# CS 255 System Design Document Template

This template lays out all the different sections that you need to complete for Project Two. Each section has guidance to prompt your thinking. You will need to continually reference the interview transcript as you work to make sure that you are addressing your client’s needs. There is no required length for the final document. Instead the goal is to complete each section based on what your client’s needs are. Remove this note when you are finished, and replace all bracketed text with the relevant information.

## UML Diagrams

### UML Use Case Diagram

A diagram of a person's life cycle

Description automatically generated

### UML Activity Diagrams

A diagram of a system

Description automatically generated

A screenshot of a diagram

Description automatically generated

### UML Sequence Diagram

A screenshot of a test

Description automatically generated

### UML Class Diagram

A diagram of a class

Description automatically generated

## Technical Requirements

**Hardware Requirements:**

Web Server: A robust web server to host the application, manage user requests, and handle concurrent connections.

Database Server: A powerful database server to store user data, driving lesson information, progress, and system settings.

**Software Requirements:**

Web Application Framework: A suitable web application framework for building the front-end and back-end components of the system.

Database Management System: A relational database management system (MySQL) to store and manage data securely.

Web Browsers: Compatibility with major web browsers (Google Chrome, Firefox, Safari, Microsoft Edge) for user access.

Operating System: Compatibility with multiple operating systems (Windows, Linux, macOS) for both server and client machines.

HTTPS Support: Ability to support secure communication through HTTPS for data encryption during transmission.

Code Versioning: Implementation of a code version control system for collaborative development and code management.

**Tools and Development Environment:**

Integrated Development Environment (IDE): Use a suitable IDE for coding, debugging, and project management.

Diagramming Tools: Use UML diagramming tools (Lucidchart) to create and maintain UML diagrams for system documentation.

Testing Frameworks: Implement testing frameworks for unit testing, integration testing, and ensuring system functionality.

Security Tools: Implement security tools to ensure data protection and identify vulnerabilities.

**Infrastructure Requirements:**

Cloud Services: Utilize cloud services (AWS, Azure, Google Cloud) for scalable and reliable hosting, storage, and data processing.

Content Delivery Network: Implement a CDN for fast and efficient delivery of static content to users.

Load Balancing: Set up load balancers to distribute incoming traffic across multiple servers for improved performance and reliability.

**Security and Privacy Requirements:**

Encryption: Implement encryption mechanisms to secure data transmission between clients and servers.

Authentication and Authorization: Develop a robust user authentication and authorization system to control access based on roles and permissions.

Data Privacy: Implement data protection measures to ensure user data privacy and comply with relevant regulations.

Regular Security Audits: Conduct regular security audits and vulnerability assessments to identify and address potential security risks.

**Scalability Requirements:**

Horizontal Scalability: Design the system architecture to support horizontal scalability, allowing for easy addition of resources as user demand grows.

Database Scaling: Set up a database system that can handle increasing data volumes by using replication, or other appropriate techniques.

**Performance Requirements:**

Quick Response Times: Ensure that web pages load quickly and efficiently to provide a seamless user experience.

Minimal Downtime: Implement strategies for system updates and maintenance to minimize downtime and disruptions for users.

Optimized Database Queries: Optimize database queries and indexes to enhance data retrieval performance.