Managing the information system project

Introduction

In this chapter, we focus on the systems analyst's role as project manager of an information systems project. Throughout the SDLC, the project manager is responsible for initiating, planning, executing, and closing down the systems development project. Project management is arguably the most important aspect of an information systems development project. Effective project management helps to ensure that systems development projects meet customer expectations and are delivered within budget and time constraints. Today there is a shift in the types of projects most firms are undertaking, which makes project management much more difficult and even more critical to project success (Fuller et al., 2008; Schiff, 2014a). For example, **in the past, organizations focused much of their development on very large, custom- designed, stand-alone applications**. Today, much of the systems development effort in organizations focuses on implementing packaged software such as enterprise resource planning (ERP) and data warehousing systems. Existing legacy applications are also being modified so that business-to-business transactions can occur seamlessly over the Internet. New web-based interfaces are being added to existing legacy systems so that a broader range of users, often distributed globally, can access corporate information and systems. Additionally, software developed by global outsourcing partners that must be integrated into an organization's existing portfolio of applications is now common practice (Overby, 2013). Working with vendors to supply applications with customers or suppliers to integrate systems, or with a broader and more diverse user community requires that project managers be highly skilled. Consequently, it is important that you gain an understanding of the project

management process; this will become a critical skill for your future success.

The **project management process** involves four phases:

1. **Initiating the project**
2. **Planning the project**
3. **Executing the project**
4. **Closing down the project**

1.Initiating a project:

During project initiation, the project manager performs several activities to assess the size, scope, and complexity of the project and to establish procedures to support subsequent activities. The types of activities that will perform when initiating a project are summarized below:

1. **Establishing the project initiation team**

This activity involves organizing project team members to assist in accomplishing the project initiation activities. (For example, during the Purchasing Fulfillment System project at PVF, Chris Martin was assigned to support the Purchasing department. It is a PVF policy that all initiation teams consist of at least one user representative, in this case Juanita Lopez, and one member of the information systems (IS) development group. Therefore, the project initiation team consisted of Chris and Juanita; Chris was the project manager.

2. Establishing a relationship with the customer

A thorough understanding of your customer builds stronger partnerships and higher levels of trust.

(At PVF, management has tried to foster strong working relationships between business units (like Purchasing) and the IS development group by assigning a specific individual to work as a liaison(communication) between both groups. Because Chris had been assigned to the Purchasing unit for some time, he was already aware of some of the problems with the existing purchasing systems. PVF's policy of assigning specific individuals to each business unit helped to ensure that both Chris and Juanita were comfortable working together prior to establishing relationships with customers.)

3. Establishing the project initiation plan

This step defines the activities required to organize the initiation team while it is working to define the goals and scope of the project.

4. Establishing management procedures

Successful projects require the development of effective management procedures.

5. Establishing the project management environment and project workbook.

The focus of this activity is to collect and organize the tools that you will use while managing the project and to construct the project workbook. Diagrams, charts, and system descriptions provide much of the project workbook contents. Thus, the project workbook serves as a repository for all project correspondence, inputs, outputs, deliverables, procedures, and standards established by the project team.

6. Developing the project charter

The project charter is a short (typically one page), high-level document prepared for the customer that describes what the project will deliver and outlines many of the key elements of the project.

2.Planning the project

Research has found a positive relationship between effective project planning and positive project outcomes. Project planning involves defining clear, discrete activities and the work needed to complete each activity within a single project. It often requires you to make numerous assumptions about the availability of resources such as hardware, software, and personnel. It is much easier to plan nearer-term activities than those occurring in the future. (In actual fact, you often have to construct longer-term plans that are more general in scope and nearer- term plans that are more detailed. The repetitive nature of the project management process requires that plans be constantly monitored throughout the project and periodically updated (usually after each phase), based upon the most recent information.)

Project Planning

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

1. Describing project scope, alternatives, and feasibility

The purpose of this activity is to understand the content and complexity of the project. Within PVF's systems development methodology, one of the first meetings must focus on defining a project's scope. Although project scope information was not included in the SSR developed by Chris and Juanita, it was important that both shared the same vision for the project before moving too far along. During this activity, you should reach agreement on the following questions:

- 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?

After defining the scope of the project, your next objective is to identify and document general alternative solutions for the current businessproblem or

opportunity. You must then assess (to judge or decide value or importance) the feasibility of each alternative solution and choose which to consider during subsequent SDLC phases.

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

At the start of project, there is no idea of doing work, every thing is unknown so detailed plan is needed to do every step. But after some time ,that is week or month, people gets idea of project scheduling and can do some steps on the basis of previous step or his/her own creativity.

## 2. Dividing the project into manageable tasks.

This is a critical activity during the project planning process. Here, you must divide the entire project into manageable tasks and then logically order them to ensure a smooth evolution between tasks.

For example, suppose that you are working on a new development project and need to collect system requirements by interviewing users of the new system and reviewing reports they currently use to do their job. A work breakdown for these activities is represented in a Gantt chart in Figure 3-10. A **Gantt chart is a graphical representation of a project that shows each task as a horizontal bar whose length is proportional to its time for completion**. Different colors, shades, or shapes can be used to highlight each kind of task. For example, those activities on the critical path (defined later) may be in red and a summary task could have a special bar. Note that the **black horizontal bars**—rows 1, 2, and 6 in Figure 3-10—**represent summary tasks**.
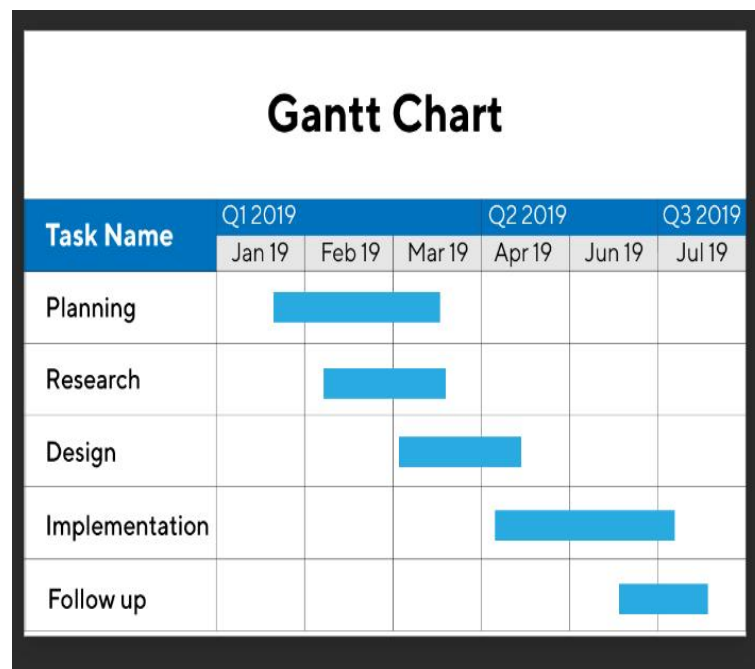
Planned versus actual times or progress for an activity can be compared by parallel bars of different colors, shades, or shapes. Gantt charts do not (typically) show how tasks must be ordered (precedence), but simply show **when an activity should begin and end**.

In Figure 3-10, the task duration is shown in the second column by days, "d,".
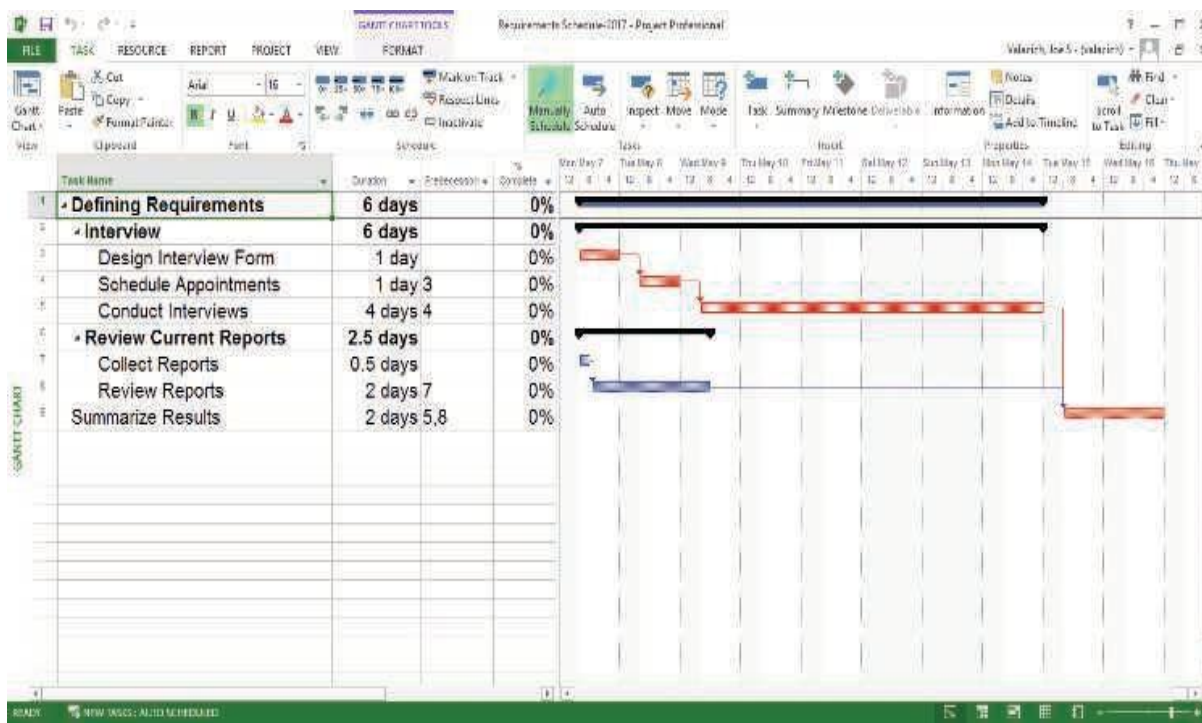
FIGURE 3-10
Gantt chart showing project tasks, duration times for those tasks, and predecessors

Gantt Chart

| Task Name	Q1 2019			Q2 2019		Q3 2019
	Jan 19	Feb 19	Mar 19	Apr 19	Jun 19	Jul 19
Planning						
Research						
Design						
Implementation						
Follow up						

3. Estimating resources and creating a resource plan

The goal of this activity is to estimate resource requirements for each project activity and to use this information to create a project resource plan. The resource plan helps assemble and deploy resources in the mosteffective manner.

For example, you would not want to bring additional programmers onto the project at a rate faster than you could prepare work for them. Projectmanagers use a variety of tools to assist in making estimates of project size and costs. The most widely used method is called COCOMO (constructive cost model**),** COCOMO predict human resource requirements for basic, intermediate, and very complex systems.

4. Developing a preliminary schedule

During this activity, you use the information on tasks and resource availability to assign time estimates to each activity in the work breakdown structure. These time estimates will enable you to create target starting and ending dates for the project. Target dates can be revisited and modified until a schedule is produced that is acceptable to the customer. Determining an acceptable schedule may require that you find additional or different resources or that the scope of the project be changed. The schedule may be represented as a Gantt chart or as a network diagram.

NETWORK DIAGRAM

Activity	Predecessor	Duration
A		6
B	A	2
C	A	40
D	B	20
E	B	9
F	D,E	4
G	C,E	15
H	F,G	3
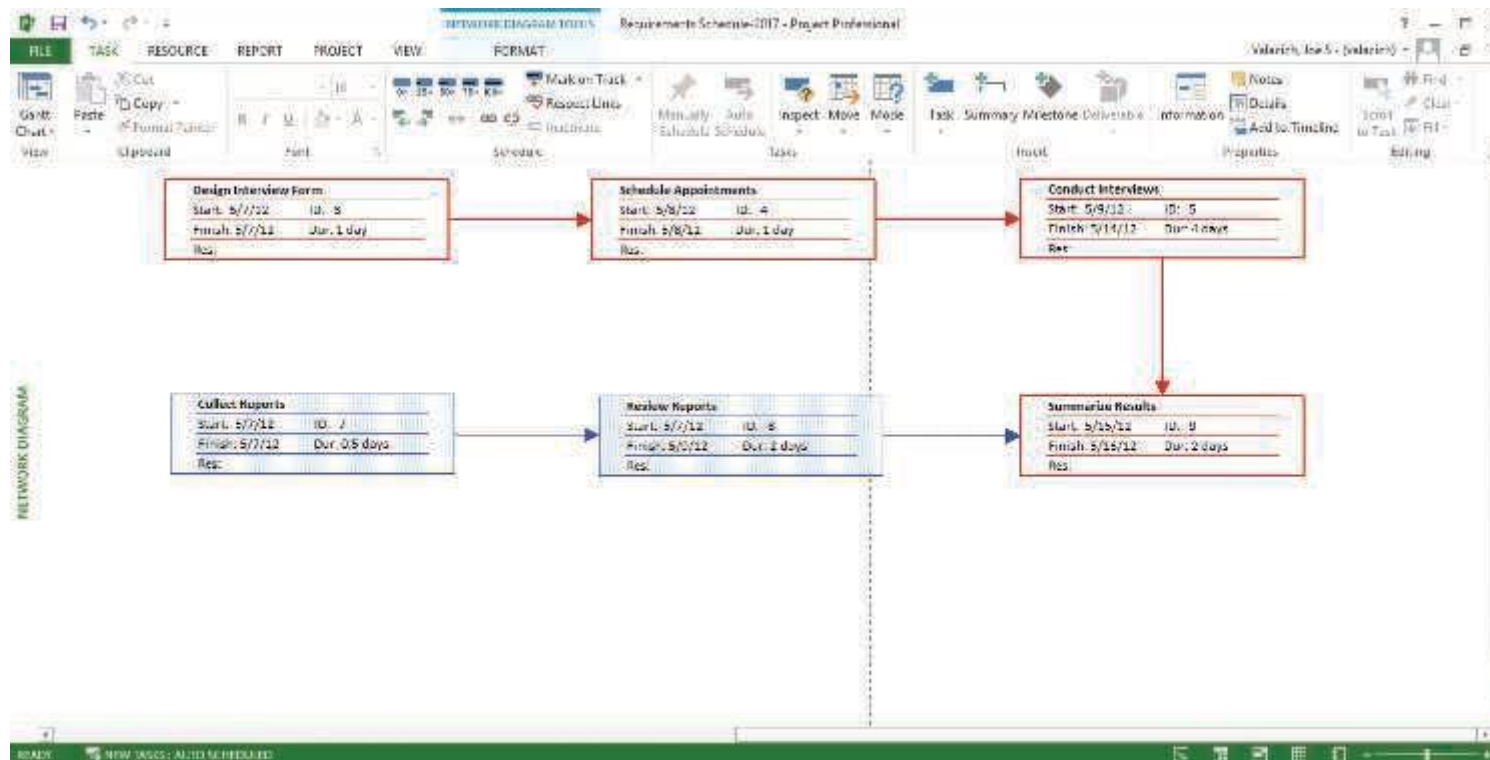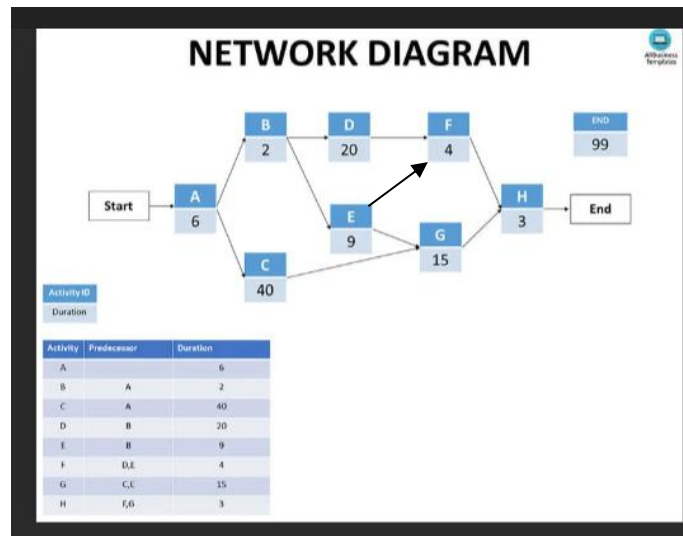
5. Developing a communication plan

The goal of this activity is to outline the **communication procedures among management, project team members, and the customer.** The communication plan includes **when and how written and oral reports will be provided by the team, how team members will coordinate work, what messages will be sent to announce the project to interested parties, and what kinds of information will be shared with vendors and external contractors involved with the project.**

It is important that free and open communication occur among all parties with respect to proprietary information and confidentiality with the customer (Fuller et al., 2008; Kettelhut, 1991; Kirsch, 2000; Vaidya nathan, 2013;Verma, 1996).

When developing a communication plan, numerous questions must be answered in order to assure that the plan is comprehensive and complete, including the following:

- Who are the stakeholders for this project?
- What information does each stakeholder need?
- When, and at what interval, does this information need to be produced?
- What sources will be used to gather and generate this information?
- Who will collect, store, and verify the accuracy of this information?
- Who will organize and package this information into a document?
- Who will be the contact person for each stakeholder should anyquestions

arise?

- What format will be used to package this information?

- What communication medium will be most effective for delivering this information to the stakeholder?

- Once these questions are answered for each stakeholder, a comprehensive communication plan can be developed. In this plan, a summary of communication documents, work assignments, schedules, and distribution methods will be outlined.

6. Determining project standards and procedures

During this activity, you will specify how various deliverables are produced and tested by you and your project team. For example, the team must decide which tools to use, how the standard SDLC might be modified, which SDLC methods will be used, documentation styles (e.g., type fonts and margins for user manuals), how team members will report the status of their assigned activities, and terminology. Setting project standards and procedures for work acceptance is a way to ensure the development of a high-quality system. Also, it is much easier to train new team members when clear standards are in place. Organizational standards for project management and conduct make the determination of individual project standards easier and the interchange or sharing of personnel among different projects feasible.

7. Identifying and assessing risk

The goal of this activity is to identify sources of project risk and estimate the consequences of those risks (Wideman, 1992). Risks might arise from the use of new technology, prospective users' resistance to change, availability of critical resources, competitive reactions or changes in

regulatory actions due to the construction of a system, or team member inexperience with technology or the business area. You should continually try to identify and assess project risk.

8. Creating a preliminary budget

During this phase, you need to create a preliminary budget that outlines the planned expenses and revenues associated with your project. The project justification will demonstrate that the benefits are worth these costs.

9. Developing a Project Scope Statement

An important activity that occurs near the end of the project planning phase is the development of the Project Scope Statement. Developed primarily for the customer, this document outlines work that will be done and clearly describes what the project will deliver. The Project Scope Statement is useful to make sure that you, the customer, and other project team members have a clear understanding of the intended project size, duration, and outcomes.

10. Setting a Baseline Project Plan

Once all of the prior project planning activities have been completed, youwill be able to develop a Baseline Project Plan. This baseline 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.

Executing the Project:

Project execution puts the Baseline Project Plan into action. Within the context of the SDLC, project execution occurs primarily during the analysis, design, and implementation phases.

Project Execution

1. Executing the Baseline Project Plan

2. Monitoring Project Progress against the Baseline Project Plan

3. Managing Changes to the Baseline Project Plan

4. Maintaining the Project Workbook

5. Communicating the Project Status

1. Executing the Baseline Project Plan: This means that you initiate the execution of project activities, acquire and assign resources, orient and train new team members, keep the project on schedule, and ensure the quality of **project deliverables**. This is a formidable/difficult task, but a task made much easier through the use of sound project management techniques.

2. Monitoring project progress against the Baseline Project Plan

While you execute the Baseline Project Plan, you should monitor your progress. If the project gets ahead of (or behind) schedule, you may have to adjust resources, activities, and budgets. Monitoring project activities can result in modifications to the current plan. Measuring the time and effort expended on each activity will help you improve the accuracy of estimations for future projects. It is possible, with project schedule charts such as Gantt charts, to show progress against a plan, and it is easy with

network diagrams to understand the ramifications (**the possible results of an action**)of delays in an activity. Monitoring progress also means that the team leader must evaluate and appraise (**to examine someone or something in order to judge their qualities, success or needs**)each team member, occasionally change work assignments or request changes in personnel, and provide feedback to the employee's supervisor.

3. Managing changes to the Baseline Project Plan

You will encounter pressure to make changes to the baseline plan.

Numerous events may initiate a change to the Baseline Project Plan, including the following possibilities:

- A slipped completion date for an activity
- A bungled (to do something wrong, in a careless or stupid way) activity that must be redone
- The identification of a new activity that becomes evident later in the project
- An unforeseen change in personnel due to sickness, resignation, or termination

4. Maintaining the project workbook

As in all project phases, maintaining complete records of all project events is necessary. The workbook provides the documentation new team members require to assimilate (to take in, fit into, or become similar) project tasks quickly. It explains why design decisions were made and is a primary source of information for producing all project reports.
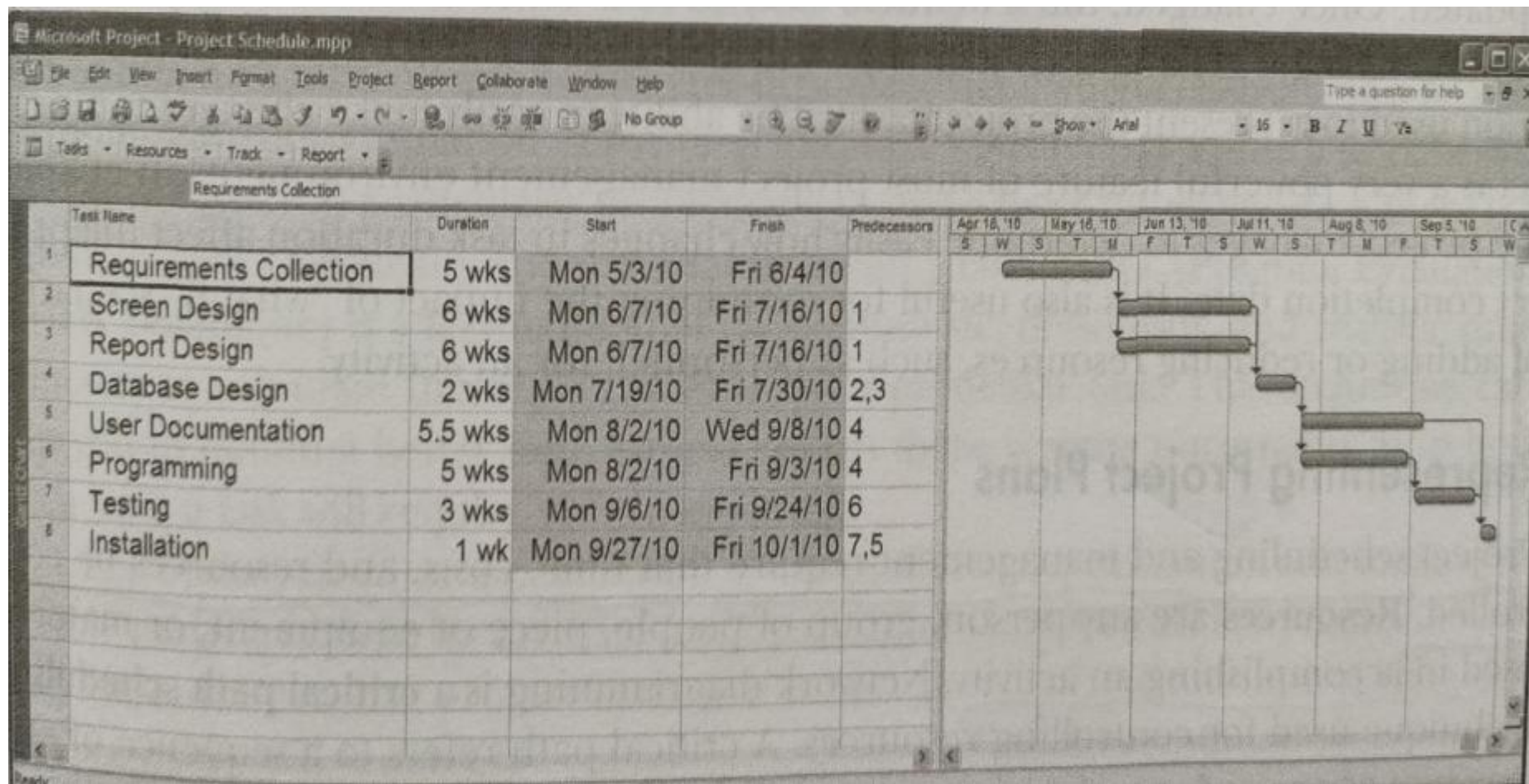
5. Communicating the project status

The project manager is responsible for keeping all stakeholders— system developers, managers, and customers—abreast (**describes two or more people who are next to each other and moving in the same direction**) of the project status.

Closing Down the project

The focus of project closedown is to bring the project to an end. Projects can conclude with a natural or unnatural termination. **A natural** termination occurs when the requirements of the project have been met—the project has been completed and is a success. **An unnatural** termination occurs when the project is stopped before completion (Keil et al., 2000). Several events can cause an unnatural termination of a project. **For example**, it may be learned that the assumption used to guide the project proved to be false, that the performance of the systems or development group was somehow inadequate, or that the requirements are no longer relevant or valid in the customer's business environment. The most likely reasons for the **unnatural termination** of a project relate to running out of time or money, or both.

Representing and Scheduling Project Plans

A project manager has a wide variety of techniques available for depicting (to represent or show something in a picture or story) and documenting project plans. These planning documents can take the form of graphical or textual reports, although graphical reports have become most popular for depicting project plans. The most commonly used methods are **Gantt charts** and **network diagrams**. Because Gantt charts do not (typically) show how tasks must be ordered (precedence) but simply show when a task should begin and when it should end, they are often more useful for depicting (representing) relatively simple projects or subparts of a larger project, showing the activities of a single worker, or monitoring the progress of activities compared to scheduled completion dates (Figure 3-18). Recall that a network diagram shows the ordering of activities by connecting a task to its predecessor and successor tasks. Sometimes a network diagram is preferable; other times a Gantt chart more easily shows certain aspects of a project. Here are the key differences between these two charts:

FIGURE 3-18
Graphical diagrams that depict project plans
(a) A Gantt chart
(b) A network diagram

Task Name	Duration	Start	Finish	Predecessors
Requirements Collection	5 wks	Mon 5/3/10	Fri 6/4/10	
Screen Design	6 wks	Mon 6/7/10	Fri 7/16/10	1
Report Design	6 wks	Mon 6/7/10	Fri 7/16/10	1
Database Design	2 wks	Mon 7/19/10	Fri 7/30/10	2,3
User Documentation	5.5 wks	Mon 8/2/10	Wed 9/8/10	4
Programming	5 wks	Mon 8/2/10	Fri 9/3/10	4
Testing	3 wks	Mon 9/6/10	Fri 9/24/10	6
Installation	1 wk	Mon 9/27/10	Fri 10/1/10	7,5

FIGURE 3-18
Graphical diagrams that depict project plans
(a) A Gantt chart
(b) A network diagram

Requirements Collection

Start: 5/3/10 ID: 1
Finish: 6/4/10 Dur: 5 wks
Res:

Report Design

Start: 6/7/10 ID: 3
Finish: 7/16/10 Dur: 6 wks
Res:

Screen Design

Start: 6/7/10 ID: 2
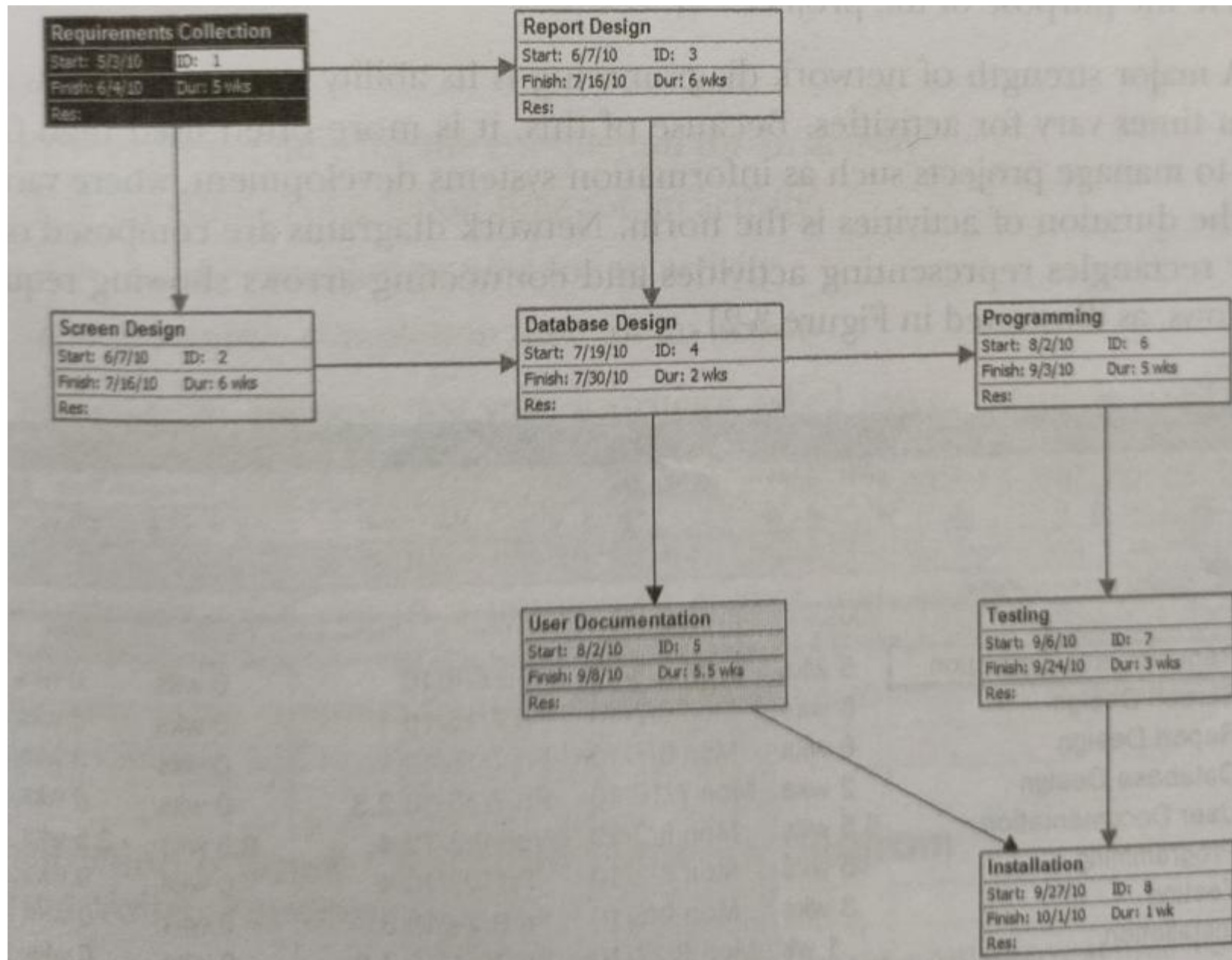Finish: 7/16/10 Dur: 6 wks
Res:

Database Design

Start: 7/19/10 ID: 4
Finish: 7/30/10 Dur: 2 wks
Res:

Programming

Start: 8/2/10 ID: 6
Finish: 9/3/10 Dur: 5 wks
Res:

User Documentation

Start: 8/2/10 ID: 5
Finish: 9/8/10 Dur: 5.5 wks
Res:

Testing

Start: 9/6/10 ID: 7
Finish: 9/24/10 Dur: 3 wks
Res:

Installation

Start: 9/27/10 ID: 8
Finish: 10/1/10 Dur: 1 wk
Res:

- Gantt charts visually show the duration of tasks, whereas a network diagram visually shows the sequence dependencies between tasks.

- Gantt charts visually show the time overlap of tasks, whereas a network diagram does not show time overlap but does show which tasks could be done in parallel.

- Some forms of Gantt charts can visually show slack time available within an earliest start and latest finish duration. A network diagram shows this by data within activity rectangles.

- Project managers also use textual reports that depict (represent) resource utilization by task, complexity of the project, and cost distributions to control activities. For example, Figure 3-19 shows a screen from Microsoft Project for Windows that summarizes all project activities, their durations in weeks, and their scheduled starting and ending dates. Most project managers use computer-based systems to help develop their graphical and textual reports.

- A project manager will periodically review the status of all ongoing project task activities to assess whether the activities will be completed early, on time, or late. If early or late, the duration of the activity, represented in column 2 of Figure 3-19, can be updated. Once changed, the scheduled start and finish times of all subsequent tasks will also change. Making such a change will also alter a Gantt chart or network diagram used to represent the project tasks. The ability to easily make changes to a project is a very powerful feature of most project management environments. It enables the project manager to determine easily how changes in task duration affect the project completion date. It is also useful for examining the impact of "what if" scenarios of adding or reducing resources, such as personnel, for an activity.
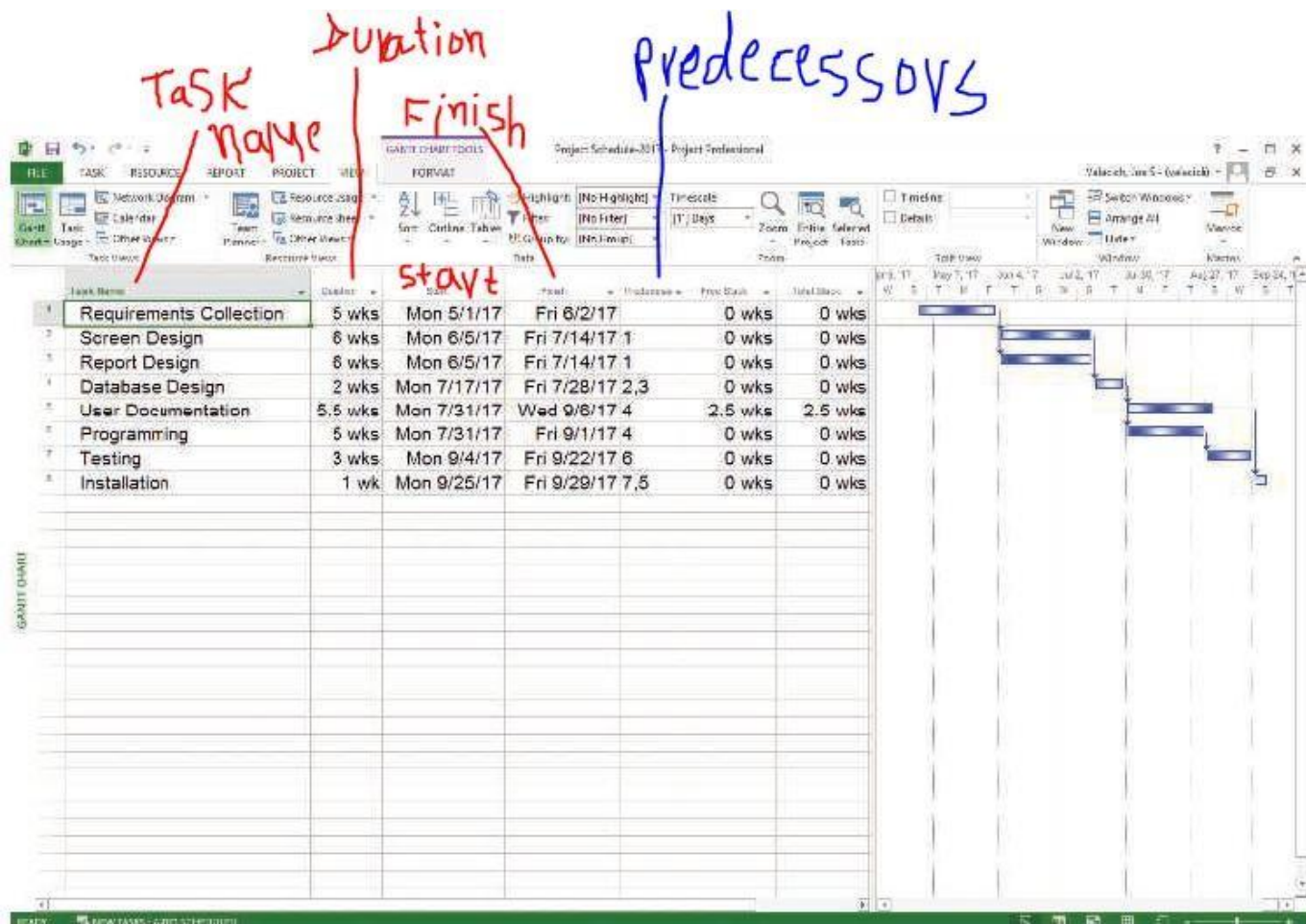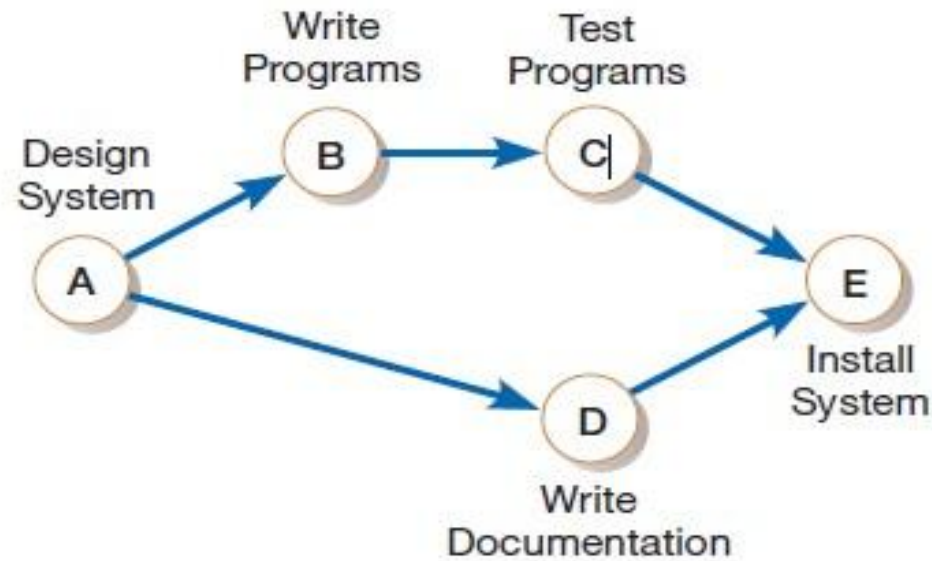
Figure 3.19

Representing Project Plans:

Project scheduling and management require that time, costs, and resources be controlled. **Resources are any person, group of people, piece of equipment, or material** used in accomplishing an activity. Network diagramming is a **critical path scheduling** technique used for controlling resources. **A critical path refers to a sequence of task activities whose order and durations directly affect the completion date of a project**. A network diagram is one of the most widely used and best- known scheduling methods. You would use a network diagram when tasks

- are well defined and have a clear beginning and end point,
- can be worked on independently of other tasks,
- are ordered, and
- serve the purpose of the project

A major strength of network diagramming is its ability to represent how completion times vary for activities. Because of this, it is more often used than Gantt charts to manage projects such as information systems development, where variability in the duration of activities is the norm. Network diagrams are composed of circles or rectangles representing activities and connecting arrows showing required work flows, as illustrated in Figure 3-20.

FIGURE 3-20

A network diagram showing activities (represented by circles) and sequence of those activities (represented by arrows)

Calculating Expected time durations using PERT:(Program Evaluation Review Technique)

One of the most difficult and most error-prone activities when constructing a project schedule is the determination of the time duration for each task within a work breakdown structure. It is particularly problematic to make these estimates when there is a high degree of complexity and uncertainty about a task. **PERT is a technique that uses optimistic, pessimistic, and realistic time** estimates to calculate the expected time for a particular task. This technique can help you to obtain a better time estimate when there is some uncertainty as to how much time a task will require to be completed. The **optimistic** (o) and **pessimistic** (p) times reflect the minimum and maximum possible periods of time for an activity to be completed. The realistic (r) time, or most likely time, reflects the project manager's "best guess" of the amount of time the activity actually will require for completion. Once each of these estimates is made for an activity, an expected time (ET) can be calculated. Because the expected completion time should be closest to the realistic (r) time, it is typically weighted four times more than the optimistic (o) and pessimistic (p) times. Once you add these values together, it must be divided by six to determine the ET. This equation is shown in the following formula:

$$ET = \frac{o + 4r + p}{6}$$

where

- ET = expected time for the completion for an activity
- o = optimistic completion time for an activity
- r = realistic completion time for an activity
- p = pessimistic completion time for an activity
- For example, suppose that your instructor asked you to calculate an expected time for the completion of an upcoming programming assignment. For this assignment, you estimate an optimistic time of two hours, a pessimistic time of eight hours, and a most likely time of six hours. Using PERT, the expected time for completing this assignment is

  5.67 hours

Using project management software

A wide variety of automated project management tools is available to help you manage a development project. New versions of these tools are continuously being developed and released by software vendors. Most of the available tools have a set of common features that include the ability to define and order tasks, assign resources to tasks, and easily modify tasks and resources. Project management tools are available to run on IBM-compatible personal computers, the Macintosh, and larger mainframe and workstation-based systems. These systems vary in the number of task activities supported, the complexity of relationships, system processing and storage requirements, and, of course, cost. For example, numerous shareware project management programs (e.g., **OpenProj, Bugzilla, and eGroupWare**) can be downloaded from the web (e.g., at www.download.com).