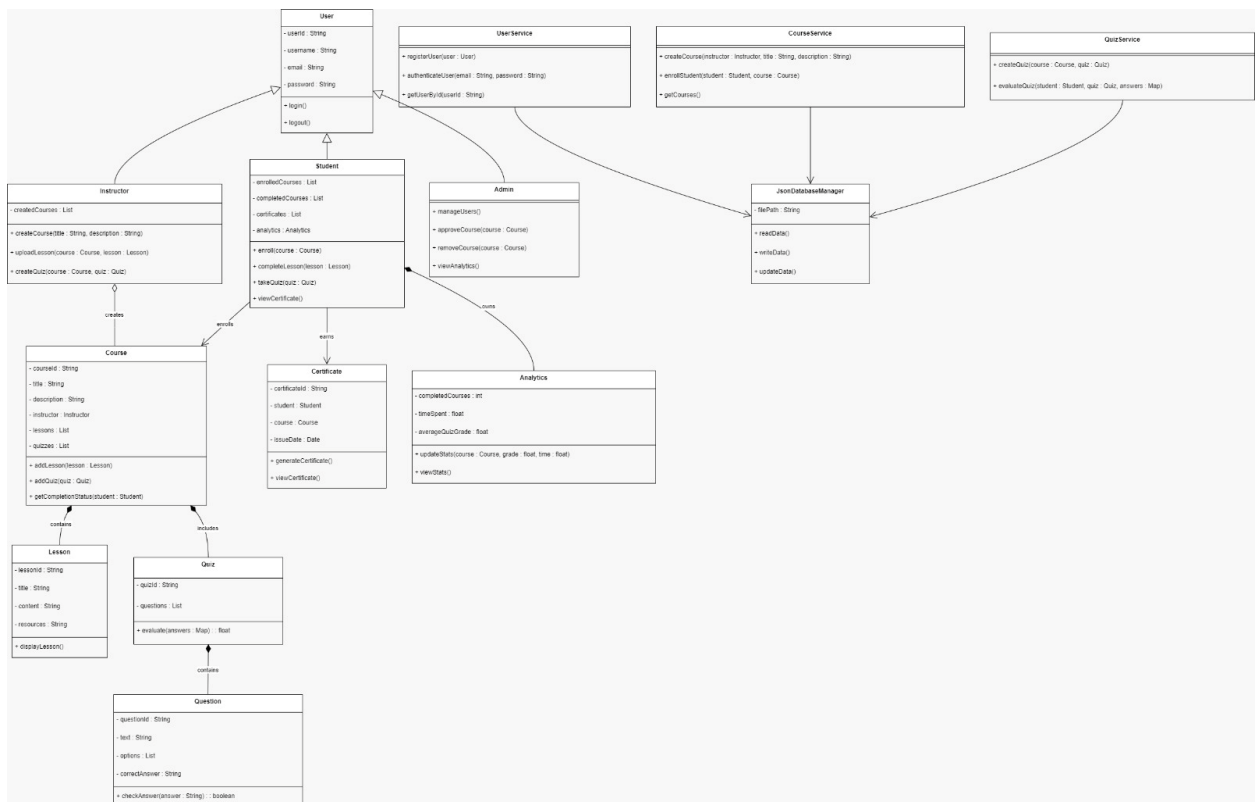


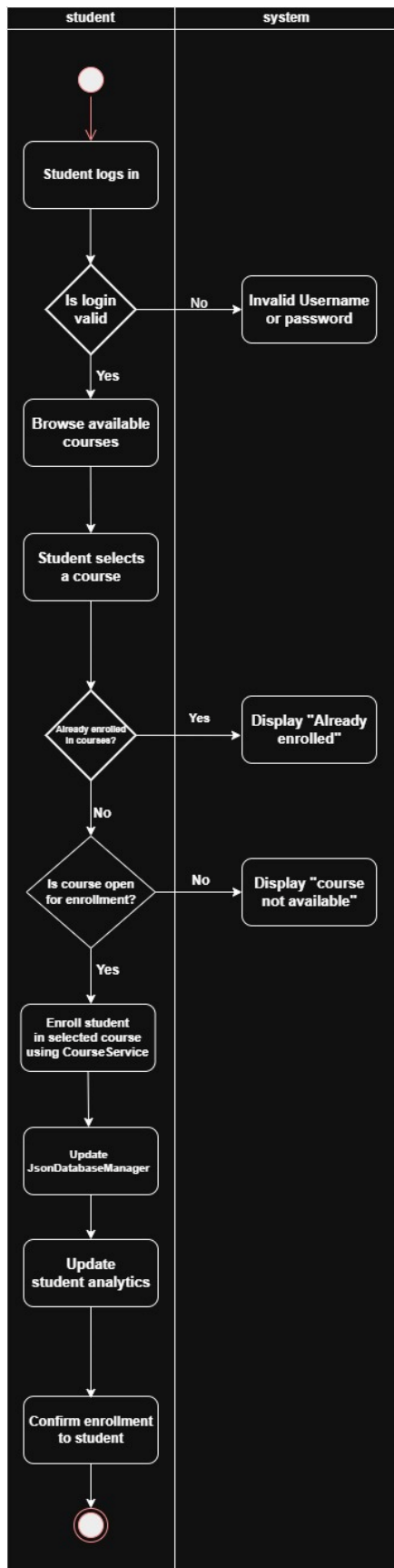
## 1) Use case diagram:

This use case diagram illustrates how **Users**, **Instructors**, and **Admins** interact with the learning platform. Users can browse, enroll, and complete courses to earn certificates. Instructors create and manage courses, including uploading lessons and designing quizzes. Admins oversee the system by managing users, approving or removing courses, and monitoring platform analytics.



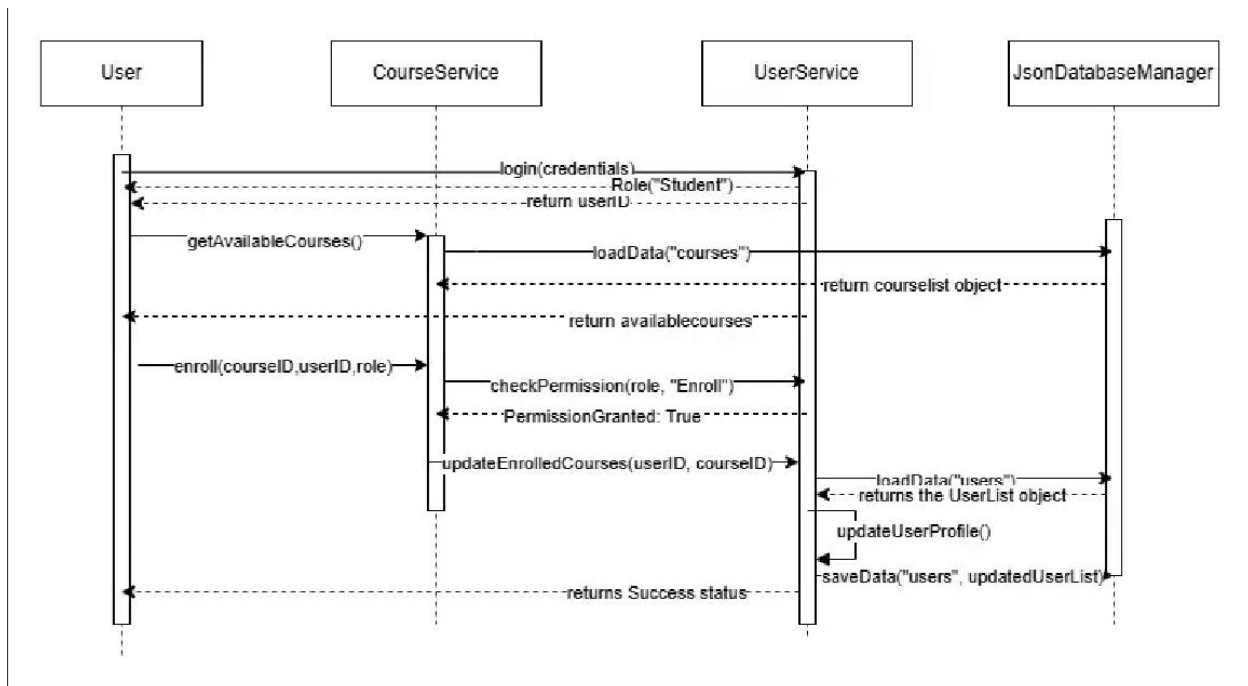
## 2) Class diagram:

Inheritance allows shared login/authentication features among all user roles. Composition (Course–Lesson, Quiz–Question) shows strong ownership; deleting a course deletes its lessons and quizzes. Aggregation (Instructor–Course) means courses are created by instructors but can exist independently. Associations represent interactions (students enrolling in courses, earning certificates, etc.). Service Layer handles logic and interacts with the JSON data layer through JsonDatabaseManager.



### 3) Activity diagram:

The activity diagram shows how a student joins a course on SkillForge. The student logs in, picks a course, and the system checks if the course is available and if the student can join. If everything is okay, the system enrolls the student, updates the JSON database and student analytics, and then confirms the enrollment; otherwise, it shows an error message.



### 4) Sequence diagram:

User logs in through the UserService, which verifies the credentials. The User then requests available courses from the CourseService, which retrieves the data from the JsonDatabaseManager. After selecting a course, the User sends an enrollment request. The CourseService checks permissions with the UserService, validates the enrollment, and updates the student's course record in the database through the JsonDatabaseManager. Finally, a confirmation message is sent back to the User, completing the enrollment process.