YOUR REQUIRED eBOOK
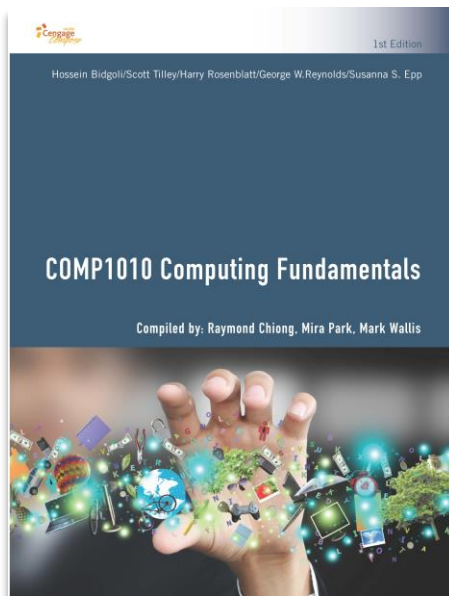
COMP1010 Computing Fundamentals

Chiong | Park | Wallis

1st Edition – Only $44.95

Only available at
http://www.cengagebrain.com.au/shop/isbn/9780170416061

Plus get **10% OFF** when you use coupon code TAKE10OFF at the checkout

COMP1010 – Week 4 Project Management

Dr. Raymond Chiong, Dr. Mira Park, Dr. Mark Wallis

COMP1010 – Introduction to Computing

University of Newcastle

Chapter Objectives

- Explain project planning, scheduling, monitoring, and reporting

- Draw a project triangle that shows the relationship among project cost, scope, and time

- Create a work breakdown structure, identify task patterns, and calculate a critical path

- Explain techniques for estimating task completion times and costs

- Describe various scheduling tools, including Gantt charts and PERT/CPM charts

THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

Chapter Objectives (Cont.)

- Analyze task dependencies, durations, start dates, and end dates

- Describe project management software and how it can be of assistance

- Control and manage project changes as they occur

- Discuss the importance of managing project risks

- Understand why projects sometimes fail

THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

Overview of Project Management

- **Project Management**: Planning, scheduling, monitoring and controlling, and reporting on information system development

- **What Shapes a Project?**
  - Successful projects must be completed on time, within budget, meet requirements, and satisfy users

- **What Is a Project Triangle?**
  - Challenge – To find optimal balance factors
    - Any change in one leg of the triangle will affect the other legs
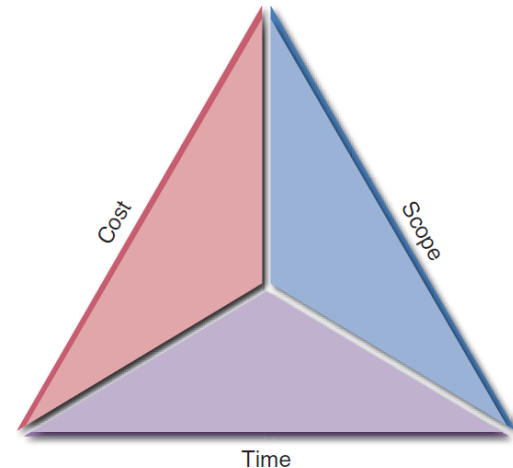

FIGURE 3-2 A typical project triangle includes cost, scope, and time.

THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

Overview of Project Management (Cont.)

- **What Does a Project Manager Do?**
    - **Project planning:** Identifying all project tasks and estimating the completion time and cost of each
    - **Project scheduling**: Creating a specific timetable showing tasks, task dependencies, and critical tasks that might delay the project
    - **Project monitoring**: Guiding, supervising, and coordinating the project team's workload
    - **Project reporting**: Creating regular progress reports for management, users, and the project team itself

THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

Creating a Work Breakdown Structure

- **Work breakdown structure (WBS)**: Breaking down a project into a series of smaller tasks
- **Gantt Chart**
  - A horizontal bar chart representing a set of tasks
  - Shows planned and actual progress on a project
  - Simplifies complex projects using a **task group**

FIGURE 3-3 In this Gantt chart, notice the yellow bars that show the percentage of task completion.

THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA
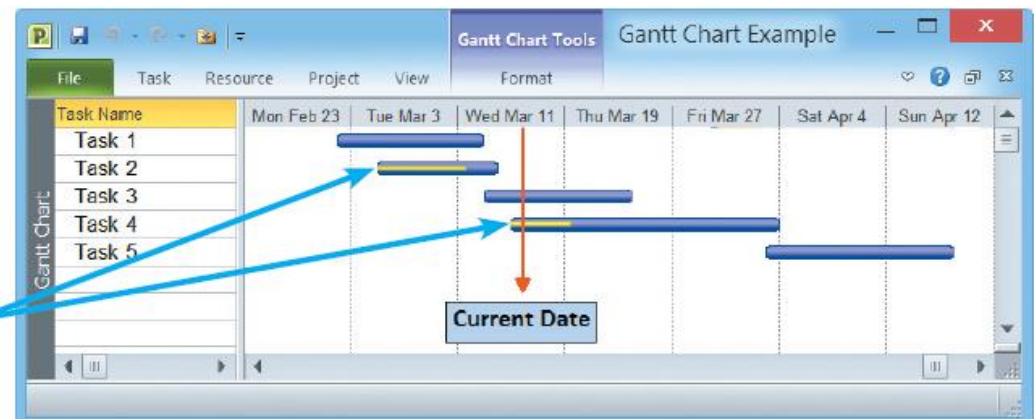
Creating a Work Breakdown Structure
(Cont. 1)

- **PERT/CPM Charts**
  - **Program Evaluation Review Technique (PERT)**
    - Developed by the U.S. Navy to manage complex projects
  - **Critical Path Method (CPM)**
    - Developed by private industry
  - Utilizes a **bottom-up technique**
  - Useful for scheduling, monitoring, and controlling actual work
    - Displays complex task patterns and relationships

THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

Creating a Work Breakdown Structure
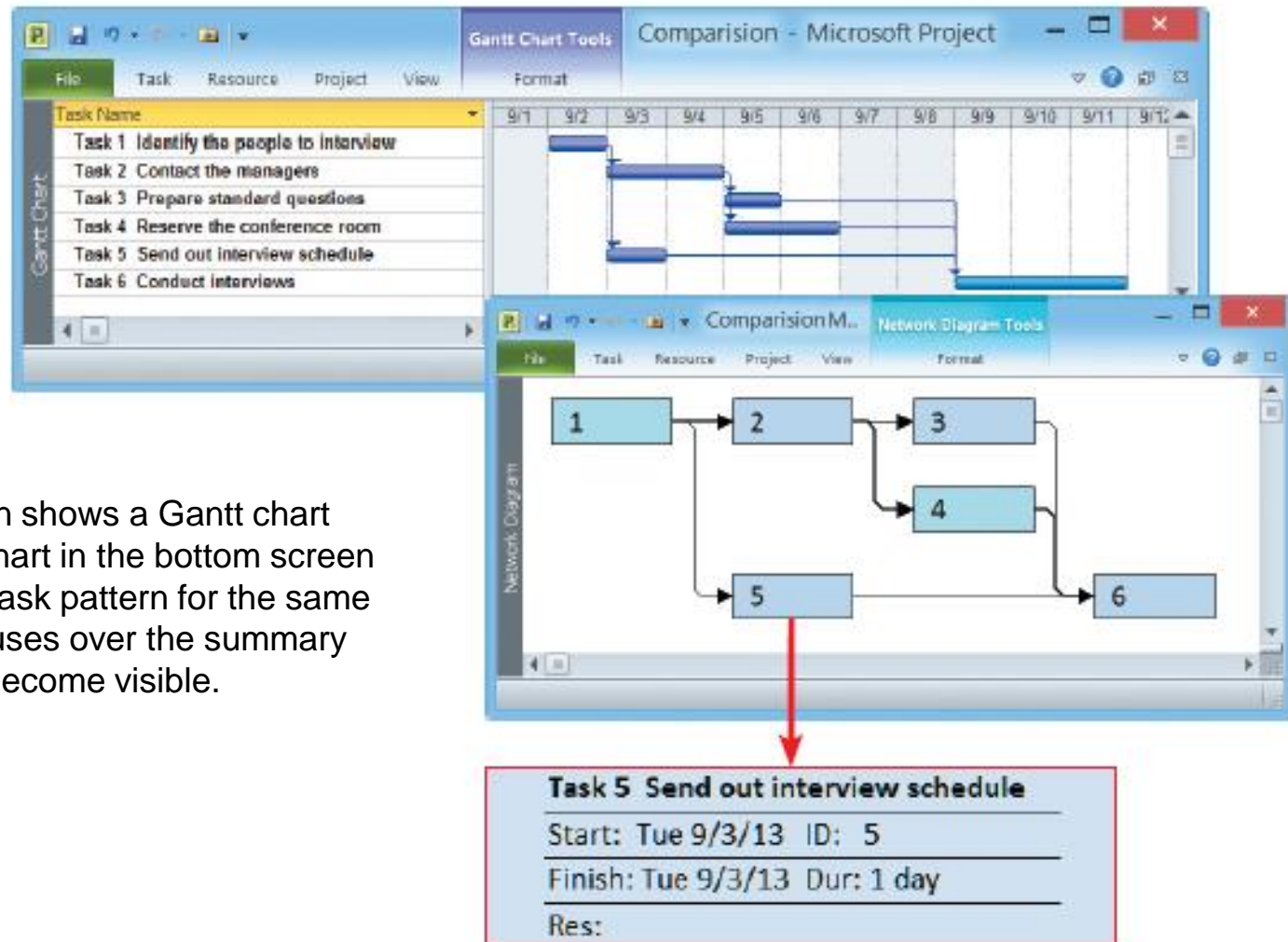**(Cont. 2)**

FIGURE 3-4 The top screen shows a Gantt chart with six tasks. The PERT chart in the bottom screen displays an easy-to-follow task pattern for the same project. When the user mouses over the summary box for Task 5, the details become visible.

Creating a Work Breakdown Structure
(Cont. 3)

- **Identifying Tasks in a WBS**
  - **Task** or **activity**: Any work that has a beginning and an end
    - Requires the use of company resources such as people, time, or money
    - Should be small and manageable
  - Projects have events or milestones
    - **Events** or **milestones**: Recognizable reference points used to monitor progress

THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

Creating a Work Breakdown Structure
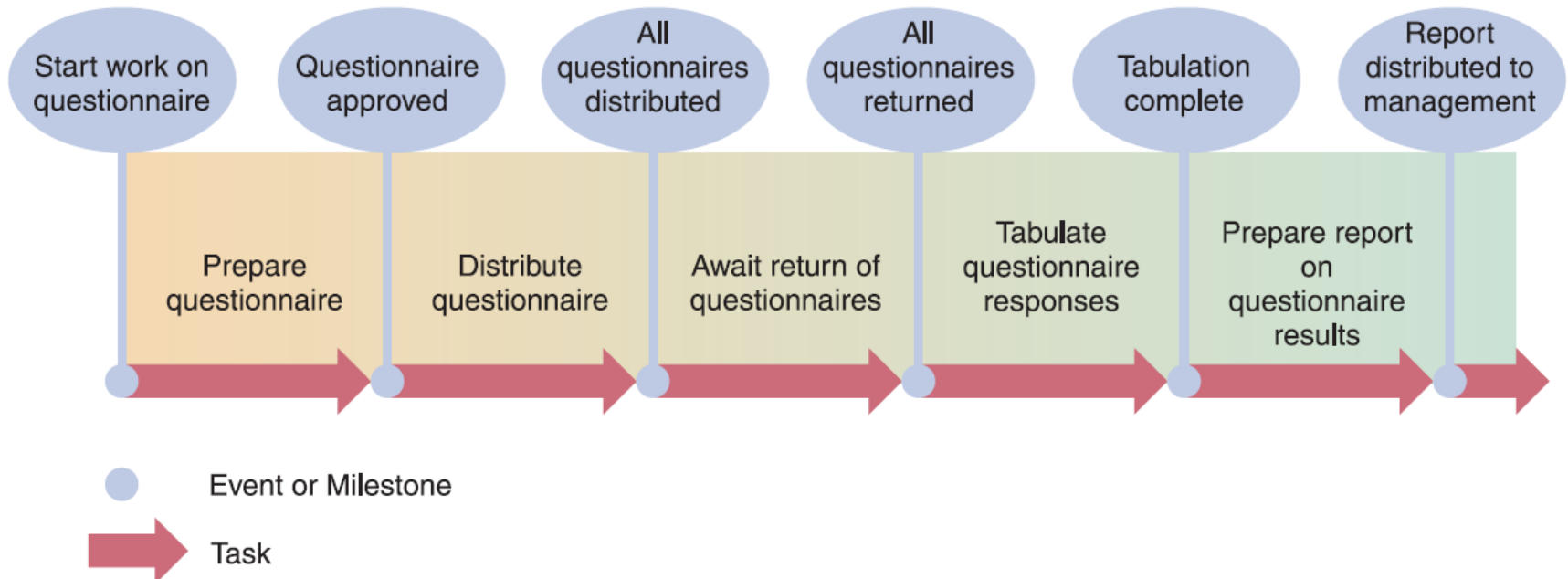**(Cont. 4)**

FIGURE 3-5 Using a questionnaire requires a series of tasks and events to track the progress. The illustration shows the relationship between the tasks and the events, or milestones, that mark the beginning and end of each task.

THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

Creating a Work Breakdown Structure
(Cont. 5)

- **Identifying Tasks in a Work Breakdown Structure (WBS)**
  - Listing the tasks
  - Estimating task duration - Can be hours, days, or weeks
    - Time estimates made by project managers
      - **Best case-estimate** (B), **probable-case estimate** (P), and **worst-case estimate** (W)
    - After making estimates, the manager assigns a **weight** to each estimate and calculates the task duration

THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

Creating a Work Breakdown Structure

(Cont. 6)

First version

First, reserve the meeting room. Then order the marketing materials and brief the managers. After the briefings, send out customer emails and burn sample DVDs. When the emails are sent and the DVDs are ready, load the new software. When the marketing materials have arrived and the software is ready, do a dress rehearsal.

Second version

First, *reserve the meeting room*. Then *order the marketing materials* and *brief the managers*. After the briefings, *send out customer emails* and *burn sample DVDs*. When the emails are sent and the DVDs are ready, *load the new software*. When the marketing materials have arrived and the software is ready, *do a dress rehearsal*.

Third version

- First, *reserve the meeting room*.
- Then *order the marketing materials* and *brief the managers*.
- After the briefings, *send out customer emails* and *burn sample DVDs*.
- When the emails are sent and the DVDs are ready, *load the new software*.
- When the marketing materials have arrived and the software is ready, *do a dress rehearsal*.

Task No.	Description	Duration (Days)	Predecessor Tasks
1	Reserve the meeting room		
2	Order the marketing materials		
3	Brief the managers		
4	Send out customer e-mails		
5	Burn sample DVDs		
6	Load the new software		
7	Do a dress rehearsal		

FIGURE 3-7 In this table, columns have been added for task number, description, duration, and predecessor tasks, which must be completed before another task can start.

FIGURE 3-6 The three versions show how to transform a task statement into a list of specific tasks for a work breakdown structure.

THE UNIVERSITY OF NEWCASTLE AUSTRALIA

Creating a Work Breakdown Structure
(Cont. 7)

- **Factors Affecting Duration**
  - Project size
    - Identify all project tasks and the time required for each
    - Consider time taken for events affecting productivity
  - Human resources
    - Assemble and guide a development team that has the skill and experience to handle the project
    - Deal with factors that could affect the project's timeline

THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

Creating a Work Breakdown Structure
(Cont. 8)

- **Factors Affecting Duration**
  - Experience with similar projects
    - Develop time and cost estimates based on the resources used for similar, previously developed information systems
  - Constraints
    - Define system requirements that can be achieved realistically within the required constraints
      - Calculate resources needed in the absence of constraints

THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

Creating a Work Breakdown Structure

(Cont. 9)

Task No.	Description	Duration (Days)	Predecessor Tasks
1	Reserve the meeting room	1	
2	Order the marketing materials	9	
3	Brief the managers	2	
4	Send out customer e-mails	3	
5	Burn sample DVDs	3	
6	Load the new software	2	
7	Do a dress rehearsal	1	

FIGURE 3-8 Task durations have been added, and the WBS is complete except for predecessor task information. The predecessor tasks will determine task patterns and sequence of performance.

FIGURE 3-9 This Microsoft Project screen displays the same WBS, including task number, task name, duration, and predecessor tasks.

THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

Identifying Task Patterns

- **Task Patterns**
  - Arrangement of tasks in a logical sequence
  - Can involve dependent tasks, multiple successor tasks, and multiple predecessor tasks
- **Using Task Boxes to Create a Model**

FIGURE 3-10 Each section of the task box contains important information about the task, including the Task Name, Task ID, Task Duration, Start Day/Date, and Finish Day/Date.

Task Name	
Start Day/Date	Task ID
Finish Day/Date	Task Duration

THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

Identifying Task Patterns (Cont. 1)

- **Task Patterns**
  - Dependent Tasks
    - Tasks that need to be completed in a sequence
    - One task can be initiated only after the prior task has been completed
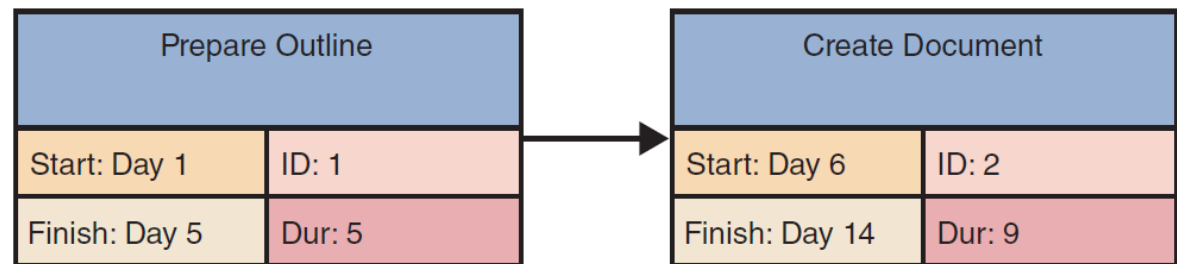
Prepare Outline		Create Document	
Start: Day 1	ID: 1	Start: Day 6	ID: 2
Finish: Day 5	Dur: 5	Finish: Day 14	Dur: 9

FIGURE 3-12 This example of a dependent task shows that the finish time of Task 1, Day 5, controls the start date of Task 2, which is Day 6.

THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

Identifying Task Patterns (Cont. 2)

- **Task Patterns**
  - Multiple Successor Tasks
    - Tasks that can be initiated simultaneously
      - Tasks are termed **concurrent**
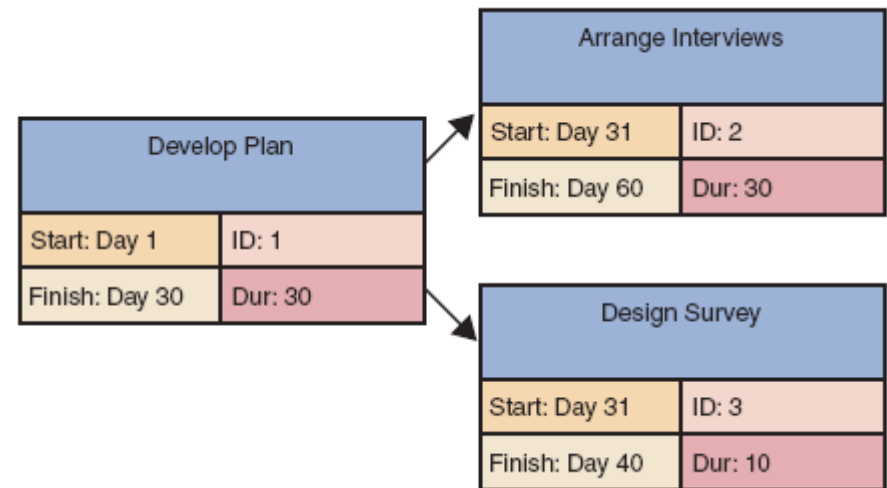   - Often, two or more concurrent tasks depend on a **predecessor task**

FIGURE 3-13 This example of multiple successor tasks shows that the finish time for Task 1 determines the start time for both Tasks 2 and 3.

THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

Identifying Task Patterns (Cont. 3)

- **Task Patterns**
  - Multiple Predecessor Tasks
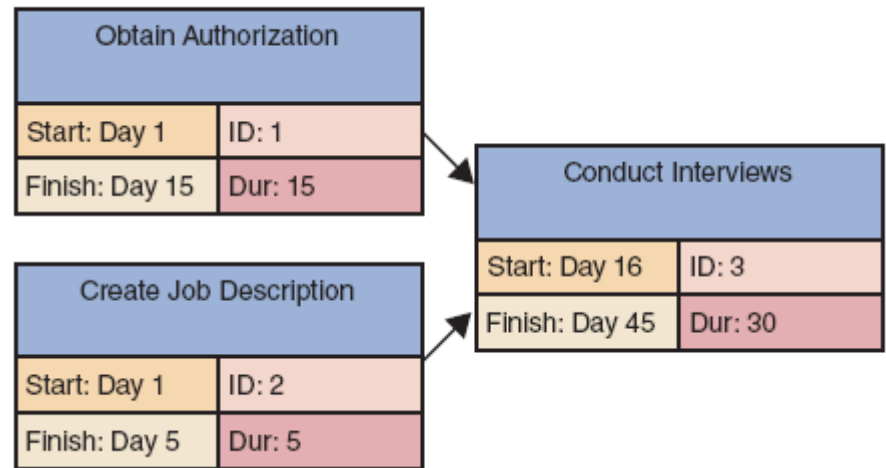   - When the initiation of a task depends on the completion of two or more prior tasks

FIGURE 3-14 This example of multiple predecessor tasks shows that the start time for a successor task must be the latest (largest) finish time for any of its preceding tasks. In the example shown, Task 1 ends on Day 15, while Task 2 ends on Day 5, so Task 1 controls the start time for Task 3.

THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

Identifying Task Patterns (Cont. 4)

- **Identifying Task Patterns**
  - Words like *then*, *when*, or *and* signal a sequence of events
    - Do Task 1, *then* do Task 2
      - Describes dependent tasks that must be completed one after the other
    - *When* Task 2 is finished, start two tasks
      - Task 3 and Task 4 describe multiple successor tasks that can both start as soon as Task 2 is finished
    - *When* Tasks 5 and 6 are done, start Task 7
      - Indicates that Task 7 is a multiple predecessor task

THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

Identifying Task Patterns (Cont. 5)

- ## Working with Complex Task Patterns
  - Study the facts very carefully to understand the logic and sequence of task patterns
  - Schedule will be wrong if task patterns are incorrect
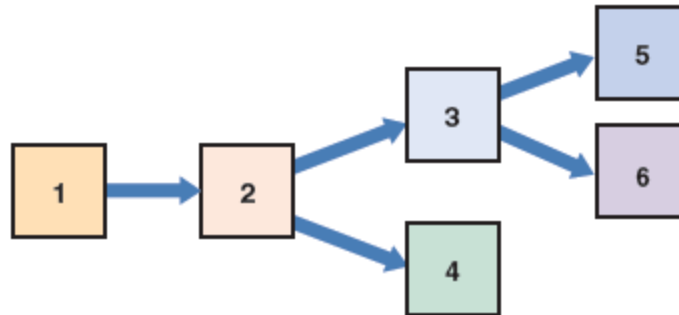

FIGURE 3-15
Dependent tasks
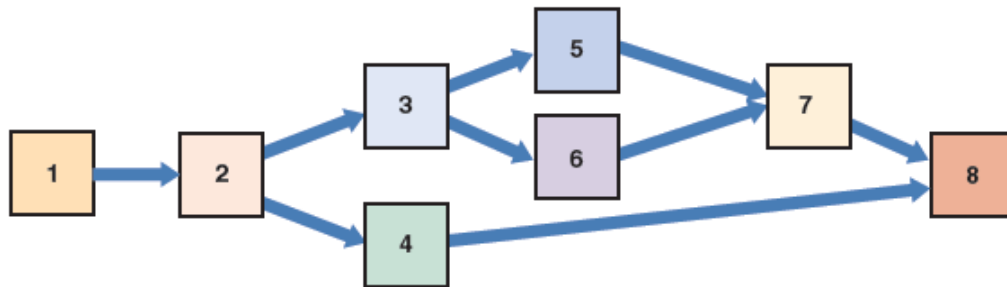
FIGURE 3-16
Dependent tasks and multiple successor tasks

FIGURE 3-17 Dependent tasks, multiple successor tasks, and multiple predecessor tasks

Copyright ©2017 Cengage Learning. All Rights Reserved. May not be scanned, copied or duplicated, or posted to a publicly accessible website, in whole or in part.

THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

Calculating the Critical Path

- **Critical Path**: Series of tasks which, if delayed, will affect the completion date of the overall project
  - If any task on the critical path falls behind schedule, the entire project will be delayed
- **Calculating the Critical Path**
  - Review patterns
  - Determine start and finish dates, which will define the critical path

Copyright ©2017 Cengage Learning. All Rights Reserved. May not be scanned, copied or duplicated, or posted to a publicly accessible website, in whole or in part.

THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

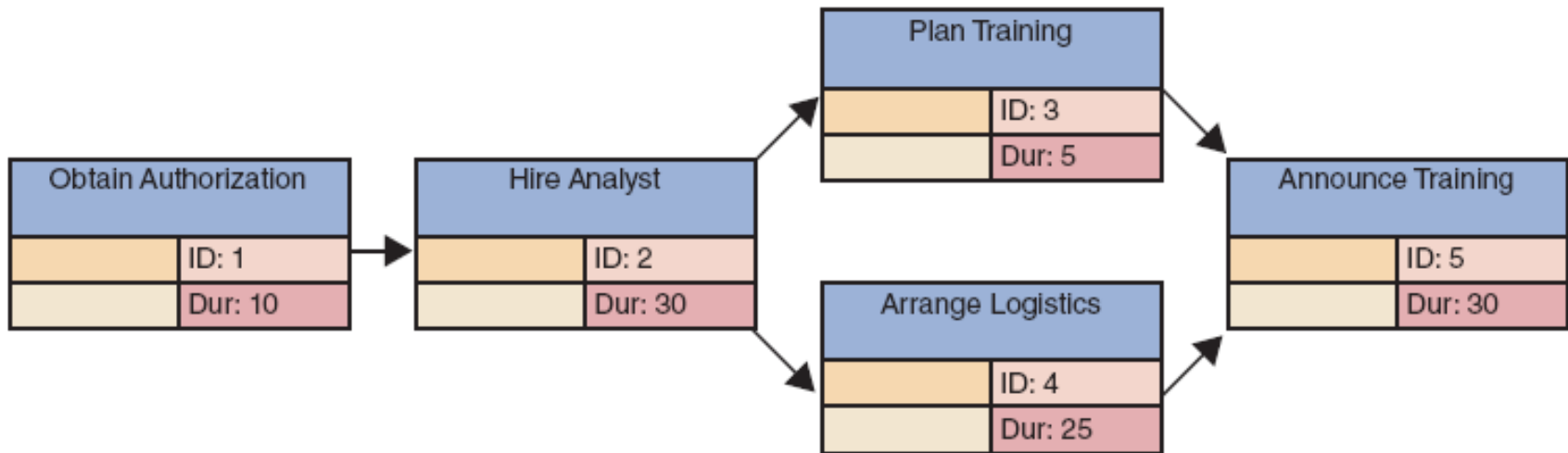# Calculating the Critical Path (Cont. 1)

FIGURE 3-18 Example of a PERT/CPM chart with five tasks. Task 2 is a dependent task that has multiple successor tasks. Task 5 has multiple predecessor tasks. In this figure, the analyst has arranged the tasks and entered task names, IDs, and durations.

THE UNIVERSITY OF
NEWCASTLE
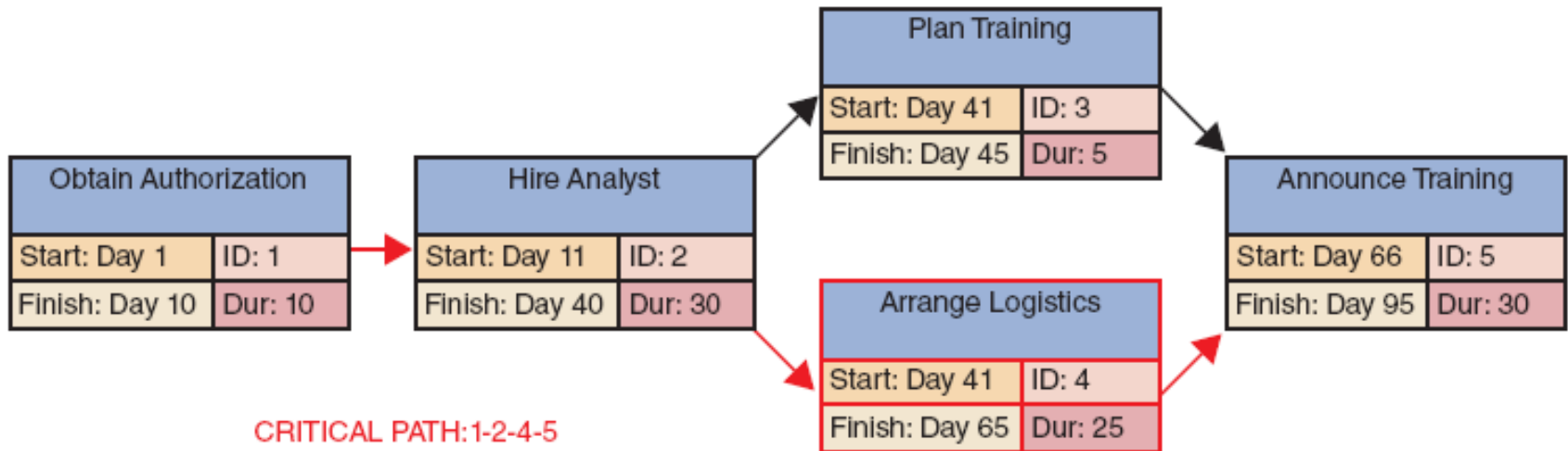AUSTRALIA

Calculating the Critical Path (Cont. 2)

FIGURE 3-19 Now the analyst has entered the start and finish times, using the rules explained in this section. Notice that the overall project has a duration of 95 days.

THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

Project Monitoring and Control

▸ **Monitoring and Control Techniques**

  ◦ **Structured walk-through**: Review of a project team member's work by other team members

  • Takes place throughout the SDLC

  • Known as **design**, **code**, or **testing reviews** based on the phase in which they occur

THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

Project Monitoring and Control (Cont.)

- **Maintaining a Schedule**
  - Most projects run into some problems or delays
  - Projects managers monitor and control the work by:
    - Anticipating problems, avoiding them, and minimizing their impact
    - Identifying potential solutions and selecting the best way to solve the problem

THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

Reporting

▸ **Project Status Meetings**
  ◦ Project managers schedule regular meetings to share updates, discuss common problems, and explain new techniques
  ◦ Help collect data from team members and conduct brainstorming sessions

▸ **Project Status Reports**
  ◦ Regularly communicated by project managers to supervisors, upper management, or users
    • Managers must communicate potential problems to the management at the right time

THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

Project Management Examples

▸ PERT/CPM Examples

- ◦ Step 1 - Display the tasks and task patterns
  - • Identify the tasks
  - • Determine task dependencies
  - • Enter the task name, ID, and duration
- ◦ Step 2 - Enter start and finish times
  - • In case of more than one predecessor tasks for a successor task, use the latest finish time of the predecessor tasks to determine the start time for the successor task

THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

Project Management Examples (Cont. 1)

- **PERT/CPM Examples**
  - In case of more than one successor task for the predecessor task, use the predecessor task's finish time to determine the start time for all successor tasks
  - Continuing from left to right, add the task duration for each task to its start time to determine and enter its finish time

THE UNIVERSITY OF
NEWCASTLE
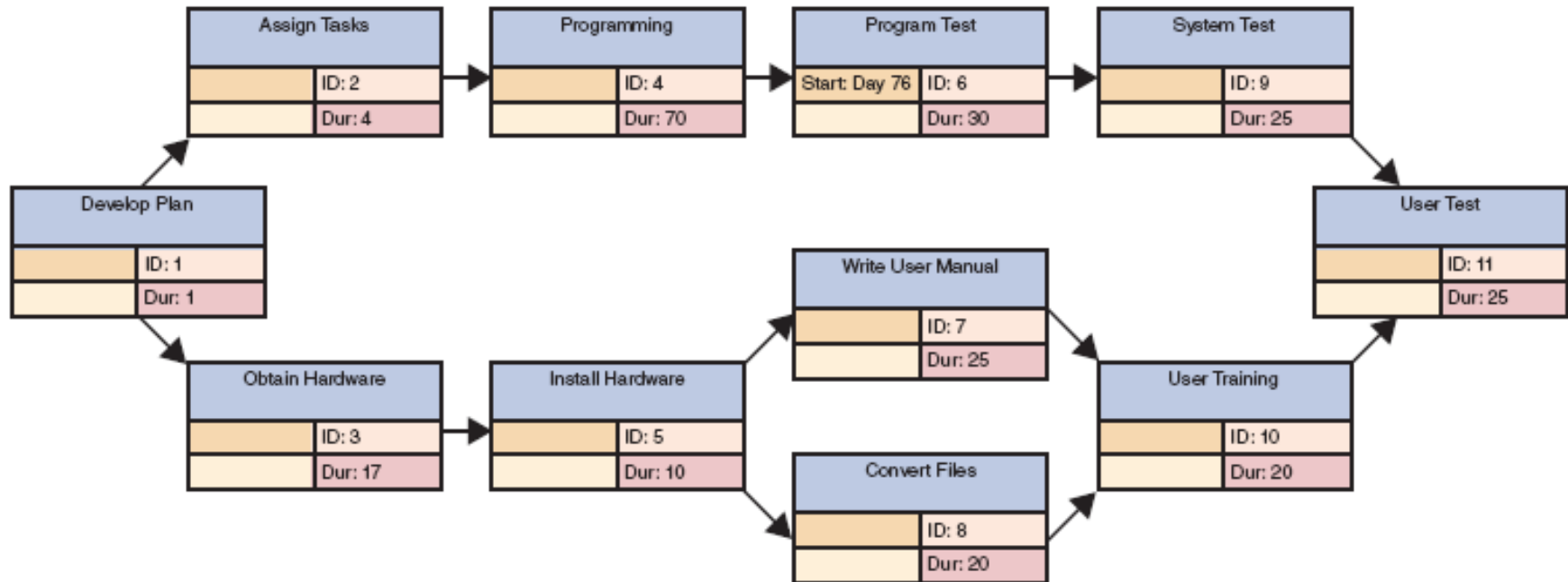AUSTRALIA

Project Management Examples (Cont. 2)

FIGURE 3-22 To transform a task list into a PERT/CPM chart, you first enter the task name, ID, duration, and predecessors for each task. Notice that this example includes dependent tasks, tasks with multiple successors, and tasks with multiple predecessors.

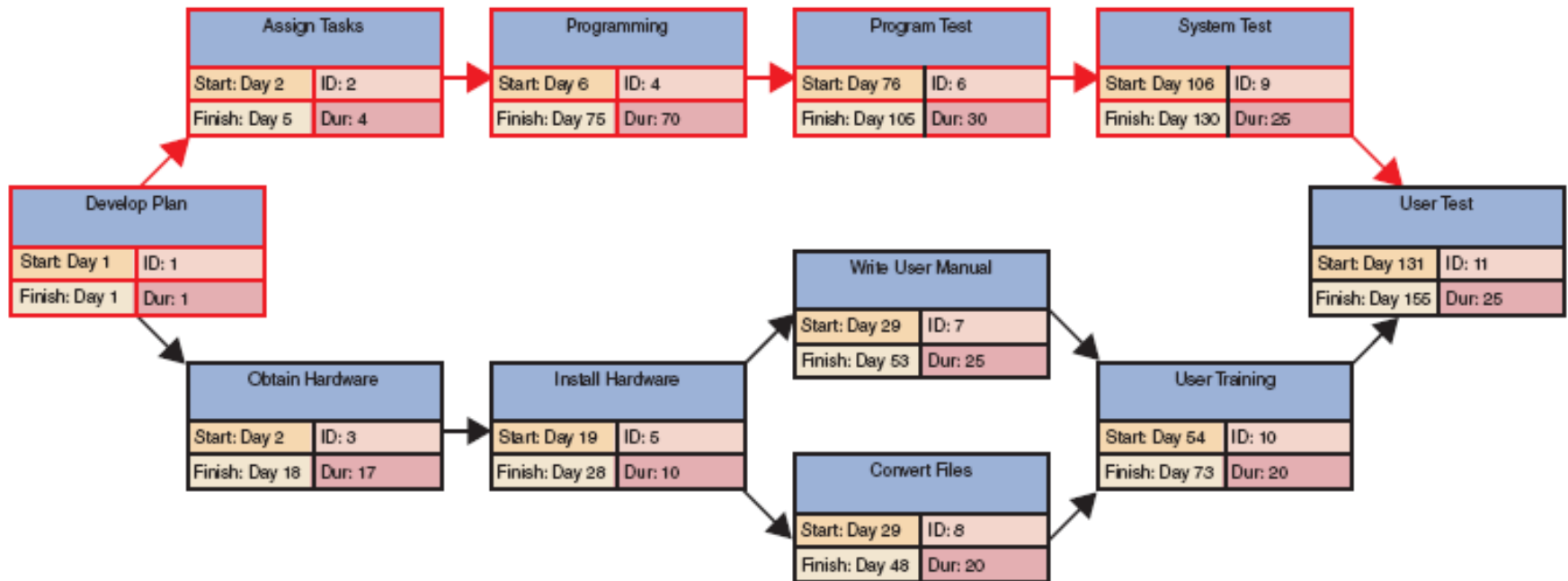THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

FIGURE 3-23 To complete the PERT/CPM chart, you apply the guidelines explained in this section. For example, Task 1 has a one-day duration, so you enter the start and finish for Task 1 as Day 1. Then you enter Day 2 as the start for successor Tasks 2 and 3.

THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

Project Management Software

- **Microsoft Project**
  - Full-featured program that holds the dominant share of the market

- **GanttProject**
  - Free, **open source** program

- Gantter
  - Free cloud-based project management tool

- Apptivo and smartsheet
  - Paid Web-based project management tools

THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

Project Management Software (Cont. 1)

FIGURE 3-26 Notice how each view displays the project and highlights the critical path. If you were the project manager on September 25, your primary concern should be conducting the user survey.

THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

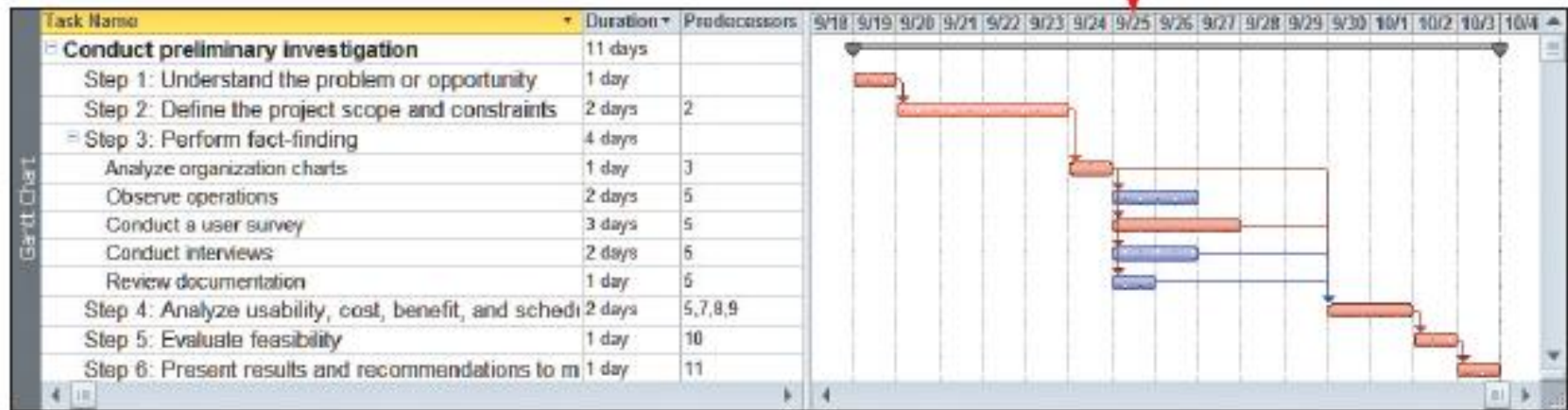# Project Management Software (Cont. 2)

PERT Chart View

FIGURE 3-26 Notice how each view displays the project and highlights the critical path. If you were the project manager on September 25, your primary concern should be conducting the user survey.

THE UNIVERSITY OF NEWCASTLE AUSTRALIA

Project Management Software (Cont. 3)

Calendar View

Tuesday	Wednesday	Thursday	Friday
24	25	26	27

Analyze organization charts, 1 day

Observe operations, 2 days

Conduct a user survey, 3 days

Conduct interviews, 2 days
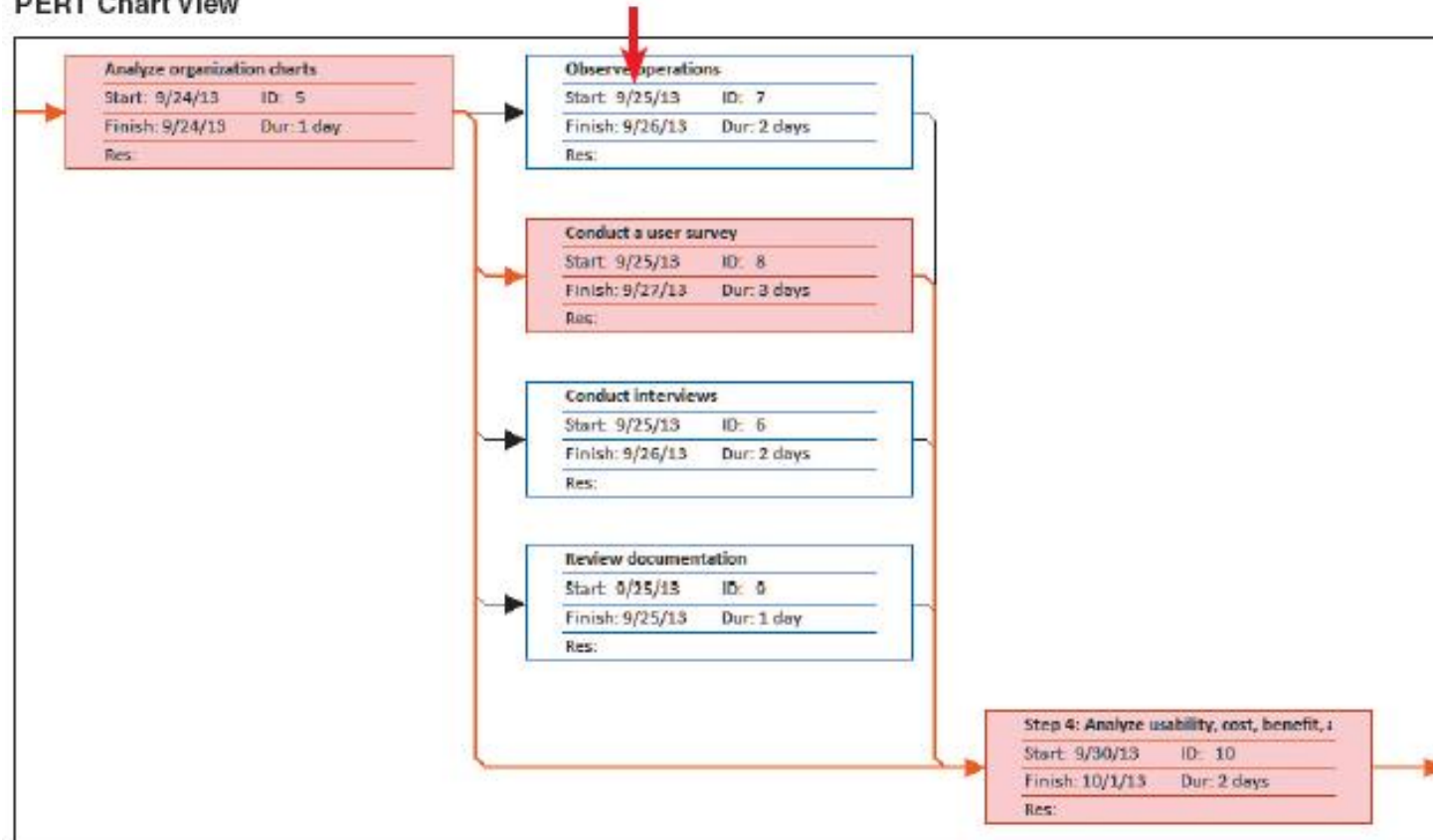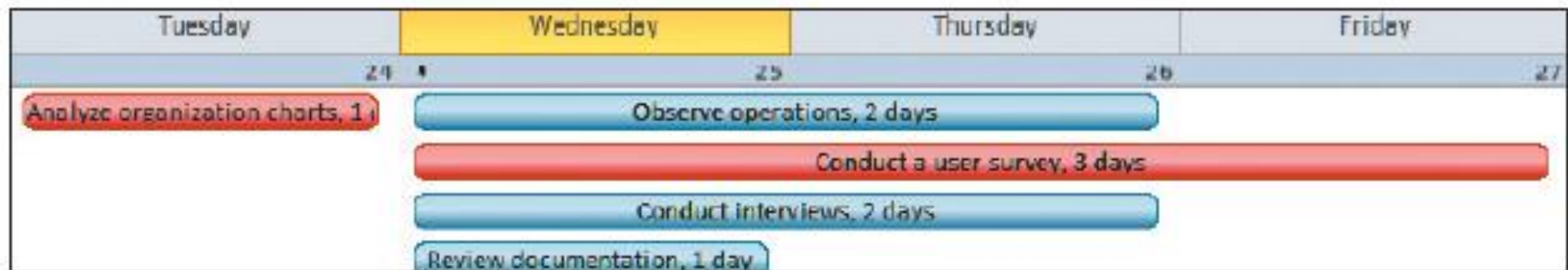
Review documentation, 1 day

FIGURE 3-26 Notice how each view displays the project and highlights the critical path. If you were the project manager on September 25, your primary concern should be conducting the user survey.

THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

Risk Management

- **Steps in Risk Management**
  - Develop a **risk management** plan
    - Review the project's scope, stakeholders, budget, schedule, and any other internal or external factors that might affect the project
    - Define project roles and responsibilities, risk management methods and procedures, categories of risks, and contingency plans
  - Identify the risks
    - List each risk and assess the likelihood that it could affect the project

THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

Risk Management (Cont. 1)

- **Steps in Risk Management**
  - Analyze the risks
    - **Qualitative risk analysis**: Evaluates each risk by estimating the probability that it will occur and the degree of impact
    - **Quantitative risk analysis**: Helps understand the actual impact in terms of dollars, time, project scope, or quality
  - Create a risk response plan
    - **Risk response plan**: Proactive effort to anticipate a risk and describe an action plan to deal with it
  - Monitor risks - Conduct a continuous tracking process

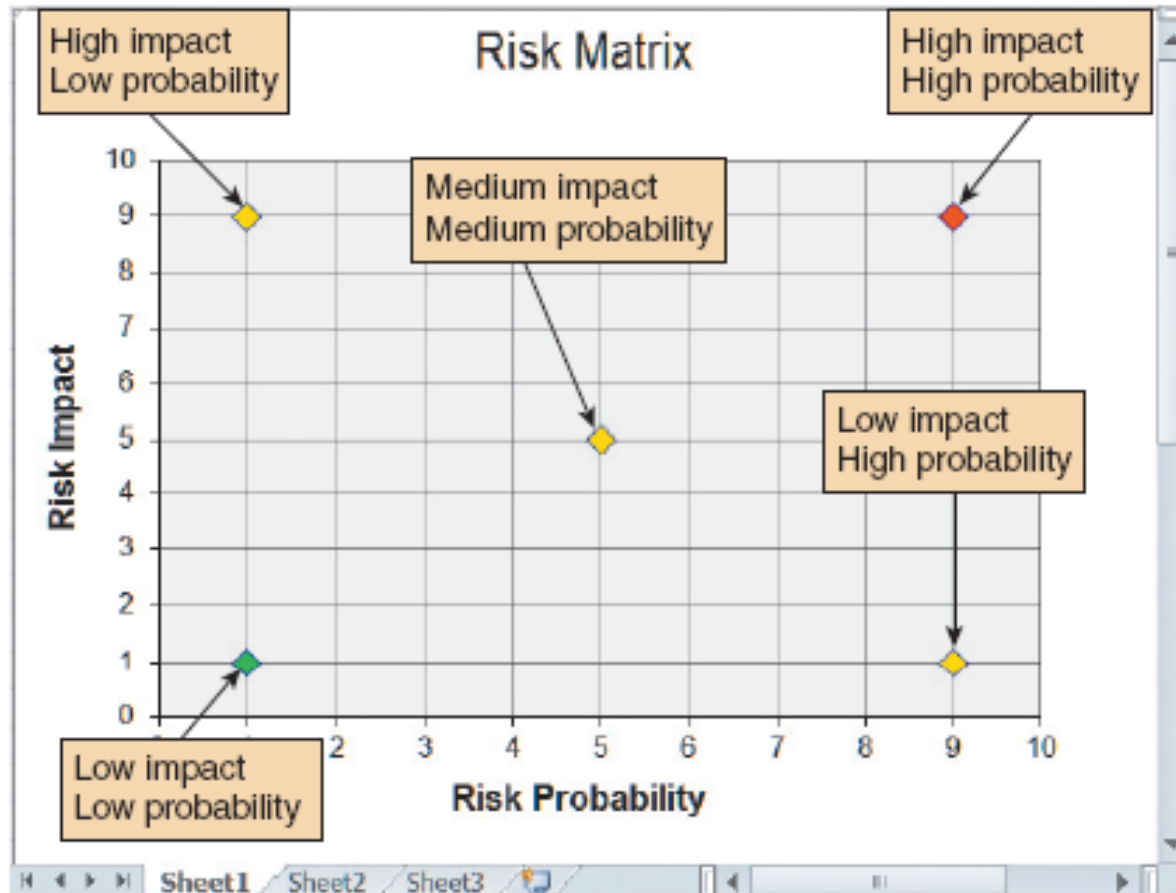THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

Risk Management (Cont. 2)

FIGURE 3-29 You can use a Microsoft Excel XY chart type to display a risk matrix that shows risk probability and potential impact.

THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

Risk Management (Cont. 3)

- **Risk Management Software**
  - Assigns specific dates as constraints
  - Aligns task dependencies
  - Notes external factors that might affect a task
  - Tracks progress
  - Displays tasks that are behind schedule

THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

Managing for Success

- **Business Issues**
  - Every system is to provide a solution to a business problem or opportunity

- **Budget Issues**
  - Cost overruns result from:
    - Unrealistic estimates
    - Failure to develop an accurate forecast
    - Poor monitoring of progress and slow response to early warning signs of problems
    - Schedule delays due to unforeseen factors
    - Human resource issues

THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

Managing for Success (Cont.)

- **Schedule Issues**
  - Problems with timetables and project milestones can indicate:
    - Failure to recognize task dependencies
    - Confusion between effort and progress
    - Poor monitoring and control methods
    - Personality conflicts among team members
    - Turnover of project personnel
    - Failure of an IT project

THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

The Bottom Line

- Project managers must be alert, technically competent, and highly resourceful

- Strong communication and human resource skills are necessary

- When problems occur, the project manager's ability to handle the situation becomes the critical factor

THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

Chapter Summary

- Project management is the process of planning, scheduling, monitoring, and reporting on the development of an information system

  – A successful project must be completed on time, within its budget, and deliver a quality product that satisfies users and meets requirements

- A project triangle shows three legs that require balancing— project cost, scope, and time

THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

Chapter Summary (Cont. 1)

- Planning, scheduling, monitoring, and reporting all take place within a larger project development framework, which includes three key steps—creating a work breakdown structure, identifying task patterns, and calculating the critical path

- Task patterns establish the sequence of work in a project

- A critical path is a series of tasks that, if delayed, would affect the completion date of the overall project

THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

Chapter Summary (Cont. 2)

- A Gantt chart is a horizontal bar chart that represents the project schedule with time on the horizontal axis and tasks arranged vertically

- A PERT/CPM chart shows the project as a network diagram with tasks connected by arrows

- Most project managers use powerful software such as Microsoft Project to plan, schedule, and monitor projects

THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA