REPORT Two Part 1

GROUP 3

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# PART 1

## Analysis and Domain Modeling

### Conceptual Model

#### Concept Definitions

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#### Association Definitions

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#### Attribute Definitions

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#### Traceability Matrix

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#### Domain Model

Each use case has a form of user interface that allows a customer, technician, salesperson, or manager to perform creation, reading, updating, and deletion of vehicles within the inventory system; with the exception of use case number five, which we will discuss at the end. Each use case involves the database to track what changed, who changed what. This will allow for future additions of adding in sales data collection. The use cases one thru four initiate via a user; a manager, technician, customer, or salesperson. They will interact with the system via a web page that will take in their requests, such as a search request, and pass it to the controller to convey to the appropriate service. In most cases, this will involve communicating with a database for the required data and then a page maker to translate and return the data to the website. A website versus a specific software gui allows for easy deployment to most computers and existing systems along. In use cases two and three, they alert a different actor, namely a technician, to bring the car to the requested spot. This can be set-up to a specific IP address or device identifier at the customer’s site. Use cases two and three have timers to check if the car has been moved per a request and uses a timer to recheck the sensor’s status to know if there needs to be a re-alert to the technician or salesperson. Use case four has a unique element of a reservation. The reservation is initiated by the customer via the dealership’s website.

Use case number five is the most unique of them by being the one that the initiator is the sensor. If a sensor is tripped, it will begin a check to the data base to see if the car was cleared to be relocated. Once confirmed via a database check, the controller will send a notice to a technician or salesperson that an unauthorized move has occurred. The technician can do a visual check per the dealership’s policy to confirm the car has gone missing. The database will be updated of the missing car, a sensor’s ID, and the time of the sensor alert.

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### System Operation Contracts

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### Data Model and Persistent Storage

The first step is to determine if the system requires data storage beyond a single execution. Based on the information, it can be inferred that the system does require persistent data storage. This means that data needs to be saved and accessed across multiple system executions. Next, we need to identify the persistent objects that need to be stored in the system. From the system architecture description, the following objects can be considered as potential candidates for persistent storage:

* Cars: Information about the cars in the dealership, including attributes such as make, model, year, and availability.
* Spaces: Details about the parking spaces in the dealership, including their status (occupied or vacant) and any associated attributes.
* Users: Data related to authenticated users, including their roles and credentials.
* Sales Data: Information about sales made, including details about the sold cars, customers, and transaction history.

These objects are subject to further analysis and refinement based on the specific requirements of the system.

Considering the requirements for persistent data storage and the nature of the data objects, a relational database is a suitable storage management strategy. A relational database provides a structured and efficient way to store and retrieve data, ensuring data integrity and enabling complex queries and relationships between different entities. To design the database schema, further analysis is required to determine the specific attributes and relationships for each persistent object. Based on this analysis, a detailed database schema can be created using SQL (Structured Query Language).

The database schema will define the tables, columns, data types, constraints, and relationships between different tables. It will serve as the blueprint for creating and managing the database. In conclusion, the system requires persistent data storage, and a relational database is a suitable storage management strategy. The identified persistent objects, such as cars, spaces, users, and sales data, can be stored and managed effectively using a well-designed database schema implemented with SQL.

A basic schema/database example is linked below:

1. Cars Table:
   * car\_id (Primary Key)
   * make
   * model
   * year
   * availability
   * (additional attributes specific to cars)
2. Spaces Table:
   * space\_id (Primary Key)
   * status
   * (additional attributes specific to spaces)
3. Users Table:
   * user\_id (Primary Key)
   * username
   * password
   * role
   * (additional attributes specific to users)
4. Sales Table:
   * sale\_id (Primary Key)
   * car\_id (Foreign Key referencing the Cars Table)
   * customer\_id (Foreign Key referencing the Users Table)
   * transaction\_date
   * (additional attributes specific to sales)

### Mathematical Model

None.

# PROJECT MANAGEMENT (PLAN OF WORK)

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# Reference list

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