Chapter 5
System Design

System Design

Systems design is the process of defining elements of a system like modules, architecture, components and their interfaces and data for a system based on the specified requirements. It is the process of defining, developing and designing systems which satisfies the specific needs and requirements of a business or organization.

A systemic approach is required for a coherent and well-running system. Bottom-Up or Top-Down approach is required to take into account all related variables of the system. A designer uses the modelling languages to express the information and knowledge in a structure of system that is defined by a consistent set of rules and definitions. The designs can be defined in graphical or textual modelling languages. Some of the popular examples of graphical modelling languages are:

- Unified Modelling Language
- Flowchart etc.

Unified Modelling Language

UML stands for Unified Modeling Language. It's a rich language to model software solutions, application structures, system behavior and business processes. The purpose of a use case diagram in UML is to demonstrate the different ways that a user might interact with a system. There are two main categories i.e. Structure diagrams and Behavioral diagrams.

- Structure diagrams show the things in the modeled system. In a more technical term, they show different objects in a system.
- Behavioral diagrams show what should happen in a system. They describe how the objects interact with each other to create a functioning system.

Flowcharts

A flowchart is a picture of the separate steps of a process in sequential order. It is a generic tool that can be adapted for a wide variety of purposes, and can be used to describe various processes. Flowcharts use rectangles, ovals, diamonds and potentially numerous other shapes to define the type of step, along with connecting arrows to define flow and sequence. They can range from simple, hand-drawn charts to comprehensive computer-drawn diagrams depicting multiple steps and routes. Some uses of flowcharts:

- To develop understanding of how a process is done
- To study a process for improvement
- To communicate to others how a process is done
- To document a process
- When planning a project

USE CASE DIAGRAM (Lu Exam Hive)

Use case diagrams give a graphic overview of the actors involved in a system, different functions needed by those actors and how these different functions interact. It's a great starting point for any project discussion because you can easily identify the main actors involved and the main processes of the system.

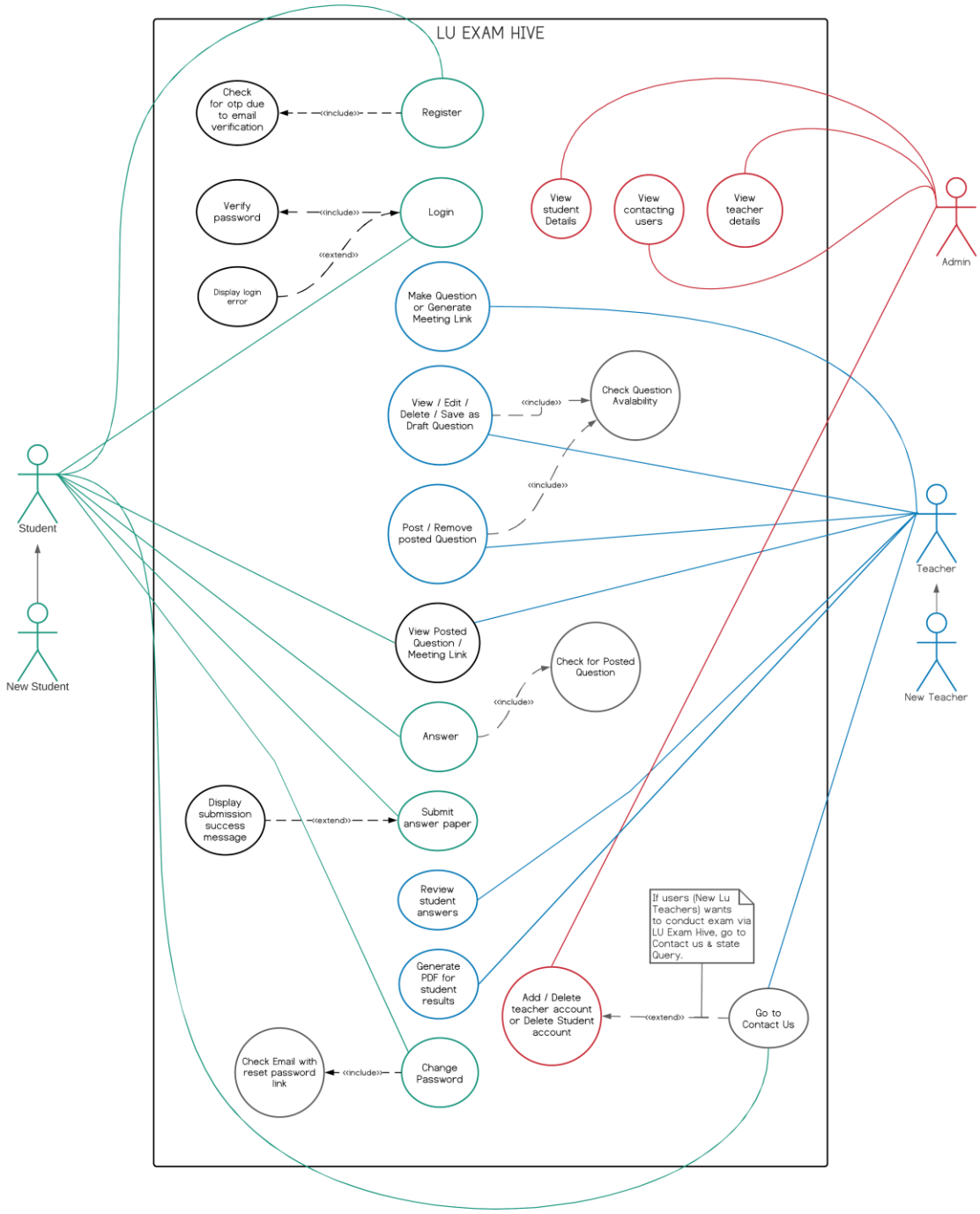

Figure 1: Use Case Diagram for Lu Exam Hive

Activity Diagram (Lu Exam Hive)

Activity diagrams represent workflows in a graphical way. They can be used to describe the business workflow or the operational workflow of any component in a system. Sometimes activity diagrams are used as an alternative to State machine diagrams. Activity diagrams are the perfect UML solution for visualizing process flows. Activity diagrams in UML are a great solution to visualize the actions, outcomes, and flows within a specific process and the behaviors that pair with them. An activity diagram is used to create a simple overview of any process to better identify areas for improvement or model software architecture to help better understand what's going on.

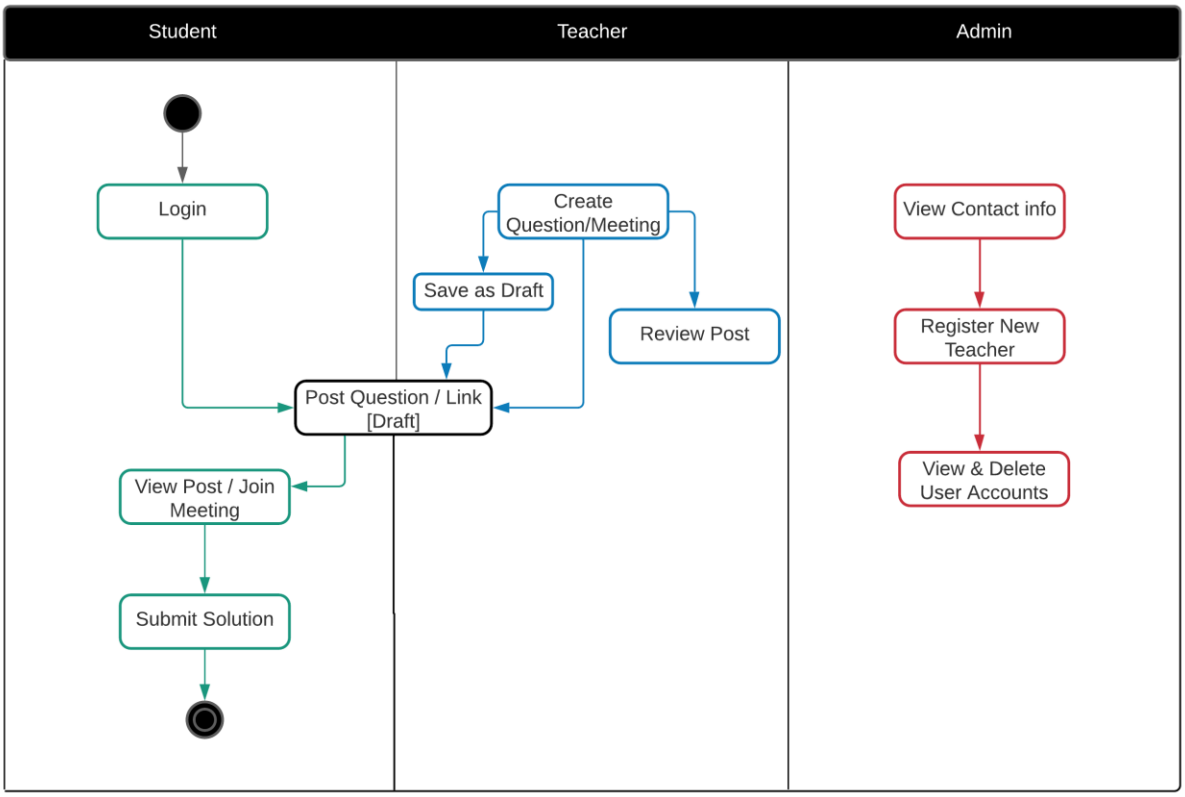

Figure 2: Activity Diagram for Lu Exam Hive

System Sequence Diagrams (Lu Exam Hive)

A system sequence diagram is a type of sequence diagram in UML. These charts show the details of events that are generated by actors from outside the system.

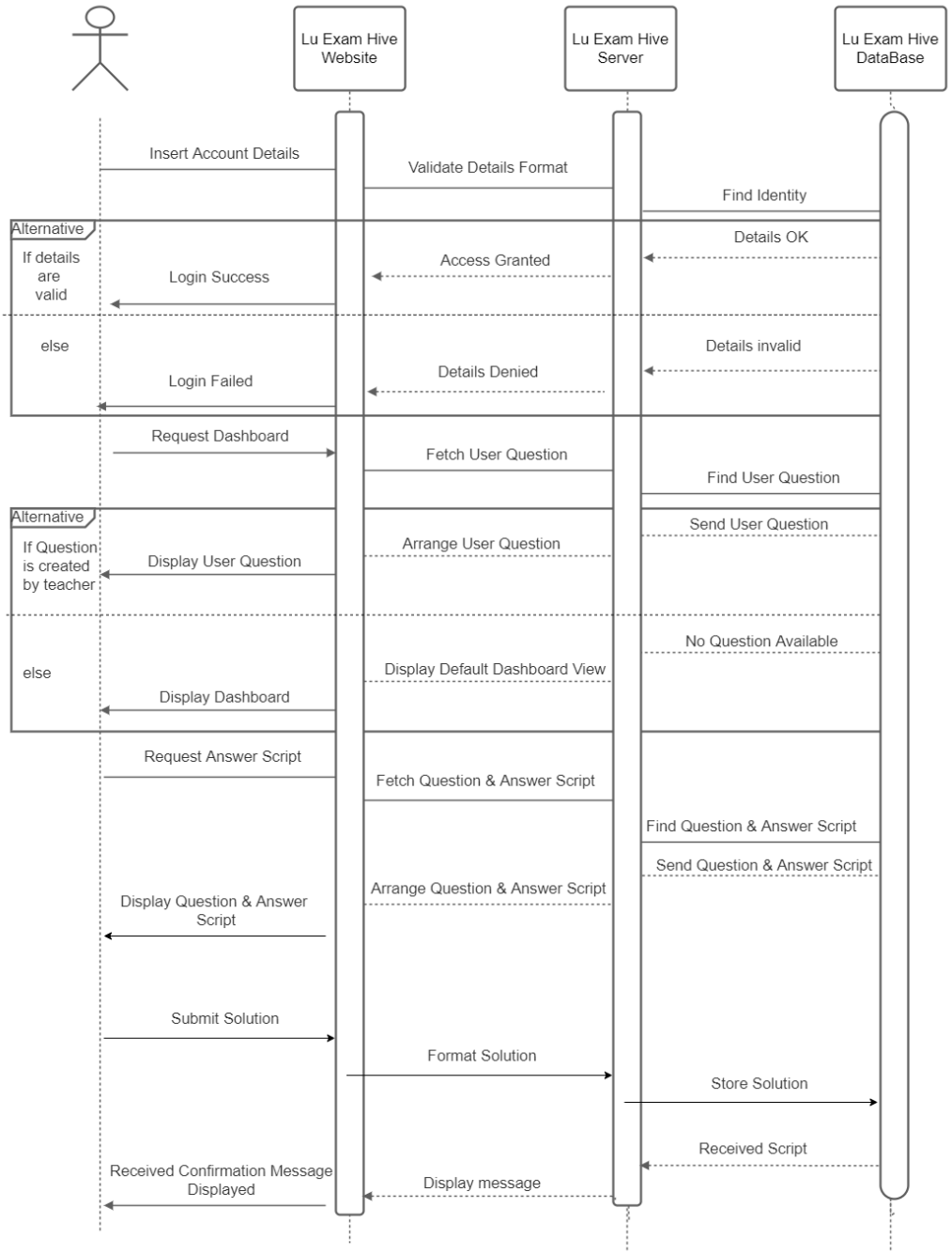

Figure 3: Sequence Diagrams for Lu Exam Hive

Class Diagram (Lu Exam Hive)

Class diagrams are the foundation for all other UML structure diagrams. Class diagrams are the main building block of any object-oriented solution. It shows the classes in a system, attributes, and operations of each class and the relationship between each class.

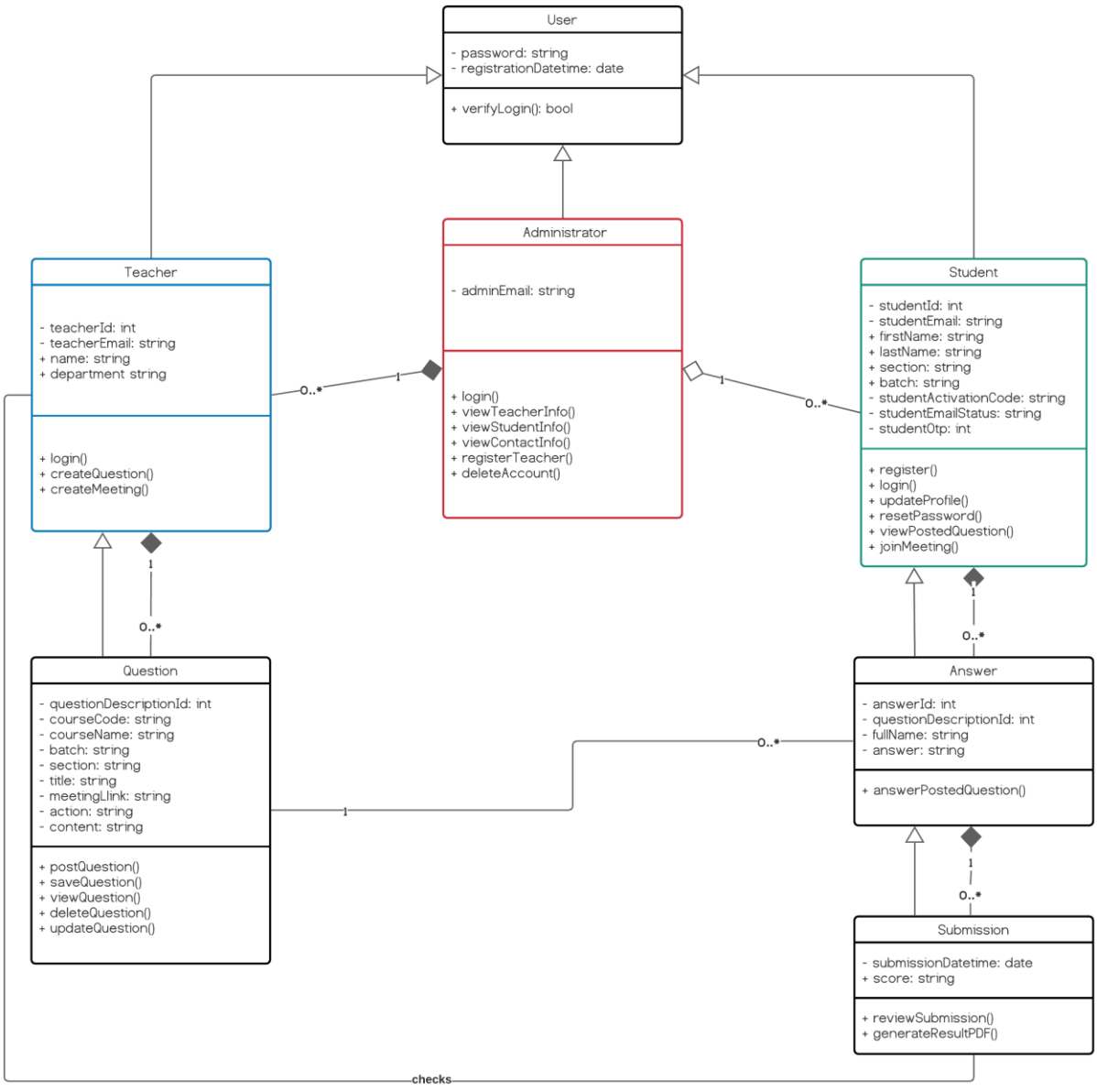

Figure 4: Class Diagram for Lu Exam Hive

UI Flowchart Diagram (Lu Exam Hive)

UI Flowchart puts you in a position where you can validate the overall flow of your application's user interface.

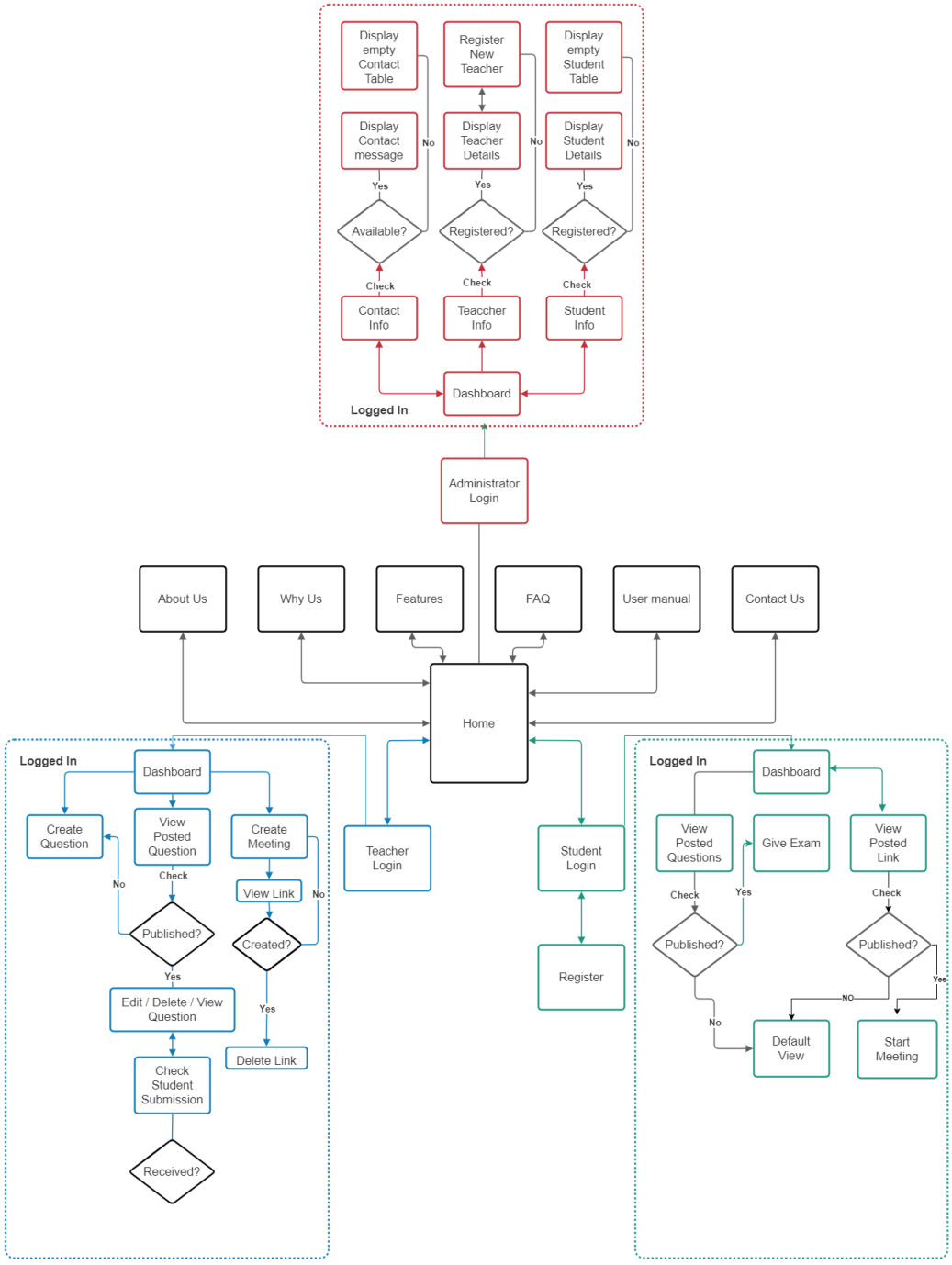

Figure 5: UI Flowchart Diagram for Lu Exam Hive