Homework Assignment: Backend System Design

Part 1: Understanding System Design

Instructions:
Based on the provided reading, answer the following questions in your own words:

1. Define System Design in one sentence.

2. List and briefly describe the five main steps in the system design process.

3. Explain why requirements analysis is a critical first step in system design.

Part 2: Applying System Design Principles

Instructions:
Choose a real-world system you interact with regularly (e.g., a mobile banking app, an e-commerce website, a university portal).

For your chosen system, analyze how it aligns with three of the following system design principles:

- Scalability

- Reliability

- Usability

- Security

For each principle, provide:

- How the system demonstrates this principle.

- One suggestion for improvement.

Part 3: Exploring UML Diagrams

Instructions:
Select one type of UML diagram from the reading (e.g., Class Diagram, Sequence Diagram, Use Case Diagram).

1. Describe the purpose of your chosen diagram type.

2. Create a simple example of this diagram for a familiar system (e.g., a library management system, a food delivery app).

3. Explain how this diagram helps in the system design process.

Part 4: Algorithm & Flowchart Creation

Instructions:
Think of a simple process in a system you use (e.g., user registration, password reset, online purchase).

1. Write a step-by-step algorithm for this process.

2. Create a flowchart representing the same process.

3. Explain how designing this algorithm helps in the overall system design.