Systems Analysis and Design with UML Version 2.0, Second Edition

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Chapter 5: Requirements Determination

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Requirements Determination

Chapter 5

Objectives

- Understand how to create a requirements definition.
- Become familiar with requirements analysis techniques.
- Understand when to use each requirements analysis technique.
- Understand how to gather requirements using interviews, JAD sessions, questionnaires, document analysis, and observation.
- Understand when to use each requirements-gathering technique.

Key Ideas

- The goal of the analysis phase is to truly understand the requirements of the new system and develop a system that addresses them.
- The first challenge is collecting and integrating the information
- The second challenge is finding the right people to participate.

Analysis Phase

- This phase takes the general ideas in the system request and
  - refines them into a detailed requirements definition (this chapter),
  - functional models (Chapter 6),
  - structural models (Chapter 7), and
  - behavioral models (Chapter 8)
- This becomes the system proposal
  - Includes revised project management deliverables,
    - feasibility analysis (Chapter 3) and
    - workplan (Chapter 4).

Requirement Specification

- a statement of what
  - the system must do or
  - characteristics it must have
  - Written from businessperson perspective ("what" of system)
  - Later requirements become more technical ("how" of system)

Functional vs. Nonfunctional

- A *functional requirement* relates directly to a process the system has to perform or information it needs to contain.
- *Nonfunctional requirements* refer to behavioral properties that the system must have, such as performance and usability.

Functional Requirements

C. Functional Requirements

1. Printing

1.1. The user can select which pages to print
1.2. The user can view a preview of the pages before printing
1.3. The user can change the margins, paper size (e.g., letter, A4) and orientation on the page

2. Spell Checking

2.1. The user can check for spelling mistakes; the system can operate in one of two modes as selected by the users
2.1.1. Mode 1 (Manual): The user will activate the spell checker and it will move the user to the next misspelled word
2.1.2. Mode 2 (Automatic): As the user types, the spell checker will flag misspelled words so the user immediately see the misspelling
2.2. The user can add words to the dictionary
2.3. The user can mark words as not misspelled but not add them to the dictionary

Nonfunctional Requirements

D. Nonfunctional Requirements

1. Operational Requirements
- 1.1. The system will operate in Windows and Macintosh environments
- 1.2. The system will be able to read and write Word documents, RTF, and HTML
- 1.3. The system will be able to import Gif, Jpeg, and BMP graphics files

2. Performance Requirements
- 2.1. Response times must be less than 7 seconds
- 2.2. The Inventory database must be updated in real time

3. Security Requirements
- 3.1. No special security requirements are anticipated

4. Cultural and Political Requirements
- 4.1. No special cultural and political requirements are anticipated

Requirements Analysis Techniques

- *Business process automation (BPA)*
  - Doesn't change basic operations
  - Automates some operations
- BPA Techniques
  - Problem Analysis
  - Root Cause Analysis

Business Process Improvement

- *Business process improvement (BPI)* changes
  - How an organization operates
  - Changes operation with new techniques
  - Can improve efficiency
  - Can improve effectiveness

BPI Components

- Duration Analysis
  - Time to perform each process
- Activity-Based Costing
  - Examines major process costs
- Informal Benchmarking
  - Studies how other organizations perform business processes

Business Process Reengineering

- Changes how the organization does certain operations
- Consists of
  - Outcome Analysis
  - Technology analysis
  - Activity Elimination

Select Appropriate Technique

- Assess Potential Business Value
- Determine Project Cost
- Specify Breadth or Scope of Analysis
- Determine Risk of Failure

Analysis Characteristics

	Business Process Automation	Business Process Improvement	Business Process Reengineering
Potential business value	Low–moderate	Moderate	High
Project cost	Low	Low–moderate	High
Breadth of analysis	Narrow	Narrow–moderate	Very broad
Risk	Low–moderate	Low–moderate	Very high

Requirements Gathering

Interviews -- Five Basic Steps

- Selecting interviewees
- Designing interview questions
- Preparing for the interview
- Conducting the interview
- Post-interview follow-up

Selecting Interviewees

- Based on information needed
- Often good to get different perspectives
  - Managers
  - Users
  - Ideally, all key stakeholders

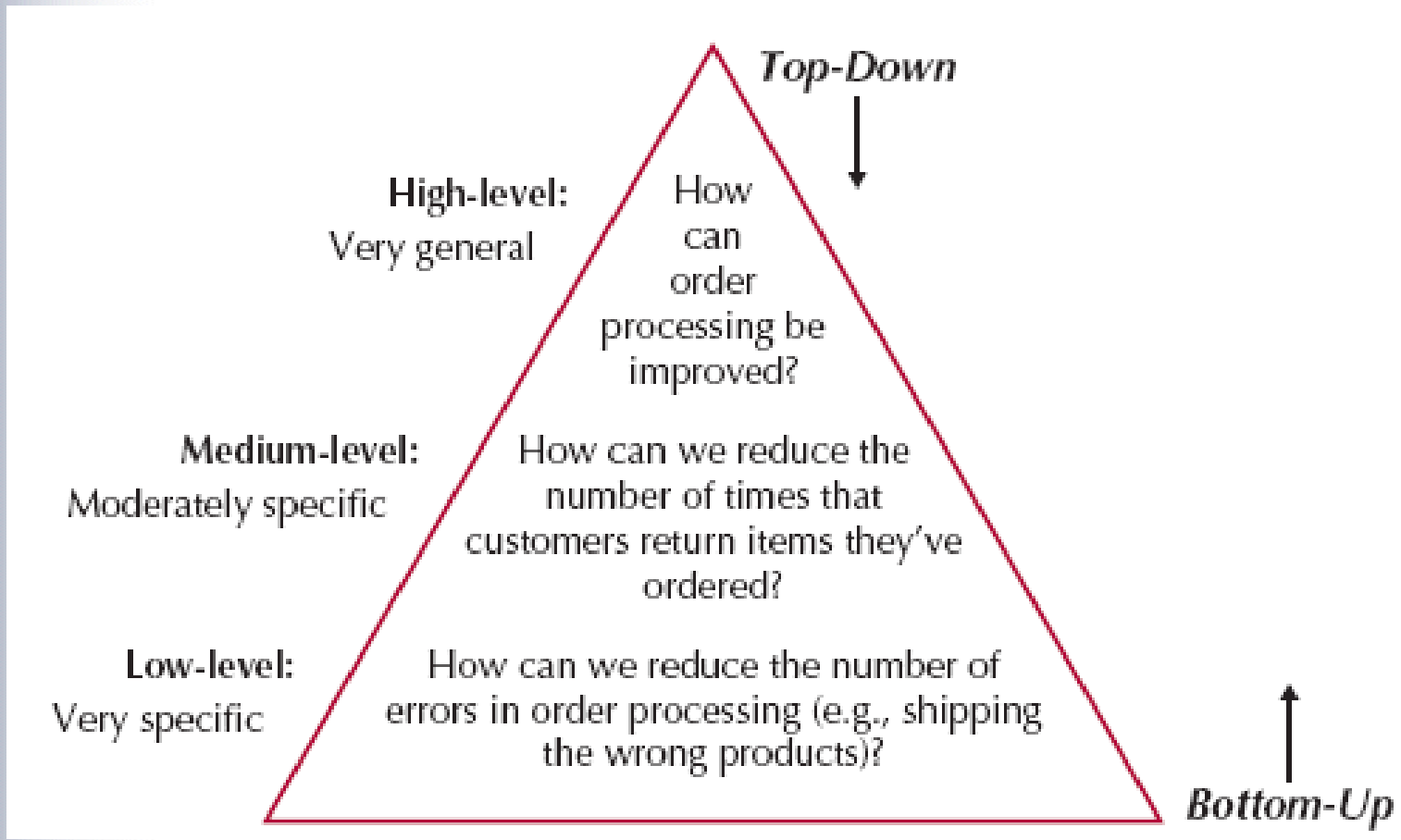
Types of Questions

Types of Questions	Examples
Closed-Ended Questions	* How many telephone orders are received per day? * How do customers place orders? * What additional information would you like the new system to provide?
Open-Ended Questions	* What do you think about the current system? * What are some of the problems you face on a daily basis? * How do you decide what types of marketing campaign to run?
Probing Questions	* Why? * Can you give me an example? * Can you explain that in a bit more detail?

Designing Interview Questions

- Unstructured interview
  - Broad, roughly defined information
- Structured interview
  - More specific information

Questioning Strategies



Interview Preparation Steps

- Prepare general interview plan
  - List of question
  - Anticipated answers and follow-ups
- Confirm areas of knowledge
- Set priorities in case of time shortage
- Prepare the interviewee
  - Schedule
  - Inform of reason for interview
  - Inform of areas of discussion

Conducting the Interview

- Appear professional and unbiased
- Record all information
- Check on organizational policy regarding tape recording
- Be sure you understand all issues and terms
- Separate facts from opinions
- Give interviewee time to ask questions
- Be sure to thank the interviewee
- End on time

Conducting the Interview Practical Tips

- Don’t worry, be happy
- Pay attention
- Summarize key points
- Be succinct
- Be honest
- Watch body language

Post-Interview Follow-Up

- Prepare interview notes
- Prepare interview report
- Look for gaps and new questions

Interview Report

INTERVIEW REPORT

Interview notes approved by: _____

Person interviewed _____
Interviewer _____
Date _____
Primary Purpose:

Summary of Interview:

Open Items:

Detailed Notes:

Your Turn

- **You are interviewing the director of the PC lab at your school regarding a new program to support keeping track of students' borrowing software**
  - With a partner, write 5 questions you would ask the PC lab director
  - Take turns having one pair of students posing the questions to another pair of students
  - Be sure to take notes and write up the results when you have finished.

JOINT APPLICATION DESIGN (JAD)

JAD Key Ideas

- Allows project managers, users, and developers to work together
- May reduce scope creep by 50%
- Avoids requirements being too specific or too vague

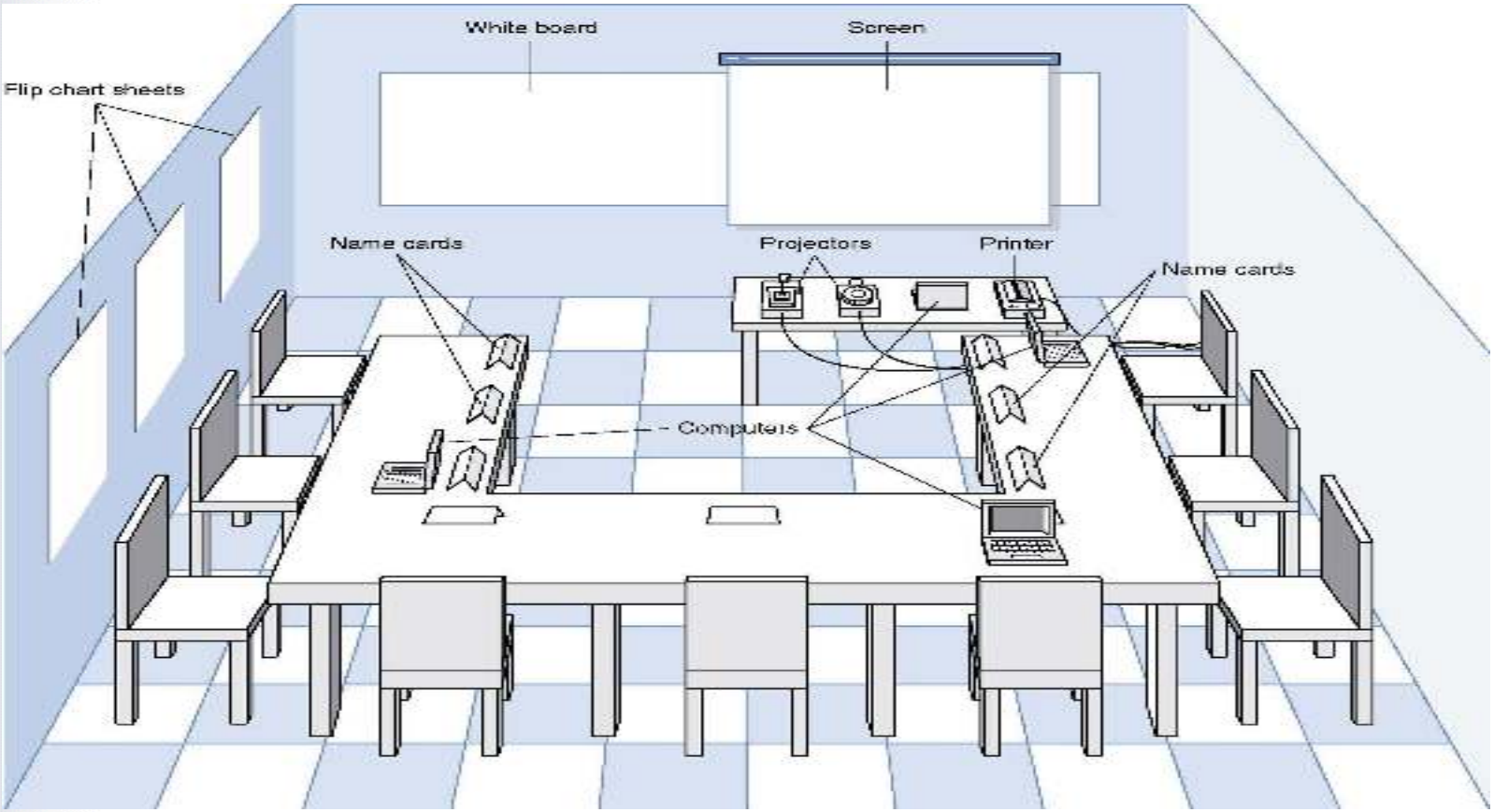
Joint Application Design (JAD) Important Roles

- Facilitator
  - sets the meeting agenda and guides the discussion
- Scribe
  - assist the facilitator by recording notes, making copies, etc.
- Project team, users, and management

Joint Application Design (JAD) Setting

- U-Shaped seating
- Away from distractions
- Whiteboard/flip chart
- Prototyping tools
- e-JAD

JAD Meeting Room



The JAD Session

- Tend to last 5 to 10 days over a three week period
- Prepare questions as with interviews
- Formal agenda and groundrules
- Facilitator activities
  - Keep session on track
  - Help with technical terms and jargon
  - Record group input
  - Help resolve issues
- Post-session follow-up

Managing Problems in JAD Sessions

- Reducing domination
- Encouraging non-contributors
- Side discussions
- Agenda merry-go-round
- Violent agreement
- Unresolved conflict
- True conflict
- Use humor

Questionnaire Steps

- Selecting participants
  - Using samples of the population
- Designing the questionnaire
  - Careful question selection
- Administering the questionnaire
  - Working to get good response rate
- Questionnaire follow-up
  - Send results to participants

Good Questionaire Design

- Begin with nonthreatening and interesting questions.
- Group items into logically coherent sections.
- Do not put important items at the very end of the questionnaire.
- Do not crowd a page with too many items.
- Avoid abbreviations.
- Avoid biased or suggestive items or terms.
- Number questions to avoid confusion.
- Pretest the questionnaire to identify confusing questions.
- Provide anonymity to respondents.

Document Analysis

- Provides clues about existing "as-is" system
- Typical documents
  - Forms
  - Reports
  - Policy manuals
- Look for user additions to forms
- Look for unused form elements

Observation

- Users/managers often don't remember everything they do
- Checks validity of information gathered other ways
- Behaviors change when people are watched
- Careful not to ignore periodic activities
  - Weekly … Monthly … Annual

Selecting the Appropriate Techniques

	Interviews	Joint Application Design	Questionnaires	Document Analysis	Observation
Type of information	As-is, improvements, to-be	As-is, improvements, to-be	As-is, improvements	As-is	As-is
Depth of information	High	High	Medium	Low	Low
Breadth of information	Low	Medium	High	High	Low
Integration of information	Low	High	Low	Low	Low
User involvement	Medium	High	Low	Low	Low
Cost	Medium	Low–Medium	Low	Low	Low–Medium

CD Selections

- Suggest how CD Selections should proceed in eliciting requirements.
  - Consider steps, techniques and goals, who and how.

CD Selections

- How would you identify possible improvements?
- What possible improvements would you suggest?

Summary

- First Step is to determine requirements
- Systems analysts use these techniques
  - *Interviews,*
  - *JAD,*
  - *Questionnaires,*
  - *Document Analysis, and*
  - *Observation*.

Expanding the Domain

- Additional resources regarding Joint Application Development can be found at:
- http://www.carolla.com/wp-jad.htm
- http://www.utexas.edu/hr/is/pubs/jad.html