# 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 student

AI-generated content may be incorrect.

### UML Activity Diagrams

A diagram of a diagram

AI-generated content may be incorrect.

### UML Sequence Diagram

A diagram of a bank system

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### UML Class Diagram

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## Technical Requirements

**Hardware Requirements**

* The system will be hosted on a cloud-based infrastructure using either **Amazon Web Services (AWS)** or **Microsoft Azure** to ensure scalability and reliability (Amazon Web Services, n.d.; Microsoft Azure, n.d.).
* Devices accessing the system must run on **Windows 10 or later**, **macOS Monterey or newer**, **iOS 14 and above**, or **Android 10 and later** to ensure compatibility.
* A **stable and secure high-speed internet connection** is required for all users accessing online services.
* The database will be managed through **a structured cloud-based SQL solution**, such as **MySQL or PostgreSQL**, to handle data efficiently (PostgreSQL Global Development Group, n.d.).

**Software Requirements**

* The system will be designed as a **web-based platform**, ensuring accessibility through modern browsers such as **Google Chrome, Mozilla Firefox, Microsoft Edge, and Safari**.
* **MySQL or PostgreSQL** will be used as the primary **database management system** to maintain structured data storage (PostgreSQL Global Development Group, n.d.).
* The **backend logic** will be implemented using **Python**, while **JavaScript** will be utilized to enhance front-end interactivity.
* A **secure authentication system** will be implemented using **OAuth 2.0** or **multi-factor authentication (MFA)** to enhance login security.

**Tools & Infrastructure**

* **Lucidchart** will serve as the **CASE tool** for UML diagram creation.
* Development will be conducted using **Visual Studio Code** and **PyCharm**, with **Postman** assisting in API testing.
* **AWS S3, Google Cloud Storage, or Azure Blob Storage** will be utilized to handle file and data storage (Google Cloud, n.d.).

**Security Measures**

* **AES-256 encryption** will be implemented to ensure robust data protection.
* **Account lockout policies** will be enforced, restricting access after five consecutive failed login attempts.
* **Automatic session timeouts** will be configured to log users out after **15 minutes of inactivity**.
* **Role-based access control (RBAC)** will be used to ensure users only have permissions relevant to their role.

**System Scalability & Performance**

* The platform will use an **auto-scaling architecture** to manage traffic spikes efficiently.
* A **caching mechanism**, utilizing **Redis or Memcached**, will be implemented to enhance data retrieval speeds.
* **Real-time error monitoring** will be enabled through tools like **AWS CloudWatch, Azure Monitor, or Google Cloud Operations Suite** to track performance issues (Amazon Web Services, n.d.; Microsoft Azure, n.d.; Google Cloud, n.d.).

**Compliance & Future Considerations**

* The system will be designed to **synchronize automatically** with **DMV updates**, ensuring compliance with driving test regulations.
* **Future expansions** will include **advanced performance tracking, analytics dashboards, and additional lesson packages**.
* Secure **REST API endpoints** will be integrated to allow seamless communication with third-party scheduling tools.

**References**

Amazon Web Services. (n.d.). *What is AWS? - Cloud computing with AWS.* Retrieved February 21, 2025, from <https://aws.amazon.com/what-is-aws/>

PostgreSQL Global Development Group. (n.d.). *PostgreSQL.* Retrieved February 21, 2025, from <https://www.postgresql.org/>

Microsoft Azure. (n.d.). *Cloud computing services: Microsoft Azure.* Retrieved February 21, 2025, from <https://azure.microsoft.com/en-us>

Google Cloud. (n.d.). *Google Cloud.* Retrieved February 21, 2025, from <https://cloud.google.com/>