Modern Systems Analysis and Design

Eighth Edition, Global Edition

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Managing the Information Systems Project

Learning Objectives

- ✓ Explain the process of managing an information systems project, including project initiation, project planning, project execution, and project closedown,
- ✓ Describe how to represent and schedule project plans using Gantt charts and network diagrams, and
- ✓ Explain how commercial project management software packages can be used to assist in representing and managing project schedules

Introduction

- Project management (PM) may be the most important aspect of systems development.
- Effective PM helps to ensure
  - The meeting of customer expectations.
  - The satisfying of budget and time constraints.
- The nature of projects has changed from custom development to implementing packaged software such as ERP and data warehousing.
- PM needs to be able to work well with vendors and diverse user community.

Pine Valley Application Project

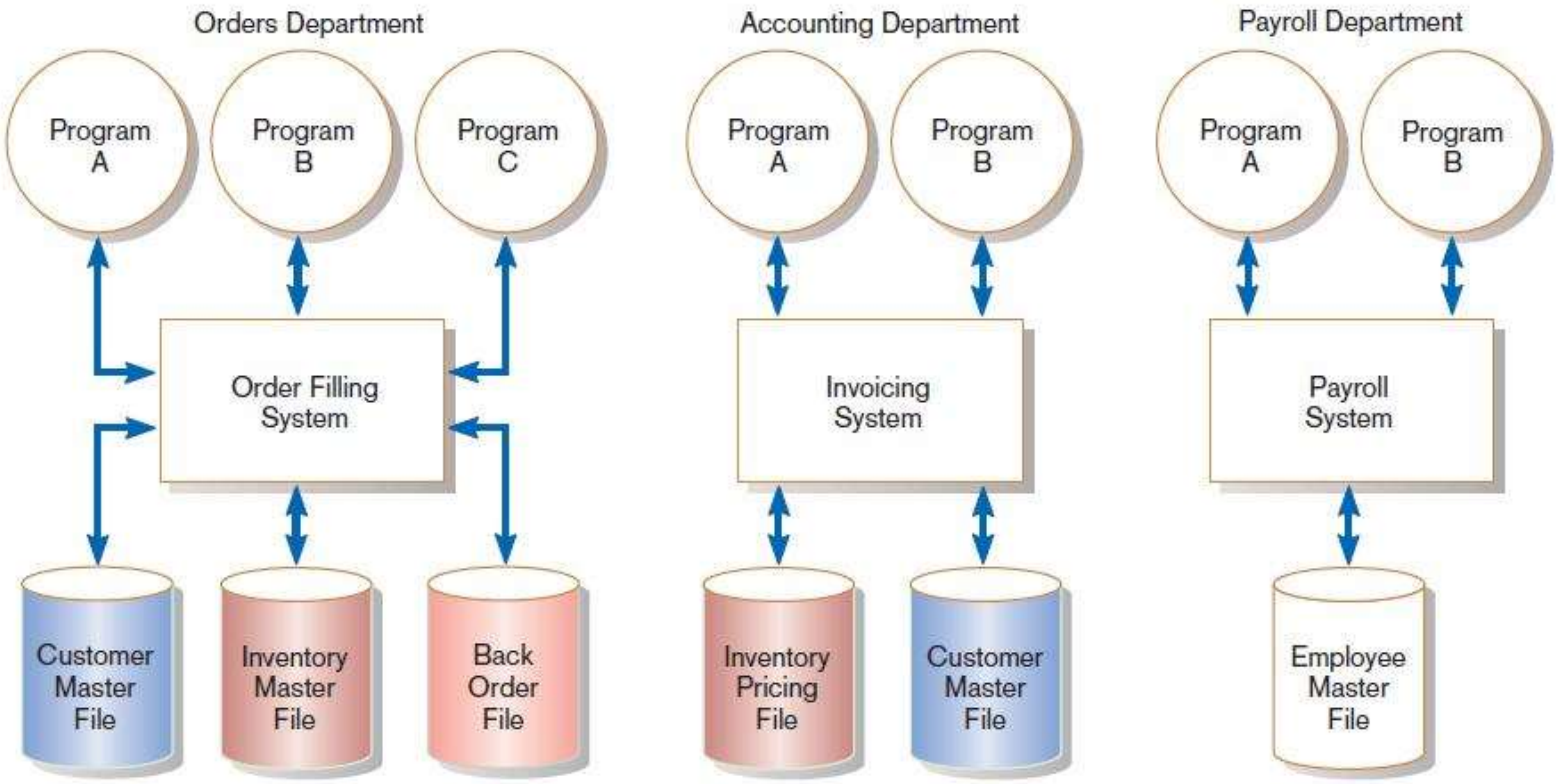


FIGURE 3-1

Three computer applications at Pine Valley Furniture: order filling, invoicing, and payroll (*Source:* Hoffer, Ramesh, and Topi, Modern Database Management 11th ed. 2013)

Managing the Information Systems Project

A project is a set of related activities that are carefully planned and orga
to achieve a specific goal

- Project
  - A planned undertaking of related activities to reach an objective that has a beginning and an end
- Project management
  - A controlled process of initiating, planning, executing, and closing down a project

Managing the Information Systems Project (cont.)

- Project manager
  - A systems analyst with a diverse set of skills—management, leadership, technical, conflict management, and customer relationship—who is responsible for initiating, planning, executing, and closing down a project
- Deliverable
  - The end product of an SDLC phase

Deciding on Systems Projects

- System Service Request (SSR)
  - A standard form for requesting or proposing systems development work within an organization
- Feasibility study
  - A study that determines whether a requested system makes economic and operational sense for an organization

** A Feasibility Study is a detailed analysis done after receiving an S

Pine Valley Furniture
System Service Request

REQUESTED BY Juanita Lopez DATE October 1, 2017

DEPARTMENT Purchasing, Manufacturing Support

LOCATION Headquarters, 1-322

CONTACT Tel: 4-3267 FAX: 4-3270 e-mail: jlopez

TYPE OF REQUEST

[X] New System
[ ] System Enhancement
[ ] System Error Correction

URGENCY

[ ] Immediate – Operations are impaired or opportunity lost
[ ] Problems exist, but can be worked around
[X] Business losses can be tolerated until new system installed

PROBLEM STATEMENT

Sales growth at PVF has caused greater volume of work for the manufacturing support unit within Purchasing. Further, more concentration on customer service has reduced manufacturing lead times, which puts more pressure on purchasing activities. In addition, cost-cutting measures force Purchasing to be more aggressive in negotiating terms with vendors, improving delivery times, and lowering our investments in inventory. The current modest systems support for Manufacturing/Purchasing is not responsive to these new business conditions. Data are not available, information cannot be summarized, supplier orders cannot be adequately tracked, and commodity buying is not well supported. PVF is spending too much on raw materials and not being responsive to manufacturing needs.

SERVICE REQUEST

I request a thorough analysis of our current operations with the intent to design and build a completely new information system. This system should handle all purchasing transactions, support display and reporting of critical purchasing data, and assist purchasing agents in commodity buying.

IS LIAISON Chris Martin (Tel: 4-6204 FAX: 4-6200 e-mail: cmartin)

SPONSOR Sal Divario, Director, Purchasing

---------- TO BE COMPLETED BY SYSTEMS PRIORITY BOARD ----------

[ ] Request approved Assigned to _____
Start date _____
[ ] Recommend revision
[ ] Suggest user development
[ ] Reject for reason _____

FIGURE 3-2
System Service Request for Purchasing Fulfillment System with name and contact information of the person requesting the system, a statement of the problem, and the name and contact information of the liaison and sponsor

Project Management Activities

FIGURE 3-4
A project manager juggles numerous activities

Phases of Project Management Process

- Phase 1: Initiation
- Phase 2: Planning
- Phase 3: Execution
- Phase 4: Closedown

PM Phase 1: Project Initiation

- Assess size, scope and complexity, and establish procedures.
- Establish:
  - Initiation team
  - Relationship with customer
  - Project initiation plan
  - Management procedures
  - Project management environment and workbook
  - Project charter

FIGURE 3-6
The project workbook for the Purchasing Fulfillment System project contains nine key elements

Project workbook
An online or hard-copy repository for all project correspondence, inputs, outputs, deliverables, procedures, and standards. Used for performing project audits, orienting new team members, communicating with management and customers, identifying future projects, and performing post-project reviews.

Project Charter

- A short document prepared for the customer describing project deliverables and outlining the work required to complete the project
- Elements:
  - Title and authorization date
  - Project manager name and contact information
  - Customer name and contact information
  - Project start and completion dates
  - Key stakeholders, roles, responsibilities
  - Project objectives and description
  - Key assumptions
  - Signatures of stakeholders

PM Phase 2: Project Planning

Define clear, discrete activities and the work needed to complete each activity. Tasks include:

1. Describing Project Scope, Alternatives, and Feasibility
2. Dividing the Project into Manageable Tasks
3. Estimating Resources and Creating a Resource Plan
4. Developing a Preliminary Schedule
5. Developing a Communication Plan
6. Determining Project Standards and Procedures
7. Identifying and Assessing Risk
8. Creating a Preliminary Budget
9. Developing a Project Scope Statement
10. Setting a Baseline Project Plan

Planning Detail

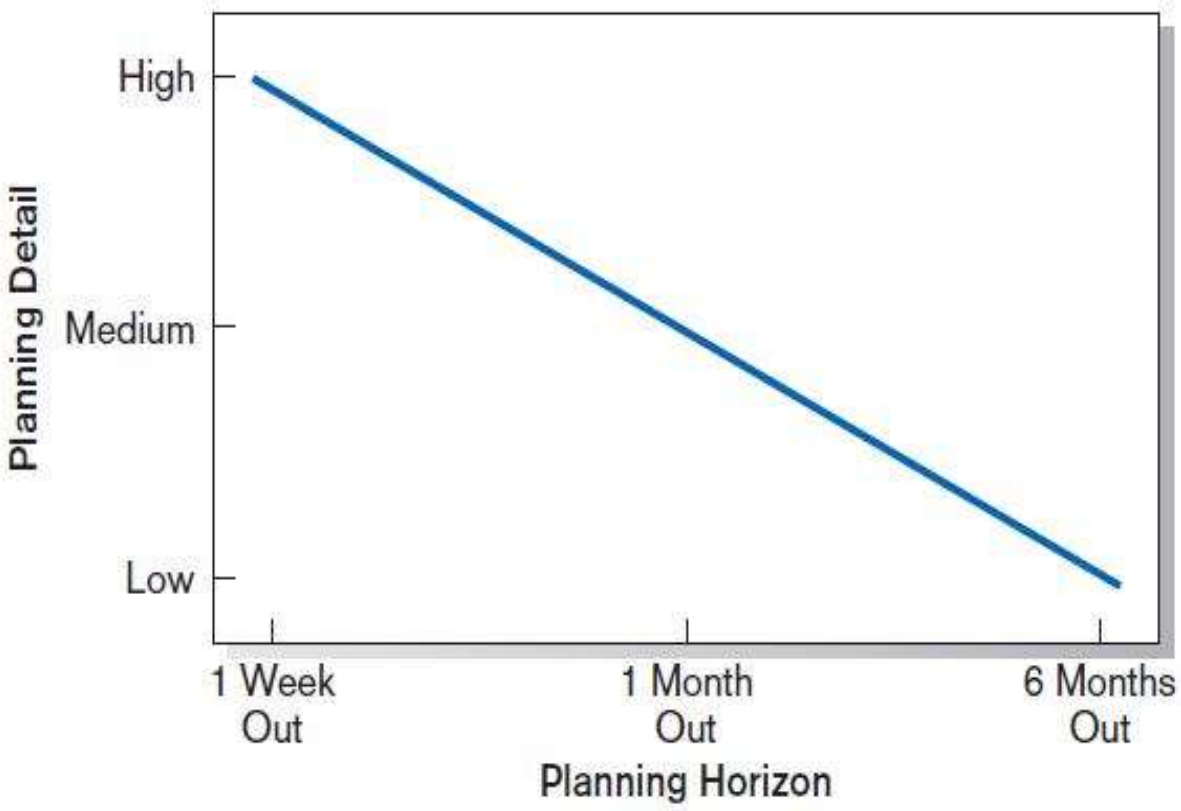


FIGURE 3-8
Level of project planning detail should be high in the short term, with less detail as time goes on

1 Project Scope, Alternatives, and Feasibility

- What problem or opportunity does the project address?
- What are the quantifiable results to be achieved?
- What needs to be done?
- How will success be measured?
- How will we know when we are finished?

2 Dividing Project into Manageable Tasks

- Work Breakdown Structure (WBS)
  - Division of project into manageable and logically ordered tasks and subtasks
- Scheduling Diagrams
  - Gantt chart: horizontal bars represent task durations
  - Network diagram: boxes and links represent task dependencies

3 Developing a Preliminary Schedule

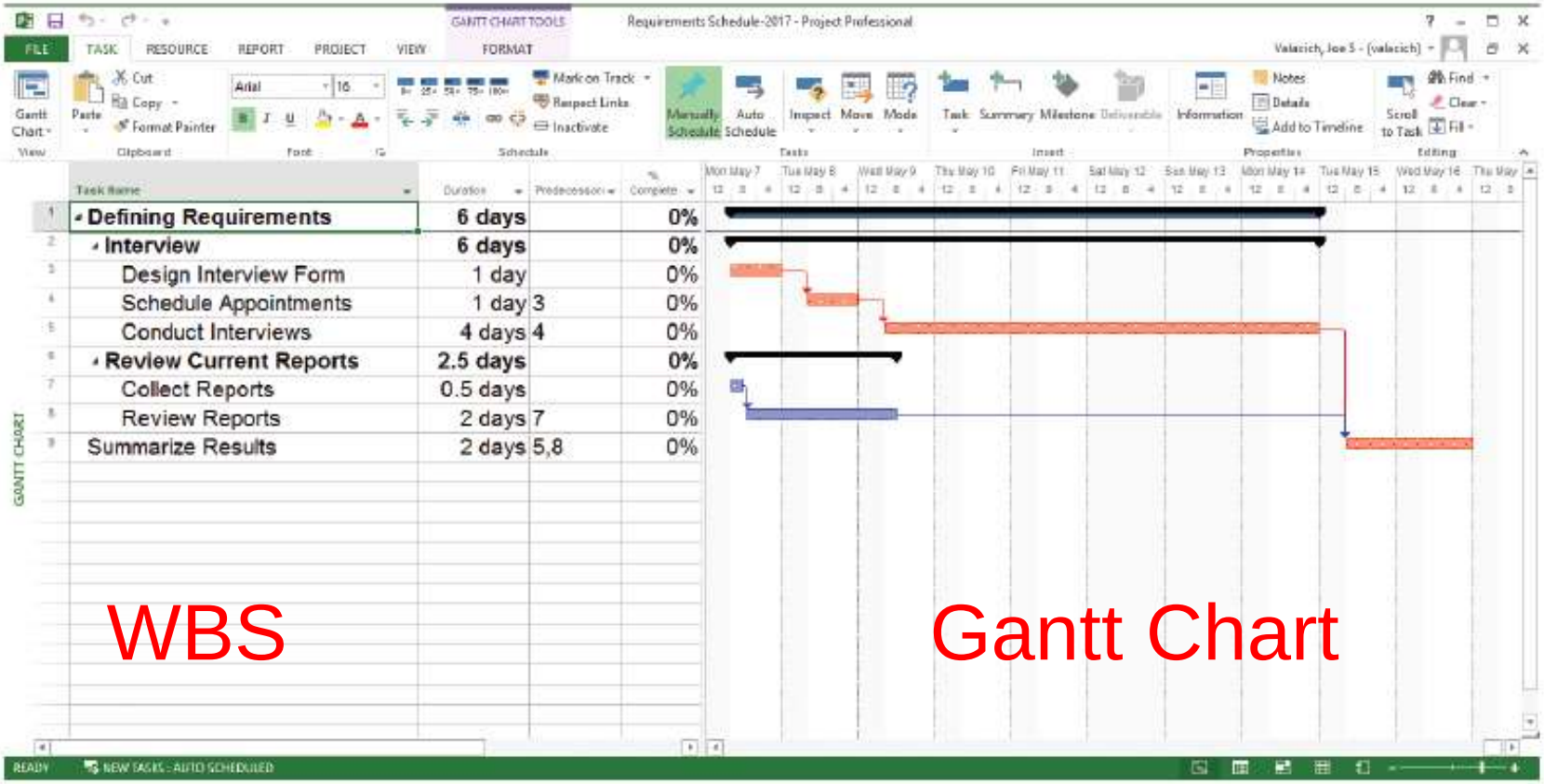
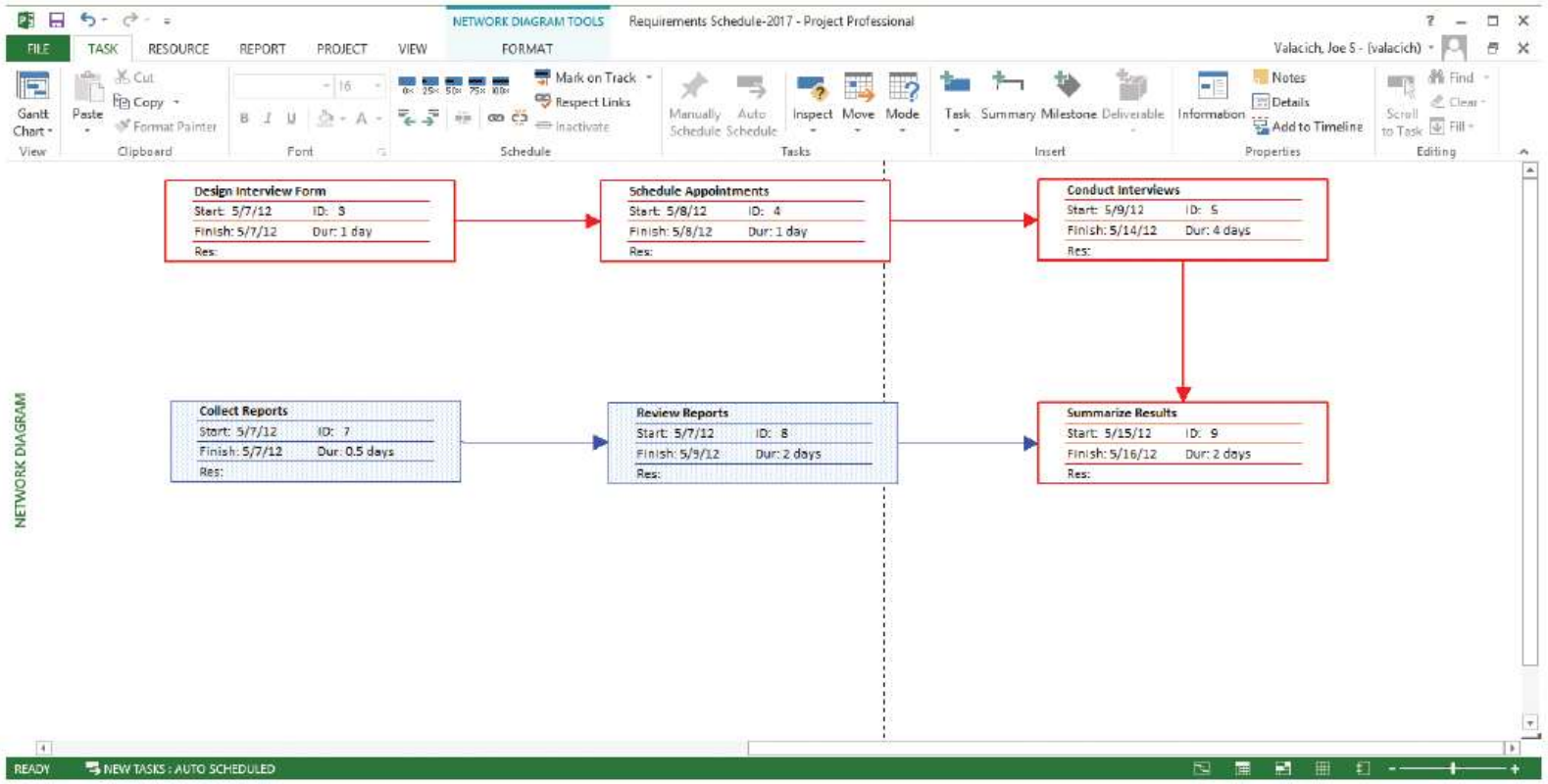


FIGURE 3-10
Gantt chart showing project tasks, duration times for those tasks, and predecessors (*Source:* Microsoft Corporation.)

Scheduling Diagrams Network Diagram

4 **FIGURE 3-12**

A network diagram illustrating tasks with rectangles (or ovals) and the relationships and sequences of those activities with arrows (*Source:* Microsoft Corporation.)



5 Estimating Resources, Creating a Resource Plan

- **Constructive Cost Model (COCOMO)** – an automated software estimation model that uses historical project data and current/future project characteristics to estimate project costs
- People are the most important and expensive resource
  - Important to have a good balance between specialization and task variety

6 Developing a Communication Plan

- Who are stakeholders?
- What information does each stakeholder need?
- When should information be produced?
- What are sources of information?
- Who will collect, store and validate info?
- Who will organize and document info?
- Who is the contact person for each stakeholder?
- What is the appropriate/best format for info?
- What communication medium should be used?

Communication Plan

Stakeholder	Document	Format	Team Contact	Date Due
Team Members	Project Status Report	Project Intranet	Juan Kim	First Monday of Month
Management Supervisor	Project Status Report	Hard Copy	Juan Kim	First Monday of Month
User Group	Project Status Report	Hard Copy	James Kim	First Monday of Month
Internal IT Staff	Project Status Report	E-Mail	Jackie James	First Monday of Month
IT Manager	Project Status Report	Hard Copy	Juan Jeremy	First Monday of Month
Contract Programmers	Software Specifications	E-Mail/Project Intranet	Jordan Kim	October 1, 2017
Training Subcontractor	Implementation and Training Plan	Hard Copy	Jordan James	January 7, 2018

FIGURE 3-13
The project communication matrix provides a high-level summary of the communication plan

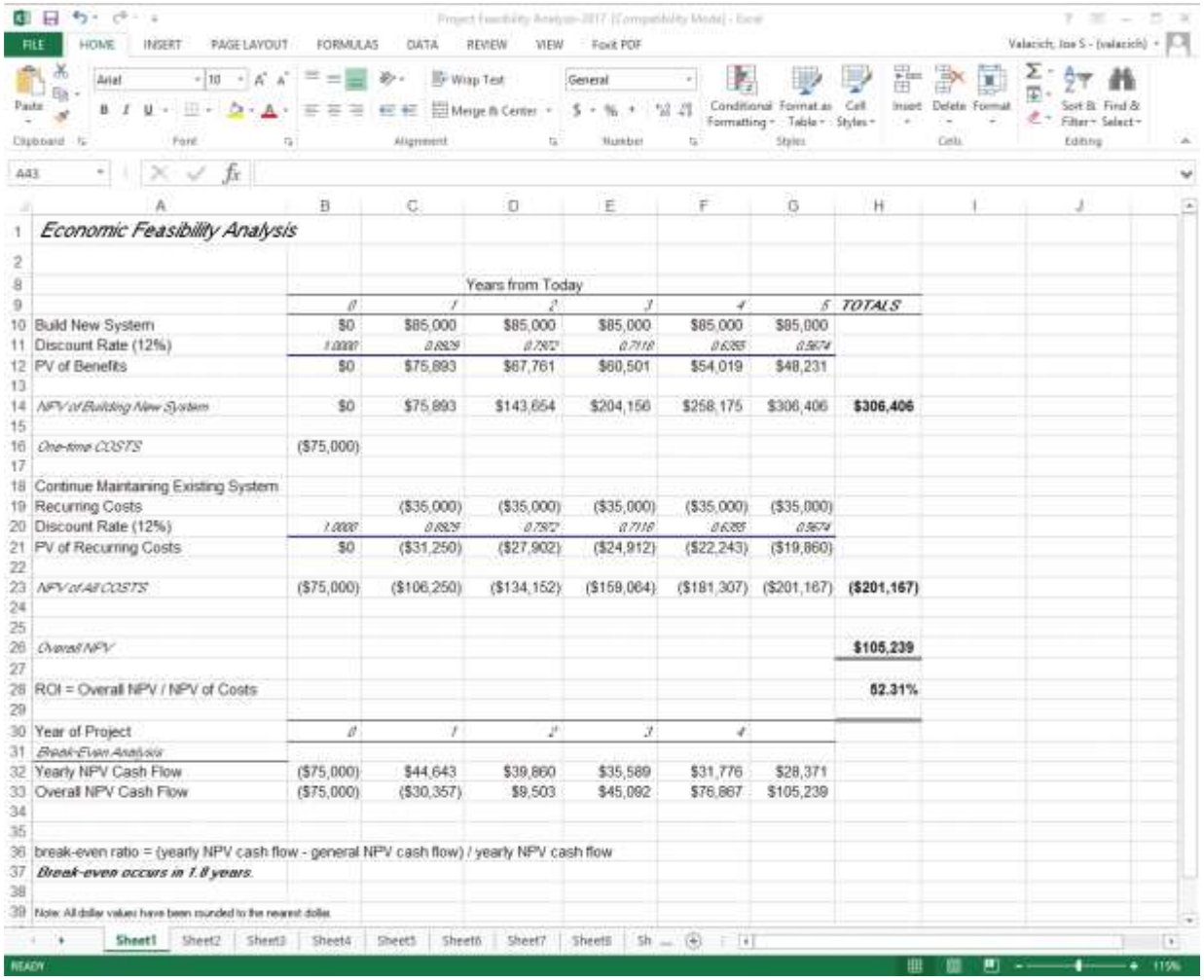
7 Determining Project Standards and Procedures

- Type of SDLC methodology
- Documentation styles
- Status updates
- Terminology

Identifying and Assessing Risk

- Sources of risk
- Consequences of risk
- Possible sources: new technology, user resistance, critical resource availability, competitive reactions, regulatory changes, team member experience

9 Developing a Preliminary Budget



	A	B	C	D	E	F	G	H
1	*Economic Feasibility Analysis*							
2								
8				Years from Today				
9		*0*	*1*	*2*	*3*	*4*	*5*	*TOTALS*
10	Build New System	$0	$85,000	$85,000	$85,000	$85,000	$85,000	
11	Discount Rate (12%)	*1.0000*	*0.8929*	*0.7972*	*0.7118*	*0.6355*	*0.5674*	
12	PV of Benefits	$0	$75,893	$67,761	$60,501	$54,019	$48,231	
13								
14	*NPV of Building New System*	$0	$75,893	$143,654	$204,156	$258,175	$306,406	**$306,406**
15								
16	*One-time COSTS*	($75,000)						
17								
18	Continue Maintaining Existing System							
19	Recurring Costs		($35,000)	($35,000)	($35,000)	($35,000)	($35,000)	
20	Discount Rate (12%)	*1.0000*	*0.8929*	*0.7972*	*0.7118*	*0.6355*	*0.5674*	
21	PV of Recurring Costs	$0	($31,250)	($27,902)	($24,912)	($22,243)	($19,860)	
22								
23	*NPV of All COSTS*	($75,000)	($106,250)	($134,152)	($159,064)	($181,307)	($201,167)	**($201,167)**
24								
25								
26	*Overall NPV*							**$105,239**
27								
28	ROI = Overall NPV / NPV of Costs							**52.31%**
29								
30	Year of Project	*0*	*1*	*2*	*3*	*4*		
31	*Break-Even Analysis*							
32	Yearly NPV Cash Flow	($75,000)	$44,643	$39,860	$35,589	$31,776	$28,371	
33	Overall NPV Cash Flow	($75,000)	($30,357)	$9,503	$45,092	$76,867	$105,239	
34								
35								
36	break-even ratio = (yearly NPV cash flow - general NPV cash flow) / yearly NPV cash flow							
37	***Break-even occurs in 1.8 years.***							
38								
39	Note: All dollar values have been rounded to the nearest dollar.							

FIGURE 3-14
A financial cost and benefit analysis for a systems development project (*Source:* Microsoft Corporation.)

Spreadsheet software is good for this.

10 Setting a Baseline Project Plan

- A **Baseline Project Plan** provides an estimate of the project's tasks and resource requirements and is used to guide the next project phase—execution. As new information is acquired during project execution, the baseline plan will continue to be updated.

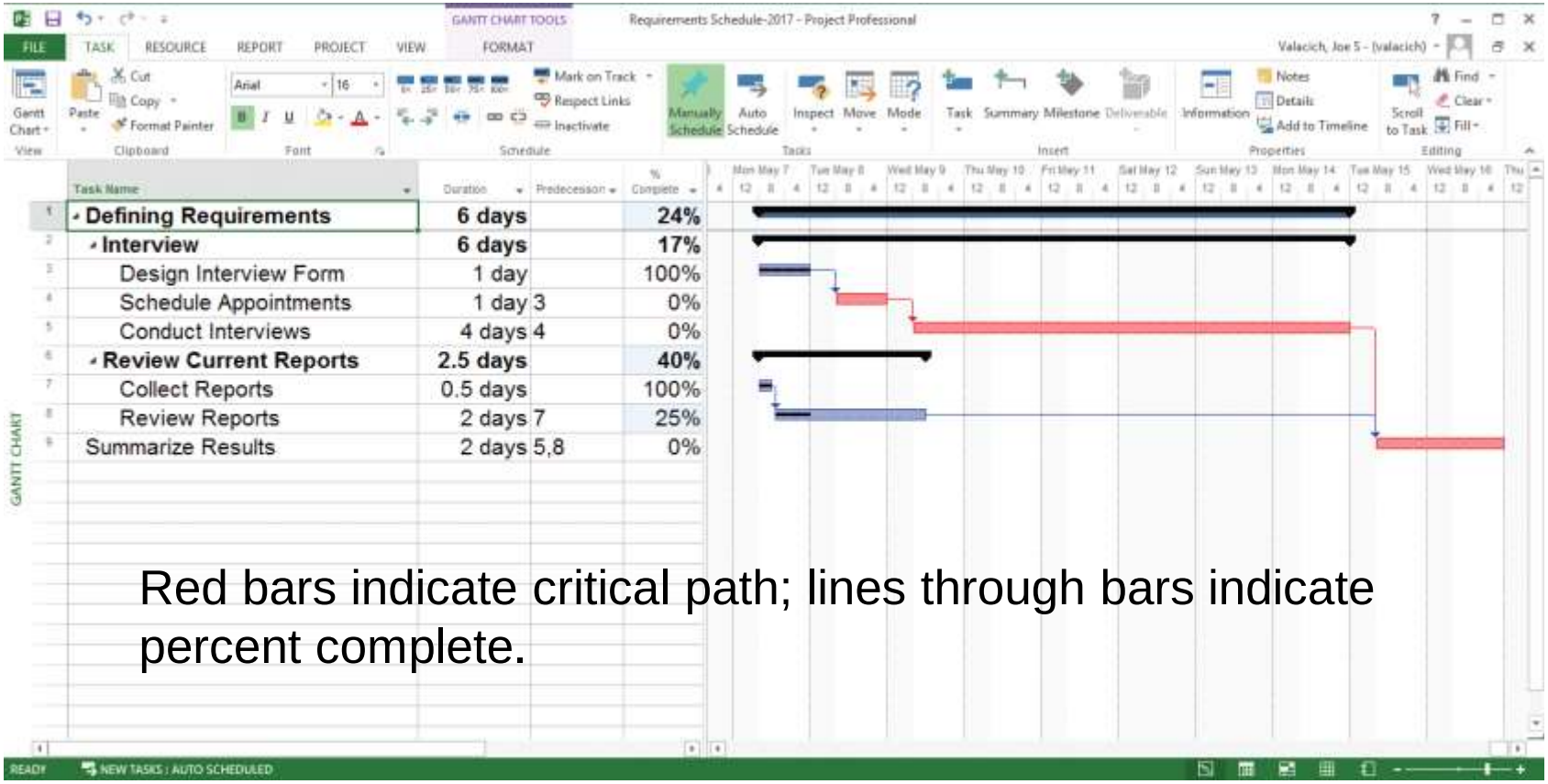
PM Phase 3: Project Execution

- Plans created in prior phases are put into action.
- Actions
  - Execute baseline project plan.
  - Monitor progress against baseline plan.
  - Manage changes in baseline plan.
  - Maintain project workbook.
  - Communicate project status.

Monitoring Progress with a Gantt Chart

FIGURE 3-16

Gantt chart with tasks 3 and 7 completed and task 8 partially completed (*Source:* Microsoft Corporation.)



Red bars indicate critical path; lines through bars indicate percent complete.

Communication Methods

TABLE 3-2 Project Team Communication Methods

Procedure	Formality	Use
Project workbook	High	Inform Permanent record
Meetings	Medium to high	Resolve issues
Seminars and workshops	Low to medium	Inform
Project newsletters	Medium to high	Inform
Status reports	High	Inform
Specification documents	High	Inform Permanent record
Minutes of meetings	High	Inform Permanent record
Bulletin boards	Low	Inform
Memos	Medium to high	Inform
Brown bag lunches	Low	Inform
Hallway discussions	Low	Inform Resolve issues

PM Phase 4: Project Closedown

- Bring the project to an end.
  - ☑ Natural Termination – Completed Successfully
  - ☑ Unnatural Termination – Due to time and money
- Actions
  - ☑ Close down the project.
  - ☑ Conduct post-project reviews.
  - ☑ Close the customer contract.

Representing and Scheduling Project Plans

- Gantt Charts
- Network Diagrams
- PERT Calculations
- Critical Path Scheduling
- Project Management Software

Gantt Charts vs. Network Diagrams

- Gantt charts
  - Show task durations.
  - Show time overlap.
  - Show slack time in duration.
- Network diagrams
  - Show task dependencies.
  - Do not show time overlap, but show parallelism.
  - Show slack time in boxes.

Gantt Charts vs. Network Diagrams (Cont.)

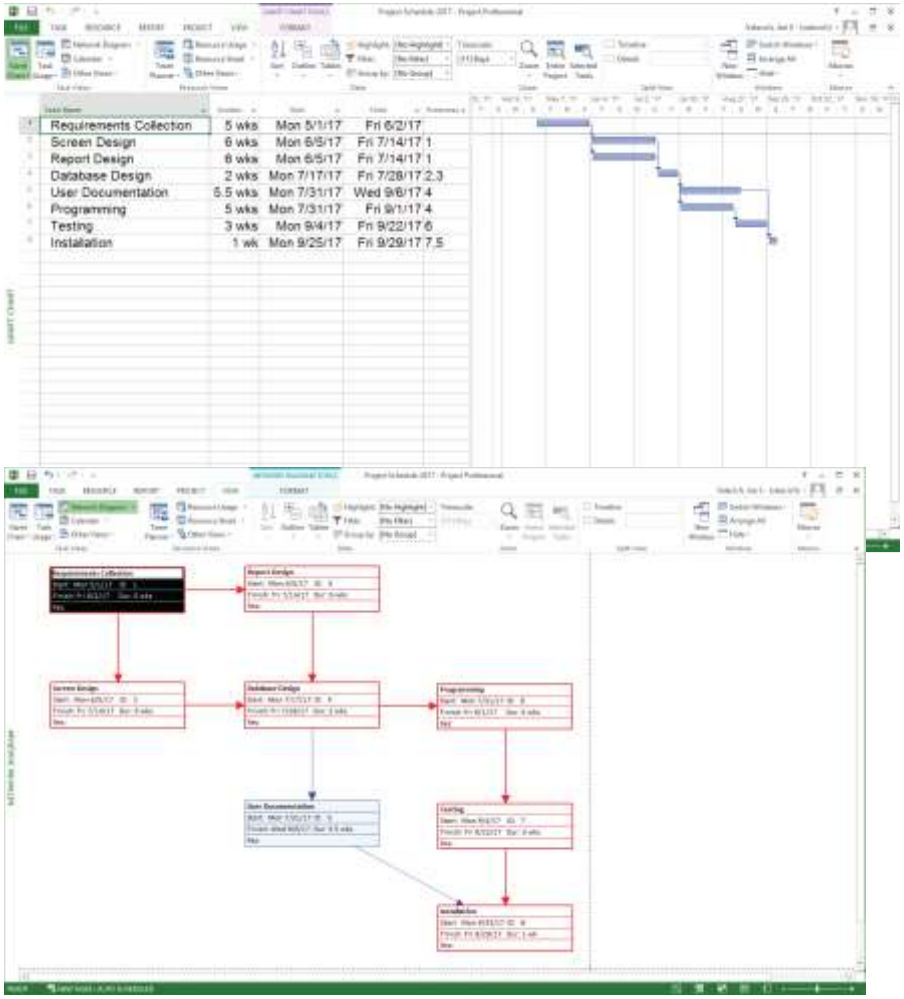
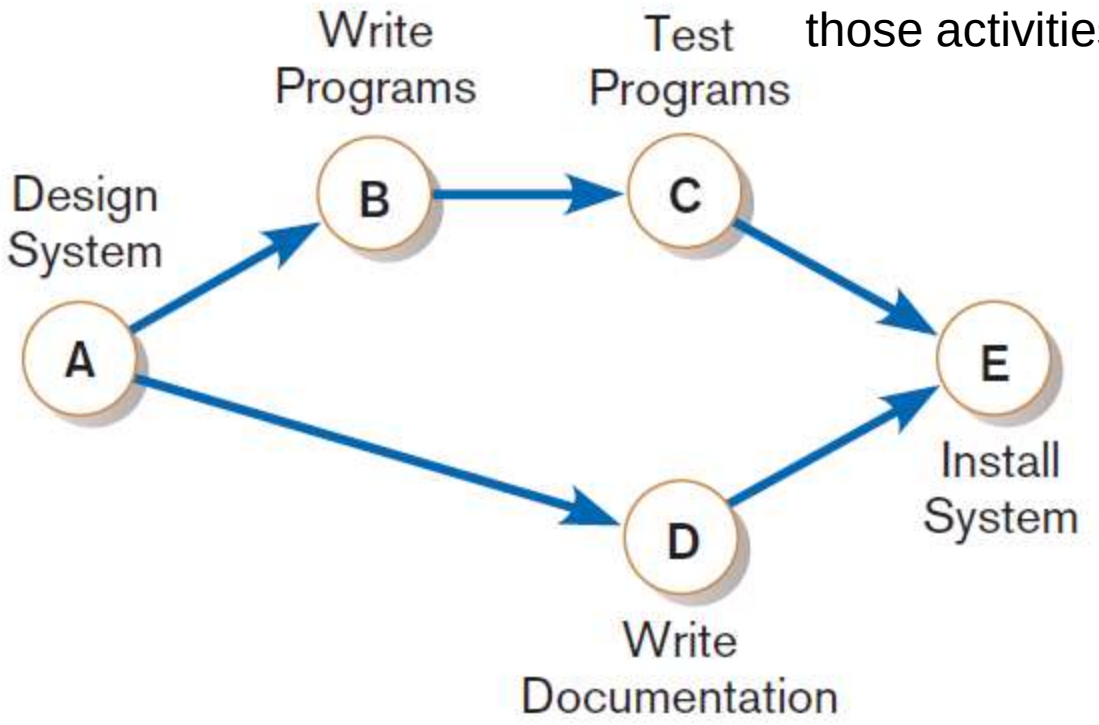


Figure 3-18
Graphical diagrams that depict project plans
(a) A Gantt chart
(b) A network diagram
(*Source:* Microsoft Corporation.)

Gantt Charts vs. Network Diagrams (Cont.)

Figure 3-20
A network diagram showing activities (represented by circles) and sequence of those activities (represented by arrows)



Estimating Task Duration

- PERT: Program Evaluation Review Technique
- Technique that uses optimistic (*o*), pessimistic (*p*), and realistic (*r*) time estimates to determine expected task duration
- Formula for Estimated Time:
  - ET = $(o + 4r + p)/6$

Example PERT Analysis

ACTIVITY	TIME ESTIMATE (in weeks) o	r	p	EXPECTED TIME (ET) $\frac{o + 4r + p}{6}$
1. Requirements Collection	1	5	9	5
2. Screen Design	5	6	7	6
3. Report Design	3	6	9	6
4. Database Design	1	2	3	2
5. User Documentation	2	6	7	5.5
6. Programming	4	5	6	5
7. Testing	1	3	5	3
8. Installation	1	1	1	1

FIGURE 3-21
Estimated time calculations for the SPTS project

Critical Path Scheduling

- A scheduling technique whose order and duration of a sequence of task activities directly affect the completion
- *Critical path:* the shortest time in which a project can be completed
- *Slack time:* the time an activity can be delayed without delaying the project

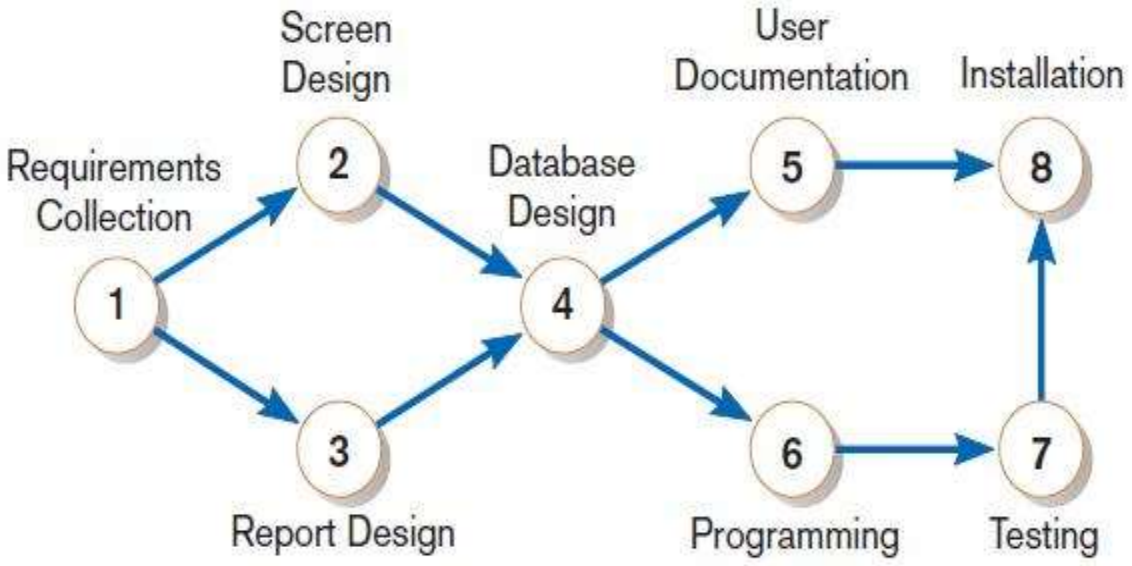
Critical Path Example (dependencies between tasks)

ACTIVITY	PRECEDING ACTIVITY
1. Requirements Collection	—
2. Screen Design	1
3. Report Design	1
4. Database Design	2,3
5. User Documentation	4
6. Programming	4
7. Testing	6
8. Installation	5,7

PRECEDING ACTIVITIES indicate the activities that must be completed before the specified activity can begin.

FIGURE 3-22 Sequence of Activities within the SPTS project

Critical Path Example (Cont.)



Network diagram shows dependencies

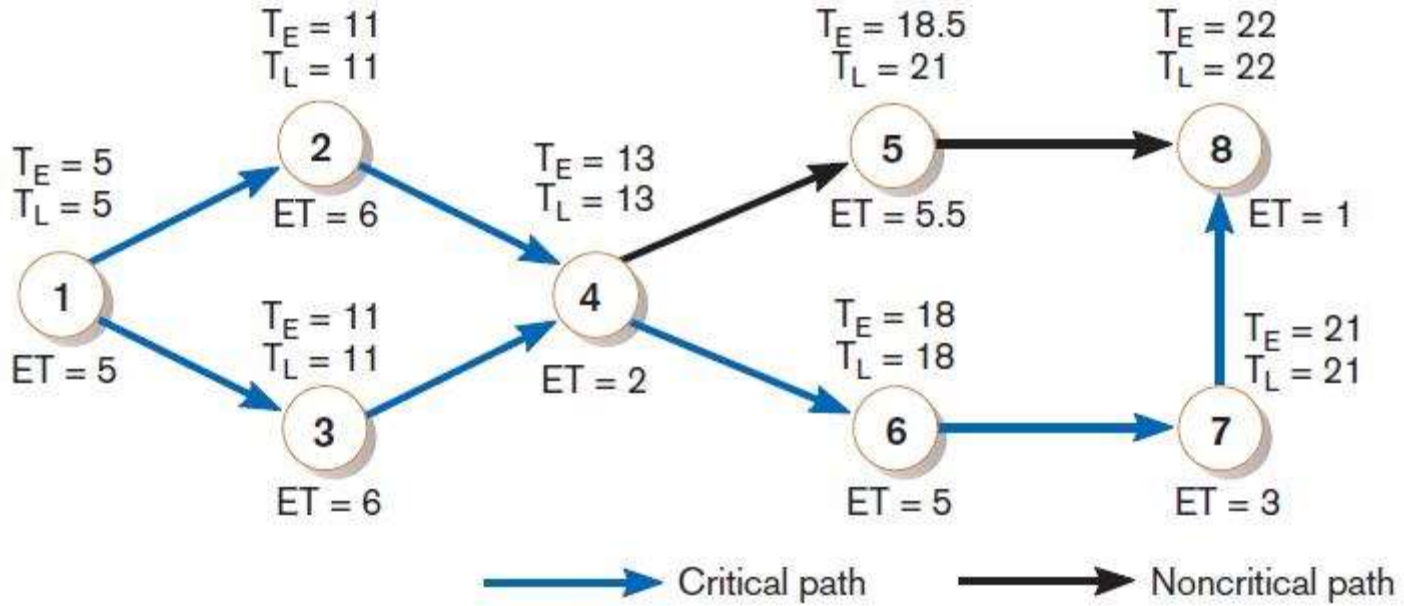
FIGURE 3-24
A network diagram that illustrates the activities (circles) and the sequence (arrows) of those activities

Determining the Critical Path

- Calculate the earliest possible completion time for each activity by summing the activity times in the longest path to the activity. This gives total expected project time.
- Calculate the latest possible completion time for each activity by subtracting the activity times in the path following the activity from the total expected time. This gives slack time for activities.
- Critical path contains no activities with slack time.

Critical Path Calculation

FIGURE 3-25
A network diagram for the SPTS project showing estimated times for each activity and the earliest and latest expected completion time for each activity



Early and late time calculations are determined and critical path established. (Note: Activity #5 can begin late without affecting project completion time.)

Critical Path Calculation (cont.)

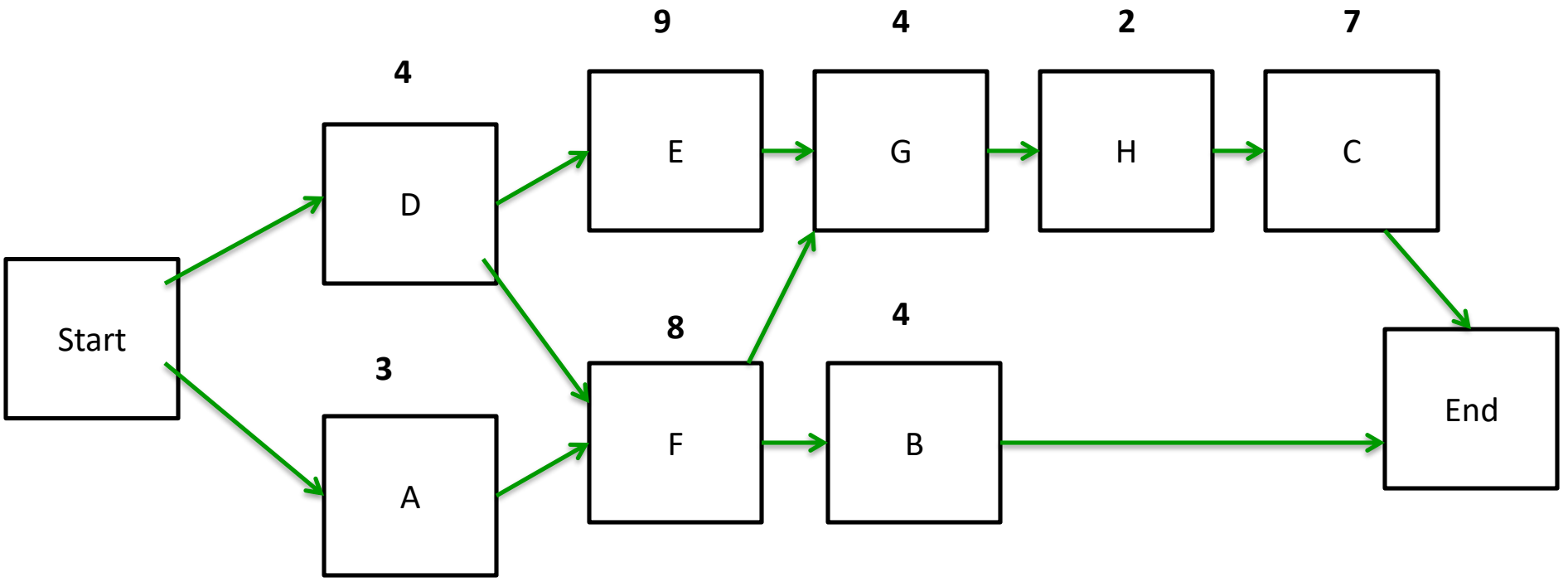
FIGURE 3-26
Activity slack time calculations for the SPTS project; all activities except number 5 are on the critical path

ACTIVITY	T_E	T_L	SLACK $T_L - T_E$	ON CRITICAL PATH
1	5	5	0	✓
2	11	11	0	✓
3	11	11	0	✓
4	13	13	0	✓
5	18.5	21	2.5	
6	18	18	0	✓
7	21	21	0	✓
8	22	22	0	✓

Note the slack time in Activity #5.

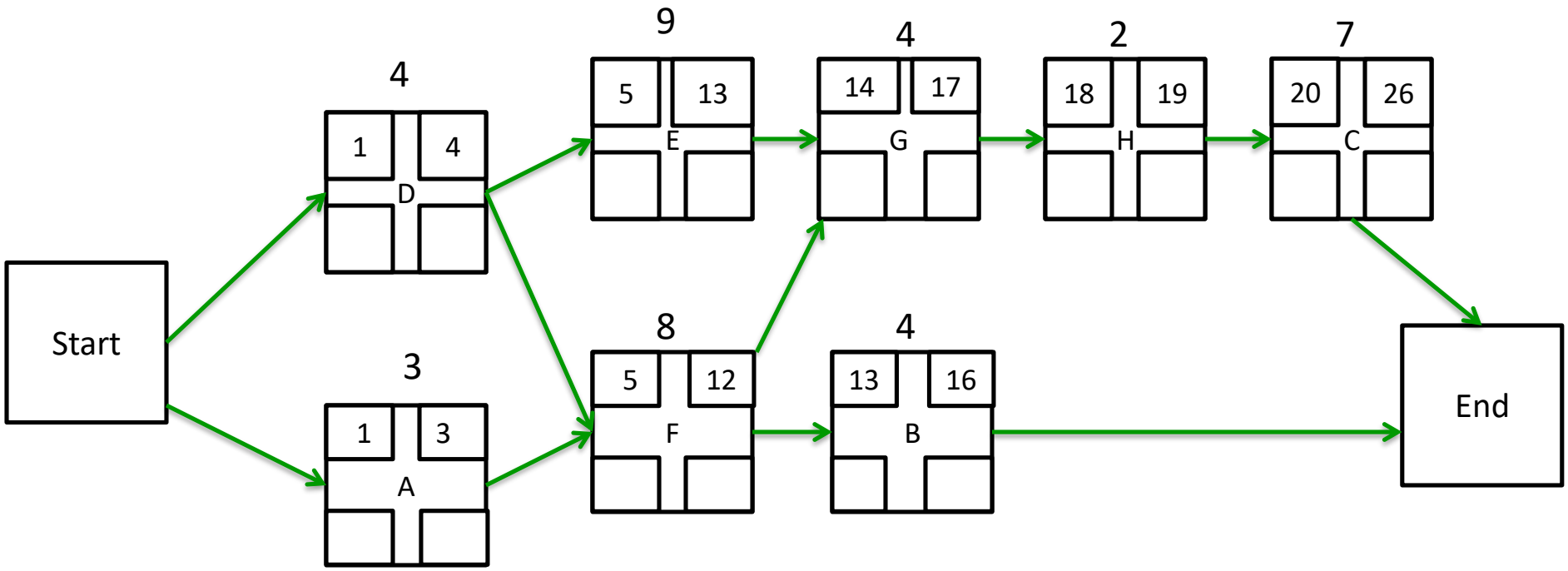
Critical Path Calculation (cont.)

Determining Critical Path and Calculating Float (Slack) by using **forward and backward pass method**



EF = ES + duration – 1 (For forward pass)
LS = LF – duration + 1 (For backward pass)

Critical Path Calculation (cont.)



EF = ES + duration – 1 (For forward pass)
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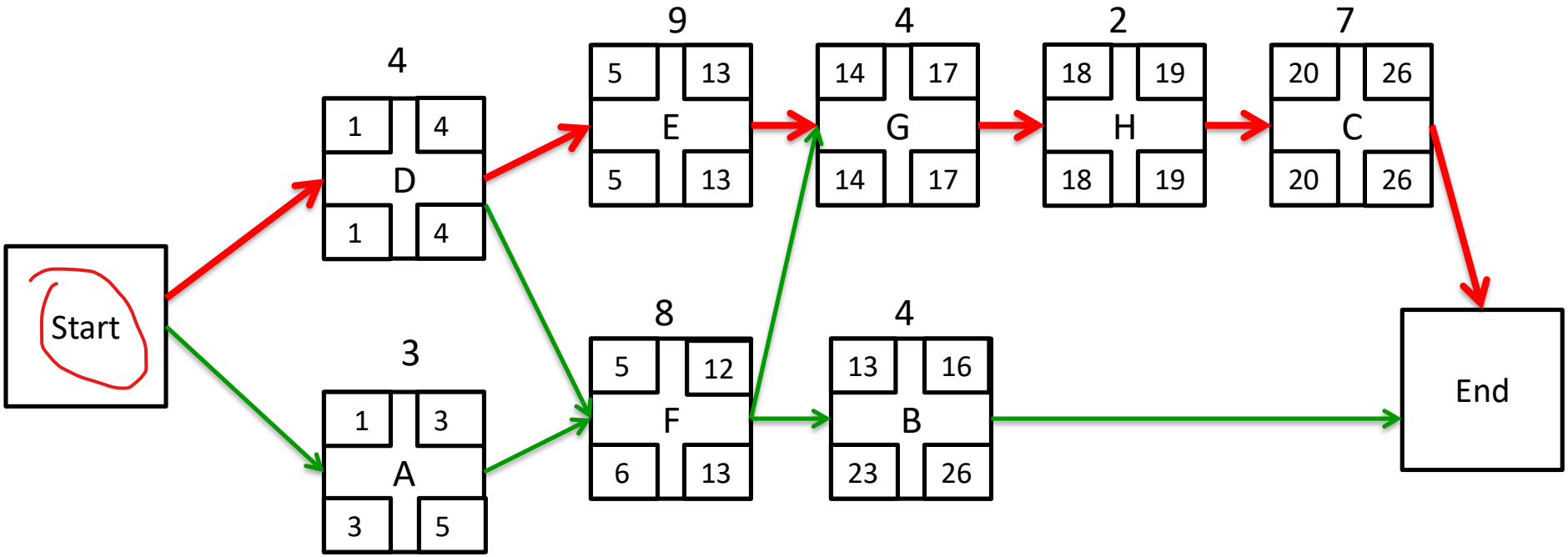
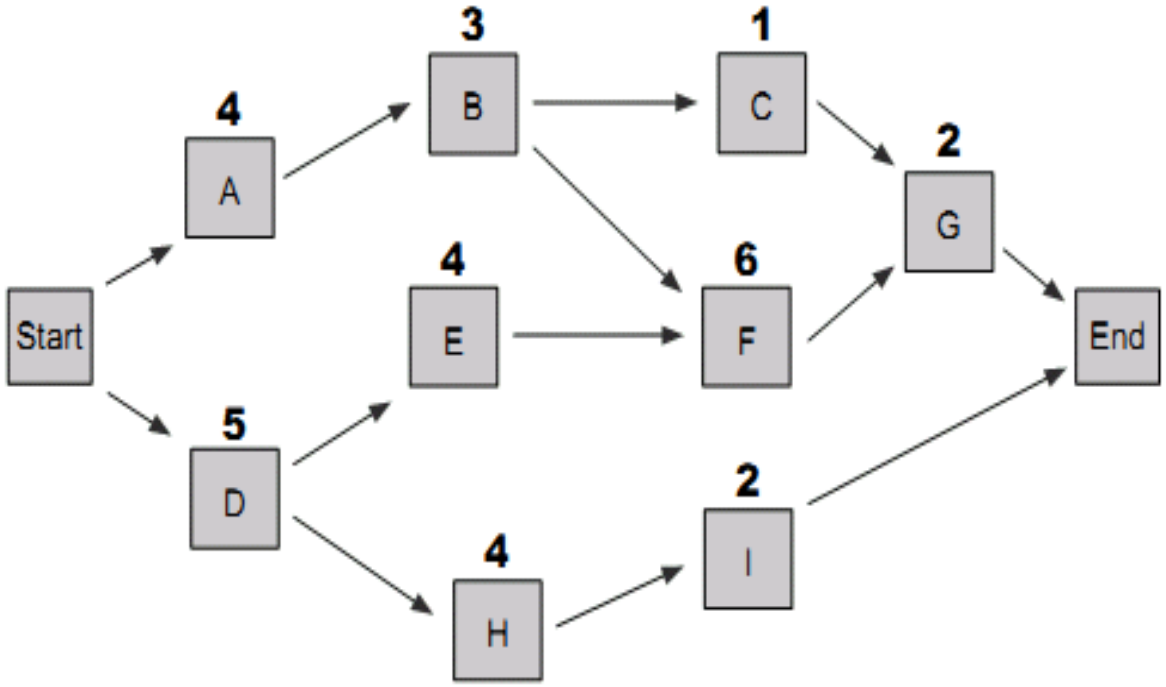
Critical Path Calculation (cont.)



EF = ES + duration – 1 (For forward pass)
LS = LF – duration + 1 (For backward pass)

Critical Path Calculation (cont.)

Determining Critical Path and Calculating Float (Slack) for the following diagram.

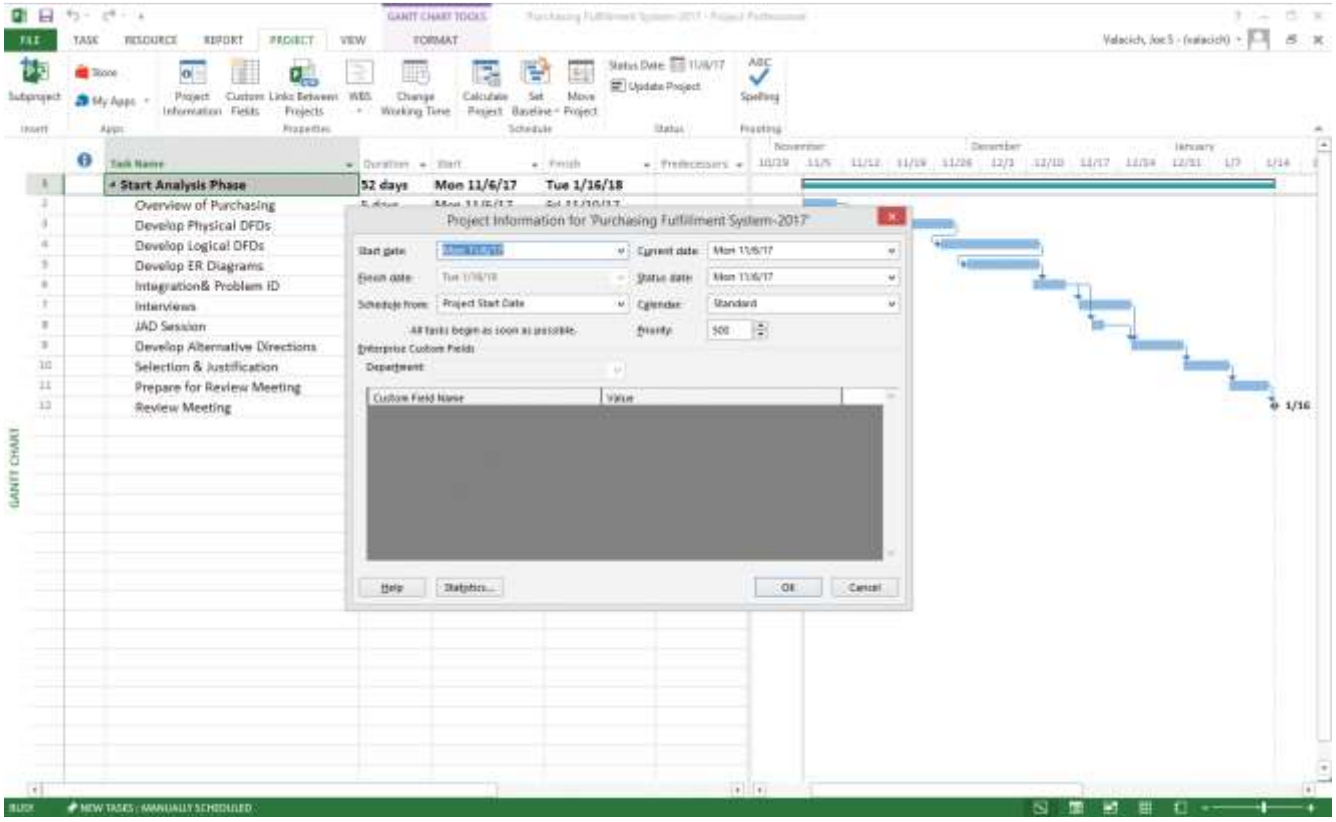


Using Project Management Software

- Many powerful software tools exist for assisting with project management.
- Example: Microsoft Project can help with
  - Entering project start or end date.
  - Establishing tasks and task dependencies.
  - Viewing project information as Gantt or Network diagrams.

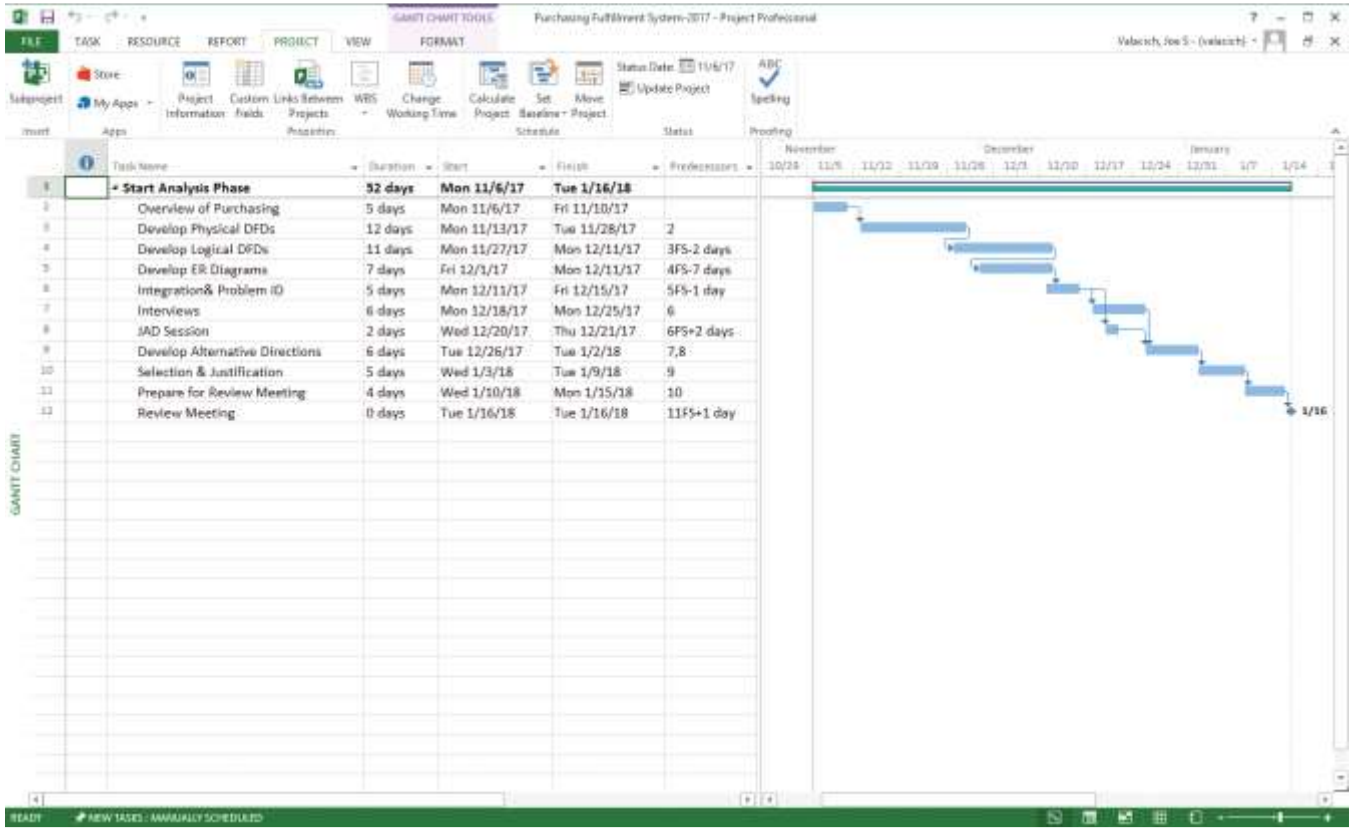
Project Start Date

FIGURE 3-27
Establishing a project starting date in Microsoft Project for Windows (*Source:* Microsoft Corporation.)



Entering Tasks

FIGURE 3-29
Entering tasks and assigning task relationships in Microsoft project for Windows (*Source:* Microsoft Corporation.)



Summary

- In this chapter you learned how to:
  - ✓ explain the process of managing an information systems project, including project initiation, project planning, project execution, and project closedown,
  - ✓ describe how to represent and schedule project plans using Gantt charts and network diagrams, and
  - ✓ explain how commercial project management software packages can be used to assist in representing and managing project schedules