**Backend Developer Assessment**

Each exercise should be designed to be solved within 30-45 minutes, allowing for a total of 3 hours for completion.

**Exercise 1**: Microservices Architecture

Topic: Java for Microservices

Task:

Explain the key principles and advantages of the microservices architecture. Additionally, outline the challenges and trade-offs associated with adopting a microservices approach.

**PRINCIPLES and ADVANTAGES**: The microservices should be **Scalables**, in addition to the **Single Responsability** and **Isolate**, each microservice should be executed independenly with his own resources and environment; about the scalabity it could means to reduce the cost by on-dement services.

**CHALLENGES:** It changes the monolithic approaches, related to the architecture and the goodness, the developer should consider a lot of topics related to infraestructure, i.e. availability, scalability, comunication, restrictions, resources and tracing of runtime exceptions.

**Exercise 2**: Enterprise Java

Topic: Enterprise Java

Task:

Implement a Java interface called `EmployeeService` that includes the following methods:

1. `List<Employee> getAllEmployees()`: Retrieves a list of all employees.

2. `Employee getEmployeeById(long id)`: Retrieves an employee by their ID.

3. `void addEmployee(Employee employee)`: Adds a new employee to the system.

**Exercise 3**: Spring Boot REST API

Topic: Spring Boot

Task:

Create a Spring Boot application that exposes a RESTful API for managing books in a library. The API should have endpoints to:

1. Get a list of all books in the library.

2. Get a book by its ISBN number.

3. Add a new book to the library.

**Exercise 4**: Spring Data JPA

Topic: Spring Data JPA

Task:

Create a Spring Data JPA repository for the `Book` entity from the previous exercise. The repository should include methods to:

1. Find books by the author's name.

2. Find books published after a certain date.

**Exercise 5**: Spring Boot and Database Transaction

Topic: Spring Boot and Database Transaction

Task:

In the book library application, modify the `addBook` method in the `BookService` to ensure that the book insertion is performed within a database transaction. The transaction should be rolled back if the book's publication date is in the future (i.e., not published yet).