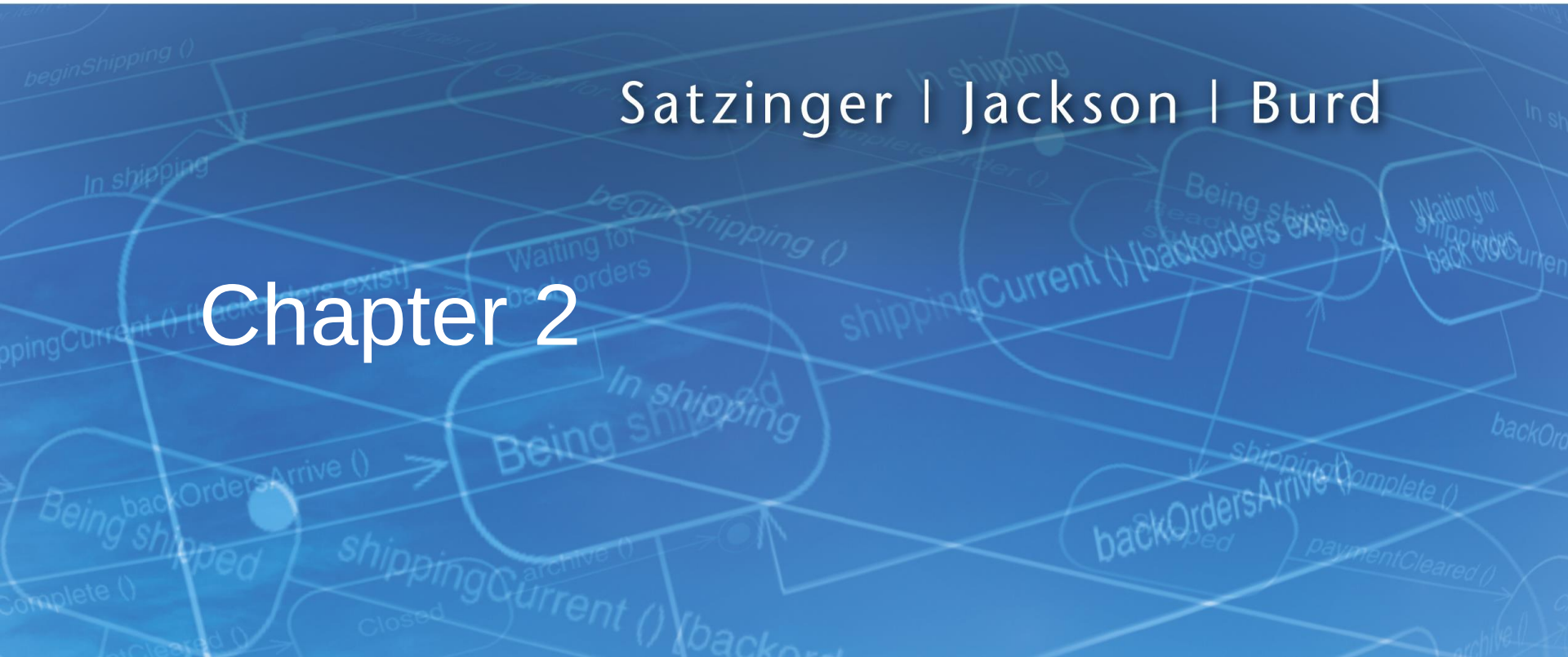
SYSTEMS ANALYSIS AND DESIGN IN A CHANGING WORLD

Satzinger | Jackson | Burd



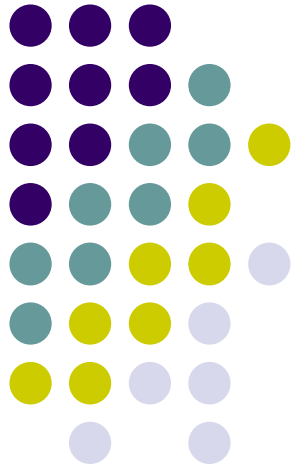
Chapter 2

Investigating System Requirements

Chapter 2

Systems Analysis and Design in a Changing World 6th Ed

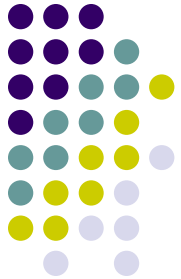
Satzinger, Jackson & Burd



Chapter 2 Outline

- The RMO Consolidated Sales and Marketing System Project
- Systems Analysis Activities
- What Are Requirements?
- Models and Modeling
- Stakeholders
- Information-Gathering Techniques
- Documenting Workflows with Activity Diagrams

Learning Objectives

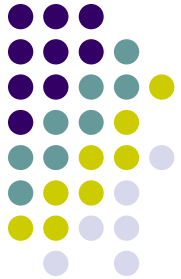


- Describe the activities of systems analysis
- Explain the difference between functional and nonfunctional requirements
- Describe the role of models in systems analysis
- Identify and understand different kinds of stakeholders and their contributions to requirements definition
- Describe information-gathering techniques and determine when each is best applied
- Develop activity diagrams to model workflows

Overview

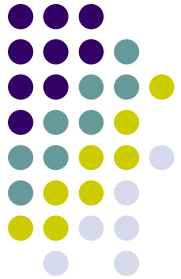
- Chapter 1 introduced the system development lifecycle (SDLC) and demonstrated its use for a small project
- This chapter expands the SDLC processes to cover a wider range of concepts, tools and techniques
- Core process 3: Discover and understand the details of the problem or need—is the main focus of systems analysis
- Systems analysis activities are detailed in this chapter
- A larger Ridgeline Mountain Outfitters (RMO) project is introduced that will be used throughout the text to illustrate analysis and design

Ridgeline Mountain Outfitters (RMO)



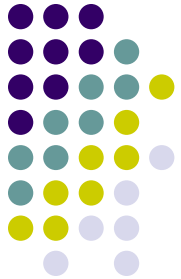
- RMO has an elaborate set of information systems that support operations and management
- Customer expectations, modern technological capabilities, and competitive pressures led RMO to believe it is time to upgrade support for sales and marketing
- A new Consolidated Sales and Marketing System was proposed
- This is a major project that grew out of the RMO strategic planning process

Ridgeline Mountain Outfitters (RMO)



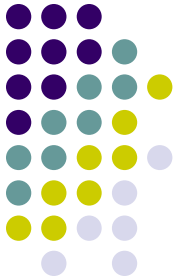
- Strategic planning and competitive advantage for organizations involves leveraging information systems
- The **information systems strategic plan** is based on the overall strategic needs of the organization
- The information systems strategic plan includes definition of the **technology architecture** and the **application architecture** needed by the organization

Information Systems Strategic Plan



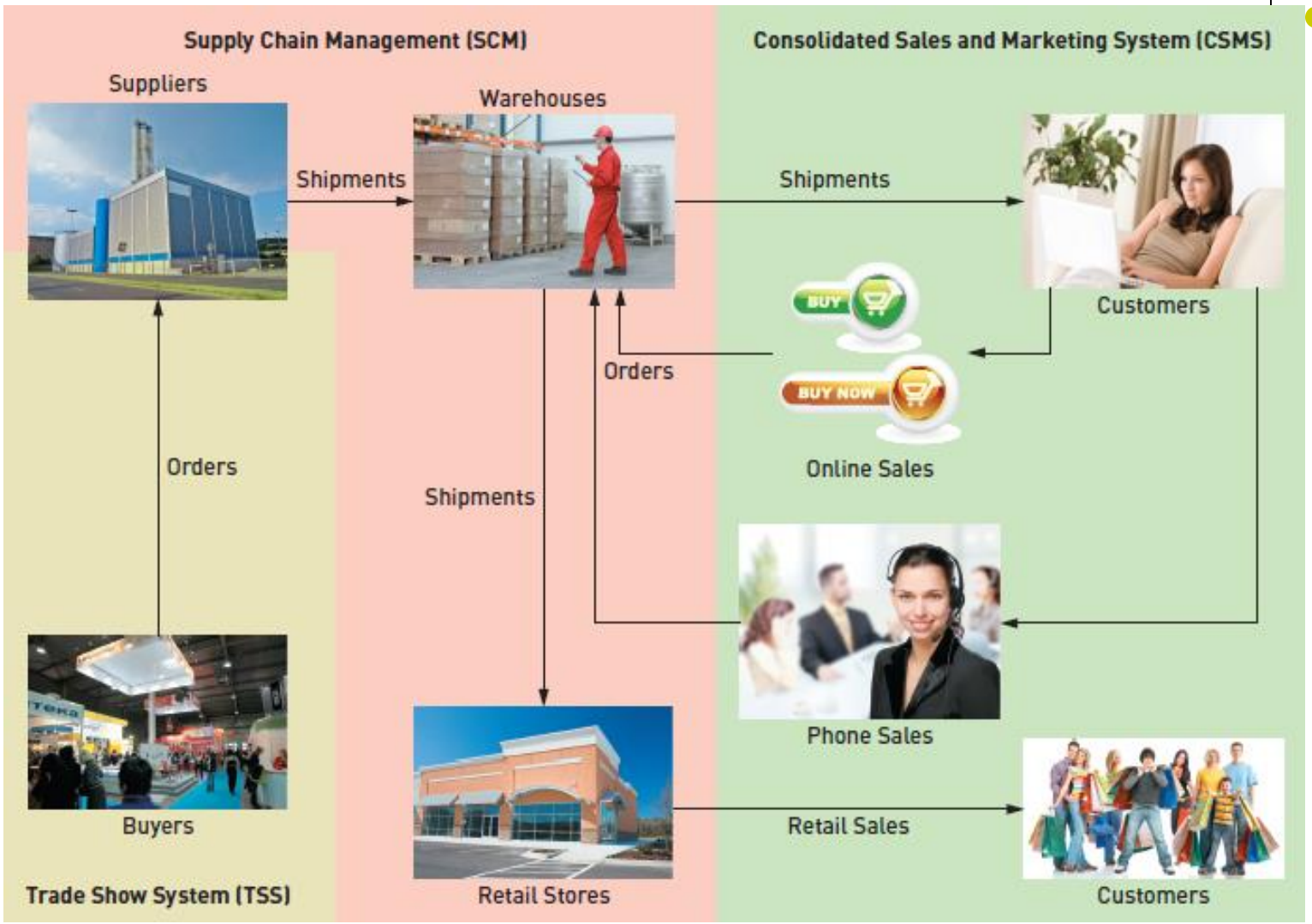
- **Technology architecture**— the set of computing hardware, network hardware and topology, and system software employed by the organization
- **Application architecture—**the information systems that supports the organization (information systems, subsystems, and supporting technology)

RMO Existing Application Architecture

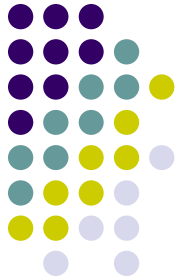


- Supply Chain Management (SCM)
  - 5 years old; Java/Oracle
  - Tradeshow system will interface with SCM
- Phone/Mail Order System
  - 12 years old; Visual Studio/MS SQL
  - Reached capacity; minimal integration
- Retail Store System
  - Older package solution; minimal integration
- Customer Support System (CSS)
  - Web based system; evolved over the years, minimal integration

Proposed Application Architecture: Integrate SCM and New CSMS



New Consolidated Sales and Marketing System (CSMS)

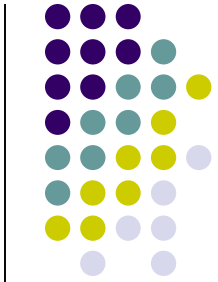


- Sales Subsystem
  - Integrates online, phone, and retail stores
- Order Fulfillment Subsystem
  - Track shipments, rate products and services
- Customer Account Subsystem
  - Shopping history, linkups, “mountain bucks” rewards
- Marketing Subsystem
  - Promotional packages, partner relationships, more complete merchandise information and reporting

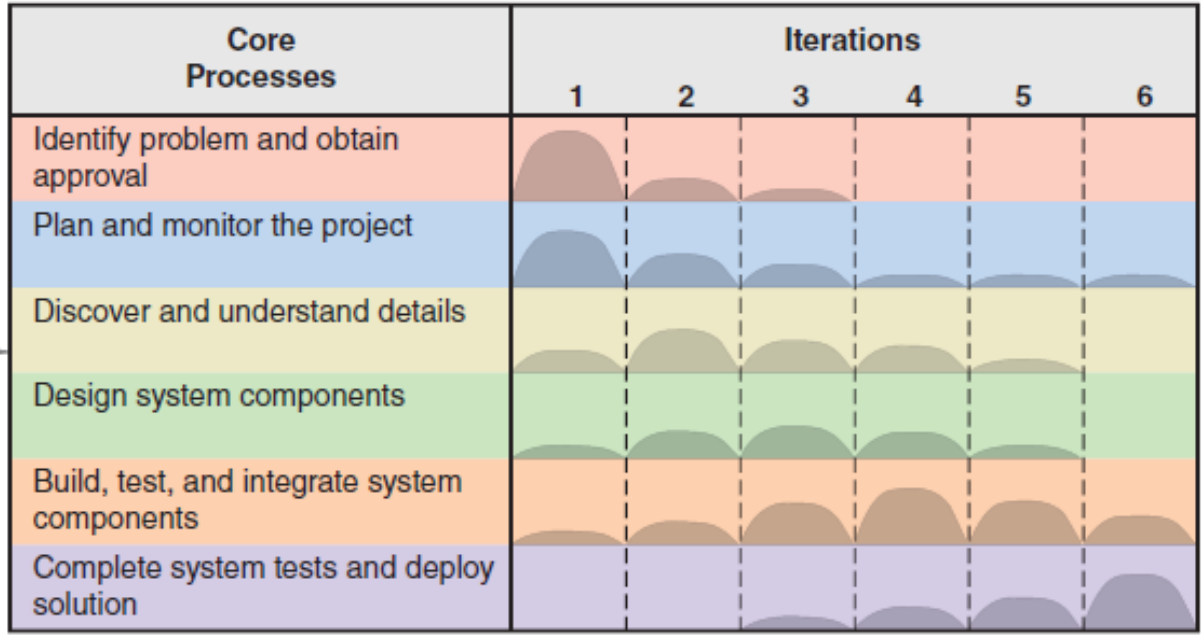
Systems Analysis Activities

- The New Consolidated Sales and Marketing System (CSMS) will require discovering and understanding extensive and complex business processes and business rules
- The SDLC indicates the project starts with identifying the problem, obtaining approval, and planning the project (as seen in Chapter 1)
- To get to the heart of systems analysis, this text skips right to analysis activities generally and the specifically for the RMO CSMS project
- Project planning and project management are covered I detail later in the text

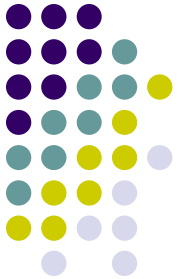
Systems Analysis Activities
Involve discovery and understanding



Analysis activities
Gather detailed information
Define requirements
Prioritize requirements
Develop user-interface dialogs
Evaluate requirements with users



Systems Analysis Activities

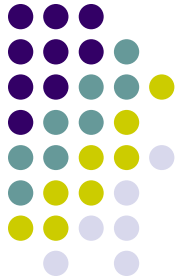


- Gather Detailed Information
  - Interviews, questionnaires, documents, observing business processes, researching vendors, comments and suggestions
- Define Requirements
  - Modeling functional requirements and non-functional requirements
- Prioritize Requirements
  - Essential, important, vs. nice to have
- Develop User-Interface Dialogs
  - Flow of interaction between user and system
- Evaluate Requirements with Users
  - User involvement, feedback, adapt to changes

What Are Requirements?

- System Requirements =
  - Functional requirements
  - Non-functional requirements
- Functional Requirements– the activities the system must perform
  - Business uses, functions the users carry out
  - Use cases in Chapter 1
- Non-Functional Requirements– other system characteristics
  - Constraints and performance goals

FURPS+ Requirements Acronym



- Functional requirements
- Usability requirements
- Reliability requirements
- Performance requirements
- Security requirements
- + even more categories…

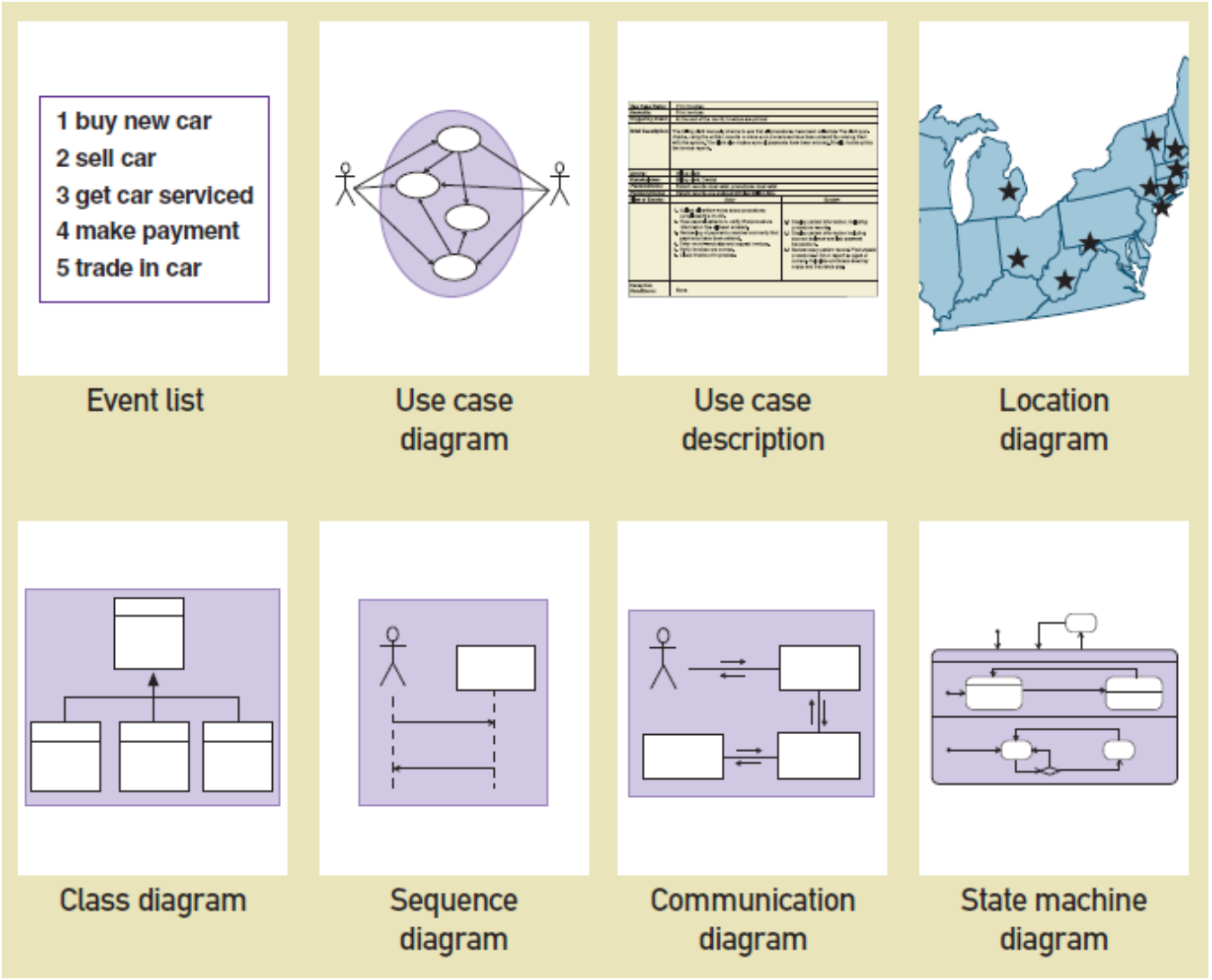
FURPS+ Requirements Acronym

Requirement categories	FURPS + categories	Example requirements
Functional	Functions	Business rules and processes
Nonfunctional	Usability	User interface, ease of use
	Reliability	Failure rate, recovery methods
	Performance	Response time, throughput
	Security	Access controls, encryption
	+ Design constraints	Hardware and support software
	Implementation	Development tools, protocols
	Interface	Data interchange formats
	Physical	Size, weight, power consumption
	Support	Installation and updates

Models and Modeling

- How do we define requirements? After collecting information, create models
- Model– a representation of some aspect of the system being built
- Types of Models
  - Textual model– something written down, described
  - Graphical models– diagram, schematic
  - Mathematical models– formulas, statistics, algorithms
- Unified Modeling Language (UML)
  - Standard graphical modeling symbols/terminology used for information systems

Some Analysis and Design Models

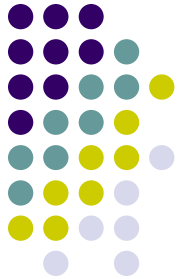


Reasons for Modeling

- Learning from the modeling process
- Reducing complexity by abstraction
- Remembering all the details
- Communicating with other development team members
- Communicating with a variety of users and stakeholders
- Documenting what was done for future maintenance/enhancement

Stakeholders

Who do you involve and talk to?

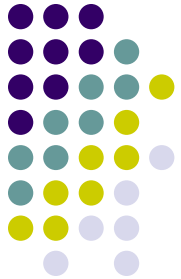


- **Stakeholders**– persons who have an interest in the successful implementation of the system
- **Internal Stakeholders**– persons within the organization
- **External stakeholders** – persons outside the organization
- **Operational stakeholders** – persons who regularly interact with the system
- **Executive stakeholders**– persons who don't directly interact, but use the information or have financial interest

Stakeholders of a comprehensive accounting system for public company

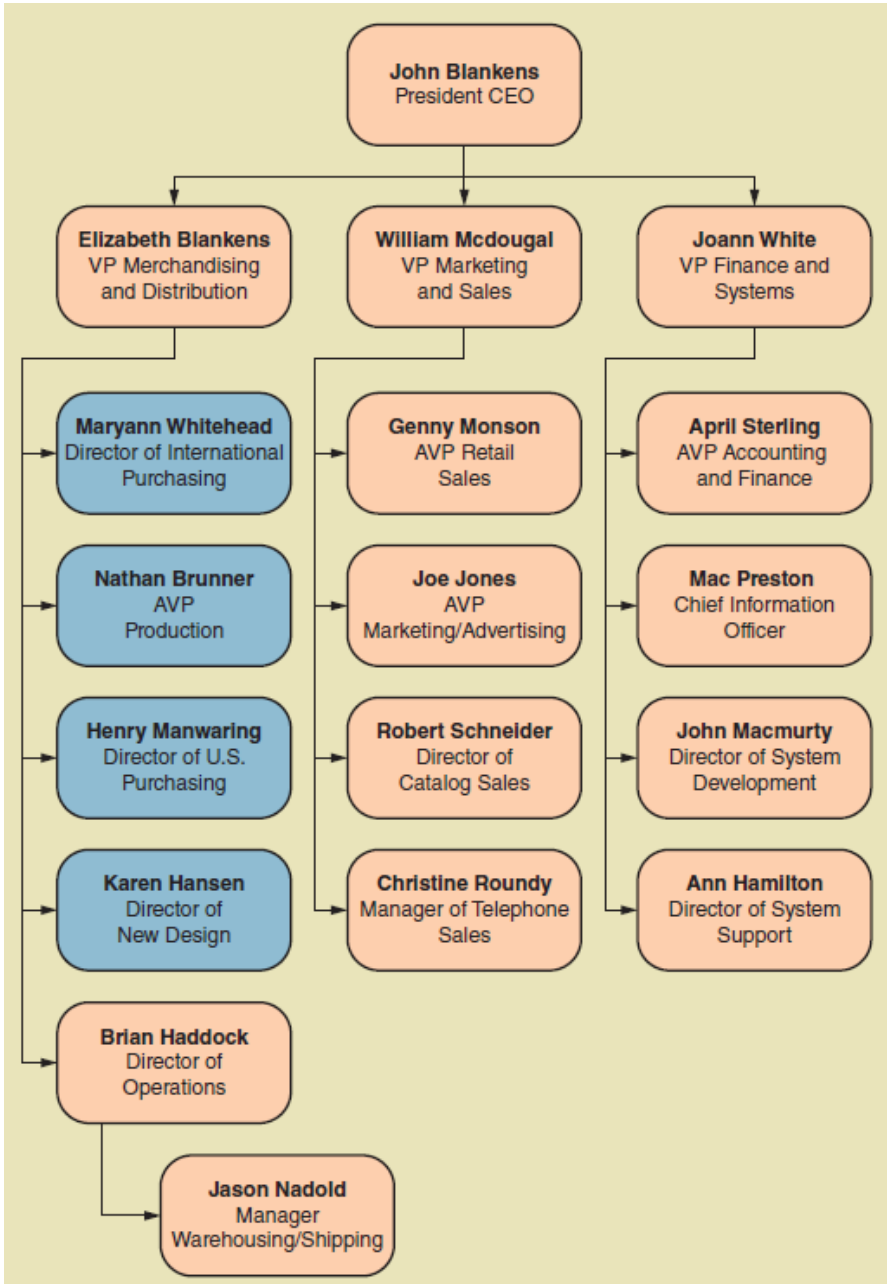
Stakeholders

For RMO CSMS Project

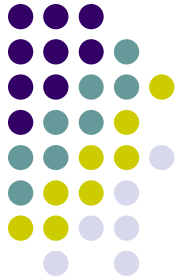


- Phone/mail sales order clerks
- Warehouse and shipping personnel
- Marketing personnel who maintain online catalog information
- Marketing, sales, accounting, and financial managers
- Senior executives
- Customers
- External shippers (e.g., UPS and FedEx)

RMO Internal Stakeholders

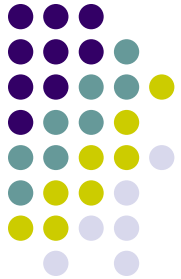


Information Gathering Techniques



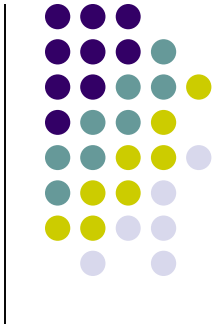
- Interviewing users and other stakeholders
- Distributing and collecting questionnaires
- Reviewing inputs, outputs, and documentation
- Observing and documenting business procedures
- Researching vendor solutions
- Collecting active user comments and suggestions

Interviewing Users and Other Stakeholders



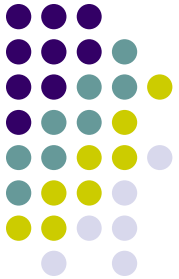
- Prepare detailed questions
- Meet with individuals or groups of users
- Obtain and discuss answers to the questions
- Document the answers
- Follow up as needed in future meetings or interviews

Themes for Information Gathering Questions



Theme	Questions to users
What are the business operations and processes?	What do you do?
How should those operations be performed?	How do you do it? What steps do you follow? How could they be done differently?
What information is needed to perform those operations?	What information do you use? What inputs do you use? What outputs do you produce?

Preparing for Interview



Checklist for Conducting an Interview

Before

- ☐ Establish the objective for the interview.
- ☐ Determine correct user(s) to be involved.
- ☐ Determine project team members to participate.
- ☐ Build a list of questions and issues to be discussed.
- ☐ Review related documents and materials.
- ☐ Set the time and location.
- ☐ Inform all participants of objective, time, and locations.

During

- ☐ Arrive on time.
- ☐ Look for exception and error conditions.
- ☐ Probe for details.
- ☐ Take thorough notes.
- ☐ Identify and document unanswered items or open questions.

After

- ☐ Review notes for accuracy, completeness, and understanding.
- ☐ Transfer information to appropriate models and documents.
- ☐ Identify areas needing further clarification.
- ☐ Thank the participants.
- ☐ Follow up on open and unanswered questions.

Interview Session Agenda

Discussion and Interview Agenda

Setting

Objective of Interview
Determine processing rules for sales commission rates

Date, Time, and Location
April 21, 2012, at 9:00 a.m. in William McDougal's office

User Participants (names and titles/positions)
William McDougal, vice president of marketing and sales, and several of his staff

Project Team Participants
Mary Ellen Green and Jim Williams

Interview/Discussion

1. *Who is eligible for sales commissions?*
2. *What is the basis for commissions? What rates are paid?*
3. *How is commission for returns handled?*
4. *Are there special incentives? Contests? Programs based on time?*
5. *Is there a variable scale for commissions? Are there quotas?*
6. *What are the exceptions?*

Follow-Up

Important decisions or answers to questions
See attached write-up on commission policies

Open items not resolved with assignments for solution
See Item numbers 2 and 3 on open items list

Date and time of next meeting or follow-up session
April 28, 2012, at 9:00 a.m.

Keeping an Open Items List

ID	Issue title	Date identified	Target end date	Responsible project person	User contact	Comments
1	Partial shipments	6-12-2012	7-15-2012	Jim Williams	Jason Nadold	Ship partials or wait for full shipment?
2	Returns and commissions	7-01-2012	9-01-2012	Jim Williams	William McDougal	Are commissions recouped on returns?
3	Extra commissions	7-01-2012	8-01-2012	Mary Ellen Green	William McDougal	How to handle commissions on special promotions?

Distribute and Collect Questionnaires

RMO Questionnaire

This questionnaire is being sent to all telephone-order sales personnel. As you know, RMO is developing a new customer support system for order taking and customer service.

The purpose of this questionnaire is to obtain preliminary information to assist in defining the requirements for the new system. Follow-up discussions will be held to permit everybody to elaborate on the system requirements.

Part I. Answer these questions based on a typical four-hour shift.

1. How many phone calls do you receive?_____
2. How many phone calls are necessary to place an order for a product?_____
3. How many phone calls are for information about RMO products, that is, questions only?_____
4. Estimate how many times during a shift customers request items that are out of stock._____
5. Of those out-of-stock requests, what percentage of the time does the customer desire to put the item on back order?_____%
6. How many times does a customer try to order from an expired catalog?_____
7. How many times does a customer cancel an order in the middle of the conversation?_____
8. How many times does an order get denied due to bad credit?_____

Part II. Circle the appropriate number on the scale from 1 to 7 based on how strongly you agree or disagree with the statement.

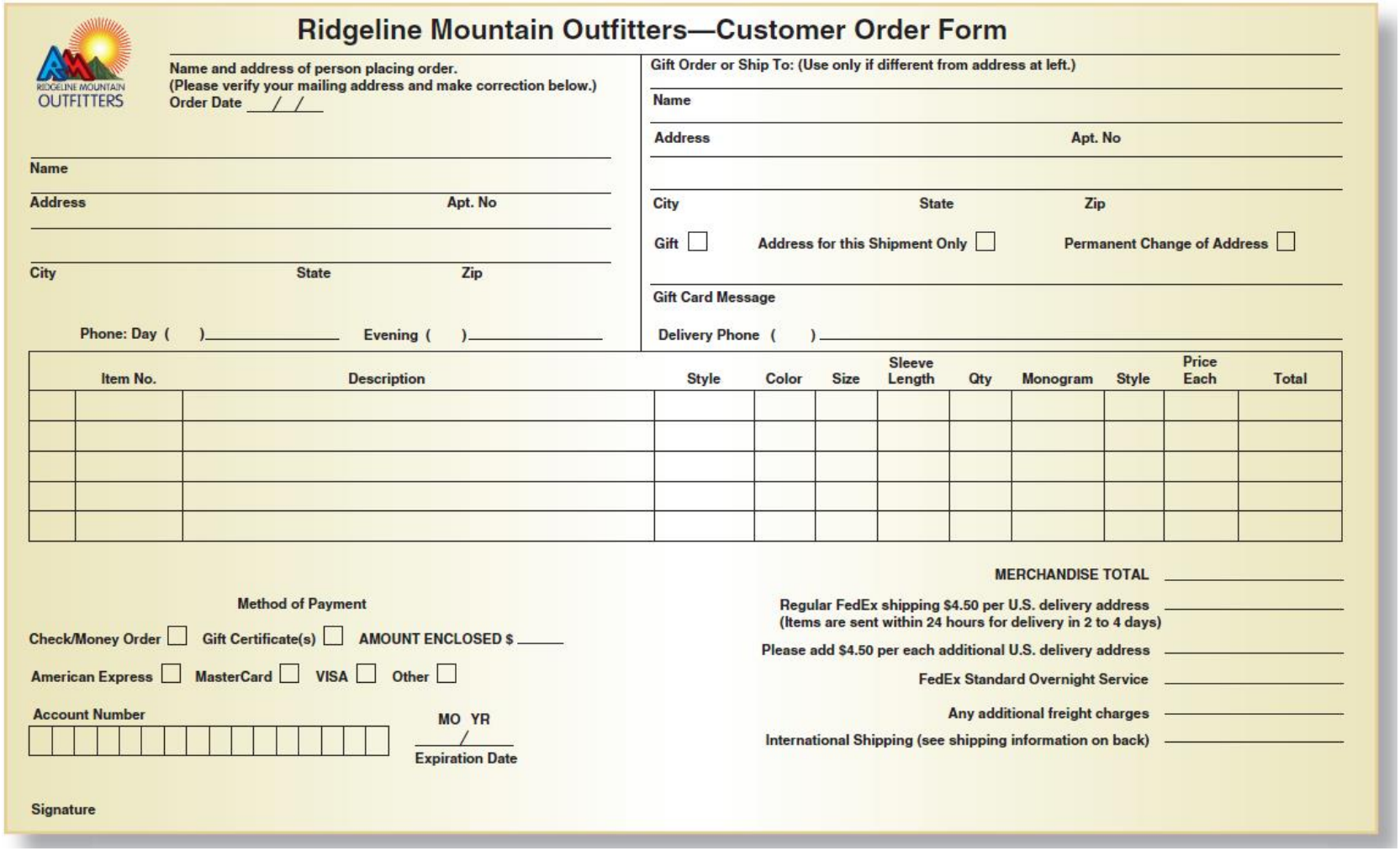
Question	Strongly Agree						Strongly Disagree
It would help me do my job better to have longer descriptions of products available while talking to a customer.	1	2	3	4	5	6	7
It would help me do my job better if I had the past purchase history of the customer available.	1	2	3	4	5	6	7
I could provide better service to the customer if I had information about accessories that were appropriate for the items ordered.	1	2	3	4	5	6	7
The computer response time is slow and causes difficulties in responding to customer requests.	1	2	3	4	5	6	7

Part III. Please enter your opinions and comments.

Please briefly identify the problems with the current system that you would like to see resolved in a new system.

_____
_____
_____

Review Inputs, Outputs, and Procedures



Ridgeline Mountain Outfitters—Customer Order Form

RIDGELINE MOUNTAIN OUTFITTERS

Name and address of person placing order.
(Please verify your mailing address and make correction below.)
Order Date ___/___/___

Name

Address Apt. No

City State Zip

Phone: Day ( )_____ Evening ( )_____

Gift Order or Ship To: (Use only if different from address at left.)

Name

Address Apt. No

City State Zip

Gift ☐ Address for this Shipment Only ☐ Permanent Change of Address ☐

Gift Card Message

Delivery Phone ( )_____

Item No.	Description	Style	Color	Size	Sleeve Length	Qty	Monogram	Style	Price Each	Total

MERCHANDISE TOTAL _____

Regular FedEx shipping $4.50 per U.S. delivery address _____
(Items are sent within 24 hours for delivery in 2 to 4 days)

Please add $4.50 per each additional U.S. delivery address _____

FedEx Standard Overnight Service _____

Any additional freight charges _____

International Shipping (see shipping information on back) _____

Method of Payment

Check/Money Order ☐ Gift Certificate(s) ☐ AMOUNT ENCLOSED $ _____

American Express ☐ MasterCard ☐ VISA ☐ Other ☐

Account Number

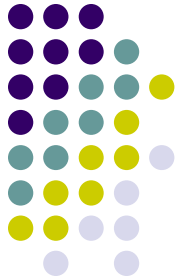
MO YR
___/___
Expiration Date

Signature

Additional Techniques

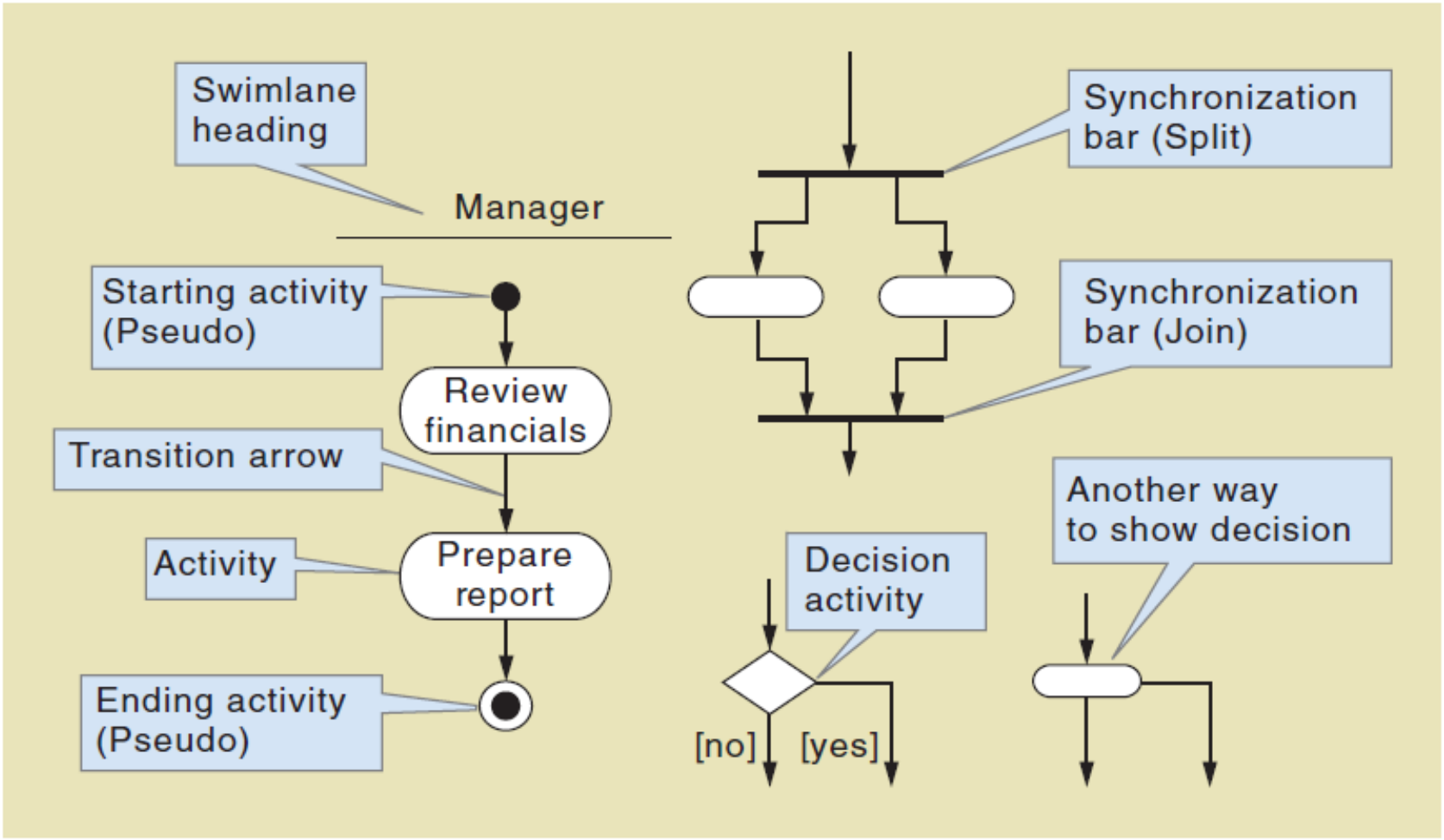
- Observe and Document Business Processes
  - Watch and learn
  - Document with Activity diagram (next section)
- Research Vendor Solutions
  - See what others have done for similar situations
  - White papers, vendor literature, competitors
- Collect Active User Comments and Suggestions
  - Feedback on models and tests
  - Users know it when the see it

Documenting Workflows with Activity Diagrams

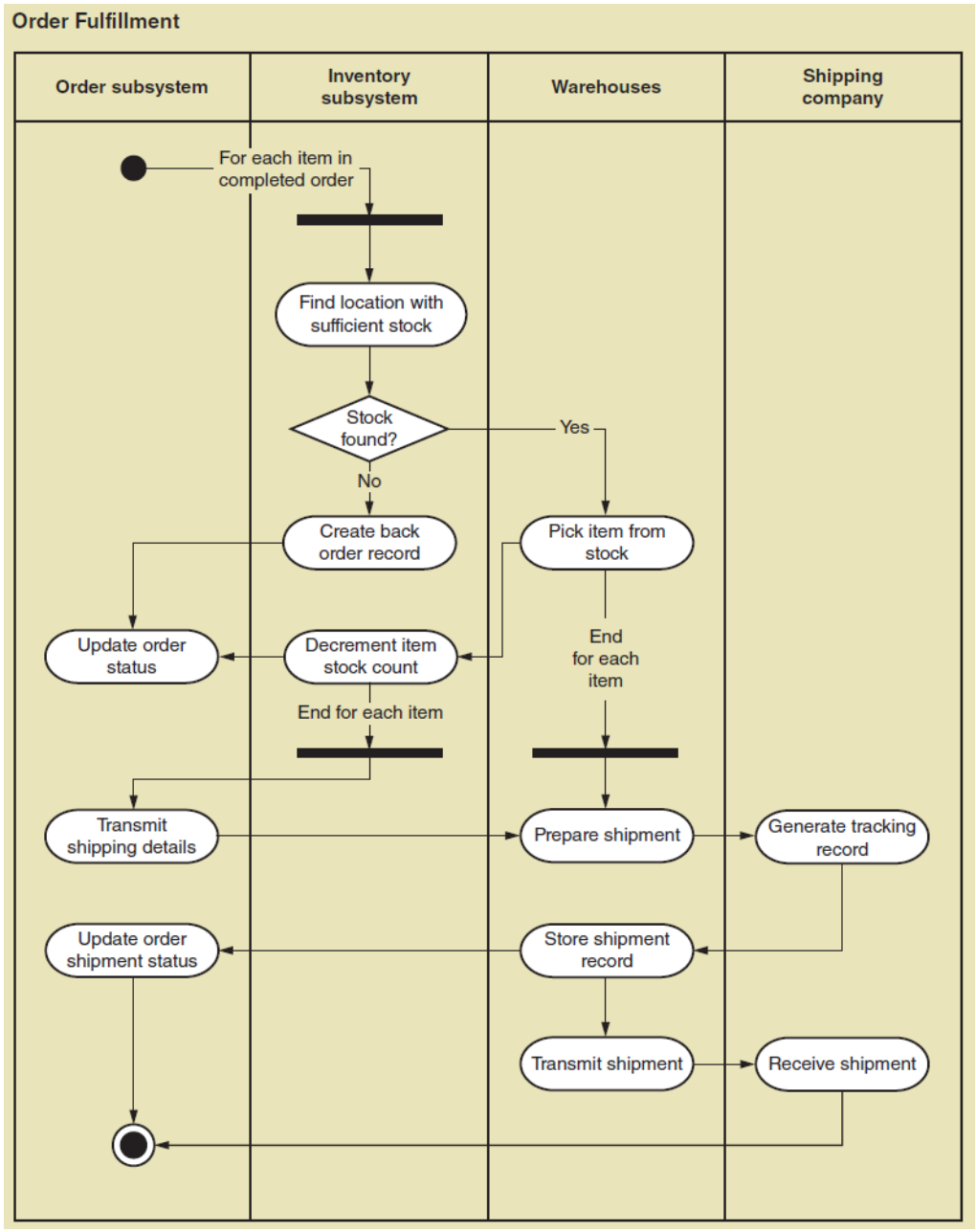


- Workflow– sequence of processing steps that completely handles one business transaction or customer request
- Activity Diagram– describes user (or system) activities, the person who does each activity, and the sequential flow of these activities
  - Useful for showing a graphical model of a workflow
  - A UML diagram

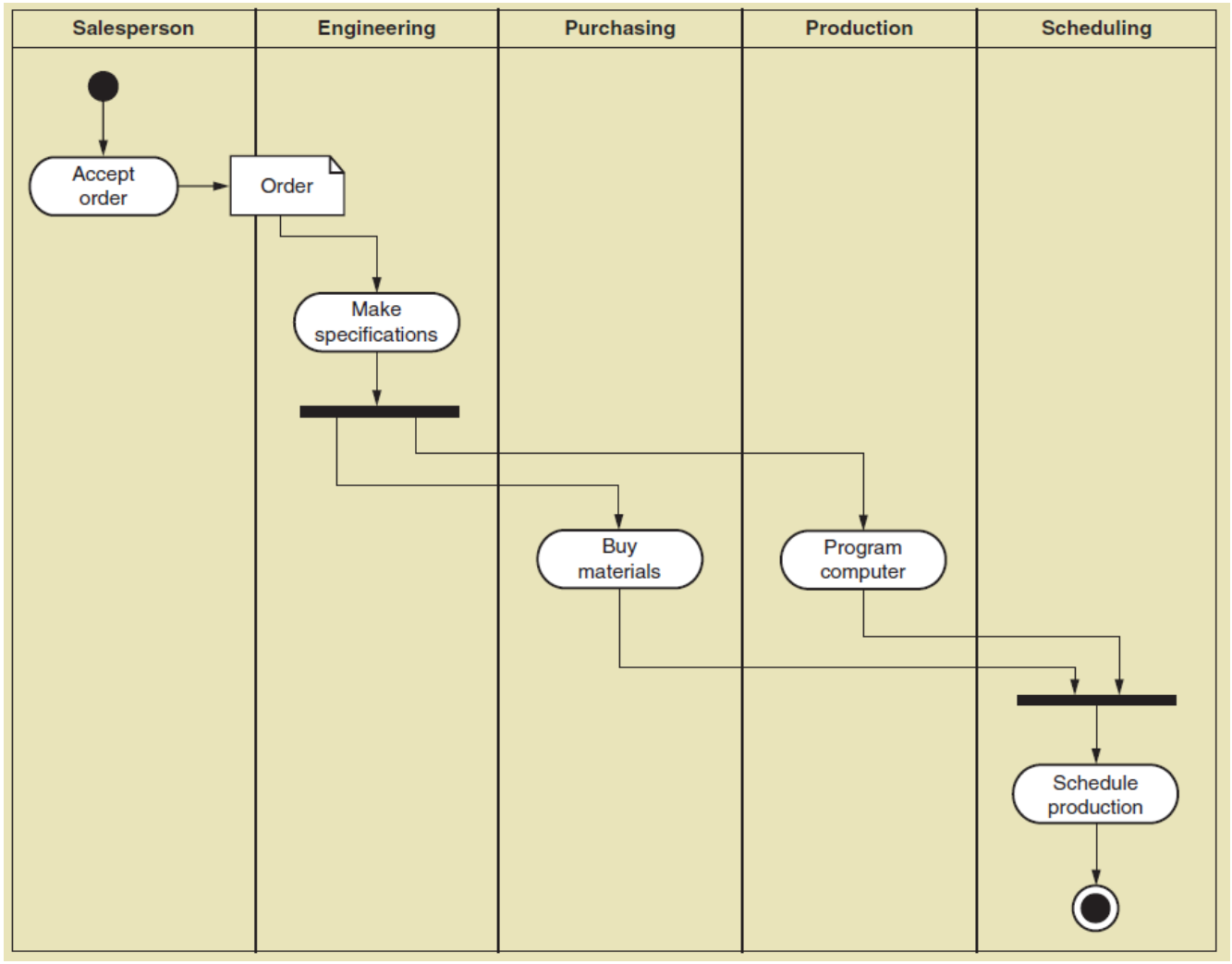
Activity Diagrams Symbols



Activity Diagram for RMO Order Fulfillment



Activity Diagram with Concurrent Paths



Summary

- Systems analysis activates correspond to the core SDLC process *Discover and understand details*
- System projects originate from the information system strategic plan, which contains an technology architecture plan and an application architecture plan
- The RMO CSMS Project will be used throughout the text as an example of analysis and design

Summary

- Systems analysis involves defining system requirements– functional and non-functional
- Analysis activities include
  - Gather detailed information
  - Define requirements
  - Prioritize requirements
  - Develop user-interface dialogs
  - Evaluate requirements with users
- FURPS+ is the acronym for functional, usability, reliability, performance, and security requirements

Summary

- Models and modeling are used to explore and document requirements
- A model represents some aspect of a system, and can include textual, graphical, and mathematical models
- Unified Modeling Language (UML) is the standard set of notations and terminology for information systems models

Summary

- Stakeholders are the people who have an interest in the success of the project
- There are internal vs. external stakeholders and operational vs. executive stakeholders
- Information gathering techniques are used to collect information about the project
  - Interviews, questionnaires, reviewing documents, observing business processes, researching vendors, comments and suggestions
- The UML Activity Diagram is used to document (model) workflows after collecting information