

UNIFIED MODELING LANGUAGE (UML)

IMPORTANCE Unified Modeling Language (UML) plays a crucial role in planning and communication among stakeholders, UI/UX designers, and developers. It also provides comprehensive documentation

throughout the software lifecycle.

CASE DIAGRAM

A use case diagram is a type of behavioral diagram defined by the (UML) that represents the functionality of a system from a user's perspective. It illustrates the system's interactions with external users (actors) and the key functions (use cases) the system provides.

CLASS DIAGRAMS

Class diagrams are a type of static structure diagram in UML that describe the structure of a system by showing its classes, attributes, operations, and the relationships among the classes.

SEQUENCE DIAGRAMS

Sequence diagrams are a type of interaction diagram in UML that show how objects interact in a given scenario of a use case. They capture the sequence of messages exchanged between objects and the order in which these interactions occur over time.

CASE STUDY BACKGROUND

User Management API:

User authentication, registration, profile management, and role-based access control.

Content Management API:

CRUD operations for content, support for rich text, media attachments, and tagging.

Media Management API:

Uploading, managing, and serving media files, media storage, retrieval, and optimization.

Advertisement Management API:

Managing advertisements, creation, editing, targeting, and reporting functionalities.

What is CRUD? CRUD stands for Create, Read, Update, and Delete, which are the four basic operations performed on data in a database or information system.

ACCEPTANCE CRITERIA User Management API: Secure user registration, login, profile updates, and tokenbased authentication. Content Management API: Accurate content CRUD operations with proper formatting and retrieval. Media Management API: Secure media upload, retrieval, and storage.

Advertisement Management API: Effective advertisement management and

analytics.

CLASS DIAGRAMS

Classes: Represent entities with attributes and operations.

Relationships:

- Composition: Strong ownership, part cannot exist without the whole.
- Generalization: Inheritance, "is-a" relationship.

Example Class Diagram

- User Management:
 - User: Attributes (username, password, email), Operations (register, login, updateProfile).
 - **Role:** Attributes (roleName), Operations (assignRole).
- Content Management:
 - o ContentItem: Attributes (title, body, tags), Operations (create, update, delete).
 - **RichText:** Inherits from ContentItem, additional formatting attributes.

CLASS DIAGRAMS

Media Management:

• MediaFile: Attributes (filename, filepath), Operations (upload, retrieve).

Advertisement Management:

Advertisement: Attributes (adTitle, adContent, targetAudience), Operations (createAd, editAd).

Key Components of a Class Diagram

Classes: Represent entities in the system. Each class is depicted as a rectangle divided into three compartments:

- Class Name: The name of the class.
- Attributes: The properties or data fields of the class.
- Operations: The methods or functions the class can perform.

CLASS DIAGRAMS

Relationships:

- Association: A general connection between classes, represented by a line.
- Multiplicity: Specifies the number of instances of one class related to one instance of another class (e.g., 1..*, 0..1).
- **Aggregation:** A special type of association representing a whole-part relationship, depicted by a hollow diamond.
- Composition: A stronger form of aggregation indicating ownership, depicted by a filled diamond.
- Inheritance (Generalization): Represents an "is-a" relationship, depicted by a solid line with a hollow arrowhead pointing to the parent class.
- **Dependency:** Represents a "uses-a" relationship, depicted by a dashed line with an arrow.

SEQUENCE DIAGRAMS

Sequence Diagram Concepts

- Lifeline: Represents an object's existence over time.
- Messages: Communication between objects.

Example Sequence Diagrams

User Registration:

- Actor (User) -> UserController: register()
- UserController -> UserService: validateUser()
- UserService -> UserRepository: saveUser()
- UserRepository -> Database: insertUser()
- Database -> UserRepository: returnSuccess()
- UserRepository -> UserService: returnSuccess()
- UserService -> UserController: returnSuccess()
- UserController -> Actor: registrationSuccess()

SEQUENCE DIAGRAMS

Content Creation:

- Actor (ContentCreator) -> ContentController: createContent()
- ContentController -> ContentService: validateContent()
- ContentService -> ContentRepository: saveContent()
- ContentRepository -> Database: insertContent()
- Database -> ContentRepository: returnSuccess()
- ContentRepository -> ContentService: returnSuccess()
- ContentService -> ContentController: returnSuccess()
- ContentController -> Actor: creationSuccess()

SEQUENCE DIAGRAMS

Key Components of a Sequence Diagram

- Actors: External entities that interact with the system (e.g., users, other systems).
- Objects/Classes: Represent the entities that participate in the interaction.
- Lifelines: Vertical dashed lines that represent the lifespan of an object during the interaction.
- Activation Bars: Thin rectangles on a lifeline that indicate when an object is active or executing a process.
- Messages: Horizontal arrows between lifelines that represent communication between objects. These can be:
 - Synchronous Messages: Represented by a solid arrowhead, indicating a call that waits for a response.
 - **Asynchronous Messages:** Represented by a stick arrowhead, indicating a call that does not wait for a response.
 - **Return Messages:** Dashed lines indicating the return of control or data.
- Frames: Boxes that represent conditional or looping constructs.

OPERATIONS AND SERVICE CONTROLLERS

Operations in Classes

- Ensure each class from the Class Diagram has corresponding operations from Sequence Diagrams.
- Example: User class with register, login, and updateProfile methods.

Service Controllers

- Role: Facilitate interaction between different subsystems.
- Example: UserService mediates between UserController and UserRepository

PRACTICAL SESSION

Creating Class Diagrams

- Objective: Create a Class Diagram using provided requirements.
- Activity: Draw classes for User Management, Content Management, Media Management, and Advertisement Management. Identify relationships like Composition and Generalization.

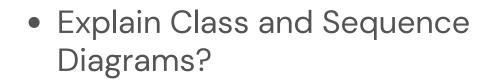
Creating Sequence Diagrams

- Objective: Create Sequence Diagrams for user registration and content creation.
- Activity: Draw sequence diagrams showing object interactions for each operation.

SUMMARY AND Q&A

What is the importance of UML in system design?

• What is CRUD?



 A REST API is a set of web service endpoints that adhere to REST principles, enabling interaction with resources using standard HTTP methods like GET, POST, PUT, and DELETE.

(Representational State Transfer Application Programming Interface)



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