



Requirement Analysis

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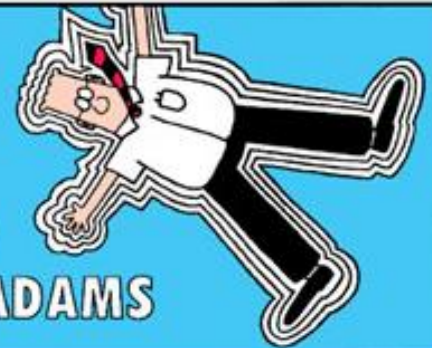
Some of the contents are adapted from **“System Analysis and Design”** by **Dennis, Wixom, & Tegarden.**



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Project Requirements Analysis and System Specification

- Why is it one of first activities in (software) project life cycle?
 - Need to understand what customer wants first!
 - Goal is to understand the customer's problem.
 - Though customer may not fully understand it!
- Requirements analysis says: “Make a list of the guidelines we will use to know when the job is done and the customer is satisfied.”
 - Also called requirements gathering or requirements engineering
- System specification says: “Here's a description of *what* the program/system will do (not how) to satisfy the requirements.”
 - Distinguish requirements gathering & system analysis?
 - A top-level exploration into the problem and discovery of whether it can be done and how long it will take.

Objectives of Requirement Analysis

- 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.

Determining Requirements

- A statement of what the system must do or what characteristic it must have.
- During analysis, requirements are written from the perspective of the business people (users).
- Two kinds of requirements:
 - Functional
 - Nonfunctional

Nonfunctional Requirements

Requirement type	Example
Operational	<ul style="list-style-type: none">• The system should be able to fit in a pocket or purse• The system should be able to integrate with the existing inventory system.
Performance	<ul style="list-style-type: none">• Any interaction between the user and the system should not exceed 2 seconds.• The system should receive updated inventory information every 15 minutes.
Security	<ul style="list-style-type: none">• Only direct managers can see personnel records of staff• Customers can see their order history only during business hours.
Cultural & Political	<ul style="list-style-type: none">• The system should be able to distinguish between United States and European currency• The system shall comply with insurance industry standards.

A Good Requirement

- Correct
- Unambiguous
- Consistent
- Verifiable
- Modifiable
- Traceable
- Ranked for importance

A Bad Requirement

- Initial Specification: Software will not be loaded from unknown sources onto the system without first having the software tested and approved.
- Critique:
 - Ambiguous – if the software is tested and approved, can it be loaded from unknown sources?
 - (not) Testable – it is stated as a negative requirement making it difficult to verify.
 - (not) Traceable – a unique identifier is missing.
- Re-specification: 3.4.5.2 Software shall be loaded onto the operational system only after it has been tested and approved.

Requirements Analysis Strategies

- The basic process of analysis is divided into:
 - Understanding the as-is system
 - Identifying improvements
 - Developing requirements for the to-be system

- There are 3 major requirements analysis strategies
 - Business process automation
 - Business process improvement
 - Business process reengineering

Business Process Automation

- BPA leaves the basic way in which the organization operates unchanged and uses computer technology to automate some of the work.
- Low risk, but low payoff.
- Planners in BPA projects invest significant time in understanding the as-is system using:
 - Problem analysis
 - Root cause analysis

Problem Analysis

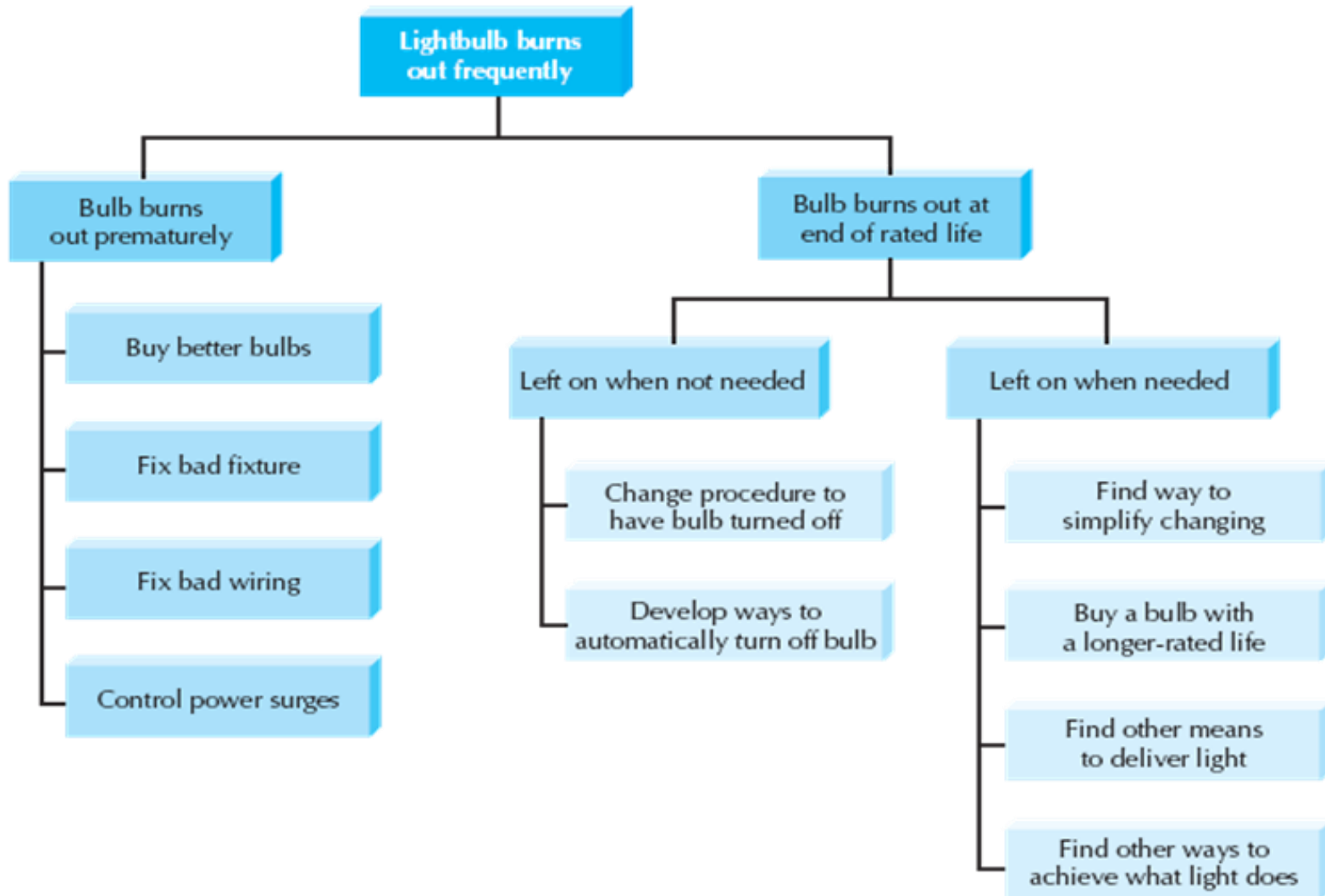
- Users and managers identify problems with the as-is system and describe how to solve them in the to-be system.
- Tends to solve problems rather than capitalize on opportunities.
- Improvements tend to be small and incremental.

Root Cause Analysis

- Users are not asked for solutions, but for:
 - A list of (prioritized) problems.
 - All possible root causes for those problems.

- Analysts investigate each root cause to find:
 - Solutions for the highest priority problems.
 - Root causes that are common to multiple problems.

Root Cause Analysis Example



Business Process Improvement

- BPI makes moderate changes to the way in which the organization operates to take advantage of new opportunities offered by technology or to copy what competitors are doing.
- Common activities:
 - Duration analysis
 - Activity-based costing
 - Informal benchmarking

Business Process Reengineering

- BPR changes the fundamental way in which the organization operates.
- Spends little time understanding the as-is, because their goal is to focus on new ideas and new ways of doing business.
- Popular activities:
 - Outcome analysis
 - Technology analysis
 - Activity elimination

Selecting the Appropriate Strategies

	Business Process Automation	Business Process Improvement	Business Process Reengineering
Potential benefit	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

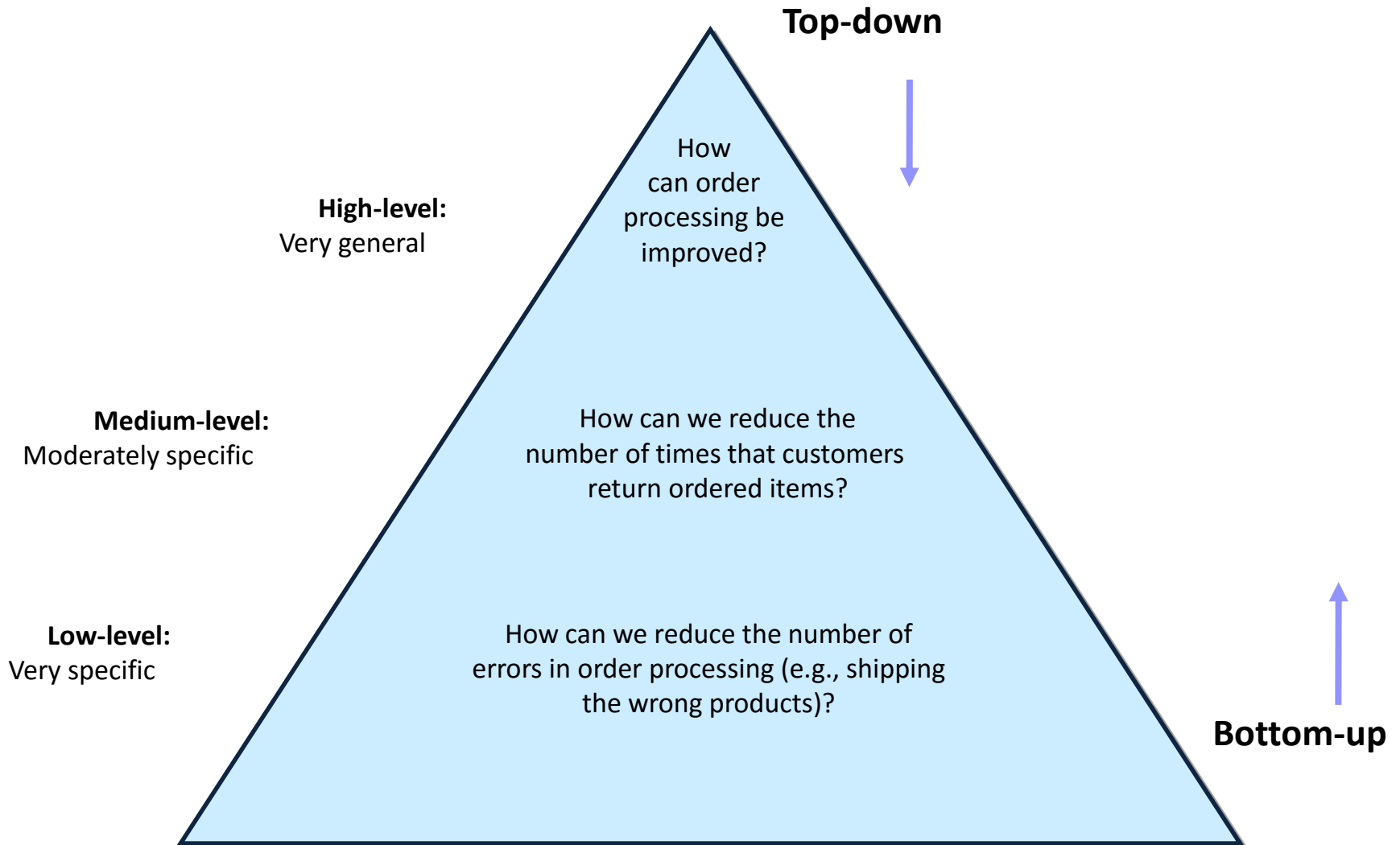
Determining Requirements

- Requirements are best determined by systems analysts and business people (users) together.
- Techniques available to systems analysts:
 - Interviews
 - Questionnaires
 - Observation
 - Document analysis
 - Joint application development (JAD)

1. Interviews

- **Selecting interviewees**
 - Different perspectives: managers, users
- **Designing interview questions**
 - Unstructured (broad), structured (narrow)
- **Preparing for the interview**
 - List questions, set priorities, schedule interview
- **Conducting the interview**
 - Be professional, record info, give interviewee time to ask questions
- **Post-interview follow-up**
 - Review notes, look for gaps

Interviewing Strategies



Types of Questions

Types of Questions	Examples
Closed-Ended Questions	<ul style="list-style-type: none">* How many telephone orders are received per day?* How do customers place orders?* What additional information would you like?
Open-Ended Questions	<ul style="list-style-type: none">* 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	<ul style="list-style-type: none">* Why?* Can you give me an example?* Can you explain that more?

2. Questionnaires

- 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 Questionnaire Designs

Begin with non-threatening 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

3. Observation

- Observation helps check validity of information gathered other ways.
 - Users/managers, when asked, often don't remember everything they do.
 - Most importantly, provide longitudinal information

- But behaviors change when people are watched.

- Be careful not to ignore periodic activities
 - Weekly ... Monthly ... Annual.

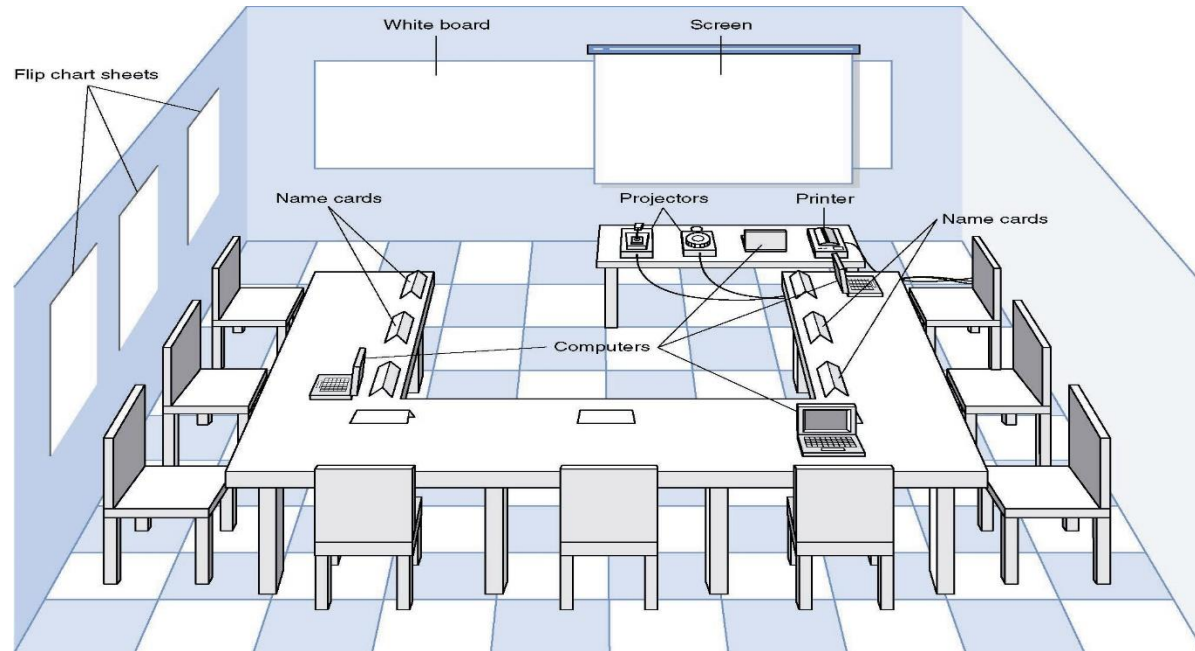
4. Document (Data) Analysis

- Review existing reports, forms, and procedure descriptions.
- Provides clues about existing “as-is” current system.
- Typical documents.
 - Forms
 - Reports
 - Policy manuals
- Look for user additions to forms.
- Look for unused form elements.

5. Joint Application Development (JAD)

- Allows project managers, users, and developers to work together.
- May reduce scope creep by 50%.
- Avoids requirements being too specific or too vague.
- Often the most useful method for collecting information from users.

JAD Meeting Room



The JAD Sessions

- May involve several days over a period of a few weeks.
- Prepare questions as with interviews.
- Formal agenda and ground rules.
- Facilitator activities
 - Keep session on track
 - Help with technical terms and jargon
 - Record group input
 - Help resolve issues
- Post-session follow-up

Key Roles Facilitator Scribe

Managing Problems in JAD Sessions

- Reducing domination
- Encouraging non-contributors
- Avoid side discussions
- Agenda merry-go-round
 - the same issue raised continually
- Violent agreement
 - Inconsistent terminology masks potential agreement
- Unresolved conflict
 - Help group select a better alternative
- True conflict
 - Document as an open issue
- Use humor

Selecting Appropriate Techniques

	Interview	JAD	Questionnaires	Document Analysis	Observation
Type of information	As-is, improves, to-be	As-is, improves, to-be	As-is, improves	As-is	As-is
Depth of info	High	High	Medium	Low	Low
Breadth of info	Low	Medium	High	High	Low
Info integration	Low	High	Low	Low	Low
User involvement	Medium	High	Low	Low	Low
Cost	Medium	Low-medium	Low	Low	Low-medium

As-is : understanding current system

Improves: identifies improvements

To-be: developing the new system