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Key Ideas

- The SDLC is the process by which the organization moves
 - from the current system
 - called the **as-is system**
 - to the new system
 - called the **to be system**.
- The output of planning
 - the **system request**
 - provides general ideas for the to-be system,
 - defines the project's scope,
 - provides the initial workplan.
 - .

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Key Ideas

- The analysis phase takes the general ideas in the system request and refines them into
 - a detailed requirements definition,
 - functional models,
 - structural models,
 - behavioral modelsthat together form the **system proposal**.
- The **system proposal** also includes revised project management deliverables,
 - such as the **feasibility analysis and the workplan**.

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Key Ideas

- The goal of the analysis phase
 - to truly understand the requirements of the new system
 - to develop a system that addresses them
 - or to decide a new system isn't needed.
- The **System Proposal** is presented to the approval committee via a system **walk-through**.
 - **system walk-through**
 - a meeting at which the concept for the new system is presented to the users, managers, and key decision makers.
- Systems analysis incorporates initial systems design.
- **Requirements determination** is the single most critical step of the entire SDLC.

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Key Ideas

- The goal of the walkthrough to explain the system in moderate detail so that
 - the users, managers, and key decision makersclearly understand it, can identify needed improvements, are able to make a decision about whether the project should continue.
- If approved, the system proposal moves into the design phase, and its elements
 - (requirements definition, functional, structural, and behavioral modelsare used as inputs to the steps in design.
- This further refines them and defines in much more detail how the system will be built.

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Key Definitions

- The **As-Is system**
 - the current system and may or may not be computerized
- The **To-Be system**
 - the new system that is based on updated requirements
- The **System Proposal**
 - the key deliverable from the Analysis Phase

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Requirements Determination

The requirements definition is a document that lists the new system's capabilities.

It then describes

- how to analyze requirements using business process automation, business process improvement, and business process reengineering techniques
- how to gather requirements using interviews, JAD sessions, questionnaires, document analysis, and observation

- The **requirements determination** step is performed to expand the system request's high-level statement of business requirements into a more precise list.
- This detailed list of requirements can then be used as input into the other activities of the analysis phase:
 - creating use cases,
 - building process models,
 - building a data model.

What is a Requirement?

- A statement of what the system must do
- A statement of characteristics the system must have
- During the analysis phase, requirements are written from the perspective of the businessperson, and they focus on **what the system does**.
- They focus on business user needs, so they usually are called **business requirements** (sometimes, **user requirements**).
- Later in the design phase, business requirements evolve to become more technical, and they describe **how the system will be implemented**.
- Requirements in the design phase are written from the developer's perspective, and they usually are called **system requirements**.

Requirement Types

- **Functional Requirements**
 - A process the system has to perform
 - Information the system must contain
- **Nonfunctional Requirements**
 - Behavioral properties the system must have
 - Operational
 - Performance
 - Security
 - Cultural and political

Functional Requirement

- relates directly to
 - a process the system has to perform or
 - information it needs to contain.
- **For example,**
 - a process-oriented functional requirement would be that the system must have the ability to search for available inventory.
 - An information-oriented functional requirement would be that the system must include actual and budgeted expenses
 - (see next illustration)
- Functional requirements flow directly into the next steps of the analysis process (use cases, process models, data model)
 - because they define the functions that the system needs to have.

Functional Requirements

Functional Requirement	Description	Examples
Process-oriented	A process the system must perform; a process the system must do	<ul style="list-style-type: none"> ■ 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	<ul style="list-style-type: none"> ■ The system must retain customer order history for three years. ■ The system must include real-time inventory levels of all warehouses. ■ The system must include budgeted and actual sales and expense amounts for current year and three previous years.

Nonfunctional Requirements

- refer to behavioral properties that the system must have,
 - such as performance and usability.
- The ability to access the system through a Web browser would be considered a nonfunctional requirement.
- may influence the rest of the analysis process (use cases, process models, and data model),
 - but often do so only indirectly;
 - nonfunctional requirements are primarily used in the design phase when decisions are made about
 - the user interface,
 - the hardware and software,
 - the system's underlying architecture.

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Nonfunctional Requirements

Nonfunctional Requirement	Description	Examples
Operational	The physical and technical environments in which the system will operate	<ul style="list-style-type: none"> ■ 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	<ul style="list-style-type: none"> ■ 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	<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. ■ 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	<ul style="list-style-type: none"> ■ 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.

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- Notice that the nonfunctional requirements describe a variety of characteristics regarding the system:
 - operational,
 - performance,
 - security,
 - cultural
 - political.
- These characteristics do not describe business processes or information, but they are very important in understanding what the final system should be like.
 - For example, the project team needs to know whether a system must be highly secure, requires subsecond response time, or has to reach a multilingual customer base.
- These requirements will affect design decisions that will be made in the design phase, particularly architecture design

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Example...

- One of the most common mistakes made by new analysts is to confuse functional and nonfunctional requirements.
- Pretend that you received the following list of requirements for a sales system:
- Requirements for Proposed System:
- The system should...
 - be accessible to Web users.
 - include the company standard logo and color scheme.
 - restrict access to profitability information.
 - include actual and budgeted cost information.
 - provide management reports.
 - include sales information that is updated at least daily.

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...Example

- have 2-second maximum response time for predefined queries and 10-minute maximum response time for ad hoc queries.
- include information from all company subsidiaries.
- print subsidiary reports in the primary language of the subsidiary.
- provide monthly rankings of salesperson performance.
- QUESTIONS:
 - Which requirements are functional business requirements? Provide two additional examples.
 - Which requirements are nonfunctional business requirements? What kind of nonfunctional requirements are they? Provide two additional examples.

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Requirements Definition

- The requirements definition report
 - usually just called the requirements definition
 is a text report that lists the functional and nonfunctional requirements in an outline format.
 - Next slide shows a sample requirements definition for Holiday Travel Vehicles, a recreational vehicle dealership.
- The requirements are numbered in a legal or outline format so that each requirement is clearly identified.
- 1st, the requirements are grouped into functional and nonfunctional requirements.
- 2nd, within each of those headings, they are grouped further by the type of requirement or by function.

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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.

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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."

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Requirements Definition

- Sometimes, business requirements are prioritized on the requirements definition.
- They can be ranked as having
 - high,
 - medium
 - lowimportance in the new system,
- or they can be labeled with the version of the system that will address the requirement
 - e.g., release 1, release 2, release 3
- This practice is particularly important with RAD methodologies that deliver requirements in batches by developing incremental versions of the system.

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Documenting Requirements

- The **most obvious** purpose of the **requirements definition**
 - to provide the information needed by the other deliverables in the analysis phase, which include
 - use cases, process models, and data models, and to support activities in the design phase.
- The **most important** purpose of the **requirements definition**
 - to define the scope of the system.
- The document describes to the analysts exactly what the final system needs to do.
- In addition, it serves to establish the users' expectations for the system.
- If /when discrepancies or misunderstandings arise,
 - the document serves as a resource for clarification.

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Determining Requirements

- Both business and IT perspectives are needed
 - to determine requirements for the requirements definition.
- Systems analysts may not understand the true business needs of the users.
 - A study by the Standish Group
 - Frank Hayes, "Chaos is back," *Computerworld*, November 8, 2004.found that the lack of user involvement is the top reason for IT project failure.

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Determining Requirements

- On the other hand, the business users may not be aware of the opportunities that a new technology may offer and may simply automate existing, inefficient procedures.
 - A good analogy is building a house or an apartment.
 - We have all lived in a house or apartment, and most of us have some understanding of what we would like to see in one.
 - If we were asked to design one from scratch, however, it would be a challenge because we lack appropriate design skills and technical engineering skills.
 - Likewise, an architect acting alone would probably miss some of our unique requirements.
- Therefore, the most effective approach is to have both businesspeople and analysts working together to determine business requirements.
 - Sometimes, however, the users neither know what they want nor understand what they need.

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Determining Requirements

- It is important that the analyst ensures that the requirements list stays focused and does not become a simple list of user wishes.
- A variety of tools is available to help the analyst help the users discover their true needs.
- These tools are grouped into three broad techniques that are based on the degree of change anticipated in the **to-be system**.
 - **Business process automation (BPA)**
 - generally involves a small amount of change;
 - **business process improvement (BPI)**
 - involves a moderate amount of change.
 - **business process reengineering (BPR)**
 - involves a substantial amount of change.
- According to the high-level business requirements stated in the systems request, the analyst can select the technique that seems to most closely fit the project at hand.

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Basic Process of Analysis

- The three techniques work similarly.
- They help users
 - **critically examine the current state of systems and processes (the as-is system),**
 - **identify exactly what needs to change,**
 - **develop a concept for a new system (the to-be system).**
- Techniques vary in amount of change
 - **BPA – small change**
 - **BPI – moderate change**
 - **BPR – significant change**

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Basic Process of Analysis

- Although BPA, BPI, and BPR enable the analyst to help users create a vision for the new system, additional information gathering techniques are needed
- Therefore, analysts use a portfolio of requirements-gathering techniques to acquire information from users, such as
 - interviews,
 - questionnaires,
 - observation,
 - **joint application development (JAD),**
 - document analysis.
- The information gathered by these techniques is critically analyzed and used to craft the requirements definition.

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Creating the Requirements Definition

- Creating the requirements definition is an iterative and ongoing process whereby
 - **the analyst collects information with requirements-gathering techniques,**
 - **critically analyzes the information to identify appropriate business requirements for the system,**
 - **adds the requirements to the requirements definition report.**
- The requirements definition is kept up to date
 - **so that the project team and business users can refer to it and get a clear understanding of the new system.**

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Creating the Requirements Definition

- To create the requirements definition, the project team
 - **determines the kinds of functional and nonfunctional requirements that they will collect about the system.**
 - These become the main sections of the document.
 - **the analysts use a variety of requirement-gathering techniques**
 - to collect information, and they list the business requirements that were identified from that information.
 - **the analysts work with the entire project team and the business users**
 - to verify, change, and complete the list and to help prioritize the importance of the requirements that were identified.

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Creating the Requirements Definition

- This process continues throughout the analysis phase, and the requirements definition evolves over time as new requirements are identified and as the project moves into later phases of the SDLC.
 - **Beware: The evolution of the requirements definition must be carefully managed.**
 - **The project team cannot keep adding to the requirements definition, or the system will never get finished.**
- Instead, the project team carefully identifies requirements and evaluates which ones fit within the system scope.
 - **When a requirement reflects a real business need, but is not within the scope of the current system or current release, it is added to a list of future requirements or given a low priority.**
- The management of requirements (and system scope) is one of the hardest parts of managing a project!

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Requirements Analysis Techniques

The basic process of **analysis** involves three steps:

Understand the existing situation (the **as-is system**).

Identify improvements.

Define requirements for the new system (the **to-be system**).

The three requirements analysis techniques (BPA, BPI, BPR) help the analysts lead users through the analysis steps so that the vision of the system can be developed.

- Sometimes the 1st step is skipped or done in a limited manner. This happens
 - when no current system exists,
 - if the existing system and processes are irrelevant to the future system,
 - if the project team is using a RAD or agile development methodology
 - in which the as-is system is not emphasized.
- Traditional methods such as waterfall and parallel development typically allot significant time to understanding the as-is system and identifying improvements before moving to capture requirements for the to-be system.

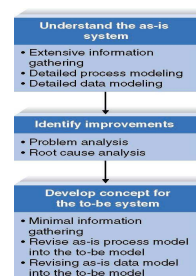
- Newer RAD and agile methodologies, such as
 - iterative development,
 - system prototyping,
 - throwaway prototyping,
 - extreme programming,
 focus almost exclusively on improvements and the to-be system requirements,
- they allow little time for investigating the current as-is system.

- To move the users “from here to there,” an analyst needs strong **critical thinking** skills.
- Critical thinking
 - the ability to recognize strengths and weaknesses and recast an idea in an improved form
 - needed in order for the analyst to understand issues and develop new business processes.
- These skills are essential in
 - examining the results of requirements gathering,
 - identifying business requirements,
 - translating those requirements into a concept for the new system.

Business process automation (BPA)

- used when the basic business requirements outlined in the system request focus on employing computer technology in some aspect of the business process, but leave the basic manner in which the organization operates unchanged.
- These types of projects can improve organizational efficiency, but have the least impact and value for the business.
- Projects in this category typically perform all three steps of the analysis process.
- Two popular activities used in the BPA technique are **problem analysis** and **root cause analysis**.

Business Process Automation



Goal:
Efficiency for users

Identifying Improvements in As-Is Systems - Problem Analysis

- The most straightforward requirements analysis activity.
- Problem analysis means asking the users and managers
 - to identify problems with the as-is system
 - to describe how to solve them in the to-be system.
- Most changes tend to solve problems rather than capitalize on opportunities
- Improvements from problem analysis tend to be small and incremental.
- This type of improvement often is very effective at improving a system's efficiency or ease of use.
 - However, it often provides only minor improvements in business value
 - the new system is better than the old, but it may be hard to identify significant monetary benefits from the new system.

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Identifying Improvements in As-Is Systems - Root Cause Analysis

- The ideas produced by problem analysis tend to be solutions to problems.
 - All solutions make assumptions about the nature of the problem,
 - assumptions that may or may not be valid.
- Users tend to jump quickly to solutions without fully considering the nature of the problem.
- Sometimes the solutions are appropriate, but many times they address a symptom of the problem,
 - not the true problem or root cause itself

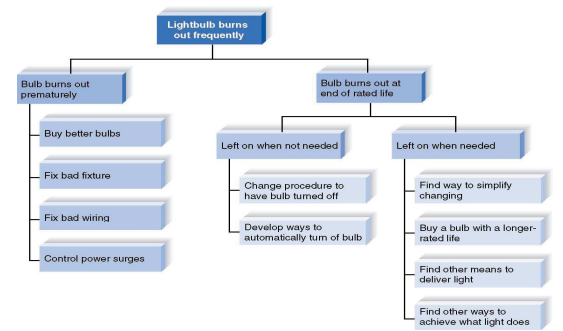
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Identifying Improvements in As-Is Systems - Root Cause Analysis

- Root cause analysis focuses on problems first rather than solutions.
- The analyst starts by having the users generate a list of problems with the current system, then prioritizes the problems in order of importance.
- Starting with the most important, the users and/or analysts generate all possible root causes for the problem.
- The key point in root cause analysis is to always challenge the obvious and dig into the problem deeply enough that the true underlying cause(s) is revealed.

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Root Cause Analysis Example



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Business Process Improvement (BPI)

- means that the basic business requirements target moderate changes to the organization's operations.
- These changes take advantage of new opportunities offered by technology or copy what competitors are doing.
- BPI can improve
 - efficiency
 - doing things right
 - effectiveness
 - doing the right things

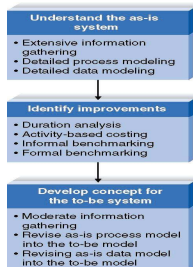
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Business Process Improvement (BPI)

- BPI projects also spend time understanding the as-is system,
 - but much less time than BPA projects;
- their primary focus is on improving business processes,
 - so time is spent on the as-is system only to help with the improvement analyses and the to-be system requirements.
- Three popular BPI activities:
 - duration analysis,
 - activity-based costing,
 - informal benchmarking.

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Business Process Improvement (BPI)



Goal:

Efficiency
and
effectiveness
for users

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Duration Analysis

- requires a detailed examination of the amount of time it takes to perform each process in the current as-is system.
- The analysts begin by determining the total amount of time it takes to perform a set of business processes for a typical input.
- They then time each of the individual steps in the business process.
- The time to complete the basic steps are then totaled and compared with the total for the overall process.
- A significant difference between the two indicates a badly fragmented process
 - the total time often can be 10 or even 100 times longer than the sum of the part

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Duration Analysis

- Potential solutions:
 - Process integration
 - change the process to use fewer people, each with broader responsibilities
 - Parallelization
 - change the process so that individual step are performed simultaneously

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Activity-based costing

- a similar analysis that examines the cost of each major process or step in a business process rather than the time taken.
- The analysts
 - identify the costs associated with each of the basic functional steps or processes,
 - identify the most costly processes,
 - focus their improvement efforts on them.

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Activity-based costing

- Assigning costs is conceptually simple.
- You just examine the direct cost of labor and materials for each input.
- Materials costs are easily assigned in a manufacturing process,
 - while labor costs are usually calculated on the basis of the amount of time spent on the input and the hourly cost of the staff.
- However, there are indirect costs such as rent, depreciation, and so on that also can be included in activity costs.

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Informal Benchmarking

- Benchmarking
 - studying how other organizations perform a business process in order to learn how your organization can do something better.
 - helps the organization by introducing ideas that employees may never have considered, but have the potential to add value.
- Informal benchmarking is fairly common for business processes that interact with the customer.
 - With informal benchmarking, the managers and analysts think about other organizations, or visit them as customers to watch how the business process is performed.

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Informal Benchmarking

- In many cases, the business studied may be a known leader in the industry or simply a related firm.
- For example,
 - suppose the team is developing a Web site for a car dealer.
 - The project sponsor, key managers, and key team members would likely visit the Web sites of competitors, as well as those of others in the car industry
 - e.g., manufacturers, accessories suppliers
 - other industries that have won awards for their Web sites.

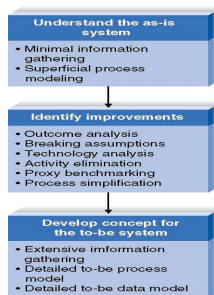
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Business Process Reengineering (BPR)

- changing the fundamental way in which the organization operates
 - Obliterating the current way of doing business and making major changes to take advantage of new ideas and new technology.
- BPR projects spend little time in understanding the as-is system,
 - because their goal is to focus on new ideas and new ways of doing business.
- Popular BPR activities:
 - outcome analysis,
 - technology analysis,
 - activity elimination.

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Business Process Reengineering (BPR)



Goal:

Radical redesign of business processes

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Outcome analysis

- focuses on understanding the fundamental outcomes that provide value to customers.
- For example,
 - suppose you are an insurance company, and one of your customers has just had a car accident.
 - What is the fundamental outcome from the customer's perspective?
 - Traditionally, insurance companies have answered this question by assuming the customer wants to receive the insurance payment quickly.
 - To the customer, however, the payment is only a means to the real outcome: a repaired car.

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Outcome analysis

- The insurance company might benefit by extending their view of the business process past its traditional boundaries to include not paying for repairs, but performing the repairs or contracting with an authorized body shop to do them.
- With this approach, the system analysts encourage the managers and project sponsor
 - to pretend they are customers
 - to think carefully about what the organization's products and services enable the customers to do

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Technology Analysis

- Many major changes in business over the past decade have been enabled by new technologies.
- Technology analysis therefore starts
 - by having the analysts and managers develop a list of important and interesting technologies.
- Then the group
 - identifies how each and every technology could be applied to the business process and
 - identifies how the business would benefit.

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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,
 - what effects are likely to occur.
- Initially, managers are reluctant to conclude that processes can be eliminated, but this is a “force-fit” exercise in that they must eliminate each activity.
- Participants must address each and every activity in the business process.

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Your Turn

- How do you know whether to use
 - business process automation,
 - business process improvement,
 - business process reengineering?
- Provide two examples.

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Selecting an Analysis Technique

- Each of the techniques discussed previously has its own strengths and weaknesses (next slide)
- No one technique is inherently better than the others,
- In practice most projects use a combination of techniques.
- Characteristics of Analysis Techniques
 - Potential business value
 - Project cost
 - Breadth of analysis
 - Risk

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Characteristics of Analysis Techniques

	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

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Potential Business Value

- varies with analysis strategy.
- BPA has the potential to improve the business,
 - most of the benefits from BPA are tactical and small in nature.
 - Since BPA does not seek to change the business processes, it can only improve their efficiency.
- BPI usually offers moderate potential benefits, depending upon the scope of the project,
 - because it seeks to change the business in some way.
 - It can increase both efficiency and effectiveness.
- BPR creates large potential benefits
 - because it seeks to radically improve the nature of the business.

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Project Cost

- BPA requires the lowest cost
 - because it has the narrowest focus and seeks to make the fewest number of changes.
- BPI can be moderately expensive, depending upon the scope of the project.
- BPR is usually expensive,
 - both because of the amount of time required of senior managers and the amount of redesign to business processes.

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Breadth of Analysis

- refers to the scope of analysis, or whether analysis includes business processes within a single business function, processes that cross the organization, or processes that interact with those in customer or supplier organizations.
- BPR takes a broad perspective, often spanning several major business processes, even across multiple organizations.
- BPI has a much narrower scope that usually includes one or several business functions.
- BPA typically examines a single process.

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Risk

- Risk of failure
 - the likelihood of failure due to poor design,
 - unmet needs,
 - too much change for the organization to handle.
- BPA and BPI have low to moderate risk
 - because the to-be system is fairly well defined and understood, and its potential impact on the business can be assessed before it is implemented.
- BPR projects, are less predictable.
 - BPR is extremely risky and not something to be undertaken unless the organization and its senior leadership are committed to making significant changes.
 - Mike Hammer, the father of BPR, estimates that 70 percent of BPR projects fail.

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Requirements-Gathering Techniques



The requirements-gathering process is used for building political support for the project, establishing trust and rapport between the project team building the system and the users who ultimately will choose to use or not use the system.

Involving someone in the process implies that the project teams views that person as an important resource and values his or her opinions.

You must include all of the key stakeholders in the requirements-gathering process. This might include managers, employees, staff members, and even some customers and suppliers.

If you do not involve a key person, that individual may feel slighted, which can cause problems during implementation.

Rapport is a term used to describe, in common terms, the relationship of two or more people who are in sync or on the same wavelength because they feel similar and/or relate well to each other.

- The second challenge of requirements gathering is choosing the way(s) in which information is collected.
- There are many techniques for gathering requirements that vary from asking people questions to watching them work.
- There are five most commonly used techniques:
 - interviews,
 - JAD sessions,
 - questionnaires,
 - document analysis,
 - observation.
- Each technique has its own strengths and weaknesses.

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Interviews

- the most commonly used technique.
 - if you need to know something, you ask someone.
- In general, interviews are conducted one-on-one, but sometimes, due to time constraints, several people are interviewed at the same time.
- There are five basic steps to the interview process:
 - selecting interviewees,
 - designing interview questions,
 - preparing for the interview,
 - conducting the interview,
 - postinterview follow-up.

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Selecting Interviewees

- 1st step to interviewing is to create an interview schedule that lists all of the people who will be interviewed, when, and for what purpose
- The schedule can be an informal list that is used to help set up meeting times, or a formal list that is incorporated into the workplan.
- The people who appear on the interview schedule are selected based on the analyst's information needs.
- The project sponsor, key business users, and other members of the project team can help the analyst determine who in the organization can best provide important information about requirements.

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Selecting Interviewees

- Sample 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 AM
Jennifer Draper	Manager, Accounts Receivable	Current problems with accounts receivable process; future goals	Mon, March 1 2:00–3:15 PM
Mark Goodin	Manager, Accounts Payable	Current problems with accounts payable process; future goals	Mon, March 1 4:00–5:15 PM
Anne Asher	Supervisor, Data Entry	Accounts receivable and payable processes	Wed, March 3 10:00–11:00 AM
Fernando Merce	Data Entry Clerk	Accounts receivable and payable processes	Wed, March 3 1:00–3:00 PM

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Selecting Interviewees

- People at different levels of the organization will have different perspectives on the system,
- it is important to include both managers who manage the processes and staff who actually perform the processes to gain both high-level and low-level perspectives on an issue.
- Also, the kinds of interview subjects that you need may change over time.
- For example, at the start of the project, the analyst has a limited understanding of the as-is business process.
- It is common to begin by interviewing one or two senior managers to get a strategic view, and then move to mid-level managers who can provide broad, overarching information about the business process and the expected role of the system being developed.

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Selecting Interviewees

- Once the analyst has a good understanding of the “big picture,” lower-level managers and staff members can fill in the exact details of how the process works.
- Like most other things about systems analysis, this is an iterative process—starting with senior managers, moving to mid-level managers, then staff members, back to mid-level managers, and so on, depending upon what information is needed along the way.
- It is quite common for the list of interviewees to grow, often by 50 percent to 75 percent.
- As you interview people, you likely will identify more information that is needed and additional people who can provide the information.

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Designing Interview Questions

- There are three types of interview questions:
 - closed-ended questions,
 - open-ended questions,
 - probing questions.

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- Closed-ended questions,
 - are those that require a specific answer
 - used when the analyst is looking for specific, precise information
 - enable analysts to control the interview and obtain the information they need
- However, these types of questions do not uncover why the answer is the way it is, nor do they uncover information that the interviewer does not think to ask ahead of time

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- Open-ended questions,
 - those that leave room for elaboration on the part of the interviewee.
 - are designed to gather rich information and give the interviewee more control over the information that is revealed during the interview.
- Sometimes the information that the interviewee chooses to discuss uncovers information that is just as important as the answer
 - e.g., if the interviewee talks only about other departments when asked for problems, it may suggest that he or she is reluctant to admit his or her own problems

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- **Probing questions**

- follow-up on what has just been discussed in order to learn more,
- are used when the interviewer is unclear about an interviewee's answer.
- encourage the interviewee to expand on or to confirm information from a previous response,
- are a signal that the interviewer is listening and interested in the topic under discussion.

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- Many beginning analysts are reluctant to use probing questions

- because they are afraid that the interviewee might be offended at being challenged
 - because they believe it shows that they didn't understand what the interviewee said.
- When done politely, probing questions can be a powerful tool in requirements gathering.

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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 the new system to provide?
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 in a bit more detail?

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Organizing Interview Questions

- No question type is better than another,
 - usually a combination of questions is used during an interview.
- At the initial stage of an IS development project, the as-is process can be unclear,
 - so the interview process begins with unstructured interviews,
- unstructured interviews
 - seek a broad and roughly defined set of information.
 - the interviewer has a general sense of the information needed, but few close-ended questions to ask.
 - These are the most challenging interviews to conduct because they require the interviewer to ask open-ended questions and probe for important information "on the fly."

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Organizing Interview Questions

- As the project progresses, the analyst comes to understand the business process much better, and (s)he needs very specific information about how business processes are performed
 - At this time, the analyst conducts structured interviews,
- In structured interviews
 - specific sets of questions are developed prior to the interviews.
 - There usually are more close-ended questions in a structured interview than in the unstructured approach.

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Organizing Interview Questions

- Interview questions must be organized into a logical sequence, so that the interview flows well.
 - For example, when trying to gather information about the current business process, it can be useful to move in logical order through the process or from the most important issues to the least important.
- There are two fundamental approaches to organizing the interview questions:
 - topdown interview
 - bottom-up interview

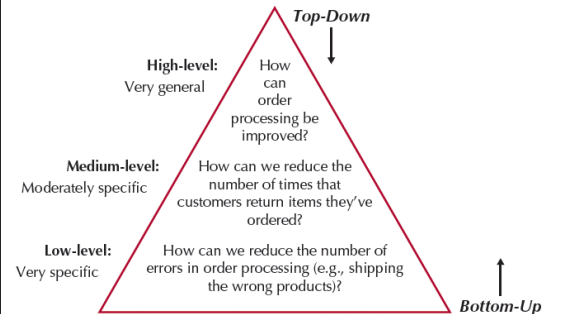
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Organizing Interview Questions

- top-down interview,
 - the interviewer starts with broad, general issues
 - gradually works towards more specific ones.
- bottom-up interview,
 - the interviewer starts with very specific questions
 - moves to broad questions.
- In practice, analysts mix the two approaches,
 - starting with broad general issues,
 - moving to specific questions,
 - moving back to general issues.

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Top-Down and Bottom-Up Questioning Strategies



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Preparing for the Interview

- have a general interview plan that lists the questions that
 - you will ask in the appropriate order;
 - anticipates possible answers and provides how you will follow up with them;
 - identifies segues between related topics.
- Confirm the areas in which the interviewee has knowledge
 - do not ask questions that (s)he or she cannot answer.
- Review the topic areas, the questions, and the interview plan, and clearly decide which have the greatest priority in case you run out of time.

• a segue is a method of smoothly transitioning from one topic to another

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Preparing for the Interview

- structured interviews with closed-ended questions take more time to prepare than unstructured interviews.
 - Some beginning analysts prefer unstructured interviews, thinking that they can “wing it.”
 - This is very dangerous and often counterproductive,
 - because any information not gathered in the first interview would require follow-up efforts
 - most users do not like to be interviewed repeatedly about the same issues.
- Be sure to prepare the interviewee as well.
 - When you schedule the interview, inform the interviewee of the reason for the interview and the areas you will be discussing far enough in advance
 - so that (s)he has time to think about the issues and organize his or her thoughts.

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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

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Conducting the Interview-Practical Tips

- Take time to build rapport
 - Rapport is a term used to describe, in common terms, the relationship of two or more people who are in sync or on the same wavelength because they feel similar and/or relate well to each other
- Pay attention
- Summarize key points
- Be succinct
 - succinct : using few words to state or express an idea, concise
- Be honest
- Watch body language

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Post-Interview Follow-Up

- Prepare interview notes
- Prepare interview report
 - should be written within forty-eight hours of the interview
- Have interviewee review and confirm interview report
- Look for gaps and new questions
- Never distribute someone's information without prior approval

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Joint Application Development (JAD)

- A structured group process focused on determining requirements
- Involves
 - project team,
 - users,
 - managementworking together
- May reduce scope creep by 50%
- Very useful technique

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JAD Participants

- Facilitator
 - Trained in JAD techniques
 - Sets agenda and guides group processes
- Scribe(s)
 - Record content of JAD sessions
- Users and managers from business area with broad and detailed knowledge

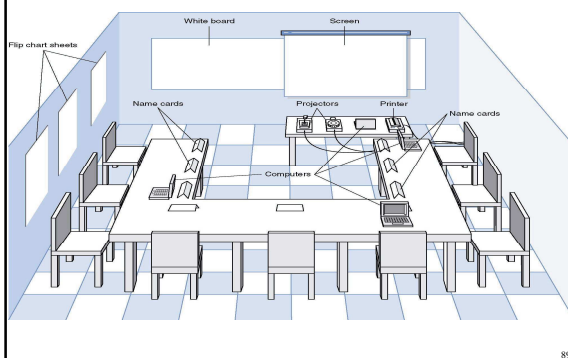
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JAD Sessions

- Time commitment – ½ day to several weeks
- Strong management support is needed to release key participants from their usual responsibilities
- Careful planning is essential
- e-JAD can help alleviate some problems inherent with groups

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JAD Meeting Room



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The JAD Session

- follow a formal agenda and have formal ground rules
 - Common ground rules include
 - following the schedule,
 - respecting others, opinions,
 - accepting disagreement,
 - ensuring that only one person talks a time.
- Top-down structure most successful
- Facilitator activities
 - Keep session on track
 - Help with technical terms and jargon
 - Record group input
 - Stay neutral, but help resolve issues
- Post-session follow-up report

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Managing Problems in JAD Sessions

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

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JAD & PD

- Both Joint Application Design (JAD) and Participatory Design (PD) are based on the premise that the success of a software development project is highly based on the degree of involvement of the users.
- JAD involves a select group of representatives from the user community to be involved in the system design and decision making.
- PD aims to involve all users throughout the development cycle.

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- JAD was originally developed at IBM in 1977 by Chuck Morris and Tony Crawford.
- It involves four main components: facilitation, agenda, documentation, and group dynamic which are realized through group sessions in which the project sponsor, system analysts, and business users participate.
- Before the actual group session occurs, a number of steps occur including: interviewing management, preparing for the logistics of the session, researching the project, documenting preliminary models, and creating the session document.

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- PD was developed Scandinavia in the late 1970's by Pelle Ehn and Morten Kyng.
- The main philosophy behind PD is that the information system should enhance the end users' work and therefore they need to be involved in the development of the system.
- PD involves users and system analysts in group sessions in order system requirements.
- PD discourages the involvement of management and rigid structure, preferring to allow the users to direct the discussion.
- <http://web.njit.edu/~jerry/MIS-645/Articles/Carmel.pdf>

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Table 2. The Generations of JAD

	"Classic" IBM JAD approach	Current JAD directions
Participants in the meetings	Users only	Users and designers
Meeting memory	Scribe/word processing	Design analysis/CASE
Applications	Transaction-oriented	Transaction-oriented, Decision Support Systems and Executive Information Systems
Scope	Applications level only	Applications level, enterprise modeling, functional testing, engineering approach

Table 3. Comparison of JAD and PD

Point of comparison	JAD	PD
Criteria for validation	Quantitative: economic optima, performance indices, time savings	Qualitative: democracy, mutual learning, mutual education, conflict resolution
Background/theory	Group dynamics, software engineering	Labor relations, group learning
Goal	Improved system	Improved workplace
Roots	— Industry — USA/Canada	— Government, unions, academe — Scandinavia
Current practice	Consultancy for profit	Consultancy on principle
Themes	Teamwork, accelerated design, completeness	Democracy of the workplace, social context, industrial democracy, empowerment, humanisation
Focal activity	The meeting — delimited by time — set agenda	Group processes: — satisfaction delimited — agenda negotiable
Techniques' emphasis	Structure	Creativity
Perspective on users	— Both operational workers and managers are considered "users" — User selection based on competence criteria — Users are viewed as one source of knowledge	— "Users" are the operational/users. Managers are grouped separately — User participation is mandatory — Users are viewed as primary source of knowledge

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Reported Benefits of JAD

Time Savings	. Repair effort per defect is only 10% in JAD phase as compared to system test phase
. Efficiency	. 30-40% in design phase and 20-30 in implementation
. Effectiveness	. 15% cycle reduction . 4 to 6 weeks saved at one firm- Western-Southeran Life
Costs	. Cost avoidance of \$500K in a Project at Texas Instruments
. Effectiveness	. JAD removes 50% of the defects of the requirements phase
. Efficiency	. 25% in design phase
Completeness	. 90% of users would do it again- Texas Instruments
. Effectiveness	. 94% for users had a better understanding- American Airlines
. Usability	. 100% of users said that the system was at least "GOOD" at AA
Subjective Evaluation	. SATISFACTION

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Questionnaires

- A set of written questions, often sent to a large number of people
- May be paper-based or electronic
- Select participants using samples of the population
- Design the questions for clarity and ease of analysis
- Administer the questionnaire and take steps to get a good response rate
- Questionnaire follow-up report

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Good Questionnaire Design

- 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

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Document Analysis

- Study of existing material describing the current system
- Forms, reports, policy manuals, organization charts describe the **formal system**
- Look for the **informal system** in user additions to forms/report and unused form/report elements
- User changes to existing forms/reports or non-use of existing forms/reports suggest the system needs modification

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Observation

- Watch processes being performed
- Users/managers often don't accurately recall everything they do
- Checks validity of information gathered other ways
- Be aware that behaviors change when people are watched
- Be unobtrusive
- Identify peak and lull periods

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Selecting the Appropriate Requirements-Gathering Techniques

- Each of the requirements-gathering techniques has strengths and weaknesses.
- No one technique is always better than the others, and in practice most projects use a combination of techniques.
- Depends on the followings
 - Type of information
 - Depth of information
 - Breadth of information
 - Integration of information
 - User involvement
 - Cost
 - Combining techniques

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Selecting the Appropriate Techniques

	Interviews	JAD	Questionnaires	Document Analysis	Observation
Type of Information	As-Is Improve. To-Be	As-Is Improve. To-Be	As-Is Improve.	As-Is	As-Is
Depth of Information	High	High	Medium	Low	Low
Breadth of Information	Low	Medium	High	High	Low
Integration of Info.	Low	High	Low	Low	Low
User Involvement	Medium	High	Low	Low	Low
Cost	Medium	Low-Medium	Low	Low	Low-Medium

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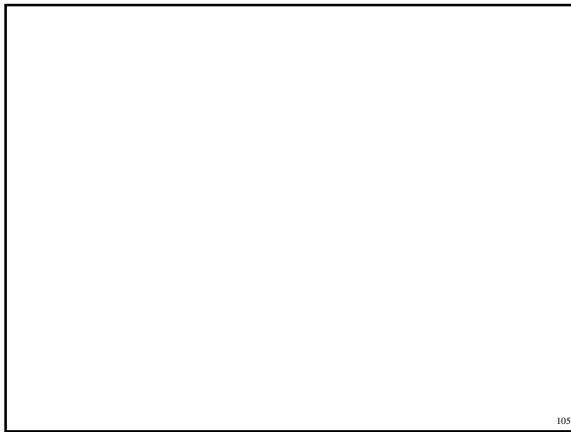
Summary

- The analysis process focuses on capturing the business requirements for the system
- Functional and non-functional business requirements tell **what** the system must do
- Three main requirements analysis techniques are
 - BPA,
 - BPI,
 - BPR
- These techniques vary in potential business value, but also in potential cost and risk

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- There are five major requirements-gathering techniques that all systems analysts must be able to use:
 - Interviews,
 - JAD,
 - Questionnaires,
 - Document Analysis,
 - Observation.
- Systems analysts must also know how and when to use each as well as how to combine methods.

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