Alexandria University

Faculty of Engineering

Computer and Communications Department

Programming II (CC272)

Lab 6 — SkillForge UML Design

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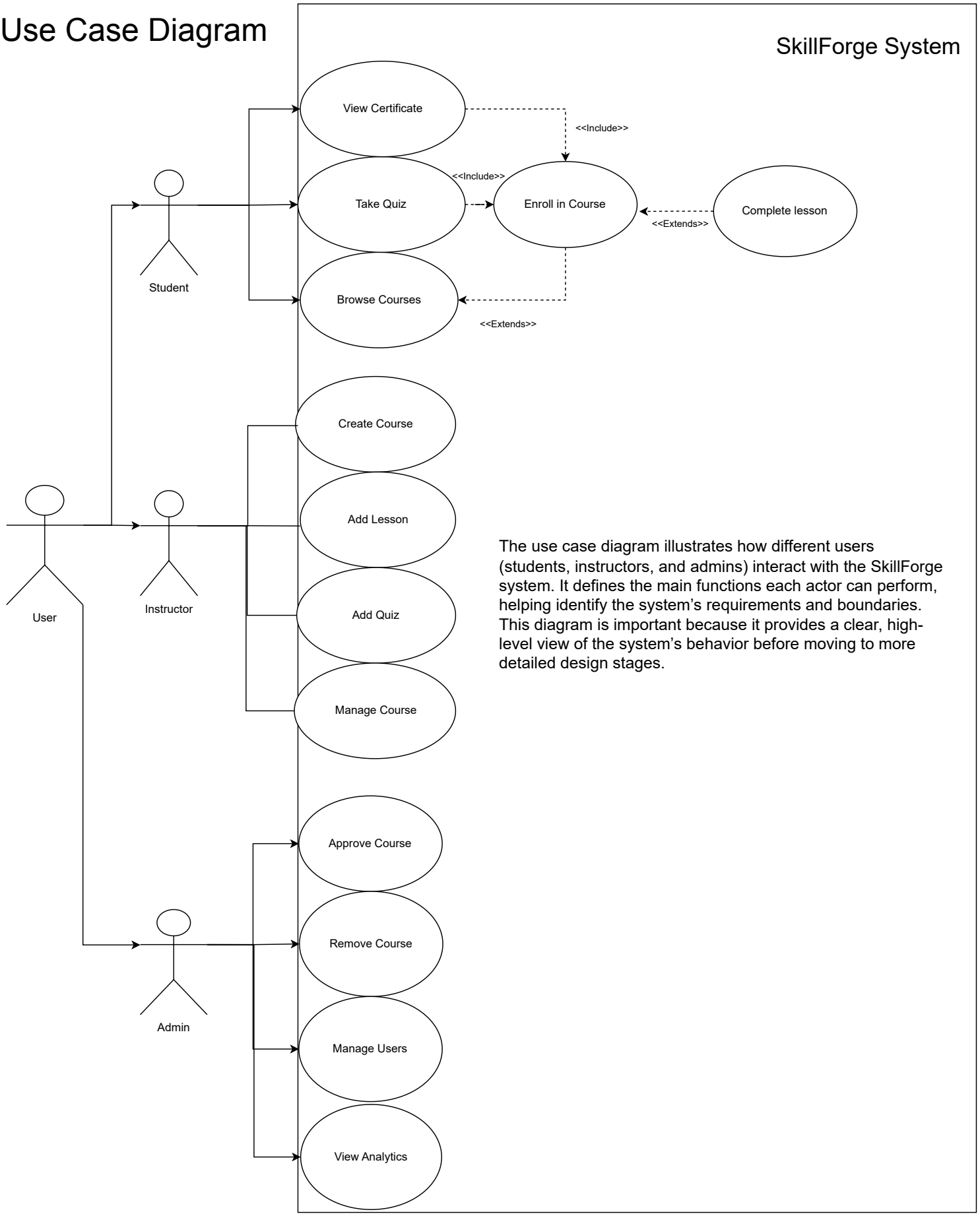
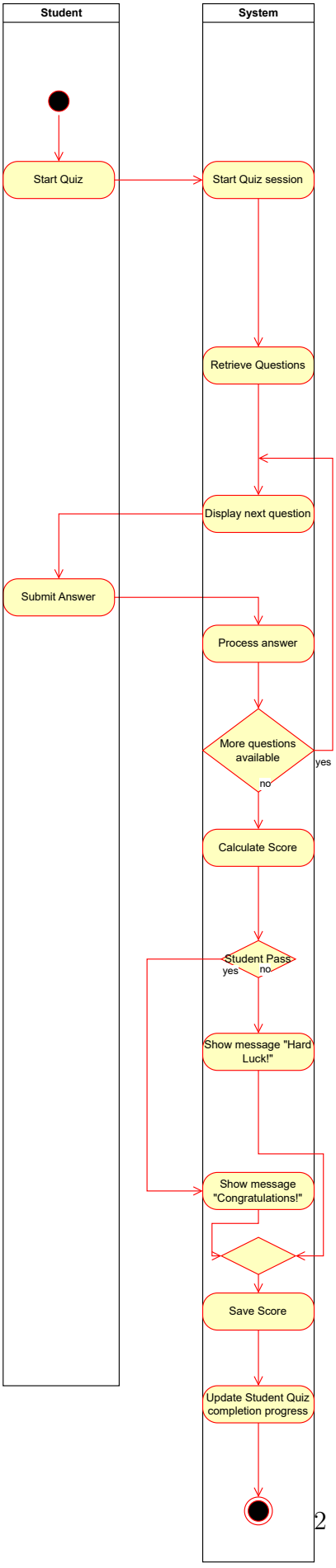
Use Case Diagram



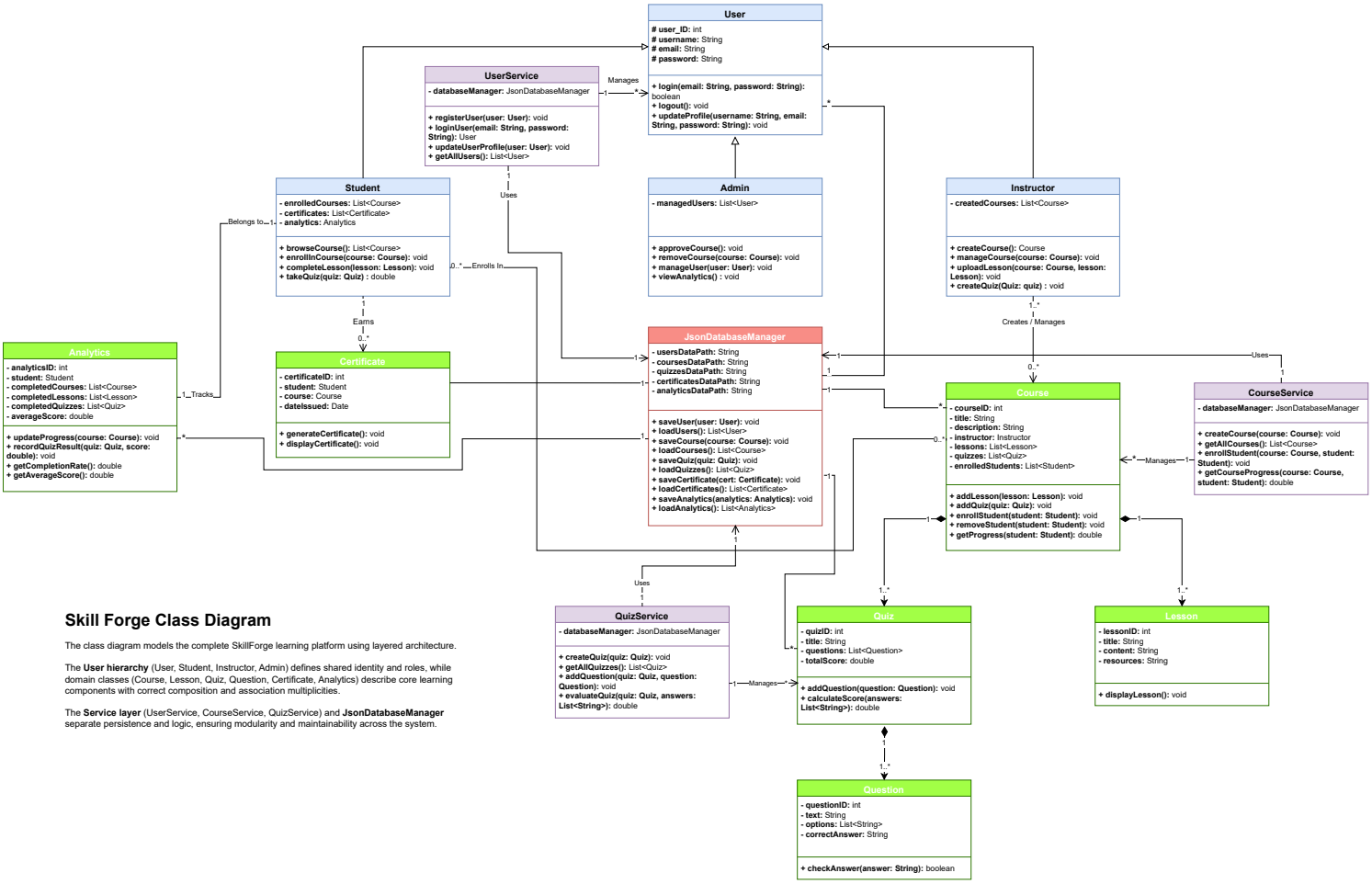
The use case diagram illustrates how different users (students, instructors, and admins) interact with the SkillForge system. It defines the main functions each actor can perform, helping identify the system's requirements and boundaries. This diagram is important because it provides a clear, high-level view of the system's behavior before moving to more detailed design stages.

Activity Diagram – Student Taking a Quiz

This activity diagram shows what happens when a student takes a quiz on the SkillForge platform. It breaks down the process step-by-step, from starting the quiz and answering questions, to getting a final score and seeing if they passed or failed. The diagram is important because it clearly shows who does what (student vs system) and helps developers understand exactly how the quiz feature should work.



Class Diagram



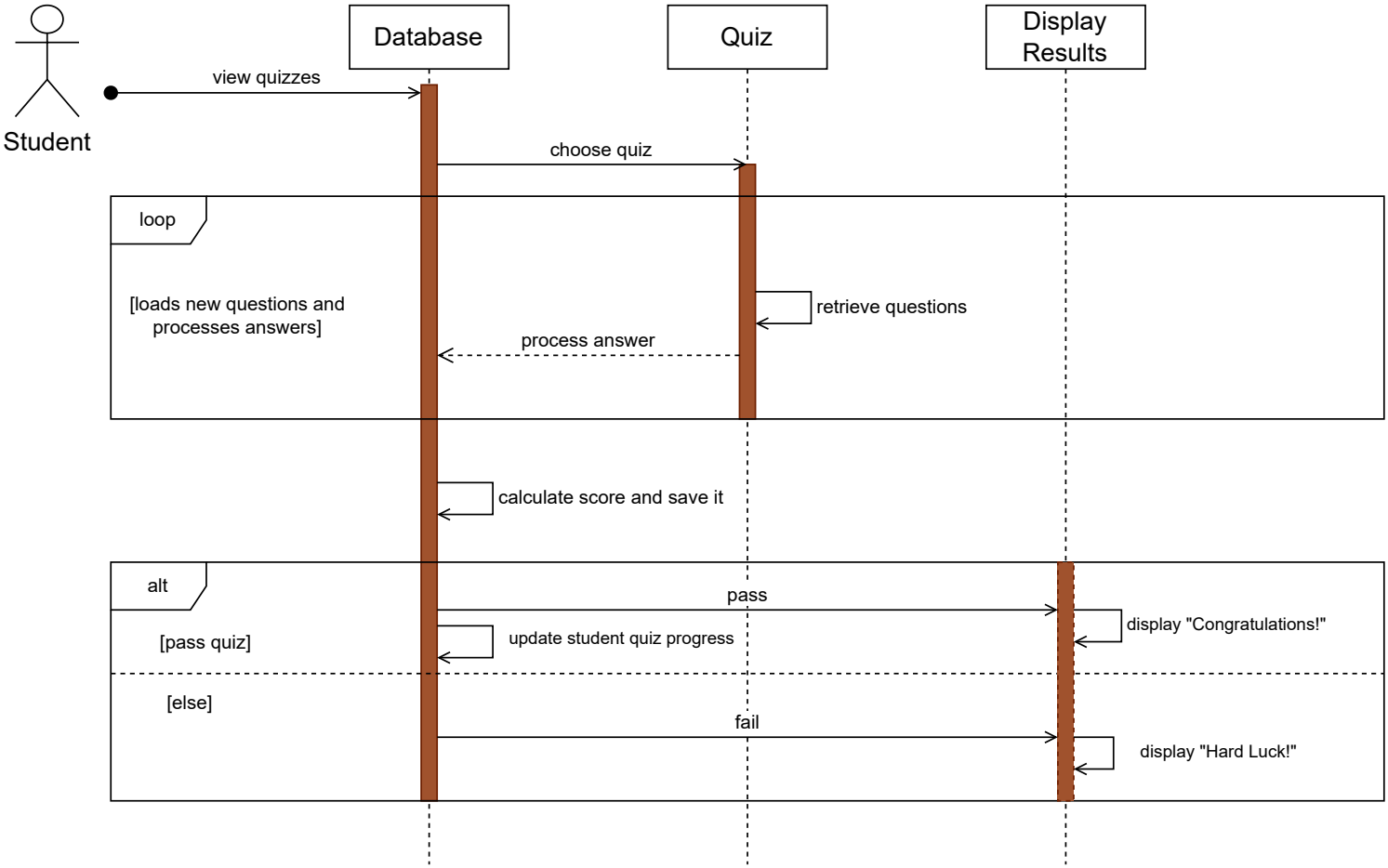
Skill Forge Class Diagram

The class diagram models the complete SkillForge learning platform using layered architecture.

The **User hierarchy** (User, Student, Instructor, Admin) defines shared identity and roles, while domain classes (Course, Lesson, Quiz, Question, Certificate, Analytics) describe core learning components with correct composition and association multiplicities.

The **Service layer** (UserService, CourseService, QuizService) and **JsonDatabaseManager** separate persistence and logic, ensuring modularity and maintainability across the system.

Sequence Diagram – Student Taking a Quiz



This UML sequence diagram illustrates the step-by-step interaction between a student, database, quiz system, and results display during a SkillForge quiz session. It captures key processes like question retrieval, answer processing, score calculation, and conditional feedback based on pass/fail outcomes. Such diagrams are vital in system design because they clarify dynamic behavior, ensure smooth coordination between components, and help developers visualize user flow and logic branching.