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Module: DBMS (DATABASE MANAGEMENT SYSTEM)

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1. Project Title Car Parking Management System

2. Project Description

The Car Parking Management System is designed to efficiently manage parking spaces, track vehicle entries and exits, and calculate rental charges. This system ensures smooth operations in parking lots, minimizing congestion and improving the user experience. The key features include:

* Vehicle Registration
* Parking Slot Management
* Entry & Exit Logging
* Rental Fee Calculation
* User & Admin Roles

3. Entity-Relationship Diagram (ERD)

The ERD represents the relationships between different entities in the system. The key entities include:

* Car (car\_id, license\_plate, model, owner\_id)
* Parking (parking\_id, location, capacity, available\_slots)
* Rental (rental\_id, car\_id, parking\_id, entry\_time, exit\_time, total\_fee)

(Entity relationships will be represented visually in the diagram.)

|  |
| --- |
| car |
| Car id  make  modol  price  mstutus |

|  |
| --- |
| rentol |
| Rentolid  Customer id  Car date  Start date  End date |

|  |
| --- |
| customer |
| Customer id  Phone  email  address |

4. Logical Data Model (LDM)

The LDM represents a high-level view of the database structure without physical implementation details. The relationships between entities are:

* A Car is owned by a User.
* A Parking lot has multiple Rental records.
* A Rental is associated with a Car and a Parking lot.
* A User can book parking spaces.

5. Physical Data Model (PDM)

The PDM represents the actual database schema with attributes, primary keys (PK), and foreign keys (FK):

Tables:

1. Car (car\_id [PK], license\_plate, model, owner\_id [FK])
2. User (user\_id [PK], name, contact, role)
3. Parking (parking\_id [PK], location, capacity, available\_slots)
4. Rental (rental\_id [PK], car\_id [FK], parking\_id [FK], entry\_time, exit\_time, total\_fee

6. Data Dictionary

**Car Table**

|  |  |  |
| --- | --- | --- |
| **Attribute Name** | **Data Type** | **Description** |
| Car\_ID | INT (Primary Key) | Unique identifier for each car |
| License\_Plate | VARCHAR(20) | Car's license plate number |
| Car\_Model | VARCHAR(50) | Model of the car |
| Car\_Color | VARCHAR(30) | Color of the car |
| Car\_Type | VARCHAR(30) | Type of car (SUV, Sedan, Hatchback, etc.) |

**2. Customer Table**

|  |  |  |
| --- | --- | --- |
| **Attribute Name** | **Data Type** | **Description** |
| Customer\_ID | INT (Primary Key) | Unique identifier for each customer |
| Name | VARCHAR(50) | Full name of the customer |
| Contact\_Number | VARCHAR(15) | Customer's phone number |
| Email | VARCHAR(50) | Customer's email address |
| Address | TEXT | Residential address of the customer |
| License\_Number | VARCHAR(30) | Customer’s driving license number |

Rental table

|  |  |  |
| --- | --- | --- |
| **Attribute Name** | **Data Type** | **Description** |
| Rental\_ID | INT (Primary Key) | Unique identifier for each rental transaction |
| Car\_ID | INT (Foreign Key) | Links to the rented car (Car Table) |
| Customer\_ID | INT (Foreign Key) | Links to the customer renting the car (Customer Table) |
| Rental\_Start\_Date | DATETIME | Date and time when the rental starts |
| Rental\_End\_Date | DATETIME | Date and time when the rental ends |
| Rental\_Status | ENUM('Ongoing', 'Completed', 'Cancelled') | Status of the rental transaction |