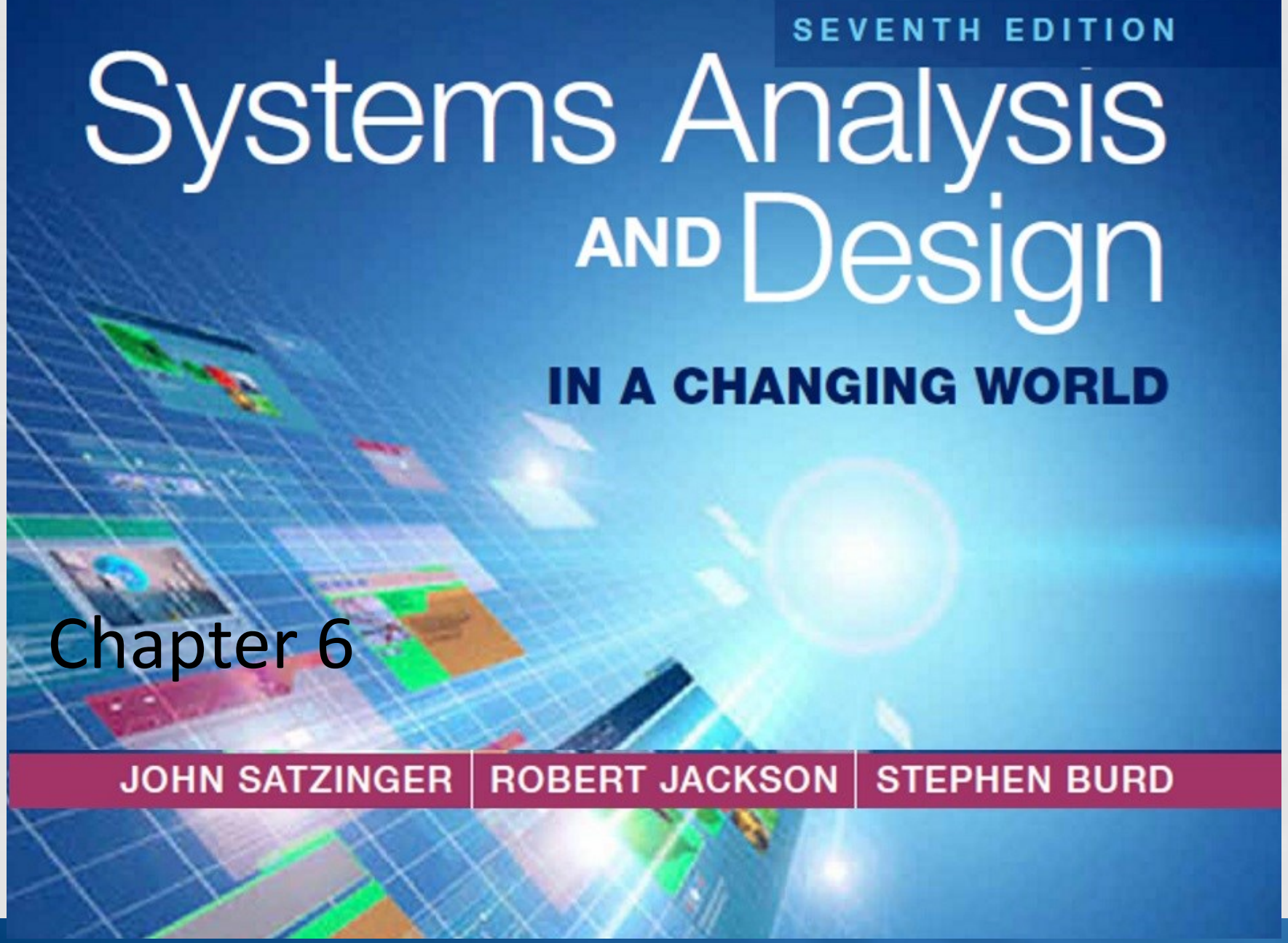


Foundations for Systems Design

Chapter 6

Systems Analysis and Design in a Changing World 7th Ed
Satzinger, Jackson & Burd

Chapter 6: Outline

- What Is Systems Design?
- Design Activities
- System Controls and Security

Learning Objectives

- Describe systems design and contrast it with systems analysis
- List the documents and models used as inputs to or output from systems design
- Explain each major design activity
- Describe security methods and controls

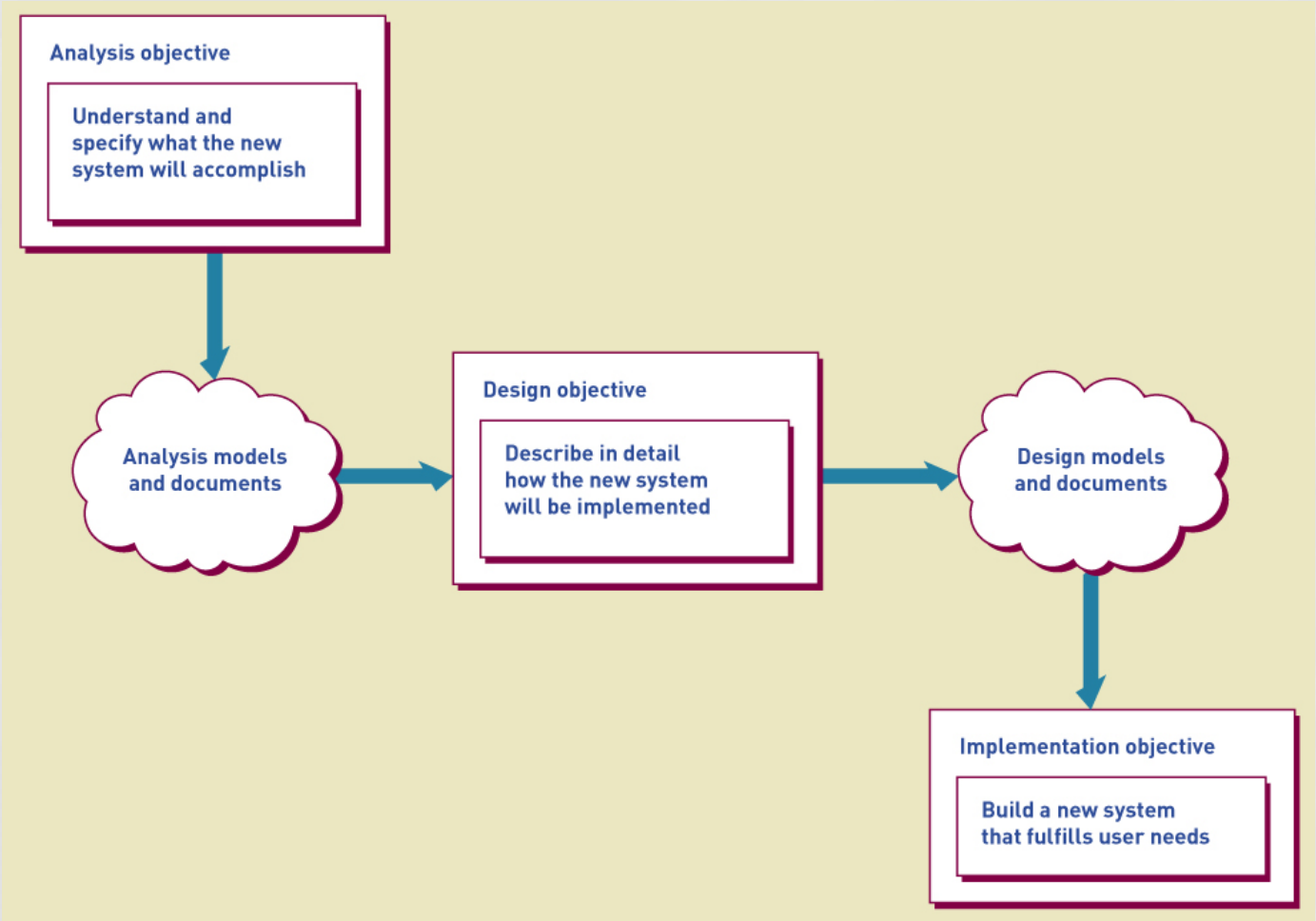
Overview

- Analysis says “what” is required and design tells us “how” the system will be configured and constructed
- Chapters 2, 3, 4 and 5 covered systems analysis activities (requirements)
- This chapter introduces system design and the design activities involved in systems development
- Design bridges the gap between requirements to actual implementation

What is Systems Design

- Analysis provides the starting point for design
- Design provides the starting point for implementation
- Analysis and design results are documented to coordinate the work
- Objective of design is to define, organize, and structure the components of the final solution to serve as a blue print for construction

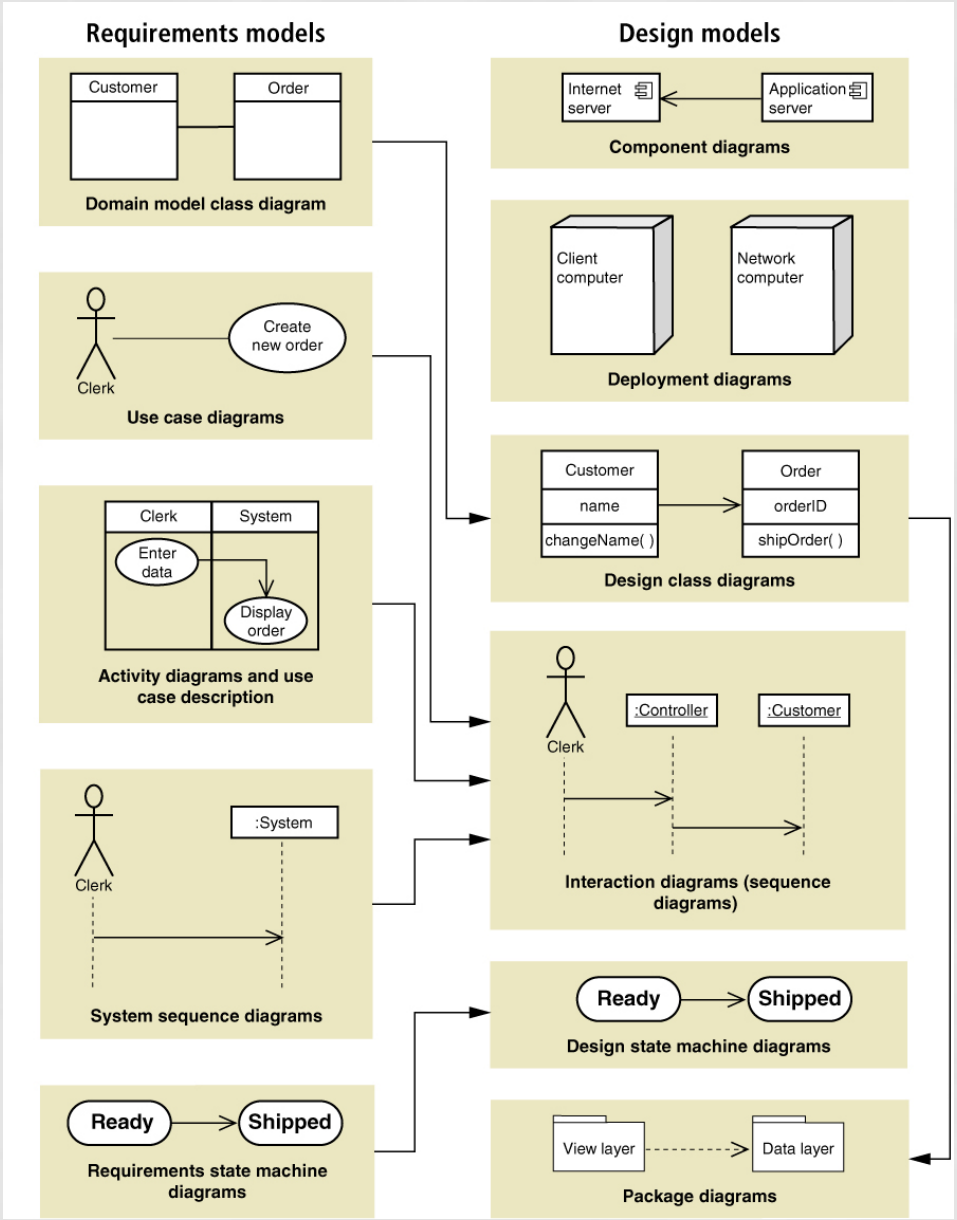
Analysis to Design to Implementation



Design Models

- Design is a model building activity
- The formality of the project will dictate the type, complexity, and depth of models
- Agile/iteration projects typically build fewer models, but models are still created
- Jumping to programming without design often causes less than optimum solutions and may require rework

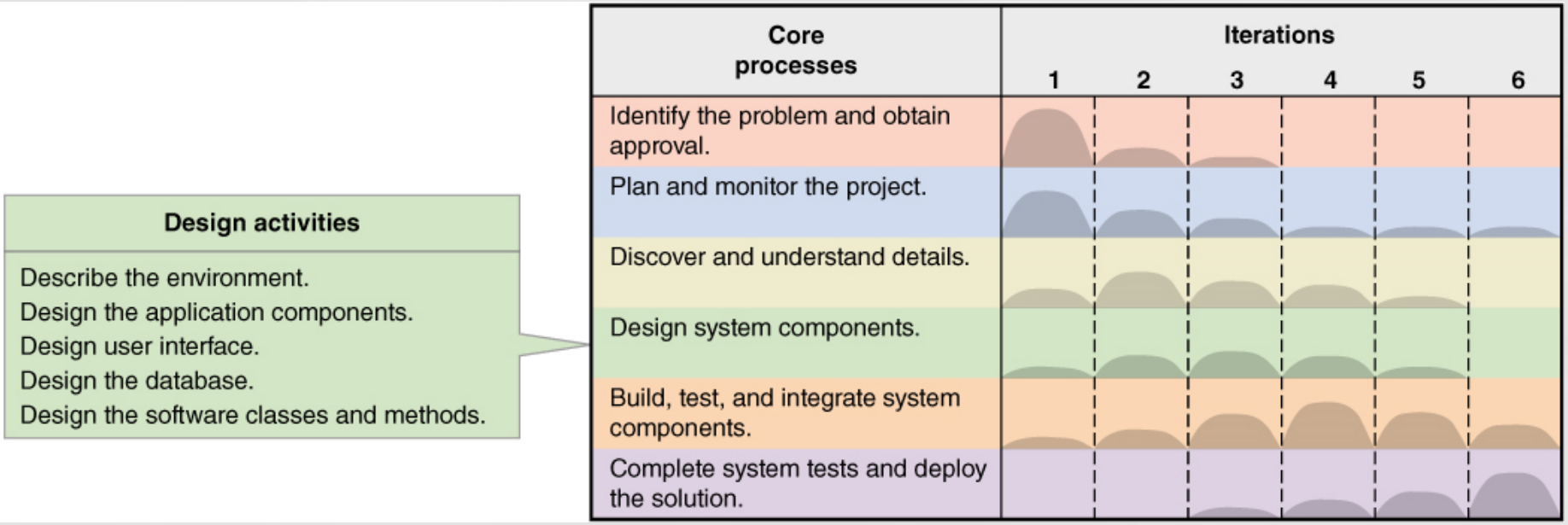
Analysis Models to Design Models



Design Activities

- Design activities correspond to components of the new system
  - The environment
  - Application components
  - User interface
  - Database
  - Software classes and methods

Design Activities and Iterations



Key Design Questions for each Activity

Design activity	Key question
Describe the environment	How will this system interact with other systems and with the organization's existing technologies?
Design the application components	What are the key parts of the information system and how will they interact when the system is deployed?
Design the user interface	How will users interact with the information system?
Design the datebase	How will data be captured, structured, and stored for later use by the information system?
Design the software classes and methods	What internal structure for each application component will ensure efficient construction, rapid deployment, and reliable operation?

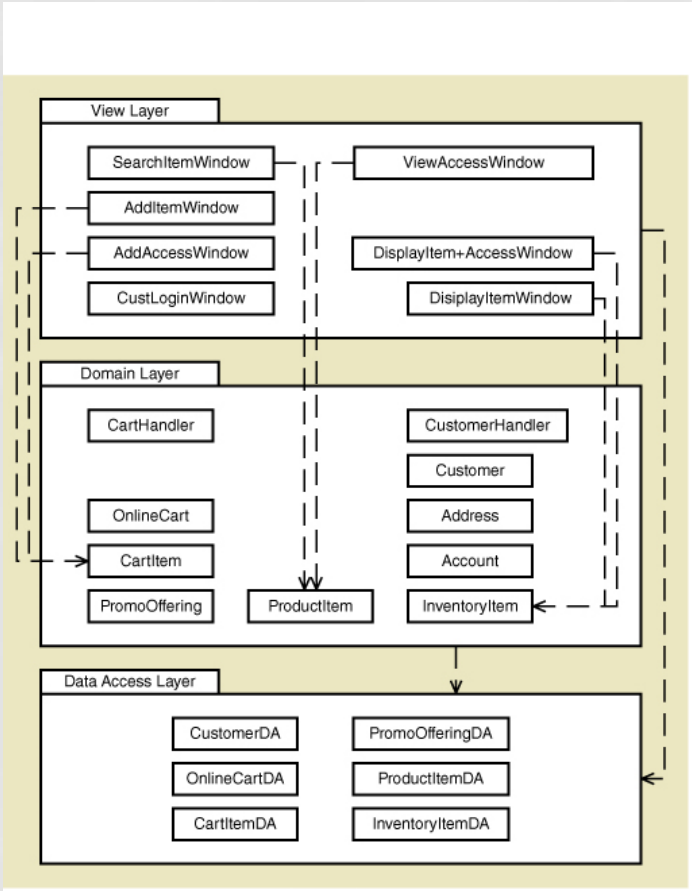
Describe the Environment

- Two key elements in the environment
  - Communications with External Systems
    - Message formats
    - Web and networks
    - Communication protocols
    - Security methods
    - Error detection and recovery
  - Conforming to an existing Technology Architecture
    - Discover and describe existing architecture
    - Chapter 7 provides more details

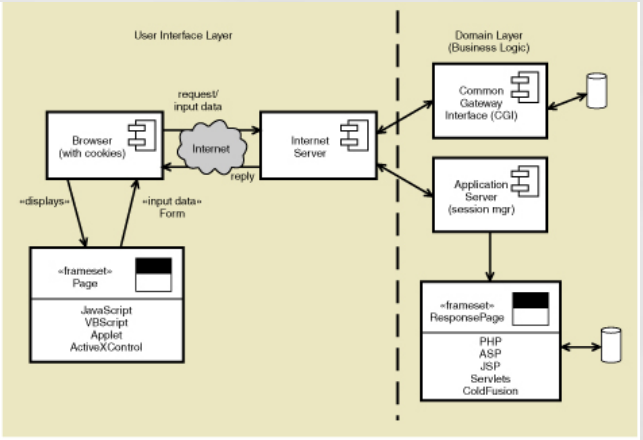
Design the Application Components

- Application component is a well defined unit of software that performs some function(s)
- Issues involve how to package components including
  - Scope and size – what are the functions, boundaries, interfaces?
  - Programming language – what are the accepted languages?
  - Build or buy – is an acceptable version available to purchase?

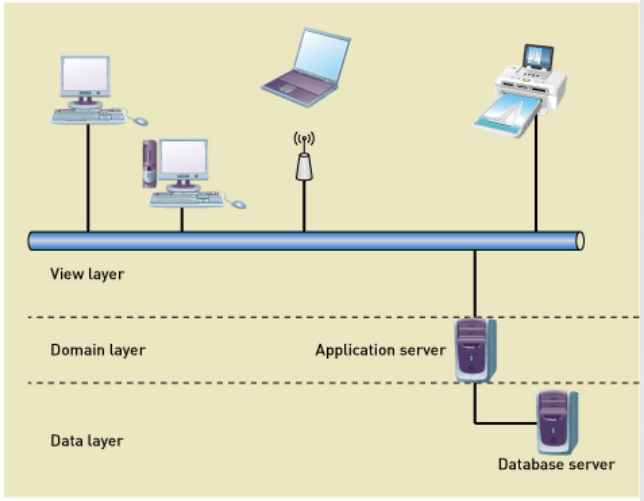
Typical models for defining application components



Package diagram



Component diagram

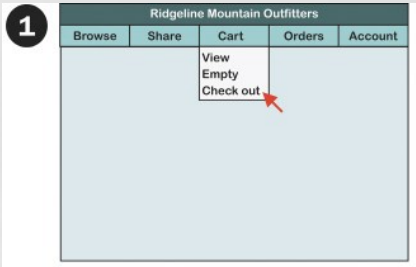


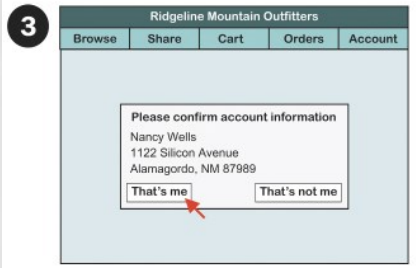
Deployment diagram

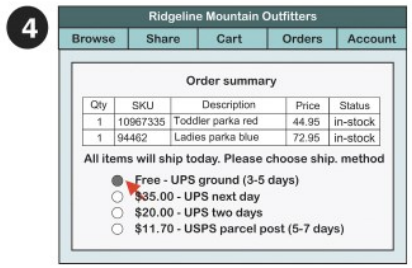
Design the User Interface

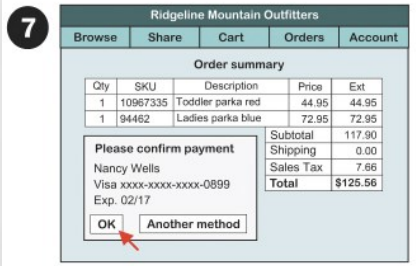
- To the user, the User Interface **is** the system.
- The user interface has large impact of user productivity
- Includes both Analysis and Design tasks
  - Requires heavy user involvement
- Current needs require multiple user interfaces
  - Many different devices and environments

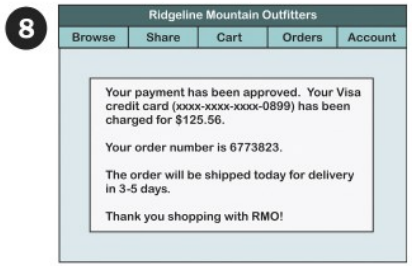
Typical models for user interface design



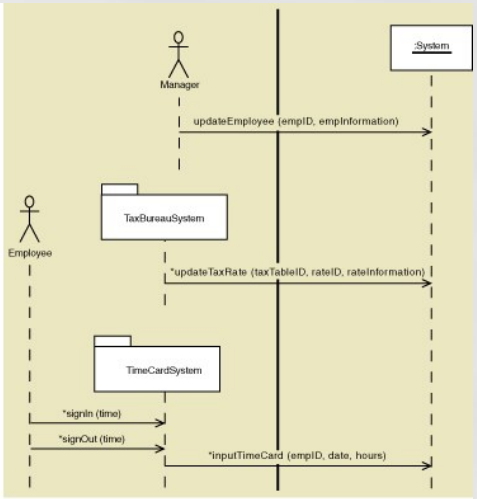




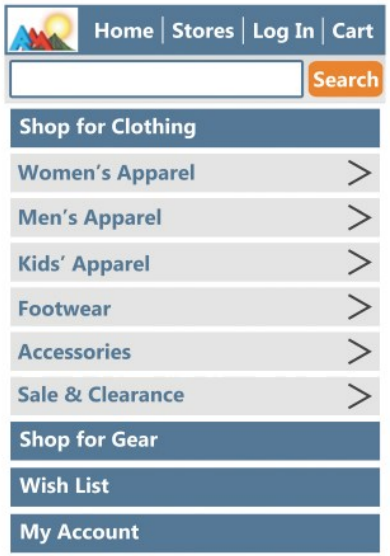




Storyboard



System sequence diagram

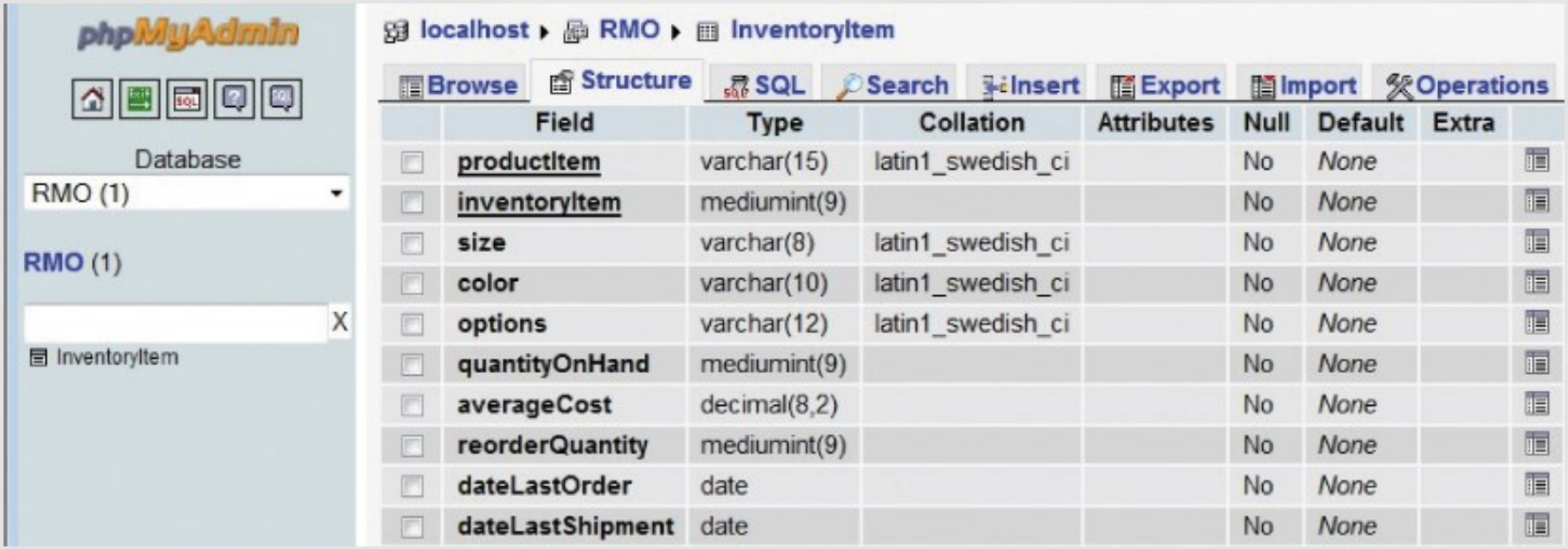


Small screen menu prototype

Design the Database

- By definition, an Information System requires data – usually in a database
- Current technology frequently use Relational Database Management Systems (RDBMS)
- Requires converting the data model to a relational database
- Requires addressing of many other technical issues
  - Throughput and response time
  - Security

Typical Table Definition as part of Database Schema

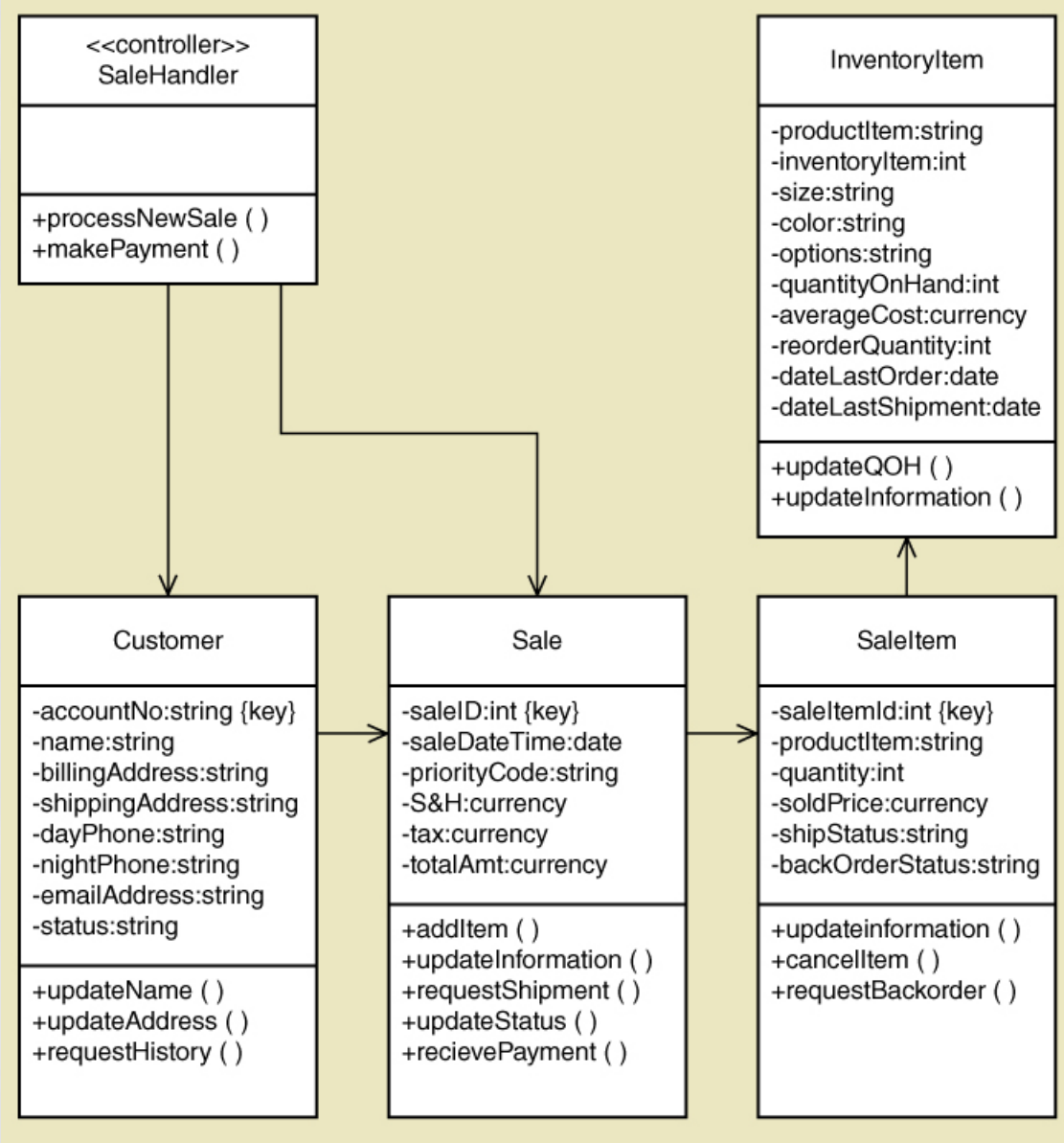


	Field	Type	Collation	Attributes	Null	Default	Extra	
☐	productItem	varchar(15)	latin1_swedish_ci		No	None		
☐	inventoryItem	mediumint(9)			No	None		
☐	size	varchar(8)	latin1_swedish_ci		No	None		
☐	color	varchar(10)	latin1_swedish_ci		No	None		
☐	options	varchar(12)	latin1_swedish_ci		No	None		
☐	quantityOnHand	mediumint(9)			No	None		
☐	averageCost	decimal(8,2)			No	None		
☐	reorderQuantity	mediumint(9)			No	None		
☐	dateLastOrder	date			No	None		
☐	dateLastShipment	date			No	None		

Design Software Classes and Methods

- AKA Detailed Design
- A model building activity
  - Design Class Diagram
  - Sequence Diagrams
  - State-Machine Diagrams

Typical Design Class Diagram with attributes and methods



Summary (1 of 3)

- This chapter introduces the concept of Systems Design
  - Analysis is fact finding and modeling
  - Design is modeling to specify how system will be implemented
  - Design is bridge between analysis an implementation

Summary (2 of 3)

- Activities of Systems Design
  - Describe the environment
  - Design the application components
  - Design the User Interface
  - Design the database
  - Design the software classes and methods