.NET Skill Challenge

Add to your personal **GitHub** repository a new project for evaluation and send the URL to the recruiters for them to share it with the technical staff. After the technical interview you can delete it.

Develop a .NET application to be integrated to the proposed Angular application.

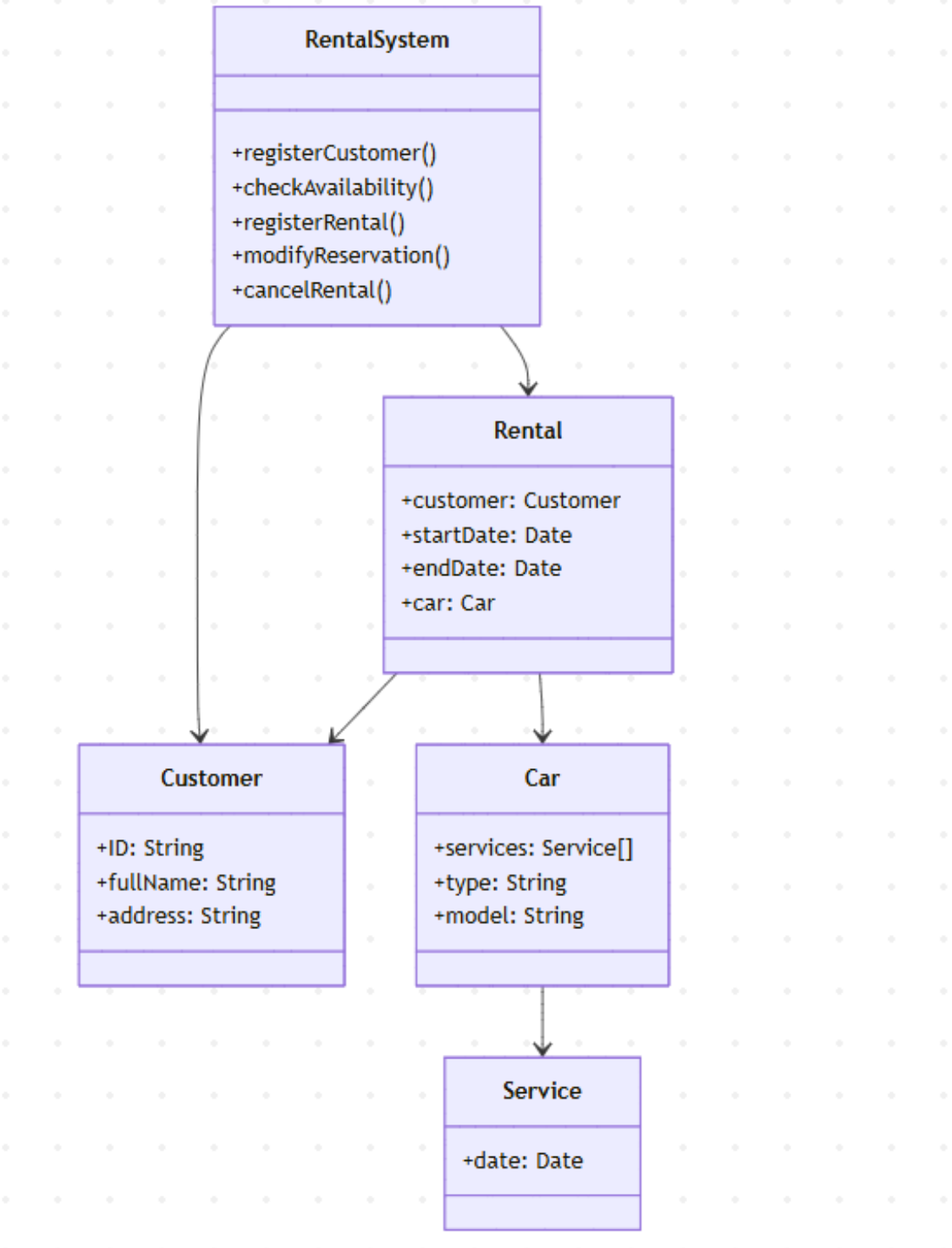
Car Rental

The car rental system at the airport will allow users to manage rentals efficiently and personally. A customer can check the availability of cars based on the date and desired features.
Register a rental by selecting a start date, specifying the vehicle characteristics they want (such as type and model), and defining the rental period by setting a return date.
Additionally, the system will allow customers to modify their reservation details, such as changing the start date, extending the return date, or changing the selected vehicle, as well as canceling a previously registered rental if their plans change. In this way, the system fulfills the processes of booking, consultation, modification, and cancellation.
To complete a Rental, the following information must be known about the Customer: ID, full name, address, rental start and end days, and car type. The system will show options according to availability.
After the rental is completed, that car cannot be rented for the next day.
All cars have a service every 2 months that lasts 2 days.
A car can only be assigned to one customer at a time.
On the other hand, management needs to generate a daily list of cars that have scheduled services in the next two weeks. The list should include the model, car type, and service date.

```
class RentalSystem {
    +registerCustomer()
    +checkAvailability()
```

```
    +registerRental()
    +modifyReservation()
    +cancelRental()
}

class Customer {
    +ID: String
    +fullName: String
    +address: String
}

class Rental {
    +customer: Customer
    +startDate: Date
    +endDate: Date
    +car: Car
}

class Car {
    +services: Service[]
    +type: String
    +model: String
}

class Service {
    +date: Date
}

RentalSystem --> Customer
RentalSystem --> Rental
Rental --> Customer
Rental --> Car
Car --> Service
```

.NET Skill Challenge



.NET Skill Challenge

Disclaimer: All the requirements include the previous tier

Technical requirements:

Junior:

Implement global exception handling.

Create a unit test to test the renting of a car that has already been reserved for a specific date range.

Suggestion: Use an ORM for mapping entities to the database, preferably EF Core, performing code first with migrations.

🔗 Reference Links:

Net 9 tutorial

Global exception handling

What is unit test?
How to use Xunit for unit testing

Semi-senior:

Make use of the clean architecture

Achieve a 50% of coverage in the unit tests (only one use-case should be tested)

Use DDD

Use CQRS pattern

Make proper use of asynchronous programming

🔗 Reference Links:

What is clean architecture?

What is code coverage?

.NET Skill Challenge

DDD

What is CQRS?

MediatR

CancellationToken

Senior:

Achieve a 90% of coverage in the unit tests (only one use-case should be tested)

Implement authorization and authentication (for simplicity we recommend using built-in authorization and authentication starting from .NET 8)

Add caching.

Suggestion: Create a durable function to handle the process of sending the email.

🔗 Reference Links:

What is authorization?

Example of authorization

What is authentication?

ASP.NET core identity

JWT
.net 8 built-in authentication and authorization

Cache

Durable functions overview

Azure Storage emulator azurite

Functional requirements:

Junior:

Show statistics of the most rented car type with its utilization percentage.

.NET Skill Challenge

Semi-senior:

The statistics should include the ranking of the top 3 given a date range

Senior:

Create a dashboard with the following sections:

1. The ranking with the topmost used cars
2. The ranking of the most used car by brand, model and type

Suggestion:

Send a confirmation email:

1. The function should send an email to the person who has successfully reserved a car.
2. The email should include the car reservation details.