3. **Prepare suitable topics:** ◦ Develop a comprehensive list of topics that address project requirements, explore emerging technologies,… For example, front-end design principles, machine learning in cloud, cloud first architecture,… 4. **Plan the Sessions:** ◦ Establish a routine for skill-sharing sessions, ideally on a weekly or biweekly basis, to sustain momentum and foster continuous learning. 5. **Create Supporting Materials:** ◦ Encourage contributors to create valuable resources, including slides, code snippets, and workflows to share for other team members.

			◦ Ensure that materials are easily accessible and stored in a shared repository, such as Confluence or GitHub. 6. **Build the Interactive Environment:** ◦ Encourage active engagement by incorporating Q&A sessions, live demonstrations, and group exercises to practice and review the new theories. 7. **Feedback and Reflection:** ◦ Gather feedback from participants regarding the effectiveness and applicability of the session. ◦ Utilize these insights to enhance future sessions and resolve any relevant questions. 8. **Integrate Learnings into the Project:** ◦ Encourage team members to integrate their newly acquired skills into their tasks. 9. **Evaluate Session Outcomes:** ◦ Evaluate the impact of sessions on improving team skills and boosting overall project performance. ◦ Refine the strategy by incorporating participant feedback and analyzing observed outcomes 10. **Building the Continuous Learning Culture:** ◦ Always promotes team members to propose new topics or volunteer for skill-sharing roles. ◦ Acknowledge and reward contributors for their efforts to sustain motivation and engagement.
Use storytelling techniques to craft a compelling narrative about how the system solves real-world problems, enhancing engagement. (Demo Application Presentation)	@Trương Lê Minh Toàn	Nov 24, 2024	1. **Identify Key Problems**: ◦ Research and outline the real-world problems your target audience faces. ◦ Gather testimonials or case studies from users who have experienced these challenges. ◦ Prioritize the problems based on their relevance and impact on the audience. 2. **Define Your Audience**: ◦ Create audience personas to understand their needs, preferences, and pain points. ◦ Tailor your narrative to resonate with the specific interests and experiences of each persona. ◦ Consider the emotional triggers that will engage your audience effectively. 3. **Craft a Compelling Story Arc**:

			◦ Structure your presentation with a clear beginning, middle, and end. ◦ Introduce a relatable protagonist (a user or a fictional character) who encounters the identified problems. ◦ Build tension by illustrating the challenges faced before the system is introduced. 4. **Showcase the Solution**: ◦ Introduce the system as the hero of the story, highlighting its features and benefits. ◦ Use specific examples of how the system effectively addresses the problems presented. ◦ Incorporate visuals, such as screenshots or videos, to illustrate the solution in action. 5. **Incorporate Real-Life Scenarios**: ◦ Share user stories or case studies that demonstrate the system's impact in real-world situations. ◦ Use data and metrics to quantify the benefits, such as time saved or increased efficiency. ◦ Highlight testimonials or quotes from satisfied users to add authenticity. 6. **Engage the Audience Emotionally**: ◦ Use descriptive language and vivid imagery to make the narrative relatable. ◦ Encourage audience empathy by focusing on the emotional journey of the protagonist. ◦ Pose rhetorical questions to provoke thought and connection with their own experiences. 7. **Practice Delivery**: ◦ Rehearse the presentation to ensure a natural and engaging storytelling flow. ◦ Adjust pacing and tone to maintain audience interest and emphasize key points. ◦ Seek feedback from peers during practice sessions to refine your approach.
Develop a post-project survey for both team members and clients to gather feedback on the overall process and deliverables. (Project Completion)	@Lê Nguyễn Thái Sơn	Nov 24, 2024	1. **Defining Survey Objectives:** • For **Team Members:** ◦ Assess the effectiveness of team collaboration and communication. ◦ Understand challenges faced during the project. ◦ Gather suggestions for improving team dynamics and workflows. • For **Clients:** ◦ Evaluate satisfaction with project deliverables.

			◦ Assess the clarity of communication and alignment with their goals. ◦ Gather feedback on potential areas for improvement. 2. **Designing Questions for Team Members:** • **Open-Ended Questions:** ◦ What did you find most rewarding about working on this project? ◦ Were there any challenges that could have been avoided? If so, how? • **Rating Scale Questions:** ◦ On a scale of 1 to 5, how effective was team communication during the project? ◦ How satisfied were you with the tools and resources provided? 3. **Designing Questions for Clients:** • **Open-Ended Questions:** ◦ Did the project meet your expectations? Why or why not? ◦ Are there any features or aspects of the deliverables you would like improved? • **Rating Scale Questions:** ◦ How satisfied are you with the final deliverables? (1-5) ◦ How clear and effective was the communication from our team? (1-5) 4. **Survey Tools and Distribution:** • Created the survey using an online platform (e.g., Google Forms, Microsoft Forms) for easy distribution and collection of responses. • Shared separate survey links with team members and clients, ensuring privacy and anonymity where appropriate. 5. **Incorporating Survey Insights:** • After collecting responses, I analyzed the feedback to identify common themes and actionable insights. • Shared a summary of key findings with the team and discussed potential changes for future projects.
Organize a team celebration to recognize everyone's hard work and reflect on key achievements in a positive environment. (Project Completion)	@Nguyễn Hoàng Trung	Nov 24, 2024	1. **Order Refreshments:** • If in-person, order food or drinks (e.g., snacks, cake, or beverages). • For virtual celebrations, suggest team members bring their own snacks or arrange for a digital gift card.

			2. **Capture the Moment:** • Arrange for photos or a video recording of the event to preserve the memories and share with the team later. 3. **Thank the Team:** • Begin the celebration by thanking everyone for their hard work, dedication, and contributions to the project's success.

🗒️ Meeting Notes

🗓️ Overview

Team	Members
Team 15	• Phung Gia Khang • Truong Le Minh Toan • Nguyen Hoang Trung • Dinh Viet Phat • Le Nguyen Thai Son

📆 Meeting dates

Date	Goal
6/9/2024	Organize a meeting to introduce members, vote for leaders, choose project topics, and set up Jira and Confluence accounts for project management.
13/9/2024	Finalize the Team Agreement and complete individual Team Member Profiles for project documentation.
20/9/2024	Complete the Persona page and document meeting notes for reference and progress tracking.
25/9/2024	Finalize the Project Plan, ER Diagram, and Empathy Map to establish clear project direction and user understanding.

Meeting Note - 6/9/2024

👥 Participants

- Phung Gia Khang
- Truong Le Minh Toan
- Nguyen Hoang Trung
- Dinh Viet Phat
- Le Nguyen Thai Son

📖 Goals

- Meeting and introducing members, voting for leaders
- Choosing topics
- Creating Jira, Confluence accounts and creating project

🗣️ Discussion topics

Time	Item	Presenter	Notes
20 minutes	Topic discussion	Phung Gia Khang	• Choosing the topic about managing transportation and do research about it
90 minutes	Learning Jira and Confluence	Dinh Viet Phat	• Taking the Linkedin Learning certificates about operating Jira, Conflucence • Joining the Jira project

✅ Action items

- Every member joining Jira and Confluence
- Applying template for Canvas for proposal creating
- Members learn to use Agile and Scrum

⤴️ Decisions

- Phung Gia Khang will be the leader
- Topic: Transportation Management System (TMS) Software

Meeting Note - 13/9/2024

👥 Participants

- Phung Gia Khang
- Truong Le Minh Toan
- Nguyen Hoang Trung
- Dinh Viet Phat
- Le Nguyen Thai Son

📖 Goals

- Complete the Team Agreement
- Complete Team Member Profiles
- Assign Role and Responsibility

🗣️ Discussion topics

Time	Item	Presenter	Notes
30 minutes	Complete Team Agreement	Phung Gia Khang, Nguyen Hoang Trung	• All team members unified about the communication platform, setting up meetings online and offline. • Complete the team agreement to discover the working style of each members.
30 minutes	Complete Team Member Profiles	Phung Gia Khang	• Times for each member reflect about themself (hobby, lifestyle, strength, weakness, …) • Discuss with each other about the personal information to bond between members • Complete the team member profiles page
1 hour	Role and Responsibilities	All team members	• Khang conducts a discussion for team to introduce about themself and if they nominate themself for a role in a team, all team members will consider to assign role based on skill of each members. • Complete the Role and Responsibilities page. Inside that page includes skill of themself and what they think the responsibilities of their roles.

✅ Action items

- Team Agreement completed
- Team Member Profiles completed

⤴️ Decisions

- Next meeting will be used to find out Persona for the problem
- Starting to write meeting notes for each meetings

Meeting Note - 20/9/2024

👥 Participants

- Phung Gia Khang
- Truong Le Minh Toan
- Nguyen Hoang Trung
- Dinh Viet Phat
- Le Nguyen Thai Son

📖 Goals

- Complete Persona page
- Complete the Project Plan
- Writing meeting note

🗣️ Discussion topics

Time	Item	Presenter	Notes
5 minutes	Meeting note	Truong Le Minh Toan	• Keep track of the meeting and jot down • Starting creating backlog and sprint in Jira to tracking the process of each page needed in the proposal.
120 minutes	Complete Persona page	Phung Gia Khang	• Discussion and researching about the stakeholders • Forming a list of stakeholders, some key group, people, and sorting it based on the priority, who play the most important role in entire process. • Choosing from that list 5 stakeholders from different category (Staff, Customer, Manager) • Forming the persona about above stakeholders, connecting with them for more information (if it necessary) • After connecting with stakeholders, try to setting up an interview with them after a few days to understand about themself and having data for researching and creating empathy map

✅ Action items

- Researching and understanding the persona of problem
- Having persona for key person of the problem
- Writing meeting note

⤴️ Decisions

- Next meeting will be held on 25/09/2024

Meeting Note - 25/9/2024

👥 Participants

- Phung Gia Khang
- Truong Le Minh Toan
- Nguyen Hoang Trung
- Dinh Viet Phat
- Le Nguyen Thai Son

📖 Goals

- Complete Project plan, ER Diagram and Empathy map, Project Requirement, Risk Assessment Matrix

🗣️ Discussion topics

Time	Item	Presenter	Notes
5 minutes	Meeting note	Truong Le Minh Toan	• Keep track of the meeting and jot down
60 minutes	ER Diagram	All team members	• Listing the entity for the problem of the ITL Corporation • Try to figure out how to connect entities and researching about the optimal way to draw a ER Diagram • Learning about how to use draw.io • Collaborating through draw.io to draw the ER Diagram and sharing it with other members
45 minutes	Empathy map	All team members	• Researching about appropriate empathy map template for applying to the proposal • From the information when interviewing stakeholders, each members present about their stakeholders. To exploit information about stakeholder, other member need to ask questions about what they hear/ think/ feel/ say/ do about the current situation of their job or their experience. • The presenters do research for missing information and try to combine all of the information of their stakeholders to create Empathy maps • Filling the page customer interview to give an overview about team members' findings during the interview with stakeholders
1 hour	Project Requirement	All team members	• Sketching the overall idea of the project, drawing the interface and listing some open questions that can encounter during the project. • Researching about objectives, assumptions, and requirements of the project

1 hour	Risk Assessment Matrix	Dinh Viet Phat	• Evaluate the risk that will occur during the project and listing it in the risk assessment matrix page

✅ Action items

- Learn about ER Diagram and Empathy map through online sources
- Fill in missing details in the project plan
- Draw ER Diagram and Empathy map

⤴️ Decisions

- Deadline for project proposal completion is on 27/09/2024
- Review of project proposal is due at 10PM 29/09/2024
- Project proposal will be submitted as soon as review and fault checking is completed

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Meeting Note - 30/9/2024

👥 Participants

- Phung Gia Khang
- Truong Le Minh Toan
- Nguyen Hoang Trung
- Dinh Viet Phat
- Le Nguyen Thai Son

📖 Goals

- Review the quality of the team members' contributions to the project proposal

🗣️ Discussion topics

Time	Item	Presenter	Notes
5 minutes	Meeting note	Phung Gia Khang	• Keep track of the meeting and jot down
30 minutes	Quality review	Phung Gia Khang	• Compliment and nominate members with on-time, high-quality task completion. • Point out the team's shortcomings in communication, collaboration, and punctuality • List upcoming tasks, which include self-learning about relational databases, Data Flow Diagrams, and Entity Relational Diagrams • Review the underperformance plan
15 minutes	Jira	Dinh Viet Phat	• Add epics, tasks, and sub-tasks into Jira • Remind the team of good practices when using SDLC management tools • Some team members forgot to update the status of the tasks they were working on. This is critical to the team's workflow because it may cause overlap tasks
45 minutes	Reflection	All team members	• All team members take turns to say what they are satisfied/unsatisfied with the first-month teamwork experience. • List any tasks they need help with
2 hours	Individual task	All team members	• All team members are required to complete their individual weekly quiz at the end of the week • Although this does not directly affect the project's outcome, we believe that failure to personal affairs on time negatively affects members' mental health and leads to procrastination and consequently failure to complete assigned group tasks.

✅ Action items

- Learn about relational databases and first, second, and third normal forms
- Reflect on past contributions and collaboration
- Complete personal weekly quiz

⤴️ Decisions

- The team deadline will be 1 day earlier for peer review
- Team members who fail to meet the deadline without appropriate reasons will be punished
- Evidence of self-learning about normal forms of databases must be provided by all members in the next meeting
- The next meeting about SQL physical design will be held on 4/10/2024

Meeting Note - 4/10/2024

👥 Participants

- Phung Gia Khang
- Truong Le Minh Toan
- Nguyen Hoang Trung
- Dinh Viet Phat
- Le Nguyen Thai Son

📖 Goals

- Master SQL physical database

🗣️ Discussion topics

Time	Item	Presenter	Notes
5 minutes	Meeting note	Phung Gia Khang	• Keep track of the meeting and jot down
30 minutes	Relational database	Le Nguyen Thai Son	• Review the whole team about tables, primary keys, foreign keys compound keys, relationships • Demonstrate the creation of a database and tables in SQL with MariaDB, accessed through phpMyAdmin tools • Perform field creation and management with SQL commands: SELECT, INSERT, UPDATE, DELETE, JOIN
30 minutes	Normalization presentation	Nguyen Hoang Trung	• Definitions and examples of first normal form, second normal form, third normal form

			• How to discriminate between the second normal form and the third normal form, which is confusing to most team members at first
45 minutes	Normalization practice	All team members	• Work on different examples of the first normal form, second normal form, and third normal form to gain first-hand experience and deeply understand these concepts • Practice separating tables to turn first normal form tables into second normal form tables, second normal forms tables into third normal form tables

10 minutes	Upcoming meeting preparation	Phung Gia Khang	• List tasks that need to be prepared for the next meeting:
			  ◦ Personal weekly task
			  ◦ Data Flow Diagram (DFD)
			  ◦ Entity Relationship Diagram (ERD)
			• Set out the date and content for the next meeting

✅ Action items

- Learn about Data Flow Diagram and Entity Relationship Diagram
- Personal practice with SQL querying and table management
- Normalization revision

⤴️ Decisions

- Evidence of SQL physical database must be provided by all members in the next meeting
- Work distribution for the Progress Report will be done in the next meeting
- The next meeting about DFD and ERD will be held on 11/10/2024

Meeting Note - 11/10/2024

👥 Participants

- Phung Gia Khang
- Truong Le Minh Toan
- Nguyen Hoang Trung
- Dinh Viet Phat
- Le Nguyen Thai Son

📖 Goals

- Understand DFD and ERD
- Distribute tasks for the Progress Report

🗣️ Discussion topics

Time	Item	Presenter	Notes
5 minutes	Meeting note	Phung Gia Khang	• Keep track of the meeting and jot down

45 minutes	Entity Relationship Diagram	Le Nguyen Thai Son	• Discriminate different levels of Entity Relationship Diagram:
			  ◦ Level 0: conceptual level
			  ◦ Level 1: logical level
			  ◦ Level 2: physical level
			• Types of relationships in ERD: one-to-one, one-to-many, many-to-many; conjunction tables
			• Introduce the DrawIO, a comprehensive diagram drawing that is optimized for live cooperation

60 minutes	Data Flow Diagram	Dinh Viet Phat	• Introduce important Data Flow Diagram concepts (e.g. process, entities, data flows, etc.)
			• Discriminate different levels of Data Flow Diagram:
			  ◦ Level 0
			  ◦ Level 1
			• Uses cases, advantages, and limitations of data flow diagrams

15 minutes	Task distribution	Truong Le Minh Toan	• Assign the task of updating the Entity Relation Ship Diagram to 3 team members • Creation of Data Flow Diagram levels 0, and 1 are assigned to 2 members

✅ Action items

- Complete the Entity Relationship Diagram and Data Flow Diagram
- Learn about Trello
- Update MySQL tables in the database with more information
- Research about the importance of team health monitor and how it should be observed and taken care of

⤴️ Decisions

- Tasks on Jira and spaces on Confluence will be rechecked for appropriateness before being submitted with the progress report
- All members must understand why team health should be carefully monitored and its effect on the outcome of the project
- The next meeting about team health monitor and the progress report will be held on 18/10/2024

Meeting Note - 18/10/2024

Participants

- Phung Gia Khang
- Truong Le Minh Toan
- Nguyen Hoang Trung
- Dinh Viet Phat
- Le Nguyen Thai Son

Goals

- Team health monitor
- Wrap up for project progress report

Discussion topics

Time	Item	Presenter	Notes
5 minutes	Meeting note	Phung Gia Khang	• Keep track of the meeting and jot down
45 minutes	Trello	Nguyen Hoang Trung	• Introduce Trello - a project management tool that help visualize projects using boards, cards, and lists. • The difference between boards, lists, and cards. How to manage them efficiently, and which information should be stored in which level of management • Learn how team health monitoring can be achieved with Trello
60 minutes	Team health monitor	All members	• All members are required to join the project Trello's board • Each member review the team's collaboration process, vote for their level of satisfaction, and leave comments in the cards
25 minutes	Progress report	Phung Gia Khang	• Review the required content of the progress report • Consult the facilitator - Dr Hang Sam Nang for advice on improvements

Action items

- Complete individual tasks that are parts of the progress report
- Constantly check and adjust any changes on Jira
- Complete the list of update
- Add team health monitor page to Confluence

Decisions

- All individual tasks must be completed on 19/10/2024
- Last meeting before progress report submission is on 20/10/2024

Meeting Note - 20/10/2024

👥 Participants

- Phung Gia Khang
- Truong Le Minh Toan
- Nguyen Hoang Trung
- Dinh Viet Phat
- Le Nguyen Thai Son

📖 Goals

- Final revision for progress report
- Submit the project progress report

🗣️ Discussion topics

Time	Item	Presenter	Notes
5 minutes	Meeting note	Phung Gia Khang	• Keep track of the meeting and jot down
15 minutes	PDF export	Phung Gia Khang	• Export Jira timeline to PDF • Check if all team members have filled the health monitor page and add it to Confluence • Export to PDF the Confluence page of the project
90 minutes	Progress report review	All team member	• Each team member read and review the progress report carefully to check for any literacy or technical issues • Fix the issues and make changes to the report
5 minutes	Progress report submission	Phung Gia Khang	• Submit the progress report • Notify stakeholders about the submission

✅ Action items

- Review and submit the progress report
- Learn how to use dummy data to supply the database with useful information
- Update MySQL tables in the database with dummy data

Decisions

- All members must be able to prove their outcome of learning about dummy data in the next meeting
- Celebration for progress report submission will be held on 21/10/2024, all members are invited to come to K34 restaurant
- The next meeting about dummy data and will be held on 25/10/2024

Meeting Note - 25/10/2024

👥 Participants

- Phung Gia Khang
- Truong Le Minh Toan
- Nguyen Hoang Trung
- Dinh Viet Phat
- Le Nguyen Thai Son

📖 Goals

- Create a database with MySQL based on the ERD and DFD

🗣️ Discussion topics

Time	Item	Presenter	Notes
5 minutes	Meeting note	Phung Gia Khang	• Keep track of the meeting and jot down
30 minutes	Update ERD	Nguyen Hoang Trung, Dinh Viet Phat	• Consider tables in Physical ERD that are redundant or those that are lacking • Redefine relationships between tables in ERD • Finalize the ERD to be converted to MySQL database
30 minutes	MySQL Workbench	All team member	• Download and set up the environment for MySQL Workbench. • Learn the basics of how to create a database, and schemas, and how to import query script files into MySQL Workbench and run them.
60 minutes	Table creations	Nguyen Hoang Trung, Dinh Viet Phat	• Turn the ERD to tables in MySQL Workbench • Write the query script file to create the table

✅ Action items

- Review the ER Diagram and update table relationships
- Turn the ER Diagram into scripts for creating tables in SQL
- Learn how to generate dummy data in script files to input into MySQL Workbench

Decisions

- Table creation must be done before the next meeting takes place
- Next meeting will be about database hosting and dummy data generation
- The next meeting about dummy data and will be held on 1/11/2024

Meeting Note - 1/11/2024

👥 Participants

- Phung Gia Khang
- Truong Le Minh Toan
- Nguyen Hoang Trung
- Dinh Viet Phat
- Le Nguyen Thai Son

📖 Goals

- Host the database on an online service/platform
- Generate a query script file for inserting dummy data into the table

🗣️ Discussion topics

Time	Item	Presenter	Notes
5 minutes	Meeting note	Phung Gia Khang	• Keep track of the meeting and jot down
30 minutes	Review the Table Creation file	All members	• Carefully check the tables in the Table Creation file including the data type, relationships, restrictions on foreign keys, order of creation • Fix any possible issues • Carefully comment on the file for easy sharing and teamwork
30 minutes	Database hosting options	All team member	• All members propose their options for hosting the database • Each option is carefully considered in terms of storage size, costs, and ease of management • Aiven is chosen as the platform to host the database online for free
60 minutes	Host the database	Truong Le Minh Toan	• Host the database using MySQL Workbench and Aiven • Share and instruct other members on how to access the server
45 minutes	Dummy data	Le Nguyen Thai Son	• Generate dummy data for the database based on data types, order, and restrictions specified in the Table Creation file

✅ Action items

- Review and update the Table Creation file
- Host the database on Aiven and MySQL Workbench
- Create a file that stores all INSERT queries of the dummy data in the created tables

⤴️ Decisions

- Dummy data must be generated and inserted into tables before the next meeting
- Use cases and Indexes will be discussed in the next meeting, all members are required to learn about these topics
- The next meeting about dummy data and will be held on 8/11/2024

Meeting Note - 8/11/2024

👥 Participants

- Phung Gia Khang
- Truong Le Minh Toan
- Nguyen Hoang Trung
- Dinh Viet Phat
- Le Nguyen Thai Son

📖 Goals

- Learn about use cases and indexes in SQL
- Create use cases and index query scripts
- Test run use cases and index files, troubleshoot issues

🗣️ Discussion topics

Time	Item	Presenter	Notes
5 minutes	Meeting note	Phung Gia Khang	• Keep track of the meeting and jot down
30 minutes	Use cases and Indexes	All members	• All members demonstrate evidence of studying use cases and indexes, including their definitions, functions, and purposes • List out the business scenarios that are often encountered by stakeholders from which, choose the 10 most outstanding scenarios for use cases.
30 minutes	Use cases and Indexes in SQL	Phung Gia Khang	• Turn business scenarios that the whole team has agreed upon into SQL query scripts • Create indexes for each query that optimize the operations and speed of the queries • Document the use cases along with their business scenarios on Confluence pages
60 minutes	Test run use cases	Phung Gia Khang, Le Nguyen Thai Son	• Run the queries and troubleshoot the issues • Modify the queries, or review the table creation and dummy data generation phase if necessary

✅ Action items

- Select business scenarios for use cases
- Test run and troubleshoot queries
- Each member chooses a suitable role for themselves and think of a major-specific work to apply into the project

Decisions

- All members must choose a major-specific role
- For each role, some detailed applications must be proposed
- The next meeting about major-specific work will be held on 11/11/2024

Meeting Note - 11/11/2024

Participants

- Phung Gia Khang
- Truong Le Minh Toan
- Nguyen Hoang Trung
- Dinh Viet Phat
- Le Nguyen Thai Son

Goals

- Assign a major-specific role for each member
- Several applications must be chosen for each role
- Prepare for the presentation to the business guest and project supervisor

Discussion topics

Time	Item	Presenter	Notes
5 minutes	Meeting note	Phung Gia Khang	• Keep track of the meeting and jot down
30 minutes	Assign major-specific roles	All team members	• All members choose their major-specific role, with the results as follows: ◦ Nguyen Hoang Trung: Front-end Developer ◦ Phung Gia Khang: Back-end Developer

			◦ Dinh Viet Phat: Data Analyst ◦ Le Nguyen Thai Son: Cloud Architect ◦ Truong Le Minh Toan: AI Engineer
30 minutes	Major-specific work	All team member	• For each role choose a few works that can be applied to the project: ◦ Front-end: Design with Figma, and build a landing page with HTML, CSS, ReactJS, Flutter ◦ Back-end: Drawing ERD and DFD, hosting and building a database, writing queries ◦ Data analysis: visualize data with Tableau, real-time data streaming/ingesting with Apache Kafka and Apache Spark for large-scale data processing ◦ Cloud Architect: draw an architectural diagram for the immigration of physical infrastructure onto the cloud ◦ AI engineering: Route optimization with real-time weather and traffic conditions using AI algorithms and object detection with Machine Learning models
60 minutes	Presentation preparation	All members	• Each member prepares the slides for the parts they are responsible for • Each member prepared to give a speech about the corresponding parts

✅ Action items

- Apply major-specific knowledge to the project
- Prepare slides for the presentation spectated by an industry expert
- Prepare to give a speech in front of the class proposing the solution

⤴️ Decisions

- Each individual part must be well-prepared before the meet-up for a presentation rehearsal
- The next meeting will be a trial presentation
- The next meeting will be held on 14/11/2024

Meeting Note - 14/11/2024

👥 Participants

- Phung Gia Khang
- Truong Le Minh Toan
- Nguyen Hoang Trung
- Dinh Viet Phat
- Le Nguyen Thai Son

📖 Goals

- Rehearse and prepare for the presentation with the industry expert

🗣️ Discussion topics

Time	Item	Presenter	Notes
5 minutes	Meeting note	Phung Gia Khang	• Keep track of the meeting and jot down
30 minutes	Assign major-specific roles	All team members	• Each member demonstrates the major-specific work they have done for other teammates
120 minutes	Presentation rehearsal	All team member	• All members present and rehearse for the upcoming presentation • Spectating members give feedback and comments

✅ Action items

- Learn the presentation well and be mentally prepared for the presentation
- Prepare any questions that the team needs to ask the industry expert and the project supervisor

⤴️ Decisions

- The next meeting will be held on 15/11/2024, right after the presentation takes place

Meeting Note - 15/11/2024

👥 Participants

- Phung Gia Khang
- Truong Le Minh Toan
- Nguyen Hoang Trung
- Dinh Viet Phat
- Le Nguyen Thai Son

📖 Goals

- Present the progress of the project and any applications the team has done

🗣️ Discussion topics

Time	Item	Presenter	Notes
5 minutes	Meeting note	Phung Gia Khang	• Keep track of the meeting and jot down
30 minutes	Presentation	All team members	• Present the progress of the team to the industry expert and the project supervisor • Get feedback and valuable insights from the industry expert and the project supervisor
60 minutes	Team reflection	All team member	• Reflect on the work of the team so far • Plan out adjustments to improve the software application solution for the video and final report
60 minutes	Video brainstorming	All team member	• Each team member lists their ideas that can be included in the videos • Distribute tasks for video recording to each member

✅ Action items

- Prepare tools and script for video recording
- Each member learns their scripts by heart for smooth recording in the next meeting

⤴️ Decisions

- Video must be recorded, edited, and submitted before the deadline on 18/11/2024
- The next meeting will be held on 17/11/2024

Meeting Note - 17/11/2024

Participants

- Phung Gia Khang
- Truong Le Minh Toan
- Nguyen Hoang Trung
- Dinh Viet Phat
- Le Nguyen Thai Son

Goals

- Record video for project demonstration
- Edit the video and submit it

Discussion topics

Time	Item	Presenter	Notes
5 minutes	Meeting note	Phung Gia Khang	• Keep track of the meeting and jot down
180 minutes	Video recording	All team members	• All team members record sources for the final video and send them to Nguyen Hoang Trung for editing
1 day	Video edit	Nguyen Hoang Trung	• Edit the video and export it • Send to all members for reviewing and submitting

Action items

- Record sources for the final video
- Submit the video demonstrating the software solution

Decisions

- The next meeting will be held on 22/11/2024

Meeting Note - 22/11/2024

👥 Participants

- Phung Gia Khang
- Truong Le Minh Toan
- Nguyen Hoang Trung
- Dinh Viet Phat
- Le Nguyen Thai Son

📖 Goals

- Review and finalize confluence pages for the final report
- Update the Jira timeline
- Reflect on teamwork

🗣️ Discussion topics

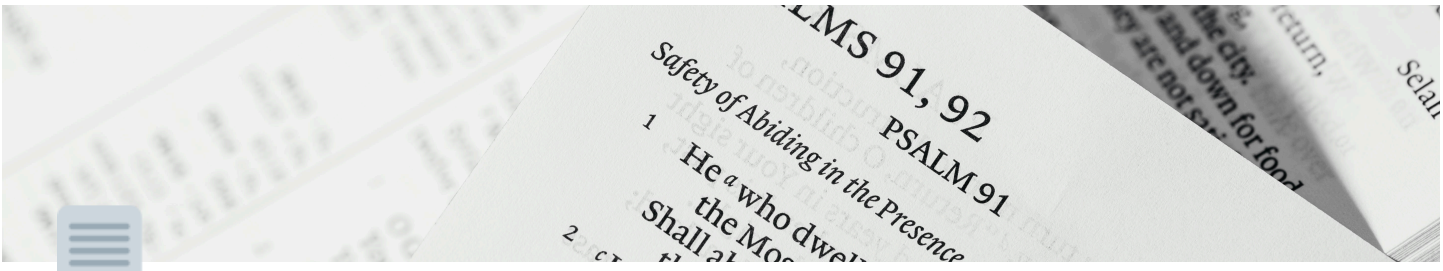
Time	Item	Presenter	Notes
5 minutes	Meeting note	Phung Gia Khang	• Keep track of the meeting and jot down
30 minutes	Team reflection	All team members	• Each member reflects on their contribution of themselves, along with their teamwork attitude according to the 4L's retrospective • Each member gives feedback and constructive criticism to each other members of the team
120 minutes	Project and report finalization	All team member	• Review the final report to check for any errors • Troubleshoot the errors, redecorate for a more beautiful report • Consult the project supervisor for any feedback before final submission

✅ Action items

- Submit the final report by 24/11/2024

⤴️ Decisions

- After the submission, a celebration party for bonding and spirit-raising is held on 25/11/2024 at K34 restaurant



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Properly acknowledge all references and sources used in our project to maintain academic integrity and ensure credibility.

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