Component Diagram
Package Diagram
Deployment Diagram

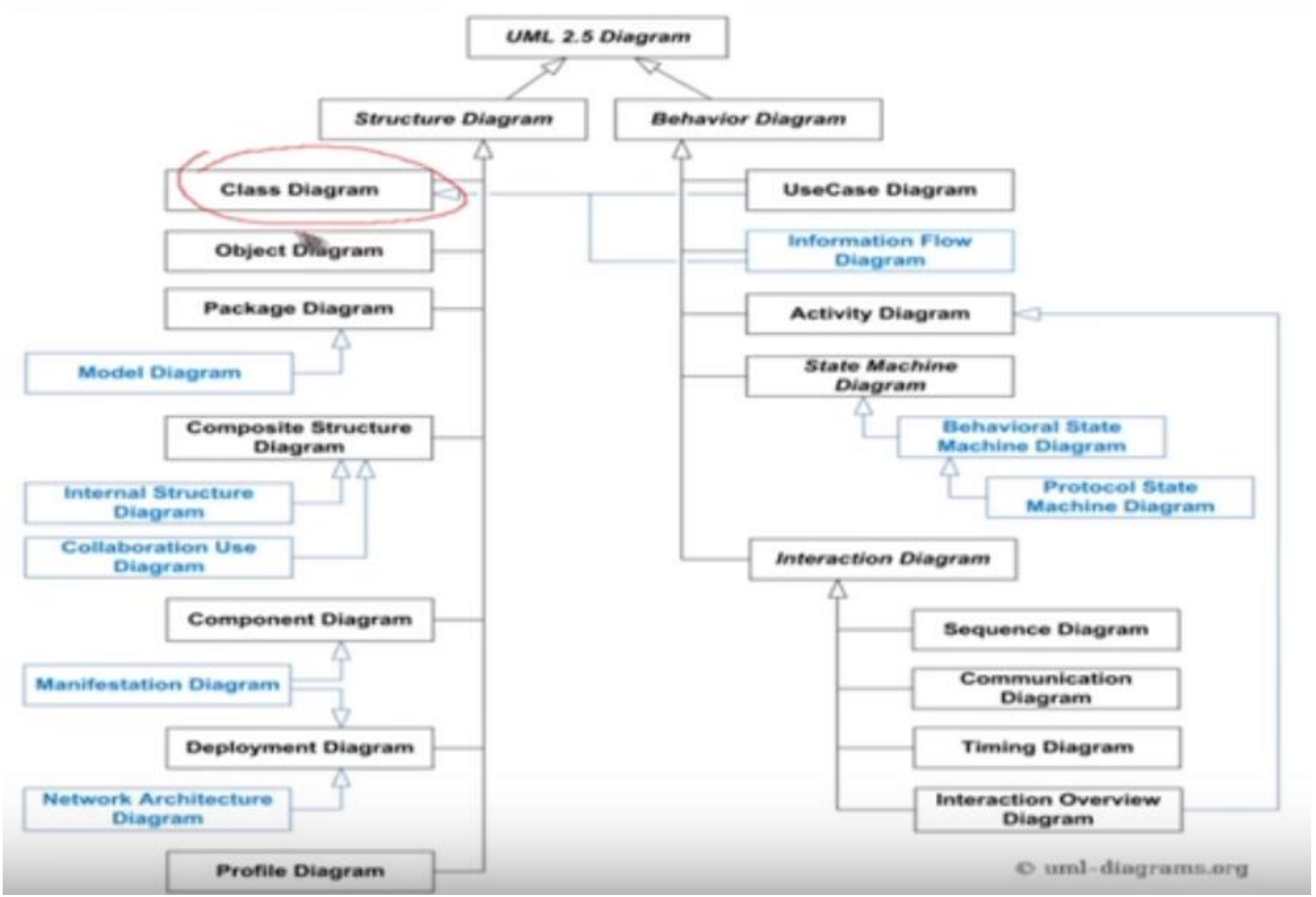
Overview

- Familiarization with Component, Deployment, Composite Structure, Package, and Timing Diagrams
- Completion of UML Diagrams
  - Behavioral Diagrams
    - Timing Diagram
  - Structural Diagrams
    - Component Diagram
    - Deployment Diagram
    - Composite Structure Diagram
    - Package Diagram

UML Diagrams

- **Structural Diagrams** show the **static structure** of the system and its parts on different abstraction and implementation **levels** and how they are related to each other
  - The elements in a structure diagram represent the meaningful concepts of a system, and may include abstract, real world and implementation concepts
- **Behavioral Diagrams** show the **dynamic behavior** of the objects in a system, which can be described as a series of changes to the system over **time**

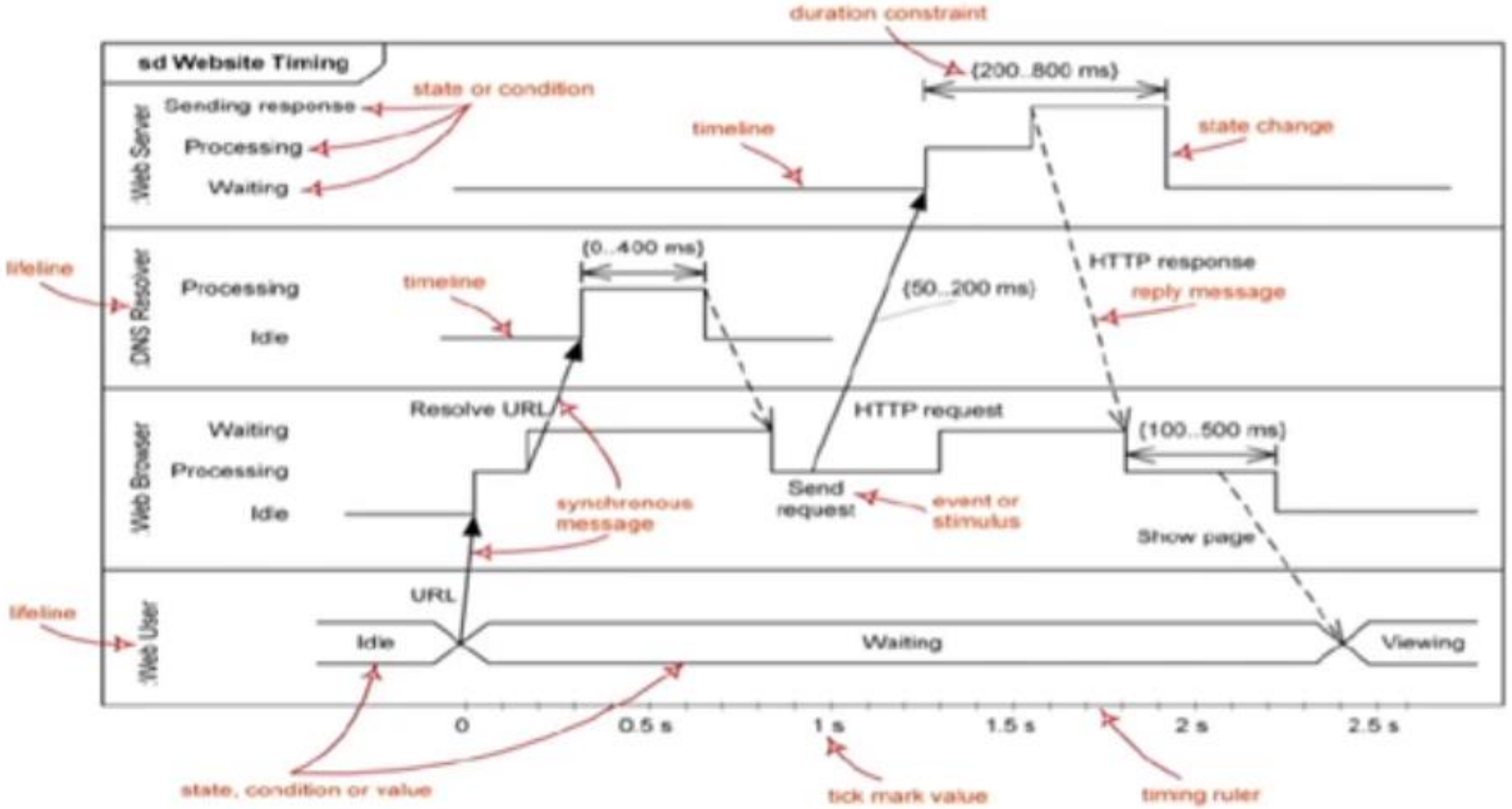
UML Diagrams Overview



Timing Diagram

- Timing diagram is a behavioral diagram which focuses on conditions changing within and among lifelines along a linear time axis
- Timing Diagrams are built during Analysis and Design phases of SDLC
- Both individual class and interactions of classes are described, focusing attention on time of events causing changes in the modeled conditions of the lifelines.
- The major components of a Timing Diagram are:
  - Lifeline
  - State or Condition Timeline
  - Duration constraint
  - Time constraint
  - Destruction Occurrence

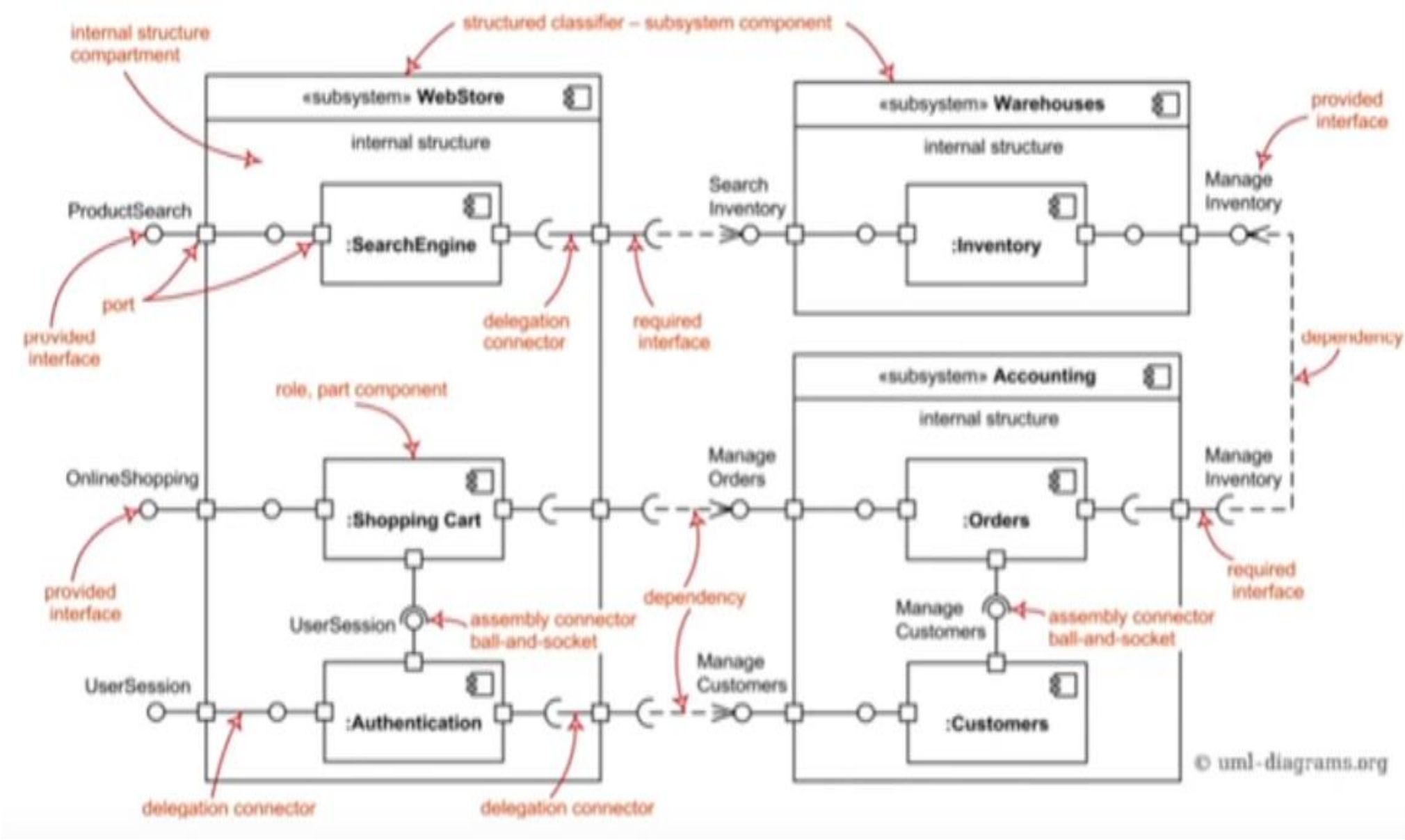
Timing Diagram



Component Diagram

- Component diagram is a structure diagram which shows components, required interfaces, ports, and relationships between them
- Component diagrams are built during Design and Implementation phases of SDLC
- This type of diagrams is used for **Component-Based Development (CBD)**, to describe systems with **Service-Oriented Architecture (SOA)**
- Components in UML could represent **logical components** (business components, process components) and **physical components** (CORBA components, EJB components, COM+ and .NET components, WSDL components)
- The major components of a Component Diagram are:
  - Component
  - Interface
  - Provided interface
  - Required interface
  - Class
  - Artifact
  - Port, Connector

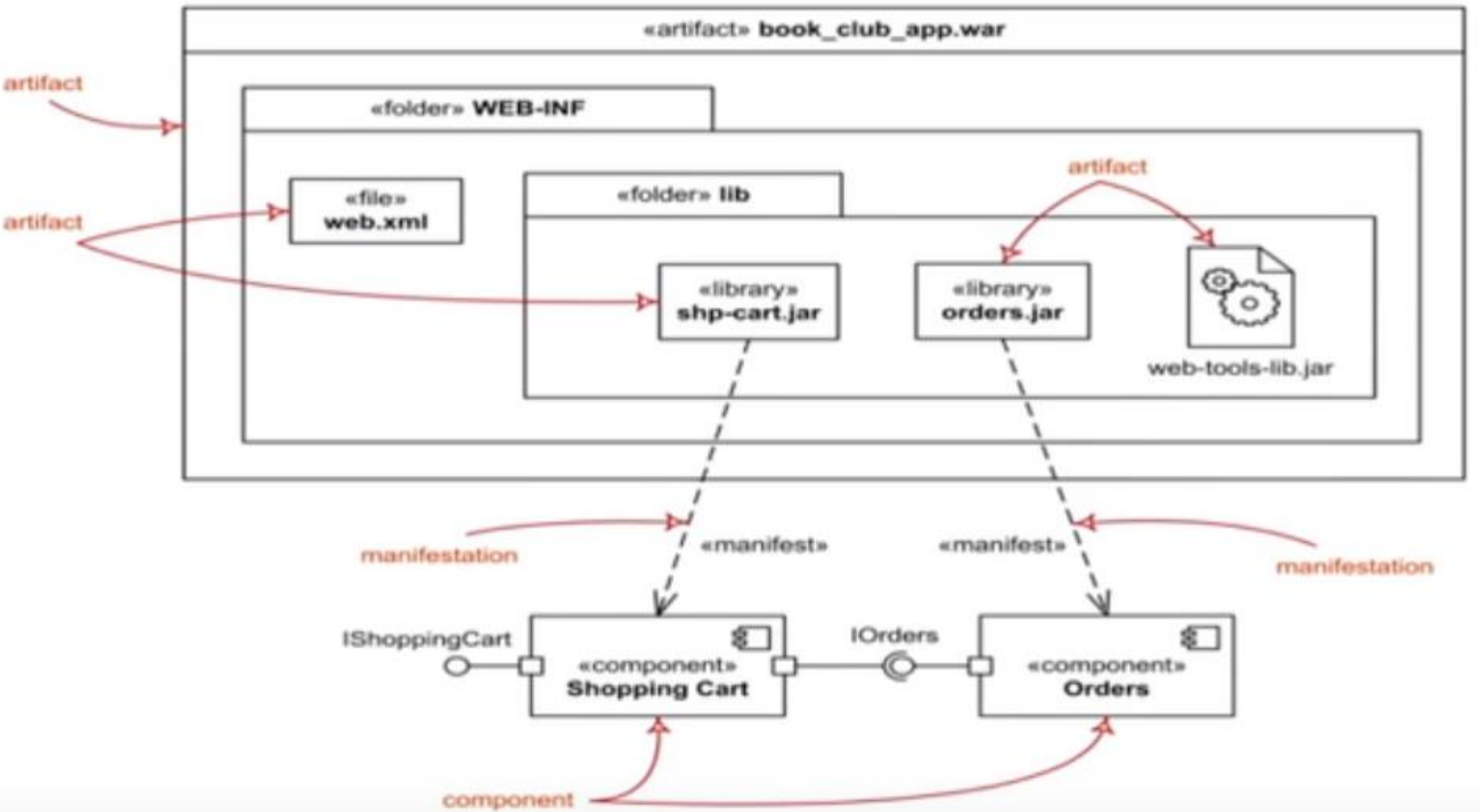
Component Diagram



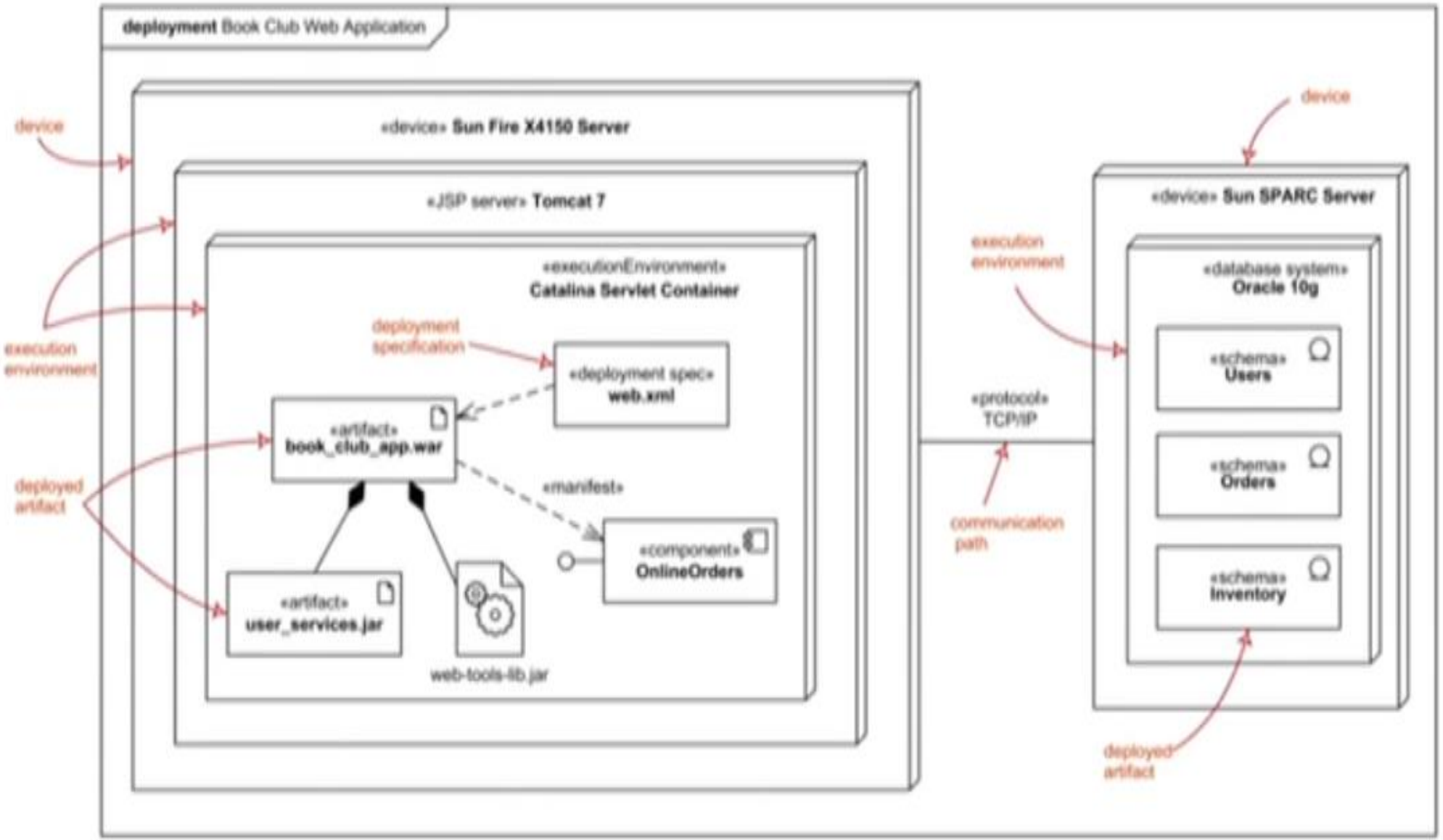
Deployment Diagram

- Deployment diagram is a structure diagram which shows architecture of the system as deployment (distribution) of software artifacts to deployment targets.
- Deployment Diagrams are built during Design and Implementation phases of SDLC
- Artifacts represent concrete elements in the physical world that are the result of a development process
- Examples of artifacts are executable files, libraries, archives, database schemas, configuration files
- Deployment target is usually represented by a **node** which is either hardware device or some software execution environment
- The major components of a Deployment Diagram are:
  - Artifacts (instances)
  - Deployment Targets (instances)

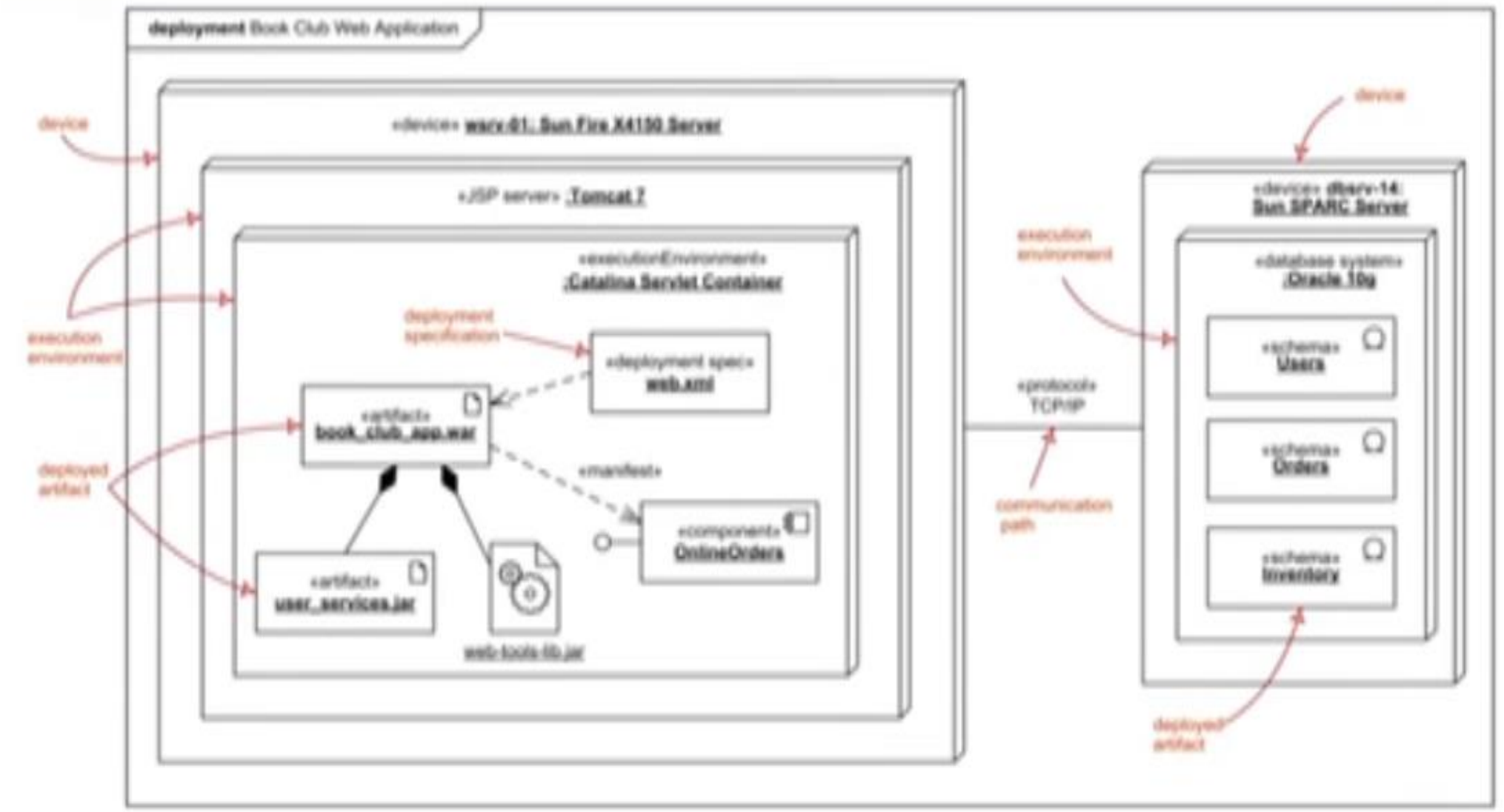
Deployment Diagram



Specification Level Deployment Diagram



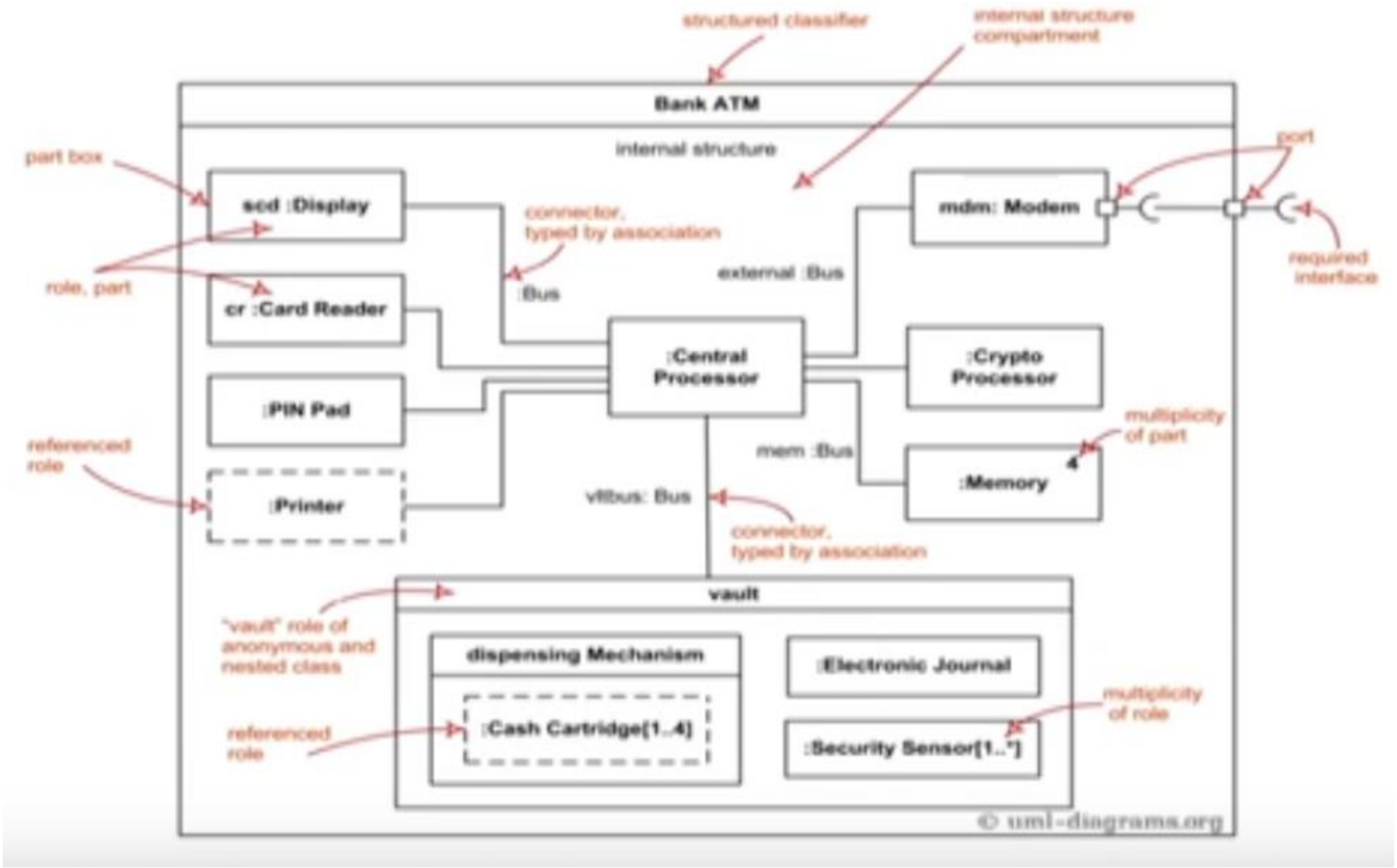
Instance Level Deployment Diagram



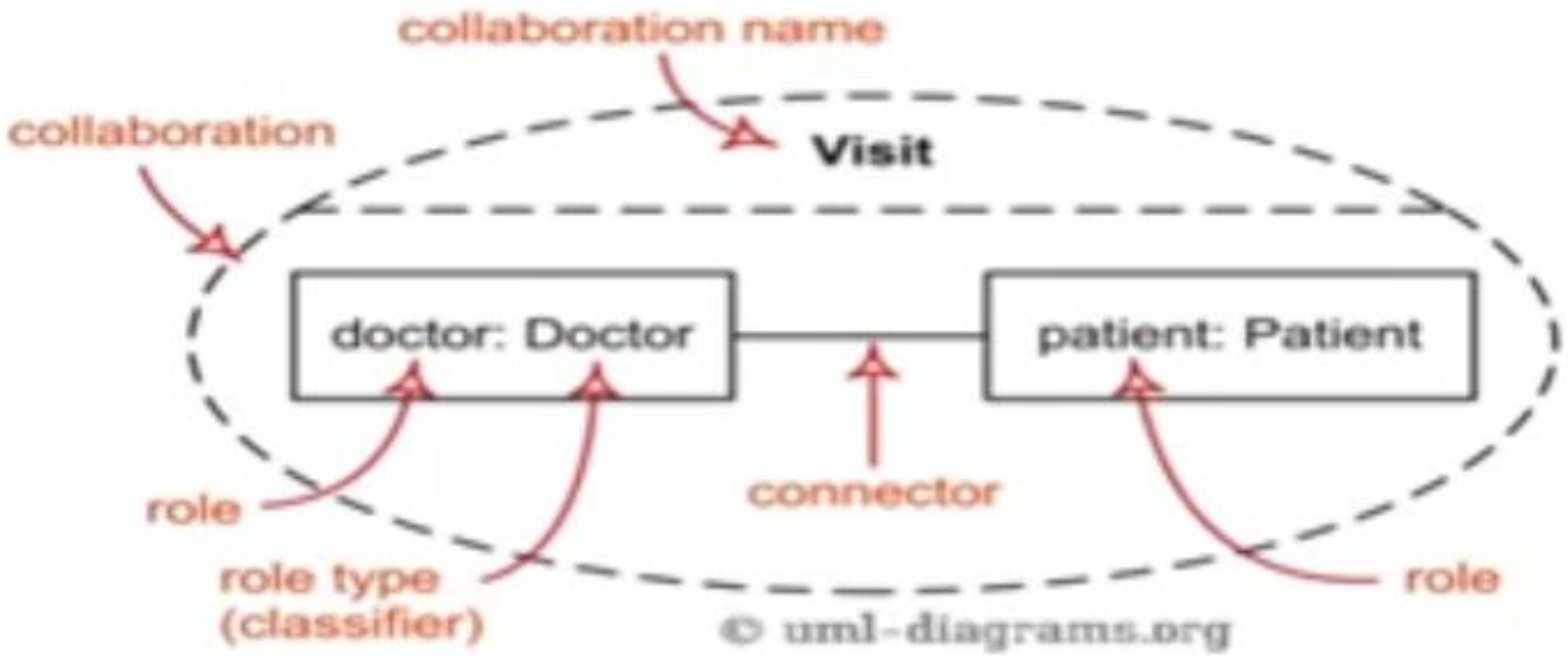
Composite Structure Diagram

- Composite Structure Diagram is a structure diagram which is used to show
  - Internal structure of a classifier - internal structure diagram
  - A behavior of a collaboration - collaboration use diagram
  - Class interactions with environment through ports
- Internal structure diagram shows internal structure of a classifier - a decomposition of that classifier into its properties, parts and relationships
- Collaboration use represents one particular use (occurrence) or application of the pattern described by a collaboration to a specific situation involving specific classes or instances playing the roles of the collaboration
- Composite Structure Diagrams are built during Design and Implementation phases of SDLC

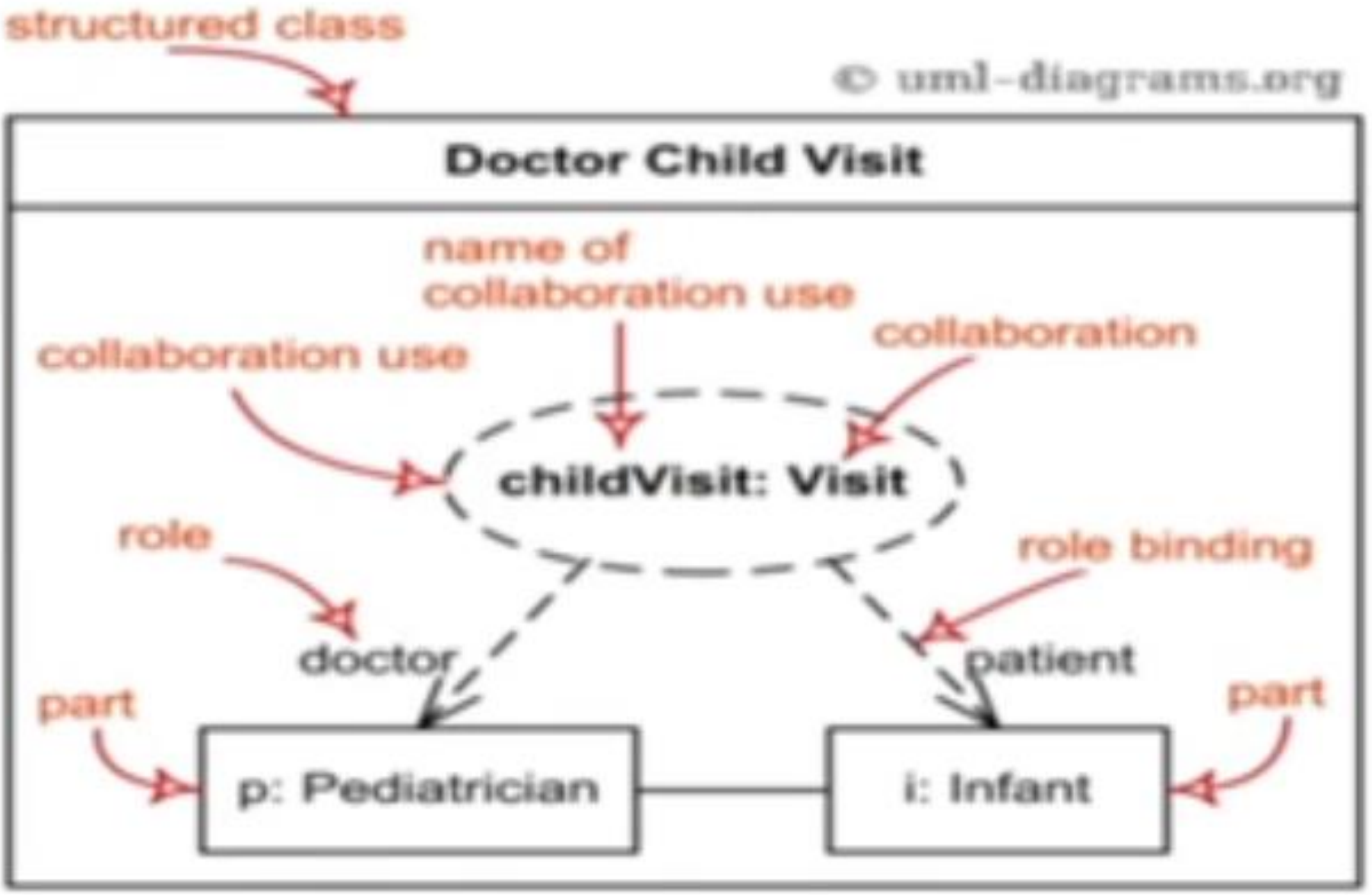
Internal Structure Diagram



Collaboration Use Diagram



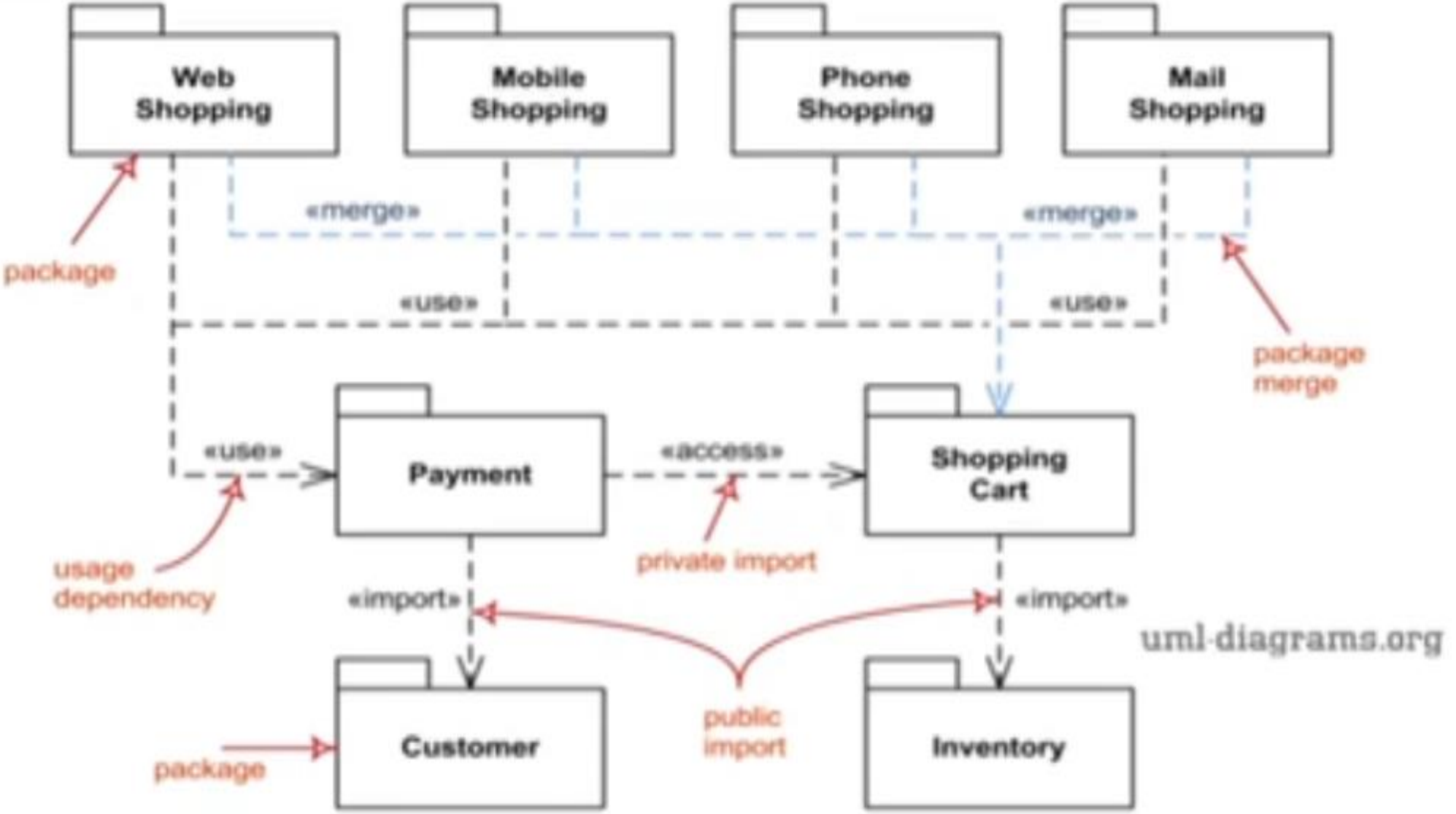
Collaboration Use Diagram



Package Diagram

- Package diagram is a structure diagram which shows structure of the designed system at the level of packages
- A system at a higher level can be grouped into logical sections, consisting of group of related diagrams
- Package Diagrams are built during Design and Implementation phases of SDLC
- A package has similar properties like classes, for example, visibility and associations among classes, but with the difference, that the property assigned to package will apply to all its component classes
- The major components of a Package Diagram are:
  - Package
  - Dependency
  - Import
  - Access
  - Merge

Package Diagram



Summary

- Familiarized with Component, Deployment, Composite Structure, Package, and Timing Diagrams
- Annotated Examples are illustrated

Reference

Source: NPTEL - Object-Oriented Analysis and Design, IIT Kharagpur Prof. Partha Pratim Das Prof. Samiran Chattopadhyay Prof. Kausik Datta

https://nptel.ac.in/courses/106105153