

Interaction and Class Design: Introduction

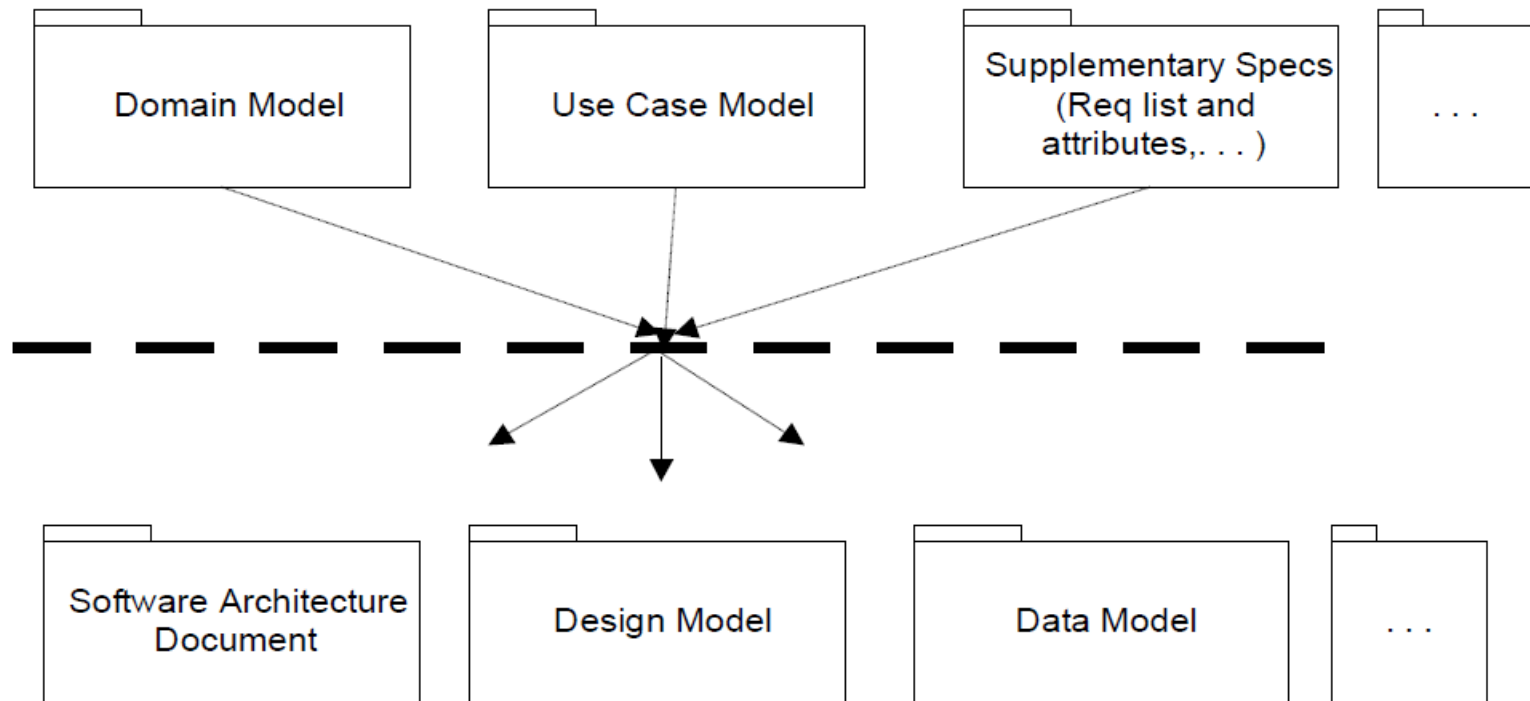
COMP 3700.002
Software Modeling and Design

Shehenaz Shaik

Transition to Design

- During requirements and analysis work, we
 - “Do the right thing”
 - Understand the domain
 - Clarify and record the constraints and requirements
 - Essentially ignore thinking about the design and focus on understanding the problem
- During design, we
 - “Do the thing right”
 - Create a software (and hardware) solution that meets the wishes of the stakeholders
- Iterative approach

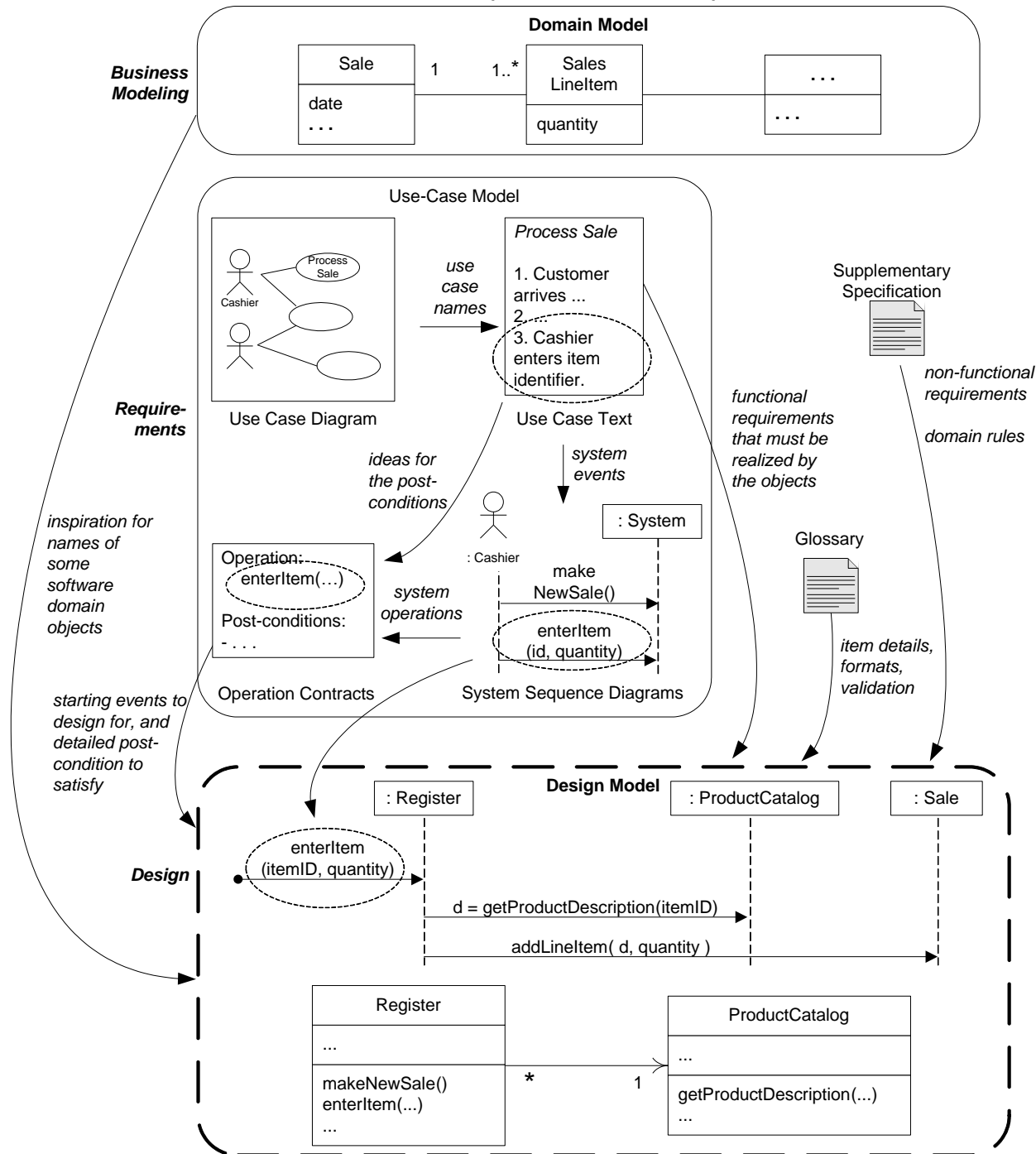
From Requirements to Design



OO Design

- Example...

Sample UP Artifact Relationships



OO Design

- Responsibility Driven Design (RDD)
 - Doing
 - Knowing
- Design principles
 - GRASP
 - Gang of Four (GoF)

GRASP Principles

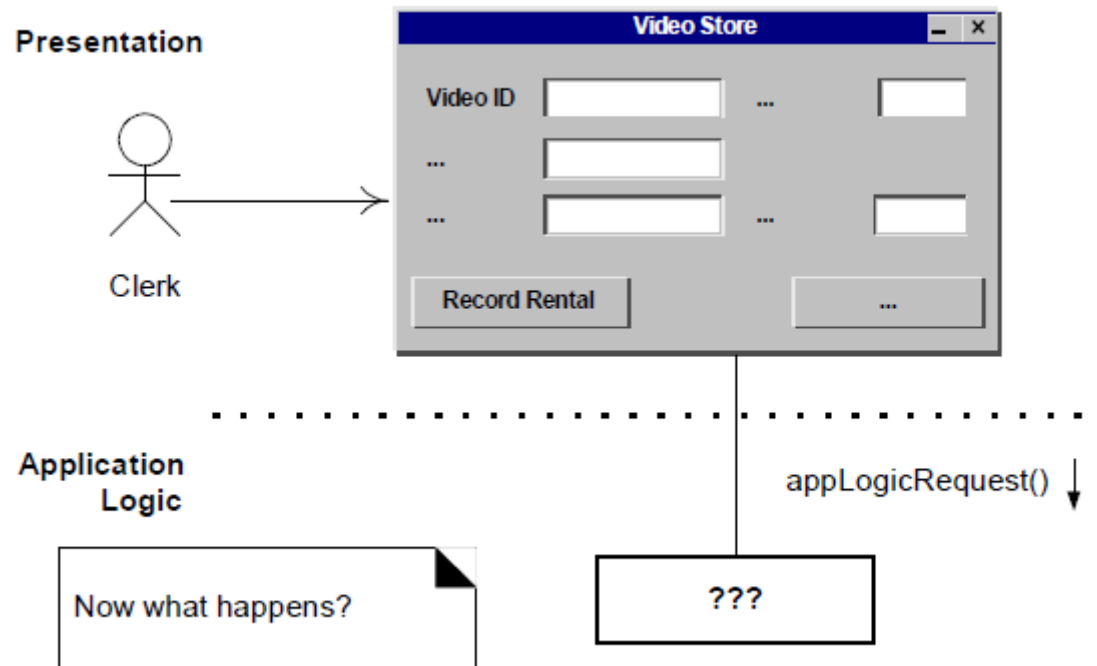
General Responsibility Assignment Software Patterns

1. Creator
2. Information Expert
3. Controller
4. Low Coupling
5. High Cohesion
6. Polymorphism
7. Pure Fabrication
8. Indirection
9. Protected Variations

GoF Patterns

1. Abstract Factory
2. Builder
3. Factory Method
4. Prototype
5. Singleton
6. Adapter
7. Bridge
8. Composite
9. Decorator
10. Facade
11. Flyweight
12. Proxy
13. Chain of Responsibility
14. Command
15. Interpreter
16. Iterator
17. Mediator
18. Memento
19. Observer
20. State
21. Strategy
22. Template Method
23. Visitor

Responsibility Driven Design



- What next?

Responsibility Driven Design (Contd.)

- Responsibility
 - Behavior of an object in terms of its role
 - Doing responsibilities
 - Doing something itself
 - Initiating action in other objects
 - Controlling and coordinating activities in other objects
 - Knowing responsibilities
 - Knowing about private encapsulated data
 - Knowing about related objects
 - Knowing about things it can derive or calculate
 - Assigned to classes of objects during object design

Responsibility Driven Design (Contd.)

- Responsibility
 - Not just a method
 - Methods fulfil responsibilities
- Collaboration
 - Methods act alone / collaborate
- UML Interaction diagram
 - Deciding on responsibility assignments
- UML Class diagram
 - Summarize assignments as methods

Next sessions...

- GRASP: Design Principles

Reading assignment

- Reference Book
 - Applying UML and Patterns – An Introduction to Object-Oriented Analysis and Design and the Unified Process, Second Edition, Craig Larman, 2004
 - Chapter 17: GRASP: Designing Objects with Responsibilities: Pages 271-278.