# Design Patterns

For our eLearning platform, we've opted to implement the MVC (Model-View-Controller) and Factory design patterns. We've opted for these design patterns as they would aid in streamlining the development process and enhancing the scalability and maintainability of our application. The MVC pattern is ideal for our platform as it has a clear separation of concerns—allowing for a modular approach to handling the diverse functionalities our application offers, such as user authentication (login/signup, updating user details), course management by admins (creating courses, accepting students), and assignment management by teachers (creating quizzes and essays) and students (enrolling in courses, submitting assignments, and viewing grades). Specifically, the Model component will manage the application data, including user profiles, course details, and assignment grades. The View component will present the data to users allowing for certain interactions based on user roles (Admin, Teacher, Student). The Controller component will serve as an intermediary, processing user inputs such as our signup forms and course enrollment requests. Additionally, it will also update the Model and View accordingly. This pattern ensures that our application will promote ease of development, testing, and maintenance.

In addition to MVC, the Factory pattern will also be utilized to handle the creation of various types of assignments and user roles within our platform. This pattern allows for the encapsulation of instantiation logic for assignments (quizzes, essays) and users (Admin, Teacher, Student), making the system more adaptable to changes. For instance, when a teacher creates an assignment, the Factory pattern will determine whether it's a quiz or an essay based on the input criteria, which will simplify the creation process and enhance code reusability. Similarly, when processing sign-ups or role updates, the Factory pattern will facilitate the creation of user objects based on the specified role, streamlining user management and ensuring that each component of our eLearning platform behaves according to its defined responsibilities.

By adopting these design patterns, our platform offers a user-friendly eLearning environment that caters to the diverse needs of its users. This approach not only aids in achieving a high degree of organization and clarity in our application's architecture but also significantly reduces development time and code redundancy. .