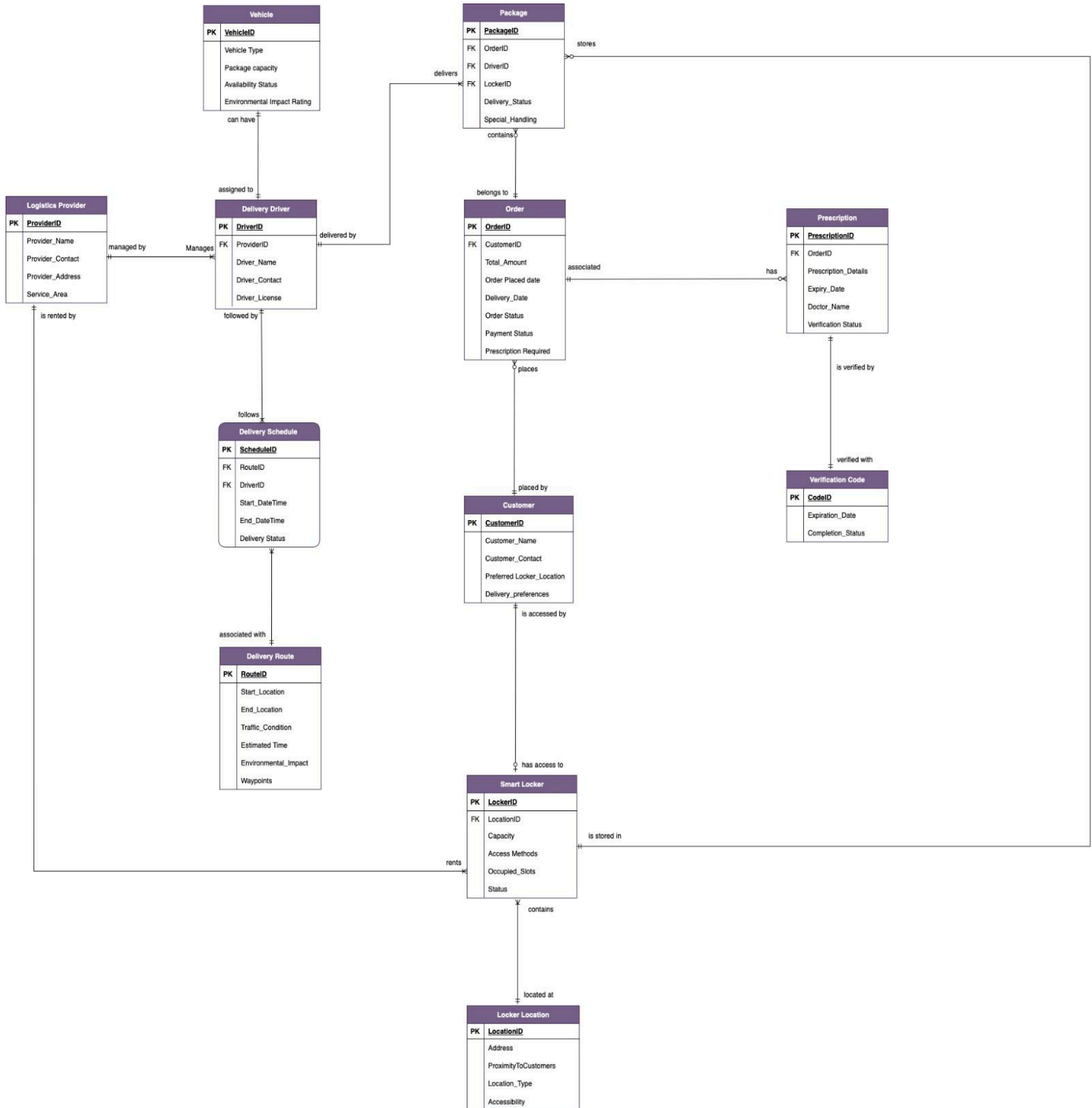


# Urban Smart Logistics and Delivery System

## Logical ERD Design



## Changes Made in the model:

1. Removed Relationship Between Verification Code, Customer, and Order:
  - Conceptual ERD: The initial design connected the Verification Code entity directly to both Customer and Order, creating a direct link between these entities.
  - Logical ERD: In the revised model, the relationships between Verification Code, Customer, and Order have been removed. Instead, the Verification Code is now associated solely through the Prescription entity, which is linked to Order and subsequently related to Customer.

### Reason for Change:

This change simplifies the model and removes redundant relationships, as the same connection can be achieved through the *Order -> Prescription -> Verification Code* path. This reduction in direct links reduces complexity in data management and reflects a normalized approach by avoiding duplicate relationships.

2. Removed Relationship Between Logistics Provider and Vehicle:
  - Conceptual ERD: The original model directly linked the Logistics Provider entity to Vehicle.
  - Logical ERD: This direct link was removed, as the Vehicle entity is now indirectly associated with Logistics Provider through Delivery Driver.

### Reason for Change:

This relationship was deemed unnecessary because the *Logistics Provider* is already connected to *Delivery Driver*, who in turn is assigned to a *Vehicle*. By linking only Logistics Provider to Delivery Driver and Delivery Driver to Vehicle, the model avoids redundancy, making it cleaner and more efficient. This change also aligns with the normalization principle by eliminating unnecessary direct associations.

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## Summary of Changes and Their Benefits

These modifications contribute to a more efficient and normalized database design. By removing redundant relationships, the logical model:

- Improves Clarity: Removing redundant relationships makes the data model easier to understand and reduces complexity for both users and developers.
- Reduces Redundancy: By structuring connections through intermediary entities (e.g., using *Order -> Prescription -> Verification Code*), the model follows a streamlined approach, preventing duplication of data and minimizing the risk of anomalies.

These changes reflect feedback from the professor and align with best practices for database design, resulting in a more structured, implementable, and optimized model.

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