

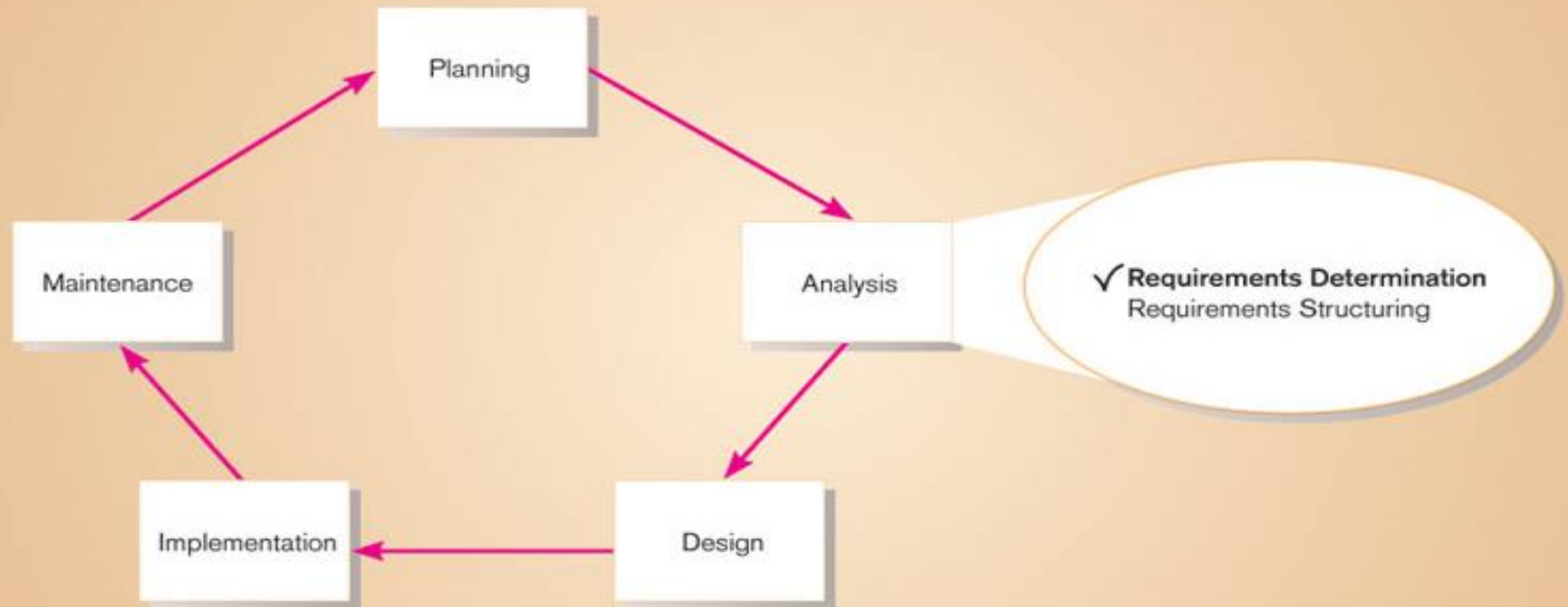
Modern Systems Analysis and Design

Chapter 6 **Determining System Requirements**

Learning Objectives

- ✓ 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.
- ✓ Use **prototyping during requirements determination**.
- ✓ Describe **contemporary approaches to requirements determination**.

System Requirements Determination



Characteristics for Successful Requirements Determination

- ▶ Impertinence
- ▶ Impartiality
- ▶ Relaxing constraints
- ▶ Attention to details
- ▶ Reframing

Deliverables of 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
 - ▶ **JAD session results, CASE repositories, system prototype displays and reports**

Traditional Requirements Determination Methods

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

What is Interviewing?

- ▶ Dialogue with user or manager to **obtain their requirements**
- ▶ Two forms:
 - ▶ **Open-ended**: conversational, questions with no specific answers in mind
 - ▶ **Closed-ended**: structured, questions with limited range of possible answers

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.

Interview Outline	
Interviewee: <i>Name of person being interviewed</i>	Interviewer: <i>Name of person leading interview</i>
Location/Medium: <i>Office, conference room, or phone number</i>	Appointment Date: Start Time: End Time:
Objectives: <i>What data to collect On what to gain agreement What areas to explore</i>	Reminders: <i>Background/experience of interviewee Known opinions of interviewee</i>
Agenda: Introduction Background on Project Overview of Interview Topics to Be Covered Permission to Tape Record Topic 1 Questions Topic 2 Questions ... Summary of Major Points Questions from Interviewee Closing	Approximate Time: 1 minute 2 minutes 1 minute 5 minutes 7 minutes ... 2 minutes 5 minutes 1 minute
General Observations: <i>Interviewee seemed busy—probably need to call in a few days for follow-up questions since he gave only short answers. PC was turned off—probably not a regular PC user.</i>	
Unresolved Issues, Topics not Covered: <i>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.</i>	
Interviewee:	Date:
Questions:	Notes:
When to ask question, if conditional Question: 1 <i>Have you used the current sales tracking system? If so, how often?</i>	Answer <i>Yes, I ask for a report on my product line weekly.</i> Observations <i>Seemed anxious—may be overestimating usage frequency.</i>
If yes, go to Question 2	
Question: 2 <i>What do you like least about the system?</i>	Answer <i>Sales are shown in units, not dollars.</i> Observations <i>System can show sales in dollars, but user does not know this.</i>

Interview Guide is a document for developing, planning and conducting an interview.

Each question in an interview guide can include both verbal and non-verbal information.

Disadvantages of Individual Interviews

- ▶ Interview **one person at a time**
- ▶ Advantages
 - ▶ **Easier to schedule** than group interviews
- ▶ Disadvantages
 - ▶ **Contradictions** and **inconsistencies** between interviewees
 - ▶ Follow-up discussions are **time consuming**

Group Interviews

- ▶ Interview 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 blackboard.
 - ▶ Group discusses the ideas.
 - ▶ Ideas are prioritized, combined, selected, reduced.

Other Approaches

- ▶ What is **Direct Observation**?
 - ▶ Watching users do their jobs
 - ▶ Can provide more accurate information than self-reporting (like **questionnaires** and **interviews**)
- ▶ What is **Document Analysis**?
 - ▶ Review of **existing business documents**
 - ▶ Can give a historical and “formal” view of system requirements

Analyzing Procedures and Other Documents

- ▶ 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.)

► Four types of useful documents

► **Written work procedures**

- Describes how a job is performed
- Includes data and information used and created in the process of performing the job or task

► **Business form**

- Explicitly indicate data flow in or out of a system

► **Report**

- Enables the analyst to work backwards from the report to the data that generated it

► **Description of current information system**

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.

(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.

(4) INDICATE PRIOR KNOWLEDGE AND INFORMATION.

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

(5) 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.

Written work procedure is a business document that **formally describes work processes**, provides useful information regarding system functionality and logic.

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


Formal vs. Informal Systems

► Formal

- The official way a system works as described in organization's documentation
- Procedure documents describe formal system

► Informal

- The way a system actually works in practice
- Interviews and observation reveal informal system




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 ANY TOWN, ANY STATE 54321
 (123) 456-7890

INVOICE

TO:

SALESPERSON	DATE OF INVOICE
SHIP TO:	

CUSTOMER ID	SHIPPING METHOD	PAYMENT TERMS	PURCHASE ORDER ID	TAX EXEMPTION ID
QUANTITY	DESCRIPTION		DISCOUNT	UNIT PRICE
				AMOUNT
				
	<i>Thank You</i>		BALANCE DUE	

FORM K1087

Business form is a document that contains useful information regarding data organizations and possible screen layouts.

Source: <http://www.giraffeonline.com>. Used by permission.

<i>Characteristic</i>	<i>Observation</i>	<i>Document Analysis</i>
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 not created for this purpose

Contemporary Methods for Determining 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 Requirements (cont.)

▶ **CASE tools**

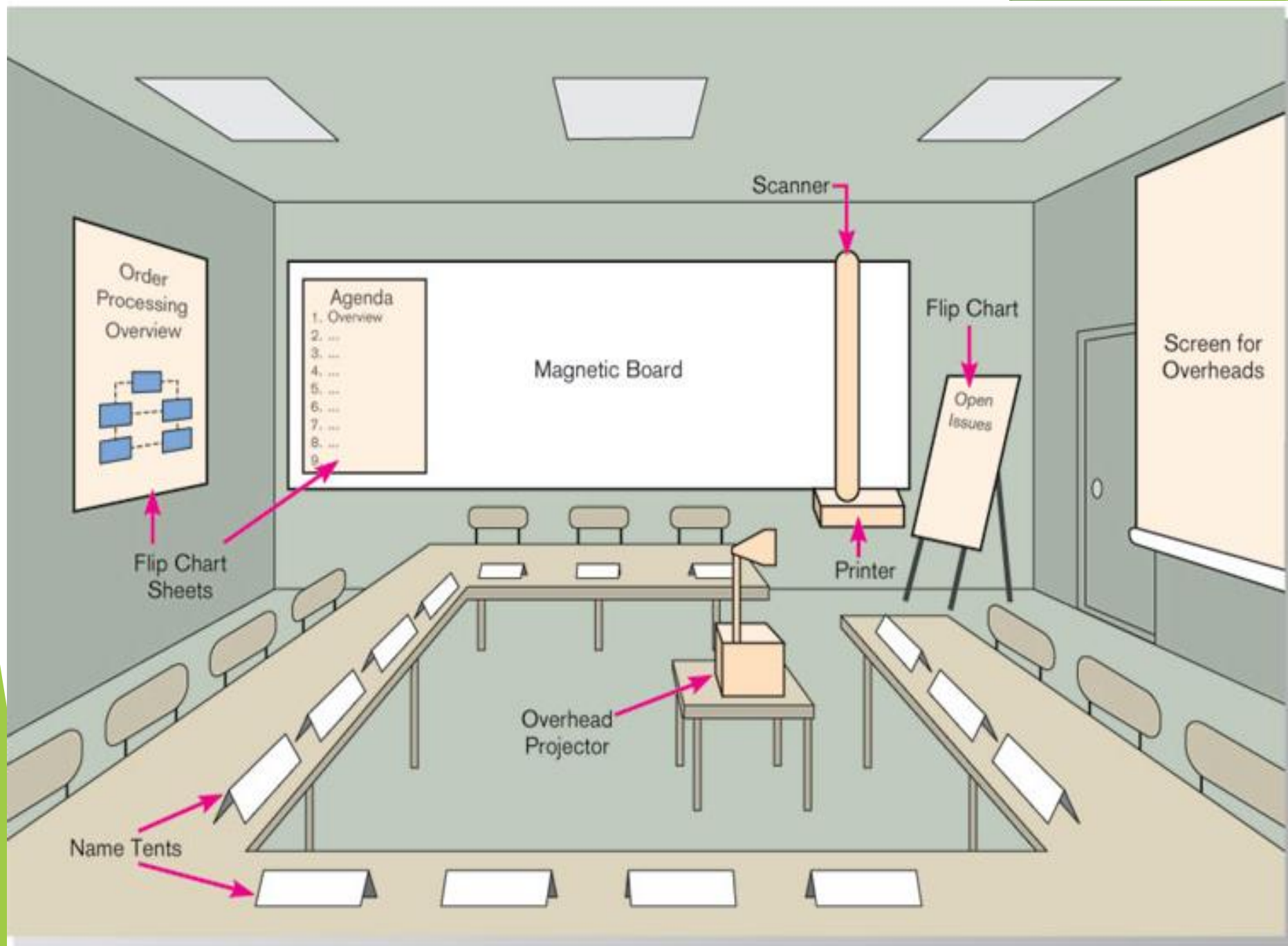
- ▶ Used to analyze existing systems
- ▶ Help discover requirements to meet changing business conditions

▶ **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 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

Joint Application Design (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

Joint Application Design (cont.)

- ▶ Supporting JAD with GSS
 - ▶ **Group support systems (GSS)** can be used to enable more participation by group members in JAD
 - ▶ Members type their answers into the computer
 - ▶ All members of the group see what other members have been typing

Prototyping

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

Prototyping (cont.)

1. Drawbacks

1. Tendency to **avoid formal documentation**
2. **Difficult to adapt** to more general user audience
3. Sharing data with other systems is **often not considered**
4. Systems Development Life Cycle (**SDLC**) checks are often **bypassed**

Business Process Reengineering (BPR)

- ▶ Search for and implementation of radical change in business processes to achieve breakthrough improvements in products and services
- ▶ **Goals**
 - ▶ Reorganize complete flow of data in major sections of an organization
 - ▶ Eliminate unnecessary steps

Business Process Reengineering (BPR)

▶ **Goals (cont.)**

- ▶ Combine steps
- ▶ Become more responsive to future change

▶ **Identification of processes to reengineer**

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

Business Process Reengineering (cont.)

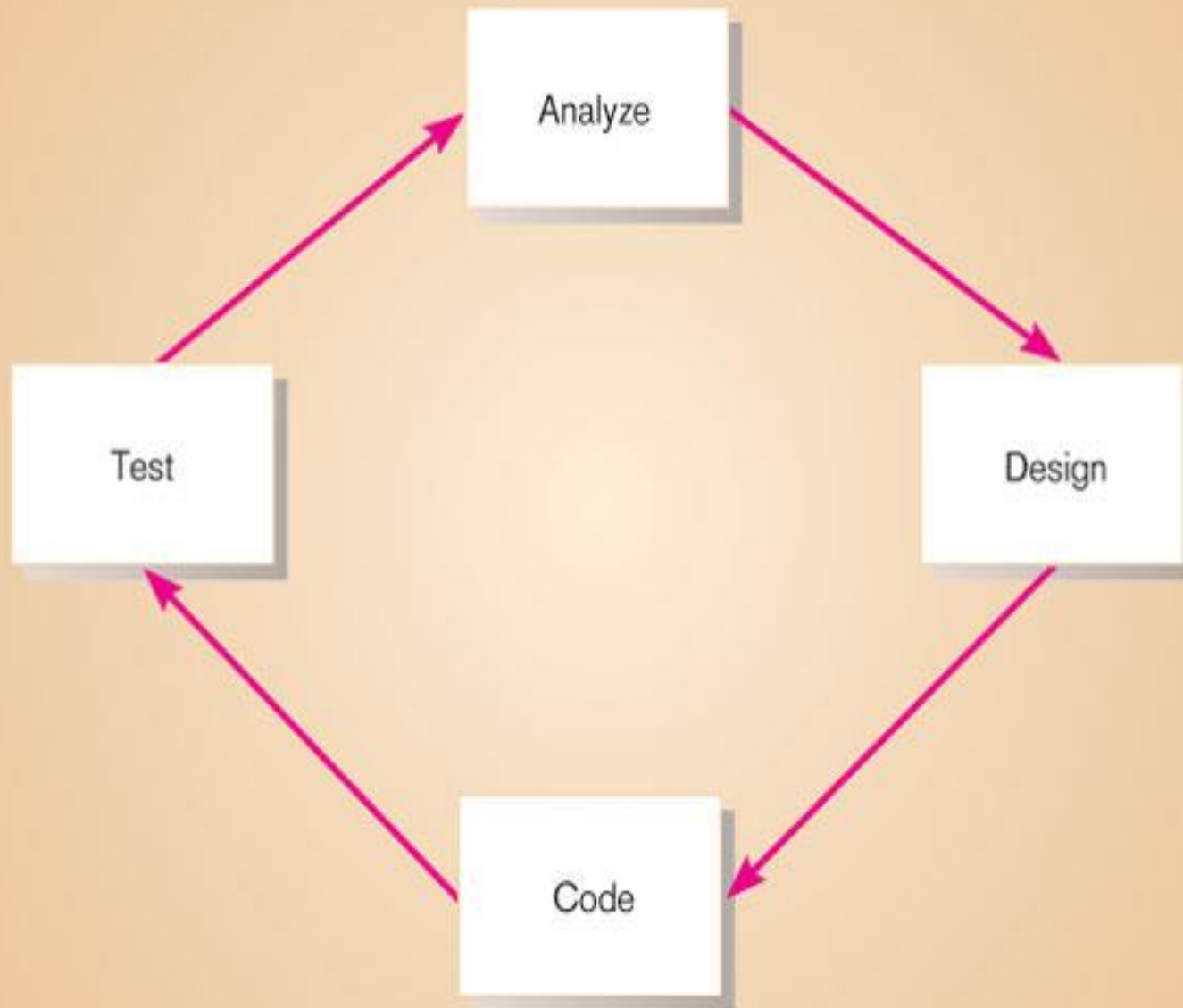
- ▶ Identify specific activities that can be improved through BPR
- ▶ **Disruptive technologies**
 - ▶ Technologies that enable the breaking of long-held business rules that inhibit organizations from making radical business changes

Long-Held Organizational Rules That Are Being Eliminated Through Disruptive Technologies

<i>Rule</i>	<i>Disruptive Technology</i>
Information can appear in only one place at a time.	Distributed databases allow the sharing of information.
Only experts can perform complex work.	Expert systems can aid nonexperts.
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.

Agile Methodologies for Requirements Determination

- ▶ 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



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

eXtreme Programming's Planning Game



EXPLORATION

Business writes a Story Card.
Development provides an estimate.



COMMITMENT

Business sorts Stories by necessity.
Development sorts Stories by risk.
Business chooses Stories for next release.



STEERING

Business reviews progress.
Business and Development adjust plan.

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.
 - ✓ Use prototyping during requirements determination.
 - ✓ Describe contemporary approaches to requirements determination.