MIT World Peace University

Software Engineering and Testing
Second Year B. Tech, Semester 4

Sequence Diagrams

Assignment 5

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Contents

1 Aim

Object Oriented Analysis and design using UML diagrams: Sequence diagram to show message exchanges, using Open Source Tool.

2 Objectives

To learn the relationships and notions of Sequence diagram.

3 Problem Statement

Draw Sequence for The Following Problem:

The Purpose of an Attandence Assistant App is to help reduce the time taken for recording the attendance of a classroom in a school or college. The app will be able to record the attendance of a class in a matter of a few Seconds with minimum Energy Expended. It will record data on cloud, and be accessible to all the Teachers.

The tasks we have to do are:

1. You will have to identify the main entities (objects) for this system.
2. You will have to find out the relationships between these objects.
3. You will have to find the necessary attributes and functions that need to be associated with each object to implement the functionality mentioned above.
4. You will make a final comprehensive diagram show and all objects and their relations along with their attributes and functions.

4 Theory

4.1 Sequence Diagram

4.1.1 What is a Sequence Diagram

A sequence diagram is a type of interaction diagram in the Unified Modeling Language (UML) that represents the interactions between objects or components within a system in a time-based manner.

4.1.2 What is the use of a Sequence Diagram

1. Visualizing the interactions and communication among objects or components of a system in a time-ordered manner.
2. Identifying potential design issues and ambiguities that may arise in the system during its execution.
3. Documenting and communicating the behavior of the system to developers, stakeholders, and users.

4. Testing and validating the design of a system, by ensuring that the sequence of events or actions occur in the correct order.

4.1.3 Elements of a Sequence Diagram

The elements of a sequence diagram include:

1. **Objects or actors:** These are the components or entities that are involved in the interactions and communications within the system.
2. **Lifelines:** These are the vertical dashed lines that represent the lifespan of an object or component within the system.
3. **Messages:** These are the arrows that represent the communications and interactions between objects or components within the system.
4. **Activation bar:** This is a rectangle that is used to indicate the time interval during which an object or component is performing an action or task.
5. **Constraints and loops:** These are used to specify conditions and repetitions in the interactions and communications within the system.
6. **Combined fragment:** This is used to represent complex interactions or conditions in a sequence diagram.

Here are the elements of a Sequence Diagram:

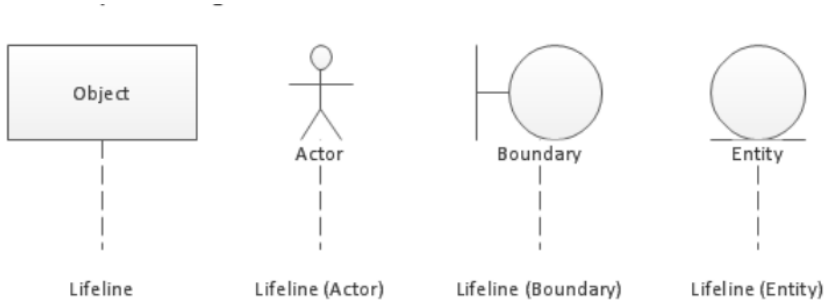

Figure 1: Elements of a Sequence Diagram

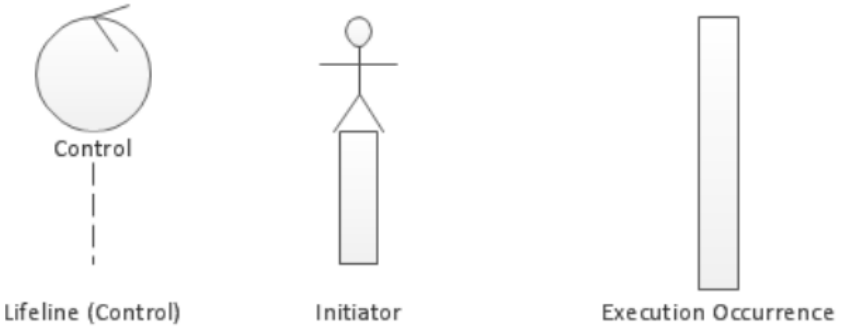

Figure 2: Elements of a Sequence Diagram

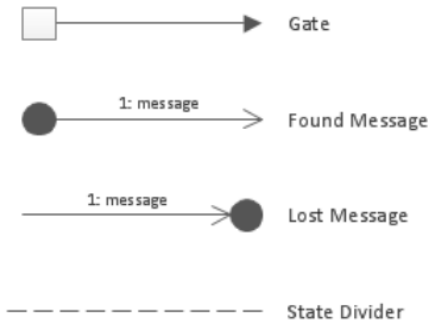

Figure 3: Messages in a Sequence Diagram

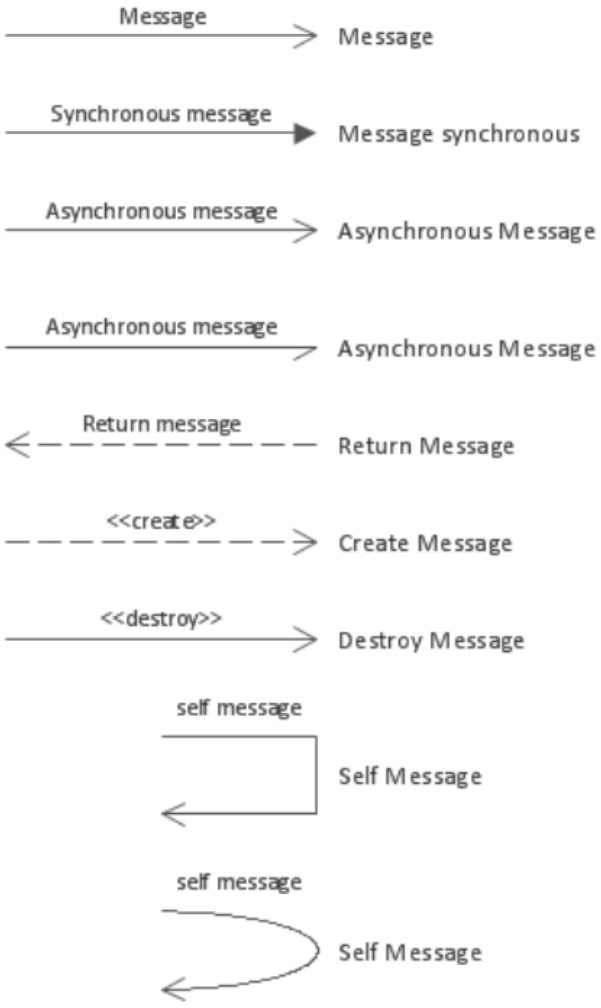

Figure 4: Messages in a Sequence Diagram

4.1.4 Sequence Diagram for the Problem Statement

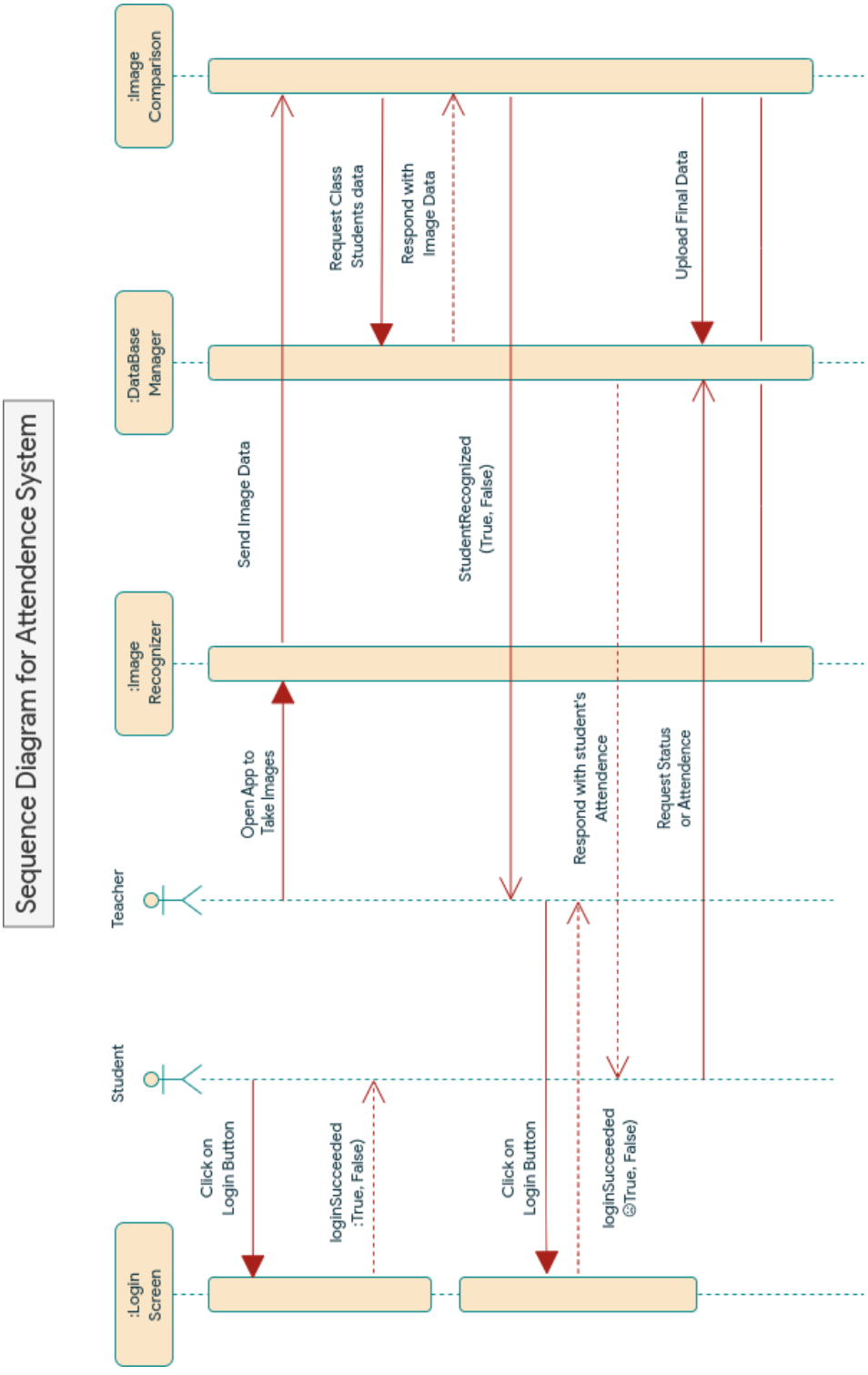

Figure 5: Sequence Diagram for the Problem Statement

5 Platform

Operating System: Arch Linux x86-64
IDEs or Text Editors Used: Visual Studio Code
External Programs for Diagrams : Draw.io

6 Conclusion

Thus, we learnt about Sequence diagrams and their usage in detail.

7 FAQ

1. **Give the significance of dynamic diagrams in UML.**

   (a) They help to visualize and understand the flow of interactions between objects and components within a system.

   (b) They help to identify potential bottlenecks and performance issues in the system.

   (c) They can be used to verify and validate the correctness of the system's behavior and interactions.

   (d) They can be used to communicate the behavior of the system to stakeholders, making it easier for them to understand and provide feedback.

2. **Explain any 2 terminologies used in Sequences diagrams.**

   (a) Lifeline: A lifeline represents an object or component that participates in the interaction. It is represented by a vertical line that extends down the diagram, with an optional name and activation bar. The activation bar represents the period of time during which the object or component is active.

   (b) Message: A message is a communication between two lifelines. It represents a request from one object or component to another. Messages are represented by horizontal arrows between lifelines, with an optional name and parameters.

3. **Explain the message passing in Sequence diagram.**

   Message passing is a key concept in sequence diagrams. It is used to model the communication and interaction between different objects or components in a system. In a sequence diagram, message passing is represented using arrows between lifelines, with the arrows labeled with the message that is being passed.

   When an object or component sends a message to another object or component, it can trigger a response from the receiving object or component. The response can be a return message, an exception, or a change in the state of the receiving object or component. The sequence diagram can include loops, conditionals, and other control structures to model the flow of messages and interactions.

4. **Draw the Sequence diagram for the following scenario: Conduction of the National Event: HACK-MITWPU for Technical event at MITWPU university.**