**PRN231 Assignment 02 - Fall 2023 HCM**

**Building ASP.NET Web API with OData and Web Client Application**

# 1. Introduction

A Car Rental Management System is a software solution that helps car rental companies manage and streamline their business operations. It provides an end-to-end platform to handle various aspects of the car rental process, from booking and reservation management to vehicle maintenance, invoicing, and customer relationship management. Here are some key components and functions of a Car Rental Management System:

* Online Booking and Reservation: The system allows customers to make bookings and reservations online through a user-friendly interface. It provides real-time availability of vehicles, rental rates, and booking confirmations.
* Vehicle/Car Management: The system keeps track of the available fleet of vehicles, including their models, make, year, mileage, and condition. It helps manage vehicle allocation, availability, and scheduling.
* Customer Management: The system maintains a database of customer information, including contact details, identification documents, and rental history. It enables easy retrieval of customer records, communication, and personalized service.

Imagine you're a developer of a FU Car Renting Management System named **FUCarRentingSystem**. Your manager has asked you to develop a website with ASP.NET Core Razor Pages for supplier management, car information management, customer management, and renting transaction management. To implement a part of this system your tasks include:

* Manage customer information.
* Manage car information.
* Manage car renting transaction.

The application has a default account (admin account) whose email is “**admin@FUCarRentingSystem.com**” and password is “**@@admin@@**” that stored in the **appsettings.json**.

# 2. Assignment Objectives

In this assignment, you will:

* Use the Visual Studio.NET to create a Web application and ASP.NET Core Web API  
  project (with OData support).
* Perform CRUD actions using Entity Framework Core with *Code First approach.*
* Using OData (a data access protocol for the web) to query and manipulate data sets.
* Apply 3-layers architecture to develop the application.
* Apply Repository pattern and Singleton pattern in a project.
* Add CRUD and searching actions to the Client application with ASP.NET Core Web API.
* Apply to validate data type for all fields.
* Run the project and test the actions of the Client Web app and ASP.NET Core Web API

# 3. Database Design

A part of Car Renting Management System database is described as the bellow

**CarProducer**(ProducerID, ProcuderName, Address, Country)

*All fields are required*

**Car**(CarID, CarName, CarModelYear, Color, Capacity, Description, ImportDate, ProducerID, RentPrice, Status)

*All fields are required*

**Customer** (CustomerID, CustomerName, Mobile, Birthday, IdentityCard, LicenceNumber, LicenceDate)

*All fields are required*

**CarRental** (CustomerID, CarID, PickupDate, ReturnDate, RentPrice, Status)

*All fields are required*

*PickupDate< ReturnDate*

**Review** (CustomerID, CarID, ReviewStar, Comment)

*All fields are required*

# 4. Main Functions

* Member (Admin/Customer) authentication by Email and Password.
* Create database with Forward Engineering approach (create model classes and DB context  
  class then make migration).
* Create Web API with OData: Car management, Customer management, Review Management and Car Rental management
* Create Client application (with Desktop/Web/Mobile application) interactive with Web  
  API to perform these functions:
  + If the user is an “**Admin**” then his/her is allowed to
    - Manage customer information.
    - Manage car information. (The delete action will delete car information in the case this information is not belong to any renting transaction. If the car information is already stored in a renting transaction, just change the status.)
    - Manage rental management.
    - Create a renting transaction report statistic by the period from StartDate to EndDate, and sort data in descending order.
  + If user is a **“Customer”**, this customer role is allowed to:
    - Register an account.
    - Create an online renting tractions with one or many cars’ information.
    - Manage his/her the profile
    - View transaction history.

# 5. Note

* You must use **Visual Studio 2019 or above (.NET5/.NET6/.NET7), MSSQL Server 2012 or above** for your development tools.
* To do your BE program, you must use **ASP.NET Core Web API with OData**. Note that *you are not allow to connect direct to database from API Controller, every database connection must be used through Repository and Data Access Objects. The database connection string must get from appsettings.json file.*
* Create Solution in Visual Studio named **StudentName\_ClassCode\_A02.sln**. Database  
  after migration should be named **StudentName\_ClassCode\_A02**.