MAD 1 Project – Vehicle Parking App

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## **Description**

This vehicle parking application manages parking lots, spots, facilitating ticket booking and tracking, all built with Flask, Jinja2, SQLite, and SQLAlchemy.

**AI Usage:** 20% AI was used to generate verbose code inside routes and Jinja files

## **Technologies Used**

* **Flask**: A Python-based server framework used for the application backend.
* **Jinja2**: A templating engine used to render HTML templates for dynamic web pages.
* **SQLite**: A lightweight, file-based database used for the application's data storage.
* **SQLAlchemy**: An Object Relational Mapper (ORM) that facilitates communication between Python programs and databases, abstracting SQL operations.

## **Architecture and Features**

The application's structure is organized for clarity and maintainability:

* **templates**: Contains all HTML web page files, separated for admin and user interfaces.
* **static**: Stores static assets like CSS files.
* **models**: Manages database definitions (models.py), SQLAlchemy initialization (db.py), and data population (populate.py).
* **controllers**: Implements route handlers, with distinct files for general, admin, and user logic.
* **app.py**: The main entry point, responsible for Flask app creation and controller registration.
* **config.py**: Holds environment-specific configuration settings.
* **requirements.txt**: Lists all necessary Python dependencies.
* **Database**: Uses instance/parking\_lot.db.sqlite with SQLAlchemy for data persistence.

The application offers a comprehensive set of functionalities:

* **User Management**: Supports user signup, login with validation, and profile viewing with basic stats.
* **Parking Management**: Allows admins to create, edit, and view parking lots and spots, while users can view available spots.
* **Booking System**: Enables users to book and release parking spots.
* **Admin Tools**: Provides an admin dashboard for user management, summaries, and oversight of parking lot usage.
* **Search & Reporting**: Includes search functionality for users and admins, alongside summary and reporting features for parking activity.
* **Security & Interface**: Features secure session management and a responsive web interface with distinct navigations for users and admins.

# **Database Schema Design**

## User: id, username, password\_hash, fullname, address, pincode, is\_admin. Links to Ticket.

## ParkingLot: id, prime\_location\_name, price, address, pin\_code, maximum\_number\_of\_spots. Links to ParkingSpot.

## ParkingSpot: id, lot\_id (Foreign Key), status (default 'A' as in Available). Links to Ticket.

## Ticket: id, active, spot\_id (Foreign Key), user\_id (Foreign Key), vehicle\_number, parking\_timestamp, leaving\_timestamp, duration, total\_cost, parking\_cost\_per\_unit\_time.

# **Video**

[Video](https://drive.google.com/file/d/1QabZI_HdwO1yfLNfxtpM3-7ozsTi2zmI/view?usp=sharing)

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