Data Management and Database Design

P2. Database Design and Initial ERD

Topic:

Rental Bike DBMS

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Rental Bike Database

Database Specification: Purpose, Business Problems Addressed and Business Rules.

Database Purpose:

The aim of the database is to maintain data to determine the demand and supply of the rental bikes based on the weather data, the time period data, customer reviews and other recorded data. It will be used to understand the customer behaviour and to optimize the operations.

Business Problems Addressed:

- Understand the customer behavior to better serve them with their choice of bikes and thus the purpose of the ride whether exercise, daily commute or city tour.
- Make appropriate decisions on which bikes to buy and discontinue based on the demand.
- Gain insights on whether the customers prefer our bikes or the renters' bike.
- To keep a track of the peak season/time thus helping the staff to manage operations.
- To track the costs of repairs and maintenance.
- Understand who our regular customers are (students, employees, tourists or others).
- To make decisions on membership rates depending on the number of members.
- To understand the operational costs and manage revenue.
- *Understand segment of customers who regularly use rental bikes for common use, gain insights of the time of travel and create a special packages and memberships for those customers.*

Business Rules:

- A customer can rent a bike for a time period of maximum 5 days.
- A customer can choose to rent a bike from us or the renters who post their bikes for rent on our application.
- If a customer chooses renter's bike then we are not responsible for any loss of the bike.
- The price of a single ride is decided depending on the time period with minimum being $4 for 30 mins.
- The type of bike chosen by the customer also determines the rate of the ride.
- If the customer uses the bike for more than the specified time period extra charges may apply.
- Provide deals and discounts to customers who have complaints and regular customers.
- We take commission from the renters whenever a customer rents their bike.

Design Decisions:

Entity Name	Why Entity Included	How Entity is related to other Entities
Customer	This is one of the most important entity in Rental bike database. Customer entity will include personal information such as Name, Contact No, Gender, Address, Occupation. The purpose of the entity is to track the information of customers.	Customers entity is related to membership entity as it allows customer to have membership. Customer details are related to Booking details as it allows the booking details entity to retain related customer information. Customers entity is related to promotional entity as customers may get promotions based on their rides. Customers entity is related to feedback entity as customers can give feedbacks related to Rental Bike Service.
Bike	The entity will keep track of different types of bikes. Bike entity will store information about bike number, owner information and bike type & cost associated per hour.	BikesDetails entity is related to Booking details entity as bike details are required during bookings. BikesDetails entity is related to renters entity as it tells the system if it is a renters bike or organization's bike.
Booking details	This is one of the core entities that will track all the details of the bike booked: Customer's Information, Bike Information, Station Information, Time Period of booking, Discount & Total Cost.	Booking details entity is related to Station entity, Bikes entity, Customers entity, TimePeriod entity, Weather entity & Promotions entity as Booking details stores the related data from all these fields.
Renters' info	Renters' info will display all the information about the renters who will rent their bike on the application. Renter's information will help the system to keep track of all the regular renters. Renters entity will include personal information such as Name, Contact No, Gender, Address, Occupation.	Renters entity is related to bikes entity as Bikes entity must keep track of the owner of the bike.
Membership details	Membership details will hold broad information about type of a membership a customer is holding, what is the billing cost of that membership.	Membership entity is related to customer entity as a customer may or may not have a membership depending on frequency of bookings.
Time period	This entity will track time of each booking. A customer can modify the booking if required an extra time for the trip.	TimePeriod entity is related to booking details entity as it records the Calendar details of a specific booking.

Weather	Weather entity will keep track of weather information. This will help the organization to track what weather conditions attract maximum bookings.	Weather entity is related to booking details entity as it determines the weather during a specific booking.
Employee	Employee is one of the core entities in rental bike database system. This entity will contain information about all the employees of organization irrespective of their team and role. Employee entity will include personal information such as Name, Contact No, Gender, Address.	Employee entity is related to BikeOrders entity as employees can place a bike order. It is also related to feedback entity as employees work on feedbacks given by the customer. Employee entity is related to repairs entity as employees would repair a bike whenever needed.
Feedback	To improve and update the process as per the customer demands we need to know what more expectations a customer has. Feedback entity is used to add information about recommendation and complaints.	Feedback entity is related to customers entity and as the customers can give feedback to improve and update the system.
Repairs—maintenance	The maintenance entity gives decomposition of maintenance/repair process such as repair or maintenance cost and insurance details of the bikes.	Repairs entity is related to employee entity as employee would repair a bike
Station	To keep track of all the bikes, location of the bikes and pick up and drop off, the station entity is included. Each station will have certain capacity that it can withheld number of bikes.	Stations entity is related to bikes entity as it stores the location of each bike. Station entity is related to booking details entity as it determines which station the customer would like to pick a bike from.
Promotions	To provide promotions to customer in order to increase their engagement	Promotions entity is related to Customers entity as promotions would be different for different customers. Promotion entity is related to BookingDetails entity as it uses those details to determine the discount.
Distributors	Distributor entity plays an important role in overall process as they will provide the bikes as per organization's requirement. When there is a need of new bikes as the organization may run out of the bikes or some bikes may get damaged beyond repair; they will reach out to the distributors to order new bikes.	Distributors entity is related to BikesOrder entity as (an employee will place a bike order according to requirement to the distributor) it will provide the organization with bikes as ordered.
Bike orders	Bike orders entity contains ordering information of the new bikes whenever the organization orders them. New bikes are required to satisfy customer demand.	BikeOrders entity is related to employee entity as employee would place the order for bikes.