Project Scope Management

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Learning Objectives

- Understand the importance of good project scope management
- Discuss methods for collecting and documenting requirements in order to meet stakeholder needs and expectations
- Explain the scope definition process and describe the contents of a project scope statement
- Discuss the process for creating a work breakdown structure using the analogy, top-down, bottom-up, and mind-mapping approaches
- Explain the importance of verifying scope and how it relates to defining and controlling scope
- Understand the importance of controlling scope and approaches for preventing scope-related problems on information technology projects
- Describe how software can assist in project scope management

What is Project Scope Management?

- **Scope** refers to *all* the work involved in creating the products of the project and the processes used to create them
  - *A **deliverable** is a product produced as part of a project, such as hardware or software, planning documents, or meeting minutes*
- Project scope management includes the processes involved in defining and controlling what is or is not included in a project
  - *Ensures that the project team and stakeholders have the same understanding of what products the project will produce and what processes the project team will use to produce them*

Project Scope Management Processes

- ***Planning scope management****: determining how the project's scope and requirements will be managed*
- **Collecting requirements**: defining and documenting the features and functions of the products produced during the project as well as the processes used for creating them
- **Defining scope**: reviewing the project charter, requirements documents, and organizational process assets to create a scope statement
- **Creating the WBS**: subdividing the major project deliverables into smaller, more manageable components
- **Verifying scope**: formalizing acceptance of the project deliverables
- **Controlling scope**: controlling changes to project scope throughout the life of the project

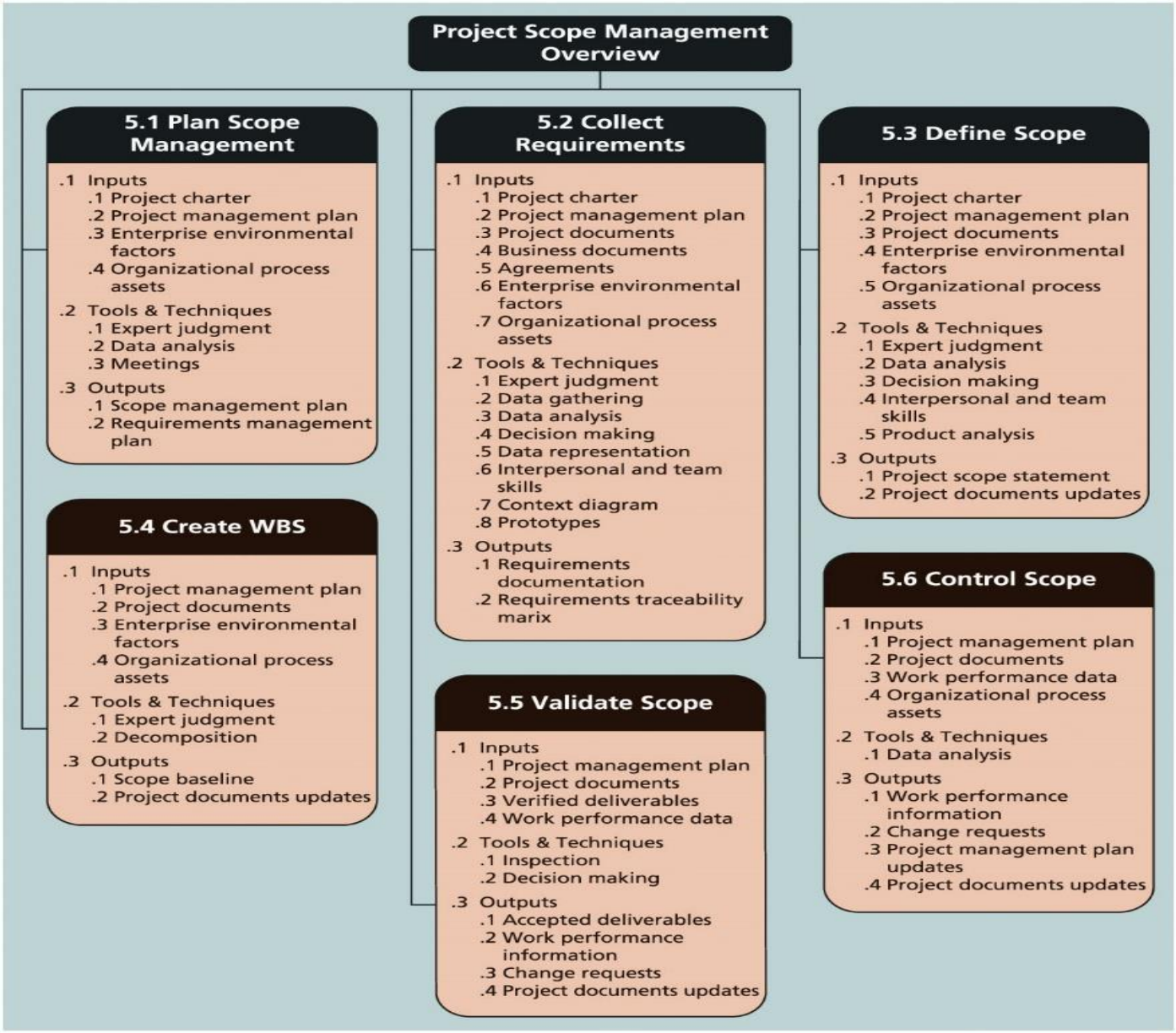
Project Scope Management Summary

Planning
Process: **Collect requirements**
Outputs: Requirements documentation, requirements management plan, requirements traceability matrix
Process: **Define scope**
Outputs: Project scope statement, project document updates
Process: **Create WBS**
Outputs: WBS, WBS dictionary, scope baseline, project document update

Monitoring and Controlling
Process: **Verify scope**
Outputs: Accepted deliverables, change requests, project document updates
Process: **Control Scope**
Outputs: Work performance measurements, organizational process assets updates, change requests, project management plan updates, project document updates

Project Start → **Project Finish**

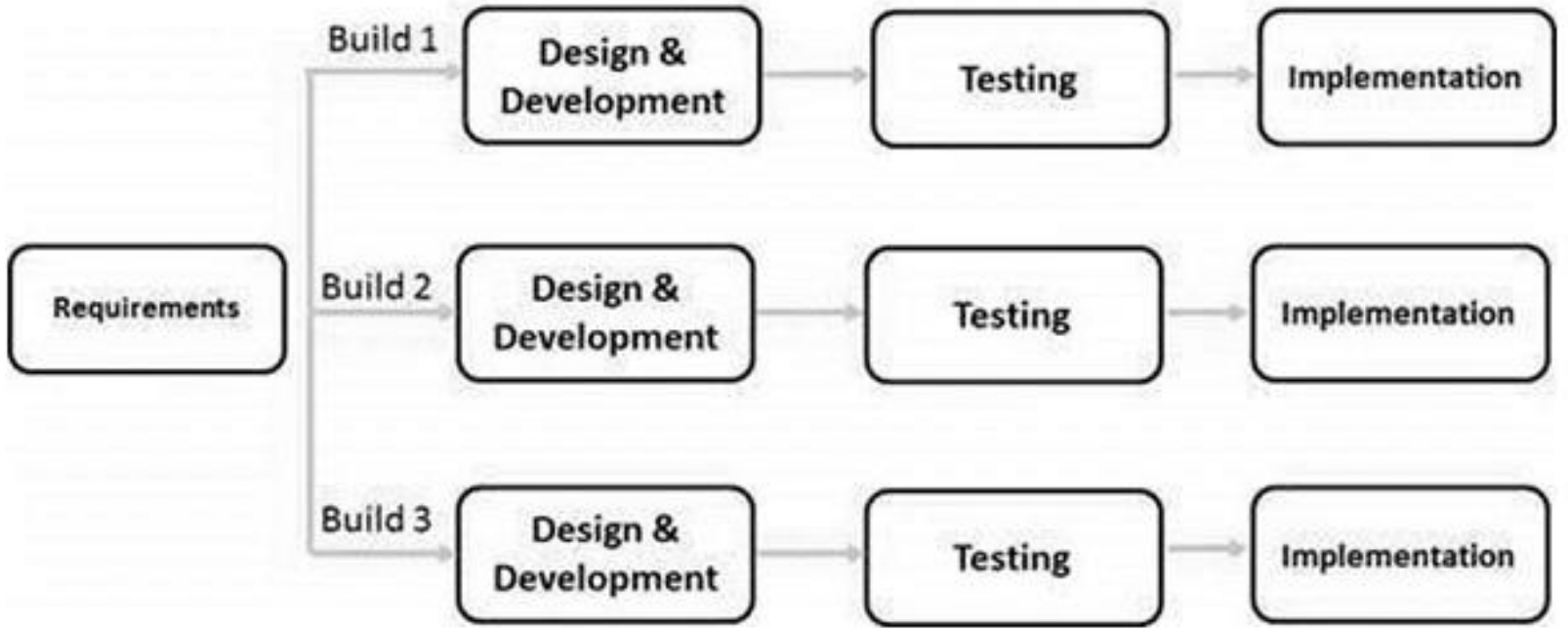
Project Scope Management Processes



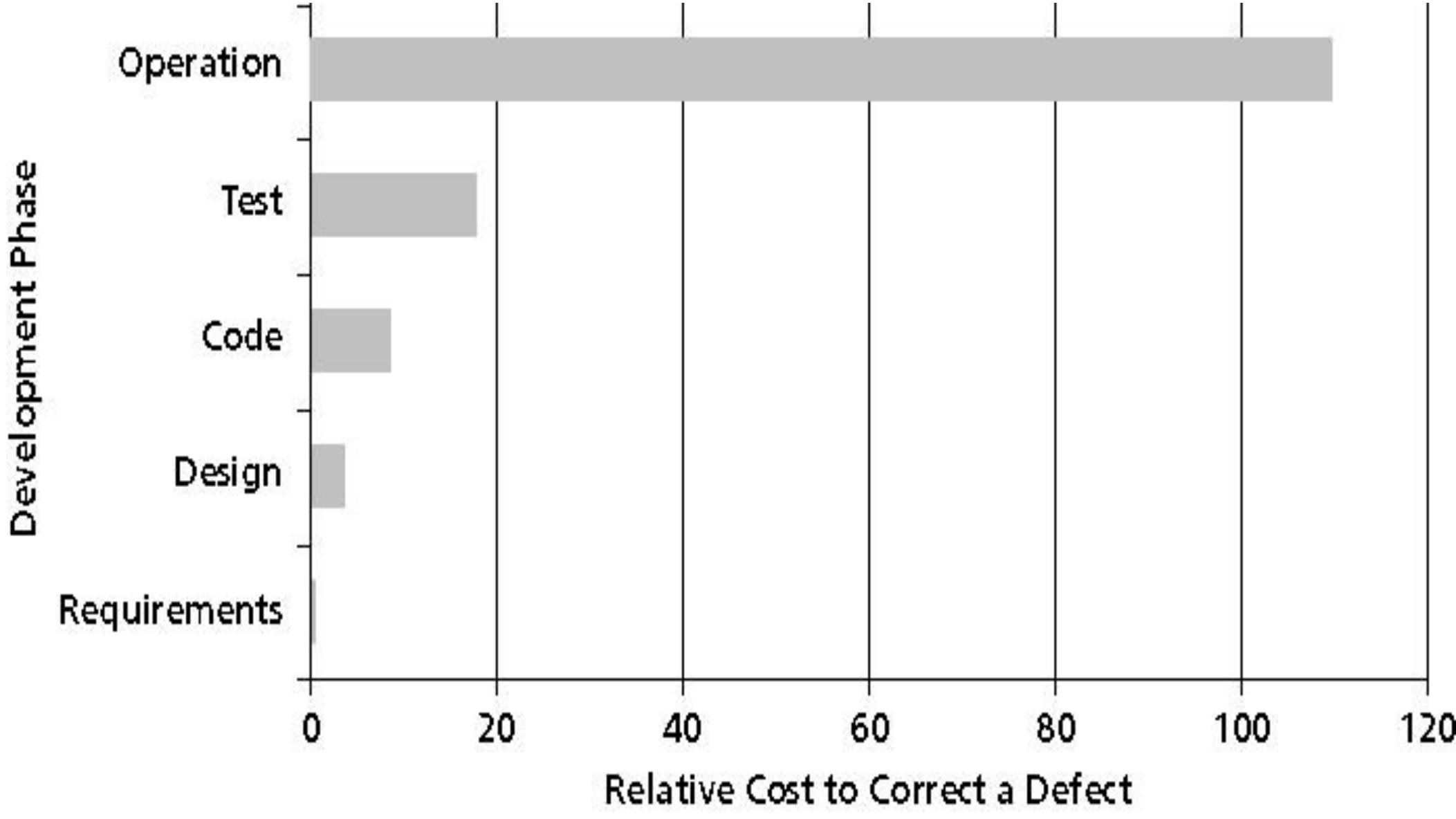
Source: *PMBOK® Guide – Sixth Edition*, Project Management Institute, Inc.

Collecting Requirements

- A **requirement** is “a condition or capability that must be met or possessed by a system, product, service, result, or component to satisfy a contract, standard, specification, or other formal document” (PMBOK® Guide, 2008)
- For some IT projects, it is helpful to divide requirements development into categories called elicitation, analysis, specification, and validation
- It is important to use an iterative approach to defining requirements since they are often unclear early in a project



Relative Cost to Correct a Software Requirement Defect



Methods for Collecting Requirements

- Interviewing
- Focus groups and facilitated workshops
- Using group creativity and decision-making techniques
- Questionnaires and surveys
- Observation
- Prototyping
- Software tools

Defining Scope

- Key inputs for preparing the project scope statement include
  - *the project charter,*
  - *requirements documentation,*
  - *and organizational process assets such as policies and procedures related to scope statements as well as project files and lessons learned from previous, similar projects*
- As time progresses, the scope of a project should become more clear and specific
- It is also helpful to document other scope-related information
  - *Project boundaries, constraints, and assumptions*
  - *Supporting document references (e.g., product specifications)*

Documenting Requirements

- Requirements documents are often generated by software and include text, images, diagrams, videos, and other media; they are often broken down into different categories such as functional, service, performance, quality, training requirements, and so on
- A **requirements management plan** describes how project requirements will be analyzed, documented, and managed
- A **requirements traceability matrix (RTM)** is a table that lists requirements, various attributes of each requirement, and the status of the requirements to ensure that all requirements are addressed

Requirement No.	Name	Category	Source	Status
R32	Laptop memory	Hardware	Project charter and corporate laptop specifications	Complete. Laptops ordered meet requirement by having 4GB of memory.

Further Defining Project Scope

Project Charter:

Upgrades may affect servers . . . (listed under Project Objectives)

Project Scope Statement, Version 1:

Servers: If additional servers are required to support this project, they must be compatible with existing servers. If it is more economical to enhance existing servers, a detailed description of enhancements must be submitted to the CIO for approval. See current server specifications provided in Attachment 6. The CEO must approve a detailed plan describing the servers and their location at least two weeks before installation.

Project Scope Statement, Version 2:

Servers: This project will require purchasing ten new servers to support Web, network, database, application, and printing functions. Virtualization will be used to maximize efficiency. Detailed descriptions of the servers are provided in a product brochure in Appendix 8 along with a plan describing where they will be located.

Media Snapshot

- Inaccurate requirements gathering continues to be one of the main causes of project failure
  - *For every dollar spent on projects and programs, 5.1 percent is wasted due to poor requirements management*
- Organizations need to develop people, processes, and culture to improve requirements management

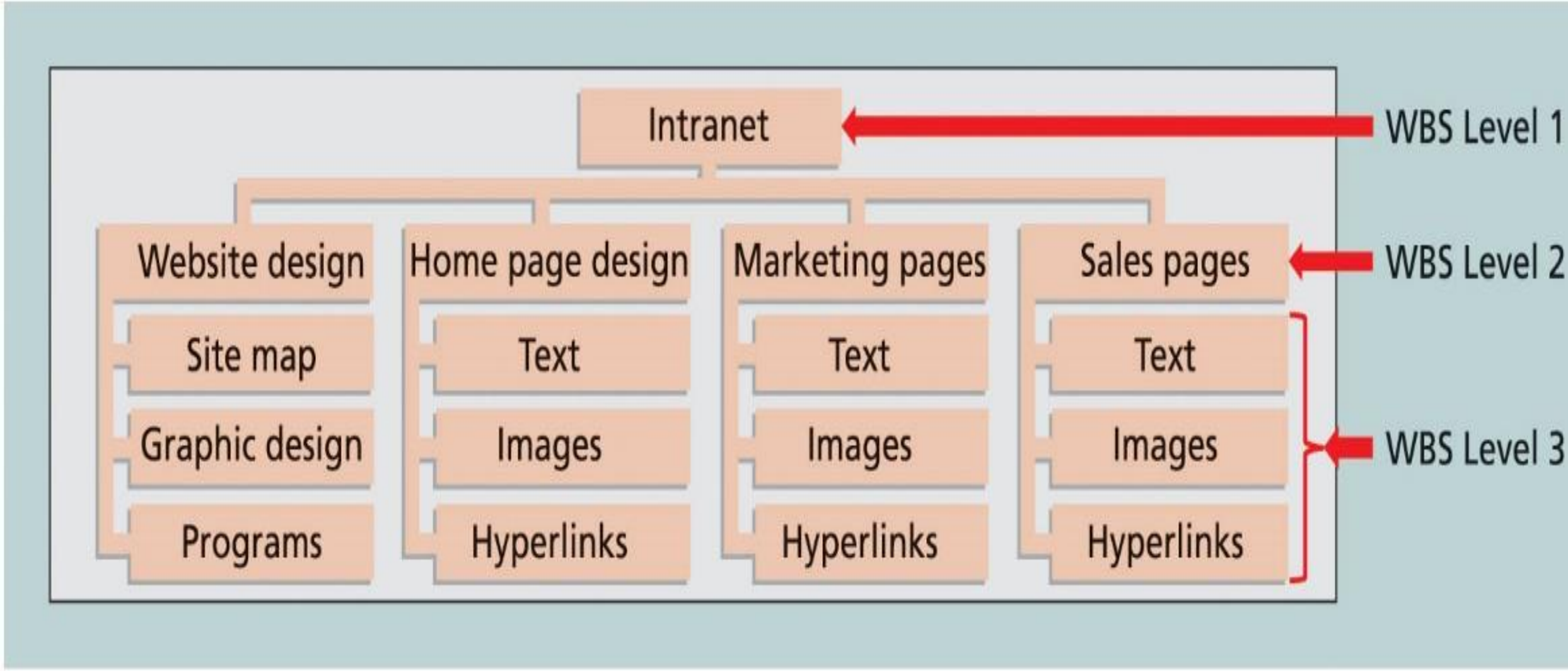
Media Snapshot

- Many people enjoy watching television shows like *Trading Spaces*, where participants have two days and $1,000 to update a room in their neighbor's house; since the time and cost are set, it's the scope that has the most flexibility
- Although most homeowners are very happy with work done on the show, some are obviously disappointed; part of agreeing to be on the show includes signing a release statement acknowledging that you will accept whatever work has been done
- Too bad you can't get sponsors for most projects to sign a similar release form; it would make project scope management much easier!

Creating the Work Breakdown Structure

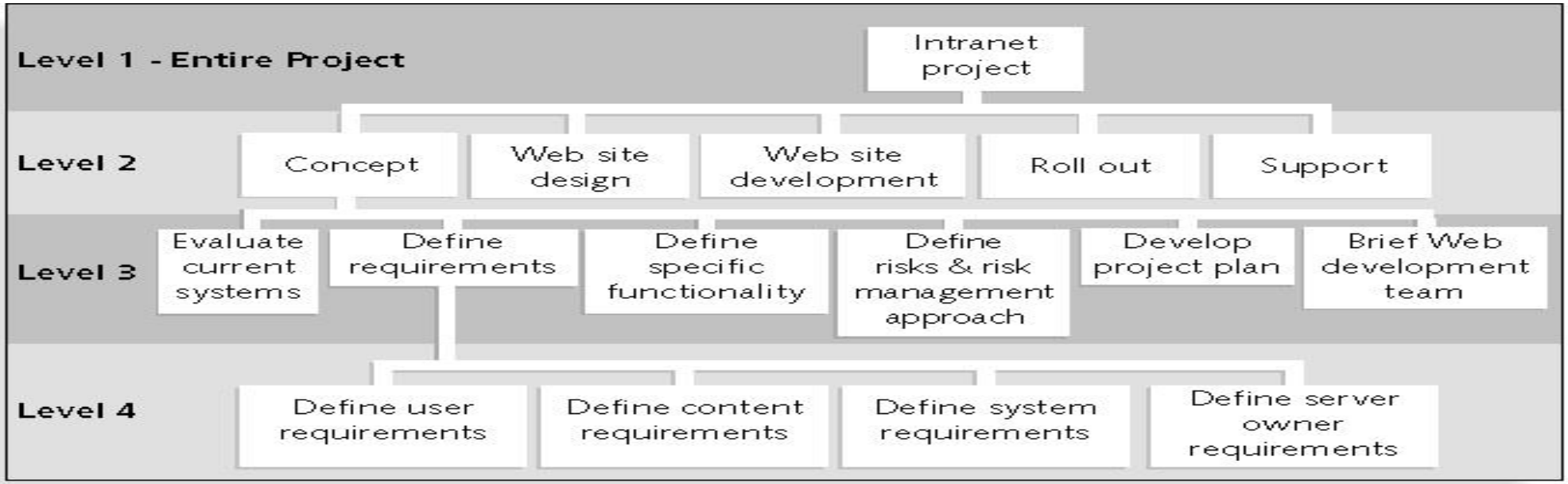
- Work Breakdown Structure (WBS) is a deliverable-oriented grouping of the work involved in a project that defines the total scope of the project
  - *Foundation document that provides the basis for planning and managing project schedules, costs, resources, and changes*
- Decomposition is the main tool or technique for creating a WBS
  - *Subdividing project deliverables into smaller pieces*
  - *A work package is a task at the lowest level of the WBS*
- Outputs of creating the WBS are the scope baseline and project documents updates
  - *Scope baseline includes the approved project scope statement and its associated WBS and WBS dictionary*

Sample Intranet WBS Organized by Product



Sample Intranet WBS Organized by Product

Chart form →



Tabular form with Microsoft Project numbering

1.0 Concept
- 1.1 Evaluate current systems
- 1.2 Define requirements
  - 1.2.1 Define user requirements
  - 1.2.2 Define content requirements
  - 1.2.3 Define system requirements
  - 1.2.4 Define server owner requirements
- 1.3 Define specific functionality
- 1.4 Define risks and risk management approach
- 1.5 Develop project plan
- 1.6 Brief Web development team

2.0 Web site design
3.0 Web site development
4.0 Roll out
5.0 Support

Tabular form with PMI numbering

1.1 Concept
- 1.1.1 Evaluate current systems
- 1.1.2 Define requirements
  - 1.1.2.1 Define user requirements
  - 1.1.2.2 Define content requirements
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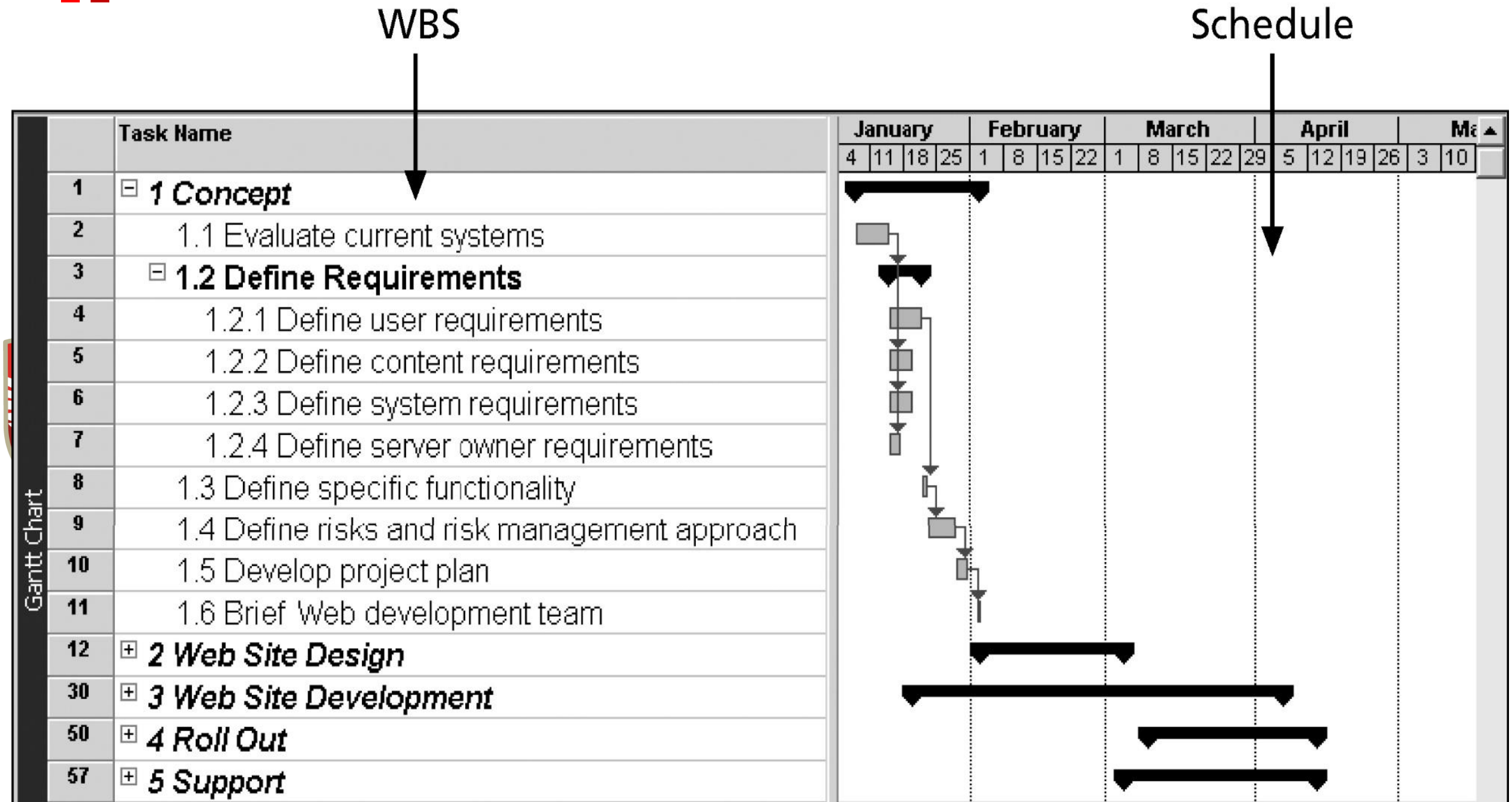
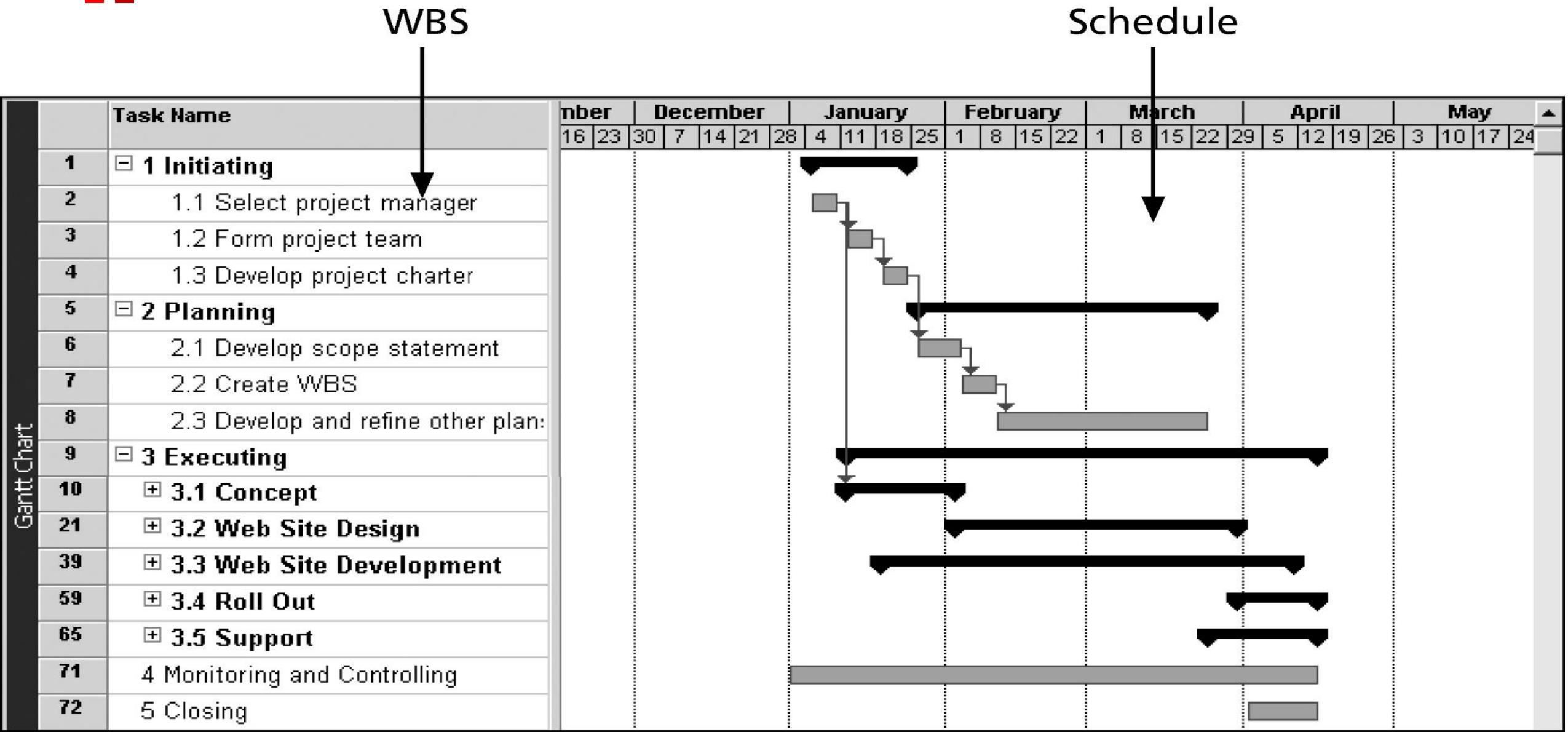
- 1.1.5 Develop project plan
- 1.1.6 Brief Web development team

1.2 Web site design
1.3 Web site development
1.4 Roll out
1.5 Support

Intranet WBS and Gantt Chart in Microsoft Project



Intranet Gantt Chart Organized by Project Management Process Groups



Executing Tasks for JWD Consulting's WBS

3.0 Executing

- 3.1 Survey
- 3.2 User inputs
- 3.3 Intranet site content
  - 3.3.1 Templates and Tools
  - 3.3.2 Articles
  - 3.3.3 Links
  - 3.3.4 Ask the Expert
  - 3.3.5 User requests feature
- 3.4 Intranet site design
- 3.5 Intranet site construction
- 3.6 Site testing
- 3.7 Site promotion
- 3.8 Site roll out
- 3.9 Project benefits measurement

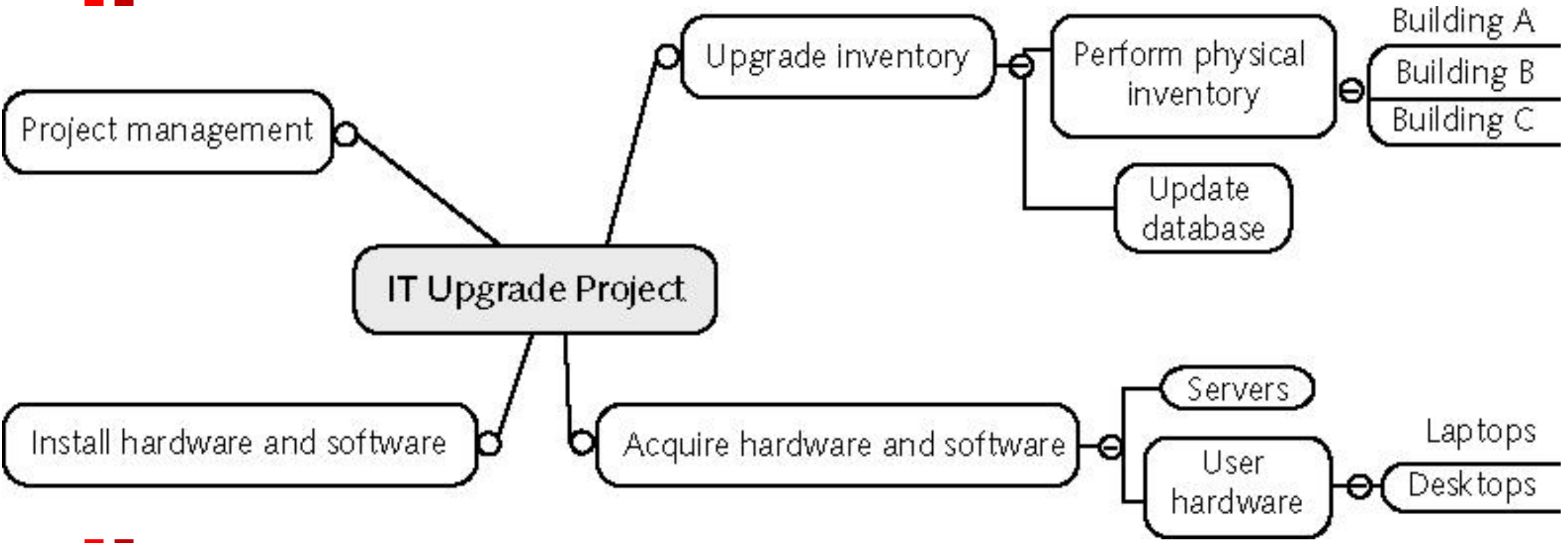
Creating the Work Breakdown Structure

1.0 Software Product Release 5.0		
	1.1 Project Management	
		1.1.1 Planning
		1.1.2 Meetings
		1.1.3 Administration
	1.2 Product Requirements	
		1.2.1 Software
		1.2.2 User Documentation
		1.2.3 Training Program Materials
	1.3 Detail Design	
		1.3.1 Software
		1.3.2 User Documentation
		1.3.2 User Documentation
	1.4 Construct	
		1.4.1 Software
		1.4.2 User Documentation
		1.4.3 Training Program Materials
	1.5 Integration and Test	
		1.5.1 Software
		1.5.2 User Documentation
		1.5.3 Training Program Materials

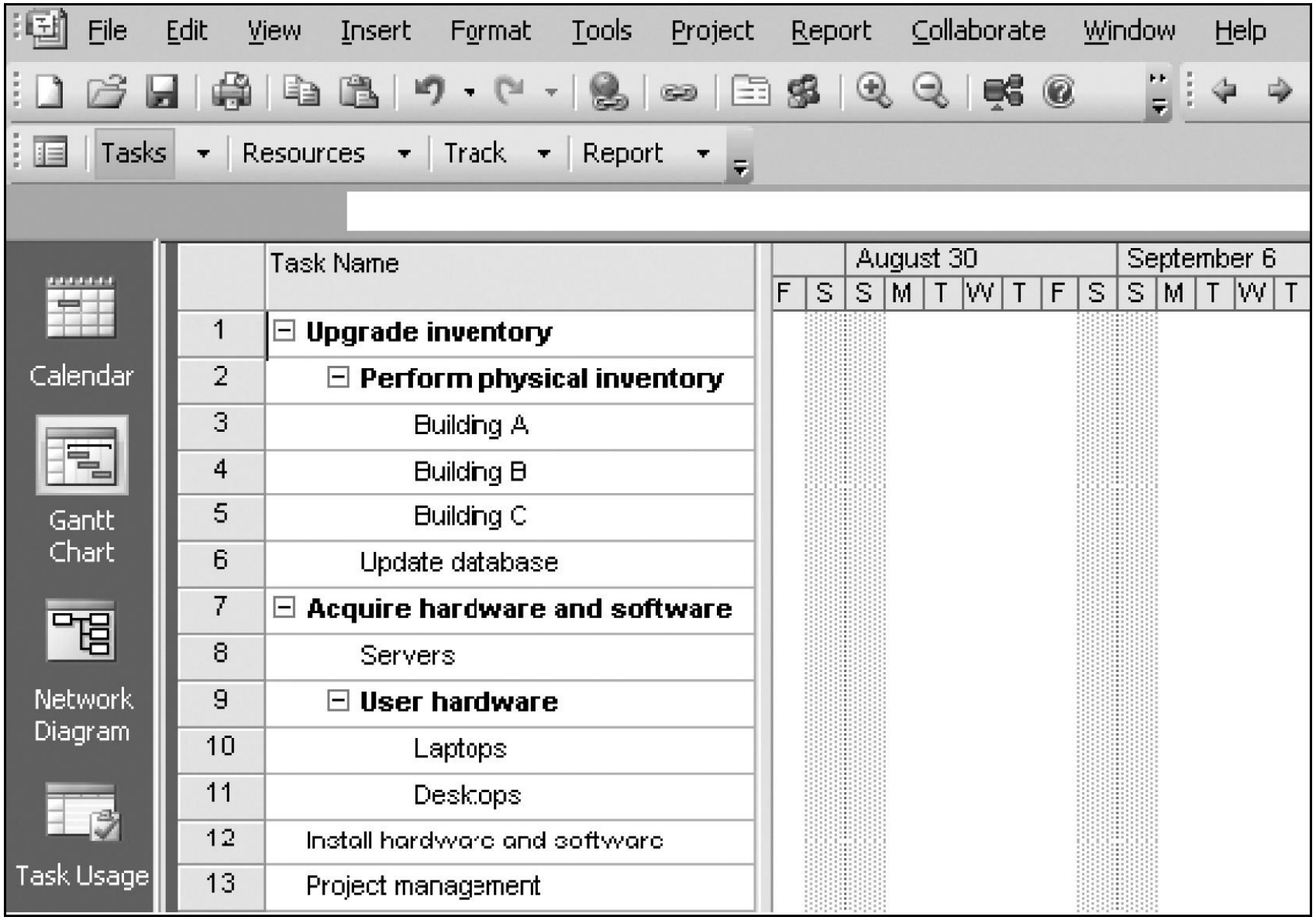
Approaches to Developing WBSs

- Using guidelines: some organizations, like the DOD, provide guidelines for preparing WBSs
- The **analogy approach**: review WBSs of similar projects and tailor to your project
- The **top-down approach**: start with the largest items of the project and break them down
- The **bottom-up approach**: start with the specific tasks and roll them up
- Mind-mapping approach: **mind mapping** is a technique that uses branches radiating out from a core idea to structure thoughts and ideas

Sample Mind-Mapping Approach for Creating a WBS



Project 2007 File with WBS Generated from a Mind Map



Advice for Young Professionals

- It is very difficult to create a good WBS
  - *Attend meetings in your organization where teams work together*
  - *Ask to see WBSs for projects that have been completed or are in process*

  Conduct your own research to find examples of different WBSs

The WBS Dictionary and Scope Baseline

- Many WBS tasks are vague and must be explained more so people know what to do and can estimate how long it will take and what it will cost to do the work
- A **WBS dictionary** is a document that describes detailed information about each WBS item
- The approved project scope statement and its WBS and WBS dictionary form the **scope baseline**, which is used to measure performance in meeting project scope goals

The WBS Dictionary

- Advice for creating a WBS and WBS dictionary
  - *Unit of work should appear at only one place in the WBS*
  - *Work content of a WBS item is the sum of the WBS items below it*
  - *WBS item is the responsibility of only one individual, even though many people may be working on it*
  - *WBS must be consistent with the way in which work is actually going to be performed; it should serve the project team first, and other purposes only if practical*
  - *Project team members should be involved in developing the WBS to ensure consistency and buy-in*
  - *Each WBS item must be documented in a WBS dictionary to ensure accurate understanding of the scope of work included and not included*
  - *WBS must be a flexible tool to accommodate inevitable changes while properly maintaining control of the work content in the project according to the scope statement*

The WBS Dictionary

WBS Dictionary Entry March 20
Project Title: Information Technology (IT) Upgrade Project
WBS Item Number: 2.2
WBS Item Name: Database Update
Description: The IT department maintains an online database of hardware and software on the corporate intranet. We need to make sure that we know exactly what hardware and software employees are currently using and if they have any unique needs before we decide what to order for the upgrade. This task will involve reviewing information from the current database, producing reports that list each department's employees and location, and updating the data after performing the physical inventory and receiving inputs from department managers. Our project sponsor will send a notice to all department managers to communicate the importance of this project and this particular task. In addition to general hardware and software upgrades, the project sponsors will ask the department managers to provide information for any unique requirements they might have that could affect the upgrades. This task also includes updating the inventory data for network hardware and software. After updating the inventory database, we will send an e-mail to each department manager to verify the information and make changes online as needed. Department managers will be responsible for ensuring that their people are available and cooperative during the physical inventory. Completing this task is dependent on WBS Item Number 2.1, Physical Inventory, and must precede WBS Item Number 3.0, Hardware and Software Acquisition.

Verifying Scope

- It is very difficult to create a good scope statement and WBS for a project
  - *It is even more difficult to verify project scope and minimize scope changes*
- **Scope verification** involves formal acceptance of the completed project scope by the stakeholders
- Acceptance is often achieved by a customer inspection and then sign-off on key deliverables

Controlling Scope (1 of 3)

- Scope control involves controlling changes to the project scope
  - *Keeping project goals and business strategy in mind*
- Goals of scope control
  - *Influence the factors that cause scope changes*
  - *Ensure changes are processed according to procedures developed as part of integrated change control*
  - *Manage changes when they occur*
- Variance is the difference between planned and actual performance

Controlling Scope

- Scope control involves controlling changes to the project scope
  - Keeping project goals and business strategy in mind
- Goals of scope control are to:
  - *Influence the factors that cause scope changes*
  - *Assure changes are processed according to procedures developed as part of integrated change control*
  - *Manage changes when they occur*
- **Variance** is the difference between planned and actual performance

Controlling Scope

- Suggestions for improving user input
  - *Develop a good project selection process and insist that sponsors are from the user organization*
  - *Place users on the project team*
  - *Conduct regular meetings with defined agendas*
  - *Deliver something to users and sponsors on a regular basis*
  - *Do not promise to deliver what the team cannot deliver in a particular time frame*
  - *Locate users with the developers*

Controlling Scope

- Suggestions for reducing incomplete and changing requirements
  - *Develop and follow a requirements management process*
  - *Employ techniques such as prototyping, use case modeling, and JAD to get more user involvement*
  - *Put requirements in writing and keep them current*
  - *Create a requirements management database for documenting and controlling requirements*
  - *Provide adequate testing and conduct it throughout the project life cycle*
  - *Review changes from a systems perspective*
  - *Emphasize completion dates to help focus on what's most important*
  - *Allocate resources specifically for handling change requests*

Best Practices for Avoiding Scope Problems

1. Keep the scope realistic. Don't make projects so large that they can't be completed. Break large projects down into a series of smaller ones.
2. Involve users in project scope management. Assign key users to the project team and give them ownership of requirements definition and scope verification.
3. Use off-the-shelf hardware and software whenever possible. Many IT people enjoy using the latest and greatest technology, but business needs, not technology trends, must take priority.
4. Follow good project management processes. As described in this chapter and others, there are well-defined processes for managing project scope and others aspects of projects.

Suggestions for Improving User Input

- Develop a good project selection process and insist that sponsors are from the user organization
- Have users on the project team in important roles
- Have regular meetings with defined agendas, and have users sign off on key deliverables presented at meetings
- Deliver something to users and sponsors on a regular basis
- Don’t promise to deliver when you know you can’t
- Co-locate users with developers

Suggestions for Reducing Incomplete and Changing Requirements

- Develop and follow a requirements management process
- Use techniques such as prototyping, use case modeling, and JAD to get more user involvement
- Put requirements in writing and keep them current
- Create a requirements management database for documenting and controlling requirements

Suggestions for Reducing Incomplete and Changing Requirements (continued)

- Provide adequate testing and conduct testing throughout the project life cycle
- Review changes from a systems perspective
- Emphasize completion dates to help focus on what's most important
- Allocate resources specifically for handling change requests/enhancements like NWA did with ResNet

Using Software to Assist in Project Scope Management

- Word-processing software helps create several scope-related documents
- Spreadsheets help to perform financial calculations and weighted scoring models and to develop charts and graphs
- Communication software like e-mail and the Web help clarify and communicate scope information
- Project management software helps in creating a WBS, the basis for tasks on a Gantt chart
- Specialized software is available to assist in project scope management

Chapter Summary

- Project scope management includes the processes required to ensure that the project addresses all the work required, and only the work required, to complete the project successfully

Main processes include:

- *Collect requirements*
- *Define scope*
- *Create WBS*
- *Verify scope*
- *Control scope*

Assignment 2

soon