

Synopsis

Vehicle Parking Management System

Project Id: P30

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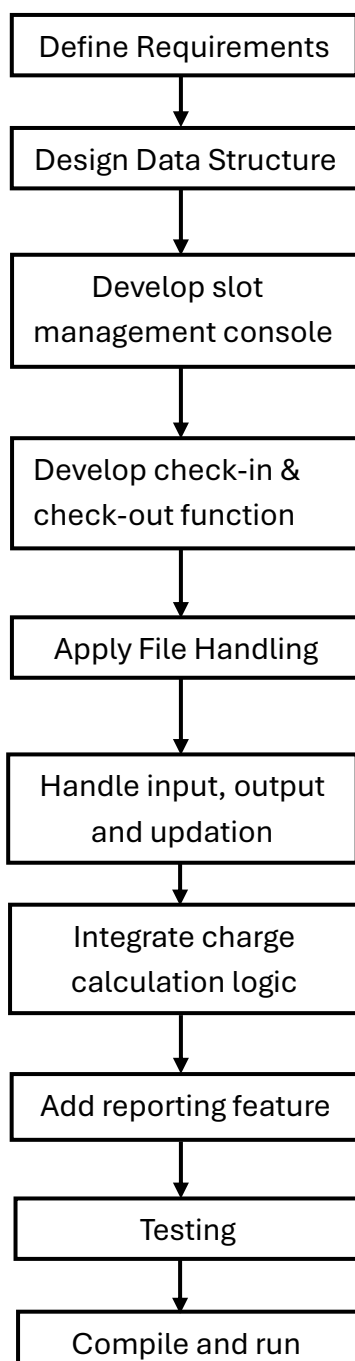
Section: A1

- **Problem Description:**

The **vehicle parking management system** is a software program developed in C language to effectively manage parking facilities. This system is designed to allocate parking space to vehicles, record check-in and check-out timings of every vehicle and compute parking charges on the outgoing vehicles. This program will support different vehicle types, provide slot availability and store parking history using file handling.

In real life scenarios such as malls, offices, airports and public parking lots are managed manually that can lead to confusion, human error or inefficiencies. This system will reduce manual errors, speed-up the process, ensure fair charge calculation and record the data of every vehicle that check-in or check-out. This system is very valuable in urban areas where parking space is limited and time efficiency is critical.

- **Steps of implementation:**



- **Proposed Modules:**

- **Vehicle check-in:** It handles the process of registration of vehicle upon entry. It will collect vehicle details and record them in text file. It will note down the vehicle check-in time and store it with vehicle details.
- **Vehicle check-out:** It handles the departure of vehicle. It will update slot availability and record the departure time in text file.
- **Slot management:** It keeps track of available and occupied parking slot. It will update the parking slots on check-in and check-out in the text file. It will notify of available parking slot and notify for no available parking slot upon availability.
- **Billing and charges:** It calculates the parking charges upon its duration and vehicle type. It will generate final bill on check-out. It will basically find out time duration by calculating check-in and check-out timings and also calculating charges for vehicle type it will generate the final bill.
- **File handling and record management:** Stores all data of vehicle using file handling. It will show the current and past history of parking lot.

- **Required topics from the subject:**

- **Functions:** functions will help in structuring the code by separating the logic for check-in, check-out and billing. This will make the code more organized, reusable and easier to debug.
- **File handling:** file handling will be used in storing and retrieving the vehicle records persistently. It will store data in an organized way in text file that is easier to read, update and delete the data.
- **Structure:** structure will be used to group related data such as vehicle number, vehicle type, time and slot number.

Example:

```
struct Vehicle {  
    char plate_number[20];  
    char vehicle_type[15];  
    int slot_number;  
    char check_in_time[20];  
    char check_out_time[20];  
    float charge;  
};
```

- **Pointers:** pointer will be used for efficient memory handling, especially when passing structure to functions. They can also be used for dynamic data access, file handling and managing arrays of structures.
- **Strings:** strings will be used to store vehicle records. It will help in comparing and formatting of string data during check-in and check-out processes.

- **Platform required:**

- VS Code
- Code block
- Turbo C
- Linux terminal

- **Books and Link sources:**

- Yashwant Kanetkar, “Let Us C”, 8th Edition, BPB Publication 2007
- E.Balagurusamy, “Programming in ANSI C ”, 6th Edition, McGraw Hill 2015
- Steve Oualline, “Practical C Programming”, 3rd Edition, Orielly Publishers, 2011
- <https://www.geeksforgeeks.org/c-programming-language/>