

***DSA-Project Report***

*Data Structures and Algorithms*

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***Car Parking Management System Report***

**Introduction**

The Car Parking Management System is designed to efficiently manage parking lot operations including parking, retrieving, and tracking car details. This report provides an overview of the system's functionality, structure,Data Structure used and usage.

**Functionality**

* **Parking a Car:** Users take information such as number plate, company, model, owner's name,owner’s CNIC number and phone number from the customer to park a car. A unique ticket number is generated(by importing Random class) for each parked car.
* **Retrieving a Car:** User takes the customer's ticket number. The system then finds the ticket number and the car is then retrieved by deleting it from the parking lot(i.e the LinkList).
* **Displaying Current Parking Lot Status:** Users can view the current status of the parking lot including parked cars.
* **Checking All-Time Parking Lot Details:** Users can view all-time parking lot details including past parked cars(this is done by using stack Link List).
* **Displaying Customer's Parking Data:**This is a feature for displaying a specific customer's parking data. In this feature again the ticket number has to be provided by the customer.
* **Exit:** Users can exit the system when done.

**System Components**

The system consists of the following components:

* **CarList:** Manages the list of parked cars.
* **DetailStackLL:** Implements a stack data structure to store all-time parking details.
* **Details:** Represents the details of a parked car.
* **ticketGenerator():** Generates a unique ticket number for each parked car.
* **start():** Main function to start the system and handle user interactions.

**Data Structures Used**

The data structures used to implement the system are:

* Stack using Link List
* Singly Link List

**Usage**

Upon starting the system, users are presented with a menu to choose from various options.

Users can select an option by entering the corresponding number.

Depending on the chosen option, users can input car details, view parking lot status, view all-time parking details, or exit the system.

Car details inputted by users are stored in the system.

All-time parking details are stored using a stack data structure.

The system allows for easy management and tracking of parked cars.

**Conclusion**

The Car Parking Management System provides an efficient solution for managing parking lot operations. With features for parking, retrieving, and tracking car details, it offers convenience to both parking lot administrators and customers. Further improvements and enhancements can be made to make the system more robust and user-friendly.