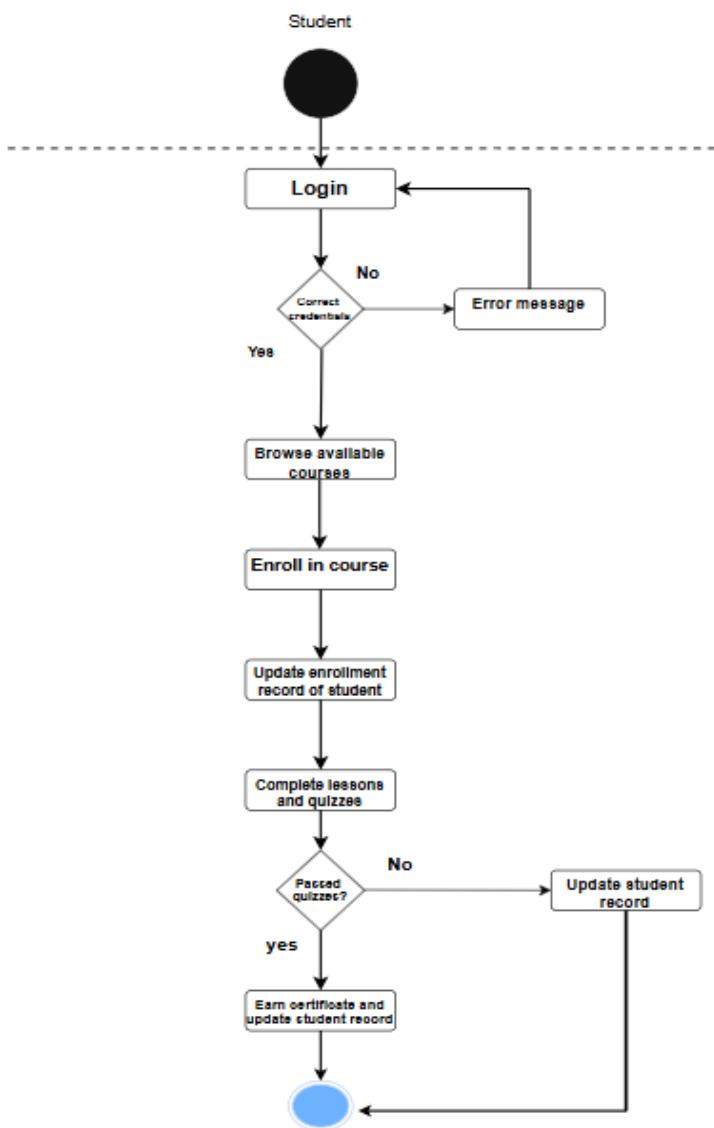


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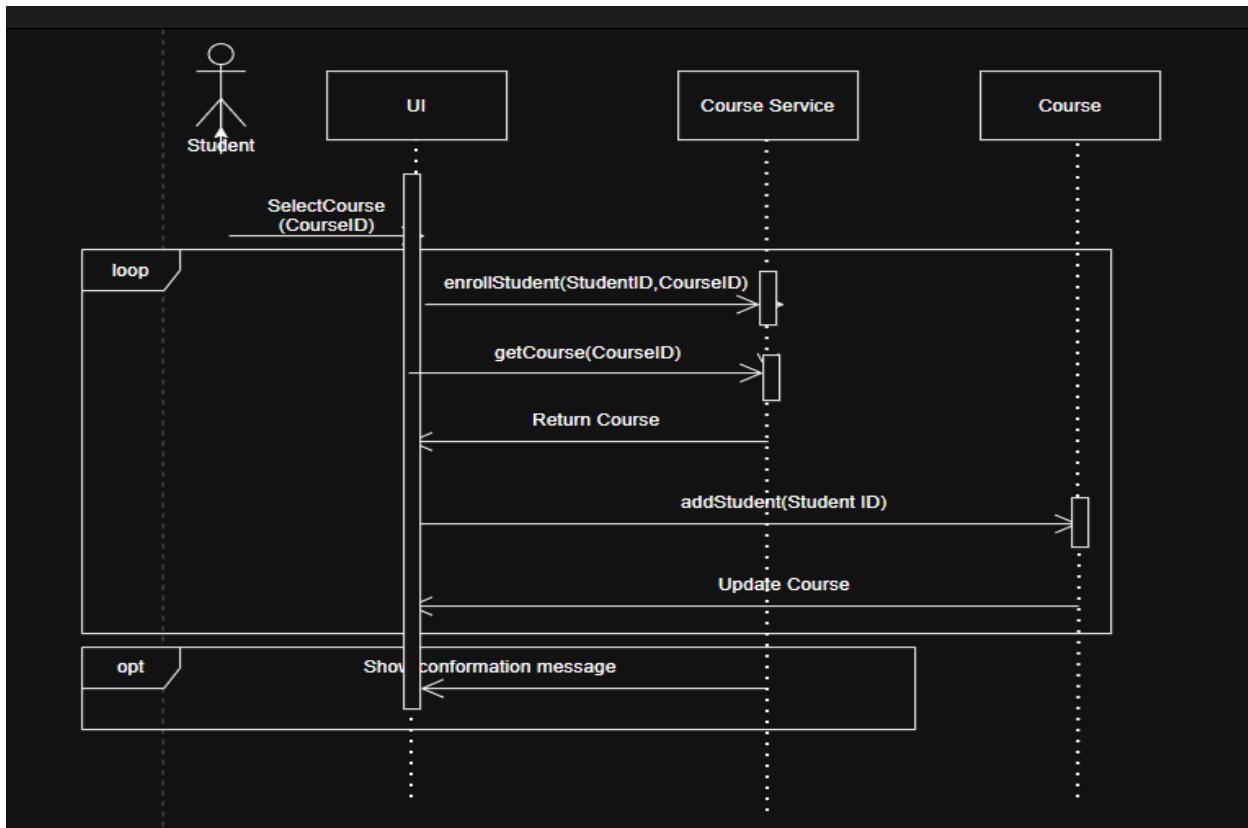
Activity Diagram:



- The student logs into the system.
- If login credentials are incorrect, an error message is shown.
- If login is successful, the student browses available courses.
- The student enrolls in a selected course.

- The system updates the student's enrollment record.
- The student completes lessons and quizzes.
- If the student fails the quizzes, the system updates the record.
- If the student passes the quizzes, they earn a certificate and their record is updated.
- The process ends.

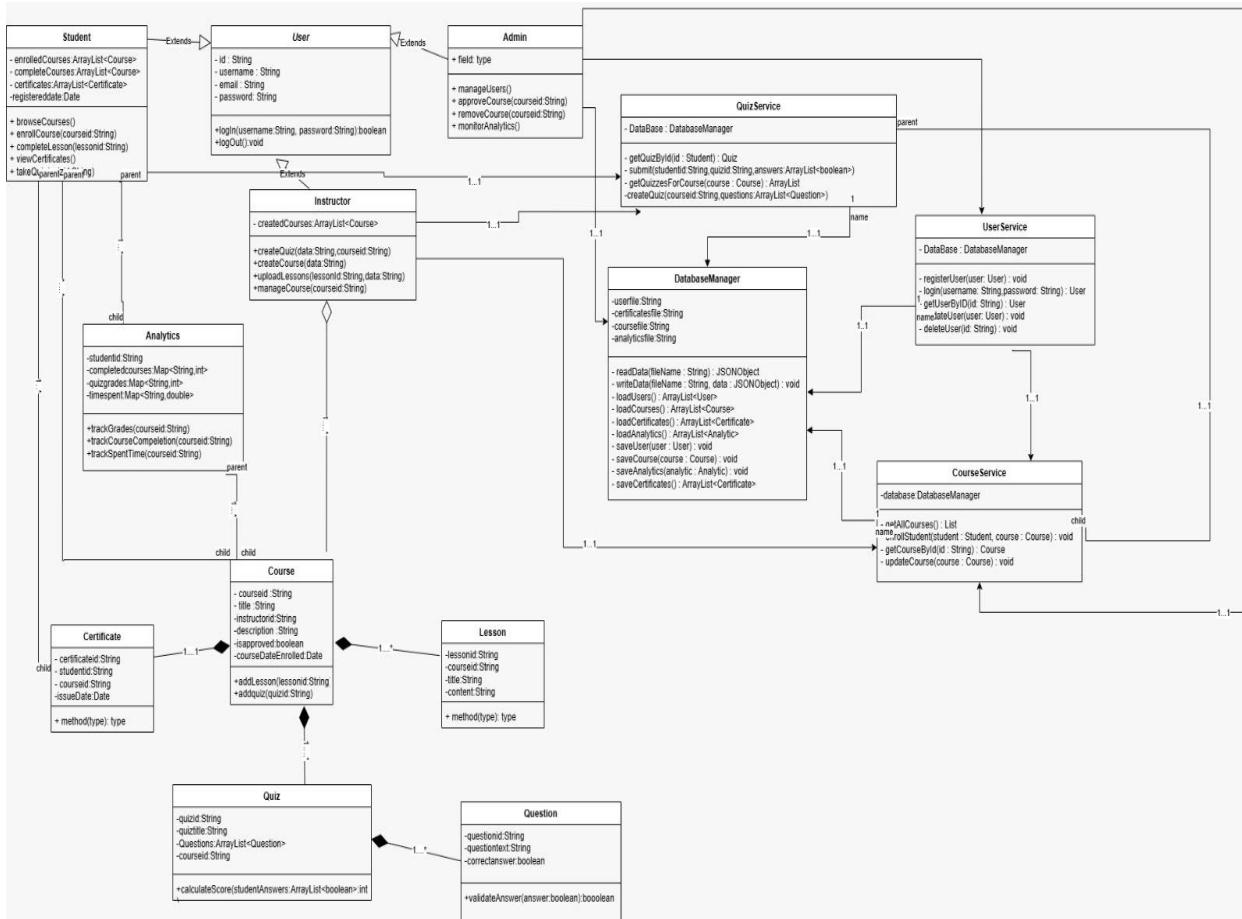
Sequence Diagram:



- The **Student** selects a course using its **CourseID**.
- The **UI** sends an **enrollStudent(StudentID, CourseID)** request to the **Course Service**.
- The **Course Service** requests course details using **getCourse(CourseID)** from the **Course** component.
- The **Course** returns the course information to the **Course Service**.
- The **Course Service** calls **addStudent(StudentID)** on the **Course** to enroll the student.

- The **Course** updates the course record to include the new student.
- After the update, the **Course Service** notifies the **UI** that the operation was successful.
- The **UI** shows a confirmation message to the **Student**.

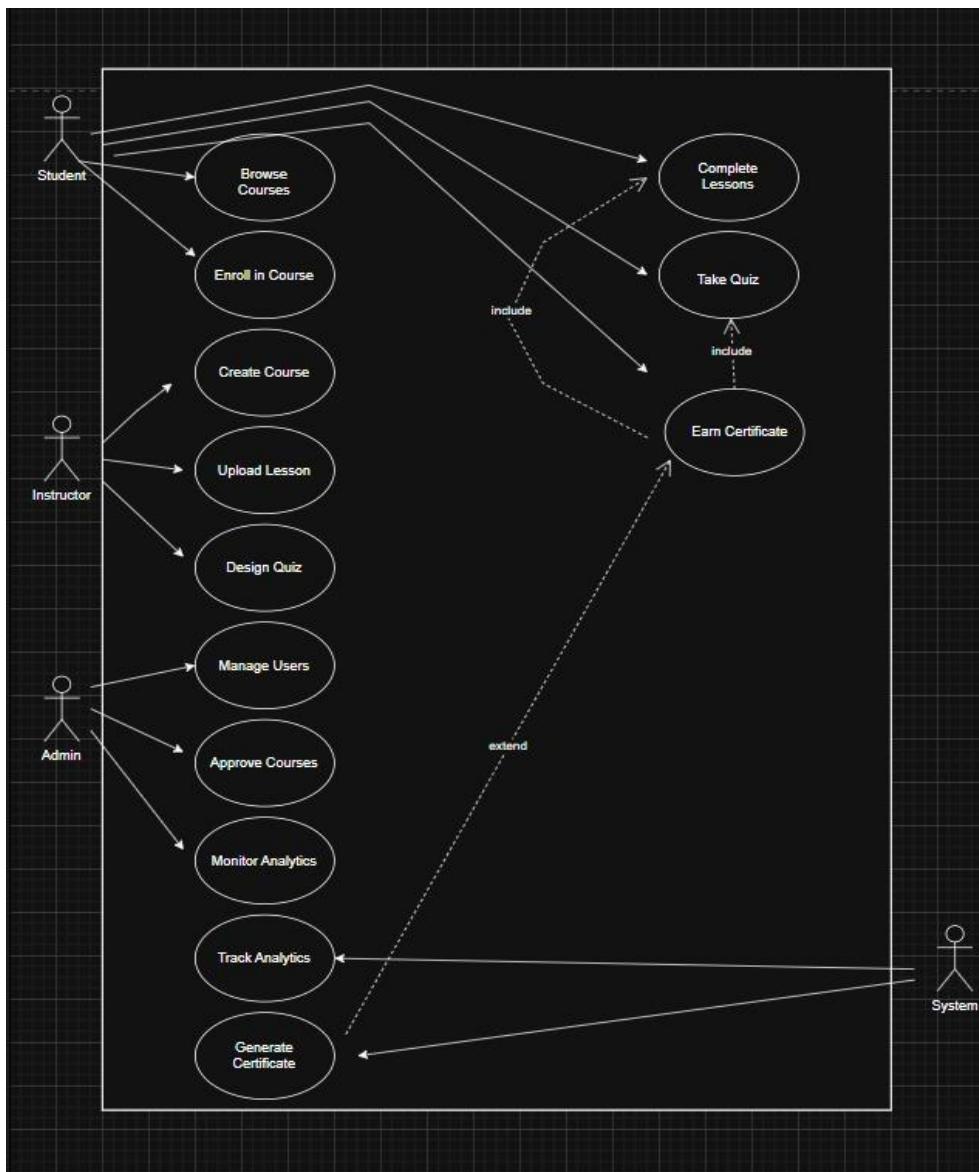
Class Diagram:



- **User** is the main class with `id`, `username`, `email`, and `password`.
- **Student**, **Instructor**, and **Admin** extend the **User** class (inherit its attributes and methods).
- **Student** can browse courses, enroll, complete lessons, and view certificates.
- **Instructor** can create and manage courses, upload lessons, and create quizzes.
- **Admin** manages users, approves or removes courses, and monitors analytics.
- **Course** contains course details like `courseId`, `title`, `description`, and related **Lesson** and **Quiz** objects.

- **Lesson** holds lesson content tied to a specific course.
- **Quiz** includes a list of **Question** objects and calculates scores.
- **Question** stores quiz questions and validates student answers.
- **Certificate** is linked to both **Student** and **Course**, recording completion details.
- **Analytics** tracks student progress, grades, and time spent.
- **DatabaseManager** handles reading and writing data for users, courses, analytics, and certificates.
- **UserService** manages user registration, login, updates, and deletion.
- **CourseService** handles course enrollment, retrieval, and updates.
- **QuizService** manages quizzes — creation, fetching, and submission.
- Overall, the diagram shows how different system components interact to support user roles, course management, analytics tracking, and data storage in an online learning platform.

Use Case Diagram:



- Students can browse available courses, enroll, complete lessons, take quizzes, and earn certificates.
- Instructors can create and manage content by uploading lessons, designing quizzes, and creating courses.
- Admins handle higher-level tasks such as managing users, approving courses, monitoring and tracking analytics, and generating certificates.
- The System automatically assists in processes like certificate generation and analytics tracking.
- Use-case relationships like «include» and «extend» are used to show dependencies:
- “Complete Lessons” and “Take Quiz” are included as part of the enrollment process.

- “Earn Certificate” extends to “Generate Certificate,” showing that certification depends on successful course completion.