Requirements Determination

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Lesson Outline

- The analysis phase.
- Requirement determination.
- Requirement elicitation techniques.
- Requirement analysis strategies.

THE ANALYSIS PHASE

- **Analysis** refers to breaking a whole into its parts with the intent of understanding the parts' nature, functions, and interrelationships.
- The planning phase deliverables are the key inputs into the analysis phase.

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- The basic process of ***analysis*** involves three steps:
  - Understand the existing situation (the as-is system)
  - Identify improvements
  - Define the requirement for the new system (the to-be system).

"eliminate inventory stock-outs." Example

- The analyst could first have the users think about circumstances leading to stock-outs (e.g., **supplier orders are not placed in a timely way**), and then describe the issues that lead to these circumstances (e.g., **on-hand inventory levels are updated only once a week**; **delays occur in identifying the best supply source for the items**; **delays occur in receiving approval of the supply order**, etc.).
- By focusing on these issues, the team is in a better position t develop new business processes that address these concerns.

"eliminate inventory stock-outs." New requirements

- The system shall update on-hand inventory levels twice per day.
- The system shall produce an out-of-stock notification immediately when an item quantity on hand reaches the item reorder point.
- The system shall include a recommended supplier with every out-of-stock notification.
- The system shall produce a supply purchase order that is sent to the appropriate manager for approval.
- The system shall send an approved supply purchase order to the supplier via secure electronic communication.

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- The final deliverables of the analysis phase is the ***system proposal***.
- The system proposal is presented to the approval committee in the form of a system ***walk-through*** to explain the system in moderate detail.
- The deliverables from the analysis phase are the first step in the design of the new system.

REQUIREMENTS DETERMINATION

- Requirements determination is performed to transform the system request's high-level statement of business requirements into a more detailed, precise list of what the new system must do to provide the needed value to the business

What is a Requirement?

- A requirement is a statement of what the system must do or what characteristics it needs to have.
- Requirements describe
  - what the business needs (***business requirements***)
  - what the users need to do (***user requirements***)
  - what the software should do (***functional requirements***)
  - characteristics the system should have (***non-functional requirements***), and
  - how the system should be built (***system requirements***)

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- Functional requirements

Functional Requirement	Description	Examples
Process-oriented	A process the system must perform; a process the system must do	■ The system must allow registered customers to review their own order history for the past three years. ■ The system must check incoming customer orders for inventory availability. ■ The system should allow students to view a course schedule while registering for classes.
Information-oriented	Information the system must contain	■ The system must retain customer order history for three years. ■ The system must include real-time inventory levels at all warehouses. ■ The system must include budgeted and actual sales and expense amounts for current year and three previous years.

(cont'd)

- Nonfunctional requirements

Nonfunctional Requirement	Description	Examples
Operational	The physical and technical environments in which the system will operate	■ The system can run on handheld devices. ■ The system should be able to integrate with the existing inventory system. ■ The system should be able to work on any Web browser.
Performance	The speed, capacity, and reliability of the system	■ Any interaction between the user and the system should not exceed 2 seconds. ■ The system downloads new status parameters within 5 minutes of a change. ■ The system should be available for use 24 hours per day, 365 days per year. ■ The system supports 300 simultaneous users from 9–11 A.M.; 150 simultaneous users at all other times.
Security	Who has authorized access to the system under what circumstances	■ Only direct managers can see personnel records of staff. ■ Customers can see their order history only during business hours. ■ The system includes all available safeguards from viruses, worms, Trojan horses, etc.
Cultural and Political	Cultural and political factors and legal requirements that affect the system	■ The system should be able to distinguish between U.S. currency and currency from other nations. ■ Company policy is to buy computers only from Dell. ■ Country managers are permitted to authorize custom user interfaces within their units. ■ Personal information is protected in compliance with the Data Protection Act.

Source: The Atlantic Systems Guild, http://www.systemsguild.com

The Process of Determining Requirements

- Both business and IT perspectives are needed to determine requirements during the analysis phase.
- The most effective approach is to have both business people and analysts working together to determine requirements.
- The analyst must also consider how best to elicit the requirements from the stakeholders(user)
- The process of determining requirements continues throughout the analysis phase, and the requirements definition evolves over time.

The Requirements Definition Statement

Functional Requirements

1. New Vehicle Management
- 1.1 The system will allow managers to view the current new vehicle inventory.
- 1.2 The system will allow the new vehicle manager to place orders for new vehicles.
- 1.3 The system will record the addition of new vehicles to inventory when they are received from the manufacturers.

2. Vehicle Sales Management
- 2.1 The system will enable salespersons to create a customer offer.
- 2.2 The system will allow salespeople to know whether an offer is pending on a specific vehicle.
- 2.3 The system will enable managers to record approval of a customer offer.
- 2.4 The system will prepare a sales contract.
- 2.5 The system will prepare a shop work order based on customer requested dealer options.
- 2.6 The system will record a customer deposit.
- 2.7 The system will record a customer payment.
- 2.8 The system will create a record of the customer's vehicle purchase.

3. Used Vehicle Management
- 3.1 The system will record information on a customer trade-in vehicle ... etc.

Nonfunctional Requirements

1. Operational
- 1.1 The system should run on tablet PCs to be used by salespeople.
- 1.2 The system should interface with the shop management system.
- 1.3 The system should connect to printers wirelessly.

2. Performance
- 2.1 The system should support a sales staff of 15 salespeople.
- 2.2 The system should be updated with pending offers on vehicles every 15 minutes.

3. Security
- 3.1 No salesperson can access any other salesperson's customer contacts.
- 3.2 Only the owner and sales manager may approve customer offers.
- 3.3 Use of each tablet PC should be restricted to the salesperson to whom it is assigned.

4. Cultural and Political
- 4.1 Company policy says that all computer equipment is purchased from Dell.
- 4.2 Customer personal information is protected in compliance with the Data Protection Act.
- 4.3 The system will conform to the state's "lemon law."

REQUIREMENTS ELICITATION TECHNIQUES

Requirements Elicitation in Practice

- The analyst should recognize that important side effects of the process of determining requirements include building political support for the project and establishing trust between the project team and the users.
- The analyst should carefully determine who is included in the process of determining requirements.

Interviews

- The most commonly used requirements elicitation technique
- Basic steps:
  - Selecting Interviewees
  - Designing Interview Questions
  - Preparing for the Interview
  - Conducting the Interview
  - Post-Interview Follow-up

Selecting interviewees

- ***Interview schedule***

Name	Position	Purpose of Interview	Meeting
Andria McClellan	Director, Accounting	Strategic vision for new accounting system	Mon, March 1 8:00–10:00 A.M.
Jennifer Draper	Manager, Accounts Receivable	Current problems with accounts receivable process; future goals	Mon, March 1 2:00–3:15 P.M.
Mark Goodin	Manager, Accounts Payable	Current problems with accounts payable process; future goals	Mon, March 1 4:00–5:15 P.M.
Anne Asher	Supervisor, Data Entry	Accounts receivable and payable processes	Wed, March 3 10:00–11:00 A.M.
Fernando Merce	Data Entry Clerk	Accounts receivable and payable processes	Wed, March 3 1:00–3:00 P.M.

- Including people at different levels of the organization
  - Managers
  - Users
  - Other key stakeholders

Designing interview questions

Types of Questions	Examples
Closed-Ended Questions	• How many telephone orders are received per day? • How do customers place orders? • What information is missing from the monthly sales report?
Open-Ended Questions	• What do you think about the way invoices are currently processed? • What are some of the problems you face on a daily basis? • What are some of the improvements you would like to see in the way invoices are processed?
Probing Questions	• Why? • Can you give me an example? • Can you explain that in a bit more detail?

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- Unstructured interview
  - –for a broad and roughly defined set of information
- Structured interview
  - – for very specific information

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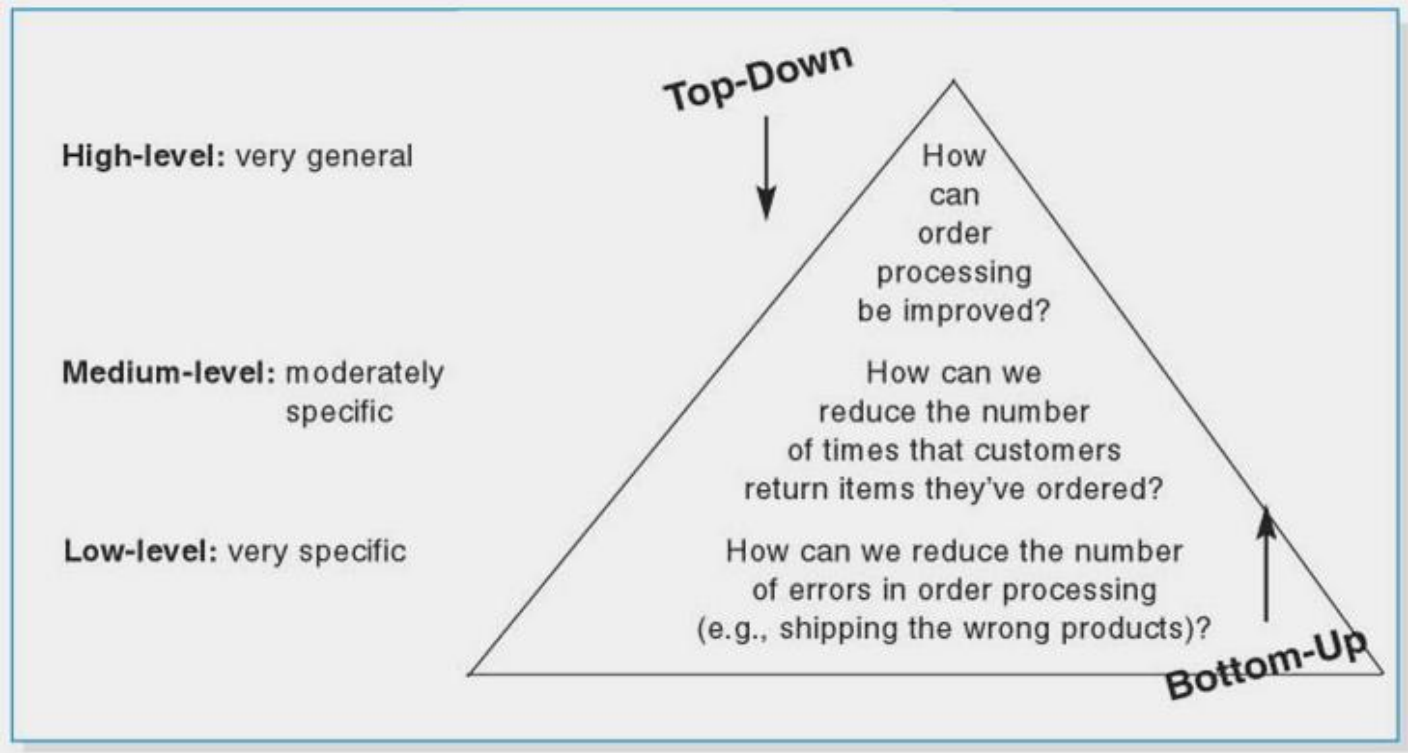
- Top-down vs. bottom-up interview



Preparing for the interview

- Prepare a general interview plan
- 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 to be professional and unbiased.
- Record all information.
- Be sure you understand the issues that are discussed.
- Separate facts from opinions.
- Give interviewee time to ask questions, and brief explain what will happen next.

Post-interview follow-up

- After the interview, the analysts needs to prepare an *interview report.*
- The report includes *interview notes.*
- The report is sent to interviewee with a request to read it and inform the analyst of clarification and updates.

Joint Application Development (JAD)

- JAD is an information gathering technique that allows the project team, users, and management to work together to identify requirements for the system.
- It can reduce scope creep by 50%,
- JAD is a structure process in which 10 to 20 users meet under the direction of a ***facilitator*** skilled in JAD techniques.

Selecting participants

- Selecting JAD participants in the same basic way as selecting interview participants.

- Facilitator
  - Expert in JAD and e-JAD techniques
  - In many cases, the JAD facilitator is a consultant external to the organization.

Designing the JAD session and Preparing for the JAD sessions

- JAD sessions can run from a half day to several weeks depending upon the size and scope of the project.
- JAD success depends upon a careful plan.
- Most JAD sessions are designed to collect specific information from users.
- It is important to prepare the analyst and participants for the JAD session.

Conducting the JAD session

- Most JAD sessions follow formal agenda and ground rules.
- The JAD facilitator performs three key functions:
  - Keep session on track, following the agenda.
  - Help the group understand the technical terms and jargon.
  - Record group's input on a public display area.
- The facilitator must remain neutral at all time and help the group through the process.

Post JAD follow-up

- Postsession report is prepared and circulated among session attendees
- The report should be completed approximately a week to two after the JAD session

Questionnaires

- A **questionnaire** is a set of written questions for obtaining information from individuals.
- **Selecting participants -** using a sample of people who are representative of the entire group.
- **Designing the questionnaire** – following good practice guidelines.
- **Administering the questionnaire** – improving the response rates.
- **Questionnaire follow-up –** developing a report.

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Good questionnaire 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

- **Document analysis** is used to understand the as-is system.
- Forms, reports, policy manuals, organization charts describe the *formal system* that the organization uses.
- The "real" or *informal system* differs from the formal one, and reveals what needs to be changed.
- The indication that system needs to be changed is when users create new forms or make changes to the existing forms/reports.

Observation

- **Observation** – the act of watching processes being performed.
- It is a powerful tool to gain insight into the as-is system, and to check the validity of information gathered from other sources.
- Nonetheless, people tend to be extremely careful in their behaviors when they are being watched.

Selecting the Appropriate Techniques

- Type of information
- Depth of information
- Breadth of information
- Integration of information
- User involvement
- Cost
- Combining techniques

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Comparison of Requirements Elicitation 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

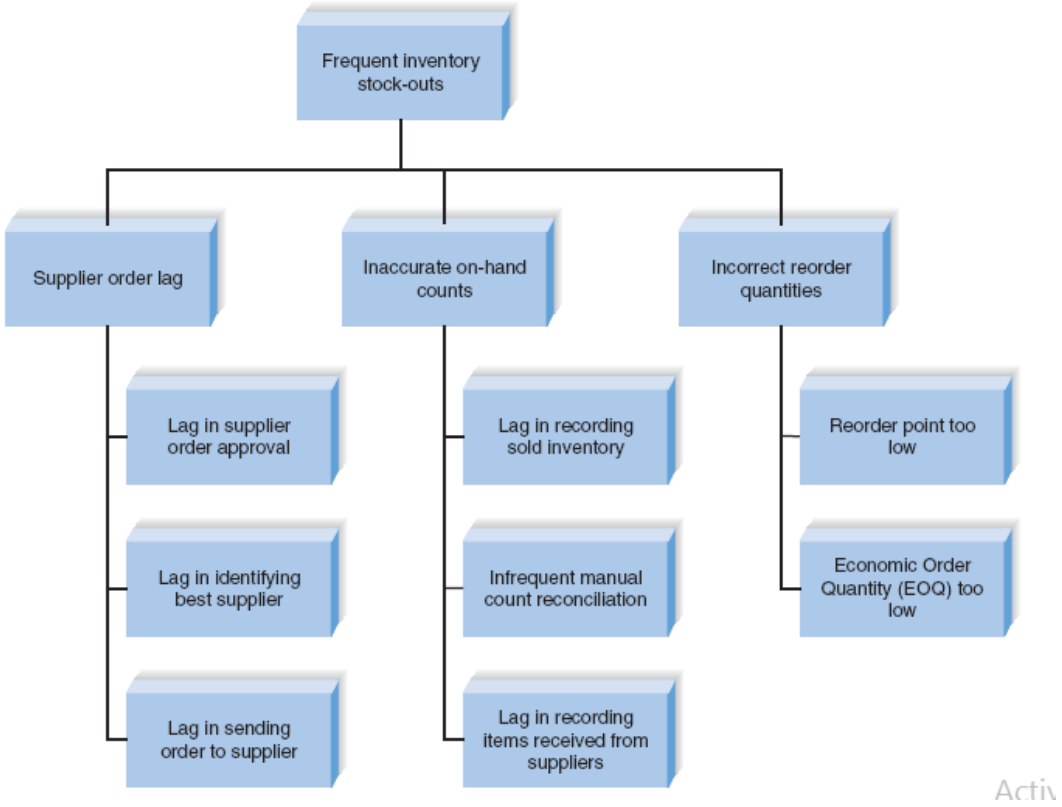
REQUIREMENTS ANALYSIS STRATEGIES

Problem Analysis

- Asking users to identify problems and solutions
- Improvements from problem analysis tend to be small and incremental
- This type of improvements often is very effective at improving a system's efficiency or ease of use; however, it provides minor improvements in business value.

Root Cause Analysis

- **Root cause analysis** focuses on problems first rather than sol



Duration Analysis

- **Duration analysis** requires a detailed examination of amount of time it takes to perform each process in the as-is system.
- Compare the total time to complete basic steps and the total time for the overall process – a significant difference indicates that the process is badly fragmented.
- Potential solutions:
  - Process integration
  - Parallelization

Activity-Based Costing

- **Activity-based costing** examines the cost of each major process or step in a business process.
- Both direct and indirect costs are considered.
- The analysts identify most costly steps and focus improvement efforts on them.

Informal Benchmarking

- **Benchmarking** refers to studying how other organizations perform a business process.
- Informal benchmarking is common for "customer-facing" processes.
- The analysts visit other organizations as customers to watch how the business process is performed.

Outcome Analysis

- **Outcome analysis** focuses on understanding fundamental outcomes that provide value to customers.
- Think what the organization *could* enable the customer to do

Technology Analysis

- **Technology analysis** involves two steps:

1. The analysts and managers list important and interesting technologies.
2. Then, the group identifies how each and every technology might be applied to the business and how the business would benefit.

Activity Elimination

The analysts and managers work together to identify how the organization could eliminate each and every activity in the business process, how the function could operate without it, and what effects are likely to occur.

Comparing Analysis Strategies

- Each of the requirement analysis strategies has its own purpose.
- No one strategy is inherently better that the others.
- The requirement analysis strategy should be chosen to fit the nature of the project.

Outline of the "*Tune Source*" System Proposal

1. **Table of Contents**
2. **Executive Summary**

   A summary of all the essential information in the proposal so that a busy executive can read it quickly and decide what parts of the plan to read in more depth.
3. **System Request**

   The revised system request form. (See Chapter 1.)
4. **Work plan**

   The original work plan, revised after having completed the analysis phase. (See Chapter 2.)
5. **Feasibility Analysis**

   A revised feasibility analysis, using the information from the analysis phase. (See Chapter 1.)
6. **Requirements Definition**

   A list of the functional and nonfunctional business requirements for the system (this chapter).
7. **Use Cases**

   A set of use cases that illustrate the basic processes that the system needs to support. (See Chapter 4.)
8. **Process Model**

   A set of process models and descriptions for the to-be system. (See Chapter 5.) This may include process models of the current as-is system that will be replaced.
9. **Data Model**

   A set of data models and descriptions for the to-be system. (See Chapter 6.) This may include data models of the as-is system that will be replaced.

Appendices

These contain additional material relevant to the proposal, often used to support the recommended system. This might include results of a questionnaire survey or interviews, industry reports and statistics, etc.

SUMMARY

- Analysis focuses on capturing the business requirements for the system
- Requirement Determination is the part of analysis in which the project team turns the business requirements stated in the system request into a precise list of requirements.
- Five Requirements Elicitation Techniques can be used to elicit business requirements.
- Requirements Analysis Strategies are useful for analysts to help the business users think critically about the new system requirements.

Test Questions

- Distinguish between business, user, and functional requirements.

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  - ***business requirements*** what the business needs
  - ***user requirements*** **-** what the users need to do
  - functional requirements - what the software should do

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