# 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 system

Description automatically generated

### UML Activity Diagrams

A screenshot of a chat

Description automatically generated

A diagram of a diagram

Description automatically generated

UML Sequence Diagram

A close-up of a diagram

Description automatically generated

### UML Class Diagram

A diagram of a company

Description automatically generated

## Technical Requirements

A number of infrastructure, software, and hardware requirements must be satisfied in order to create a reliable and scalable system. The backend architecture will be supported by a dependable cloud hosting company, like AWS, Google Cloud, or Microsoft Azure, which guarantees fault tolerance, high availability, and load balancing to efficiently handle traffic during periods of high demand. Desktop computers, tablets, and mobile devices are just a few of the user devices that the system must handle in order to ensure quick data access for all of them.

For software needs, user data, lesson information, payment records, and student progress data will be stored in a relational Database Management System (DBMS) such as MySQL or PostgreSQL. In order to guarantee data redundancy and automatic backups for recovery, the selected DBMS should provide both cloud-based and on-premises choices. Furthermore, Apache or Nginx will be used by the web server to manage HTTP requests and enable safe, effective content delivery. To produce a responsive and user-friendly design, the frontend will make use of HTML5, CSS3, JavaScript, and frameworks like React or Angular, while the backend will use programming languages like Java, Python, or Node.js. Integration with APIs such as PayPal or Stripe will secure payment processing and handle lesson package transactions. Additionally, mobile support will be provided to ensure compatibility with Android and iOS devices.

Regarding tools and the development environment, use case, activity, sequence, and class diagrams will be created and maintained using UML diagramming tools such as Lucidchart or Microsoft Visio. Integrated development environments (IDEs) like Visual Studio Code for general development, PyCharm for Python, or IntelliJ IDEA for Java are examples of development tools. Git will be used to manage version control, while GitLab and GitHub will be used for source code management and teamwork. Testing tools will include Selenium for end-to-end testing to guarantee UI functioning and JUnit for Java, Pytest for Python, or Jest for JavaScript for unit testing backend logic. Google Analytics or Mixpanel for tracking user activity will be used to facilitate monitoring and analytics.

High-speed internet will be necessary for server connectivity as part of the infrastructure needs in order to reduce latency, guarantee speedy data access, and guarantee seamless operation. To further safeguard server access, firewall and VPN configurations will be put into place. SSL/TLS encryption is a critical security measure for all data in transit, including payment information and login credentials. For authentication and authorization, role-based access control (RBAC) will be used, limiting access according to user roles (Admin, Instructor, and Student). The database and user data will be backed up every day to guard against data loss. Last but not least, scalability will be a top concern. Auto-scaling settings will be implemented to handle spikes in user traffic and database needs, guaranteeing that the system can develop with DriverPass as it expands.