Phases of System Development

- ***Requirement Analysis***
  - This involves determining the functionality users require from the system
  - Covers creation of Use Case Diagram
- ***Object Oriented Analysis***
  - This involves discovering classes and their relationships
  - Covers creation of class diagram
- ***Object Oriented Design***
  - The result of analysis is expanded into technical solutions in this phase
  - Covers creation of state and sequence diagrams
- ***Implementation***
  - All the models are converted into code
- ***Testing***
  - All the functionality is tested
  - Involves tests such as Unit, System, Integration and Acceptance tests

Use Case Tests

- ***The Boss Test***
  - Check if the boss would be happy with a task. If so, it can be a good use case.
- ***The Elementary Business Process (EBP) Test***
  - This involves a task performed by a user. If it is considerable, for example, Make Payment, then it can be a good use case.
- ***The Size Test***
  - Check the size of the feature that we are testing to be a use case.

Parts of Use Case Diagram

- ***An Actor***
  - Is a person or a system that derives benefit from and is external to the system
- ***A Use Case***
  - Represents a major piece of system functionality
- ***A System Boundary***
  - Represents scope of the system
- ***An Association Relationship***
  - Links an actor with the use cases with which it interacts

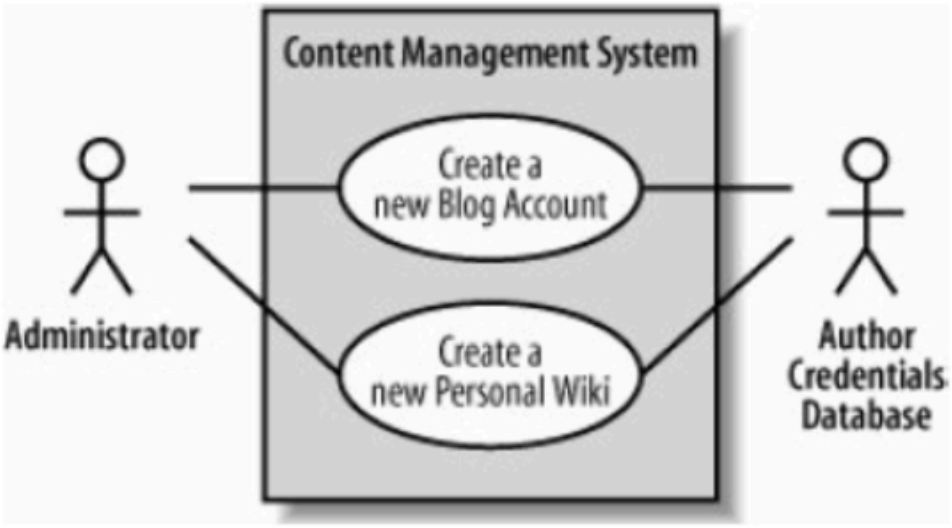
Types of Actors

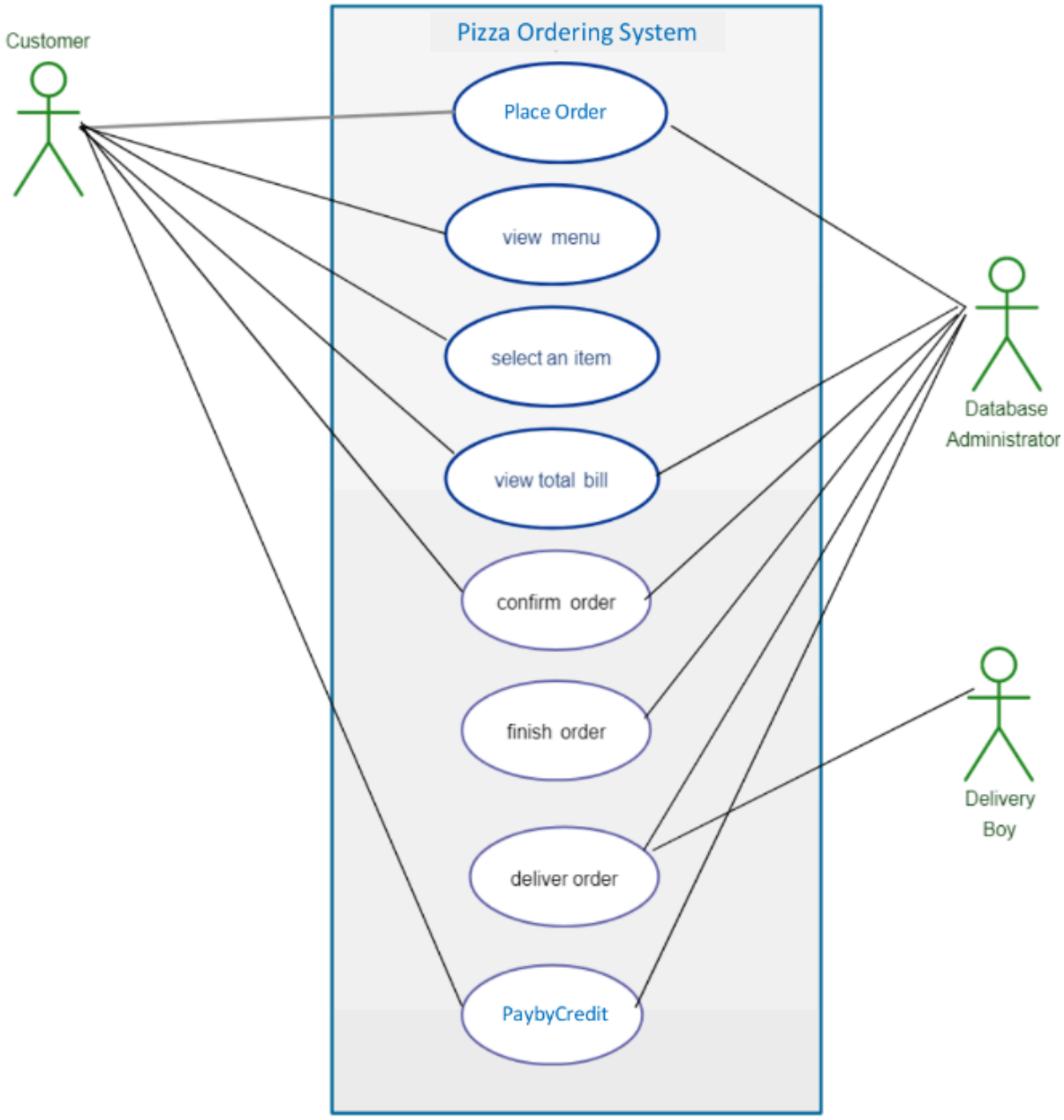
- ***Primary Actor***
    - Has user goals fulfilled using the services of the system
- ***Supporting Actor***
    - Provides a service to the system
- ***Offstage Actor***
    - Has an interest in the behavior of a use case

Types of Diagrams

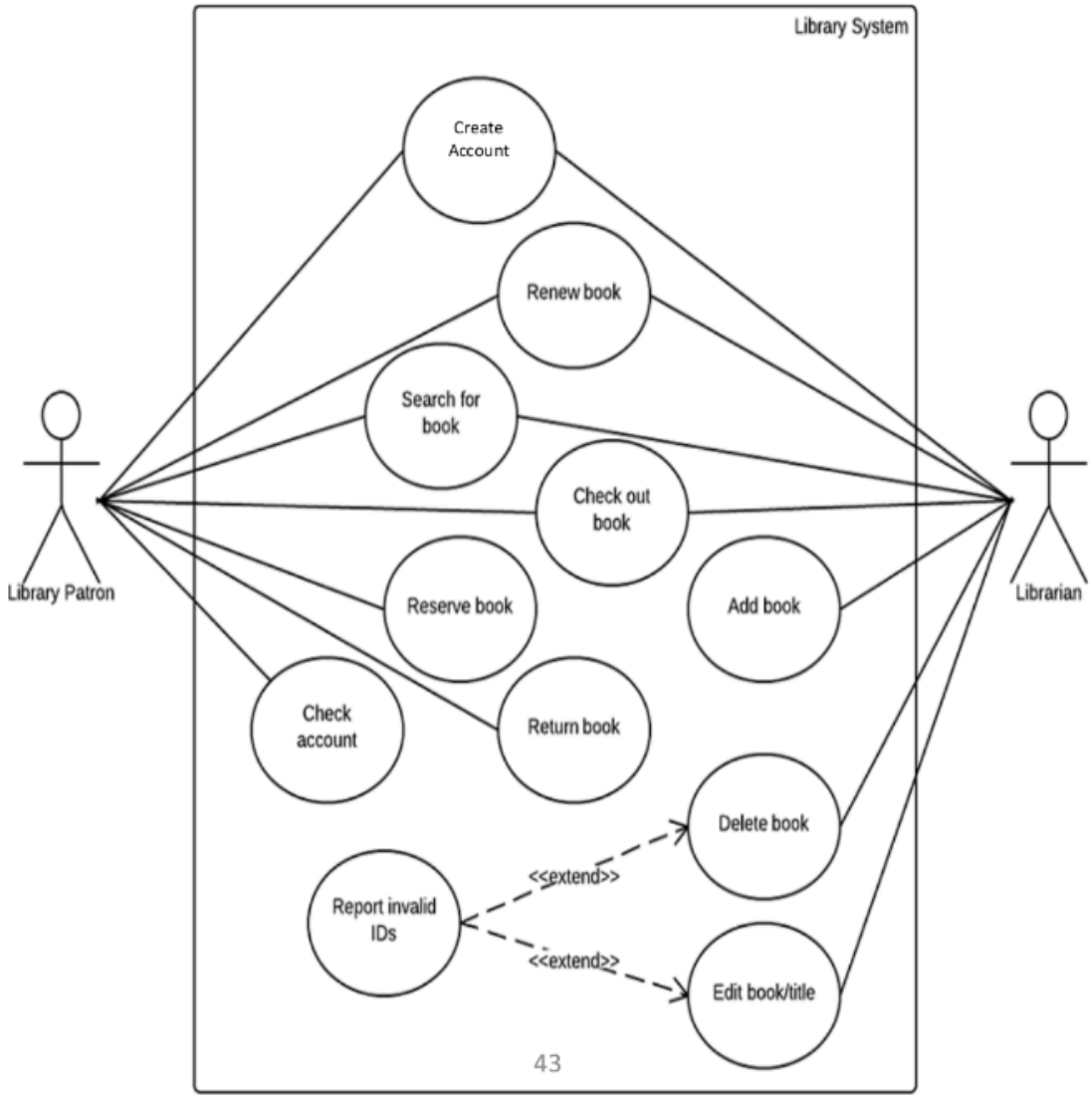
- ***Use Case Diagram***
    - Involves all the use cases, actors and the relationships between them
- ***Domain Model***
    - Contains classes, their attributes and their relationships and cardinalities.
- ***System Sequence Diagram***
    - Involves the actors and the steps in which they interact with the system
- ***Design Model***
    - Describes the system's implementation and source code in a diagrammatic fashion

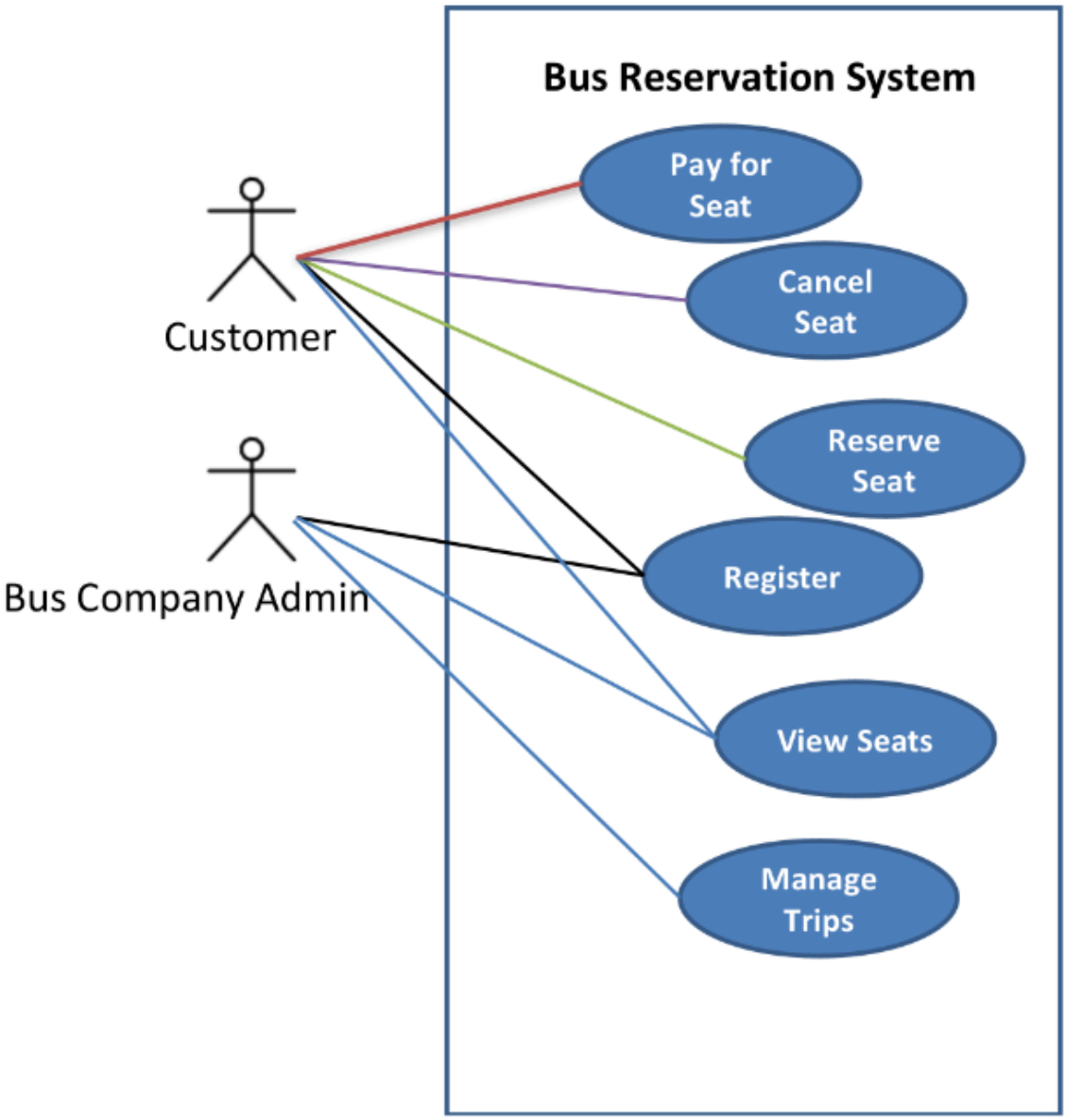
Examples of Use Case Diagram




Customer
Pizza Ordering System
Place Order
view menu
select an item
view total bill
confirm order
finish order
deliver order
PaybyCredit
Database Administrator
Delivery Boy

Use Case Diagram for Library Management System




Bus Reservation System
Pay for Seat
Cancel Seat
Reserve Seat
Register
View Seats
Manage Trips
Customer
Bus Company Admin

Fully-Dressed Use Cases

- ***Name***
  - Name of the use case.
- ***Scope***
  - How broad the use case is.
- ***Level***
  - The level of the use case, whether it is user-level or a sub-function
- ***Primary Actor***
  - The person who uses this service of the system to fulfill a goal
- ***Stakeholders & Interests***
  - Stakeholders are people who want the system and interests are their reasons
- ***Preconditions***
  - The conditions that should be true for the use case to function
- ***Postconditions***
  - The conditions that would be true after the use case is concluded
- ***Main Success Scenario***
  - Covers the steps that would lead to the successful execution of the use case
- ***Extensions***
  - Alternative scenarios of success and failure
- ***Special Requirements***
  - Covers any non-functional requirements
- ***Technologies & Data Variations***
  - Technical variations on how something must be done

Fully-Dressed Use Case Example

- ***Name***
  - Rent Video
- ***Scope***
  - System Level Scope
- ***Level***
  - User-Level Goal
- ***Primary Actor***
  - Clerk
- ***Stakeholders & Interests***
  - *Clerk:* Wants accurate and fast entry
  - *Customer*: Wants videos and fast service with minimal effort

    - *Accountant*: Wants to accurately record transactions
    - *Marketing Team*: Wants to track customer actions and habits
- ***Preconditions***
    - Clerk is verified and authorized
- ***Postconditions***
    - Video has been rented
    - Rent has been paid
    - The transaction has been recorded by the system
- ***Main Success Scenario***
    - Customer arrives at a checkout with videos or games to rent.
    - Clerk enters Customer ID.
    - Clerk enters the rental identifier.
    - System records rental line item and presents item description.
    - (Clerk repeats steps 3 and 4 until indicated done.)
    - System displays total.
    - Customer pays. System handles payment.
    - Clerk requests a rental report.
    - System outputs it. Clerk gives it to Customer.
    - Customer leaves with rentals and a report.
- ***Extensions***
    - System fails. System is restarted and the system state is restored
    - Customer has unpaid fine for return so pays a fine
- ***Special Requirements***
    - The rental process should take 30 seconds
    - The rental process should take 3 steps
- ***Technologies & Data Variations***
    - ID entries by bar code scanner or keyboard.