Name : Khushi Nitinkumar Patel

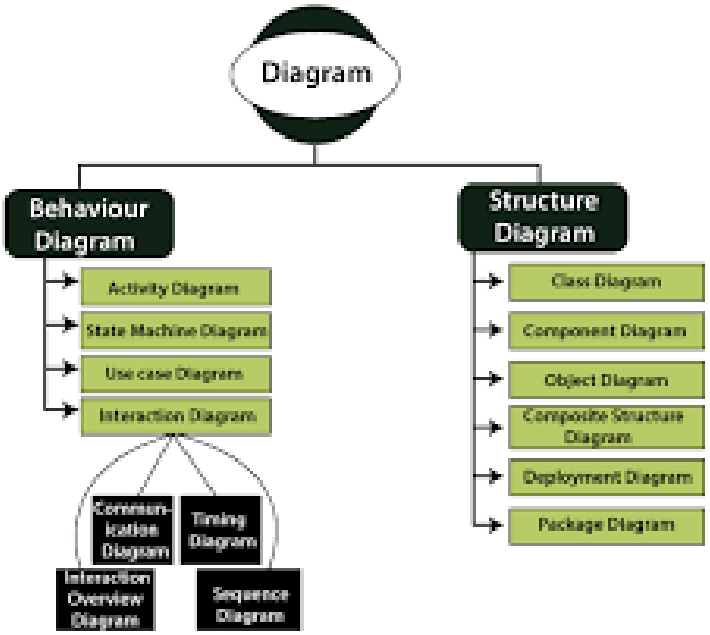
Batch : B3

PRN : 2020BTECS00037

Assignment – 2 : UML Diagrams

(Use Case, Class and Sequence Diagrams)

What are UML Diagrams ?



Unified Modeling Language (UML) diagrams are graphical representations used in software engineering and systems design to visually depict different aspects of a system, its structure, behavior, and interactions. UML diagrams provide a standardized way to communicate complex concepts and ideas among software developers, designers, and stakeholders. They help in understanding, designing, documenting, and communicating the various aspects of a software system.

UML diagrams encompass several types, each serving a specific purpose:

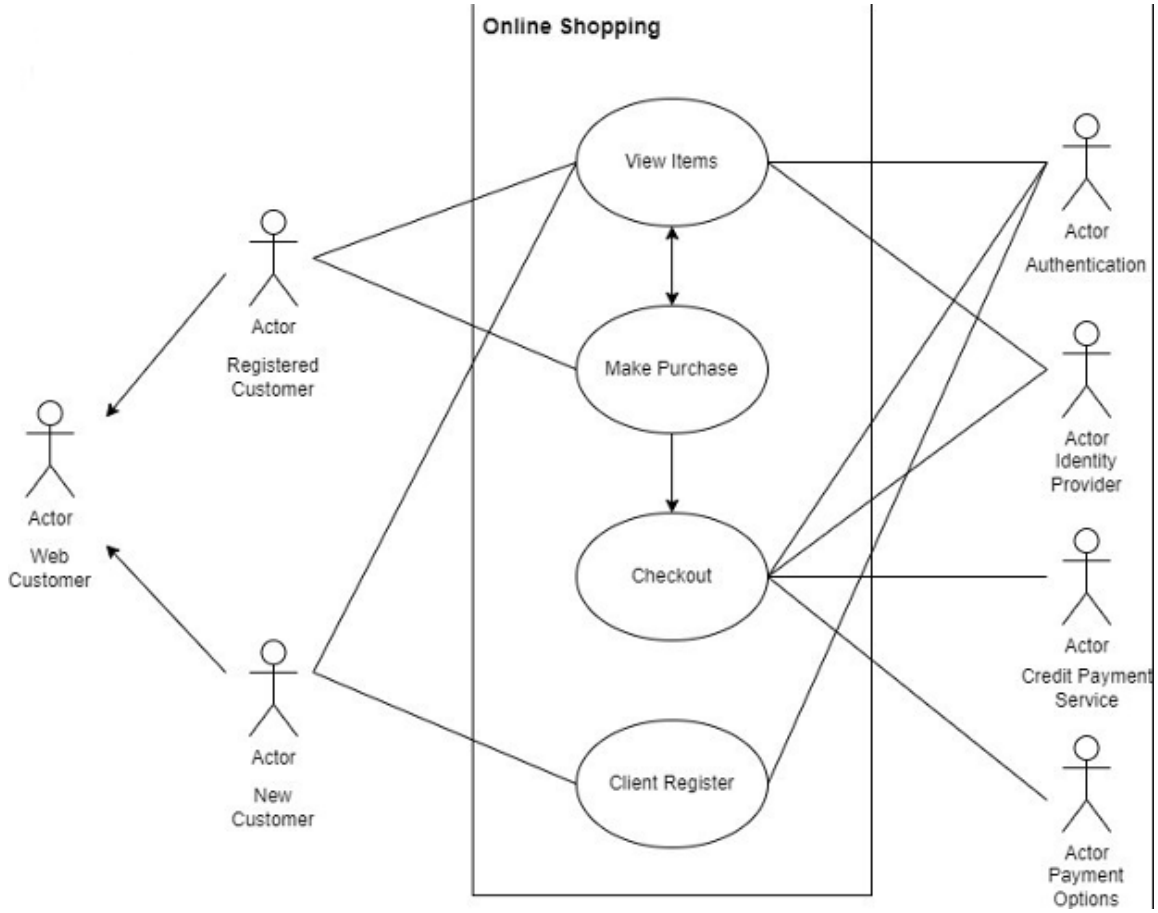
1. Class Diagrams: These illustrate the classes in a system, their attributes, methods, relationships, and inheritance hierarchies. They help in understanding the structure of the system.
2. Use Case Diagrams: Use case diagrams depict the interactions between different actors (users or external systems) and the system. They show the different ways in which users can interact with the system and the functionalities provided by the system.
3. Sequence Diagrams: Sequence diagrams represent the dynamic behavior of a system by showing the interactions between various objects or components over time. They are particularly useful for illustrating the flow of messages and method calls during the execution of a use case or scenario.
4. Activity Diagrams: Activity diagrams capture the flow of activities or processes within a system. They are often used to model business processes or the workflow within a software application.
5. State Machine Diagrams: State machine diagrams depict the states that an object or system can be in and the transitions between these states in response to events. They are useful for modeling the behavior of objects over their lifecycle.
6. Component Diagrams: Component diagrams show the physical components of a system and their relationships, highlighting how different parts of the system interact.
7. Deployment Diagrams: Deployment diagrams illustrate the physical architecture of a system, showing how software components are distributed across hardware nodes.
8. Package Diagrams: Package diagrams group related UML elements, such as classes or components, into packages, helping to organize the structure of a system.

UML diagrams are a powerful tool for documenting and communicating software designs. They promote a common understanding among team members, assist in identifying design flaws early in the development process, and aid in generating code from visual models. However, it's important to note that while UML diagrams provide a valuable visual representation, the quality of the underlying design and communication skills are equally important for creating successful software systems.

Free UML tools:

1. **StarUML**
2. **Umbrello**
3. **Draw.io**
4. **UML designer tool**
5. **Umple**

1. Consider Online Shopping System (e.g Flipkart, Amezon etc.) for purchasing products online. Users can Browse Products, add to Cart the products and Checkout while Admin Can Manage Products and View Orders. A Payment system is important for processing a payment. For the above scenario draw a Use Case Diagram using online UML tool.



2. Consider online Flight Booking System for managing bookings. For the different classes given below draw a Class diagram for above scenario. Consider different classes and relationships given below.

Classes:

Passenger

Attributes: passengerID, name, email

Operations: searchFlight(), bookFlight()

Booking Agent

Operations: confirmBooking(), updateFlightSchedule()

Flight

Attributes: flightID, source, destination, departureTime, arrivalTime

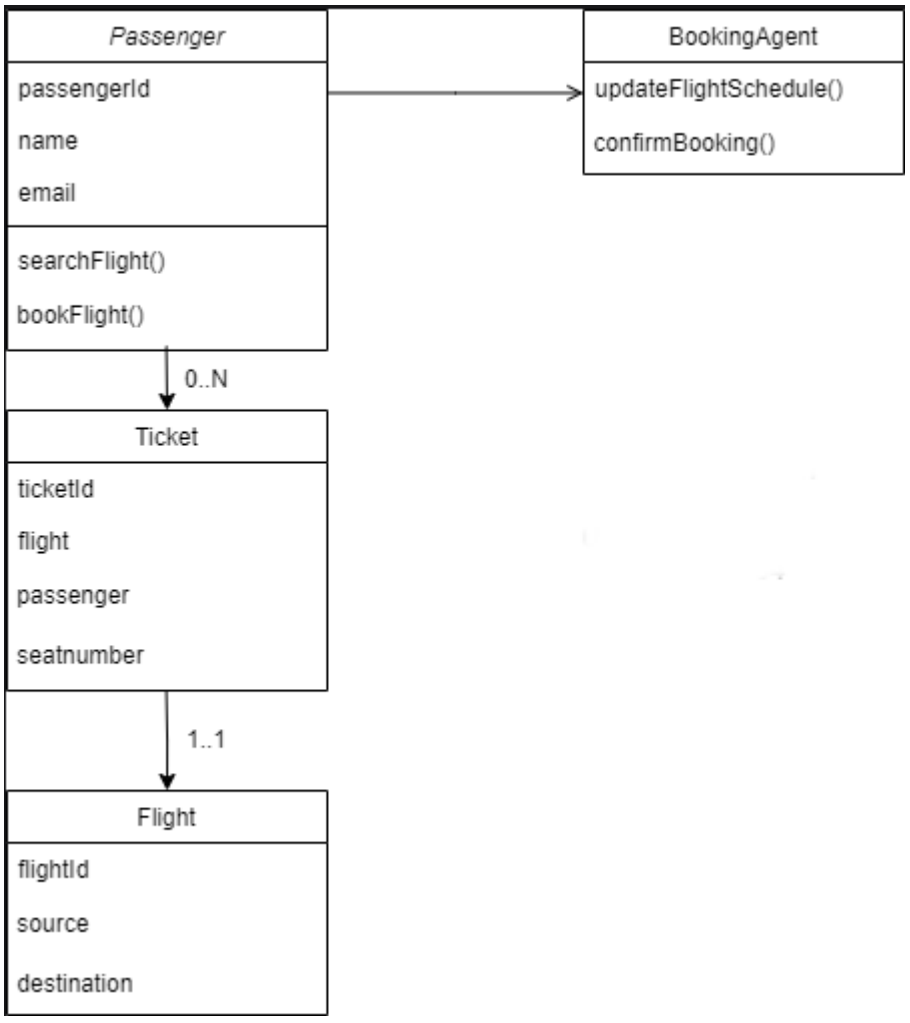
Ticket

Attributes: ticketID, flight, passenger, seatNumber

Relationships:

A Passenger can have 0..N Tickets.

A Ticket is associated with one Flight and one Passenger



3. Consider the scenario of Library Management System (LMS). A library wants to develop a management system. Here are the basic requirements:
    - There are two types of users: Librarian and Member.
    - Both users can search for books.
    - Only a Librarian can add or remove a book.
    - A Member can borrow and return books.
    - Each Book has a title, ISBN number, and author(s).
    - Based on above requirements, draw a sequence diagram which can fulfil above tasks.