Modern Systems Analysis and Design

Seventh Edition

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Chapter 6

Determining System Requirements

Learning Objectives

- ✓ Describe options for designing and conducting interviews and develop a plan for conducting an interview to determine system requirements.
- ✓ Explain the advantages and pitfalls of observing workers and analyzing business documents to determine system requirements.
- ✓ Explain how computing can provide support for requirements determination.
- ✓ Participate in and help plan a Joint Application Design session.

Learning Objectives (Cont.)

- ✓ Use prototyping during requirements determination.
- ✓ Describe contemporary approaches to requirements determination.
- ✓ Understand how requirements determination techniques apply to the development of electronic commerce applications.

Performing Requirements Determination

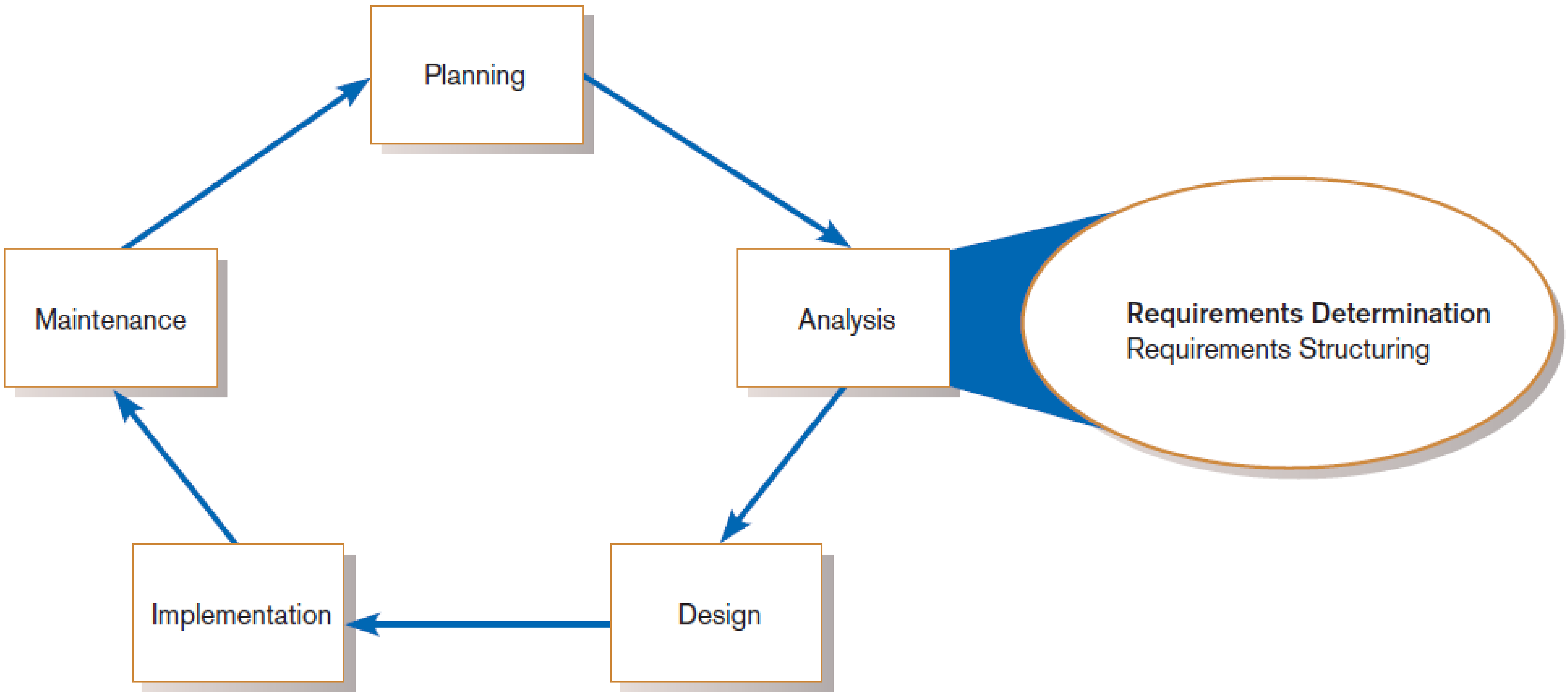

FIGURE 6-1
Systems development life cycle with analysis phase highlighted

The Process of Determining Requirements

- Good Systems Analyst Characteristics:
  - Impertinence—question everything
  - Impartiality—consider all issues to find the best organizational solution
  - Relax constraints—assume anything is possible
  - Attention to details—every fact must fit
  - Reframing—challenge yourself to new ways

Deliverables and Outcomes

- Deliverables for Requirements Determination:
  - From interviews and observations
    - interview transcripts, observation notes, meeting minutes
  - From existing written documents
    - mission and strategy statements, business forms, procedure manuals, job descriptions, training manuals, system documentation, flowcharts
  - From computerized sources
    - Joint Application Design session results, CASE repositories, reports from existing systems, displays and reports from system prototype

Traditional Methods for Determining Requirements

- Interviewing individuals
- Interviewing groups
- Observing workers
- Studying business documents

Interviewing and Listening

- One of the primary ways analysts gather information about an information systems project
- An **interview guide** is a document for developing, planning and conducting an interview.

Guidelines for Effective Interviewing

- Plan the interview.
  - Prepare interviewee: appointment, priming questions.
  - Prepare agenda, checklist, questions.
- Listen carefully and take notes (tape record if permitted).
- Review notes within 48 hours.
- Be neutral.
- Seek diverse views.

Interviewing and Listening (Cont.)

Interview Outline	
Interviewee: *Name of person being interviewed*	Interviewer: *Name of person leading interview*
Location/Medium: *Office, conference room,* *or phone number*	Appointment Date: Start Time: End Time:
Objectives: *What data to collect* *On what to gain agreement* *What areas to explore*	Reminders: *Background/experience of interviewee* *Known opinions of interviewee*
Agenda:	Approximate Time:
Introduction	1 minute
Background on Project	2 minutes
Overview of Interview	
Topics to Be Covered	1 minute
Permission to Record	
Topic 1 Questions	5 minutes
Topic 2 Questions	7 minutes
…	…
Summary of Major Points	2 minutes
Questions from Interviewee	5 minutes
Closing	1 minute

FIGURE 6-2 Typical interview guide

Interviewing and Listening (Cont.)

General Observations:
Interviewee seemed busy probably need to call in a few days for follow-up questions because he gave only short answers. PC was turned off–probably not a regular PC user.

Unresolved Issues, Topics Not Covered:
He needs to look up sales figures from 1999. He raised the issue of how to handle returned goods, but we did not have time to discuss.

Interviewee:	Date:
Questions:	**Notes:**
When to ask question, if conditional *Question: 1* *Have you used the current sales tracking system? If so, how often ?*	*Answer* *Yes, I ask for a report on my product line weekly.* *Observations* *Seemed anxious–may be overestimating usage frequency.*
If yes, go to Question 2	
Question: 2 *What do you like least about the system?*	*Answer* *Sales are shown in units, not dollars.* *Observations* *System can show sales in dollars, but user does not know this.*

FIGURE 6-2 Typical interview guide (cont.)

Choosing Interview Questions

- Each question in an interview guide can include both verbal and non-verbal information.
  - **Open-ended questions**: questions that have no prespecified answers
  - **Closed-ended questions**: questions that ask those responding to choose from among a set of specified responses

Interviewing Guidelines

- Don’t phrase a question in a way that implies a right or wrong answer.
- Listen very carefully.
- Type interview notes within 48 hours after the interview.
- Don’t set expectations about the new system unless you know these will be deliverables.
- Seek a variety of perspectives from the interviews.

Interviewing Groups

- Drawbacks to individual interviews:
  - Contradictions and inconsistencies between interviewees
  - Follow-up discussions are time consuming
  - New interviews may reveal new questions that require additional interviews with those interviewed earlier

Interviewing Groups (Cont.)

- Interviewing several key people together
  - Advantages
    - More effective use of time
    - Can hear agreements and disagreements at once
    - Opportunity for synergies
  - Disadvantages
    - More difficult to schedule than individual interviews

Nominal Group Technique (NGT)

- A facilitated process that supports idea generation by groups
- Process
  - Members come together as a group, but initially work separately.
  - Each person writes ideas.
  - Facilitator reads ideas out loud, and they are written on a blackboard or flipchart.
  - Group openly discusses the ideas for clarification.
  - Ideas are prioritized, combined, selected, reduced.
- Used to complement group meetings or as part of JAD effort

Directly Observing Users

- **Direct Observation**
  - Watching users do their jobs
  - Used to obtain more firsthand and objective measures of employee interaction with information systems
  - Can cause people to change their normal operating behavior
  - Time-consuming and limited time to observe

Analyzing Procedures and Other Documents

- **Document Analysis**
  - Review of existing business documents
  - Can give a historical and “formal” view of system requirements

Analyzing Procedures and Other Documents (Cont.)

- Types of information to be discovered:
  - Problems with existing system
  - Opportunity to meet new need
  - Organizational direction
  - Names of key individuals
  - Values of organization
  - Special information processing circumstances
  - Reasons for current system design
  - Rules for processing data

Analyzing Procedures and Other Documents (Cont.)

- **Useful document: Written work procedure**
  - For an individual or work group
  - Describes how a particular job or task is performed
  - Includes data and information used and created in the process

Analyzing Procedures (Cont.)

GUIDE FOR PREPARATION OF INVENTION DISCLOSURE
(See FACULTY and STAFF MANUALS for Detailed
Patent Policy and Routing Procedures.)

(1) DISCLOSE ONLY ONE INVENTION PER FORM.

(2) PREPARE COMPLETE DISCLOSURE.

The disclosure of your invention is adequate for patent purposes ONLY if it enables a person skilled in the art to understand the invention.

(3) CONSIDER THE FOLLOWING IN PREPARING A COMPLETE DISCLOSURE:

(a) All essential elements of the invention, their relationship to one another, and their mode of operation.

(b) Equivalents that can be substituted for any elements.

(c) List of features believed to be new.

(d) Advantages this invention has over the prior art.

(e) Whether the invention has been built and/or tested.

FIGURE 6-3 Example of a procedure

Analyzing Procedures (Cont.)

(4) PROVIDE APPROPRIATE ADDITIONAL MATERIAL.

Drawings and descriptive material should be provided as needed to clarify the disclosure. Each page of this material must be signed and dated by each inventor and properly witnessed. A copy of any current and/or planned publication relating to the invention should be included.

(5) INDICATE PRIOR KNOWLEDGE AND INFORMATION.

Pertinent publications, patents or previous devices, and related research or engineering activities should be identified.

(6) HAVE DISCLOSURE WITNESSED.

Persons other than coinventors should serve as witnesses and should sign each sheet of the disclosure only after reading and understanding the disclosure.

(7) FORWARD ORIGINAL PLUS ONE COPY (two copies if supported by grant/contract) TO VICE PRESIDENT FOR RESEARCH VIA DEPARTMENT HEAD AND DEAN.

FIGURE 6-3 Example of a procedure (cont.)

Analyzing Procedures and Other Documents (Cont.)

- Potential Problems with Procedure Documents:
  - May involve duplication of effort
  - May have missing procedures
  - May be out of date
  - May contradict information obtained through interviews

Analyzing Procedures and Other Documents (Cont.)

- **Formal Systems**: the official way a system works as described in organizational documentation (i.e. work procedure)
- **Informal Systems**: the way a system actually works (i.e. interviews, observations)

Analyzing Procedures and Other Documents (Cont.)

- **Useful document: Business form**
  - Used for all types of business functions
  - Explicitly indicates what data flow in and out of a system and data necessary for the system to function
  - Gives crucial information about the nature of the organization

Analyzing Procedures and Other Documents (Cont.)

INVOICE

Your Company Name
Your Company Slogan

Street Address
City, ST ZIP Code
Phone:
Fax:

DATE: March 13, 2014
INVOICE # 100
FOR: Project or Service Description
BILL TO: Name
Company Name
Street Address
City, ST ZIP Code
Phone:

DESCRIPTION	T	AMOUNT
	T	
	SUBTOTAL	$ –
	TAX RATE	8.60%
	SALES TAX	$
	OTHER	–
	TOTAL	$ –

Make all checks payable to Your Company Name. If you have any questions concerning this invoice, contact Name, Phone Number, Email

THANK YOU FOR YOUR BUSINESS!

FIGURE 6-4
An invoice form from Microsoft Excel

Analyzing Procedures and Other Documents (Cont.)

- **Useful document: Report**
  - Primary output of current system
  - Enables you to work backwards from the report to the data needed to generate it
- **Useful document: Description of current information system**

Analyzing Procedures and Other Documents (Cont.)

TABLE 6-4 Comparison of Observation and Document Analysis

Characteristic	Observation	Document Analysis
Information Richness	High (many channels)	Low (passive) and old
Time Required	Can be extensive	Low to moderate
Expense	Can be high	Low to moderate
Chance for Follow-Up and Probing	Good: probing and clarification questions can be asked during or after observation	Limited: probing possible only if original author is available
Confidentiality	Observee is known to interviewer; observee may change behavior when observed	Depends on nature of document; does not change simply by being read
Involvement of Subject	Interviewees may or may not be involved and committed depending on whether they know if they are being observed	None, no clear commitment
Potential Audience	Limited numbers and limited time (snapshot) of each	Potentially biased by which documents were kept or because document was not created for this purpose

Contemporary Methods for Determining System Requirements

- **Joint Application Design (JAD)**
  - Brings together key users, managers, and systems analysts
  - Purpose: collect system requirements simultaneously from key people
  - Conducted off-site
- **Group Support Systems**
  - Facilitate sharing of ideas and voicing of opinions about system requirements

Contemporary Methods for Determining System Requirements (Cont.)

- **CASE tools**
  - Used to analyze existing systems
  - Help discover requirements to meet changing business conditions
- **System prototypes**
  - Iterative development process
  - Rudimentary working version of system is built
  - Refine understanding of system requirements in concrete terms

Joint Application Design (JAD)

- Intensive group-oriented requirements determination technique
- Team members meet in isolation for an extended period of time
- Highly focused
- Resource intensive
- Started by IBM in 1970s

JAD (Cont.)

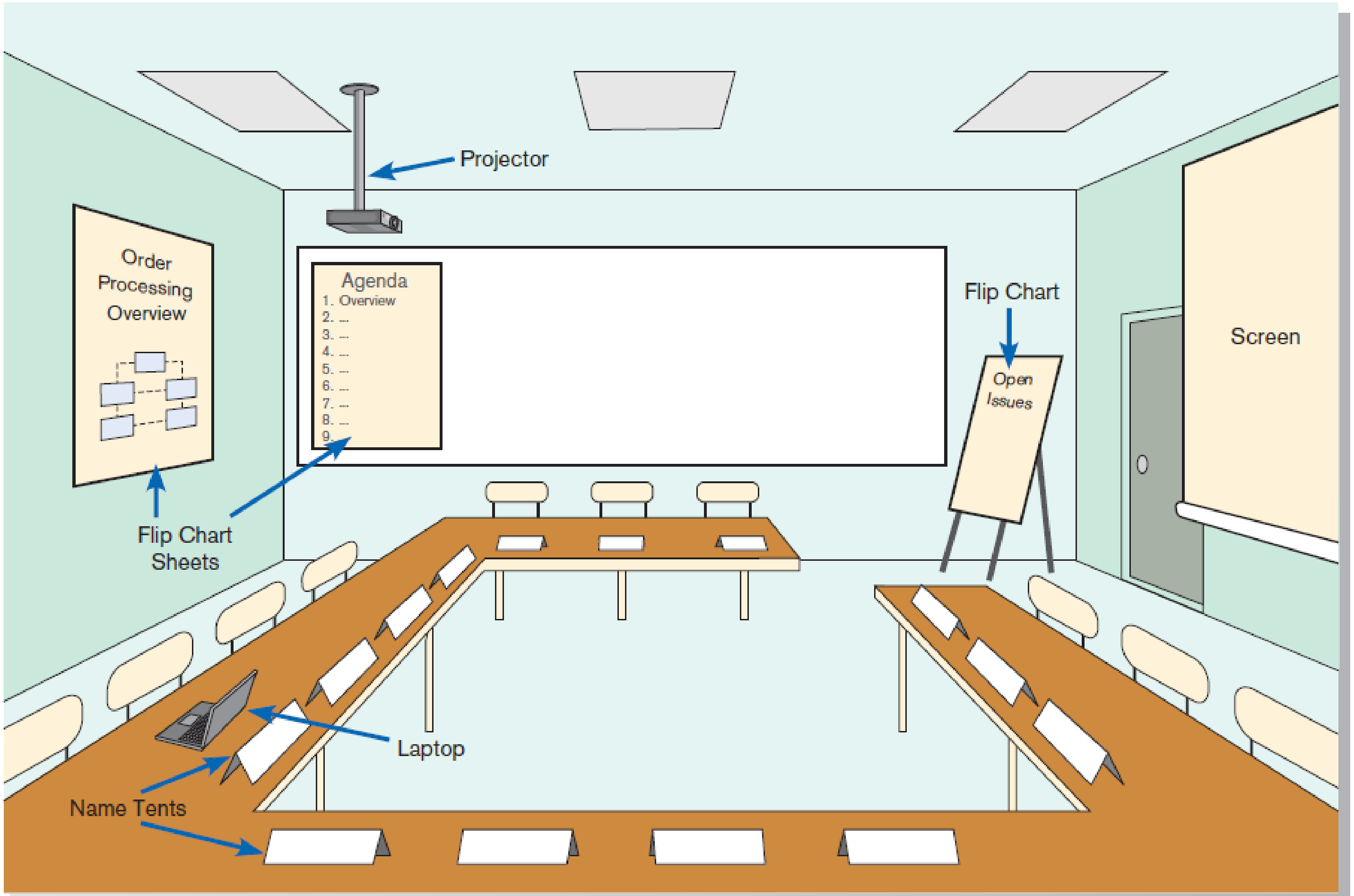

FIGURE 6-6 Illustration of the typical room layout for a JAD
Source: Based on Wood and Silver, 1995.

JAD (Cont.)

- JAD Participants:
  - **Session Leader**: facilitates group process
  - **Users:** active, speaking participants
  - **Managers**: active, speaking participants
  - **Sponsor**: high-level champion, limited participation
  - **Systems Analysts**: should mostly listen
  - **Scribe**: record session activities
  - **IS Staff**: should mostly listen

JAD (Cont.)

- End Result
  - Documentation detailing existing system
  - Features of proposed system

CASE Tools During JAD

- Upper CASE tools are used
- Enables analysts to enter system models directly into CASE during the JAD session
- Screen designs and prototyping can be done during JAD and shown to users

Using Prototyping During Requirements Determination

- Quickly converts requirements to working version of system
- Once the user sees requirements converted to system, will ask for modifications or will generate additional requests

Using Prototyping During Requirements Determination (Cont.)

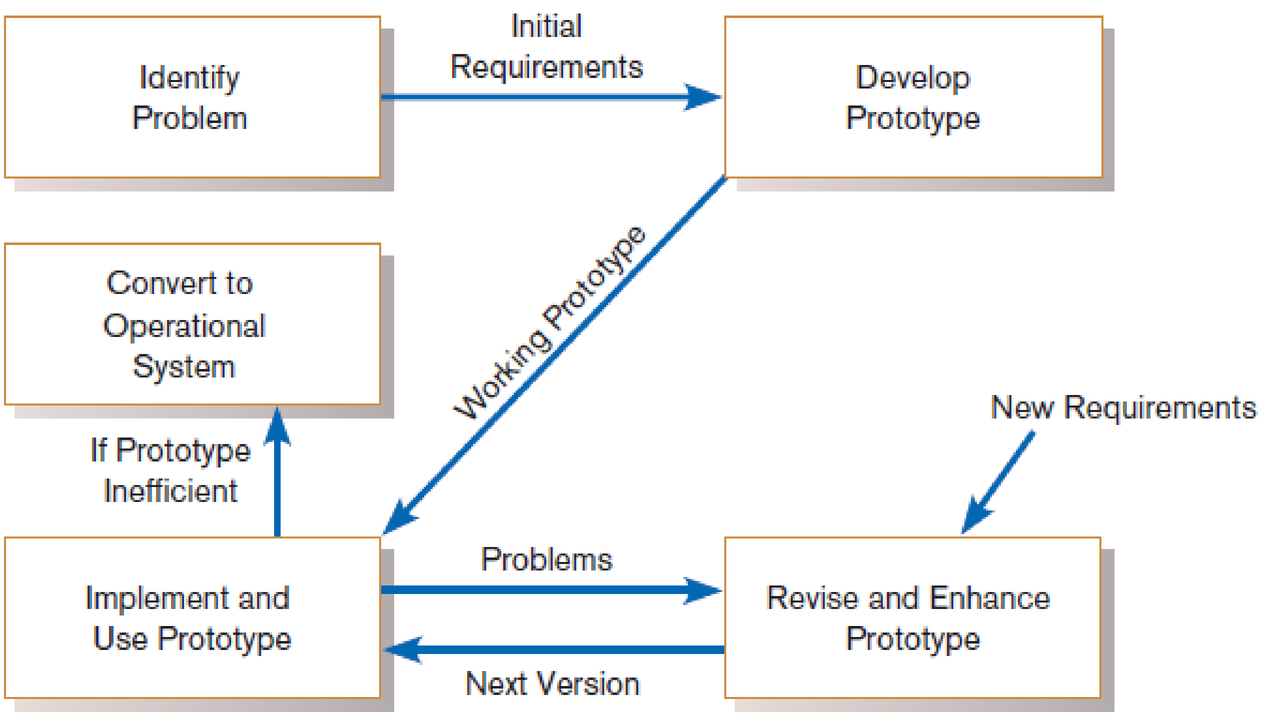

Figure 6-7
The prototyping methodology
(*Source:* Based on "Prototyping: The New Paradigm for Systems Development," by J. D. Naumann and A. M. Jenkins, *MIS Quarterly* 6(3): 29–44.)

Using Prototyping During Requirements Determination (Cont.)

- Most useful when:
  - User requests are not clear.
  - Few users are involved in the system.
  - Designs are complex and require concrete form.
  - There is a history of communication problems between analysts and users.
  - Tools are readily available to build prototype.

Using Prototyping During Requirements Determination (Cont.)

- Drawbacks
  - Tendency to avoid formal documentation
  - Difficult to adapt to more general user audience
  - Sharing data with other systems is often not considered
  - Systems Development Life Cycle (SDLC) checks are often bypassed

Radical Methods for Determining System Requirements

- **Business Process Reengineering (BPR)**: search for and implementation of radical change in business processes to achieve breakthrough improvements in products and services

Radical Methods for Determining System Requirements (Cont.)

- Goals
  - Reorganize complete flow of data in major sections of an organization.
  - Eliminate unnecessary steps.
  - Combine steps.
  - Become more responsive to future change.

Identifying Processes to Reengineer

- Key business processes
  - Structured, measured set of activities designed to produce specific output for a particular customer or market
  - Focused on customers and outcome
  - Same techniques as requirements determination are used

Disruptive Technologies

- Information technologies must be applied to radically improve business processes.
- **Disruptive technologies** are technologies that enable the breaking of long-held business rules that inhibit organizations from making radical business changes.

Disruptive Technologies (Cont.)

TABLE 6-6 Long-Held Organizational Rules That Are Being Eliminated through Disruptive Technologies

Rule	Disruptive Technology
Information can appear in only one place at a time.	Distributed databases allow the sharing of information.
Businesses must choose between centralization and decentralization.	Advanced telecommunications networks can support dynamic organizational structures.
Managers must make all decisions.	Decision-support tools can aid nonmanagers.
Field personnel need offices where they can receive, store, retrieve, and transmit information.	Wireless data communication and portable computers provide a "virtual" office for workers.
The best contact with a potential buyer is personal contact.	Interactive communication technologies allow complex messaging capabilities.
You have to find out where things are.	Automatic identification and tracking technology knows where things are.
Plans get revised periodically.	High-performance computing can provide real-time updating.

Requirements Determination using Agile Methodologies

- **Continual user involvement**
  - Replace traditional SDLC waterfall with iterative analyze–design–code–test cycle
- **Agile usage-centered design**
  - Focuses on user goals, roles, and tasks
- **The Planning Game**
  - Based on eXtreme programming
  - Exploration, steering, commitment

Continual User Involvement

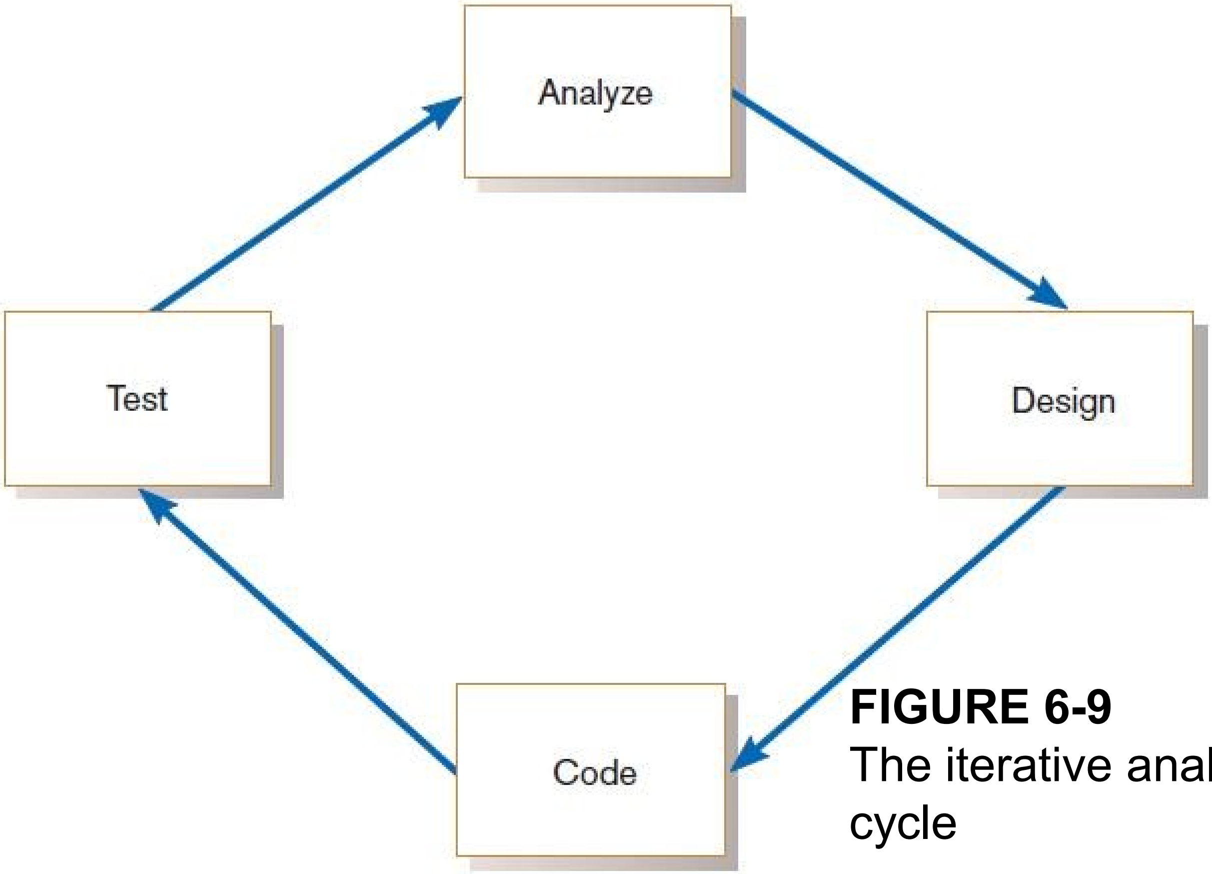

FIGURE 6-9
The iterative analysis–design–code–test cycle

Agile Usage-Centered Design Steps

- Gather group of programmers, analysts, users, testers, facilitator.
- Document complaints of current system.
- Determine important user roles.
- Determine, prioritize, and describe tasks for each user role.
- Group similar tasks into interaction contexts.
- Associate each interaction context with a user interface for the system, and prototype the interaction context.
- Step through and modify the prototype.

The Planning Game from eXtreme Programming

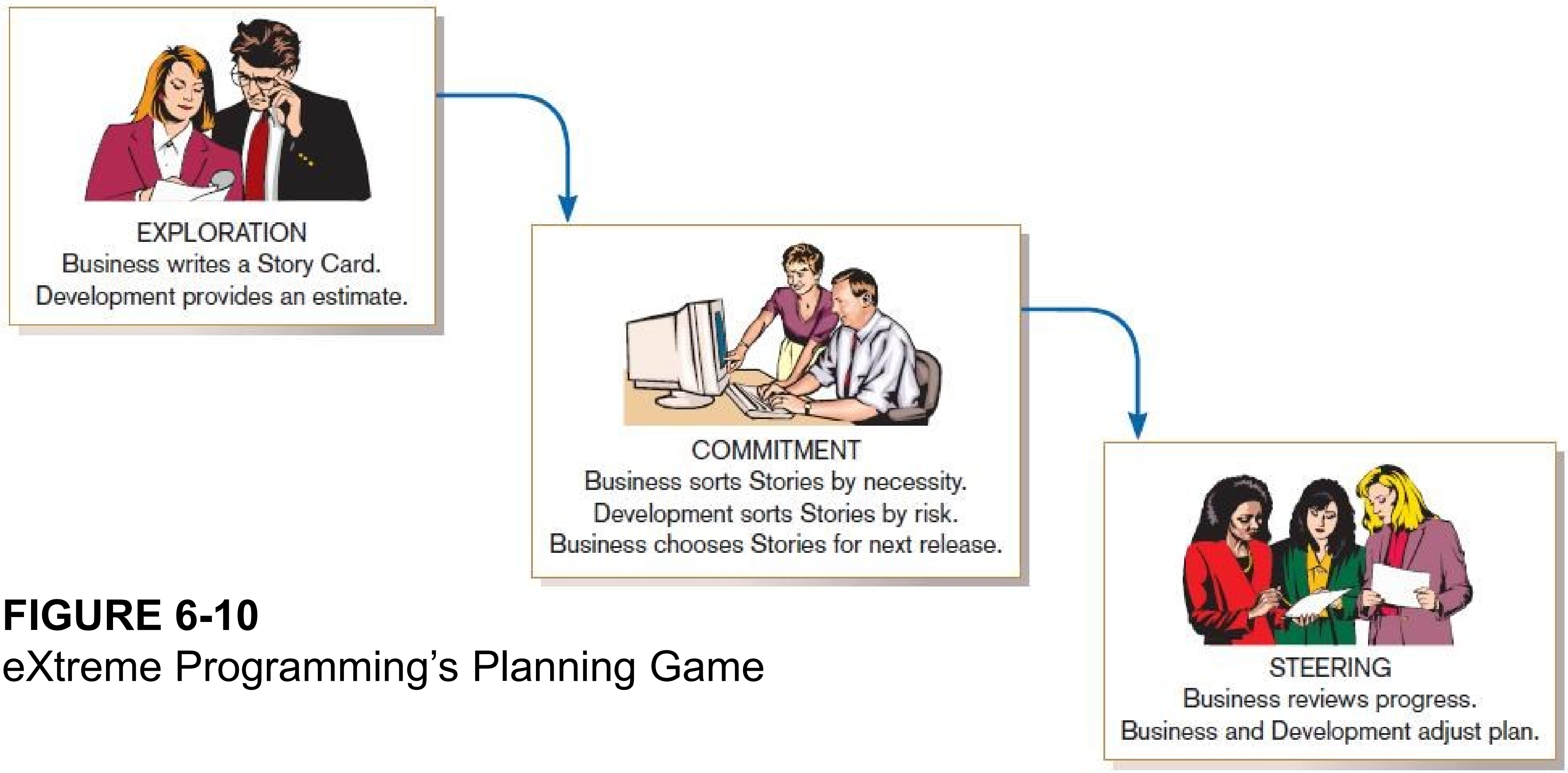

FIGURE 6-10
eXtreme Programming's Planning Game

Electronic Commerce Applications: Determining System Requirements

- Determining system requirements for Pine Valley furniture’s WebStore
  - System layout and navigation characteristics
  - WebStore and site management system capabilities
  - Customer and inventory information
  - System prototype evolution

Summary

- In this chapter you learned how to:
  - ✓ Describe interviewing options and develop interview plan.
  - ✓ Explain advantages and pitfalls of worker observation and document analysis.
  - ✓ Explain how computing can support requirements determination.
  - ✓ Participate in and help plan Joint Application Design sessions.

Summary (Cont.)

- ✓ Use prototyping during requirements determination.
- ✓ Describe contemporary approaches to requirements determination.
- ✓ Understand how requirements determination techniques apply to the development of electronic commerce applications.