



Fox School of Business  
TEMPLE UNIVERSITY®

# Information Technology Audit & Cyber Security

## Managing Information System Projects

Systems & Infrastructure  
Lifecycle Management

# INTRODUCTION

## 1002 Organisational Independence \*

- 1002.1 The IS audit and assurance function shall be independent of the area or activity being reviewed to permit objective completion of the audit and assurance engagement.

## 1003 Professional Independence

- 1003.1 IS audit and assurance professionals shall be independent and objective in both attitude and appearance in all matters related to audit and assurance engagements.

\* ITAF™ 3<sup>rd</sup> Edition – A Professional Practices Framework for IS Audit/Assurance

Introduction

Definitions

Governance

Roles and  
Responsibilities

Org. Forms

Project Startup

Project Initiation

Project Planning

Project Execution

Project Closedown

# 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

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Project Closedown

# 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.

# DEFINITIONS

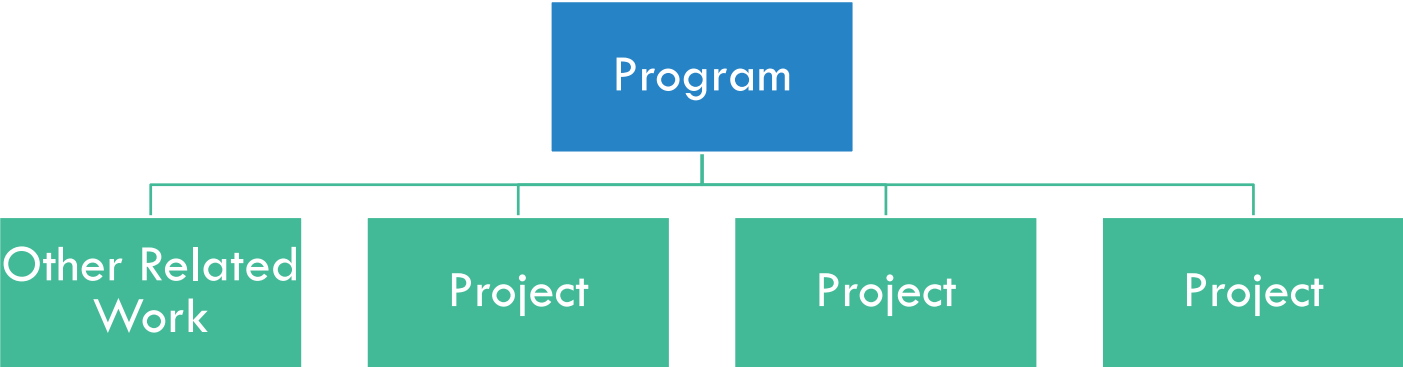
Definitions	Valacich	Project Management Institute (PMI)
<b>Project</b>	A planned undertaking of related activities to reach an objective that has a beginning and an end.	A temporary endeavor undertaken to create a unique product, service or result. A project is <u>temporary</u> in that it has a defined <u>beginning</u> and <u>end</u> time, and therefore <u>defined scope and resources</u> .
<b>Project Management</b>	A controlled process of initiating, planning, executing, and closing down a project.	The application of knowledge, skills, tools, and techniques to project activities to meet the project requirements.

**Operational work** is ongoing to support the business and systems of the organization

**Project work** ends when the project is closed.

# DEFINITIONS

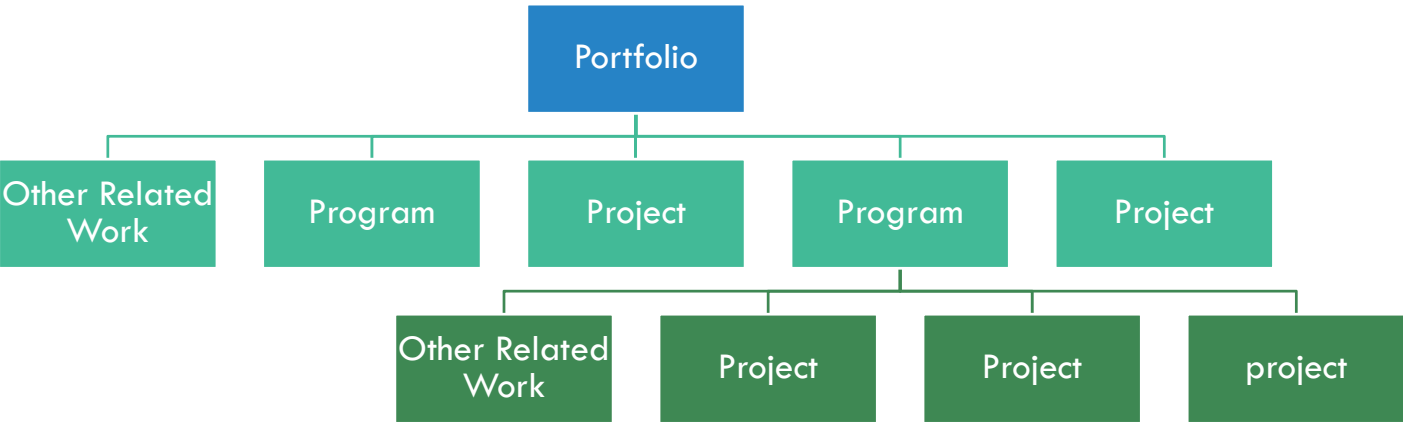
**Program** – A group of related Projects



- Focuses on project interdependencies
- May reduce risks
- Economies of scale
- Improved management

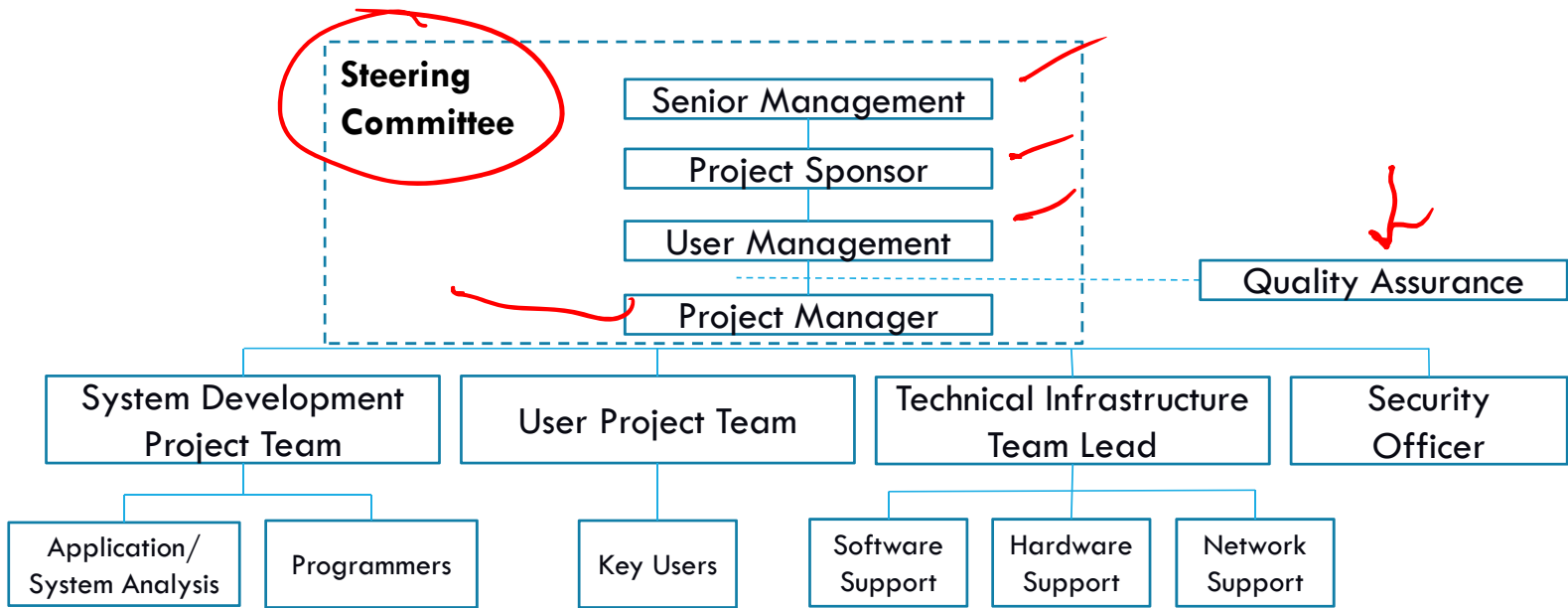
# DEFINITIONS

**Portfolio** – A group of Programs, individual projects, and other related operational work



- May reduce risks
- Economies of scale
- Improved management
- Help in achieving a common strategic goal

# PROJECT GOVERNANCE

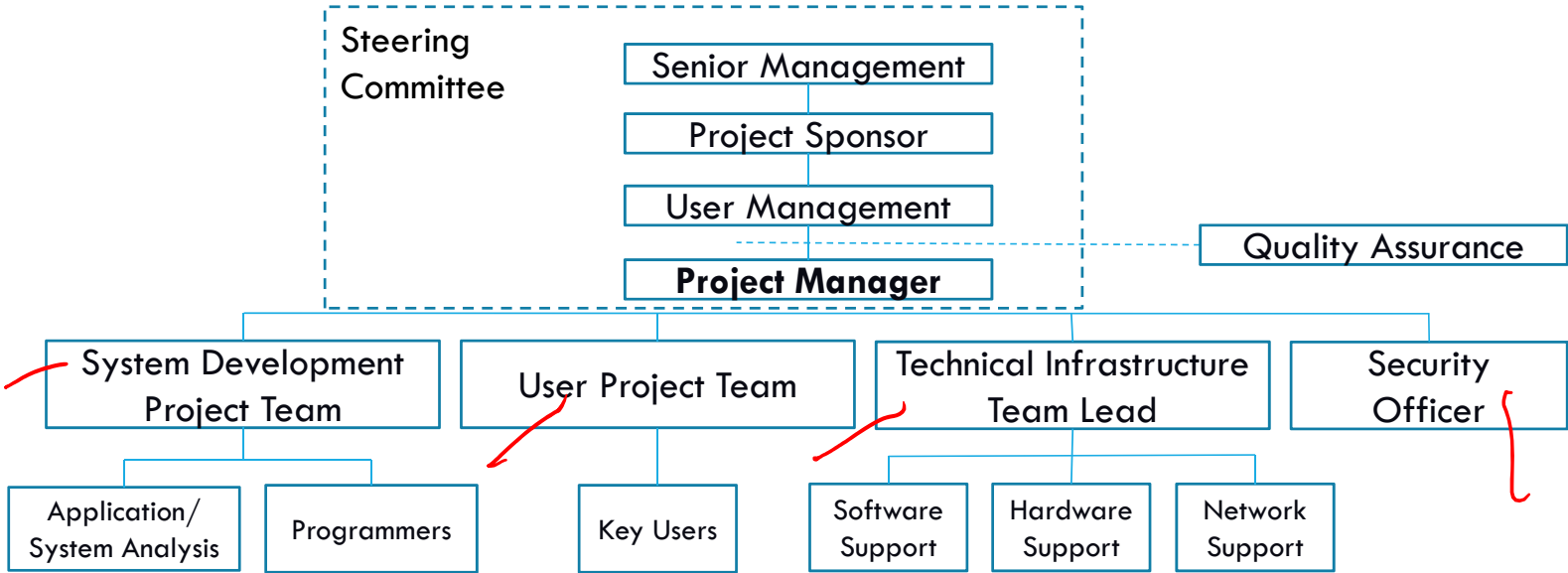


**Note:** CISA candidates should be familiar with general roles and responsibilities of groups or individuals involved in the systems development process.

For a detailed description of roles and responsibilities: Section 3.3.5, CISA Review Manual, page 158.



# PROJECT ROLES AND RESPONSIBILITIES



## Project Manager:

- Manages budgets and day-to-day activities
- Initiates, plans, executes and closes the Project
- Responsible for all Deliverables

Introduction

Definitions

**Project Roles and Responsibilities**

Project

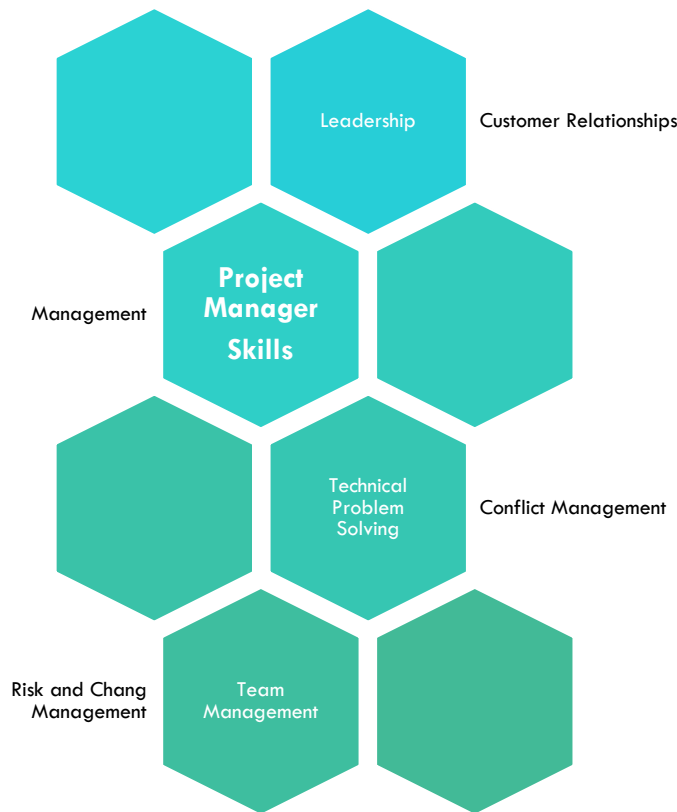
Organizational Forms

Agile Methods

OO / UML

This Course

# PROJECT ROLES AND RESPONSIBILITIES (CONT.)



Introduction

Definitions

Roles and  
Responsibilities  
PM Skillset

**PM Knowledge  
Areas**

Project  
Organizational Forms

Agile Methods

OO / UML

This Course

# KNOWLEDGE AREAS

Knowledge Area	Description
Integration Management	is concerned with identifying the work and processes needed in a project, and for coordinating these.
Scope Management	includes processes for identifying and defining all the work needed to meet project goals. It also involves managing a project's scope as it progresses.
Time Management	ensure that a project is completed according to schedule.
Cost Management	responsible for ensuring that budgets and cost estimates are created, and controlled costs.
Quality Management	is concerned with ensuring that a project meets the standards and requirements that were set out for it.
Human Resources Management	relate to forming and managing the project team. This includes managing team members' roles and responsibilities, and needed changes to the team.
Communications Management	ensure that information throughout a project is correctly generated, collected, distributed, stored, and retrieved.
Risk Management	ensure that risks are identified and analyzed, and that appropriate responses are developed.
Procurement Management	concerned with obtaining a project's required goods and services from various suppliers.
Stakeholder Management	ensuring that relevant stakeholders are identified and engaged in all project decisions and activities.



Chapter 3

Introduction

Definitions

Roles and  
Responsibilities

PM Skillset

**PM Knowledge  
Areas**

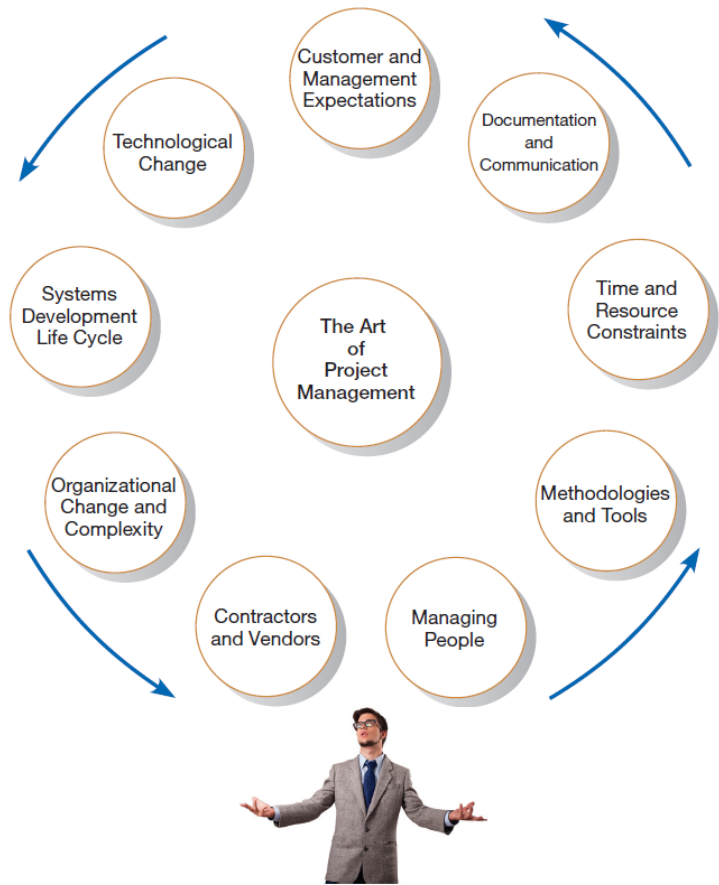
Project  
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# PROJECT MANAGEMENT ACTIVITIES



**FIGURE 3-4**  
A project manager juggles numerous activities

## PROJECT ORGANIZATIONAL FORMS

### Influence Project Organization

- PM is only a staff function
- Only allowed to advise which activities should be completed

### Pure Project Organization

- PM has formal authority over team members
- Usually bolstered by project working space

### Matrix Project Organization

- Management authority is shared with dept. heads
- Most common form

# 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

**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

☒ New System  
☐ System Enhancement  
☐ System Error Correction

URGENCY

☐ Immediate – Operations are impaired or opportunity lost  
☐ Problems exist, but can be worked around  
☒ 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

# 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

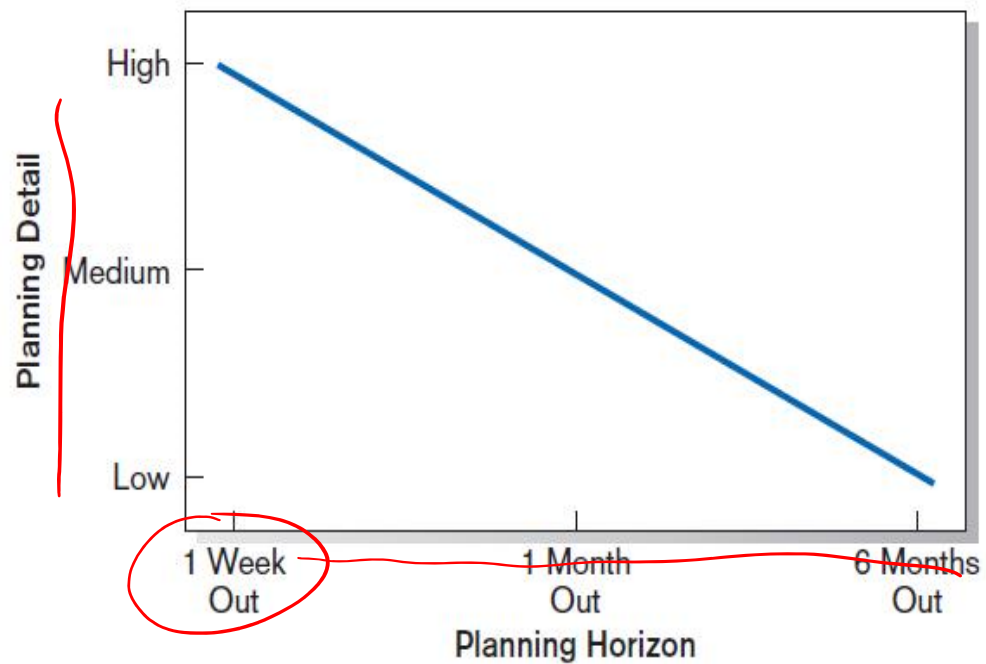
Sponsor

## 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

## 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?

## DIVIDING PROJECT INTO MANAGEABLE TASKS

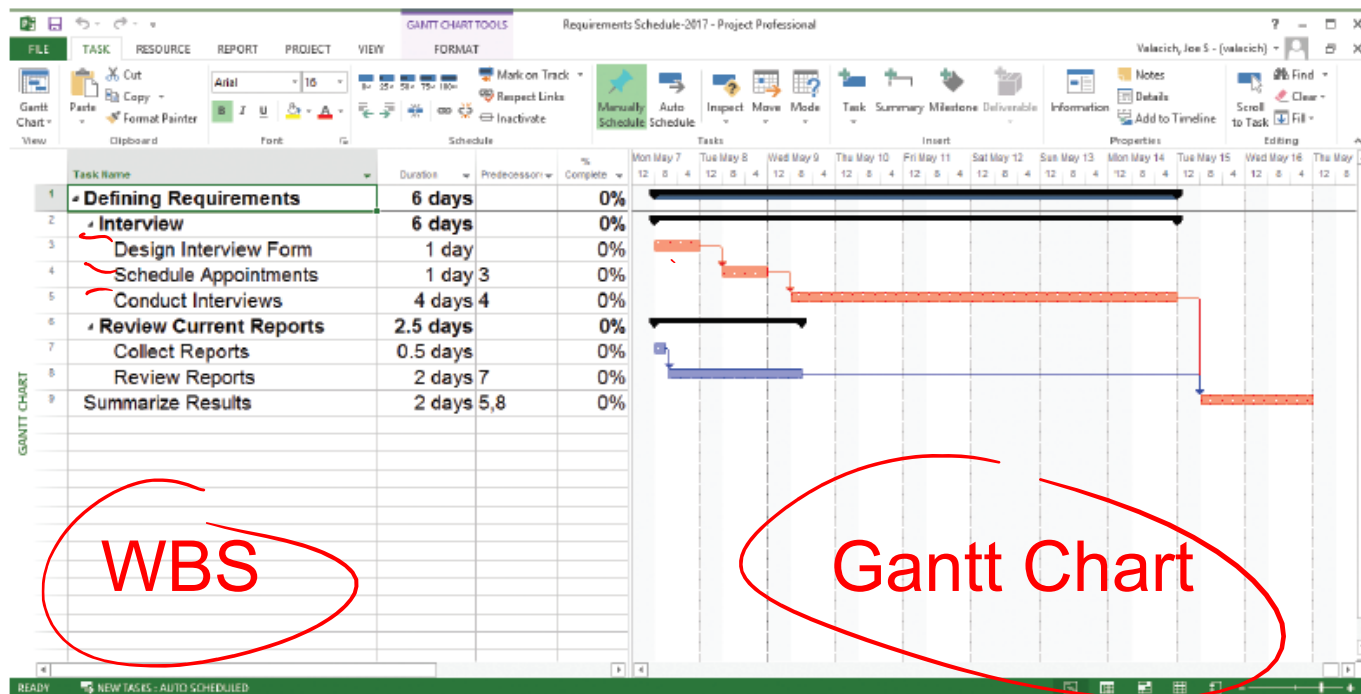
### Work Breakdown Structure (WBS)

- 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

# DEVELOPING A PRELIMINARY SCHEDULE



**FIGURE 3-10**

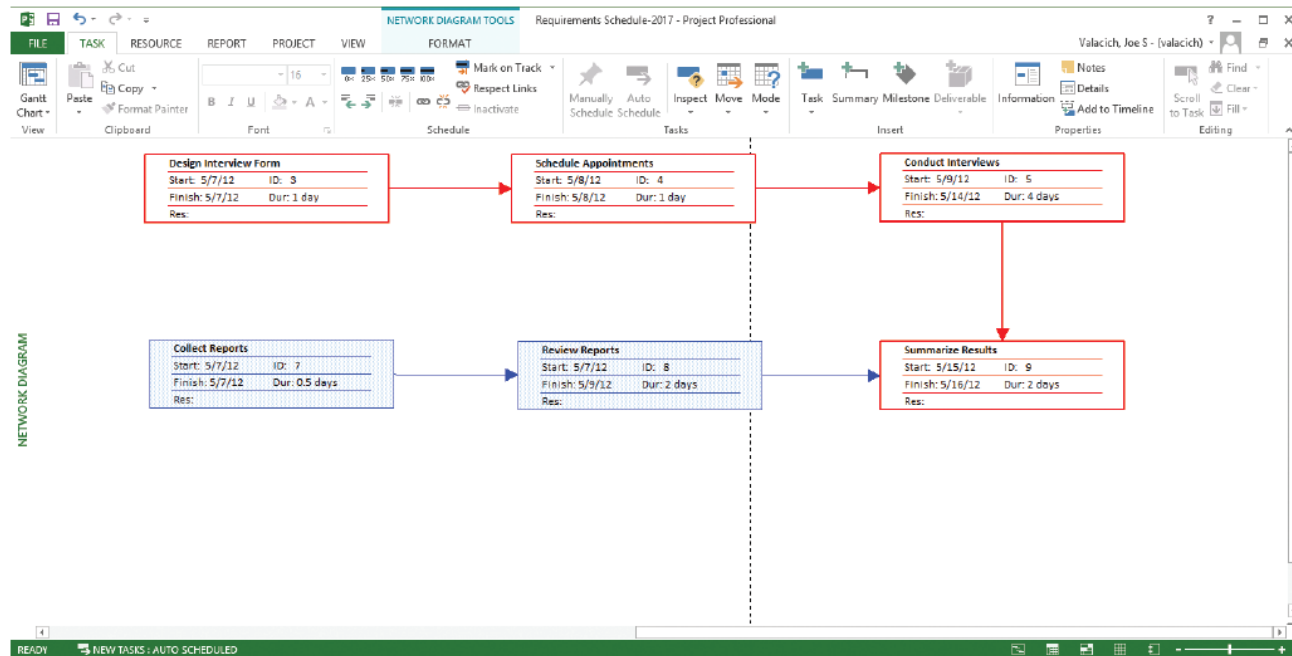
Gantt chart showing project tasks, duration times for those tasks, and predecessors  
(Source: Microsoft Corporation.)



# SCHEDULING DIAGRAMS NETWORK DIAGRAM

**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.)



## 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

## 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

# 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

# DEVELOPING A PRELIMINARY BUDGET

Project Feasibility Analysis-2017 [Compatibility Mode] - Excel

Valacich, Joe S - (valacich)

	0	1	2	3	4	5	TOTALS
<b>Economic Feasibility Analysis</b>							
Years from Today							
Build New System	\$0	\$85,000	\$85,000	\$85,000	\$85,000	\$85,000	
Discount Rate (12%)	1.0000	0.8929	0.7972	0.7118	0.6355	0.5674	
PV of Benefits	\$0	\$75,893	\$67,761	\$60,501	\$54,019	\$48,231	
NPV of Building New System	\$0	\$75,893	\$143,654	\$204,156	\$258,175	\$306,406	<b>\$306,406</b>
One-time COSTS	(\$75,000)						
Continue Maintaining Existing System							
Recurring Costs		(\$35,000)	(\$35,000)	(\$35,000)	(\$35,000)	(\$35,000)	
Discount Rate (12%)	1.0000	0.8929	0.7972	0.7118	0.6355	0.5674	
PV of Recurring Costs	\$0	(\$31,250)	(\$27,902)	(\$24,912)	(\$22,243)	(\$19,860)	
NPV of All COSTS	(\$75,000)	(\$106,250)	(\$134,152)	(\$159,064)	(\$181,307)	(\$201,167)	<b>(\$201,167)</b>
Overall NPV							<b>\$105,239</b>
ROI = Overall NPV / NPV of Costs							<b>52.31%</b>
Year of Project	0	1	2	3	4		
Break-Even Analysis							
Yearly NPV Cash Flow	(\$75,000)	\$44,643	\$39,860	\$35,589	\$31,776	\$28,371	
Overall NPV Cash Flow	(\$75,000)	(\$30,357)	\$9,503	\$45,092	\$76,867	\$105,239	
break-even ratio = (yearly NPV cash flow - general NPV cash flow) / yearly NPV cash flow							
Break-even occurs in 1.8 years.							
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.

## 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.

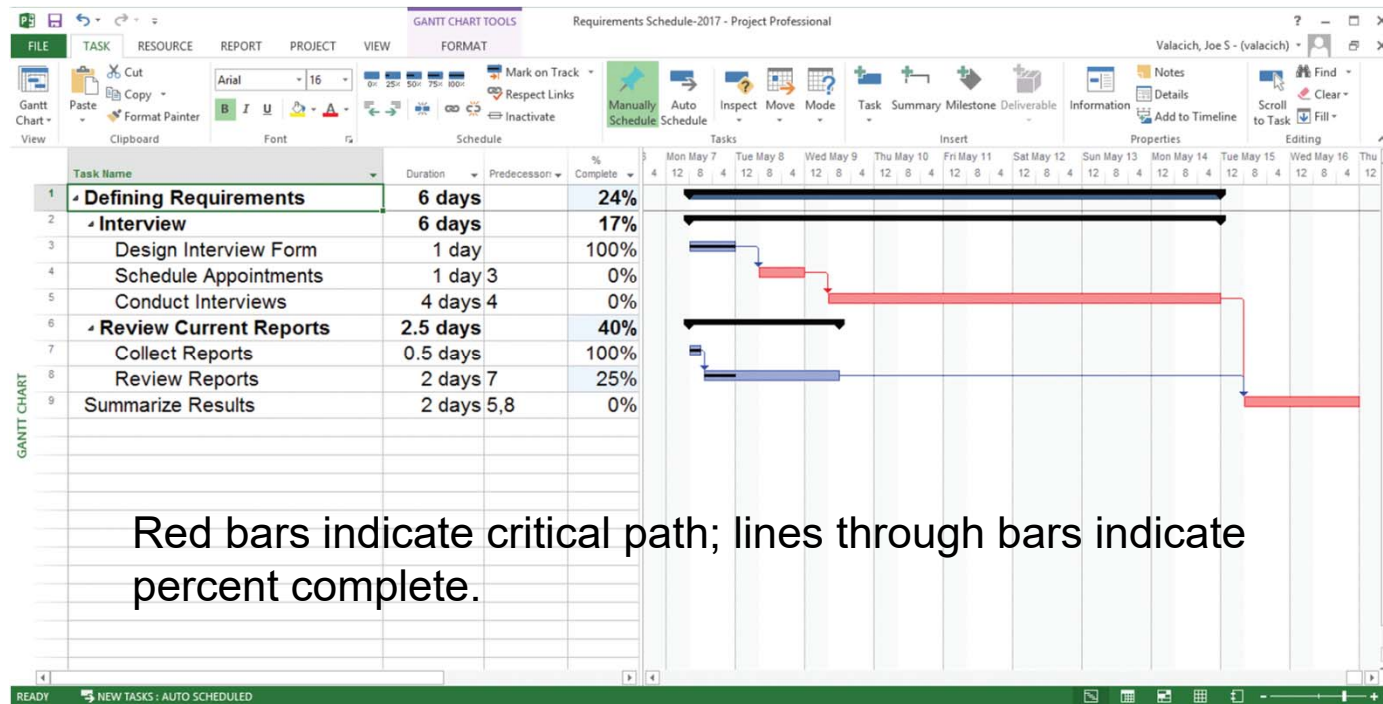
### Actions

- 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.)



# 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.

### Actions:

- Close down the project.
  - Transition project team
  - Address Open actions, risks and issues
  - Review and transfer custody of contracts
- Lessons Learned
- Conduct post-project reviews.
- Close the customer contract.
  - Closure Notifications

# REPRESENTING AND SCHEDULING PROJECT PLANS

Gantt Charts

Network Diagrams

PERT Calculations

Critical Path Scheduling

Project Management Software

# GANTT CHARTS VS. NETWORK DIAGRAMS

## Gantt charts

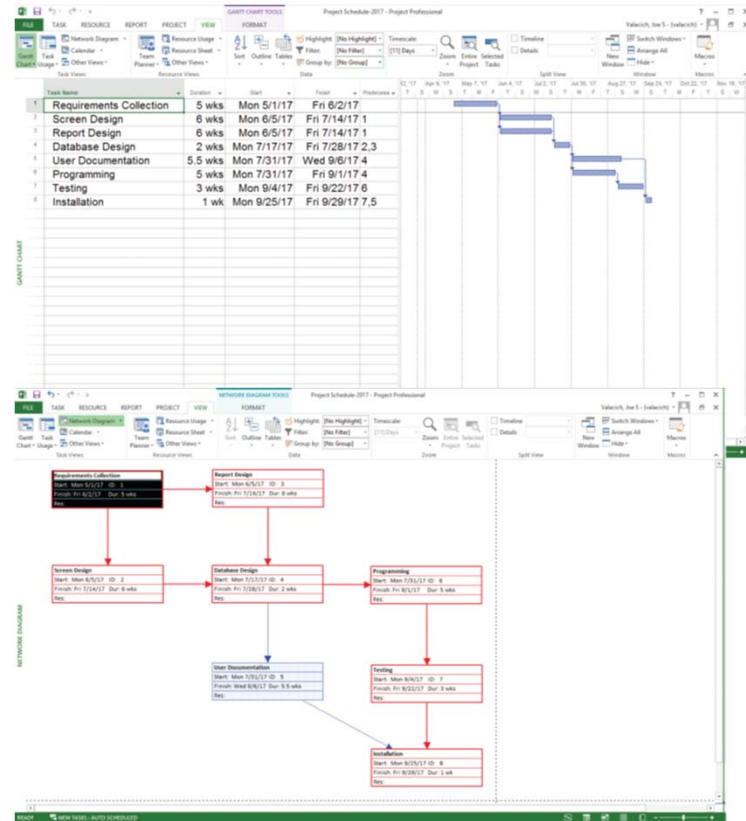
- Show task durations.
- Show time overlap.
- Show slack time in duration.

## Network diagrams

- Show task dependencies.
- Do not show time overlap, but show parallelism.
- Show slack time in boxes.

# GANTT CHARTS VS. NETWORK DIAGRAMS (CONT.)

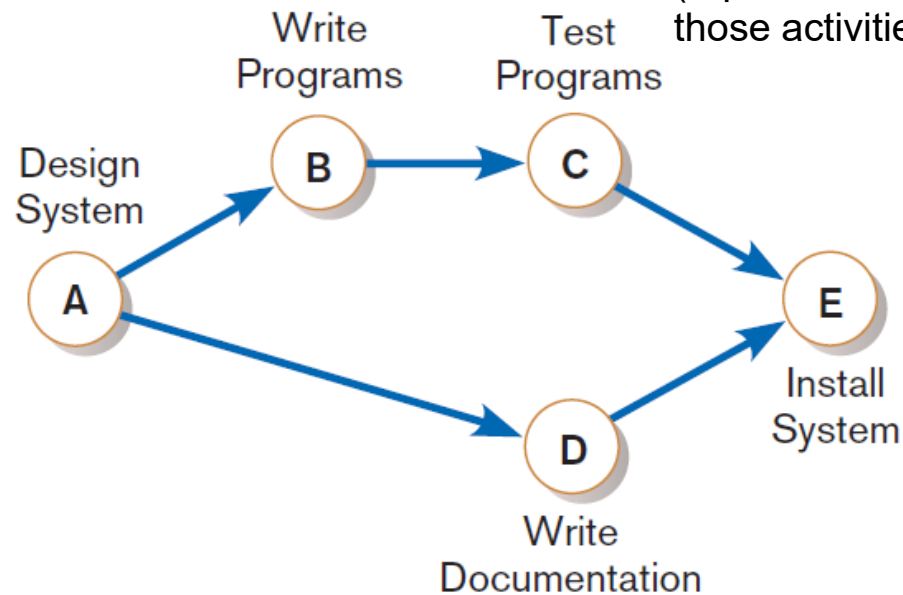
**Figure 3-18**  
Graphical diagrams that depict project plans  
(a) A Gantt chart  
(b) A network diagram  
(Source: Microsoft Corporation.)



## 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)			EXPECTED TIME (ET)
	<i>o</i>	<i>r</i>	<i>p</i>	$\frac{o + 4r + p}{6}$
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

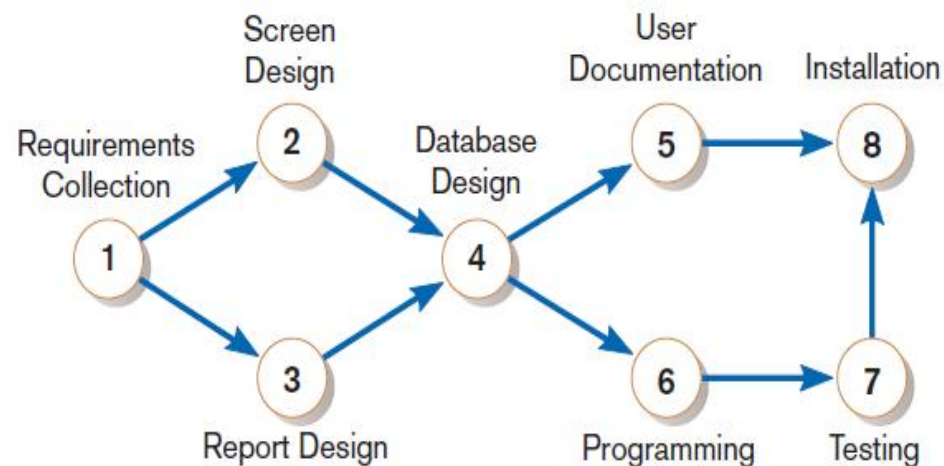
## CRITICAL PATH EXAMPLE (DEPENDENCIES BETWEEN TASKS)

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.

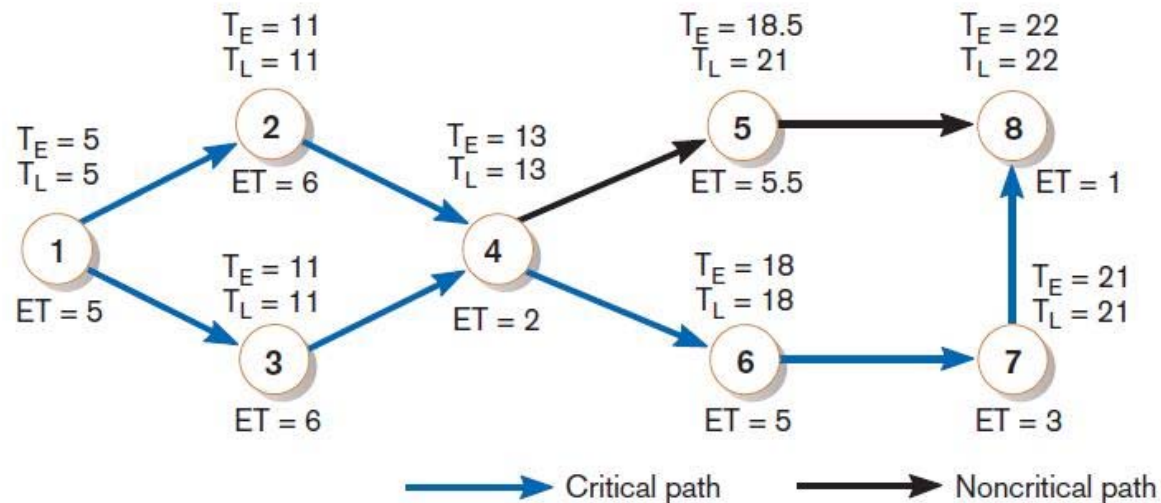
Calculate the latest possible completion time for each activity by subtracting the activity times in the path following the activity from the total expected time. This gives slack time for activities.

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.



# USING PROJECT MANAGEMENT SOFTWARE

Many powerful software tools exist for assisting with project management.

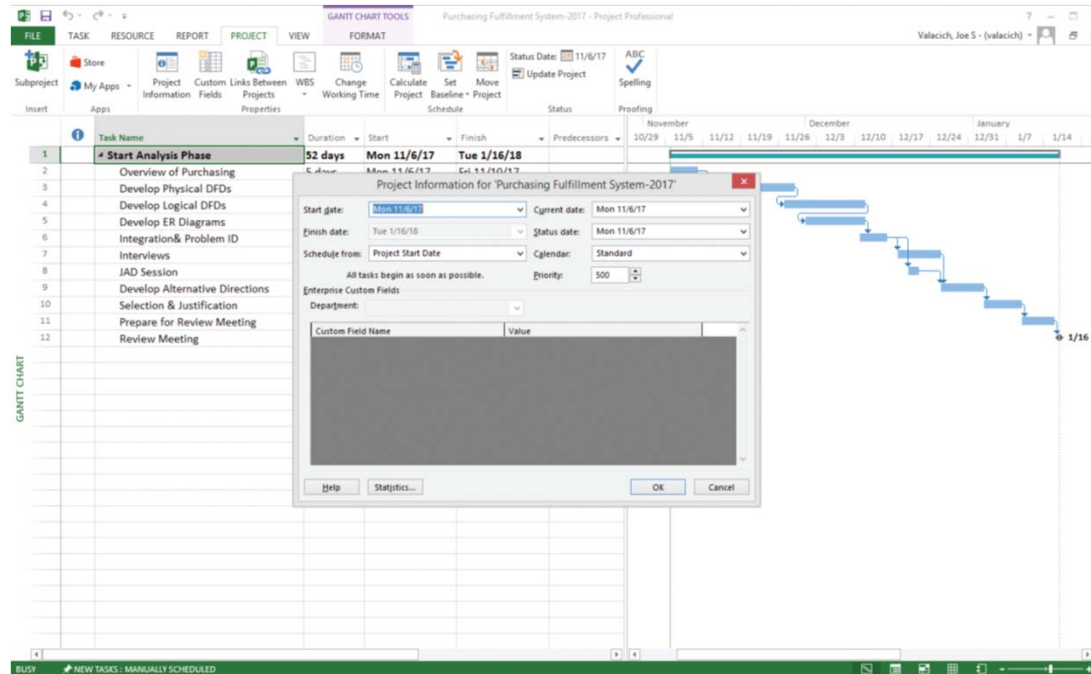
Example: Microsoft Project can help with

- 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**

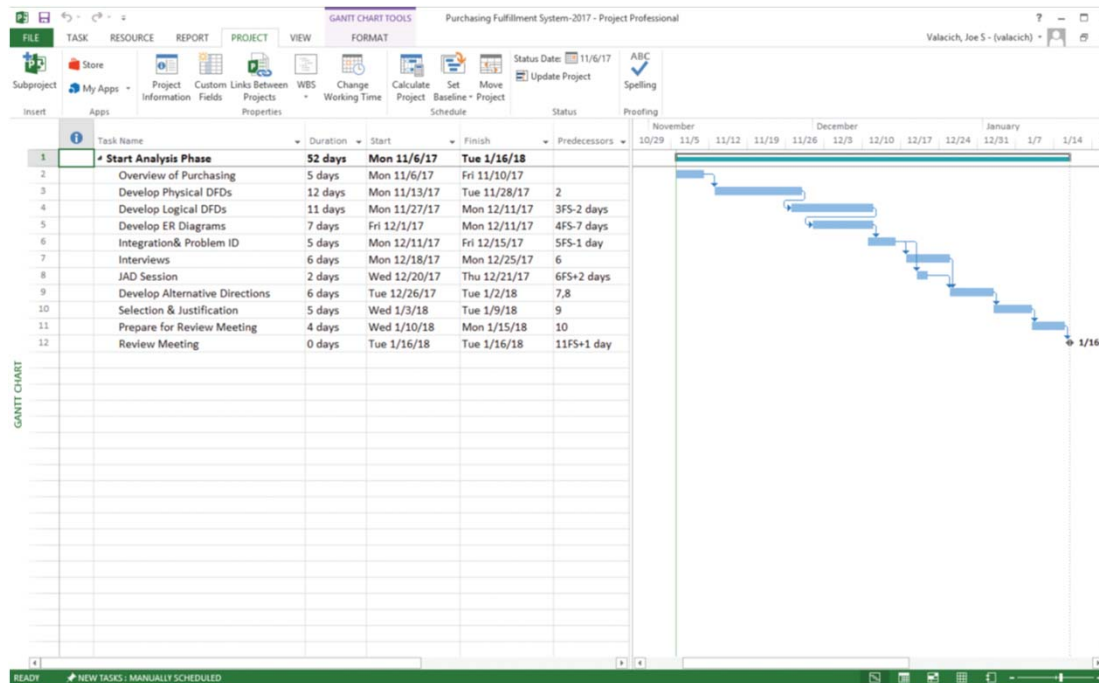
Establishing a project starting date in Microsoft Project for Windows  
(Source: Microsoft Corporation.)



# 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