

## Assignment 1: Courier Management System

### Introduction

The Courier Management System is a project aimed at streamlining the courier delivery process by efficiently managing users, couriers, employees, locations, and payments. This system is built using SQL for database management, Java for implementation with Object-Oriented Programming principles, exception handling, and unit testing.

### Task 1: Database Design

#### Database Schema Design

The database schema for the Courier Management System consists of multiple tables with appropriate relationships. The main tables include:

- **User:** Stores customer details.
- **Courier:** Stores courier details.
- **CourierServices:** Stores different courier services and their costs.
- **Employee:** Stores employee details.
- **Location:** Stores location details.
- **Payment:** Stores payment transactions for couriers.

<b>User TABLE</b>	<pre>CREATE TABLE User (   UserID INT PRIMARY KEY,   Name VARCHAR(255),   Email VARCHAR(255) UNIQUE,   Password VARCHAR(255),   ContactNumber VARCHAR(20),   Address TEXT );</pre>
<b>Courier TABLE</b>	<pre>CREATE TABLE Courier (   CourierID INT PRIMARY KEY,   SenderName VARCHAR(255),   SenderAddress TEXT,   ReceiverName VARCHAR(255),   ReceiverAddress TEXT,   Weight DECIMAL(5,2),   Status VARCHAR(50),   TrackingNumber VARCHAR(20)   UNIQUE,   DeliveryDate DATE );</pre>

<b>CourierServices TABLE</b>	CREATE TABLE CourierServices ( ServiceID INT PRIMARY KEY, ServiceName VARCHAR(100), Cost DECIMAL(8,2) );
<b>Employee TABLE</b>	CREATE TABLE Employee ( EmployeeID INT PRIMARY KEY, Name VARCHAR(255), Email VARCHAR(255) UNIQUE, ContactNumber VARCHAR(20), Role VARCHAR(50), Salary DECIMAL(10,2) );
<b>Location TABLE (One-to-Many with Courier)</b>	CREATE TABLE Location ( LocationID INT PRIMARY KEY, LocationName VARCHAR(100), Address TEXT );
<b>Payment TABLE (Many-to-One with Courier and Location)</b>	CREATE TABLE Payment ( PaymentID INT PRIMARY KEY, CourierID INT, LocationID INT, Amount DECIMAL(10,2), PaymentDate DATE, FOREIGN KEY (CourierID) REFERENCES Courier(CourierID), FOREIGN KEY (LocationID) REFERENCES Location(LocationID) );

### **Populating Sample Data**

INSERT INTO User (UserID, Name, Email, Password, ContactNumber, Address)  
VALUES

(1, 'Alice Johnson', 'alice@example.com', 'pass123', '1234567890', '123 Main St'),

(2, 'Bob Smith', 'bob@example.com', 'pass456', '0987654321', '456 Elm St');

INSERT INTO Courier (CourierID, UserID, SenderName, SenderAddress,  
ReceiverName, ReceiverAddress, Weight, Status, TrackingNumber, DeliveryDate)  
VALUES

```
(1, 1, 'Alice Johnson', '123 Main St', 'David Brown', '789 Oak St', 2.5, 'In Transit',  
'TRK12345', '2025-03-30'),
```

```
(2, 2, 'Bob Smith', '456 Elm St', 'Eve Adams', '101 Pine St', 1.2, 'Delivered',  
'TRK67890', '2025-03-28');
```

```
INSERT INTO CourierServices (ServiceID, ServiceName, Cost) VALUES
```

```
(1, 'Standard Delivery', 50.00),
```

```
(2, 'Express Delivery', 100.00);
```

```
INSERT INTO Employee (EmployeeID, Name, Email, ContactNumber, Role, Salary)  
VALUES
```

```
(1, 'John Doe', 'john.doe@example.com', '1122334455', 'Delivery Agent', 40000.00);
```

```
INSERT INTO Location (LocationID, LocationName, Address) VALUES
```

```
(1, 'Downtown Hub', '500 Center St');
```

```
INSERT INTO Payment (PaymentID, CourierID, LocationID, Amount, PaymentDate)  
VALUES
```

```
(1, 1, 1, 50.00, '2025-03-29');
```

**MYSQL SCRIPT:**

```
CREATE DATABASE Assignment1;

USE Assignment1;

CREATE TABLE User (
    UserID INT PRIMARY KEY,
    Name VARCHAR(255),
    Email VARCHAR(255) UNIQUE,
    Password VARCHAR(255),
    ContactNumber VARCHAR(20),
    Address TEXT
);

CREATE TABLE Courier (
    CourierID INT PRIMARY KEY,
    UserID INT,
    SenderName VARCHAR(255),
    SenderAddress TEXT,
    ReceiverName VARCHAR(255),
    ReceiverAddress TEXT,
    Weight DECIMAL(5,2),
    Status VARCHAR(50),
    TrackingNumber VARCHAR(20) UNIQUE,
    DeliveryDate DATE,
    FOREIGN KEY (UserID) REFERENCES User(UserID)
);

CREATE TABLE CourierServices (
    ServiceID INT PRIMARY KEY,
    ServiceName VARCHAR(100),
    Cost DECIMAL(8,2)
);

CREATE TABLE Employee (
    EmployeeID INT PRIMARY KEY,
    Name VARCHAR(255),
```

```
Email VARCHAR(255) UNIQUE,
ContactNumber VARCHAR(20),
Role VARCHAR(50),
Salary DECIMAL(10,2)
);

CREATE TABLE Location (
    LocationID INT PRIMARY KEY,
    LocationName VARCHAR(100),
    Address TEXT
);

CREATE TABLE Payment (
    PaymentID INT PRIMARY KEY,
    CourierID INT,
    LocationID INT,
    Amount DECIMAL(10,2),
    PaymentDate DATE,
    FOREIGN KEY (CourierID) REFERENCES Courier(CourierID),
    FOREIGN KEY (LocationID) REFERENCES Location(LocationID)
);

INSERT INTO User (UserID, Name, Email, Password, ContactNumber, Address) VALUES
(1, 'Alice Johnson', 'alice@example.com', 'pass123', '1234567890', '123 Main St'),
(2, 'Bob Smith', 'bob@example.com', 'pass456', '0987654321', '456 Elm St');

INSERT INTO Courier (CourierID, UserID, SenderName, SenderAddress, ReceiverName,
ReceiverAddress, Weight, Status, TrackingNumber, DeliveryDate) VALUES
(1, 1, 'Alice Johnson', '123 Main St', 'David Brown', '789 Oak St', 2.5, 'In Transit', 'TRK12345', '2025-03-30'),
(2, 2, 'Bob Smith', '456 Elm St', 'Eve Adams', '101 Pine St', 1.2, 'Delivered', 'TRK67890', '2025-03-28');

INSERT INTO CourierServices (ServiceID, ServiceName, Cost) VALUES
(1, 'Standard Delivery', 50.00),
```

(2, 'Express Delivery', 100.00);

INSERT INTO Employee (EmployeeID, Name, Email, ContactNumber, Role, Salary) VALUES

(1, 'John Doe', 'john.doe@example.com', '1122334455', 'Delivery Agent', 40000.00);

INSERT INTO Location (LocationID, LocationName, Address) VALUES

(1, 'Downtown Hub', '500 Center St');

INSERT INTO Payment (PaymentID, CourierID, LocationID, Amount, PaymentDate) VALUES

(1, 1, 1, 50.00, '2025-03-29');

SELECT \* FROM User;

SELECT \* FROM Courier;

SELECT \* FROM CourierServices;

SELECT \* FROM Employee;

SELECT \* FROM Location;

SELECT \* FROM Payment;

## IMPLEMENTATION SCREEN SHOTS:

Result Grid						
Filter Rows:						
	UserID	Name	Email	Password	ContactNumber	Address
▶	1	Alice Johnson	alice@example.com	pass123	1234567890	123 Main St
	2	Bob Smith	bob@example.com	pass456	0987654321	456 Elm St
•	NULL	NULL	NULL	NULL	NULL	NULL

Result Grid										
Filter Rows:										
	CourierID	UserID	SenderName	SenderAddress	ReceiverName	ReceiverAddress	Weight	Status	TrackingNumber	DeliveryDate
▶	1	1	Alice Johnson	123 Main St	David Brown	789 Oak St	2.50	In Transit	TRK12345	2025-03-30
	2	2	Bob Smith	456 Elm St	Eve Adams	101 Pine St	1.20	Delivered	TRK67890	2025-03-28
•	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

Result Grid			
Filter Rows: <input type="text"/>			
	ServiceID	ServiceName	Cost
▶	1	Standard Delivery	50.00
	2	Express Delivery	100.00
•	NULL	NULL	NULL

Result Grid						
Filter Rows: <input type="text"/>						
Edit:              Export/Import:             Wrap Cell Content:						
	EmployeeID	Name	Email	ContactNumber	Role	Salary
▶	1	John Doe	john.doe@example.com	1122334455	Delivery Agent	40000.00
•	NULL	NULL	NULL	NULL	NULL	NULL

Result Grid			
Filter Rows: <input type="text"/>			
Edit:			
	LocationID	LocationName	Address
▶	1	Downtown Hub	500 Center St
•	NULL	NULL	NULL

Result Grid					
Filter Rows: <input type="text"/>					
Edit:              Export/Import:             Wrap Cell Content:					
	PaymentID	CourierID	LocationID	Amount	PaymentDate
▶	1	1	1	50.00	2025-03-29
•	NULL	NULL	NULL	NULL	NULL