Overview of
Object Oriented Analysis and Design
in
IT Industry
Using RUP and UML

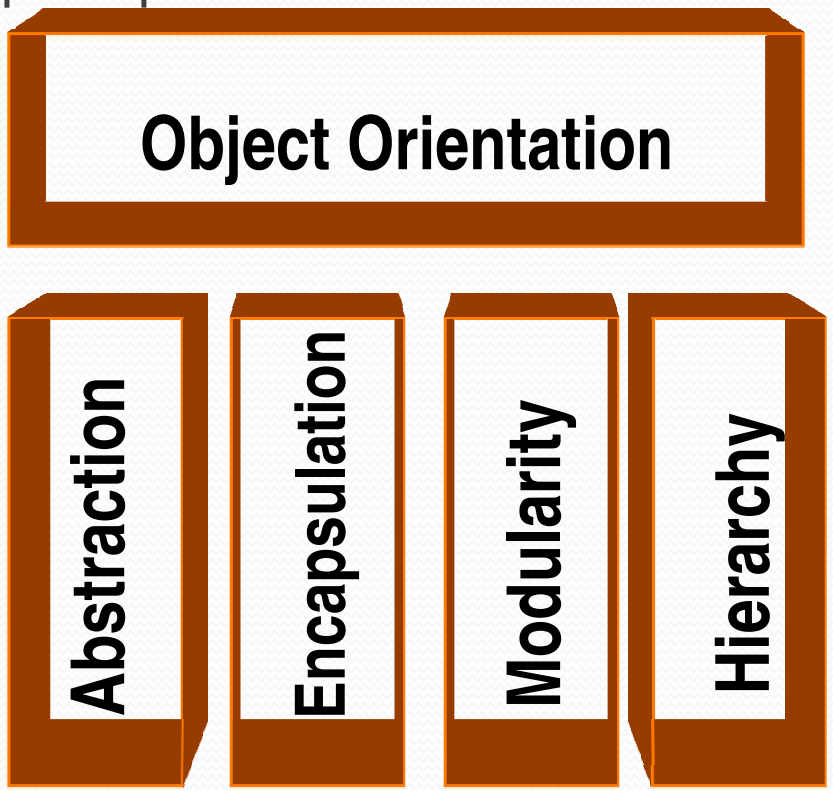
By Dinesh Anantwar

What does a OO Designer needs?

- OO Concepts
- OO Language
- OO Analysis and Design Methodolgy
- OO Notation
- OO tool to draw OOAD Design
- Experience of OO Project execution

Object Oriented Approach – The basic principles

- Will usage of OO language guarantee good OO Programming?
- Object Orientation is based on basic principles:
  - Abstraction
  - Encapsulation
  - Modularity
  - Hierarchy



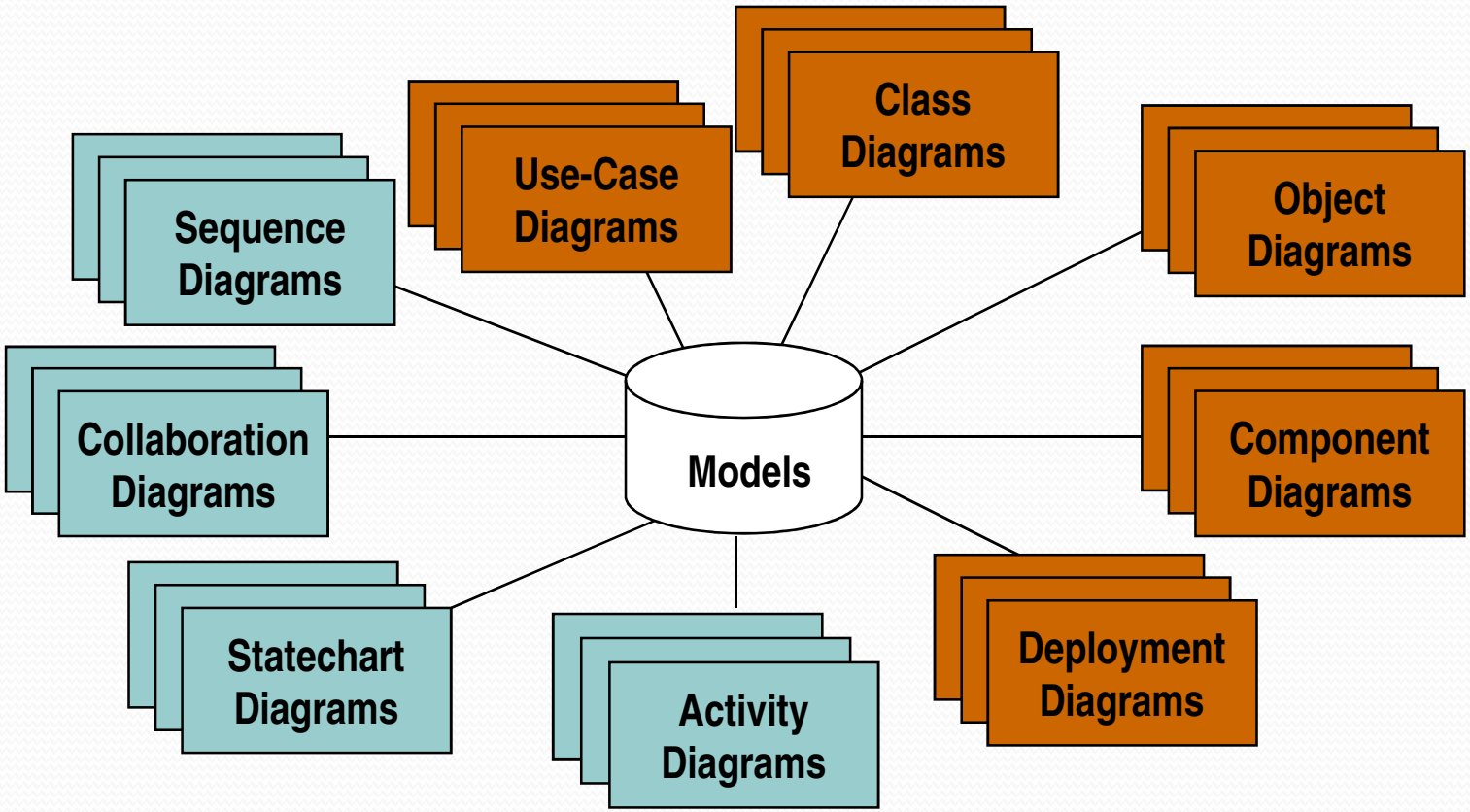
OOAD Techniques

- Fusion
- Jacobson
- Rumbaugh
- Booch
- Rational Unified Process (RUP) with Unified Modeling Language (UML)

OO Design Tools

- Rational Software
- StarUML

UML Diagrams for OOAD design using RUP

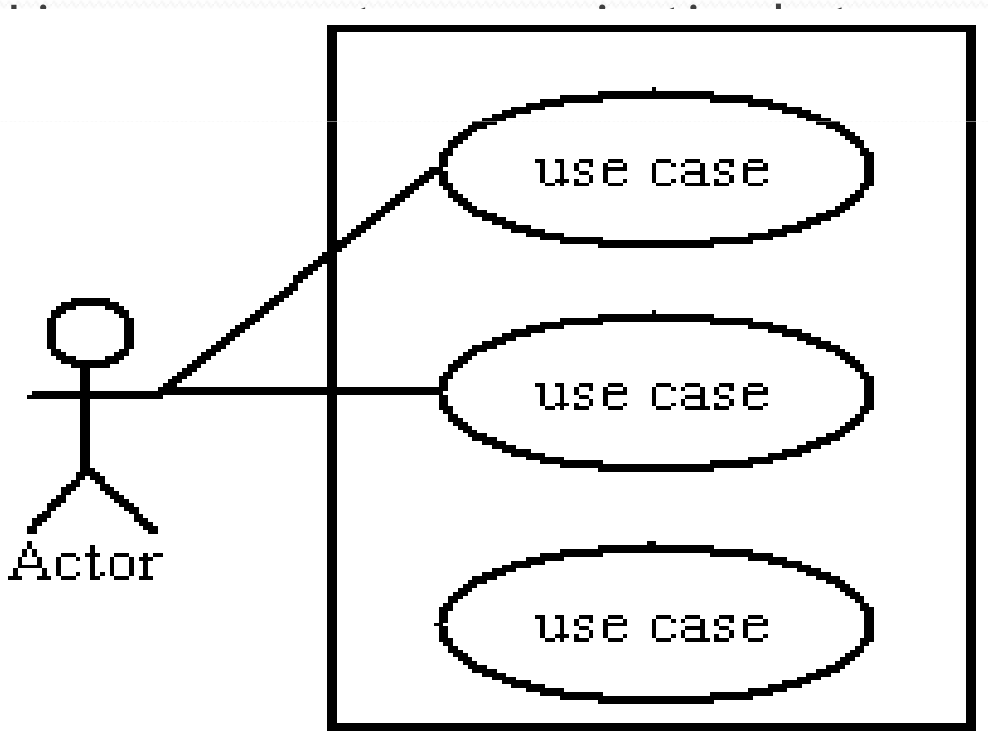


UML Diagrams: Some Questions…

- Why so many diagrams?
- Who will create these diagrams?
- Do I need to create all diagrams?
- Which one do I begin with?

•Use Case Analysis - Drawing the Use Case Diagram

- Stick Figure Represents Actor
- Oval Represents Use Case
- The Rectangle represents System Boundary
- Associatio actor and use cases



Use Case Analysis - Use Case Relationships

- 3 kinds of relationships between use cases
  - Include
  - Extend
  - Uses

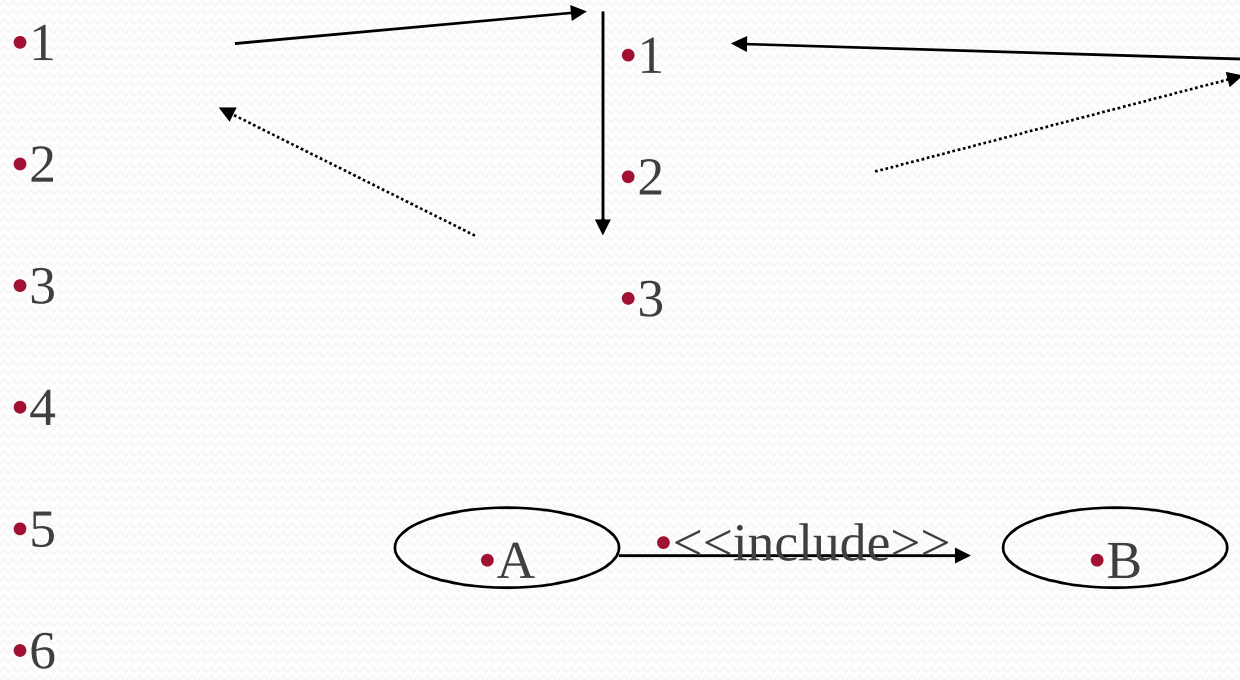
Use Case Analysis - Use Case Relationships

- Include:
  - «include» stereotype indicates that one use case “includes” the contents of another use case.
  - Enables factoring out frequent common behavior

- Use case “A” includes use case “B” if :
  - B describes scenario which is part of scenario of A
  - &
  - B describes scenario common for a set of use cases including A.

Use Case Analysis - Use Case Relationships

- Scenario for A
- Scenario for C
- Scenario for B



- <<include>> Relationship

Use Case Analysis - Use Case Relationships

- Extends:
  - «extend» stereotype indicates that one use case is “extended” by another use case.
  - Enables factoring out infrequent behavior or error conditions
  - Used to show optional behaviour for a use case which will be required only under certain conditions

Use Case Analysis - Use Case Relationships

- Uses:
  - «uses» stereotype indicates that one use case is precondition for executing another use case.

- Use case “A” uses use case “B” if
  - B describes a scenario which is not part of scenarios carrying out service A
  - and
  - B is a precondition for successful invocation of A

Use Case Analysis - Use Case Relationships

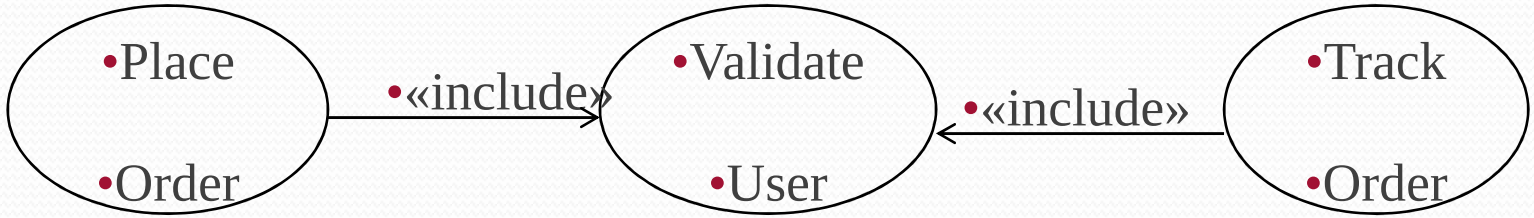
- Dynamic View Diagrams

- Scenario for B
  - 1
  - 2
  - 3
- Scenario for A
  - 1
  - 2
  - 3
  - 4

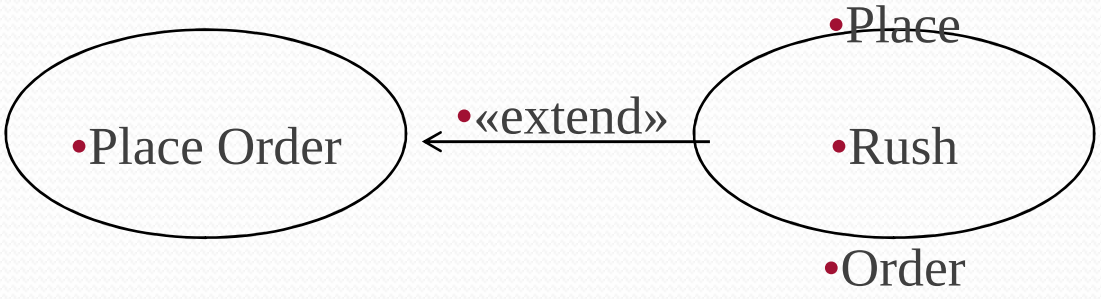
- <<uses>> Relationship

Use Case Analysis - Use Case Relationships

- Examples
  - Include:

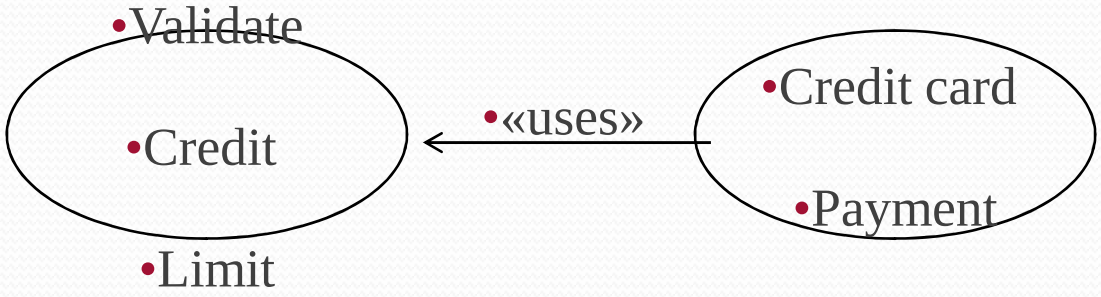


  - Extend:



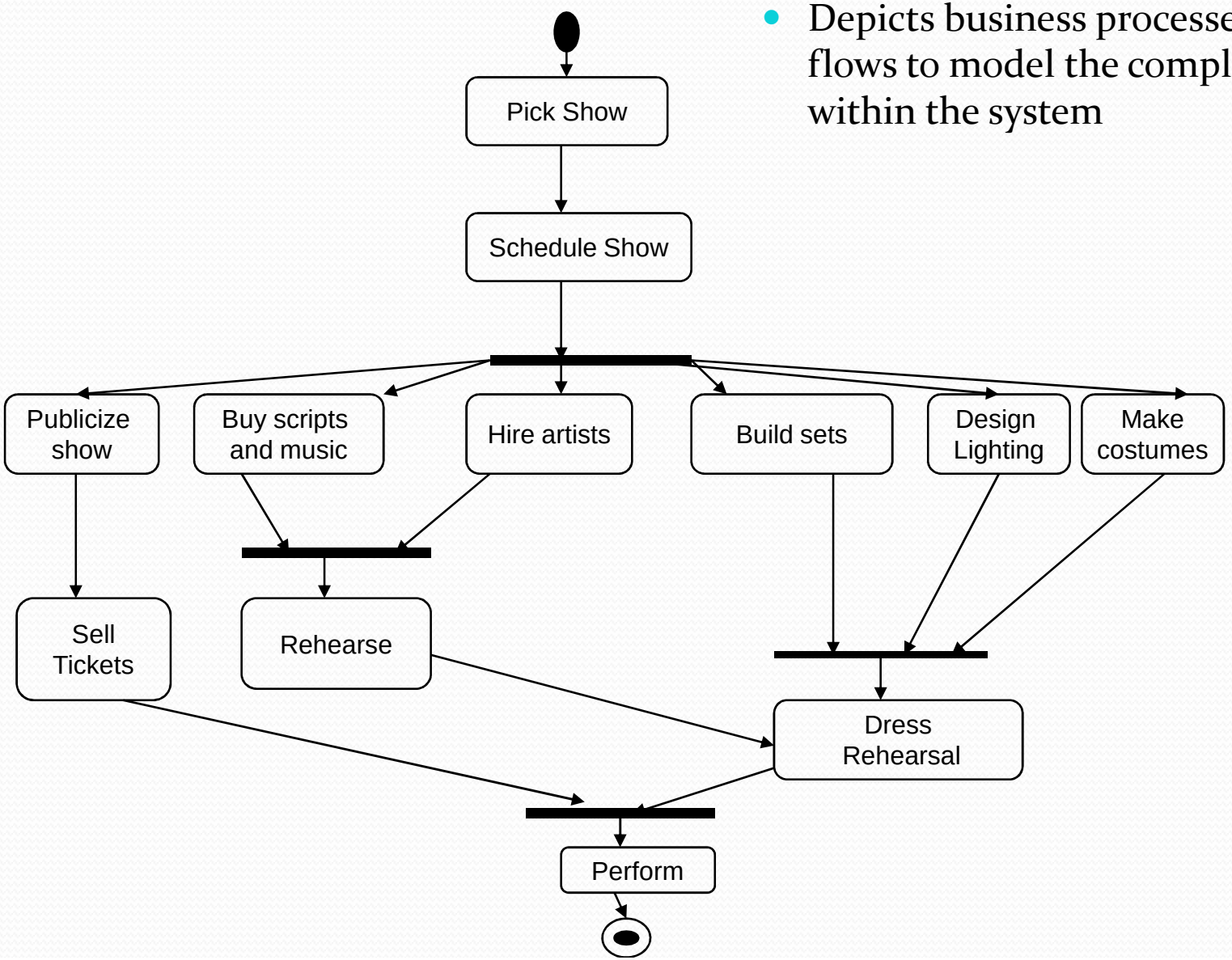
Use Case Analysis - Use Case Relationships

- Examples
  - Uses:



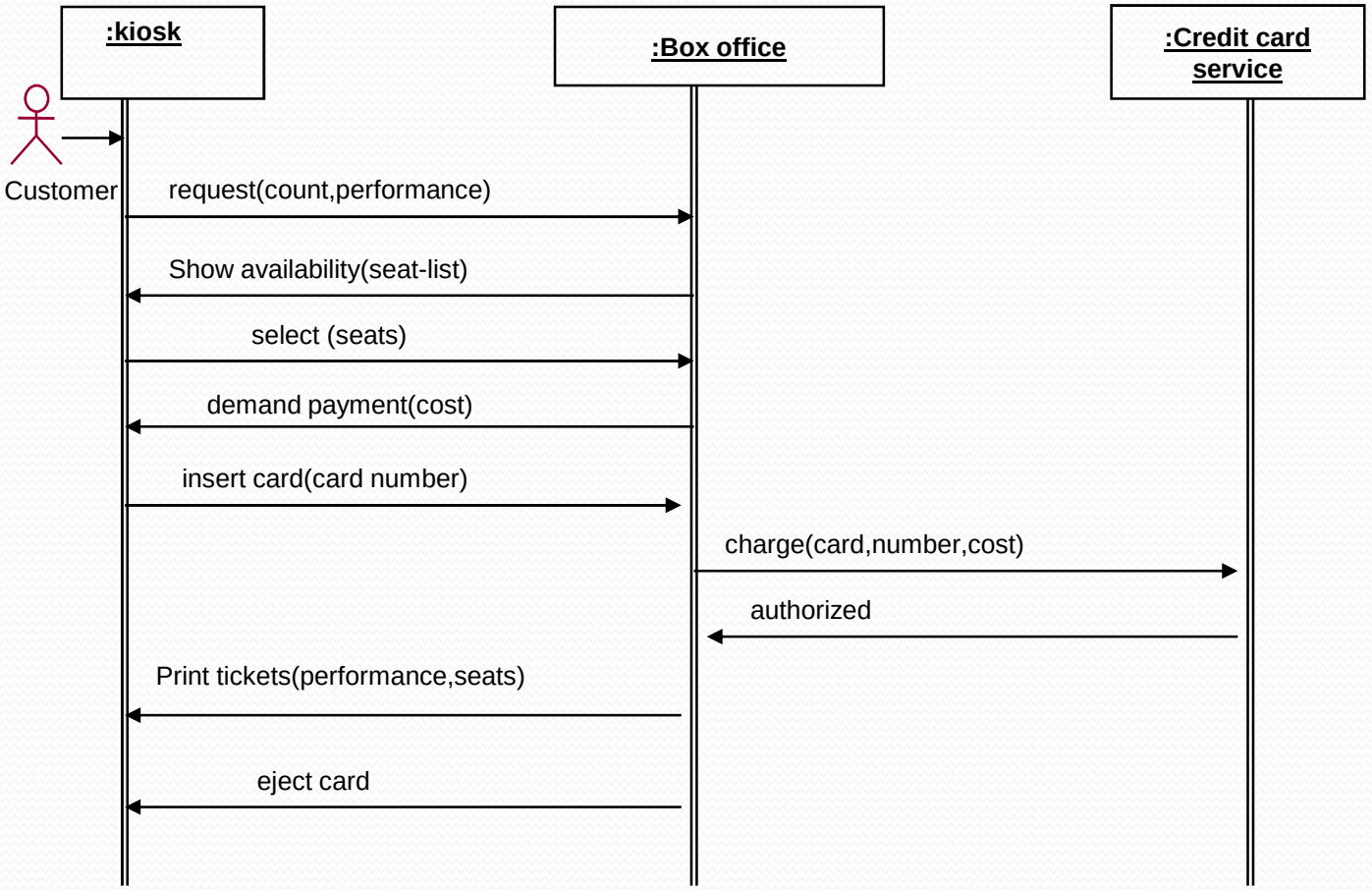
OOAD: Activity Diagram

- Depicts business processes and data flows to model the complex logic within the system



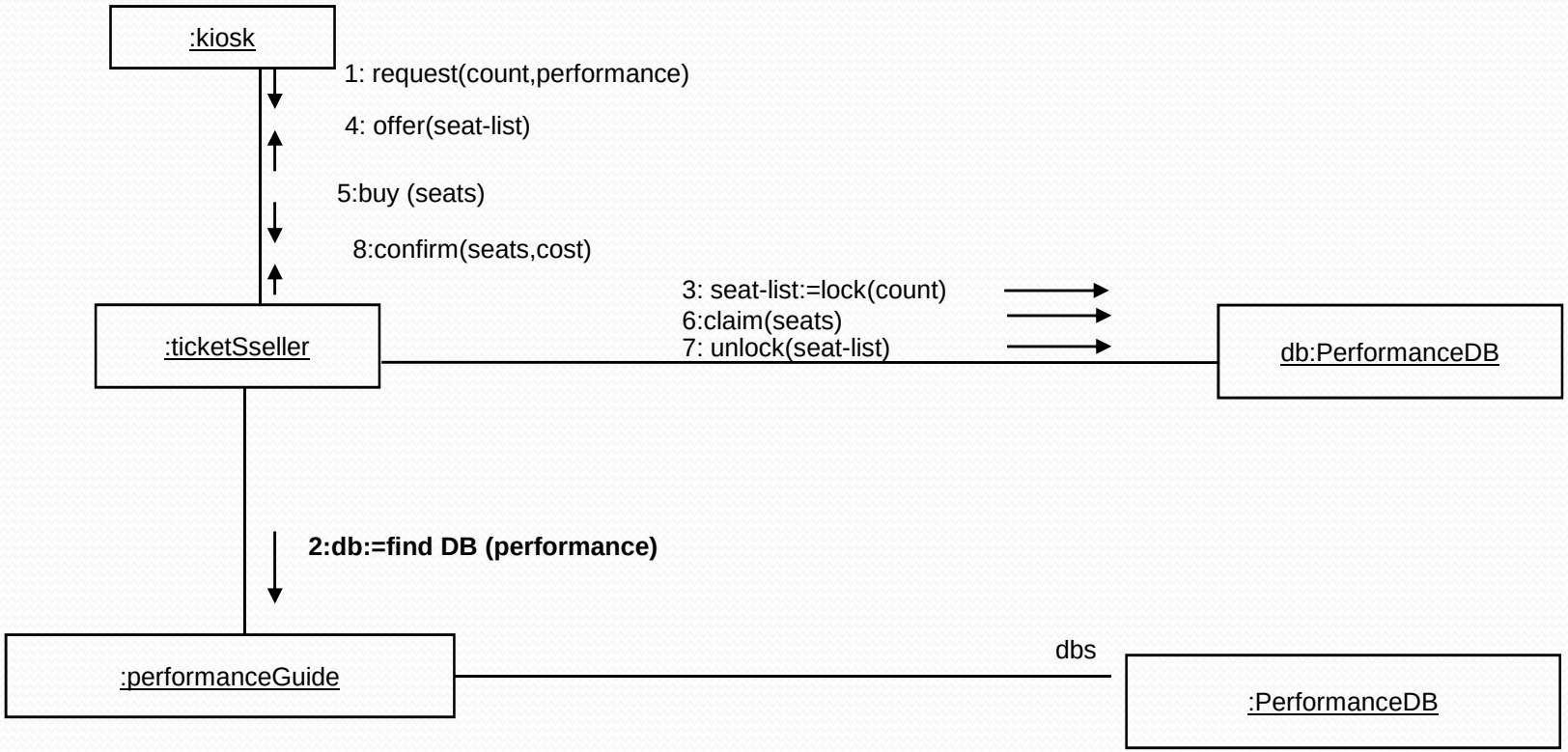
OOAD: Sequence Diagrams

- Models the time ordering of messages between classifiers to accomplish given functionality



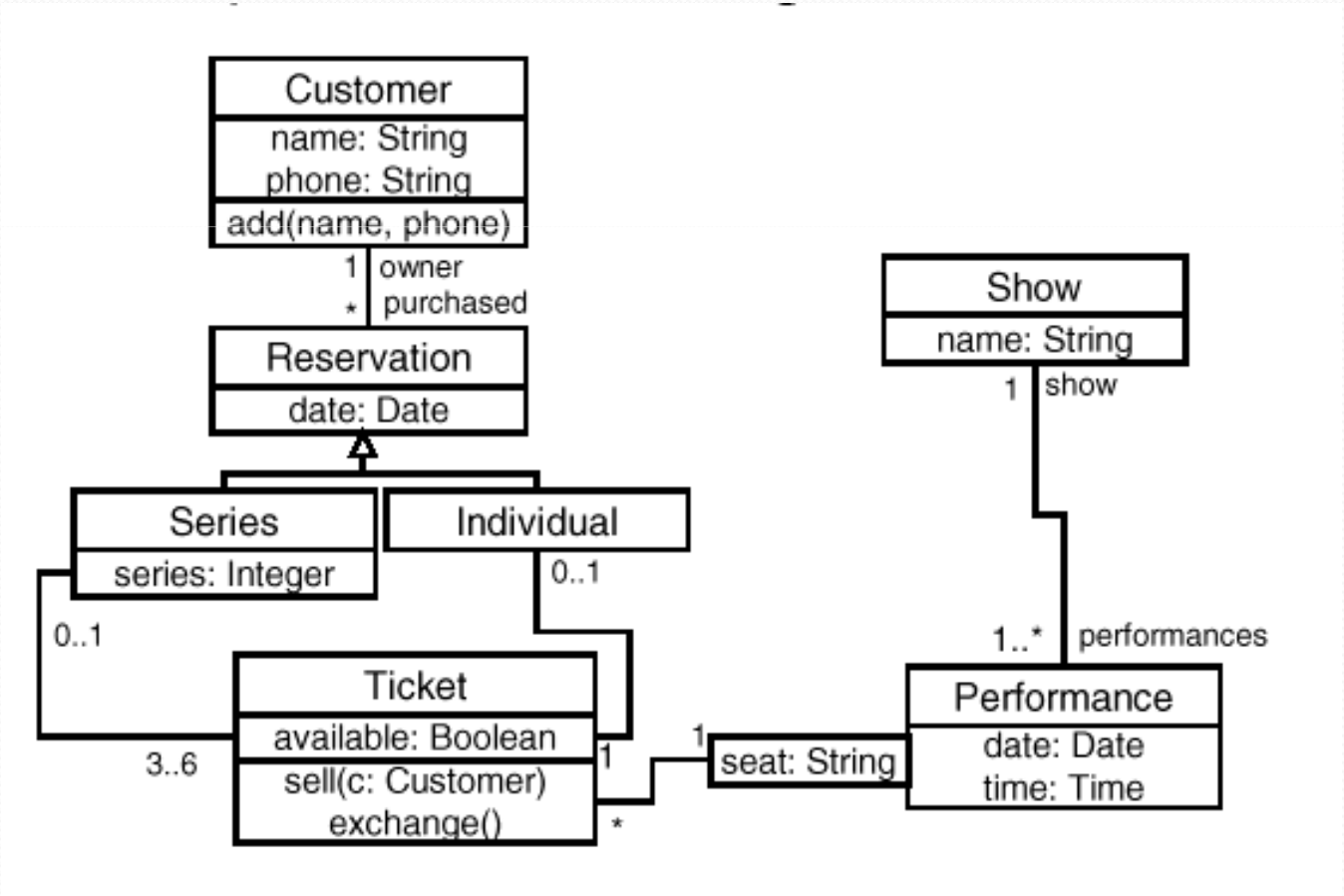
UML Diagrams: Collaboration Diagrams

- Focuses on the structural organisation of objects that send and receive messages. Known as communication diagrams in UML 2.0.



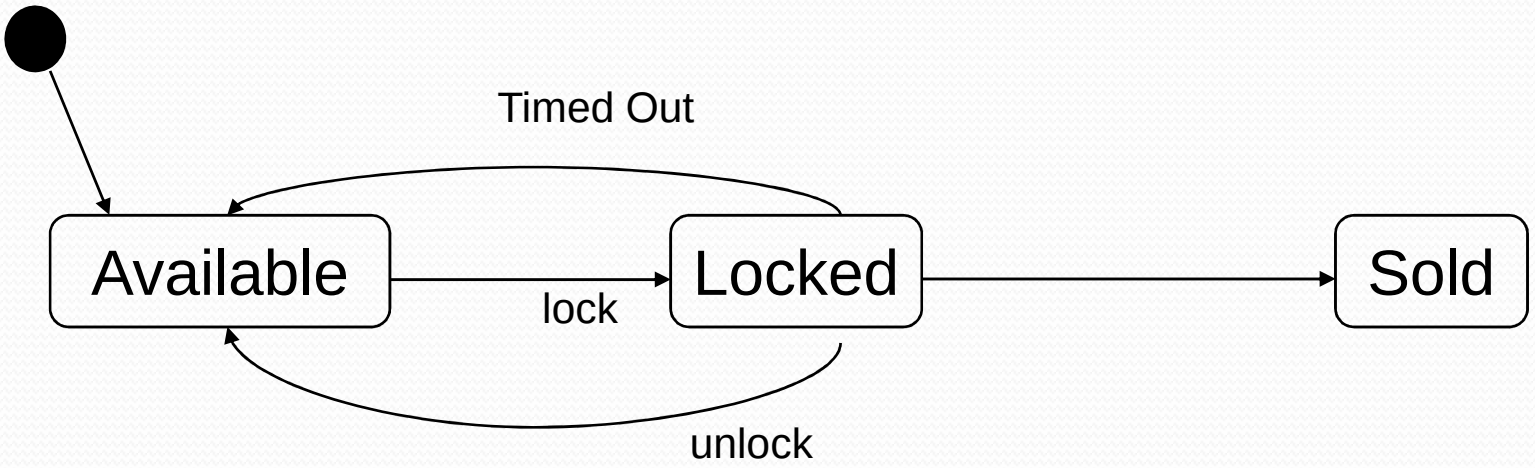
UML Diagrams: Class Diagrams

- Models a collection of static model elements such as classes, their contents and relationships

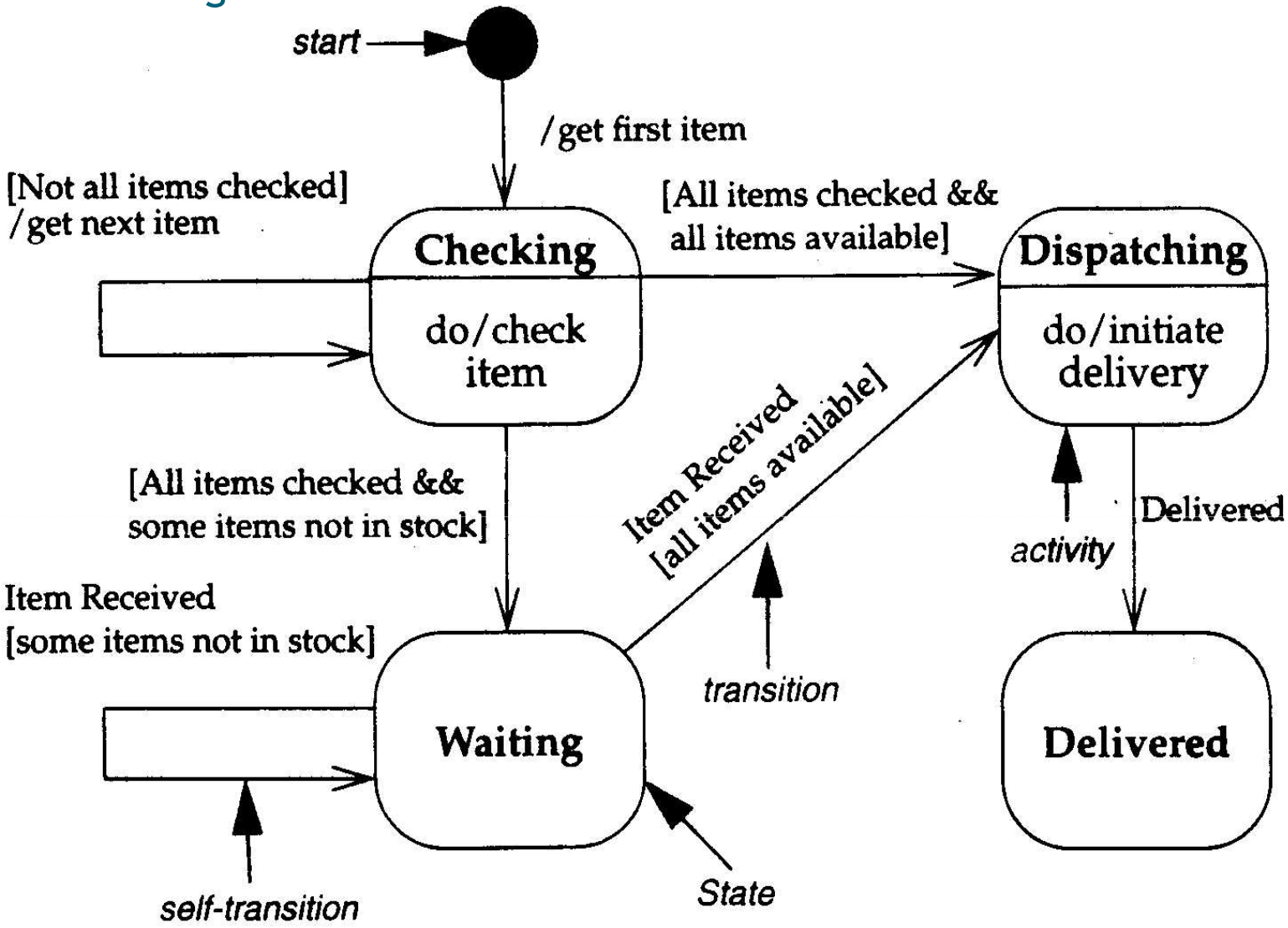


UML Diagrams: State machine Diagrams

- Describes states of an object and transitions between the states

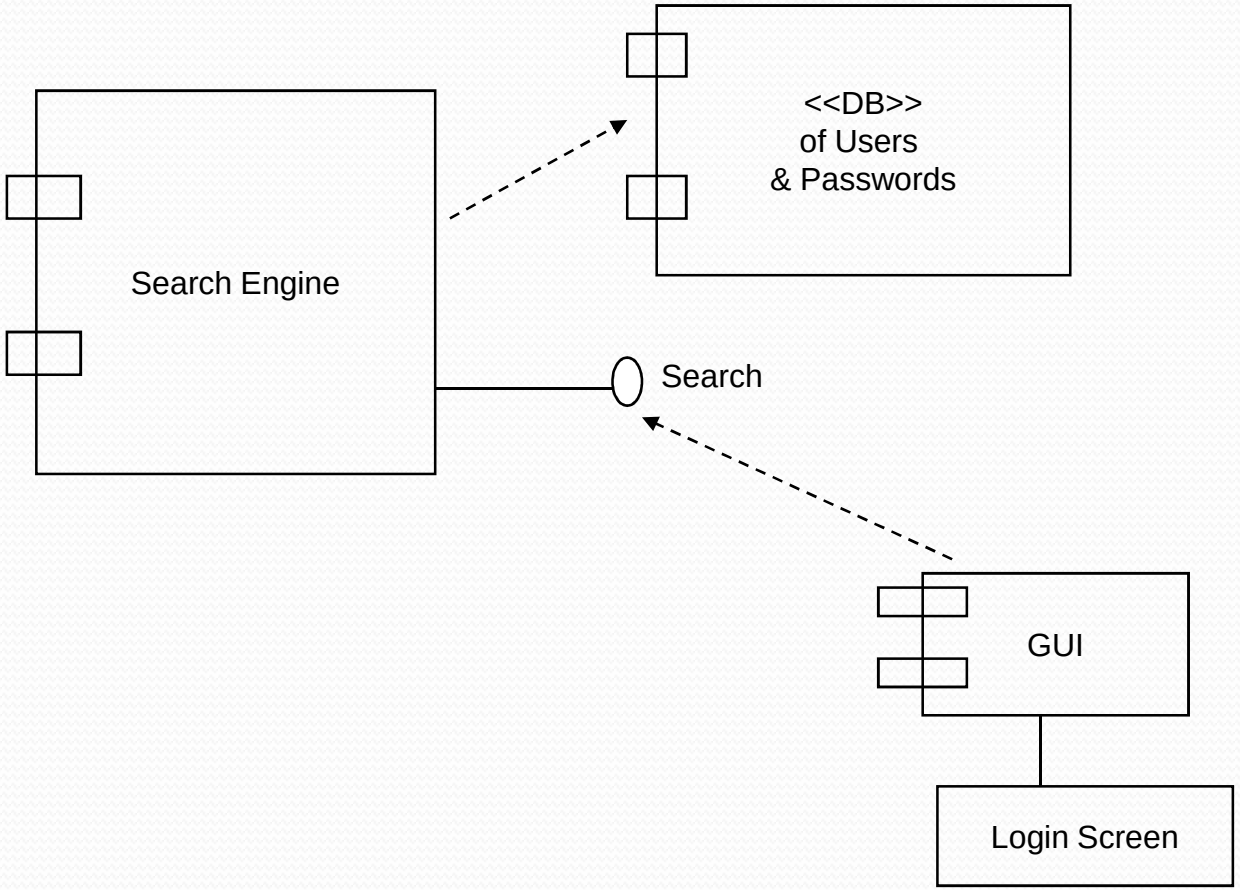


- Order Processing



UML Diagrams: Component Diagrams

- Depicts the components, their interfaces and interrelationships



UML Diagrams: Deployment Diagrams

- Shows the execution architecture of the application