Chapter 6:
Project Time Management

Information Technology Project Management, Sixth Edition

Note: See the text itself for full citations.

Information Technology
Project Management 6e

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Announcements

- ~~8/25 – Chapter 1, Syllabus and Class Overview~~
- ~~9/1 – Chapter 2, Term Project Guidance, Team Breakouts~~
- ~~9/8 – Chapter 3, Team Breakouts~~
- ~~9/15 – Chapter 4, Team Breakouts~~
- ~~9/22 – Chapter 5, Team Breakouts~~
- ~~9/29~~ – No Class, Thursday follows Monday schedule….
- 10/6 – Chapter 6, Team Breakouts
- 10/13 – Midterm (chapters 1-6)
- 10/20 – 1st Team Presentations, due and presented

# Learning Objectives

▸ Understand the importance of project schedules

▸ 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

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

REVIEW: Project Management Framework – 9 Knowledge Areas
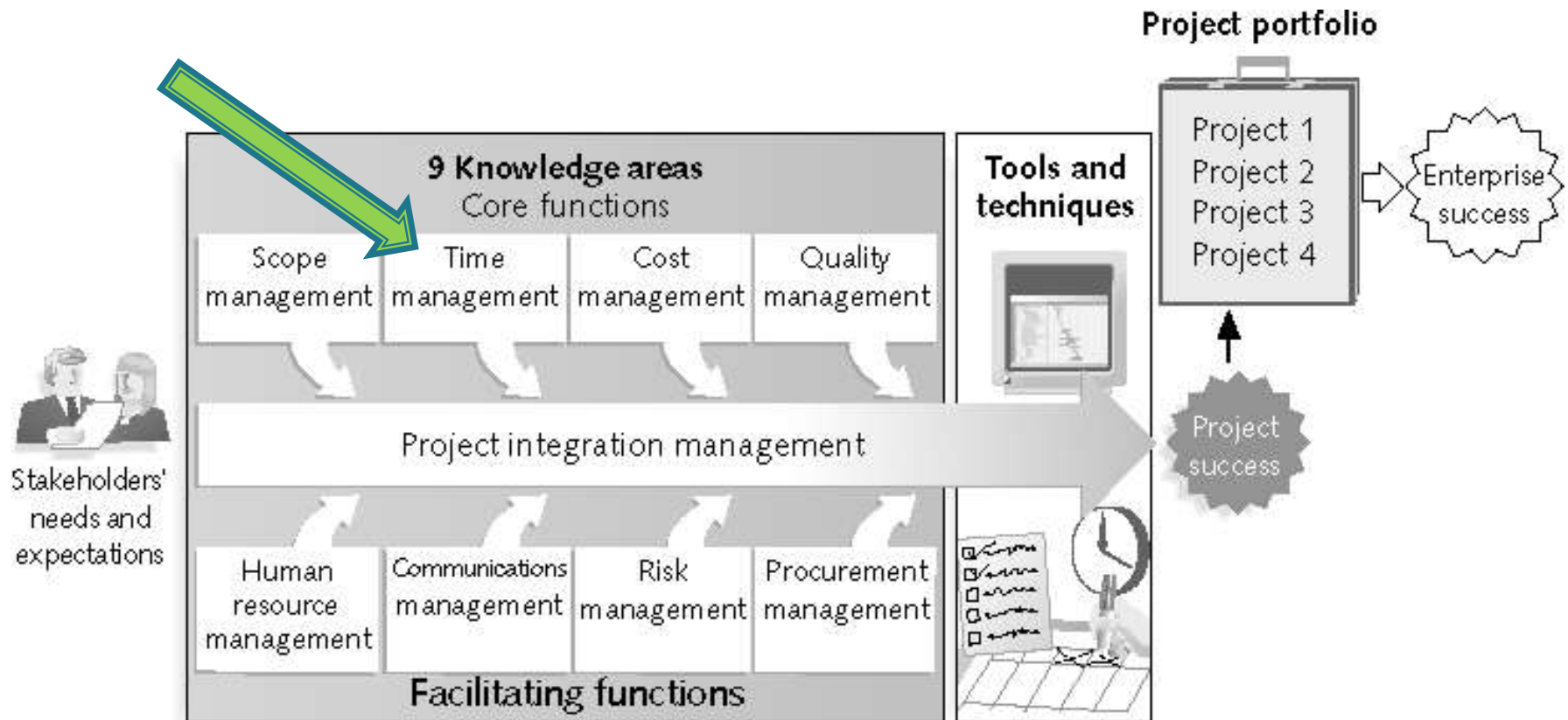
REVIEW: The 5 Project Management Process Groups

▶ The project management process groups include:

1) Initiating processes – *defining or authorizing a project or phase*

2) Planning processes – *devising a workable scheme (plan) can happen is all process groups, cost plans, resource plans, procurement plans.*

3) Executing processes – *coordinating people and other resources to carry out activities – did you make that order?*

4) Monitoring and controlling processes – *measure progress and changes against the plans*

5) Closing processes – *formal signoff, lessons learned, close out contracts etc…*

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REVIEW: Project Management Process Groups and Knowledge Area Mapping*

Knowledge Area	Project Management Process Groups				
	Initiating	Planning	Executing	Monitoring and Controlling	Closing
Project Integration Management	Develop project charter	Develop project management plan	Direct and manage project execution	Monitor and control project work, Perform integrated change control	Close project or phase
Project Scope Management		Collect requirements, Define scope, Create WBS		Verify scope, Control scope	
Project Time Management		Define activities, Sequence activities,		Control schedule	

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REVIEW:(continued)

Knowledge Area	Project Management Process Groups				
	Initiating	Planning	Executing	Monitoring and Controlling	Closing
Project Time Management (continued)		Estimate activity resources, Estimate activity durations, Develop schedule			
Project Cost Management		Estimate costs, Determine budget		Control costs	
Project Quality Management		Plan quality	Perform quality assurance	Perform quality control	
Project Human Resource Management		Develop human resource plan	Acquire project team, Develop project team, Manage project team		

Figure 6-1. Project Time Management Summary

Planning
Process: **Define activities**
Outputs: Activity list, activity attributes, milestone list
Process: **Sequence activities**
Outputs: Project schedule network diagrams, project document updates
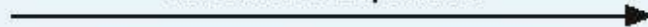Process: **Estimate activity resources**
Outputs: Activity resource requirements, resource breakdown structure, project document updates
Process: **Estimate activity durations**
Outputs: Activity duration estimates, project document updates
Process: **Develop schedule**
Outputs: Project schedule, schedule baseline, schedule data, project document updates
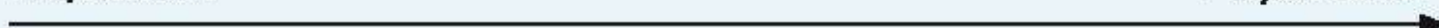
Monitoring and Controlling
Process: **Control schedule**
Outputs: Work performance measurements, organizational process assets updates, change requests, project management plan updates, project document updates

Project Start   **Project Finish**

Project Time Management Processes

- **Defining activities**: identifying the specific activities that the project team members must perform to produce 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 (time)

- **Developing the schedule**: analyzing activity sequences, activity resource estimates to create the project schedule

- *Our good friend -* **Controlling** **the schedule**: controlling and managing changes to the project schedule

Defining Activities

- An **activity** or **task** is an element of work that normally has an:
  - expected duration
  - a cost
  - and resource requirements

- ***** you need to understand your activities in order to come up with cost, resource, and time estimates*

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Milestones

- A **milestone** is a significant event that normally has no duration, but tells us something major in the project has happened worth noting~!

- Examples : *we've finished building out all the electrical circuits for our new data center*

Sequencing Activities

- Involves reviewing activities and determining dependencies

- A **dependency** or **relationship** helps you sequence project activities or tasks

- Example: *We need to finish the electrical circuits before we install our server racks and plug in the UPS's*

Three types of Dependencies

- **Mandatory dependencies**: inherent in the nature of the work being performed on a project, sometimes referred to as hard logic Ex: the electrical example

- **Discretionary dependencies**: sometimes referred to as soft logic and should be used with care since they may limit later scheduling options *Ex: We need to build in training for our engineers to support this new system*

- **External dependencies**: involve relationships between project and non-project activities : *Ex: new compliance or regulations etc…. Competitor came out with new features…*

Network Diagrams

- Network diagrams are the preferred technique for showing activity sequencing

- A **network diagram** is a schematic display of the logical relationships among project activities

- Two main formats are the arrow and precedence diagramming methods

Figure 6-4. Sample PDM Network Diagram
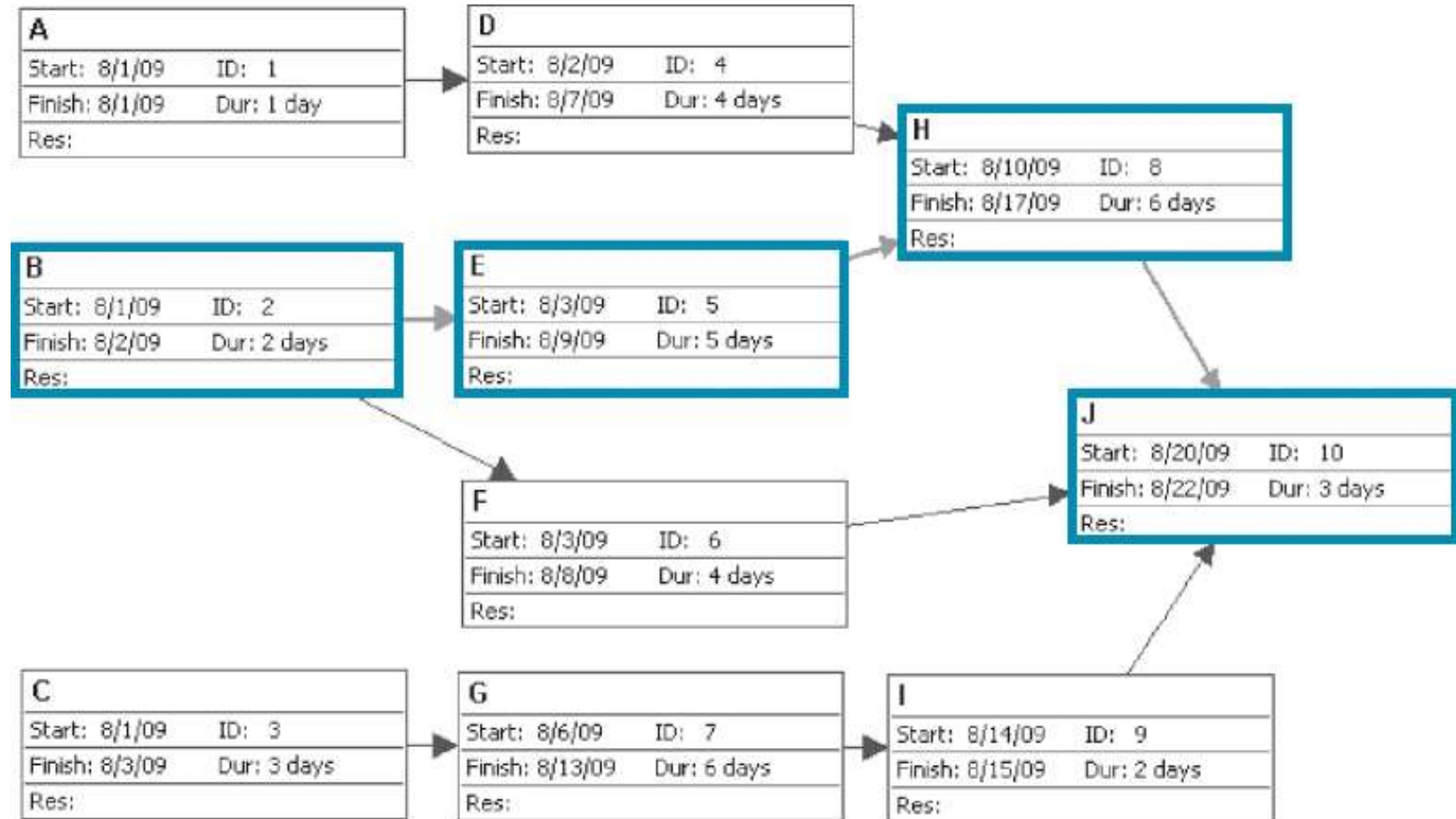
Estimating Activity Resources

- 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?

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, it might take you 10 hrs to develop something(effort), but the duration could be marked as a week due to other dependencies, waiting on people, Friday- then Monday….

- 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 (3 weeks)
- most likely (4 weeks)
- and pessimistic estimate (5 weeks)

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
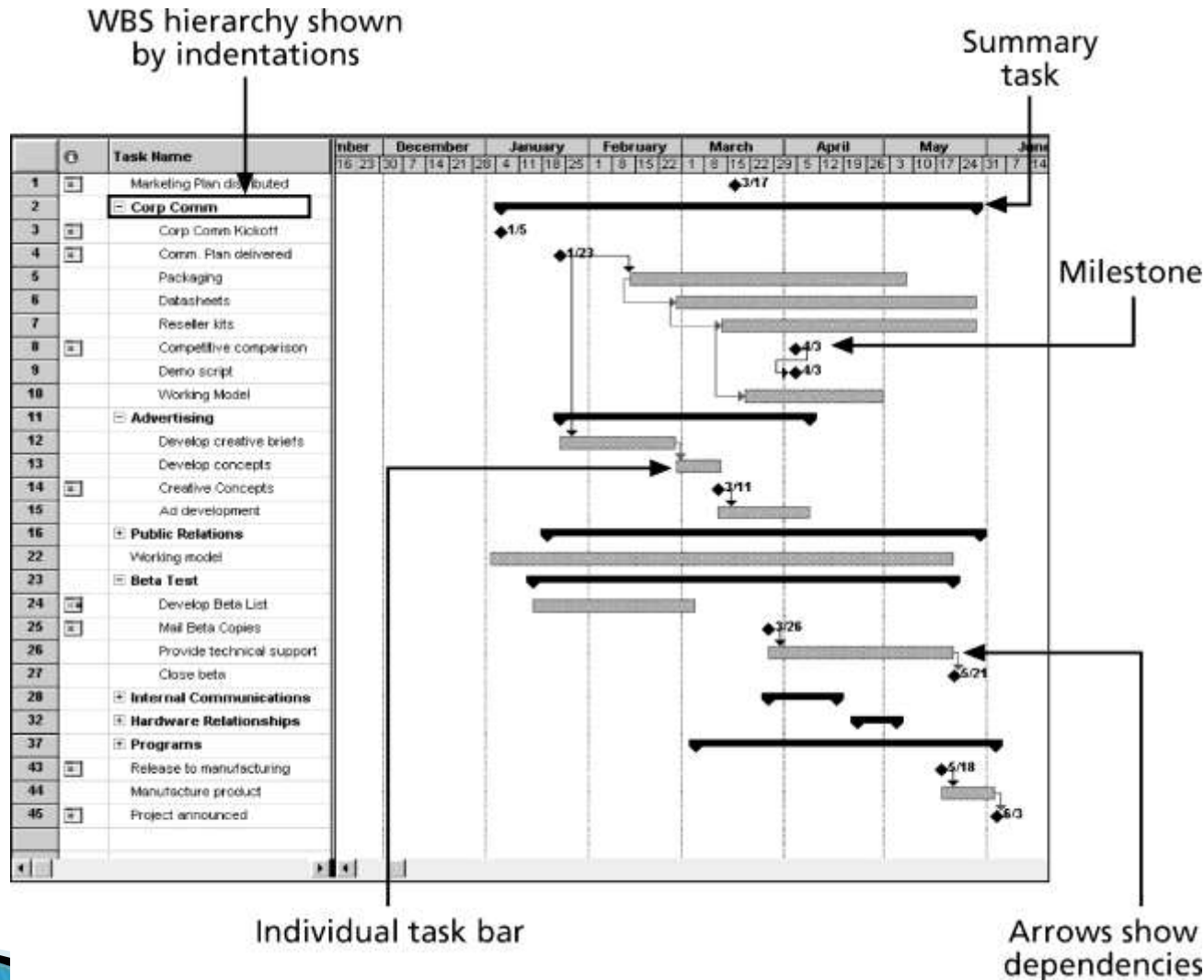
Gantt Charts

▸ **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

▸ Standard Symbols include:
  ◦ Black diamonds: milestones
  ◦ Thick black bars: summary tasks
  ◦ Lighter horizontal bars: durations of tasks
  ◦ Arrows: dependencies between tasks

Figure 6-5. Gantt Chart for Project X
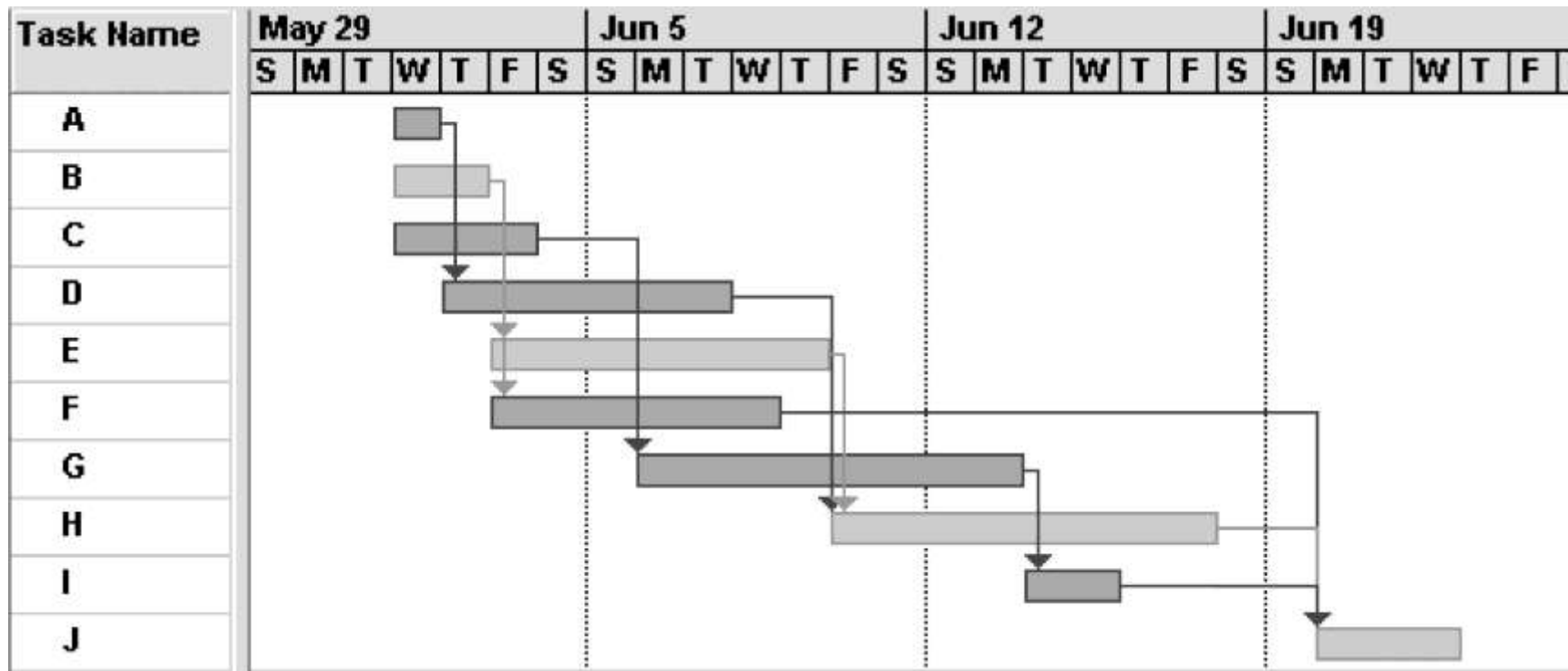
Note: Darker bars would be red in Project 2007 to represent critical tasks.

Figure 6-6. Gantt Chart for Software Launch Project

WBS hierarchy shown by indentations

Summary task

Milestone

Individual task bar

Arrows show dependencies

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

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, *and why pm's or estimators add buffers!!!!*

▸ In traditional estimates, people often add a buffer to each task

▸ Critical chain scheduling removes buffers from individual tasks and instead creates:
  ◦ **Project buffers** or additional time added before the project's due date *(we'll finish june 1, when really done may 1)*
  ◦ **Feeding buffers** or additional time ***added before*** tasks on the critical path *(task a should finish in 2 weeks, but is really done in a week – but appears to start early.)*
  ◦ (protects project with limited resources)

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 **=**

optimistic time + 4X most likely time + pessimistic time
$$6$$

▸ Example:

PERT weighted average =

 8 workdays + 4 X 10 workdays + 24 workdays = **12 days**
$$6$$

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

Best way to explain, is your taking an educated guess based on peoples expertise and averaging out based on low to high execution.

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

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:
  ◦ Define activities
  ◦ Sequence activities
  ◦ Estimate activity resources
  ◦ Estimate activity durations
  ◦ Develop schedule
  ◦ Control schedule