
Curve Electric Bikes Management System

Team Number: 18

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Project Topic – Curve Electric E-Bikes Management System

How can the network dynamics of a bike-share system produce insights to enhance its stock? In this study, we model station demand and route traffic in connection with time and climate. These models are utilized for making decisions regarding riders in both the long term and short term on the rider's incentives. These incentives aim to boost the inventory, thereby enhancing services provided by the company for customer contentment and eventually increasing the firm's profit. Consequently, we suggest utilizing a visualization to assist in making decisions regarding these incentives during the day.

Problem Statement:

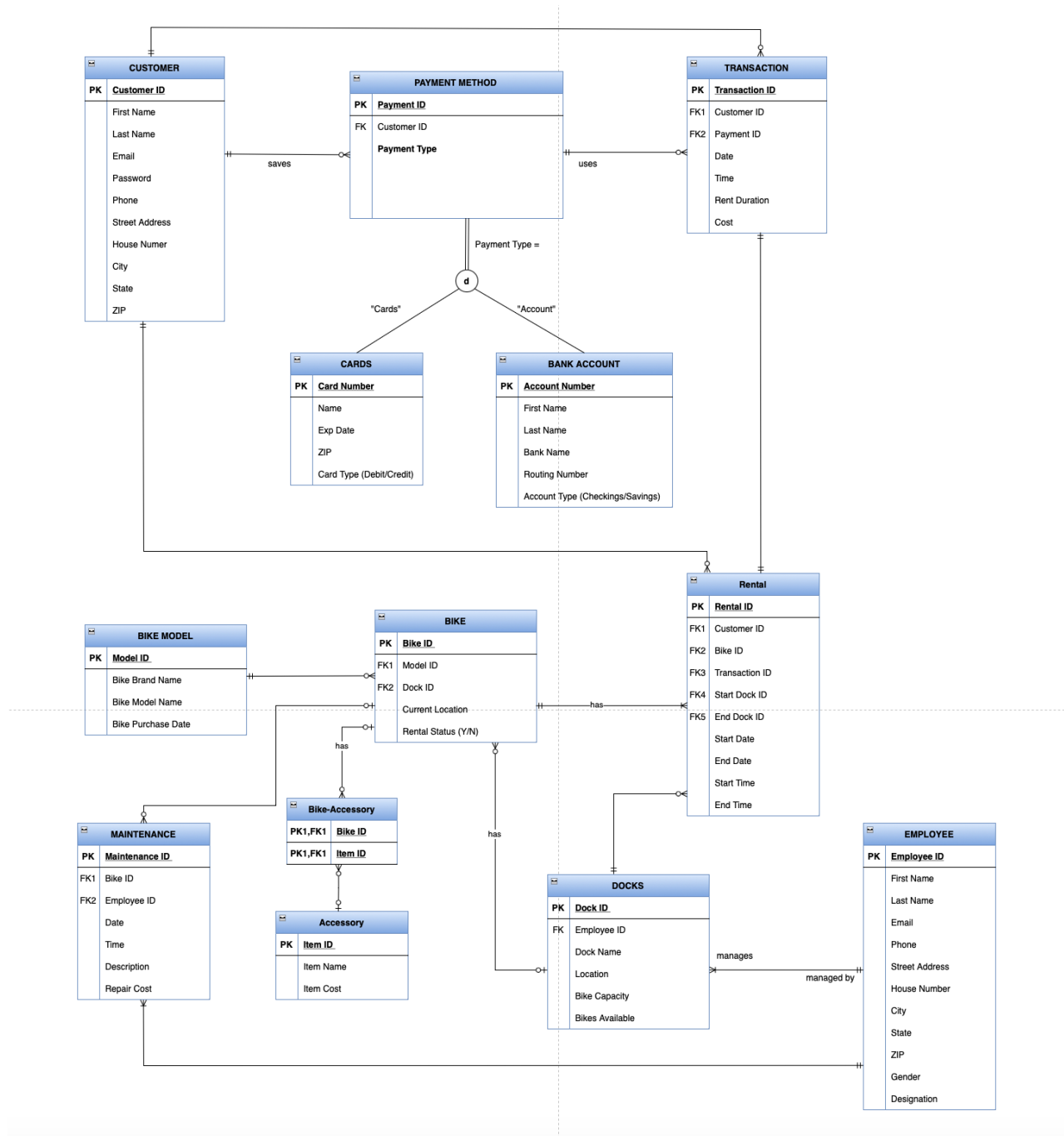
This project will focus on the standard station-based bike-sharing system. Curve E-Bikes is a bike sharing initiative located in Jammu & Kashmir, India. The bicycle-sharing program started on October 18, 2021. This initiative was created for those requiring it temporarily for a charge. Users can rent a bike from one docking station and return it to a different one after use. Each bike-sharing station experiences different levels of demand based on the time of day. When certain stations are packed with bikes, cyclists cannot park their bicycles. During peak times, though, many of the stations lack available bikes. The operator employs force-balancing, indicating a truck that transports bikes, to preserve its stability. The equilibrium is essential for the efficient utilization of a station's resources. In the short term, an inconsistent bike inventory lowers the likelihood of potential users cycling. In the direst situation, individuals relinquish their hopes for the bike-sharing system ultimately fails, and no one is interested in utilizing it.

Objective:

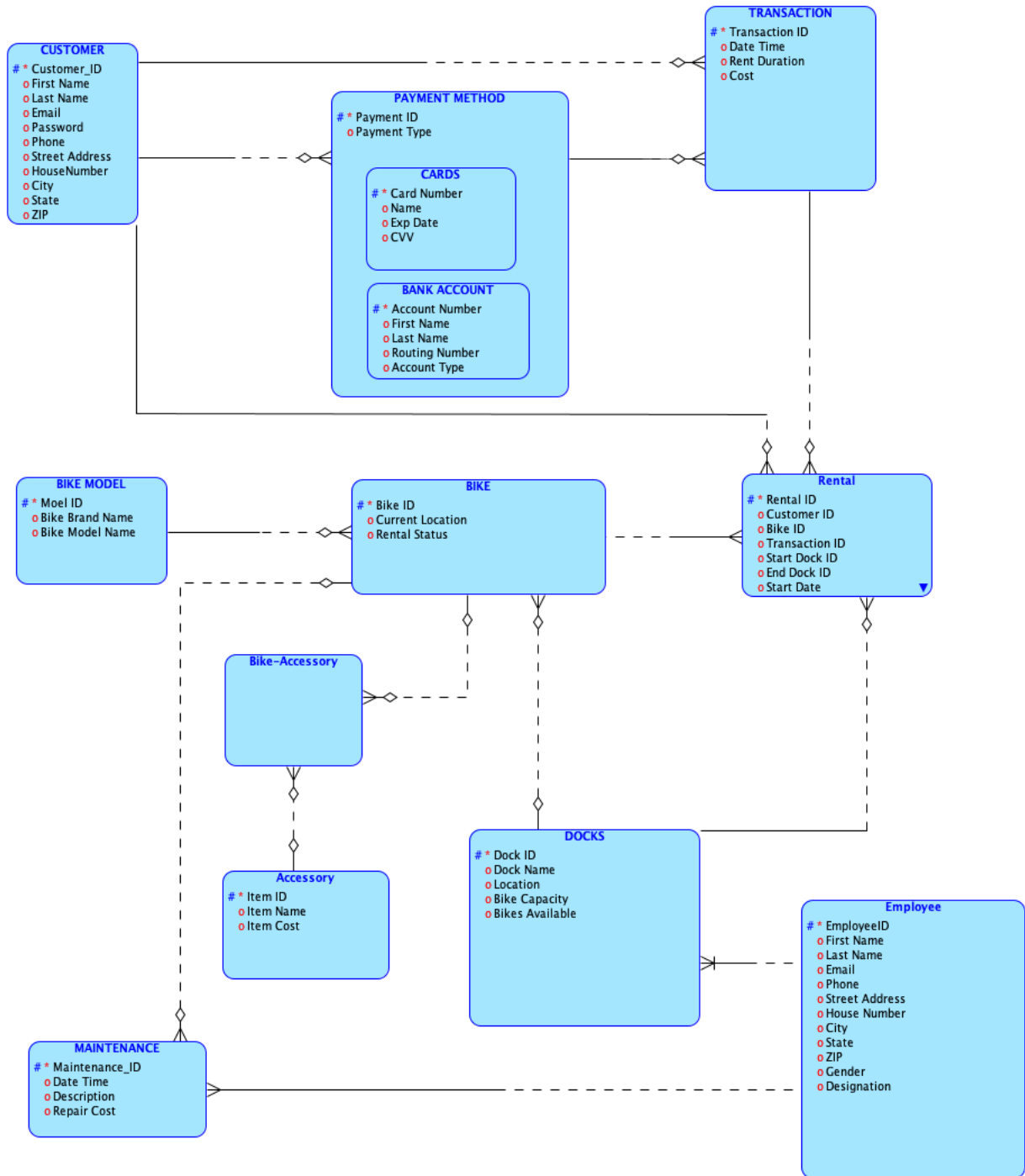
The extent of a Curve E-Bike database management system would rely on the particular demands and objectives of the Curve E-bike rental service. Nonetheless, several shared components of the extent of the system might encompass:

- Keeping and managing information on bike availability, including bike location, condition (e.g., present, operational, under maintenance), along with any related information.
- Monitoring client details, including contact information, rental agreements, and payment records.
- Documenting and tracking rental activities, such as the start and end times of rentals, bicycles engaged, and expenses incurred.
- Monitoring maintenance records, including the dates bikes were serviced, the procedures performed, and any related costs.
- By examining biking patterns, pinpointing areas where bicycles are frequently utilized or in demand, and overseeing the financial performance of the bike sharing service, up-to-the-minute data and information is offered to support informed business choices and improve operational effectiveness.

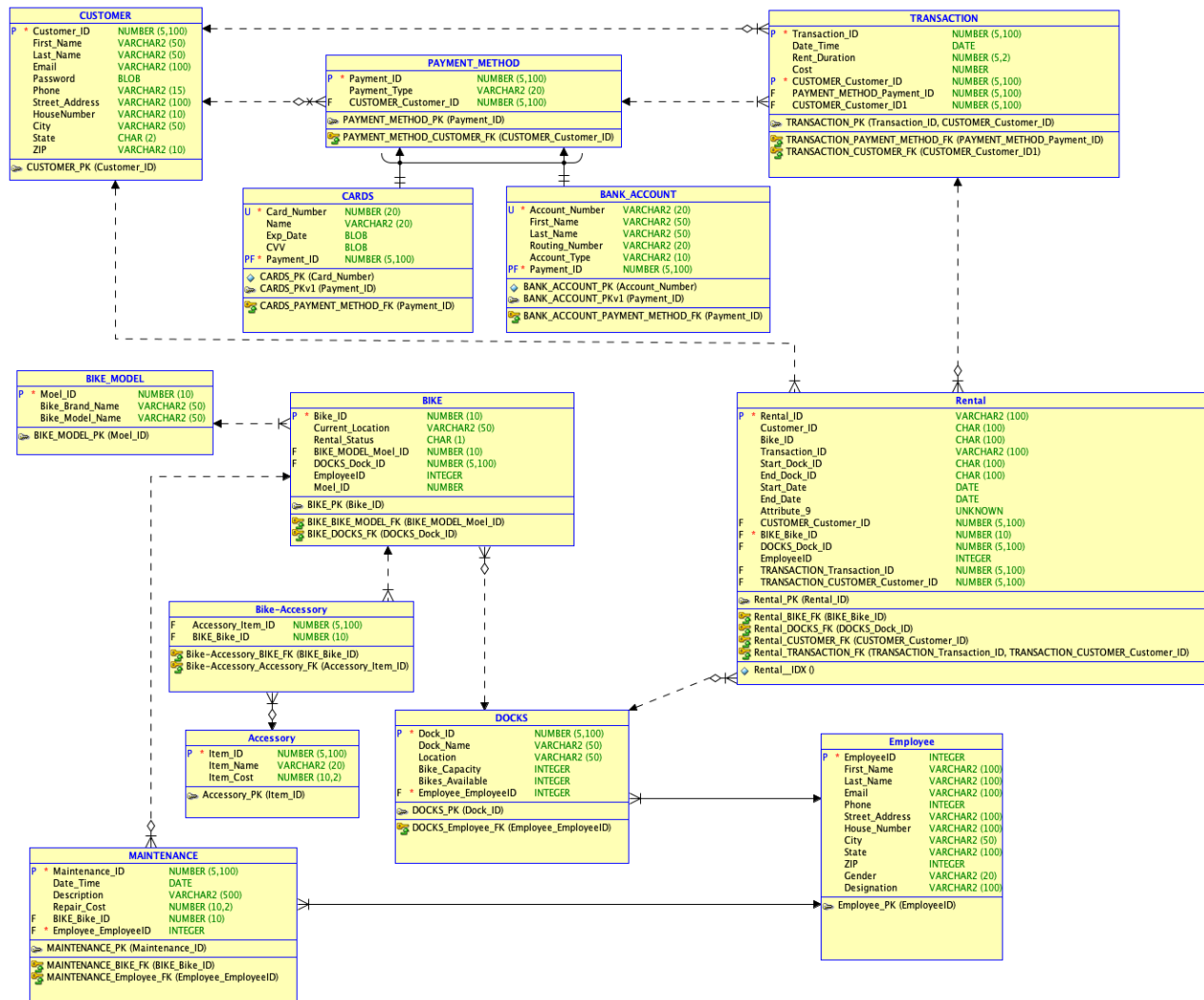
Conceptual Diagram:



Logical Diagram:



Entity Relationship Diagram:



Entities:

1. **Customer:** The customer is an entity which represents people who rent the bike. It contains of all personal details of the customer such as Name, Email ID, Phone, Address, Password, Membership Status. It is associated with payment method, transactions and rentals.
2. **Payment method:** This entity represents of the payment methods used by the customer to rent bikes. It consists of the attributes like payment method, transactions, amount. It is associated with other entities for example customer and transition.
3. **Bike:** It represents a bike that can be rented. It has attributes like model, series number, current location and it is associated with other entities like bike model, maintenance, accessory, rental and docks.
4. **Bike Model:** Bike model is an entity which represents the models of the bikes which are to be rented. It has attributes like brand, type and year. This entity is associated with only one entity which is bike.
5. **Docks:** This entity represents a place from where bikes can be rented and returned back. It has attributes like name, id, location, capacity and number of bikes available. It is associated with entities like bike and employee.
6. **Employee:** This entity represents an employee responsible for managing the docks and maintaining the bikes. It has attributes such as the name, email, phone, address, role, and gender. It is associated with other entities such as Docks and Maintenance as an Employee is responsible for managing Docks and completing maintenance on bikes.
7. **Maintenance:** This represents a maintenance history of the bikes which includes bike id, employee id, date, time and cost. It is only associated with bikes as an employee performs maintenance on bikes and a bike can have multiple maintenance history.
8. **Rental:** The entity represents rental transactions which occurs for a bike, which includes the bike ID, customer ID, start and end date and time, start and end dock, and duration as a derived attribute. It is associated with other entities such as Bike, Customer, and Transactions.
9. **Accessory:** This entity represents an accessory which be use for the bike such as helmate, mobile stand, cup holder, etc. It contains attributes like name, type, cost, and inventory count and it is associated with the Bike entity.
10. **Transactions:** This entity represents transaction which are made to rent a bike which contains attributes like payment date and time, customer, amount. It is associated with other entities such as Payment Method, Customer and Rental.

Relationship:

- Customer can have multiple Payment Method (1:M)
- Customer can have multiple Transaction (1:M)
- Customer can have multiple Rental (1:M)
- Payment Method can have multiple Transaction (1:M)
- Payment Method will be associated with only one Customer (1:1)
- Transaction will be associated with only one Customer (1:1)
- Transaction will have only one Payment Method (1:1)
- Transaction will be associated with multiple Rental (1:M)
- Bike Model can have multiple Bikes (1:M)
- Bike can be of only one Bike Model (1:1)
- Bike can have multiple Maintenance records (1:M)
- Bike can have multiple Accessories (1:M)
- Bike can be stationed at only one Dock (1:1)
- Bike can have multiple Rental (1:M)
- Rental will be associated with only one Transaction (1:1)
- Rental will be associated with only one Customer (1:1)
- Rental will be associated with only one Bike (1:1)
- Rental will have a Dock (1:1)
- Maintenance record will be of only one Bike (1:1)
- An Accessory will be associated with only Bike (1:1)
- Dock can have multiple Bikes (1:M)
- Dock will be managed by only one Employee (1:1)
- Dock can have multiple Rentals (1:M)
- An Employee will manage multiple Docks (1:M)