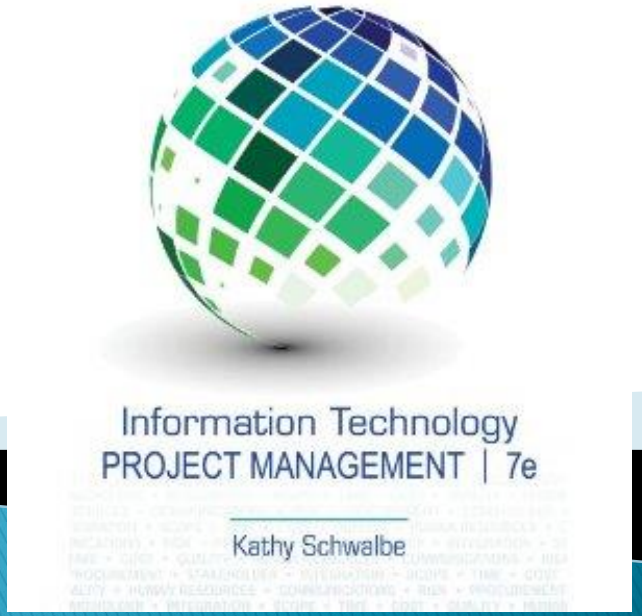
Chapter 4: Project Integration Management

Information Technology Project Management, Seventh Edition



Note: See the text itself for full citations.

Learning Objectives

- Describe an overall framework for project integration management as it relates to the other project management knowledge areas and the project life cycle
- Discuss the strategic planning process and apply different project selection methods
- Explain the importance of creating a project charter to formally initiate projects
- Describe project management plan development, understand the content of these plans, and review approaches for creating them

Learning Objectives

- Explain project execution, its relationship to project planning, the factors related to successful results, and tools and techniques to assist in directing and managing project work
- Describe the process of monitoring and controlling a project
- Understand the integrated change control process, planning for and managing changes on information technology (IT) projects, and developing and using a change control system
- Explain the importance of developing and following good procedures for closing projects
- Describe how software can assist in project integration management

The Key to Overall Project Success: Good Project Integration Management

- Project managers must coordinate all of the other knowledge areas throughout a project's life cycle
- Many new project managers have trouble looking at the "big picture" and want to focus on too many details (See opening case for a real example)
- Project integration management is *not* the same thing as software integration

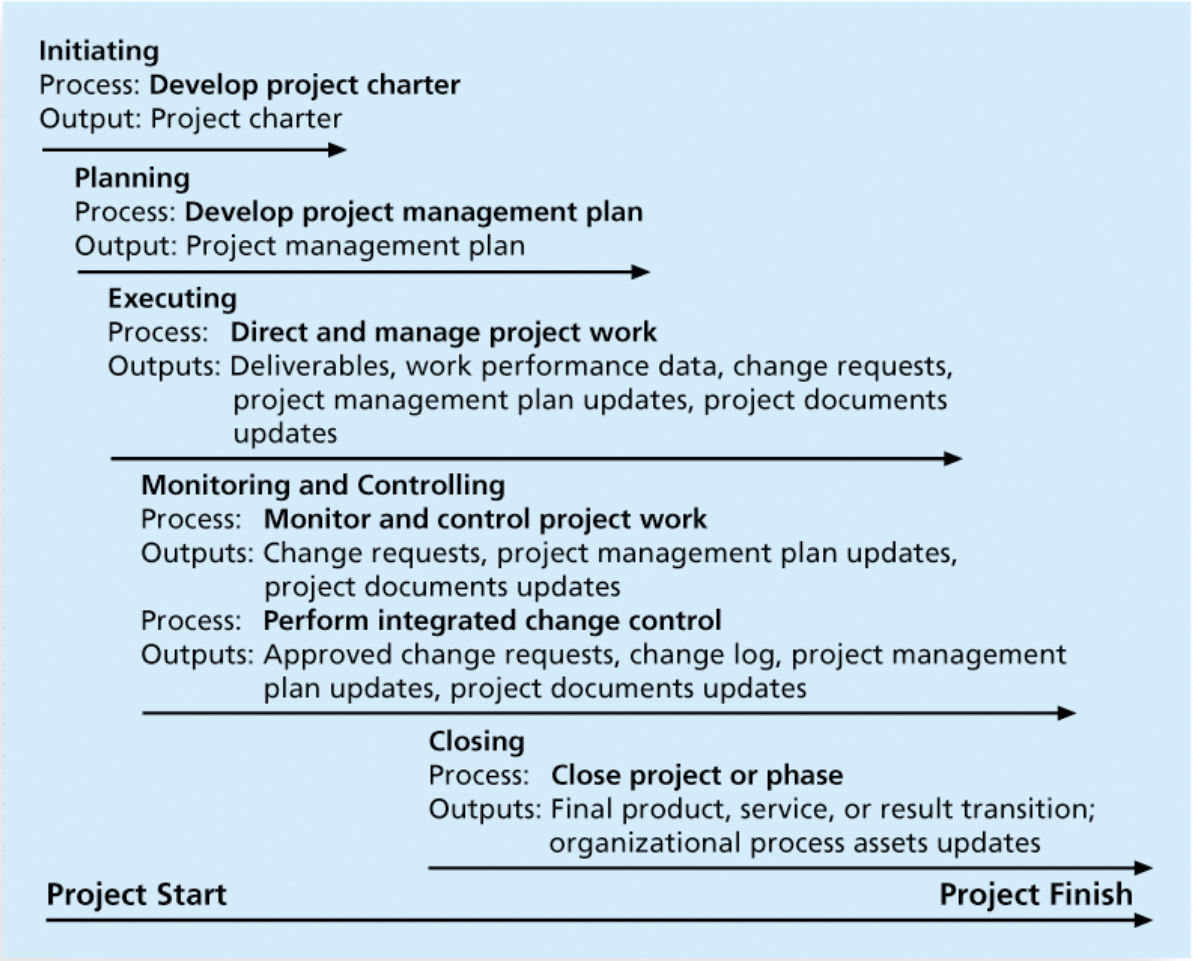
Project Integration Management Processes

- 1. Developing the project charter involves working with stakeholders to create the document that formally authorizes a project—the charter.
- 2. Developing the project management plan involves coordinating all planning efforts to create a consistent, coherent document—the project management plan.
- 3. Directing and managing project work involves carrying out the project management plan by performing the activities included in it.

Project Integration Management Processes (cont'd)

- Monitoring and controlling project work involves overseeing activities to meet the performance objectives of the project
- Performing integrated change control involves identifying, evaluating, and managing changes throughout the project life cycle.
- Closing the project or phase involves finalizing all activities to formally close the project or phase.

Figure 4-1. Project Integration Management Summary



What Went Wrong?

- The Airbus A380 megajet project was two years behind schedule in Oct. 2006, causing Airbus' parent company to face an expected loss of $6.1 billion over the next four years
- The project suffered from severe integration management problems, or "integration disintegration...Early this year, when pre-assembled bundles containing hundreds of miles of cabin wiring were delivered from a German factory to the assembly line in France, workers discovered that the bundles, called harnesses, didn't fit properly into the plane. Assembly slowed to a near-standstill, as workers tried to pull the bundles apart and re-thread them through the fuselage. Now Airbus will have to go back to the drawing board and redesign the wiring system."*

*Matlack, Carol. "First, Blame the Software," *BusinessWeek Online (October 5, 2006).*

Strategic Planning and Project Selection

- **Strategic planning** involves determining long-term objectives, predicting future trends, and projecting the need for new products and services
- Organizations often perform a **SWOT analysis**
  - analyzing **S**trengths, **W**eaknesses, **O**pportunities, and **T**hreats
- As part of strategic planning, organizations
  - identify potential projects
  - use realistic methods to select which projects to work on
  - formalize project initiation by issuing a project charter

Figure 4-2. Mind Map of a SWOT Analysis to Help Identify Potential Projects

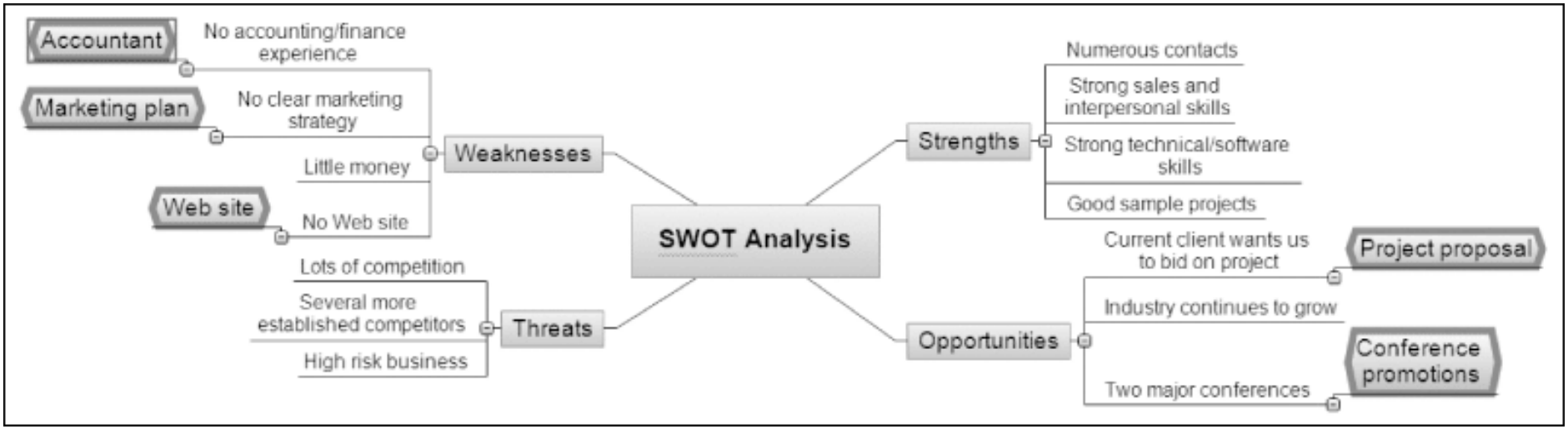
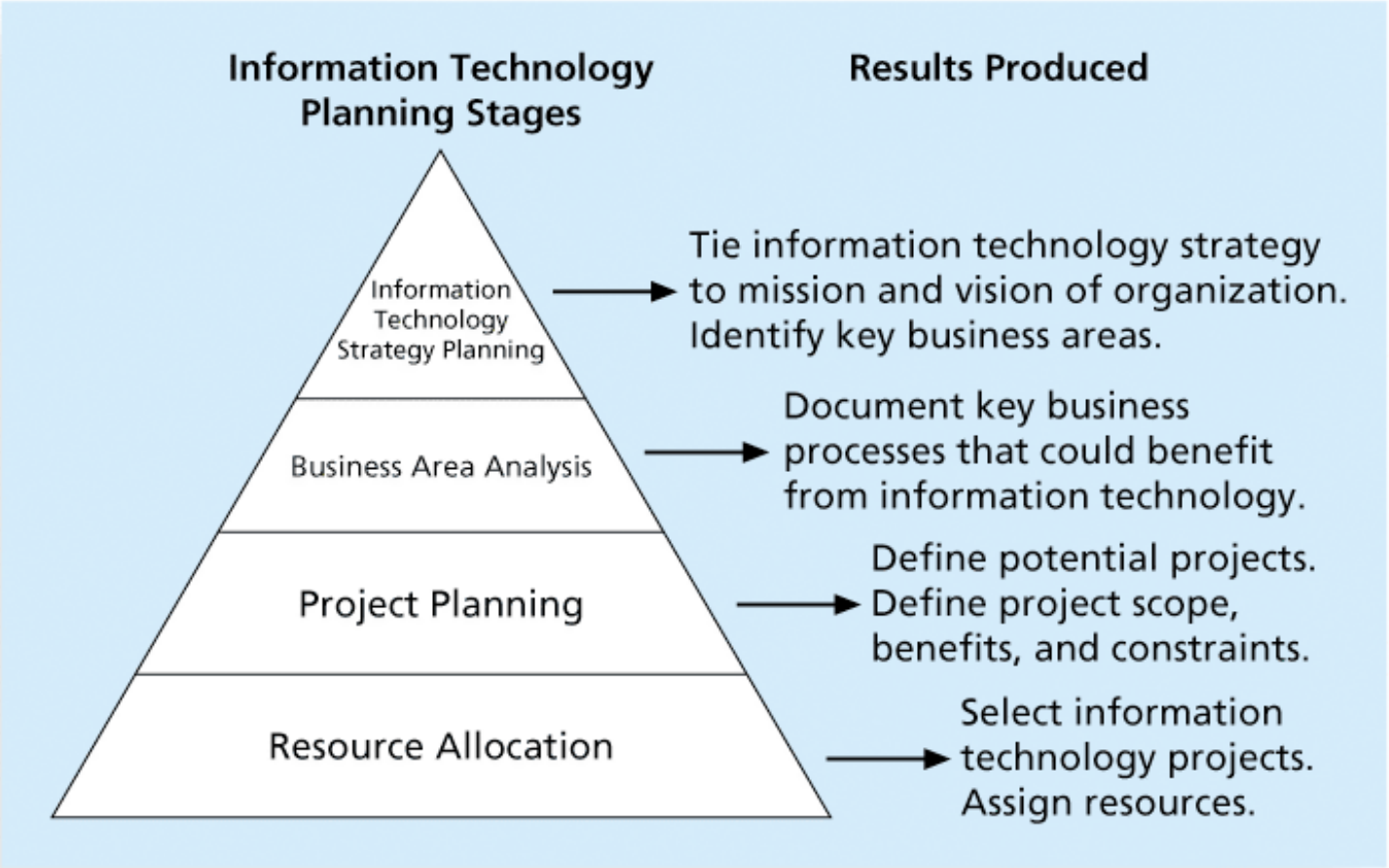


Figure 4-3. Information Technology Planning Process



Best Practice

- Only one in seven product concepts comes to fruition. Why is it that some companies, like Proctor & Gamble, Johnson and Johnson, Hewlett Packard, and Sony are consistently successful in NPD? Because they use a disciplined, systematic approach to NPD projects based on best practices
- Four important forces behind NPD success include the following:
  1. A product innovation and technology strategy for the business
  2. Resource commitment and focusing on the right projects, or solid portfolio management
  3. An effective, flexible and streamlined idea-to-launch process
  4. The right climate and culture for innovation, true cross-functional teams, and senior management commitment to NPD

Methods for Selecting Projects

- There are usually more projects than available time and resources to implement them
- Methods for selecting projects include:
  - focusing on broad organizational needs
  - categorizing information technology projects
  - performing net present value or other financial analyses
  - using a weighted scoring model
  - implementing a balanced scorecard

Focusing on Broad Organizational Needs

- It is often difficult to provide strong justification for many IT projects, but everyone agrees they have a high value
- "It is better to measure gold roughly than to count pennies precisely"
- Three important criteria for projects:
  - There is a ***need*** for the project
  - There are ***funds*** available
  - There's a strong ***will*** to make the project succeed

Categorizing IT Projects

- One categorization is whether the project addresses
  - a problem
  - an opportunity, or
  - a directive
- Another categorization is how long it will take to do and when it is needed
- Another is the overall priority of the project

Financial Analysis of Projects

- Financial considerations are often an important consideration in selecting projects
- Three primary methods for determining the projected financial value of projects:
  - Net present value (NPV) analysis
  - Return on investment (ROI)
  - Payback analysis

Net Present Value Analysis

- **Net present value** (NPV) analysis is a method of calculating the expected net monetary gain or loss from a project by discounting all expected future cash inflows and outflows to the present point in time
- Projects with a positive NPV should be considered if financial value is a key criterion
- The higher the NPV, the better

Figure 4-4. Net Present Value Example

	A	B	C	D	E	F	G
1	Discount rate	10%					
2							
3	PROJECT 1	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	TOTAL
4	Benefits	$0	$2,000	$3,000	$4,000	$5,000	$14,000
5	Costs	$5,000	$1,000	$1,000	$1,000	$1,000	$9,000
6	Cash flow	($5,000)	$1,000	$2,000	$3,000	$4,000	$5,000
7	NPV →	$2,316					
8		Formula =npv(b1,b6:f6)					
9							
10	PROJECT 2	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	TOTAL
11	Benefits	$1,000	$2,000	$4,000	$4,000	$4,000	$15,000
12	Costs	$2,000	$2,000	$2,000	$2,000	$2,000	$10,000
13	Cash flow	($1,000)	$0	$2,000	$2,000	$2,000	$5,000
14	NPV →	$3,201					
15		Formula =npv(b1,b13:f13)					
16							
17							

Note that totals are equal, but NPVs are not because of the time value of money

Figure 4-5. JWD Consulting NPV Example

Discount rate	**8%**					
Assume the project is completed in Year 0			**Year**			
	0	**1**	**2**	**3**	**Total**	
Costs	140,000	40,000	40,000	40,000		
Discount factor	1	0.93	0.86	0.79		
Discounted costs	**140,000**	**37,200**	**34,400**	**31,600**	**243,200**	
Benefits	0	200,000	200,000	200,000		
Discount factor	1	0.93	0.86	0.79		
Discounted benefits	**0**	**186,000**	**172,000**	**158,000**	**516,000**	
Discounted benefits - costs	(140,000)	148,800	137,600	126,400	**272,800**	← **NPV**
Cumulative benefits - costs	(140,000)	8,800	146,400	272,800		
		↑				
ROI →	**112%**					
	Payback In Year 1					

Note: See the template called business_case_financials.xls

NPV Calculations

- Determine estimated costs and benefits for the life of the project and the products it produces
- Determine the discount rate (check with your organization on what to use)
- Calculate the NPV (see text for details)
- Notes: Some organizations consider the investment year as year 0, while others start in year 1. Some people entered costs as negative numbers, while others do not. Check with your organization for their preferences

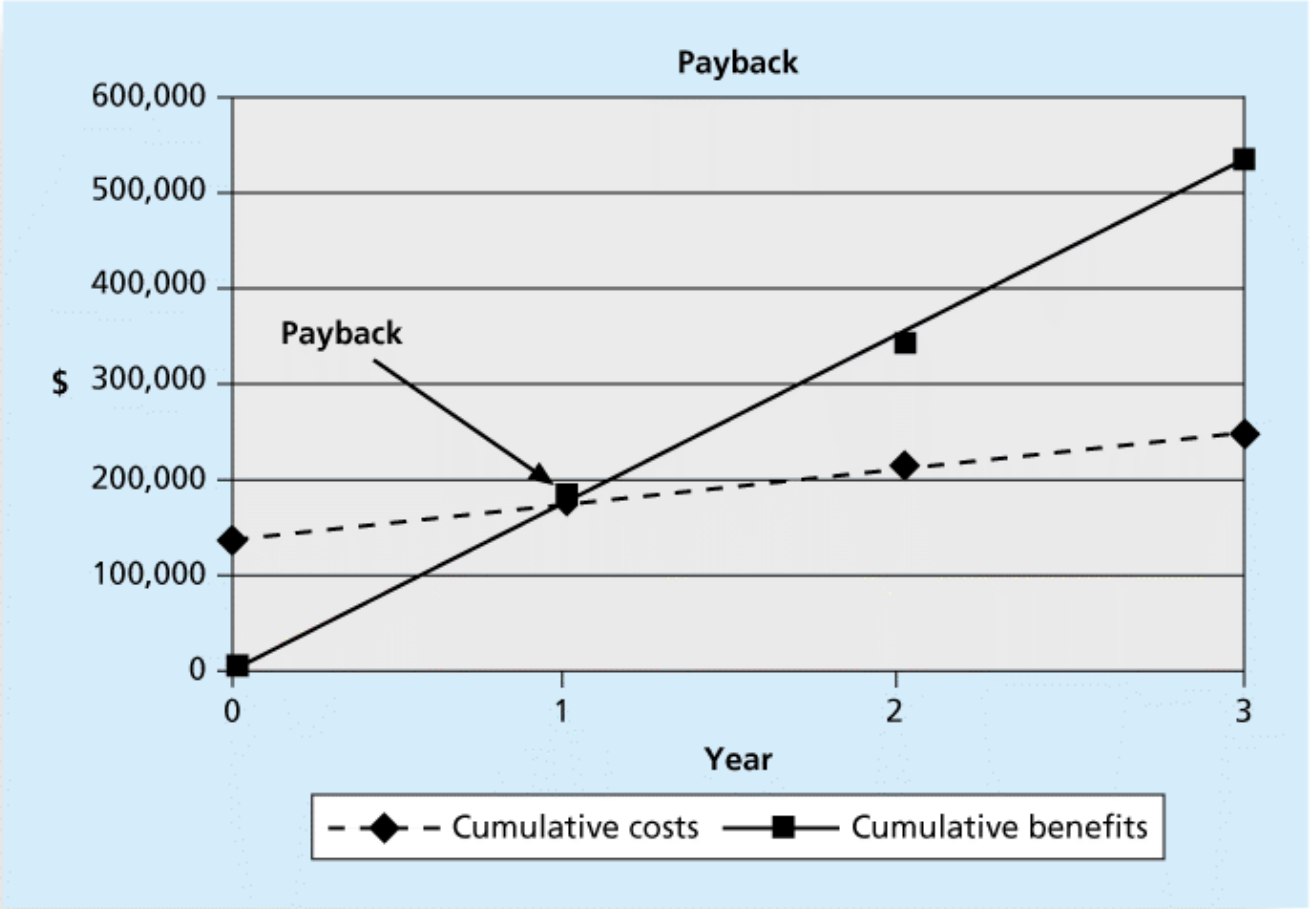
Return on Investment

- **Return on investment** (ROI) is calculated by subtracting the project costs from the benefits and then dividing by the costs
  - ROI = (total discounted benefits - total discounted costs) / discounted costs
- The higher the ROI, the better
- Many organizations have a **required rate of return** or minimum acceptable rate of return on investment for projects
- **Internal rate of return** (IRR) can by calculated by finding the discount rate that makes the NPV equal to zero

Payback Analysis

- Another important financial consideration is payback analysis
- The **payback period** is the amount of time it will take to recoup, in the form of net cash inflows, the total dollars invested in a project
- Payback occurs when the net cumulative discounted benefits equals the costs
- Many organizations want IT projects to have a fairly short payback period

Figure 4-6. Charting the Payback Period



Weighted Scoring Model

- A weighted scoring model is a tool that provides a systematic process for selecting projects based on many criteria
  - Identify criteria important to the project selection process
  - Assign weights (percentages) to each criterion so they add up to 100%
  - Assign scores to each criterion for each project
  - Multiply the scores by the weights and get the total weighted scores
- The higher the weighted score, the better

Figure 4-7. Sample Weighted Scoring Model for Project Selection

	A	B	C	D	E	F
1	**Criteria**	**Weight**	**Project 1**	**Project 2**	**Project 3**	**Project 4**
2	Supports key business objectives	25%	90	90	50	20
3	Has strong internal sponsor	15%	70	90	50	20
4	Has strong customer support	15%	50	90	50	20
5	Uses realistic level of technology	10%	25	90	50	70
6	Can be implemented in one year or less	5%	20	20	50	90
7	Provides positive NPV	20%	50	70	50	50
8	Has low risk in meeting scope, time, and cost goals	10%	20	50	50	90
9	**Weighted Project Scores**	**100%**	**56**	**78.5**	**50**	**41.5**
10						
11						
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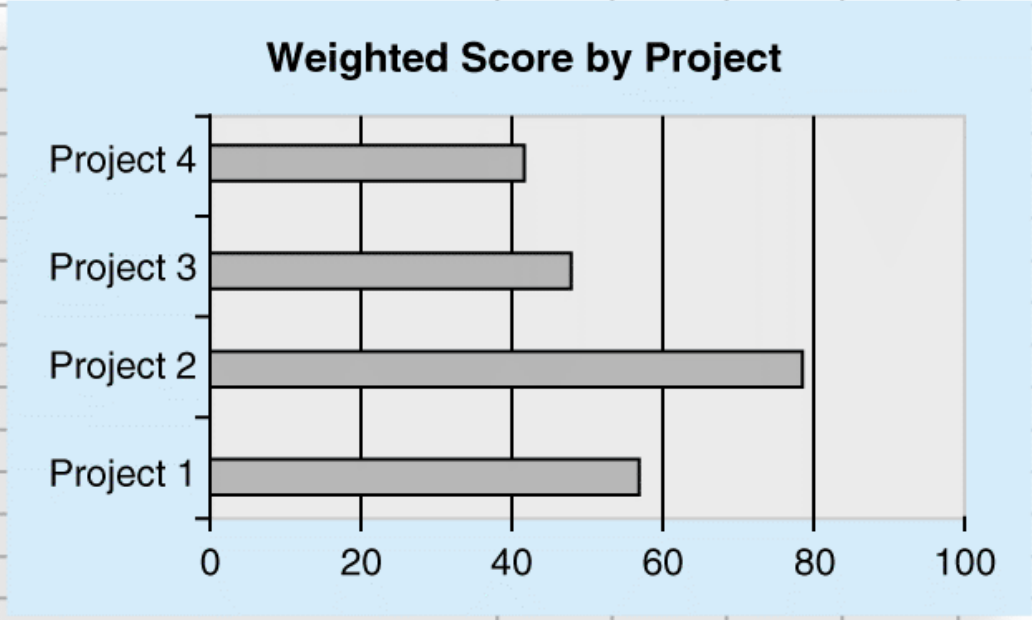
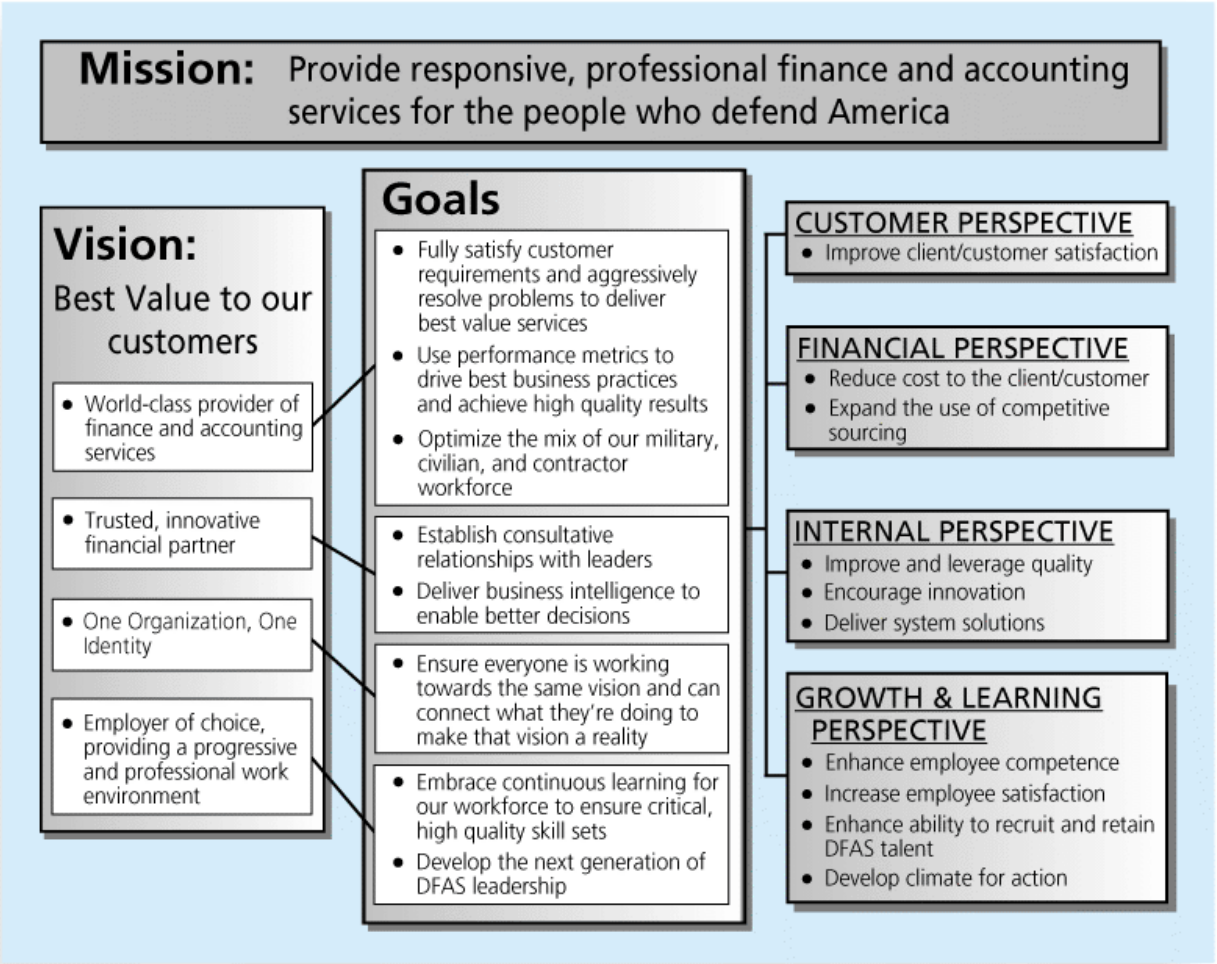


Implementing a Balanced Scorecard

- Drs. Robert Kaplan and David Norton developed this approach to help select and manage projects that align with business strategy
- A **balanced scorecard**
  - is a methodology that converts an organization's value drivers, such as customer service, innovation, operational efficiency, and financial performance, to a series of defined metrics
- See www.balancedscorecard.org for more information

Figure 4-8. Balanced Scorecard Example



Developing a Project Charter

- After deciding what project to work on, it is important to let the rest of the organization know
- A **project charter** is a document that formally recognizes the existence of a project and provides direction on the project's objectives and management
- Key project stakeholders should sign a project charter to acknowledge agreement on the need and intent of the project; a signed charter is a key output of project integration management

Inputs for Developing a Project Charter

- A project statement of work
- A business case
- Agreements
- Enterprise environmental factors
- **Organizational process assets**, which include formal and informal plans, policies, procedures, guidelines, information systems, financial systems, management systems, lessons learned, and historical information

Table 4-1. Project Charter for the DNA-Sequencing Instrument Completion Project

Project Title: DNA-Sequencing Instrument Completion Project
Date of Authorization: February 1
Project Start Date: February 1 **Projected Finish Date:** November 1

Key Schedule Milestones:

- Complete first version of the software by June 1
- Complete production version of the software by November 1

Budget Information: The firm has allocated $1.5 million for this project, and more funds are available if needed. The majority of costs for this project will be internal labor. All hardware will be outsourced.

Project Manager: Nick Carson, (650) 949-0707, ncarson@dnaconsulting.com

Project Objectives: The DNA-sequencing instrument project has been underway for three years. It is a crucial project for our company. This is the first charter for the project, and the objective is to complete the first version of the software for the instrument in four months and a production version in nine months.

Main Project Success Criteria: The software must meet all written specifications, be thoroughly tested, and be completed on time. The CEO will formally approve the project with advice from other key stakeholders.

Table 4-1. Project Charter (cont.)

Approach:

- Hire a technical replacement for Nick Carson and a part-time assistant as soon as possible.
- Within one month, develop a clear work breakdown structure, scope statement, and Gantt chart detailing the work required to complete the DNA sequencing instrument.
- Purchase all required hardware upgrades within two months.
- Hold weekly progress review meetings with the core project team and the sponsor.
- Conduct thorough software testing per the approved test plans.

ROLES AND RESPONSIBILITIES

Name	Role	Position	Contact Information
Ahmed Abrams	Sponsor	CEO	aabrams@dnaconsulting.com
Nick Carson	Project Manager	Manager	ncarson@dnaconsulting.com
Susan Johnson	Team Member	DNA expert	sjohnson@dnaconsulting.com
Renyong Chi	Team Member	Testing expert	rchi@dnaconsulting.com
Erik Haus	Team Member	Programmer	ehaus@dnaconsulting.com
Bill Strom	Team Member	Programmer	bstrom@dnaconsulting.com
Maggie Elliot	Team Member	Programmer	melliot@dnaconsulting.com

Sign-off: (Signatures of all the above stakeholders)

Ahmed Abrams *Nick Carson*
Susan Johnson *Renyong Chi*
Erik Haus *Bill Strom*
Maggie Elliot

Comments: (Handwritten or typed comments from above stakeholders, if applicable)

"I want to be heavily involved in this project. It is crucial to our company's success, and I expect everyone to help make it succeed." —Ahmed Abrams

"The software test plans are complete and well documented. If anyone has questions, do not hesitate to contact me." —Renyong Chi

Developing a Project Management Plan

- A **project management plan** is a document used to coordinate all project planning documents and help guide a project's execution and control
- Plans created in the other knowledge areas are subsidiary parts of the overall project management plan

Common Elements of a Project Management Plan

- Introduction or overview of the project
- Description of how the project is organized
- Management and technical processes used on the project
- Work to be done, schedule, and budget information

Table 4-2. Sample Contents for a Software Project Management Plan (SPMP)

MAJOR SECTION HEADINGS	SECTION TOPICS
Overview	Purpose, scope, and objectives; assumptions and constraints; project deliverables; schedule and budget summary; evolution of the plan
Project Organization	External interfaces; internal structure; roles and responsibilities
Managerial Process Plan	Start-up plans (estimation, staffing, resource acquisition, and project staff training plans); work plan (work activities, schedule, resource, and budget allocation); control plan; risk management plan; closeout plan
Technical Process Plans	Process model; methods, tools, and techniques; infrastructure plan; product acceptance plan
Supporting Process Plans	Configuration management plan; verification and validation plan; documentation plan; quality assurance plan; reviews and audits; problem resolution plan; subcontractor management plan; process improvement plan

IEEE Standard 1058-1998.

What the Winners Do

"The winners clearly spell out what needs to be done in a project, by whom, when, and how. For this they use an integrated toolbox, including PM tools, methods, and techniques…If a scheduling template is developed and used over and over, it becomes a repeatable action that leads to higher productivity and lower uncertainty. Sure, using scheduling templates is neither a breakthrough nor a feat. But laggards exhibited almost no use of the templates. Rather, in constructing schedules their project managers started with a clean sheet, a clear waste of time.“*

*Milosevic, Dragan and And Ozbay. “Delivering Projects: What the Winners Do.” Proceedings of the Project Management Institute Annual Seminars & Symposium (November 2001).

Directing and Managing Project Work

- Involves managing and performing the work described in the project management plan
- The majority of time and money is usually spent on execution
- The application area of the project directly affects project execution because the products of the project are produced during execution

Coordinating Planning and Execution

- Project planning and execution are intertwined and inseparable activities
- Those who will do the work should help to plan the work
- Project managers must solicit input from the team to develop realistic plans

Providing Leadership and a Supportive Culture

- Project managers must lead by example to demonstrate the importance of creating and then following good project plans
- Organizational culture can help project execution by
  - providing guidelines and templates
  - tracking performance based on plans
- Project managers may still need to break the rules to meet project goals, and senior managers must support those actions

Capitalizing on Product, Business, and Application Area Knowledge

- It is often helpful for IT project managers to have prior technical experience
- On small projects, the project manager may be required to perform some of the technical work or mentor team members to complete the projects
- On large projects, the project manager must understand the business and application area of the project

Project Execution Tools and Techniques

- **Expert judgment**: Experts can help project managers and their teams make many decisions related to project execution
- **Meetings:** Meetings allow people to develop relationships, pick up on important body language or tone of voice, and have a dialogue to help resolve problems.
- **Project management information systems**: There are hundreds of project management software products available on the market today, and many organizations are moving toward powerful enterprise project management systems that are accessible via the Internet
- See the What Went Right? example of Kuala Lumpur's Integrated Transport Information System on p. 169

Monitoring and Controlling Project Work

- Changes are inevitable on most projects, so it's important to develop and follow a process to monitor and control changes
- Monitoring project work includes collecting, measuring, and disseminating performance information
- A **baseline** is the approved project management plan plus approved changes

Media Snapshot

- The 2002 Olympic Winter Games and Paralympics took five years to plan and cost more than $1.9 billion. PMI awarded the Salt Lake Organizing Committee (SLOC) the Project of the Year award for delivering world-class games.
- Four years before the Games began, the SLOC used a Primavera software-based system with a cascading color-coded WBS to integrate planning…The SLOC also used an Executive Roadmap, a one-page list of the top 100 Games-wide activities, to keep executives apprised of progress. Activities were tied to detailed project information within each department's schedule. A 90-day highlighter showed which managers were accountable for each integrated activity.
- Fraser Bullock, SLOC Chief Operating Officer and Chief, said, "We knew when we were on and off schedule and where we had to apply additional resources. The interrelation of the functions meant they could not run in isolation—it was a smoothly running machine."*

*Foti, Ross, "The Best Winter Olympics, Period," PM Network (January 2004) 23.

Performing Integrated Change Control

- Three main objectives are:
  - Influencing the factors that create changes to ensure that changes are beneficial
  - Determining that a change has occurred
  - Managing actual changes as they occur

Change Control on Information Technology Projects

- Former view: The project team should strive to do exactly what was planned on time and within budget
- Problem: Stakeholders rarely agreed up-front on the project scope, and time and cost estimates were inaccurate
- Modern view: Project management is a process of constant communication and negotiation
- Solution: Changes are often beneficial, and the project team should plan for them

Change Control System

- A **change control system** is a formal, documented process that describes when and how official project documents and work may be changed
- Describes who is authorized to make changes and how to make them

Change Control Board (CCB)

- A **change control board** is a formal group of people responsible for approving or rejecting changes on a project
- CCBs provide guidelines for preparing change requests, evaluate change requests, and manage the implementation of approved changes
- Includes stakeholders from the entire organization

Making Timely Changes

- Some CCBs only meet occasionally, so it may take too long for changes to occur
- Some organizations have policies in place for time-sensitive changes
  - “48-hour policy” allows project team members to make decisions, then they have 48 hours to reverse the decision pending senior management approval
  - Delegate changes to the lowest level possible, but keep everyone informed of changes

Global Issues

- Rapid changes in technology, such as the increased use of mobile roaming for communications, often cause governments around the world to take action.
- Incompatible hardware, software, and networks can make communications difficult in some regions, and a lack of competition can cause prices to soar.
- Fortunately, a group called the Organisation for Economic Co-operation and Development (OECD) promotes policies that will improve the economic and social well-being of people around the world.
- In February 2012, the OECD called upon its members' governments to boost competition in international mobile roaming markets.

Configuration Management

- **Configuration management** ensures that the descriptions of the project's products are correct and complete
- Involves identifying and controlling the functional and physical design characteristics of products and their support documentation
- Configuration management specialists identify and document configuration requirements, control changes, record and report changes, and audit the products to verify conformance to requirements
- See www.icmhq.com for more information

Table 4-3. Suggestions for Performing Integrated Change Control

View project management as a process of constant communication and negotiation.
Plan for change.
Establish a formal change control system, including a change control board (CCB).
Use effective configuration management.
Define procedures for making timely decisions on smaller changes.
Use written and oral performance reports to help identify and manage change.
Use project management and other software to help manage and communicate changes.
Focus on leading the project team and meeting overall project goals and expectations.

Closing Projects or Phases

- To close a project or phase, you must finalize all activities and transfer the completed or cancelled work to the appropriate people
- Main outputs include
  - Final product, service, or result transition
  - Organizational process asset updates

Using Software to Assist in Project Integration Management

- Several types of software can be used to assist in project integration management
  - Documents can be created with word processing software
  - Presentations are created with presentation software
  - Tracking can be done with spreadsheets or databases
  - Communication software like e-mail and Web authoring tools facilitate communications
  - Project management software can pull everything together and show detailed and summarized information
  - **Business Service Management** (BSM) tools track the execution of business process flows

Figure 4-9. Sample Portfolio

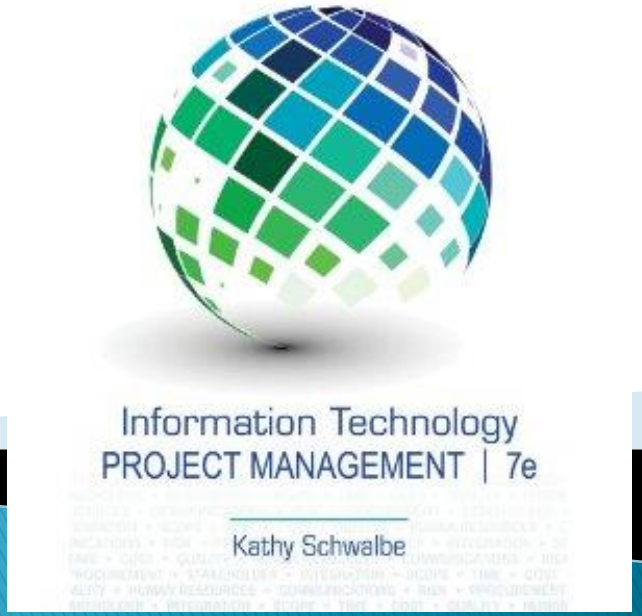
Source: www.projectmanager.com

Chapter Summary

- Project integration management involves coordinating all of the other knowledge areas throughout a project's life cycle
- Main processes include
  - Develop the project charter
  - Develop the project management plan
  - Direct and manage project execution
  - Monitor and control project work
  - Perform integrated change control
  - Close the project or phase

Chapter 5: Project Scope Management

Information Technology Project Management, Seventh Edition



Note: See the text itself for full citations.

Learning Objectives

- Understand the importance of good project scope management
- Describe the process of planning scope management
- Discuss methods for collecting and documenting requirements 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

Learning Objectives

- Explain the importance of validating 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 (IT) projects
- Describe how software can assist in project scope management

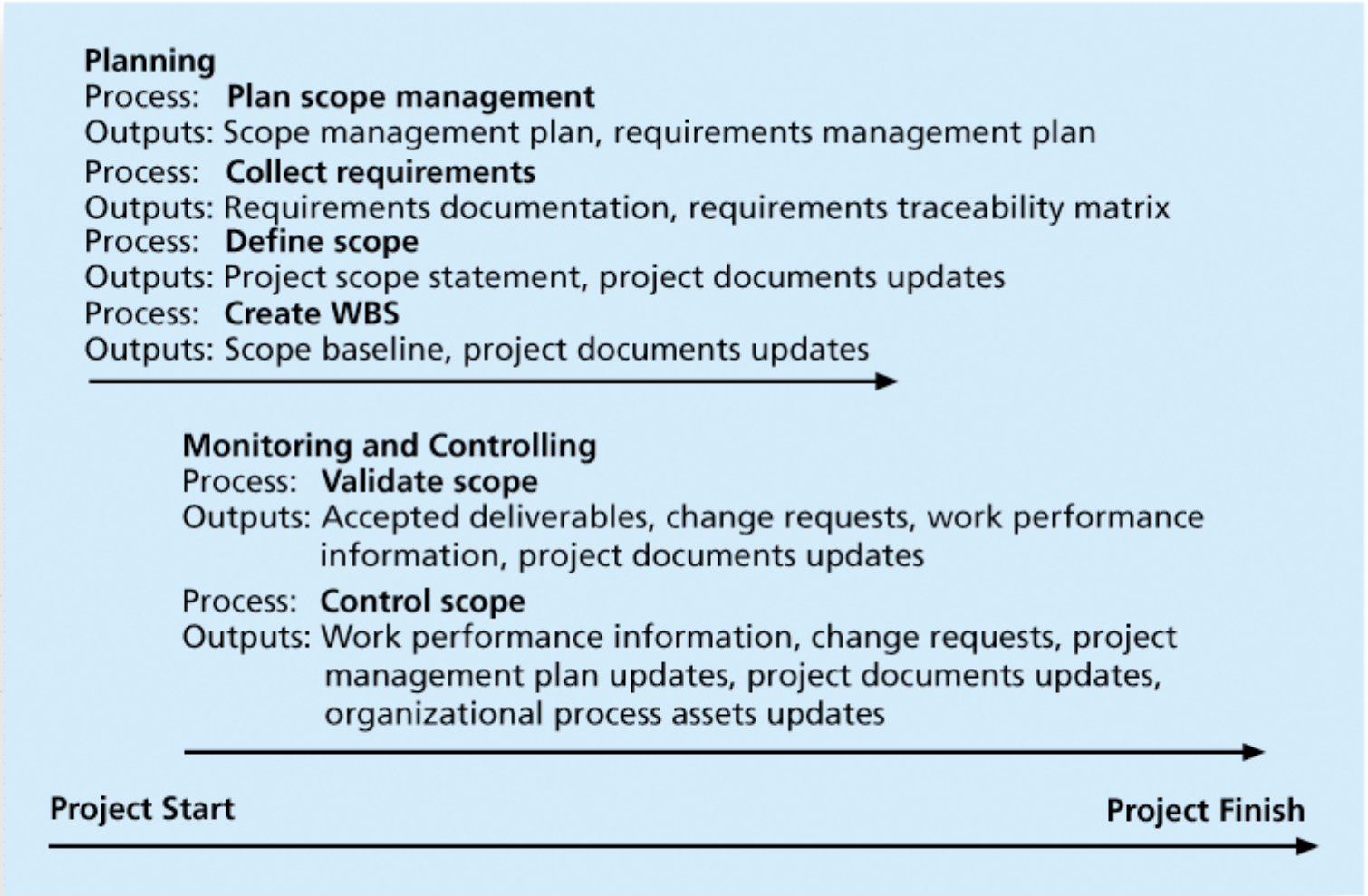
What is Project Scope Management?

- **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

Project Scope Management Processes

- **Planning scope:** 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
- **Validating scope**: formalizing acceptance of the project deliverables
- **Controlling scope:** controlling changes to project scope throughout the life of the project

Figure 5-1. Project Scope Management Summary



Planning Scope Management

- The project team uses expert judgment and meetings to develop two important outputs: the scope management plan and the requirements management plan
- The scope management plan is a subsidiary part of the project management plan

Scope Management Plan Contents

- How to prepare a detailed project scope statement
- How to create a WBS
- How to maintain and approve the WBS
- How to obtain formal acceptance of the completed project deliverables
- How to control requests for changes to the project scope

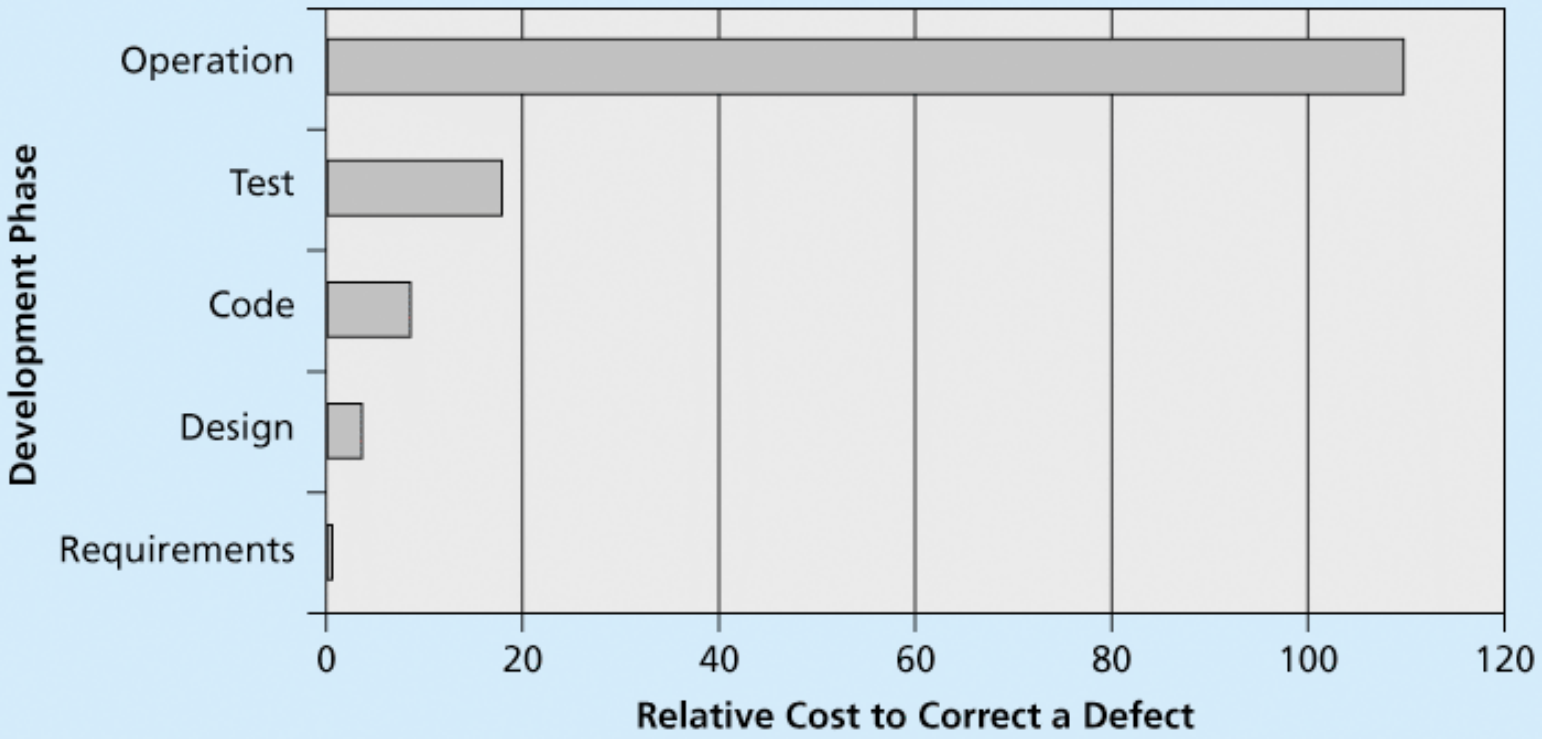
Requirements Management Plan

- The PMBOK® Guide, Fifth Edition, describes requirements as “conditions or capabilities that must be met by the project or present in the product, service, or result to satisfy an agreement or other formally imposed specification”
- The **requirements management plan** documents how project requirements will be analyzed, documented, and managed

Collecting Requirements

- 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

Figure 5-2. Relative Cost to Correct a Software Requirement Defect



Source: Robert B. Grady, "An Economic Release Decision Model: Insights into Software Project Management." *Proceedings of the Applications of Software Measurement Conference* (Orange Park, FL: Software Quality Engineering, 1999), pp. 227–239.

Methods for Collecting Requirements

- Interviewing
- Focus groups and facilitated workshops
- Using group creativity and decision-making techniques
- Questionnaires and surveys
- Observation
- Prototyping
- **Benchmarking**, or generating ideas by comparing specific project practices or product characteristics to those of other projects or products inside or outside the performing organization, can also be used to collect requirements

Statistics on Requirements for Software Projects (2011 Survey)*

- Eighty-eight percent of the software projects involved enhancing existing products instead of creating new ones
- Eighty-six percent of respondents said that customer satisfaction was the most important metric for measuring the success of development projects
- Eighty-three percent of software development teams still use Microsoft Office applications such as Word and Excel as their main tools to communicate requirements

*John Simpson, “2011: The State of Requirements Management” (2011).

What Went Right?

- Genesys Telecommunications Laboratories uses Accept software, a product planning and innovation management application and winner of the Excellence in Product Management Award from 2006–2008
- Accept helps them instill a consistent, repeatable, and predictable process for new product definition and development
- They can define what information comprises a requirement and enforce discipline around that process

Requirements Traceability Matrix

- 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
- Table 5-1. Sample entry in an RTM

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.

Defining Scope

- **Project scope statements** should include at least a product scope description, product user acceptance criteria, and detailed information on all project deliverables. It is also helpful to document other scope-related information, such as the project boundaries, constraints, and assumptions. The project scope statement should also reference supporting documents, such as product specifications
- As time progresses, the scope of a project should become more clear and specific

Table 5-2. Sample Project Charter (partial)

Project Title: Information Technology (IT) Upgrade Project

Project Start Date: March 4 **Projected Finish Date:** December 4

Key Schedule Milestones:

- Inventory update completed April 15
- Hardware and software acquired August 1
- Installation completed October 1
- Testing completed November 15

Budget Information: Budgeted $1,000,000 for hardware and software costs and $500,000 for labor costs.

Project Manager: Kim Nguyen, (310) 555–2784, knguyen@course.com

Project Objectives: Upgrade hardware and software for all employees (approximately 2,000) within nine months based on new corporate standards. See attached sheet describing the new standards. Upgrades may affect servers as well as associated network hardware and software.

Main Project Success Criteria: The hardware, software, and network upgrades must meet all written specifications, be thoroughly tested, and be completed in nine months. Employee work disruptions will be minimal.

Approach:

- Update the IT inventory database to determine upgrade needs
- Develop detailed cost estimate for project and report to CIO
- Issue a request for quote to obtain hardware and software
- Use internal staff as much as possible for planning, analysis, and installation

Table 5-3: 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

- 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 (WBS)

- A **WBS** is a deliverable-oriented grouping of the work involved in a project that defines the total scope of the project
- WBS is a foundation document that provides the basis for planning and managing project schedules, costs, resources, and changes
- **Decomposition** is subdividing project deliverables into smaller pieces
- A **work package** is a task at the lowest level of the WBS
- The **scope baseline** includes the approved project scope statement and its associated WBS and WBS dictionary

Figure 5-3. Sample Intranet WBS Organized by Product

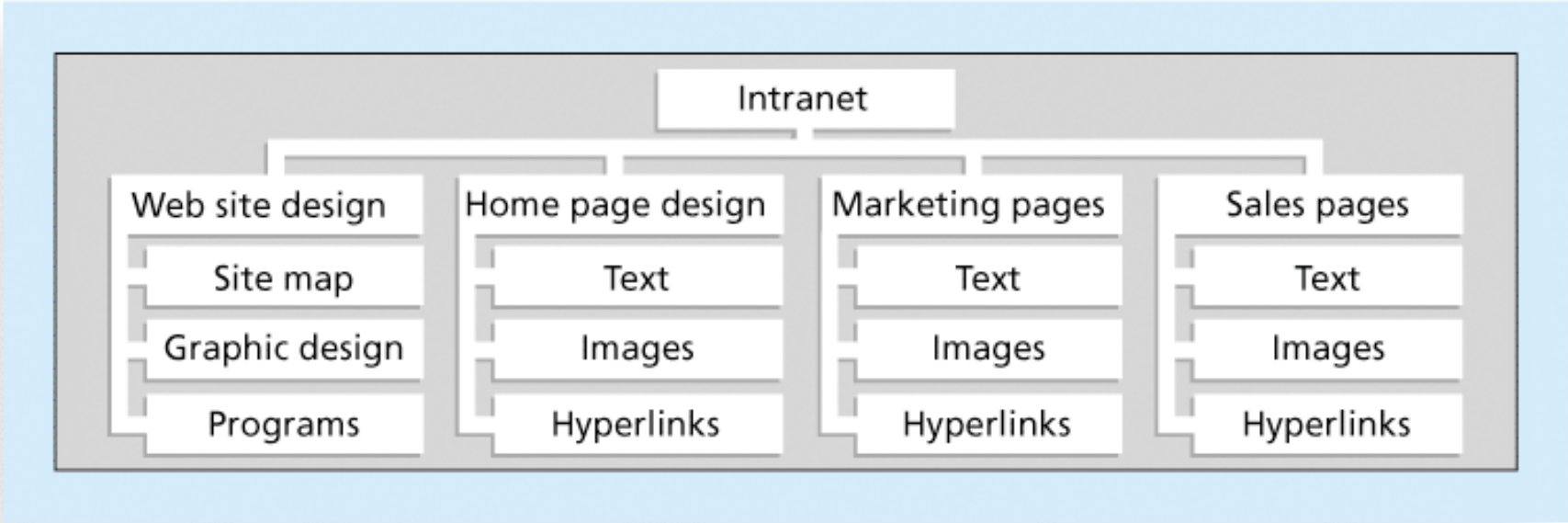
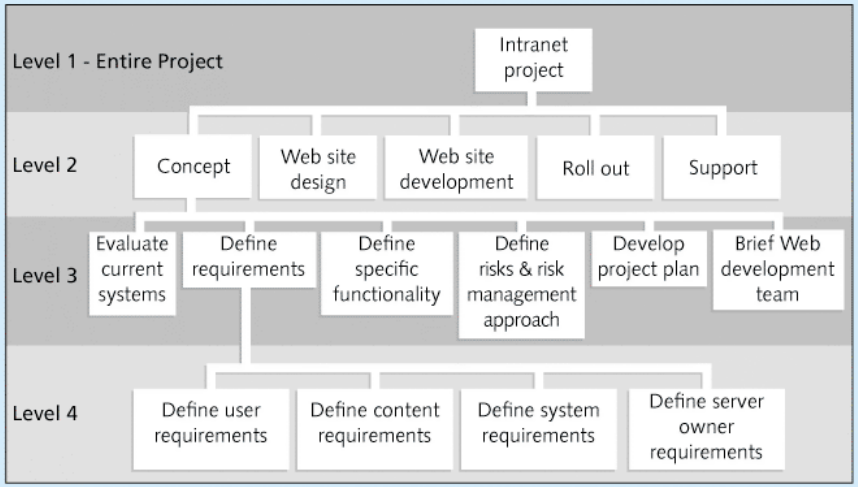


Figure 5-4. Sample Intranet WBS Organized by Phase

Chart form →



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
  - 1.1.2.3 Define system requirements
  - 1.1.2.4 Define server owner requirements
- 1.1.3 Define specific functionality
- 1.1.4 Define risks and risk management approach
- 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

Figure 5-5. Intranet WBS and Gantt Chart in Microsoft Project

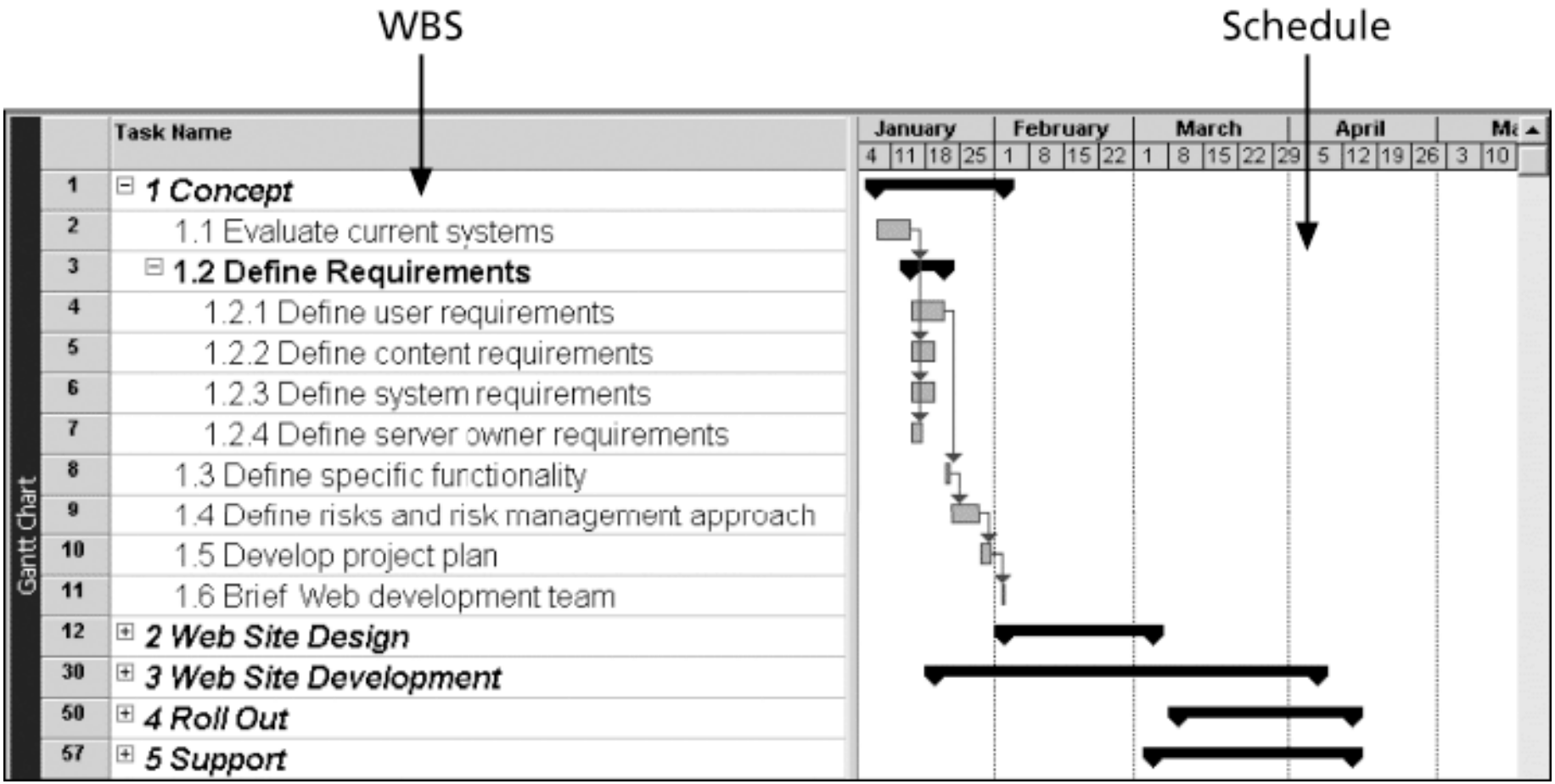


Figure 5-6. Intranet Gantt Chart Organized by Project Management Process Groups

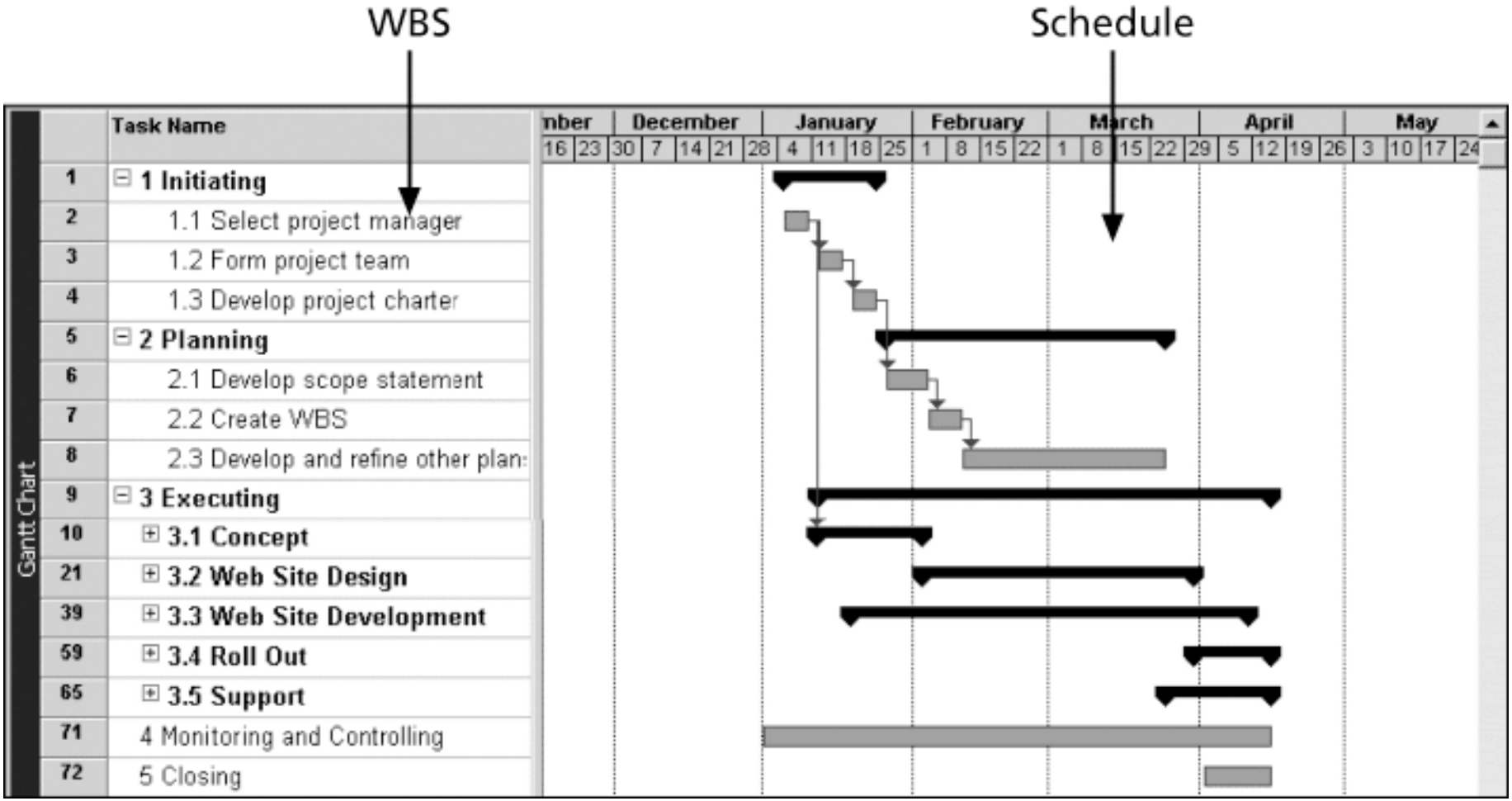


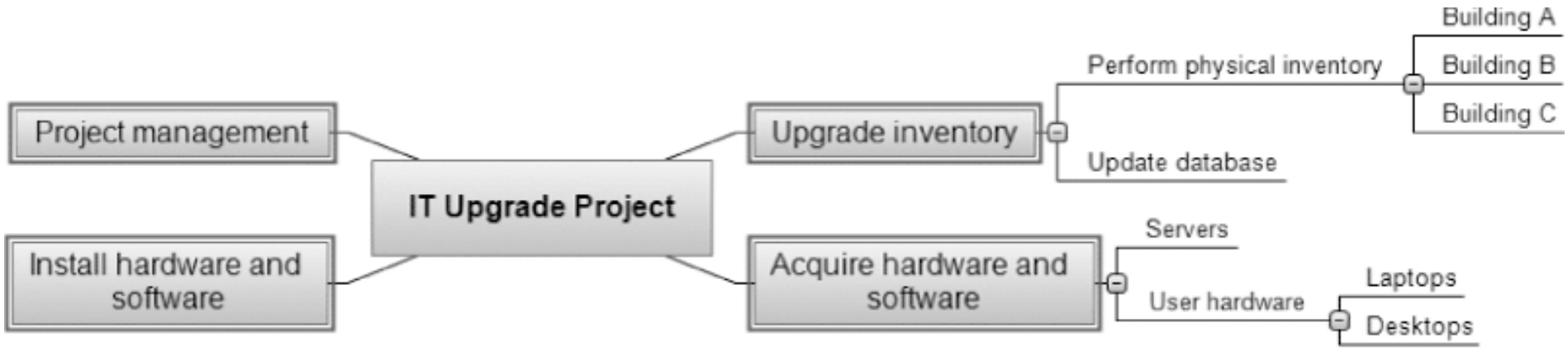
Table 5-4: Executing Tasks for JWD Consulting's WBS

- 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

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

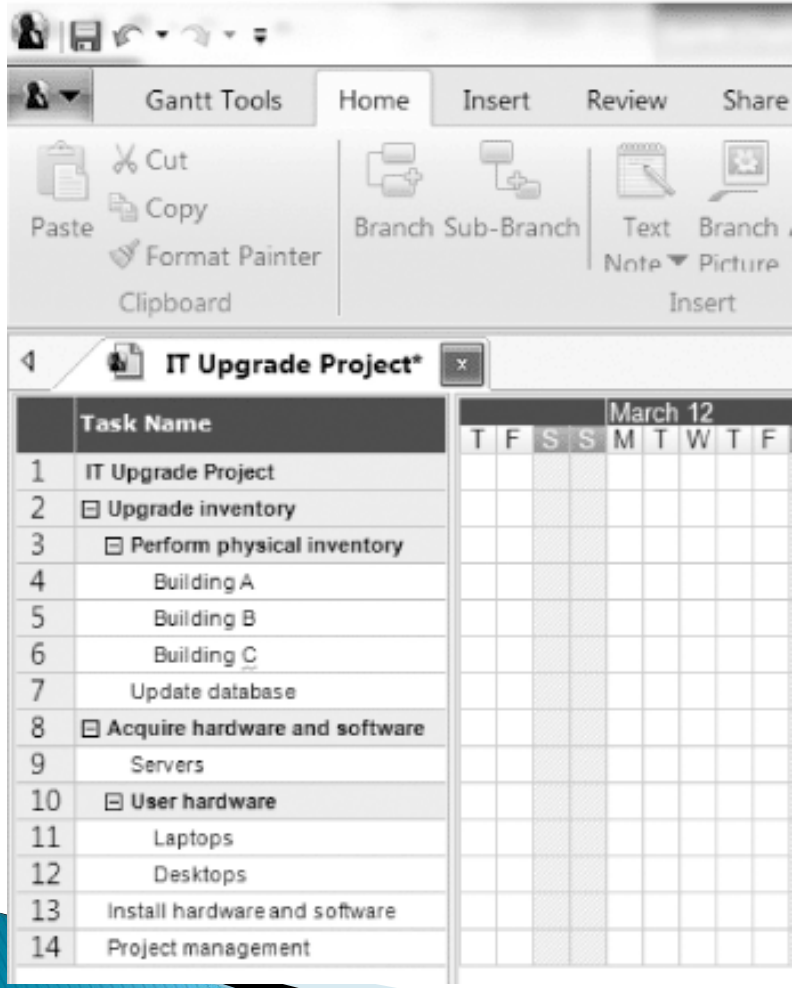
Figure 5-7. Sample Mind-Mapping Approach for Creating a WBS



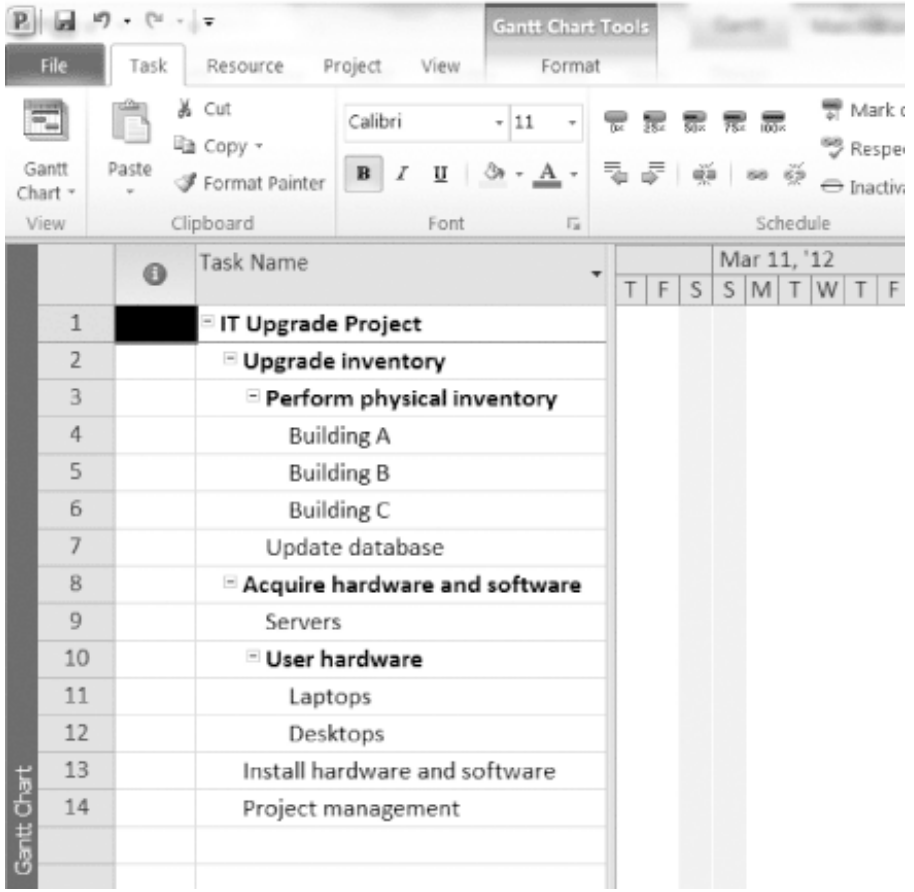
Source: MatchWare's MindView 4 Business Edition

Figure 5-8. Gantt Charts With WBS Generated From a Mind Map

MindView 4.0 Gantt Chart



Project 2010 Gantt Chart



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

Table 5-5. Sample WBS Dictionary Entry

WBS Dictionary Entry March 20
Project Title: Information Technology (IT) Upgrade Project
WBS Item Number: 2.2
WBS Item Name: Update Database
Description: The IT department maintains an online database of hardware and software on the corporate intranet. However, 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, Perform Physical Inventory, and must precede WBS Item Number 3.0, Acquire Hardware and Software.

Advice for Creating a WBS and WBS Dictionary

- A unit of work should appear at only one place in the WBS.
- The work content of a WBS item is the sum of the WBS items below it
- A WBS item is the responsibility of only one individual, even though many people may be working on it
- The 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

Advice for Creating a WBS and WBS Dictionary (cont'd)

- 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 in that item
- The 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

What Went Wrong?

- A project scope that is too broad and grandiose can cause severe problems
  - Scope creep and an overemphasis on technology for technology's sake resulted in the bankruptcy of a large pharmaceutical firm, Texas-based FoxMeyer Drug
  - In 2001, McDonald's fast-food chain initiated a project to create an intranet that would connect its headquarters with all of its restaurants to provide detailed operational information in real time. After spending $170 million on consultants and initial implementation planning, McDonald's realized that the project was too much to handle and terminated it

Validating 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 validation** involves formal acceptance of the completed project deliverables
- Acceptance is often achieved by a customer inspection and then sign-off on key deliverables

Global Issues

- Many countries have had difficulties controlling the scope of large projects, especially those that involve advanced technologies and many different users
- For example, the state government of Victoria, Australia, has a Web site for its public transportation smart card at www.myki.com.au.
- There were many problems in developing and implementing the smart card

Controlling Scope

- Scope control involves controlling changes to the project scope
- 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, and
  - manage changes when they occur
- **Variance** is the difference between planned and actual performance

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 (cont'd)

- 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

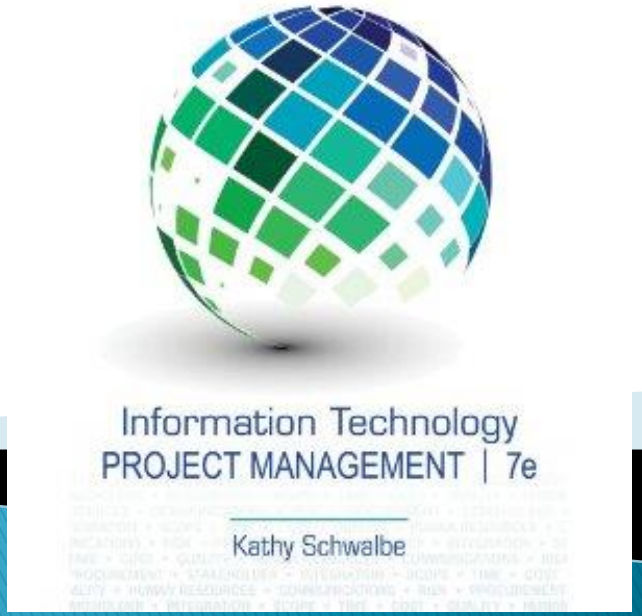
- Word-processing software helps create several scope-related documents
- Spreadsheets help to perform financial calculations, weighed scoring models, and develop charts and graphs
- Communication software like e-mail and the Web help clarify and communicate scope information
- Project management software 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
  - Define scope management
  - Collect requirements
  - Define scope
  - Create WBS
  - Validate scope
  - Control scope

Chapter 6: Project Time Management

Information Technology Project Management, Seventh Edition



Note: See the text itself for full citations.

Learning Objectives

- Understand the importance of project schedules and good project time management
- Discuss the process of planning schedule management
- Define activities as the basis for developing project schedules
- Describe how project managers use network diagrams and dependencies to assist in activity sequencing
- Understand the relationship between estimating resources and project schedules
- Explain how various tools and techniques help project managers perform activity duration estimates

Learning Objectives

- Use a Gantt chart for planning and tracking schedule information, find the critical path for a project, and describe how critical chain scheduling and the Program Evaluation and Review Technique (PERT) affect schedule development
- Discuss how reality checks and discipline are involved in controlling and managing changes to the project schedule
- Describe how project management software can assist in project time management and review words of caution before using this software

Importance of Project Schedules

- Managers often cite delivering projects on time as one of their biggest challenges
- Time has the least amount of flexibility; it passes no matter what happens on a project
- Schedule issues are the main reason for conflicts on projects, especially during the second half of projects

Individual Work Styles and Cultural Differences Cause Schedule Conflicts

- One dimension of the Meyers-Briggs Type Indicator focuses on peoples' attitudes toward structure and deadline
- Some people prefer to follow schedules and meet deadlines while others do not (J vs. P)
- Difference cultures and even entire countries have different attitudes about schedules

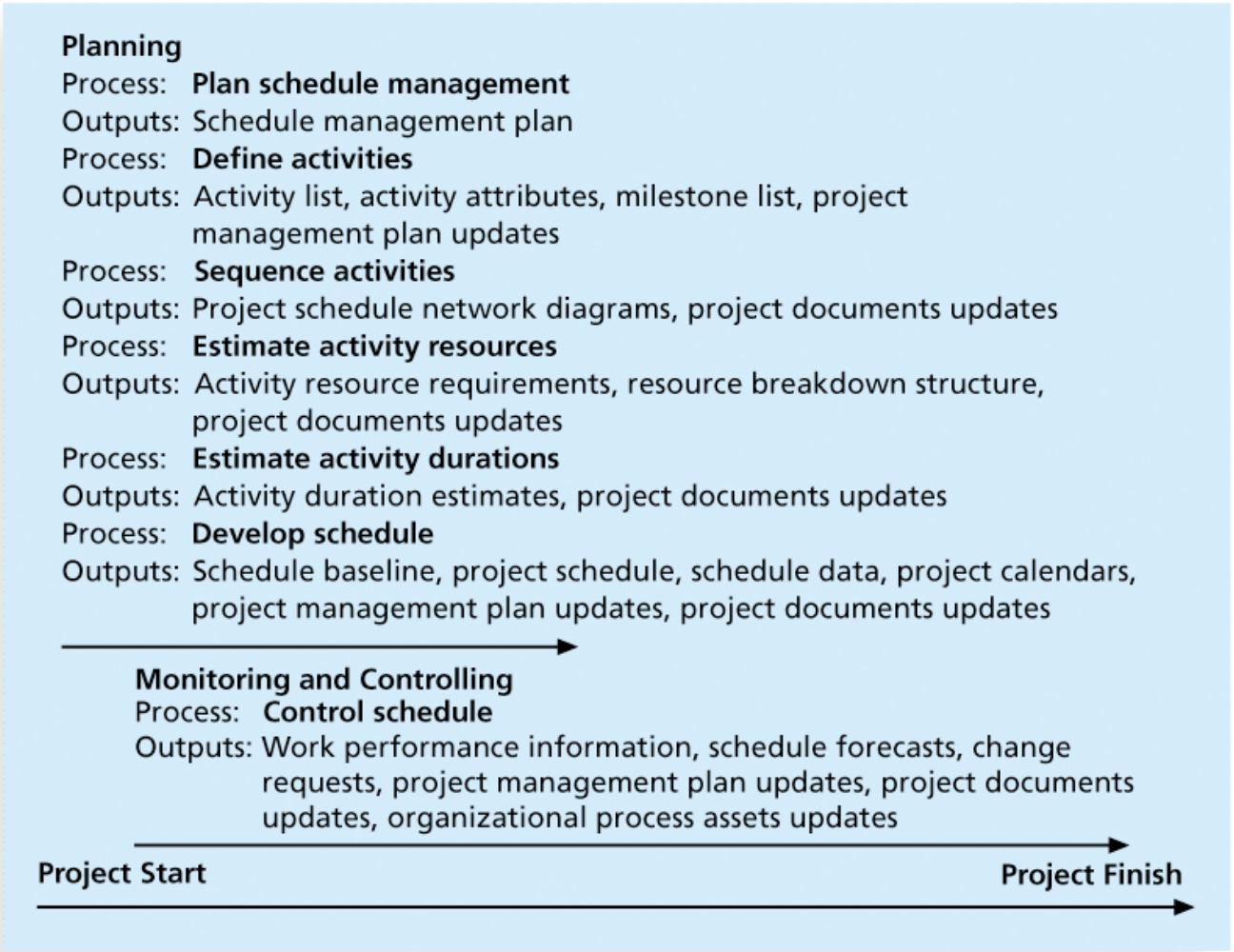
Media Snapshot

- In contrast to the 2002 Salt Lake City Winter Olympic Games (see Chapter 4's Media Snapshot), planning and scheduling was very different for the 2004 Summer Olympic Games held in Athens, Greece
- Many articles were written before the opening ceremonies predicting that the facilities would not be ready in time. …many people were pleasantly surprised by the amazing opening ceremonies, beautiful new buildings, and state-of-the-art security and transportation systems in Athens
- The Greeks even made fun of critics by having construction workers pretend to still be working as the ceremonies began

Project Time Management Processes

- **Planning schedule management:** determining the policies, procedures, and documentation that will be used for planning, executing, and controlling the project schedule
- **Defining activities:** identifying the specific activities that the project team members and stakeholders must perform to produce the project deliverables
- **Sequencing activities:** identifying and documenting the relationships between project activities
- **Estimating activity resources:** estimating how many **resources** a project team should use to perform project activities
- **Estimating activity durations:** estimating the number of work periods that are needed to complete individual activities
- **Developing the schedule:** analyzing activity sequences, activity resource estimates, and activity duration estimates to create the project schedule
- **Controlling the schedule:** controlling and managing changes to the project schedule

Figure 6-1. Project Time Management Summary



Planning Schedule Management

- The project team uses expert judgment, analytical techniques, and meetings to develop the schedule management plan
- A schedule management plan includes:
  - Project schedule model development
  - The scheduling methodology
  - Level of accuracy and units of measure
  - Control thresholds
  - Rules of performance measurement
  - Reporting formats
  - Process descriptions

Defining Activities

- An **activity** or **task** is an element of work normally found on the work breakdown structure (WBS) that has an expected duration, a cost, and resource requirements
- Activity definition involves developing a more detailed WBS and supporting explanations to understand all the work to be done so you can develop realistic cost and duration estimates

Activity Lists and Attributes

- An **activity list** is a tabulation of activities to be included on a project schedule that includes
  - the activity name
  - an activity identifier or number
  - a brief description of the activity
- **Activity attributes** provide more information such as predecessors, successors, logical relationships, leads and lags, resource requirements, constraints, imposed dates, and assumptions related to the activity

Milestones

- A **milestone** is a significant event that normally has no duration
- It often takes several activities and a lot of work to complete a milestone
- They're useful tools for setting schedule goals and monitoring progress
- Examples include obtaining customer sign-off on key documents or completion of specific products

What Went Wrong?

- At the U.S. Federal Bureau of Investigation (FBI), poor time management was one of the reasons behind the failure of Trilogy, a "disastrous, unbelievably expensive piece of vaporware, which was more than four years in the (un)making. The system was supposed to enable FBI agents to integrate intelligence from isolated information silos within the Bureau."*
- In May 2006, the Government Accounting Agency said that the Trilogy project failed at its core mission of improving the FBI's investigative abilities and was plagued with missed milestones and escalating costs. Sentinel replaced Trilogy in 2007.
- During a test exercise in 2011, Sentinel experienced two outages, and the FBI determined that the current hardware structure was inadequate. Unfortunately, history seemed to repeat itself as troubles still loomed with Sentinel in 2012

*Roberts, Paul, "Frustrated contractor sentenced for hacking FBI to speed deployment," *InfoWorld Tech Watch, (July 6, 2006).*

Sequencing Activities

- Involves reviewing activities and determining dependencies
- A **dependency** or **relationship** is the sequencing of project activities or tasks
- You *must* determine dependencies in order to use critical path analysis

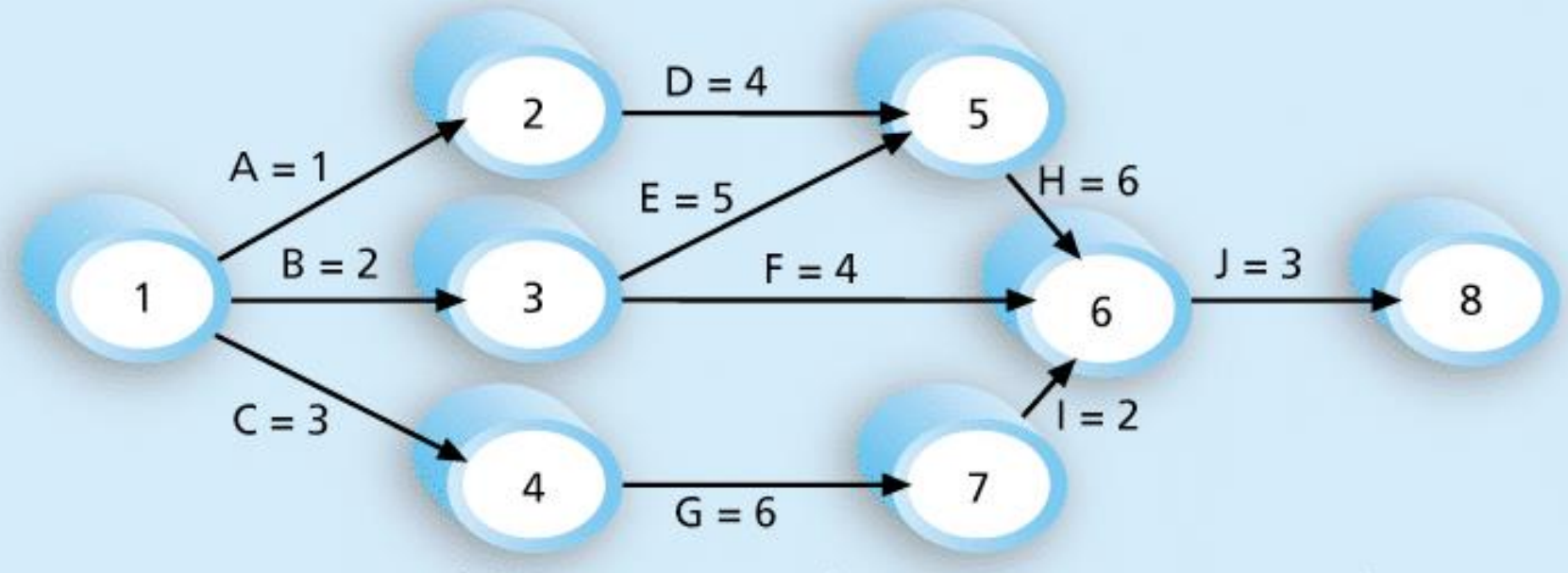
Three types of Dependencies

- **Mandatory dependencies:** inherent in the nature of the work being performed on a project, sometimes referred to as hard logic
- **Discretionary dependencies:** defined by the project team., sometimes referred to as soft logic and should be used with care since they may limit later scheduling options
- **External dependencies:** involve relationships between project and non-project activities

Network Diagrams

- Network diagrams are the preferred technique for showing activity sequencing
- A **network diagram** is a schematic display of the logical relationships among, or sequencing of, project activities
- Two main formats are the arrow and precedence diagramming methods

Figure 6-2. Network Diagram for Project X



Note: Assume all durations are in days; A=1 means Activity A has a duration of 1 day.

Arrow Diagramming Method (ADM)

- Also called activity-on-arrow (AOA) network diagrams
- Activities are represented by arrows
- Nodes or circles are the starting and ending points of activities
- Can only show finish-to-start dependencies

Process for Creating AOA Diagrams

1. Find all of the activities that start at node 1. Draw their finish nodes and draw arrows between node 1 and those finish nodes. Put the activity letter or name and duration estimate on the associated arrow
2. Continuing drawing the network diagram, working from left to right. Look for bursts and merges. **Bursts** occur when a single node is followed by two or more activities. A **merge** occurs when two or more nodes precede a single node
3. Continue drawing the project network diagram until all activities are included on the diagram that have dependencies
4. As a rule of thumb, all arrowheads should face toward the right, and no arrows should cross on an AOA network diagram

Precedence Diagramming Method (PDM)

- Activities are represented by boxes
- Arrows show relationships between activities
- More popular than ADM method and used by project management software
- Better at showing different types of dependencies

Figure 6-3. Task Dependency Types

Task dependencies

The nature of the relationship between two linked tasks. You link tasks by defining a dependency between their finish and start dates. For example, the "Contact caterers" task must finish before the start of the "Determine menus" task. There are four kinds of task dependencies in Microsoft Project.

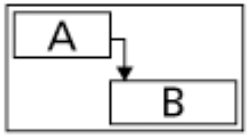
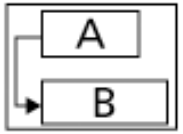
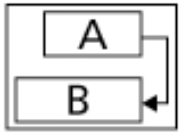
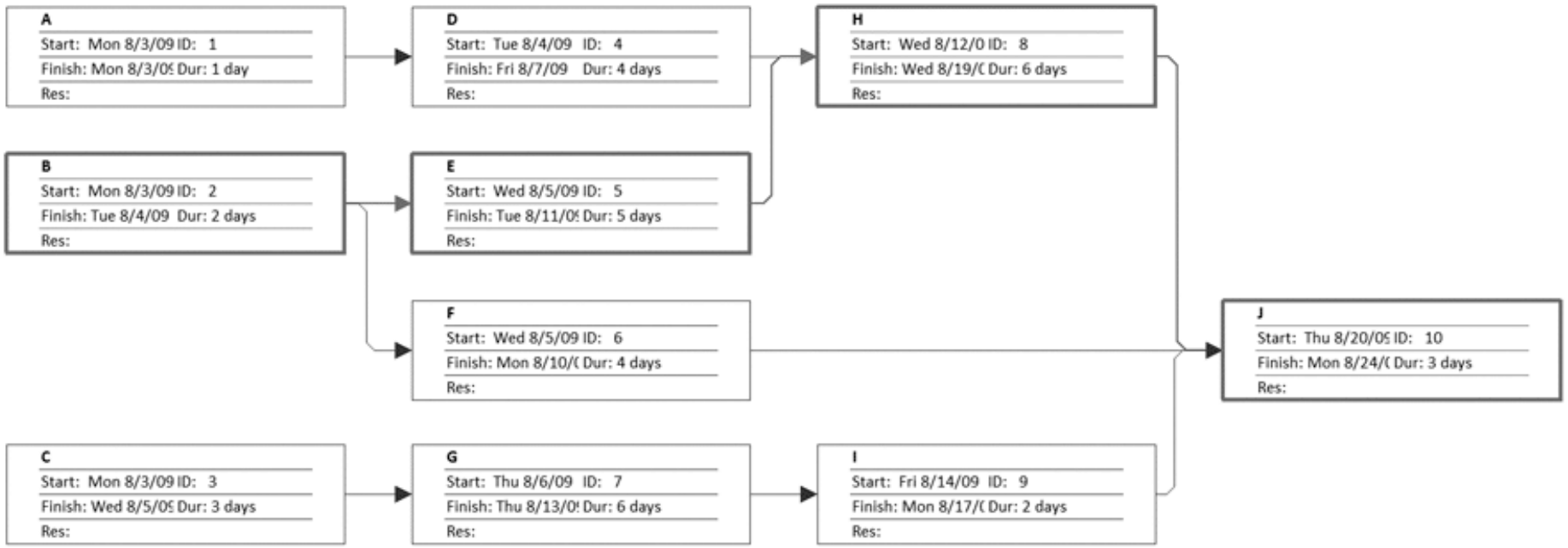
Task dependency	Example	Description
Finish-to-start (FS)		Task (B) cannot start until task (A) finishes.
Start-to-start (SS)		Task (B) cannot start until task (A) starts.
Finish-to-finish (FF)		Task (B) cannot finish until task (A) finishes.
Start-to-finish (SF)		Task (B) cannot finish until task (A) starts.

Figure 6-4. Sample PDM Network Diagram



Estimating Activity Resources

- Before estimating activity durations, you must have a good idea of the quantity and type of resources that will be assigned to each activity; **resources** are people, equipment, and materials
- Consider important issues in estimating resources
  - How difficult will it be to do specific activities on this project?
  - What is the organization's history in doing similar activities?
  - Are the required resources available?
- A **resource breakdown structure** is a hierarchical structure that identifies the project's resources by category and type

Activity Duration Estimating

- **Duration** includes the actual amount of time worked on an activity *plus* elapsed time
- **Effort** is the number of workdays or work hours required to complete a task
- Effort does not normally equal duration
- People doing the work should help create estimates, and an expert should review them

Three-Point Estimates

- Instead of providing activity estimates as a discrete number, such as four weeks, it's often helpful to create a **three-point estimate**
  - an estimate that includes an optimistic, most likely, and pessimistic estimate, such as three weeks for the optimistic, four weeks for the most likely, and five weeks for the pessimistic estimate
- Three-point estimates are needed for PERT and Monte Carlo simulations

Developing the Schedule

- Uses results of the other time management processes to determine the start and end date of the project
- Ultimate goal is to create a realistic project schedule that provides a basis for monitoring project progress for the time dimension of the project
- Important tools and techniques include Gantt charts, critical path analysis, and critical chain scheduling, and PERT analysis

Gantt Charts

- **Gantt charts** provide a standard format for displaying project schedule information by listing project activities and their corresponding start and finish dates in a calendar format
- Symbols include:
  - A black diamond: a milestones
  - Thick black bars: summary tasks
  - Lighter horizontal bars: durations of tasks
  - Arrows: dependencies between tasks

Figure 6-5. Gantt Chart for Project X

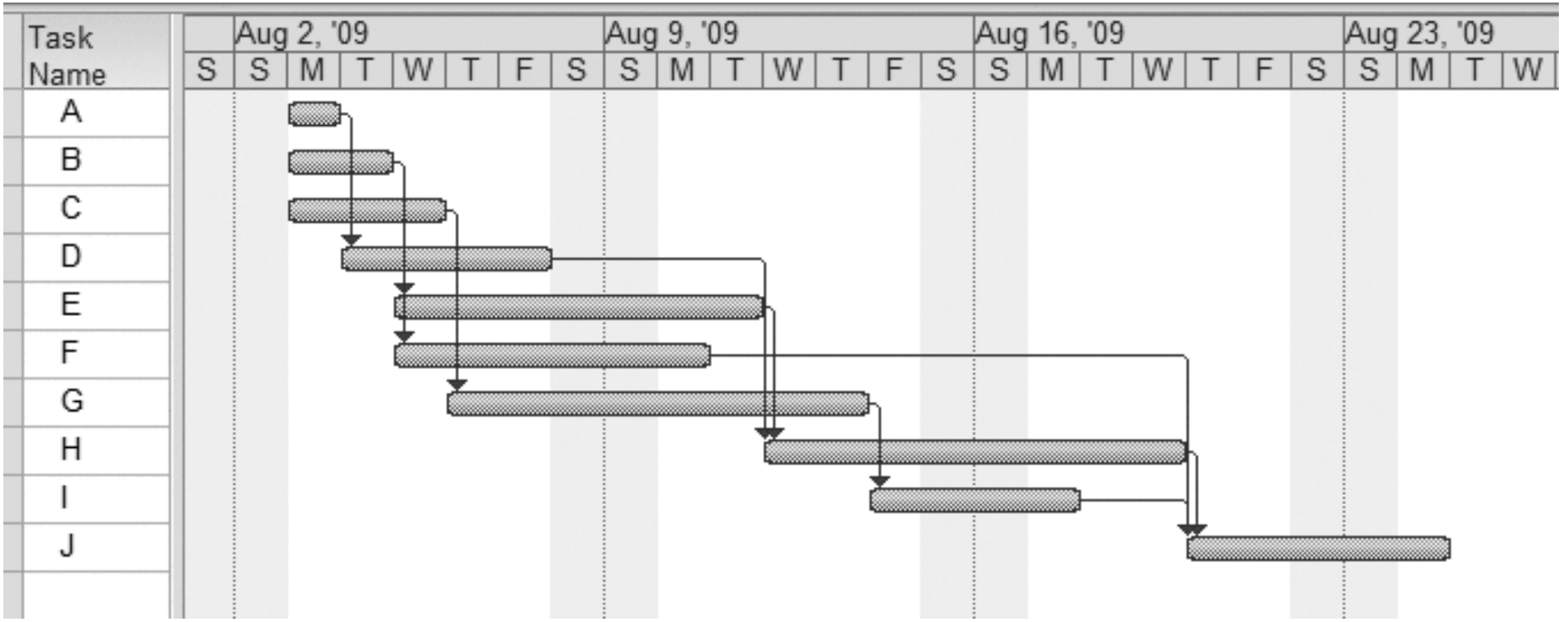
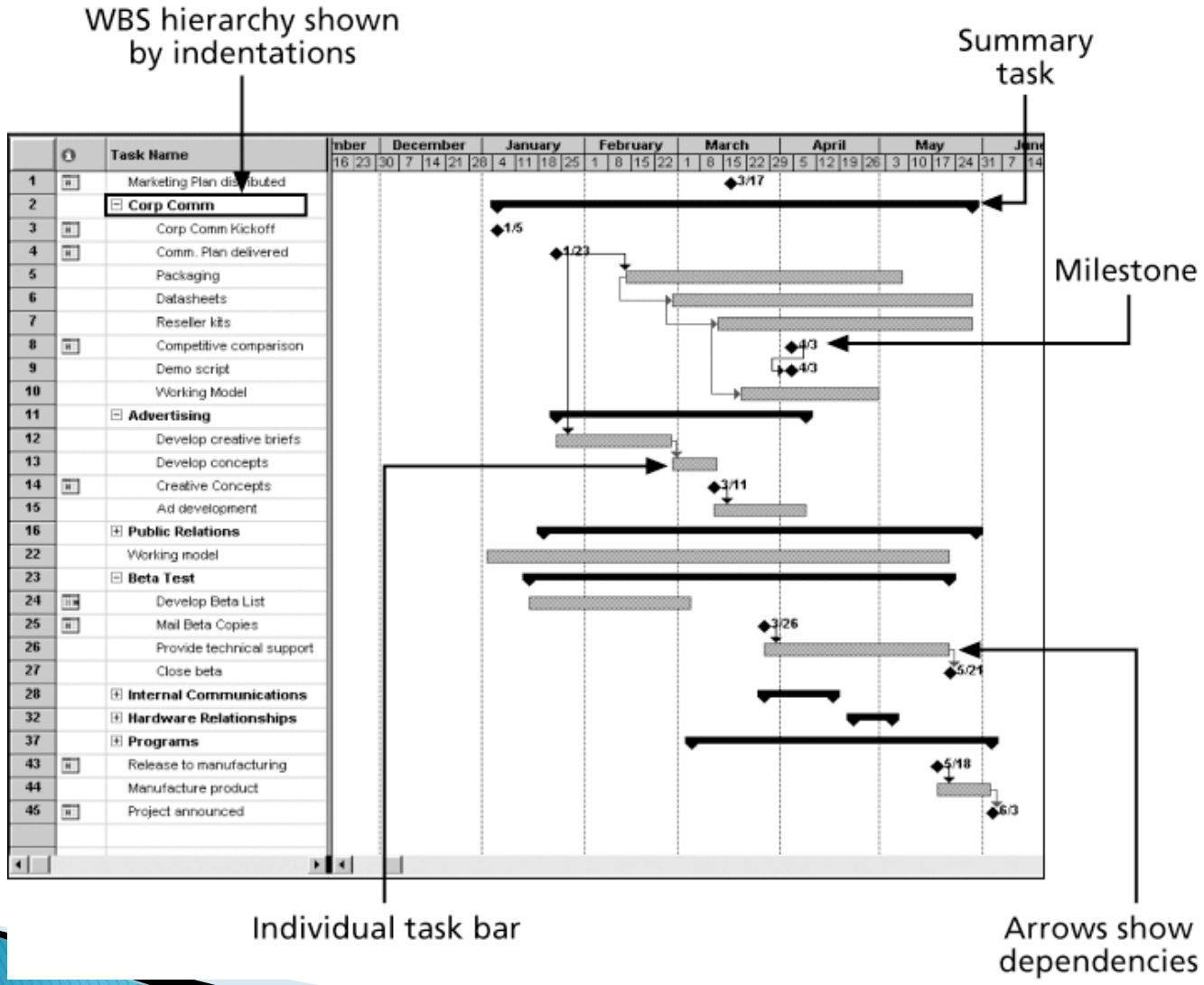


Figure 6-6. Gantt Chart for Software Launch Project



Adding Milestones to Gantt Charts

- Many people like to focus on meeting milestones, especially for large projects
- Milestones emphasize important events or accomplishments on projects
- Normally create milestone by entering tasks with a zero duration, or you can mark any task as a milestone

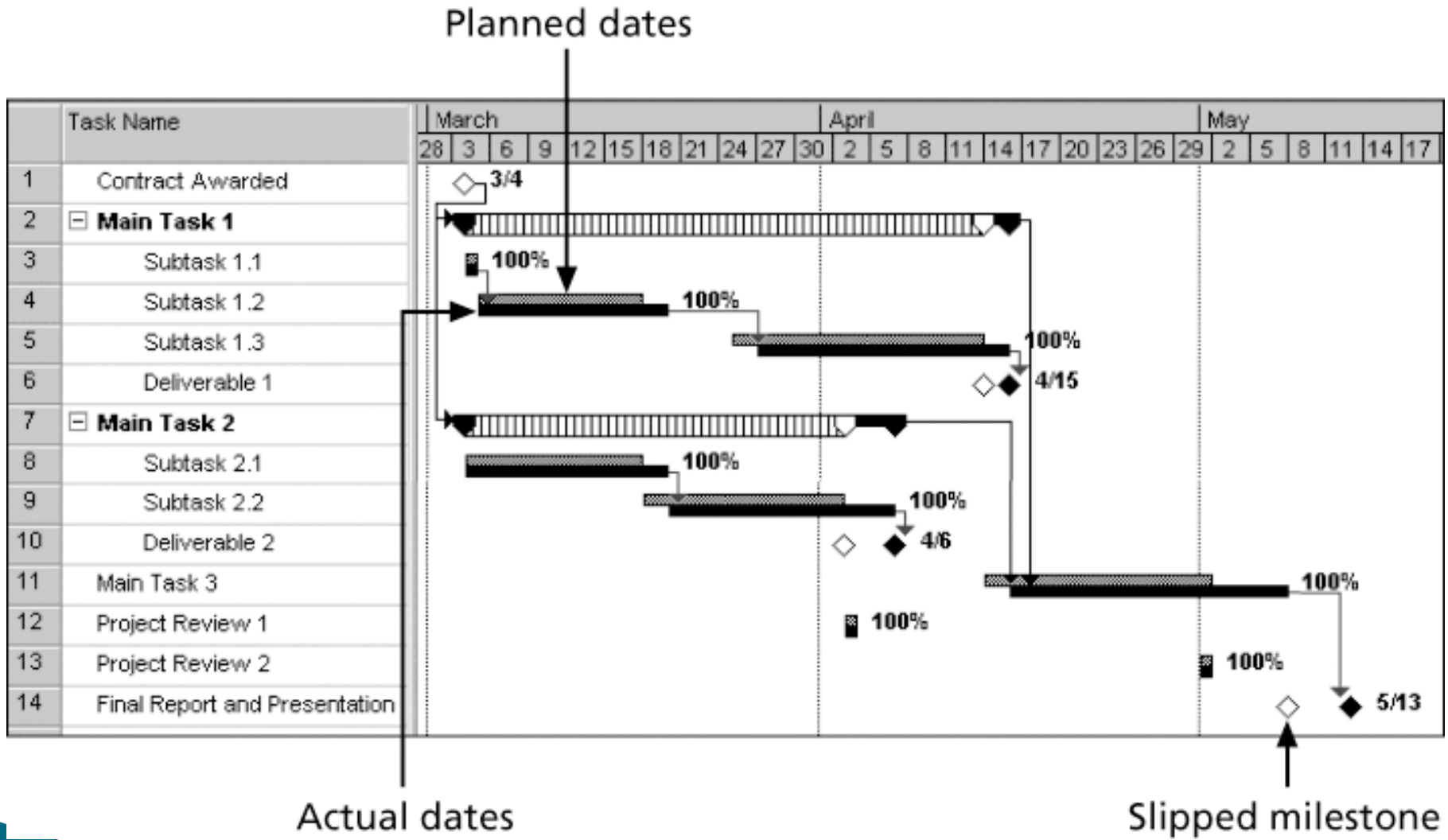
SMART Criteria

- Milestones should be
  - **S**pecific
  - **M**easurable
  - **A**ssignable
  - **R**ealistic
  - **T**ime-framed

Best Practice

- Schedule risk is inherent in the development of complex systems. Luc Richard, the founder of www.projectmangler.com, suggests that project managers can reduce schedule risk through project milestones, a best practice that involves identifying and tracking significant points or achievements in the project. The five key points of using project milestones include the following:
  1. Define milestones early in the project and include them in the Gantt chart to provide a visual guide
  2. Keep milestones small and frequent
  3. The set of milestones must be all-encompassing
  4. Each milestone must be binary, meaning it is either complete or incomplete.
  5. Carefully monitor the critical path

Figure 6-7. Sample Tracking Gantt Chart



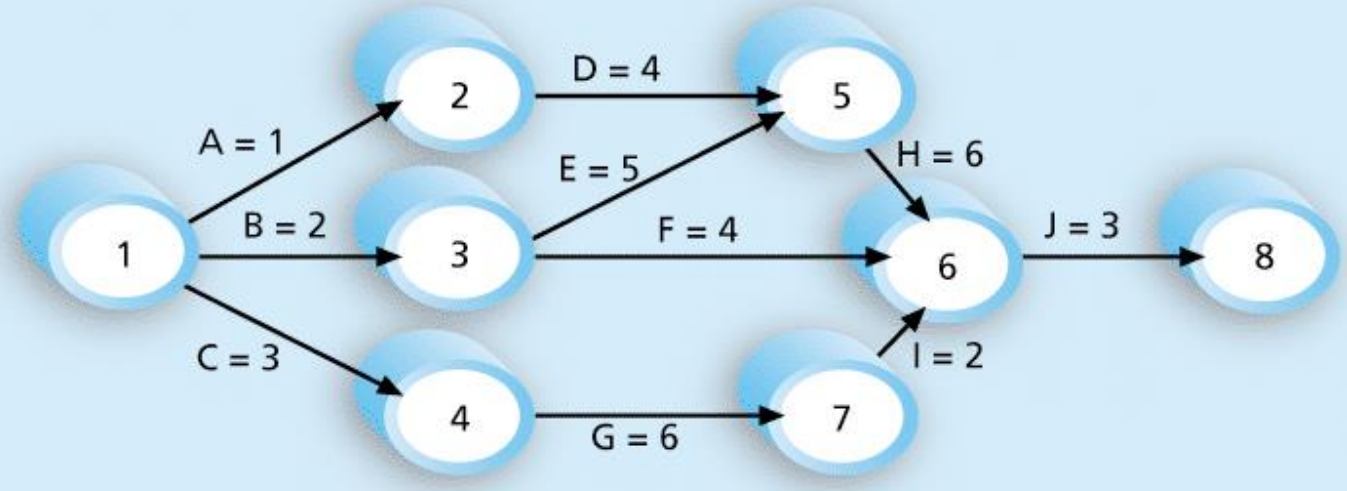
Critical Path Method (CPM)

- **CPM** is a network diagramming technique used to predict total project duration
- A **critical path** for a project is the series of activities that determines the *earliest time* by which the project can be completed
- The critical path is the *longest path* through the network diagram and has the least amount of slack or float
- **Slack** or **float** is the amount of time an activity may be delayed without delaying a succeeding activity or the project finish date

Calculating the Critical Path

- First develop a good network diagram
- Add the duration estimates for all activities on each path through the network diagram
- The longest path is the critical path
- If one or more of the activities on the critical path takes longer than planned, the whole project schedule will slip *unless* the project manager takes corrective action

Figure 6-8. Determining the Critical Path for Project X



Note: Assume all durations are in days.

Path 1:	A-D-H-J	Length = 1+4+6+3 = 14 days
Path 2:	B-E-H-J	Length = 2+5+6+3 = 16 days
Path 3:	B-F-J	Length = 2+4+3 = 9 days
Path 4:	C-G-I-J	Length = 3+6+2+3 = 14 days

Since the critical path is the longest path through the network diagram, Path 2, B-E-H-J, is the critical path for Project X.

More on the Critical Path

- A project team at Apple computer put a stuffed gorilla on the top of the cubicle of the person currently managing critical task
- The critical path is *not* the one with all the critical activities; it only accounts for time
  - Remember the example of ***growing grass*** being on the critical path for Disney's Animal Kingdom
- There can be more than one critical path if the lengths of two or more paths are the same
- The critical path can change as the project progresses

Using Critical Path Analysis to Make Schedule Trade-offs

- **Free slack** or **free float** is the amount of time an activity can be delayed without delaying the early start of any immediately following activities
- **Total slack** or **total float** is the amount of time an activity may be delayed from its early start without delaying the planned project finish date
- A **forward pass** through the network diagram determines the early start and finish dates
- A **backward pass** determines the late start and finish dates

Figure 6-9. Calculating Early and Late Start and Finish Dates

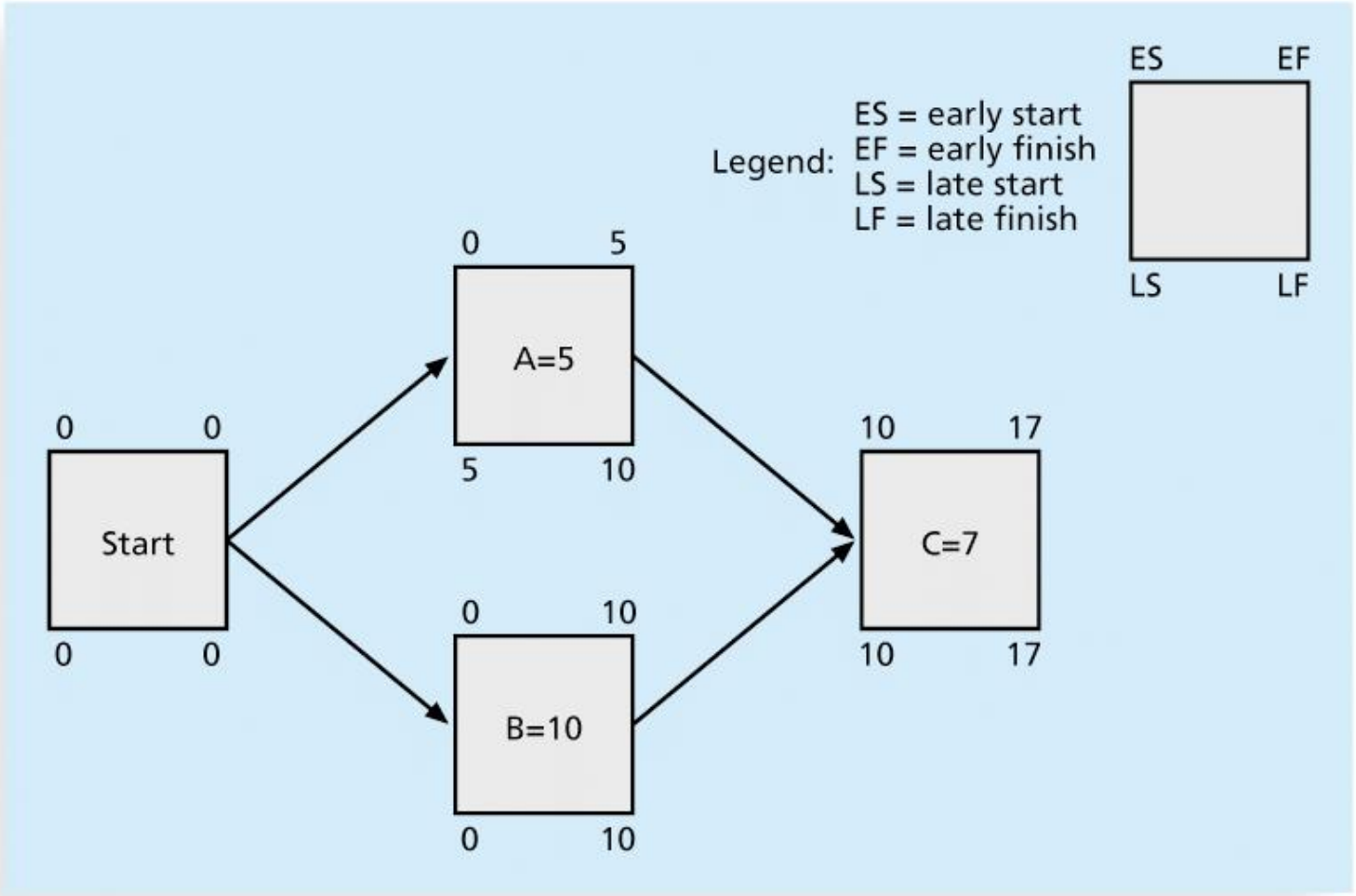


Table 6-1. Free and Total Float or Slack for Project X

Task Name	Start	Finish	Late Start	Late Finish	Free Slack	Total Slack
A	8/3/09	8/3/09	8/5/09	8/5/09	0d	2d
B	8/3/09	8/4/09	8/3/09	8/4/09	0d	0d
C	8/3/09	8/5/09	8/5/09	8/7/09	0d	2d
D	8/4/09	8/7/09	8/6/09	8/11/09	2d	2d
E	8/5/09	8/11/09	8/5/09	8/11/09	0d	0d
F	8/5/09	8/10/09	8/14/09	8/17/09	7d	7d
G	8/6/09	8/13/09	8/10/09	8/17/09	0d	2d
H	8/12/09	8/19/09	8/12/09	8/19/09	0d	0d
I	8/14/09	8/17/09	8/18/09	8/19/09	2d	2d
J	8/20/09	8/24/09	8/20/09	8/24/09	0d	0d

Using the Critical Path to Shorten a Project Schedule

- Three main techniques for shortening schedules
  - Shortening durations of critical activities/tasks by adding more resources or changing their scope
  - **Crashing** activities by obtaining the greatest amount of schedule compression for the least incremental cost
  - **Fast tracking** activities by doing them in parallel or overlapping them

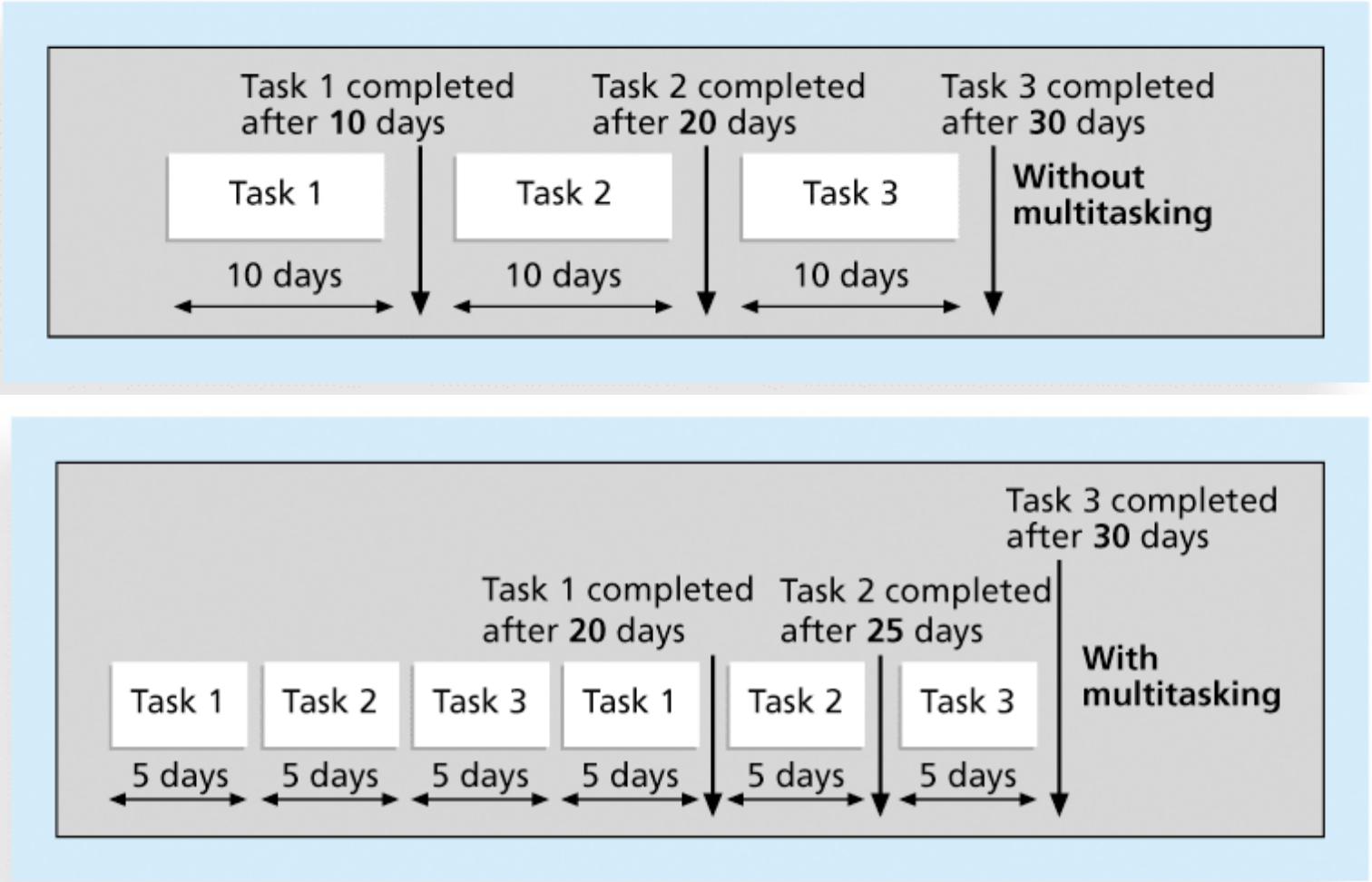
Importance of Updating Critical Path Data

- It is important to update project schedule information to meet time goals for a project
- The critical path may change as you enter actual start and finish dates
- If you know the project completion date will slip, negotiate with the project sponsor

Critical Chain Scheduling

- **Critical chain scheduling**
  - a method of scheduling that considers limited resources when creating a project schedule and includes buffers to protect the project completion date
- Uses the **Theory of Constraints (TOC)**
  - a management philosophy developed by Eliyahu M. Goldratt and introduced in his book *The Goal*.
- Attempts to minimize **multitasking**
  - when a resource works on more than one task at a time

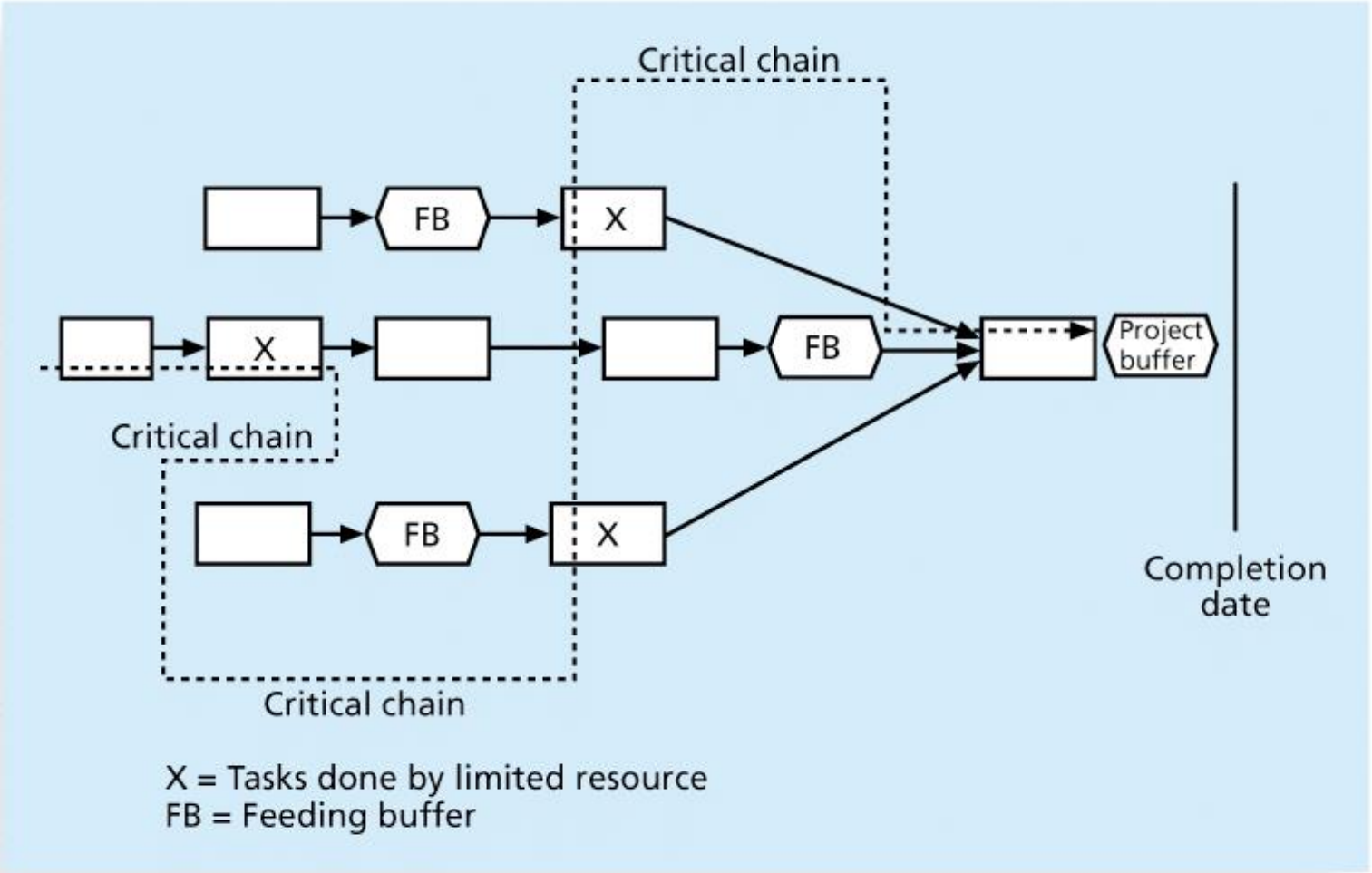
Figures 6-10.a and b. Multitasking Example



Buffers and Critical Chain

- A **buffer** is additional time to complete a task
- **Murphy's Law** states that if something can go wrong, it will
- **Parkinson's Law** states that work expands to fill the time allowed
- In traditional estimates, people often add a buffer to each task and use it if it's needed or not
- Critical chain scheduling removes buffers from individual tasks and instead creates
  - a **project buffer** or additional time added before the project's due date
  - **feeding buffers** or additional time added before tasks on the critical path

Figure 6-11. Example of Critical Chain Scheduling



Program Evaluation and Review Technique (PERT)

- **PERT** is a network analysis technique used to estimate project duration when there is a high degree of uncertainty about the individual activity duration estimates
- PERT uses **probabilistic time estimates**
  - duration estimates based on using optimistic, most likely, and pessimistic estimates of activity durations, or a three-point estimate

PERT Formula and Example

- PERT weighted average **=**

$$\frac{\text{optimistic time} + 4\text{X most likely time} + \text{pessimistic time}}{6}$$

- Example:

PERT weighted average =

$$\frac{8 \text{ workdays} + 4 \text{ X } 10 \text{ workdays} + 24 \text{ workdays}}{6} = \textbf{12 days}$$

where optimistic time= 8 days

most likely time = **10 days**, and

pessimistic time = 24 days

Therefore, you'd use **12 days** on the network diagram instead of 10 when using PERT for the above example

Schedule Control Suggestions

- Perform reality checks on schedules
- Allow for contingencies
- Don’t plan for everyone to work at 100% capacity all the time
- Hold progress meetings with stakeholders and be clear and honest in communicating schedule issues

Controlling the Schedule

- Goals are to know the status of the schedule, influence factors that cause schedule changes, determine that the schedule has changed, and manage changes when they occur
- Tools and techniques include
  - Progress reports
  - A schedule change control system
  - Project management software, including schedule comparison charts like the tracking Gantt chart
  - Variance analysis, such as analyzing float or slack
  - Performance management, such as earned value (chapter 7)

Reality Checks on Scheduling

- First review the draft schedule or estimated completion date in the project charter
- Prepare a more detailed schedule with the project team
- Make sure the schedule is realistic and followed
- Alert top management well in advance if there are schedule problems

Working with People Issues

- Strong leadership helps projects succeed more than good PERT charts
- Project managers should use
  - empowerment
  - incentives
  - discipline
  - negotiation

Global Issues

- Mittal Steel Poland earned Poland's Project Excellence Award in 2007 for implementing a SAP system
- Derek Prior, research director at AMR Research, identified three things the most successful SAP implementation projects do to deliver business benefits:
  - Form a global competence centre
  - Identify super-users for each location
  - Provide ongoing involvement of managers in business processes so they feel they own these processes

Using Software to Assist in Time Management

- Software for facilitating communications helps people exchange schedule-related information
- Decision support models help analyze trade-offs that can be made
- Project management software can help in various time management areas

What Went Right?

- Microsoft lists dozens of examples of how customers benefit from using Project 2010. One such customer, Amdocs, a global provider of customer experience systems (CES) software, wanted to help its IT project teams work more efficiently
- Employees now have Web-based access from any location, managers have better project visibility, and the company can extend the centralized solution to include more users and applications. Amdocs can now deploy Project Server 2010 in less than a day, or 50 percent faster. Only one person is needed to manage the shared infrastructure.

Words of Caution on Using Project Management Software

- Many people misuse project management software because they don't understand important concepts and have not had training
- You must enter dependencies to have dates adjust automatically and to determine the critical path
- You must enter actual schedule information to compare planned and actual progress

Chapter Summary

- Project time management is often cited as the main source of conflict on projects, and most IT projects exceed time estimates
- Main processes include
  - Plan schedule management
  - Define activities
  - Sequence activities
  - Estimate activity resources
  - Estimate activity durations
  - Develop schedule
  - Control schedule

Sesi 6-7

PROJECT 2010

GUIDE TO USING MICROSOFT PROJECT 2010

Introduction	A.2
New Features of Project 2010	A.3
Before You Begin	A.4
Overview of Project 2010	A.5
Starting Project 2010 and Using the Help Feature	A.5
Main Screen Elements	A.7
Project 2010 Views	A.11
Project 2010 Filters	A.15
Project Scope Management	A.17
Creating a New Project File	A.17
Developing a Work Breakdown Structure	A.20
Saving Project Files with or Without a Baseline	A.24
Project Time Management	A.24
Manual and Automatic Scheduling	A.24
Entering Task Durations	A.25
Establishing Task Dependencies	A.30
Changing Task Dependency Types and Adding Lead or Lag Time	A.33
Gantt Charts	A.36
Network Diagrams	A.38
Critical Path Analysis	A.40
Project Cost Management	A.42
Fixed and Variable Cost Estimates	A.43
Assigning Resources to Tasks	A.45
Baseline Plan, Actual Costs, and Actual Times	A.51
Earned Value Management	A.57

Project Human Resource Management	A.60
Resource Calendars	A.60
Resource Histograms	A.61
Resource Leveling	A.63
Using the New Team Planner Feature	A.65
Project Communications Management	A.66
Common Reports and Views	A.66
Using Templates and Inserting Hyperlinks and Comments	A.68
Discussion Questions	A.72
Exercises	A.72
Exercise A-1: Homework Assignments	A.72
Exercise A-2: Web Site Development	A.73
Exercise A-3: Software Training Program	A.75
Exercise A-4: Project Tracking Database	A.76
Exercise A-5: Real Project Application	A.79