Lab 6: SkillForge UML Design

Scenario:

SkillForge is an online collaborative learning and certification platform that helps students and professionals learn new skills, complete courses, take quizzes, and earn certificates. The platform supports **three** main types of users: **Students**, **Instructors**, and **Admins**.

Each User is identified by a user ID, username, email, and password

- Students can browse available courses, enroll, complete lessons and quizzes, and earn certificates.
- Instructors can create and manage courses, upload lessons, and design quizzes.
- Admins can manage users, approve or remove courses, and monitor platform analytics.

Each Course is created by an instructor and contains multiple lessons and quizzes.

- A Lesson includes a lesson ID, title, content, and optional resources.
- A Quiz contains multiple Questions and evaluates student understanding.

When a student completes all course lessons and passes all quizzes, a certificate is generated and stored in the system.

The Analytics module tracks account statistics such as completed courses, time spent, and quiz grades for each student.

All platform data (users, courses, certificates, and analytics) is stored in JSON files and managed by a JsonDatabaseManager class.

Service classes such as UserService, CourseService, and QuizService handle business logic and interact with the database layer.

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Question

Using the scenario above, perform a full UML analysis and design for the SkillForge platform. Your work should include the following diagrams and explanations:

1. Use Case Diagram

- Identify the main actors and the key use cases.
- Draw a UML Use Case Diagram showing actors, use cases, and relationships such as *include*, *extend*, and *generalization*.
- Briefly describe each use case.

2. Activity Diagram

- Choose one major use case (for example, "Enroll in a Course") and model its workflow.
- Create a UML Activity Diagram showing the sequence of activities, decisions, synchronization, and object flows involved in that process.

3. Class Diagram

- Identify the key classes, their attributes, methods, and relationships (association, aggregation, composition, inheritance).
- Draw a UML Class Diagram representing the structure of the SkillForge platform.
- Include **multiplicities** where applicable.

4. Sequence Diagram

- For the same use case selected in the Activity Diagram show how objects interact over time.
- Create a UML Sequence Diagram that illustrates the message flow between actors and system components.
- Label all lifelines, messages, and activation bars clearly.

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Submission Note

- **Each diagram must be neatly labeled and accompanied by a short explanation (2–3 sentences) describing what it represents and its importance in the system design.**

For this phase, you are required to submit a ZIP file containing:

- A PDF report that includes **all four UML diagrams** and brief explanations.
- The source files of the diagrams (e.g., .drawio, .uml, .vsdx, or similar formats).
- **Delivering a copy will be severely penalized for both parties, so delivering nothing is so much better than delivering a copy.**
- **No late submission is allowed**

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