

# **Systems Analysis and Design with UML Version 2.0**



## **Chapter 4 Project Management**

# Project Management



## Chapter 4

# 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.

# PM Steps

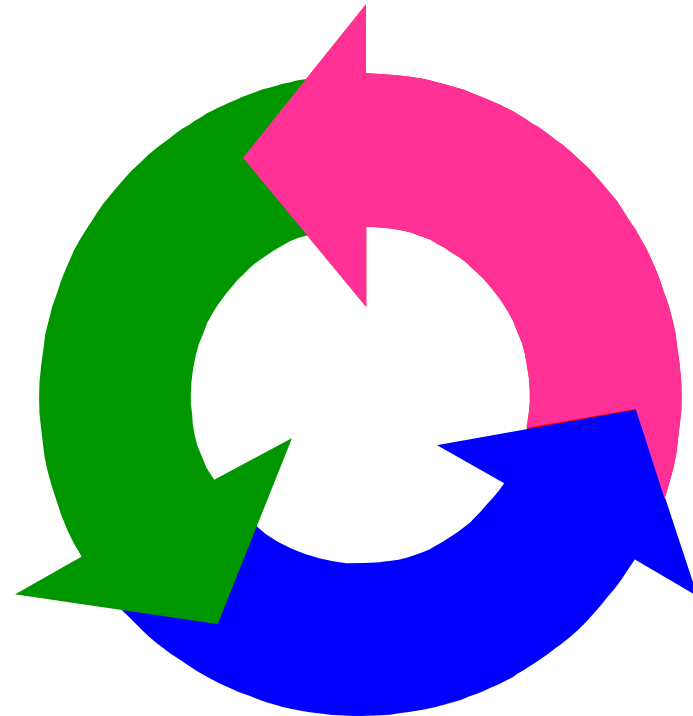


- Identifying the project sizes
  - Creating and Managing the workplan
  - Staffing the project.
  - Coordinating project activities
- ✓ Workplan, Staffing Plan, and Standards list

# Estimation Trade-offs

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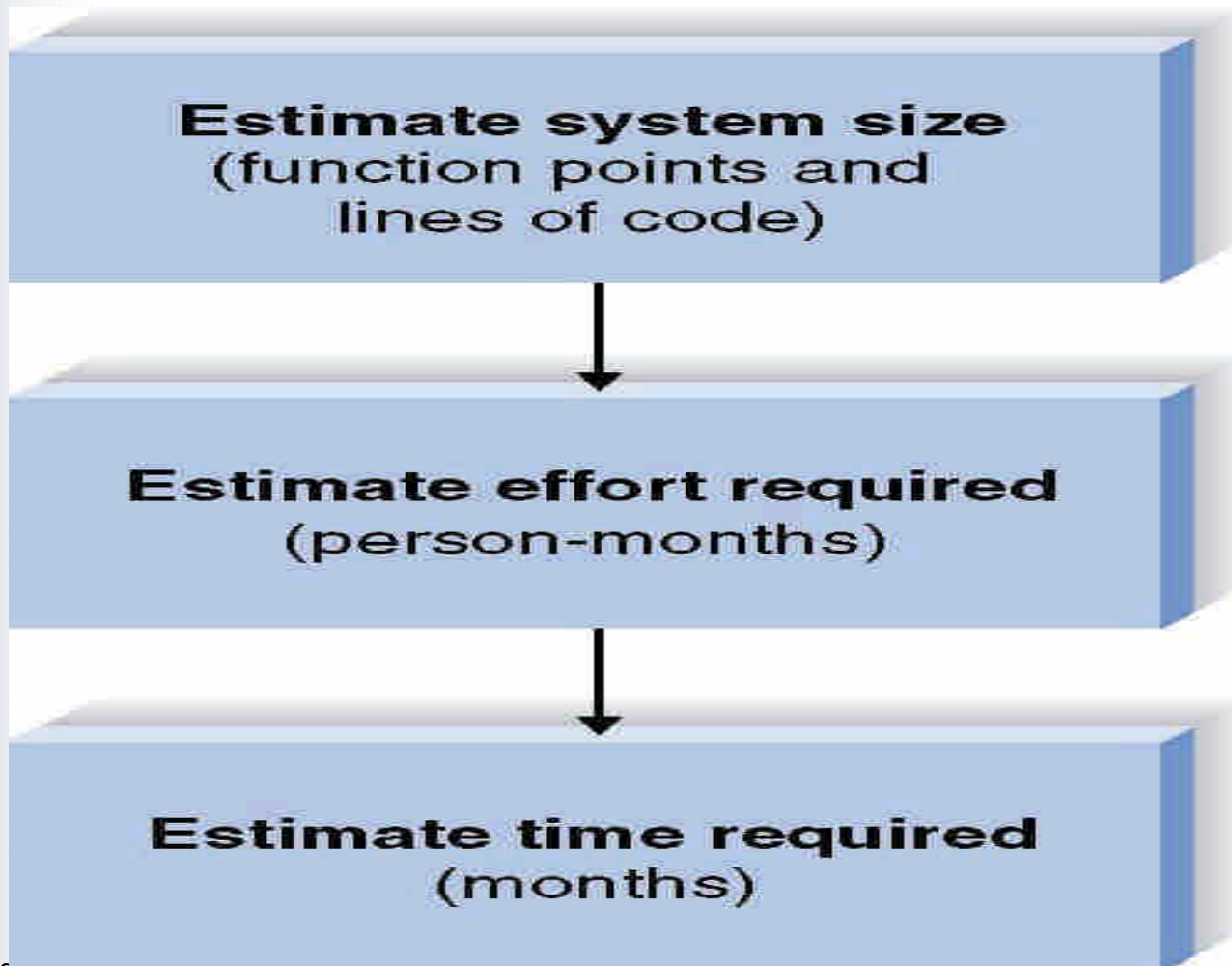
- ☑ Size
  - Function points
  - Lines of code
- ☑ Effort
  - Person-months
- ☑ Time
  - Months



# Estimating a Project Based on Industry Information

	Planning	Analysis	Design	Implementation
<b>Industry Standard For Web Applications</b>	<b>15%</b>	<b>20%</b>	<b>35%</b>	<b>30%</b>
<b>Time Required in Person Months</b>	<b>4</b>	<b>5.33</b>	<b>9.33</b>	<b>8</b>

# Time Estimation Using a More Complex Approach



# Function Point Estimation

## -- Step One

	Complexity			
Description	Low	Medium	High	Total
Inputs	__x 3	__x 4	__x 6	_____
Outputs	__x 4	__x 5	__x 7	_____
Queries	__x 3	__x 4	__x 6	_____
Files	__x 7	__x 10	__x 15	_____
Program Interfaces	__x 5	__x 7	__x 10	_____
TOTAL UNADJUSTED FUNCTION POINTS				_____



# Function Points Estimation

## -- Step Two

	Scale of 1 to 5
Data Communications	_____
Heavy Use Configuration	_____
Transaction Rate	_____
End-User efficiency	_____
Complex Processing	_____
Installation Ease	_____
Multiple sites	_____
Performance	_____
Distributed functions	_____
On-line data entry	_____
On-line update	_____
Reusability	_____
Operational Ease	_____
Extensibility	_____
Project Complexity (PC)	_____

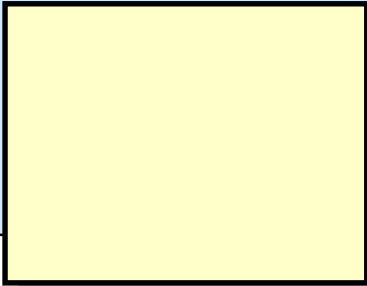
# Function Point Estimation

## -- Step Three



Processing Complexity (PC): \_\_\_\_\_  
(From Step 2)

Adjusted Processing  
Complexity (PCA) =  $0.65 + (0.001 * \text{_____})$

Total Adjusted  
Function Points: \_\_\_\_\_ \* \_\_\_\_\_ =   
(TUFP -- From Step 1)

# Function Points Estimation

## -- Step Four

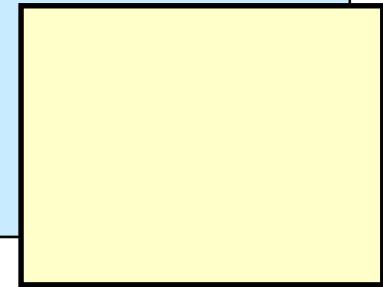
Adjusted Project Complexity

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

Total Adjusted Function Points

=

Adjusted Project Complexity \* TUFP →



# Converting Function Points to Lines of Code

Language	LOC/Function Code 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*

# Estimating Effort



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

# COCOMO Estimation Calculation



Effort = 1.4 \* thousands-of-  
(in Person- lines-of-code  
Months)

*Example:*

*If LOC = 2000 Then...*

*Effort = (1.4 \* 2000) = 28 Person Months*

# Estimating Schedule Time



- ☑ Rule of thumb for estimation

Schedule Time (months)

=

$3.0 * \text{person-months}^{1/3}$

# CREATING THE WORK PLAN





# A Workplan Example



Work Plan Information	Example
Name of task Start date Completion date Person assigned Deliverable(s) Completion status Priority Resources needed Estimated time Actual time	Perform economic feasibility Jan 05, 2001 Jan 19, 2001 Mary Smith, sponsor Cost-benefit analysis Open High Spreadsheet 16 hours 14.5 hours

# Identifying Tasks

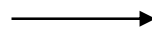


- ☑ Top-down approach
  - Identify highest level tasks
  - Break them into increasingly smaller units
- ☑ Methodology
  - Using standard list of tasks

# Top Down Task Identification



Phases



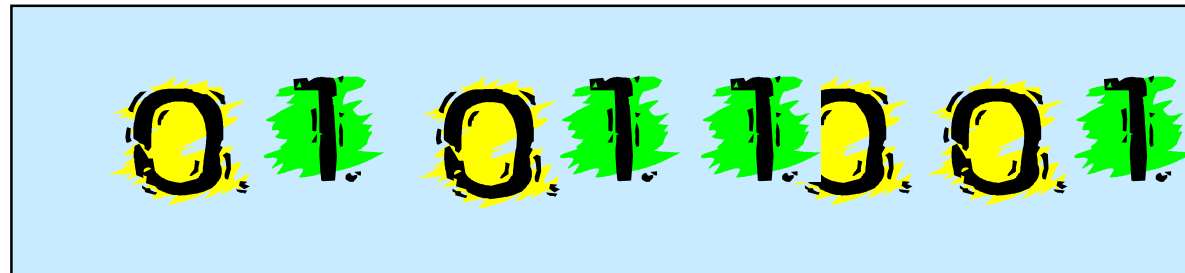
Phases with high level steps



Work Plan	Deliverables	Estimated hours	Actual hours	Assigned To
*				
*				
*				
*				

# Getting the Right Numbers for Estimation

- ☑ Prior projects
  - Past experience
  - Industry standards
- ☑ Detailed analysis

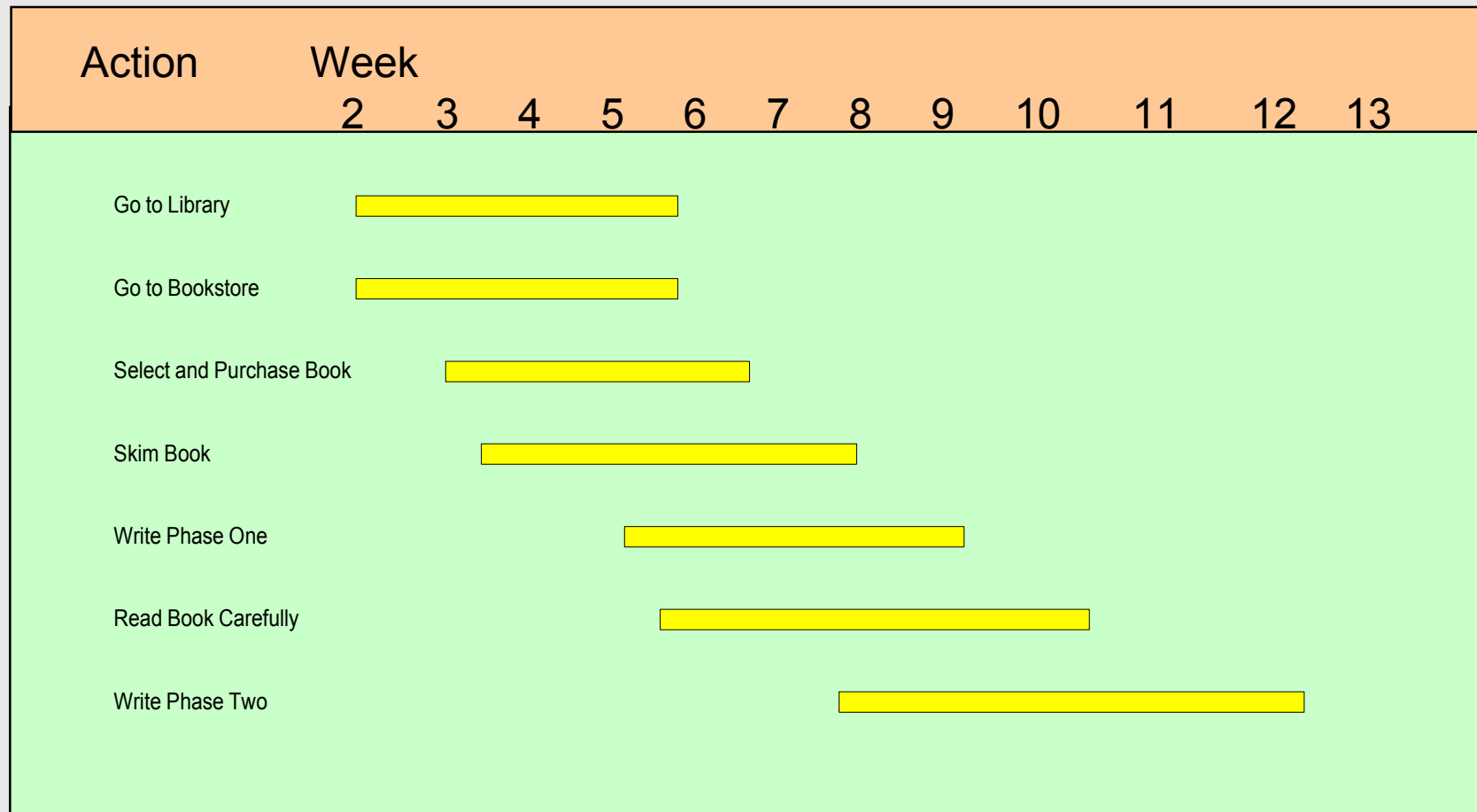


# Managing Scope

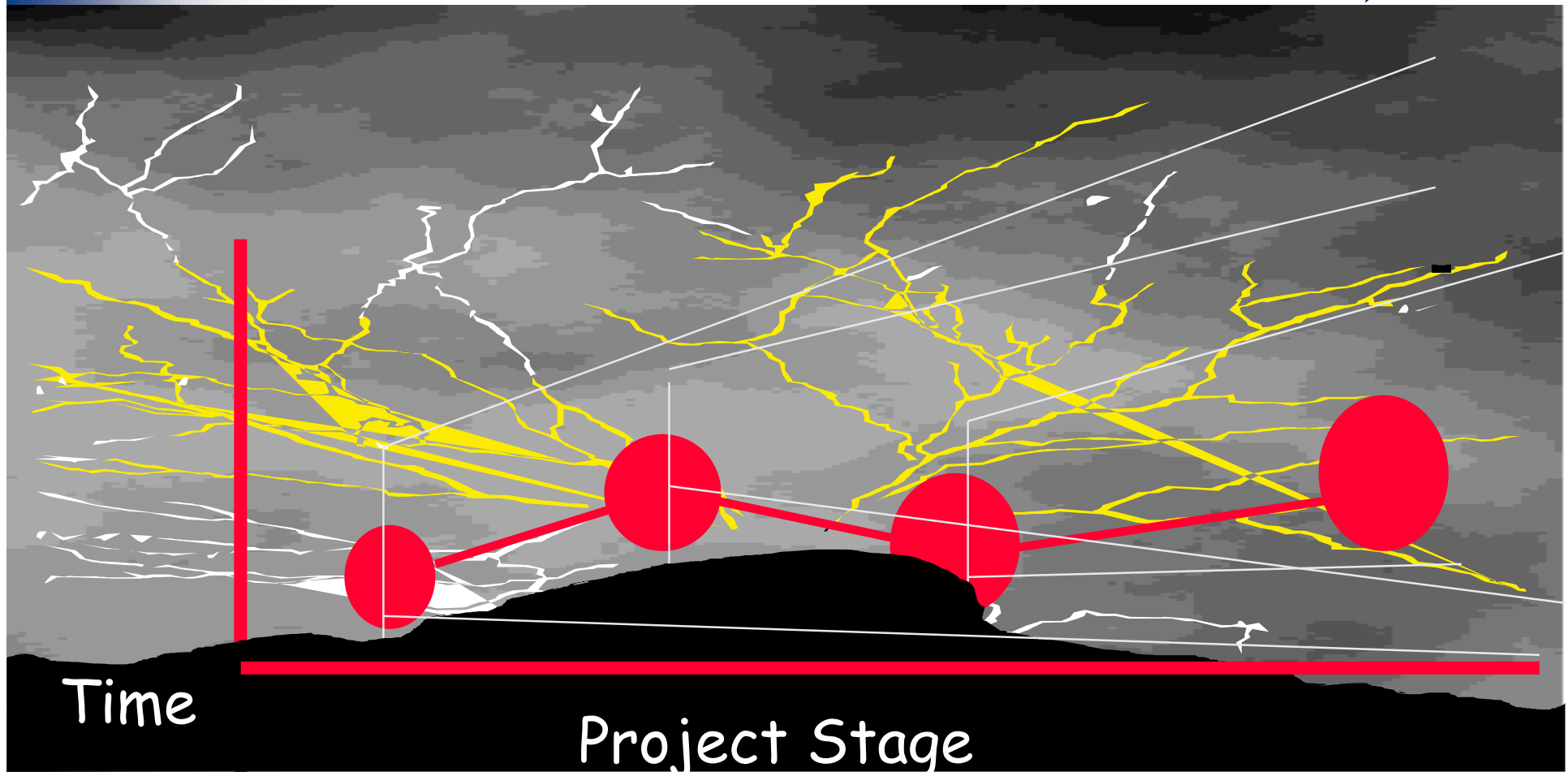


- ☒ Scope creep -- a major cause of development problems
  - JAD and prototyping
  - Formal change approval
  - Charging for changes

# Tracking Tasks Using Gantt Chart



# The Hurricane Model



# Margins of Error in Cost and Time Estimates

		Typical margins of Error for Well-done Estimates	
Phase	Deliverable	Cost (%)	time (%)
Planning	System Request	400	60
	Project Plan	100	25
Analysis	System Proposal	50	15
Design	System Specification	25	10
Source: Boehm et al. (1995)			



# Timeboxing



- ☑ Fixed deadline
- ☑ Reduced functionality, if necessary
- ☑ Fewer “finishing touches”
  - 80% versus 20%
  - 75% versus 25%

# Timeboxing Steps



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

# STAFFING THE PROJECT

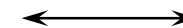
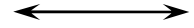


# Staffing Attributes



- ❑ 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

# Increasing Complexity with Larger Teams



# 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?

# 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

# Motivation



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



# Conflict Avoidance Strategies

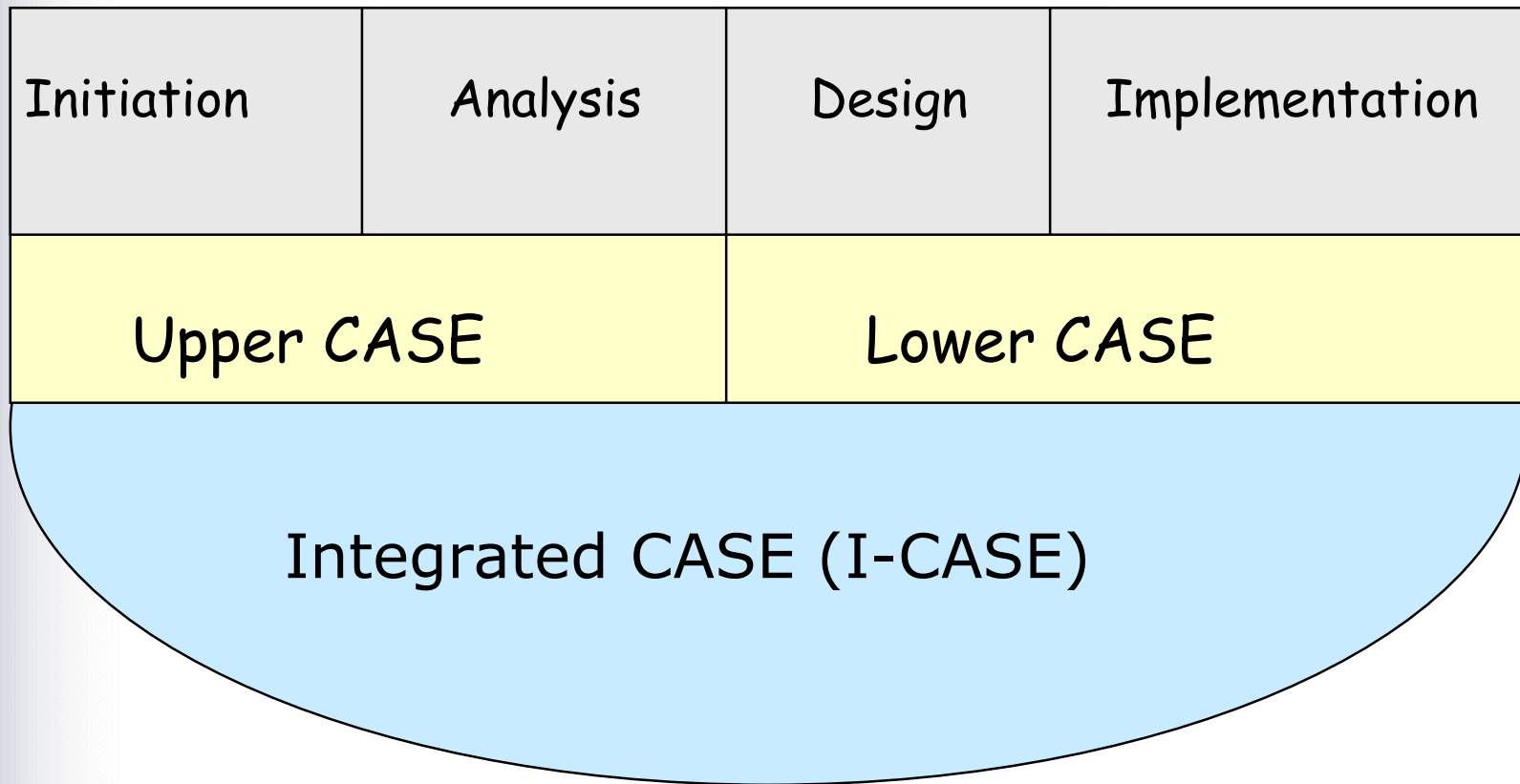


- ❑ Clearly define roles and project plans
- ❑ Hold individuals accountable
- ❑ Project charter listing norms and groundrules
- ❑ Develop schedule commitments ahead of time
- ❑ Forecast other priorities and their possible impact on the project

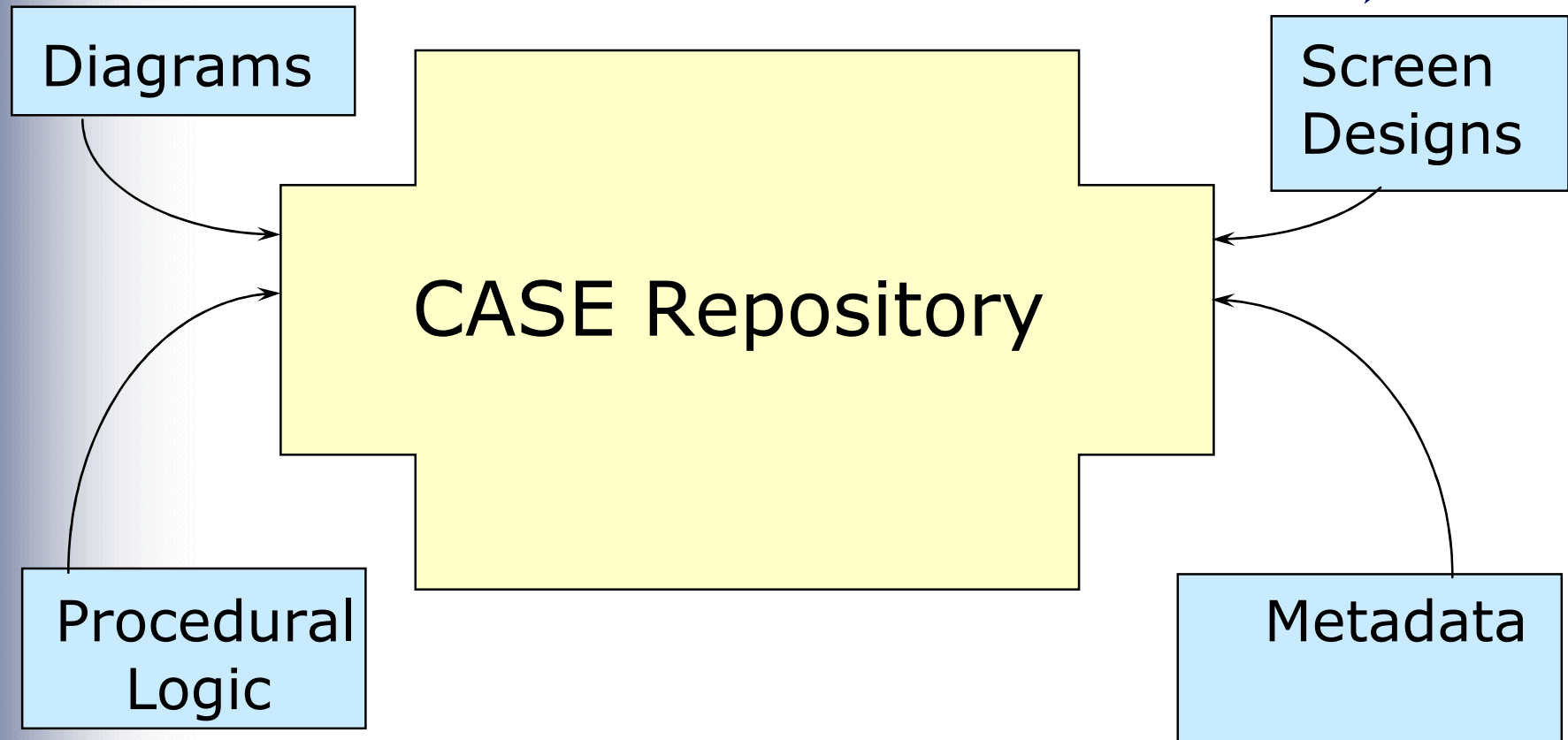
# **CONTROLLING AND DIRECTING THE PROJECT**



# CASE Tools



# CASE Components



# Standards



- ☒ *Examples*

- Formal rules for naming files
- Forms indicating goals reached
- Programming guidelines

# Documentation



- ☑ Project binder
- ☑ Table of contents
- ☑ Continual updating

# Managing Risk



- ☑ Risk assessment (**a document Fig4-20**)
- ☑ Actions to reduce risk
- ☑ Revised assessment

# Classic Mistakes



- ❑ Overly optimistic schedule
- ❑ Failing to monitor schedule
- ❑ Failing to update schedule
- ❑ Adding people to a late project



# Summary



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

# Expanding the Domain



- ✦ For more detail on project management, visit the project management institute and its special interest group on information systems:
  - [www.pmi.org](http://www.pmi.org)
  - [www.pmi-issig.org](http://www.pmi-issig.org)