

# Systems Analysis and Design

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# Project Management

## Chapter 3

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## Key Definitions

- Project management is the process of planning and controlling the development of a system within a specified timeframe at a minimum cost with the right functionality.
- A project manager has the primary responsibility for managing the hundreds of tasks and roles that need to be carefully coordinated.

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## Four Key Steps in Managing Projects

- Identifying project size
- Creating and managing the workplan
- Staffing the project
- Coordinating project activities

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## IDENTIFYING PROJECT SIZE

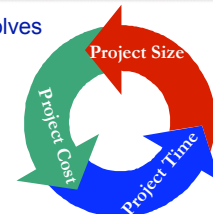
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## Project Manager's Balancing Act

Project Management involves making trade-offs...



Modifying one element requires adjusting the others

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## Project Estimation

- ☑ The process of assigning projected values for time and effort
- ☑ Sources of estimates
  - Methodology in use
  - Actual previous projects
  - Experienced developers
- ☑ Estimates begin as a range and become more specific as the project progresses

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## Project Time Using the Planning Phase Approach

	Planning	Analysis	Design	Implementation
Typical industry standards for business applications	15%	20%	35%	30%
Estimates based on actual figures for first stages of SDLC	Actual: 4 person-months	Estimated: 5.33 person-months	Estimated: 9.33 person-months	Estimated: 8 person-months

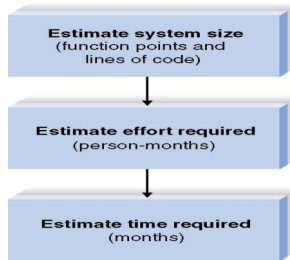
SDLC = systems development life cycle.

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## Project Estimation Using the Function Point Approach



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## Function Point Estimation Worksheet Step One – Estimate System Size (System Components)

Description	Total Number	Complexity			Total
		Low	Medium	High	
Inputs	6	3 x 3	2 x 4	1 x 6	23
Outputs	19	4 x 4	10 x 5	5 x 7	101
Queries	15	0 x 7	15 x 10	0 x 15	39
Files	15	0 x 7	15 x 10	0 x 15	150
Program Interfaces	3	1 x 5	0 x 7	2 x 10	25
<b>Total Unadjusted Function Points (TUFF):</b>					<b>338</b>

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## Function Point Estimation Worksheet Step One – Estimate System Size (Overall System - Example)

Data Communications	3
Heavy use configuration	0
Transaction rate	0
End-user efficiency	0
Complex processing	0
Installation ease	0
Multiple sites	0
Performance	0
Distributed functions	2
Online data entry	2
Reusability	1
Operational ease	0
Extensibility	0
<b>Total Processing Complexity (PC):</b>	<b>8</b>

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## Function Point Estimation Adjusting the Function Points

Processing Complexity (PC):  
(From Step 2)

Adjusted Processing Complexity (PCA) =  $0.65 + (0.01 * 8)$

Total Adjusted Function Points:  $73 * 338 = 247$   
(TUFF -- From Step 1)

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## Function Points Estimation Review of Adjustments

$$\text{Adjusted Project Complexity} = .065 + (0.01 * \text{Project Complexity})$$

$$\text{Total Adjusted Function Points} = \text{Adjusted Project Complexity} * \text{TUFP}$$

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## Converting Function Points to Lines of Code

Language	Approximate Number of Lines of Code per Function Point
C	130
COBOL	110
Java	55
C++	50
Turbo Pascal	50
Visual Basic	30
PowerBuilder	15
HTML	15
Packages (e.g., Access, Excel)	10-40

Source: Capers Jones, Software Productivity Research, <http://www.spr.com>

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## Function Point Estimation Step Two – Estimate Effort Required

- ☑ Function of size and production rate
- ☑ COCOMO model

$$\text{(Effort in Person Months)} = 1.4 * \text{thousands-of-lines-of-code}$$

**Example:**

$$\text{If LOC} = 10000 \text{ Then...} \\ \text{Effort} = (1.4 * 10) = 14 \text{ Person Months}$$

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## Function Point Estimation Step Three - Schedule Time

- ☑ Rule of thumb for estimation

Schedule Time (months)

=

3.0 \* person-months (1/3 is the exponent)

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## CREATING AND MANAGING THE WORK PLAN

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## A Workplan Example

Work Plan Information	Example
Name of task	Perform economic feasibility
Start date	Jan 05, 2005
Completion date	Jan 19, 2005
Person assigned	Project sponsor: Mary Smith
Deliverable(s)	Cost-benefit analysis
Completion status	Open
Priority	High
Resources needed	Spreadsheet
Estimated time	16 hours
Actual time	14.5 hours

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## Identifying Tasks

- ☑ Methodology
  - Using standard list of tasks
- ☑ Top-down approach
  - Identify highest level tasks
  - Break them into increasingly smaller units
  - Organize into *work breakdown structure*

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## Project Workplan

- ☑ List of all tasks in the work breakdown structure, plus
  - Duration of task
  - Current task status
  - Task dependencies
  - Milestone (dates)

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## Tracking Project Tasks

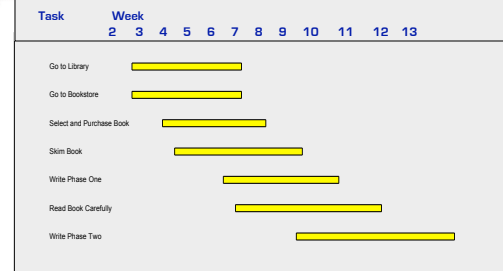
- ☑ Gantt Chart
  - Bar chart format
  - Useful to monitor project status at any point in time
- ☑ PERT Chart
  - Flowchart format
  - Illustrate task dependencies and critical path

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## Tracking Tasks Using Gantt Chart

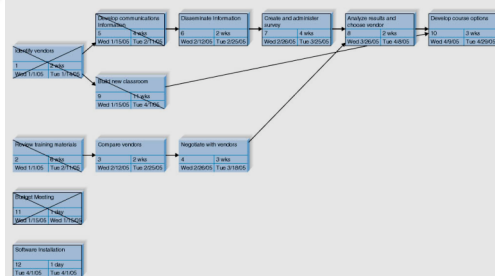


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## Tracking Tasks Using PERT Chart

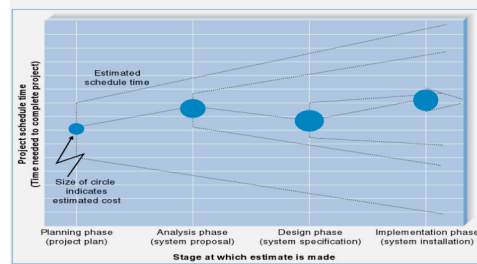


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## Hurricane Model



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## Margins of Error in Cost and Time Estimates

Typical Margins of Error for Well-Done Estimates			
Phase	Deliverable	Cost (%)	Schedule Time (%)
Planning phase	System request	400	60
	Project plan	100	25
Analysis phase	System proposal	50	15
Design phase	System specifications	25	10

Source: Barry W. Boehm and colleagues, "Cost Models for Future Software Life Cycle Processes: COCOMO 2.0," in J. D. Arthur and S. M. Henry (editors) *Annals of Software Engineering Special Volume on Software Process and Product Measurement*, Amsterdam: J. C. Baltzer AG Science Publishers, 1995.

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## Managing Scope

- ☑ Scope creep
- ☑ JAD and prototyping
- ☑ Formal change approval
- ☑ Defer additional requirements as future system enhancements

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## Timeboxing

- ☑ Fixed deadline
- ☑ Reduced functionality, if necessary
- ☑ Fewer "finishing touches"

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## Timeboxing Steps

1. Set delivery date
  - ☑ Deadline should not be impossible
  - ☑ Should be set by development group
2. Prioritize features by importance
3. Build the system core
4. Postpone unfinished functionality
5. Deliver the system with core functionality
6. Repeat steps 3-5 to add refinements and enhancements

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## STAFFING THE PROJECT

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## Staffing Attributes

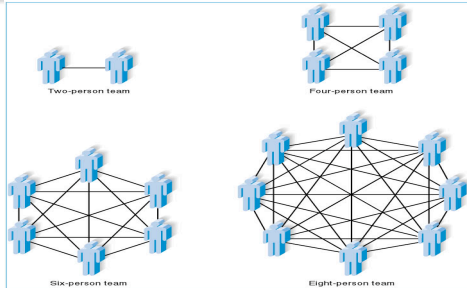
- ☑ Staffing levels will change over a project's lifetime
- ☑ Adding staff may add more overhead than additional labor
- ☑ Using teams of 8-10 reporting in a hierarchical structure can reduce complexity

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## Increasing Complexity with Larger Teams



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## Your Turn

- ☑ How do you know how many people to assign to a project?
- ☑ How do you know what special skills will be needed for completion of the project?

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## Key Definitions

- ☑ The **staffing plan** describes the kinds of people working on the project
- ☑ The **project charter** describes the project's objectives and rules
- ☑ A **functional lead** manages a group of analysts
- ☑ A **technical lead** oversees progress of programmers and technical staff members

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## Motivation

- ☑ Use monetary rewards cautiously
- ☑ Use intrinsic rewards
  - Recognition
  - Achievement
  - The work itself
  - Responsibility
  - Advancement
  - Chance to learn new skills

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## Handling Conflict

- ☑ Clearly define project plans
- ☑ Recognize project importance to organization
- ☑ Project charter listing norms and groundrules
- ☑ Develop schedule commitments ahead of time
- ☑ Forecast other priorities and their possible impact on the project

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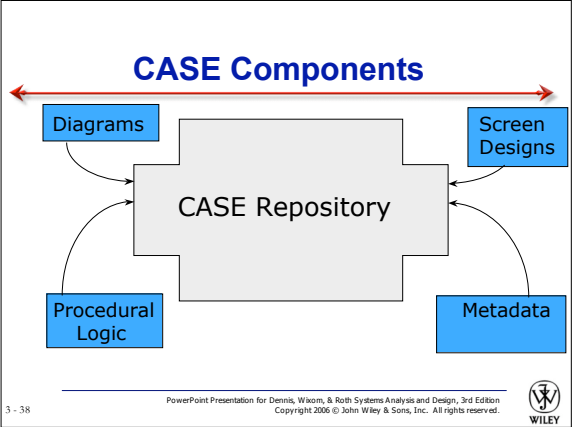
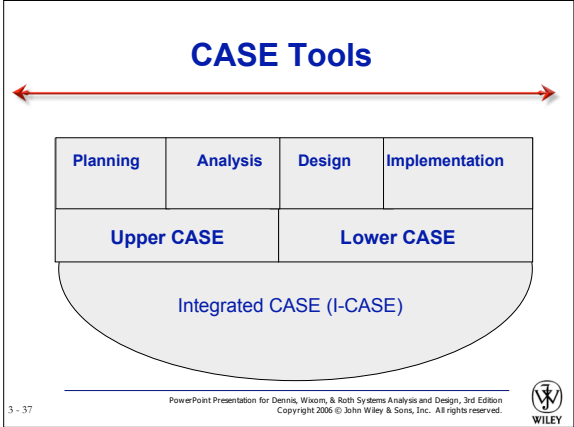


## COORDINATING PROJECT ACTIVITIES

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- ### Standards
- 
- ☑ *Examples*
    - Formal rules for naming files
    - Forms indicating goals reached
    - Programming guidelines
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- ### Documentation
- 
- ☑ Project binder
  - ☑ Table of contents
  - ☑ Continual updating
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- ### Managing Risk
- 
- ☑ Risk assessment
  - ☑ Actions to reduce risk
  - ☑ Revised assessment
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- ### Classic Mistakes
- 
- ☑ Overly optimistic schedule
  - ☑ Failing to monitor schedule
  - ☑ Failing to update schedule
  - ☑ Adding people to a late project
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## Summary

- ❑ Project management is critical to successful development of new systems
- ❑ Project management involves planning, controlling and reporting on time, labor, and costs.

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