ENGR3450 – Project Management

Week 5

The Project Planning

Scope, Schedule and Cost Management

İzmir, 2019

YAŞAR ÜNİVERSİTESİ
Mühendislik Fakültesi

Agenda today

- Project Scope Management
- Project Schedule Management
- Project Cost Management

Knowledge Areas & Project Management Process Groups Matrix

Knowledge Areas	Project Management Process Groups				
	Initiating	Planning	Executing	Monitoring & Control	Closing
1. Project Integration Management	a. Develop Project Charter	b. Develop Project Management Plan	c. Direct and Manage Project Work d. Manage Project Knowledge	e. Monitor and Control Project Work f. Perform Integrated Change Control	g. Close Project or Phase
2. Project Scope Management		a. Plan Scope Management b. Collect Requirements c.Define Scope d. Create WBS		e. Validate Scope f. Control Scope	
3. Project Schedule Management		a. Plan Schedule Management b. Define Activities c. Sequence Activities d. Estimate Activity Durations e. Develop Schedule		f. Control Schedule	
4. Project Cost Management		a. Plan Cost Management b. Estimate Costs c. Determine Budget		d. Control Costs	
5. Project Quality Management		a. Plan Quality Management	b. Manage Quality	c. Control Quality	
6. Project Resource Management		a. Plan Resource Management b. Estimate Activity Resources	c. Acquire Resources d. Develop Team e. Manage Team	f. Control Resources	
7. Project Communcations Management		a. Plan Communcations Management	b. Manage Communications	c. Monitor Communications	
8. Project Risk Management		a. Plan Resource Management b. Identify Risks c. Perform Qualitative Risk Analysis d. Perform Quantitative Risk Analysis e. Plan Risk Responses	f. Implement Risk Responses	g. Monitor Risks	
9. Project Procurement Management		a. Plan Procurement Management Plan	b. Conduct Procurements	c. Control Procurements	
10. Stakeholder Management	a. Identify Stakeholders	b. Plan Stakeholder Engagement	c. Manage Stakeholder Engagement	d. Monitor Stakeholder Engagement	

Project Scope Management

		Project Management Process Groups				
		Initiating	**Planning**	**Executing**	**Monitoring & Control**	**Closing**
e Areas	**1. Project Integration Management**	a. Develop Project Charter	b. Develop Project Management Plan	c. Direct and Manage Project Work d. Manage Project Knowledge	e. Monitor and Control Project Work f. Perform Integrated Change Control	g. Close Project or Phase
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	4. Project Cost Management		a. Plan Cost Management b. Estimate Costs c. Determine Budget		d. Control Costs	

Scope Management processes

- Planning Process Group:
  - Collect Requirements

    (stakeholder needs and requirements to meet project objectives)

  - Define Scope

    (Detailed description of the project and product.)

  - Create WBS (Look at Previous week)

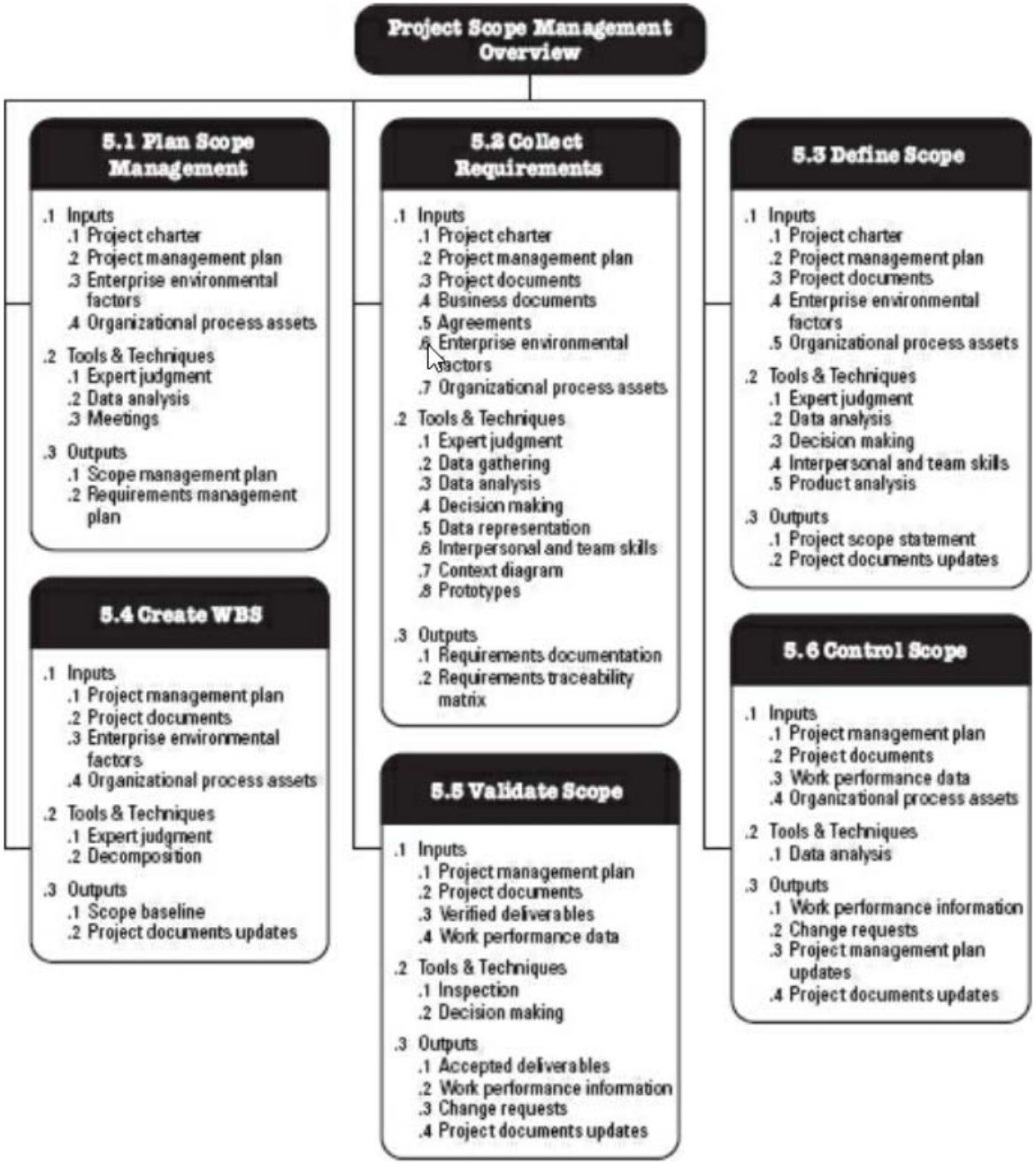
    (The process of subdividing project deliverables and project work into smaller, more manageable components.)

Scope Management processes

- Monitoring & Control Process Group:
  - Validate Scope

    (Formalizing acceptance of the completed project deliverables)
  - Control Scope

    (The process of monitoring the status of the project and product scope and managing changes to the scope baseline).


Project Scope Management Overview
5.1 Plan Scope Management
.1 Inputs
.1 Project charter
.2 Project management plan
.3 Enterprise environmental factors
.4 Organizational process assets
.2 Tools & Techniques
.1 Expert judgment
.2 Data analysis
.3 Meetings
.3 Outputs
.1 Scope management plan
.2 Requirements management plan
5.2 Collect Requirements
.1 Inputs
.1 Project charter
.2 Project management plan
.3 Project documents
.4 Business documents
.5 Agreements
.6 Enterprise environmental factors
.7 Organizational process assets
.2 Tools & Techniques
.1 Expert judgment
.2 Data gathering
.3 Data analysis
.4 Decision making
.5 Data representation
.6 Interpersonal and team skills
.7 Context diagram
.8 Prototypes
.3 Outputs
.1 Requirements documentation
.2 Requirements traceability matrix
5.3 Define Scope
.1 Inputs
.1 Project charter
.2 Project management plan
.3 Project documents
.4 Enterprise environmental factors
.5 Organizational process assets
.2 Tools & Techniques
.1 Expert judgment
.2 Data analysis
.3 Decision making
.4 Interpersonal and team skills
.5 Product analysis
.3 Outputs
.1 Project scope statement
.2 Project documents updates
5.4 Create WBS
.1 Inputs
.1 Project management plan
.2 Project documents
.3 Enterprise environmental factors
.4 Organizational process assets
.2 Tools & Techniques
.1 Expert judgment
.2 Decomposition
.3 Outputs
.1 Scope baseline
.2 Project documents updates
5.5 Validate Scope
.1 Inputs
.1 Project management plan
.2 Project documents
.3 Verified deliverables
.4 Work performance data
.2 Tools & Techniques
.1 Inspection
.2 Decision making
.3 Outputs
.1 Accepted deliverables
.2 Work performance information
.3 Change requests
.4 Project documents updates
5.6 Control Scope
.1 Inputs
.1 Project management plan
.2 Project documents
.3 Work performance data
.4 Organizational process assets
.2 Tools & Techniques
.1 Data analysis
.3 Outputs
.1 Work performance information
.2 Change requests
.3 Project management plan updates
.4 Project documents updates

Scope

- Product scope:

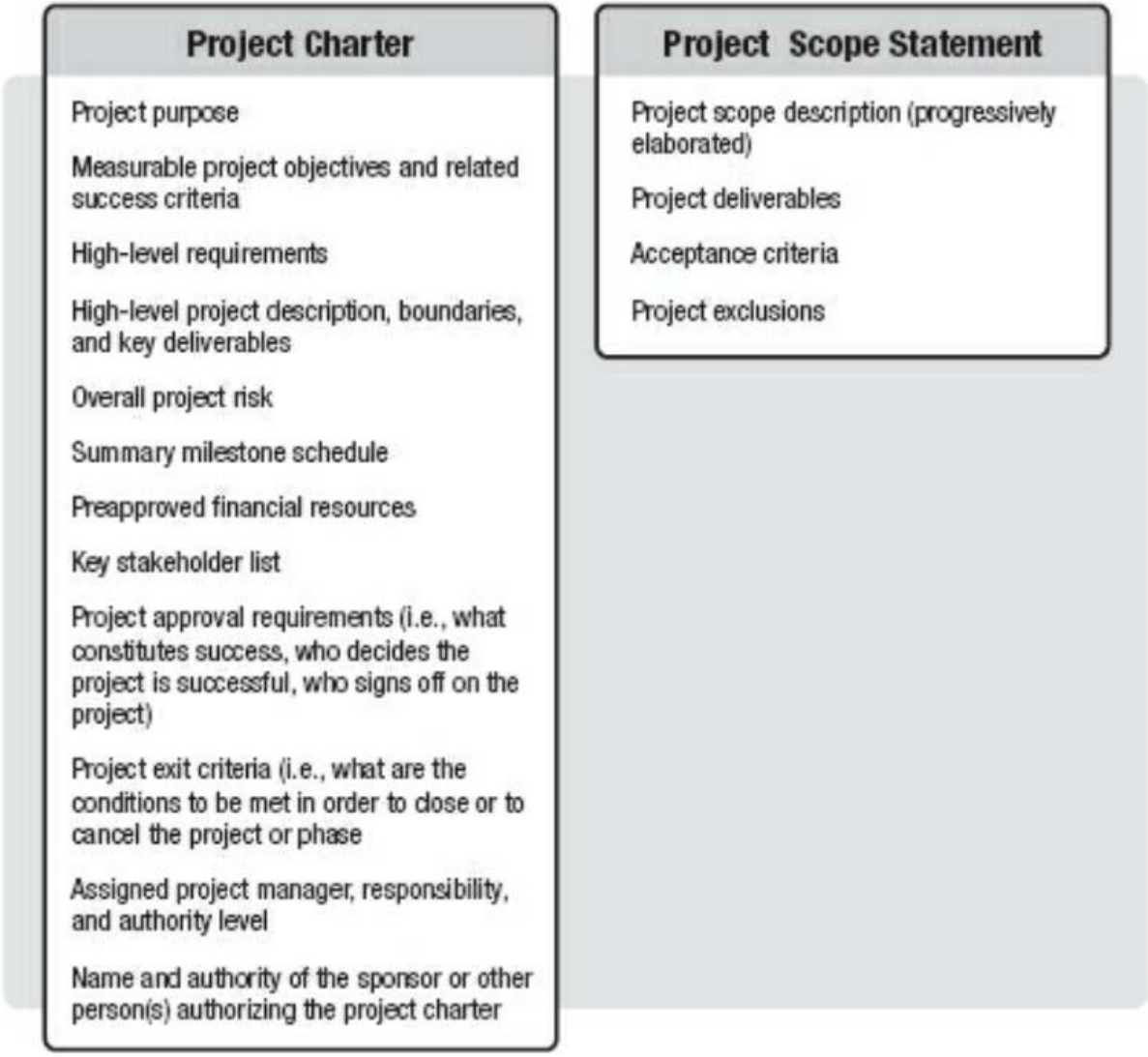
  The features and functions that characterize a product, service, or result.

- Project scope.

  The work performed to deliver a product, service, or result with the specified features and functions. The term “project scope” is sometimes viewed as including product scope.

Define Scope

Project Charter and Scope



Create WBS

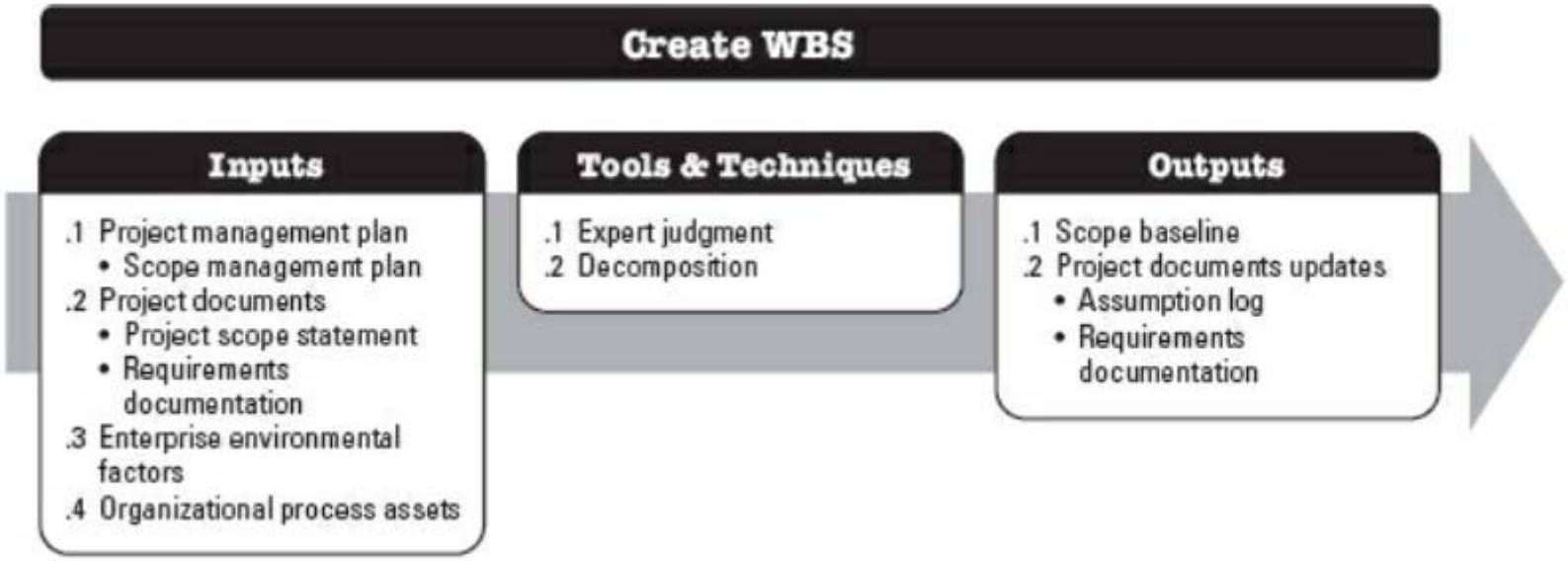


Figure 5-10. Create WBS: Inputs, Tools & Techniques, and Outputs

Project Schedule Management

e Areas	Project Management Process Groups				
	Initiating	**Planning**	**Executing**	**Monitoring & Control**	**Closing**
1. Project Integration Management	a. Develop Project Charter	b. Develop Project Management Plan	c. Direct and Manage Project Work d. Manage Project Knowledge	e. Monitor and Control Project Work f. Perform Integrated Change Control	g. Close Project or Phase
2. Project Scope Management		a. Plan Scope Management b. Collect Requirements c.Define Scope d. Create WBS		e. Validate Scope f. Control Scope	
3. Project Schedule Management		a. Plan Schedule Management b. Define Activities c. Sequence Activities d. Estimate Activity Durations e. Develop Schedule		f. Control Schedule	
4. Project Cost Management		a. Plan Cost Management b. Estimate Costs c. Determine Budget		d. Control Costs	

Schedule Management Process

- Planning Process Group:
  - Define Activities

    The process of identifying and documenting the specific actions to be performed to produce the project deliverables.
  - Sequence Activities

    The process of identifying and documenting relationships among the project activities.
  - Estimate Activity Durations

    The process of estimating the number of work periods needed to complete individual activities with the estimated resources.
  - Develop Schedule

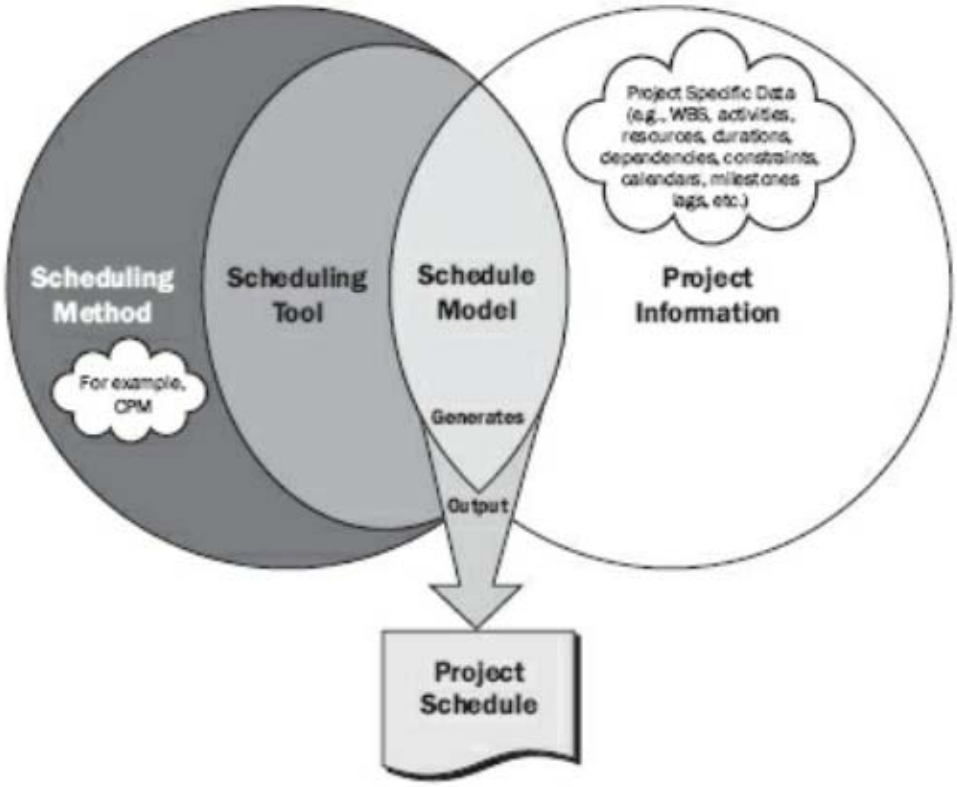
    The process of analyzing activity sequences, durations, resource requirements, and schedule constraints to create the project schedule model for project execution and monitoring and controlling.

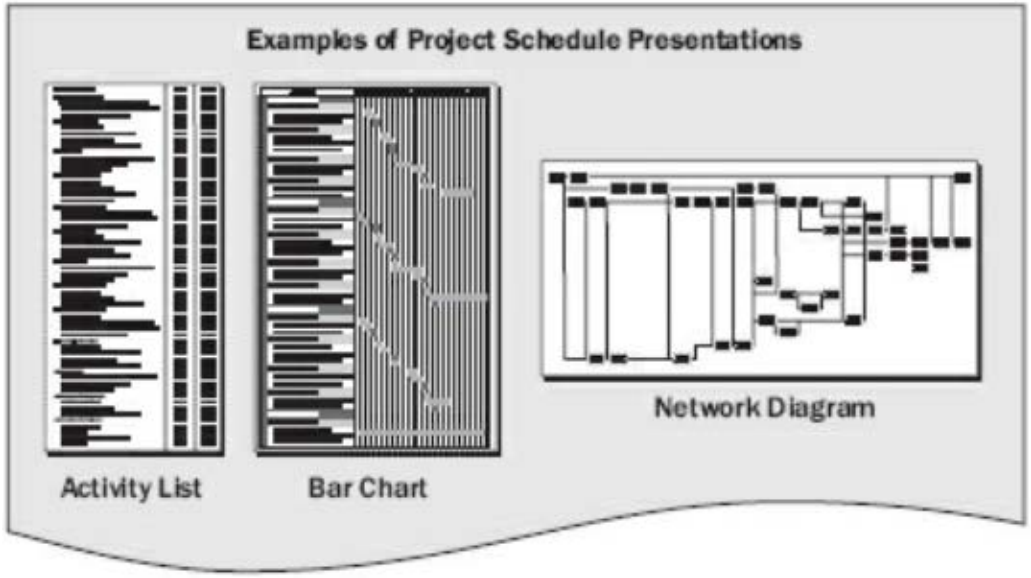
Schedule Management Process

- Monitoring & Control Process Group:
  - Control Schedule


Project Schedule Management Overview
6.1 Plan Schedule Management
.1 Inputs
.1 Project charter
.2 Project management plan
.3 Enterprise environmental factors
.4 Organizational process assets
.2 Tools & Techniques
.1 Expert judgment
.2 Data analysis
.3 Meetings
.3 Outputs
.1 Schedule management plan
6.2 Define Activities
.1 Inputs
.1 Project management plan
.2 Enterprise environmental factors
.3 Organizational process assets
.2 Tools & Techniques
.1 Expert judgment
.2 Decomposition
.3 Rolling wave planning
.4 Meetings
.3 Outputs
.1 Activity list
.2 Activity attributes
.3 Milestone list
.4 Change requests
.5 Project management plan updates
6.3 Sequence Activities
.1 Inputs
.1 Project management plan
.2 Project documents
.3 Enterprise environmental factors
.4 Organizational process assets
.2 Tools & Techniques
.1 Precedence diagramming method
.2 Dependency determination and integration
.3 Leads and lags
.4 Project management information system
.3 Outputs
.1 Project schedule network diagrams
.2 Project documents updates
6.4 Estimate Activity Durations
.1 Inputs
.1 Project management plan
.2 Project documents
.3 Enterprise environmental factors
.4 Organizational process assets
.2 Tools & Techniques
.1 Expert judgment
.2 Analogous estimating
.3 Parametric estimating
.4 Three-point estimating
.5 Bottom-up estimating
.6 Data analysis
.7 Decision making
.8 Meetings
.3 Outputs
.1 Duration estimates
.2 Basis of estimates
.3 Project documents updates
6.5 Develop Schedule
.1 Inputs
.1 Project management plan
.2 Project documents
.3 Agreements
.4 Enterprise environmental factors
.5 Organizational process assets
.2 Tools & Techniques
.1 Schedule network analysis
.2 Critical path method
.3 Resource optimization
.4 Data analysis
.5 Leads and lags
.6 Schedule compression
.7 Project management information system
.8 Agile release planning
.3 Outputs
.1 Schedule baseline
.2 Project schedule
.3 Schedule data
.4 Project calendars
.5 Change requests
.6 Project management plan updates
.7 Project documents updates
6.6 Control Schedule
.1 Inputs
.1 Project management plan
.2 Project documents
.3 Work performance data
.4 Organizational process assets
.2 Tools & Techniques
.1 Data analysis
.2 Critical path method
.3 Project management information system
.4 Resource optimization
.5 Leads and lags
.6 Schedule compression
.3 Outputs
.1 Work performance information
.2 Schedule forecasts
.3 Change requests
.4 Project management plan updates
.5 Project documents updates

Scheduling Overview





PMBOK®

Define activities

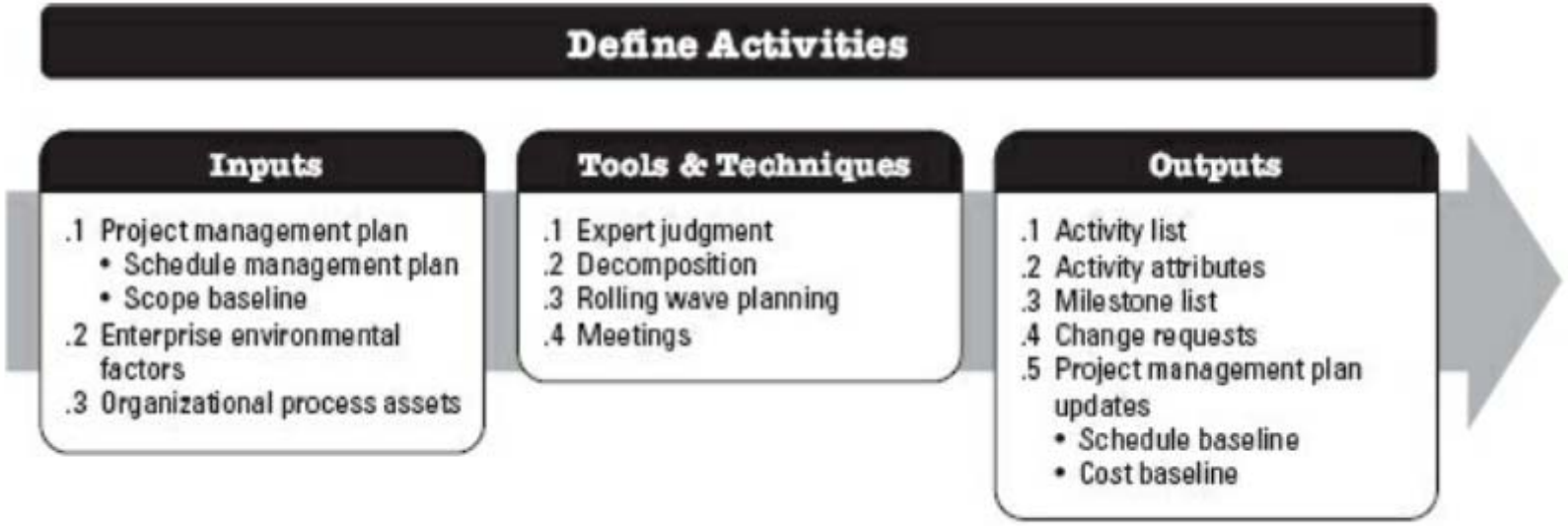


Figure 6-5. Define Activities: Inputs, Tools & Techniques, and Outputs

Sequence activities

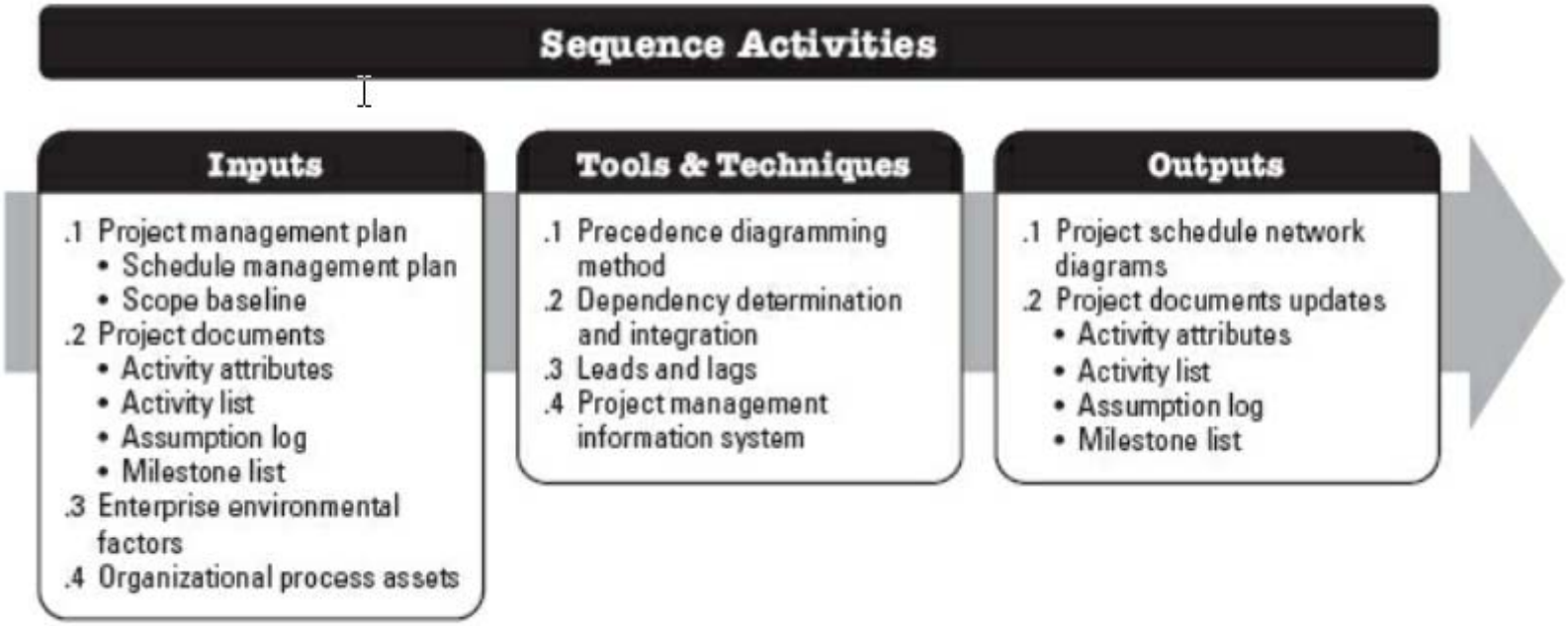


Figure 6-7. Sequence Activities: Inputs, Tools & Techniques, and Outputs

Sequence activities

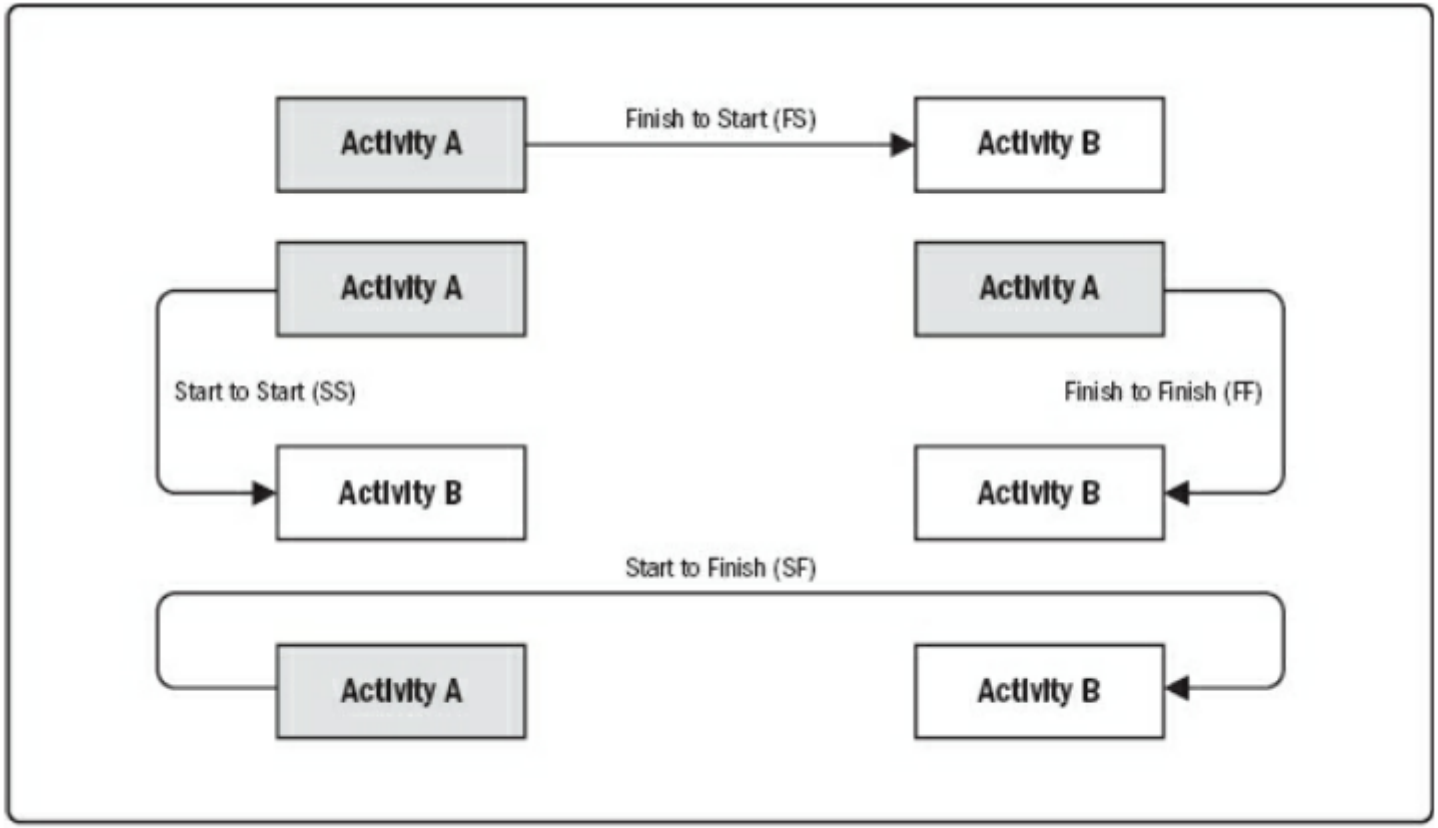


Figure 6-9. Precedence Diagramming Method (PDM) Relationship Types

Sequence activities

- Finish-to-start (FS).

  A logical relationship in which a successor activity cannot start until a predecessor activity has finished. For example, installing the operating system on a PC (successor) cannot start until the PC hardware is assembled (predecessor).

- Finish-to-finish (FF).

  A logical relationship in which a successor activity cannot finish until a predecessor activity has finished. For example, writing a document (predecessor) is required to finish before editing the document (successor) can finish.

Sequence activities

- Start-to-start (SS).

  A logical relationship in which a successor activity cannot start until a predecessor activity has started. For example, level concrete (successor) cannot begin until pour foundation (predecessor) begins.

- Start-to-finish (SF).

  A logical relationship in which a successor activity cannot finish until a predecessor activity has started. For example, a new accounts payable system (successor) has to start before the old accounts payable system can be shut down (predecessor).

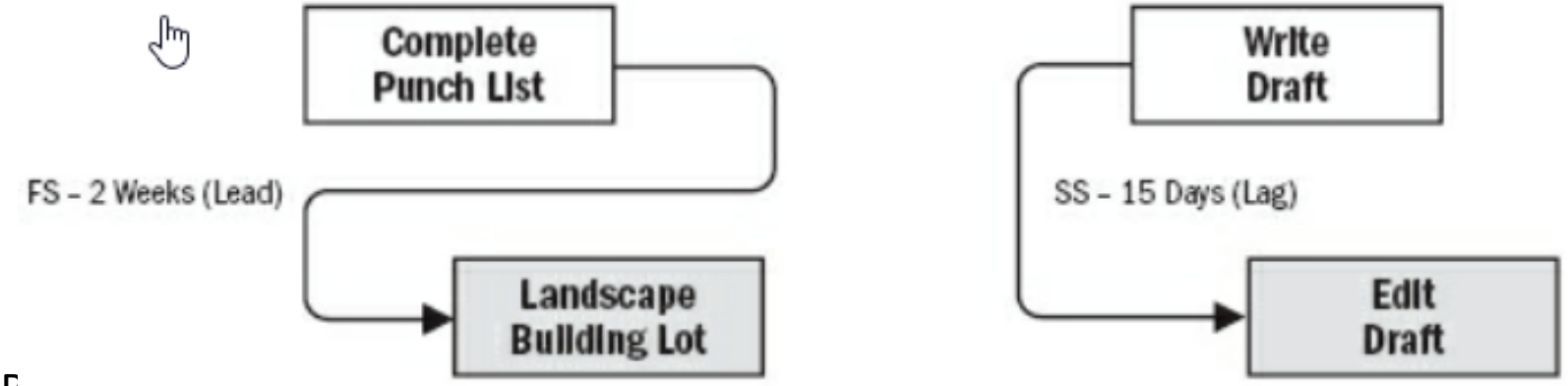
Leads and Lags

- A lead is the amount of time a successor activity can be advanced with respect to a predecessor activity.

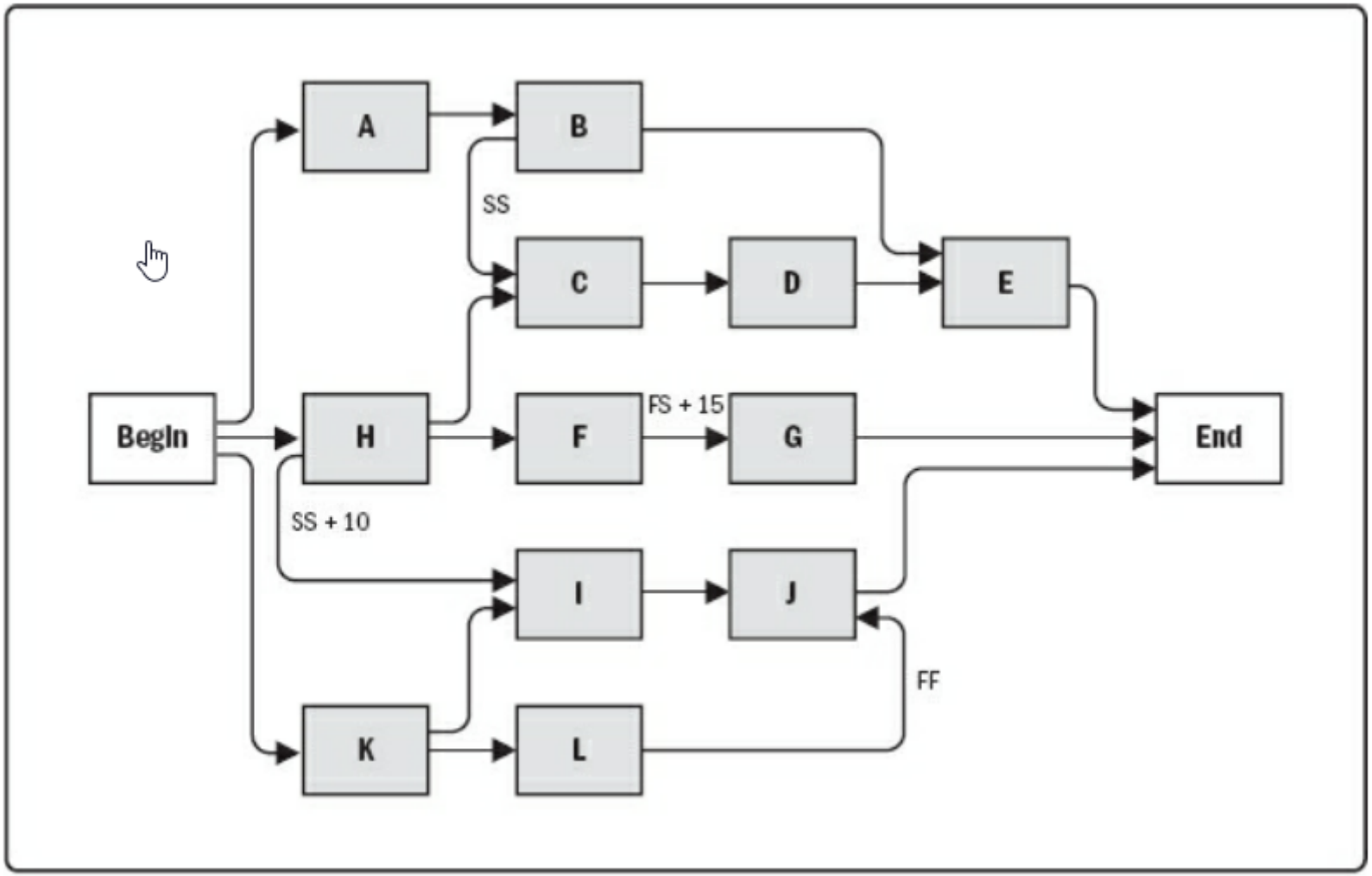
  For example, on a project to construct a new office building, the landscaping could be scheduled to start 2 weeks prior to the scheduled punch list completion.

- A lag is the amount of time a successor activity will be delayed with respect to a predecessor activity.

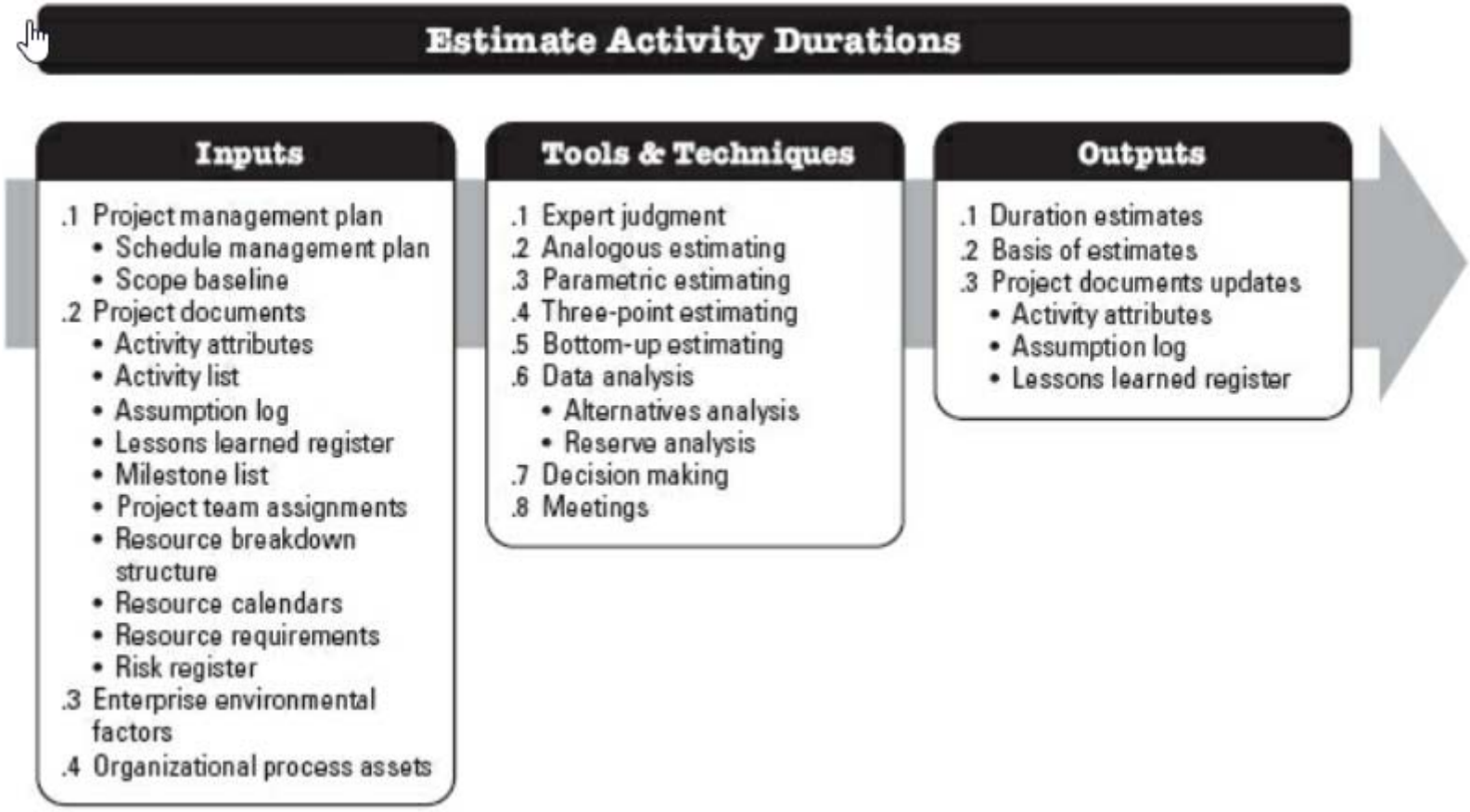
  For example, a technical writing team may begin editing the draft of a large document 15 days after they begin writing it.



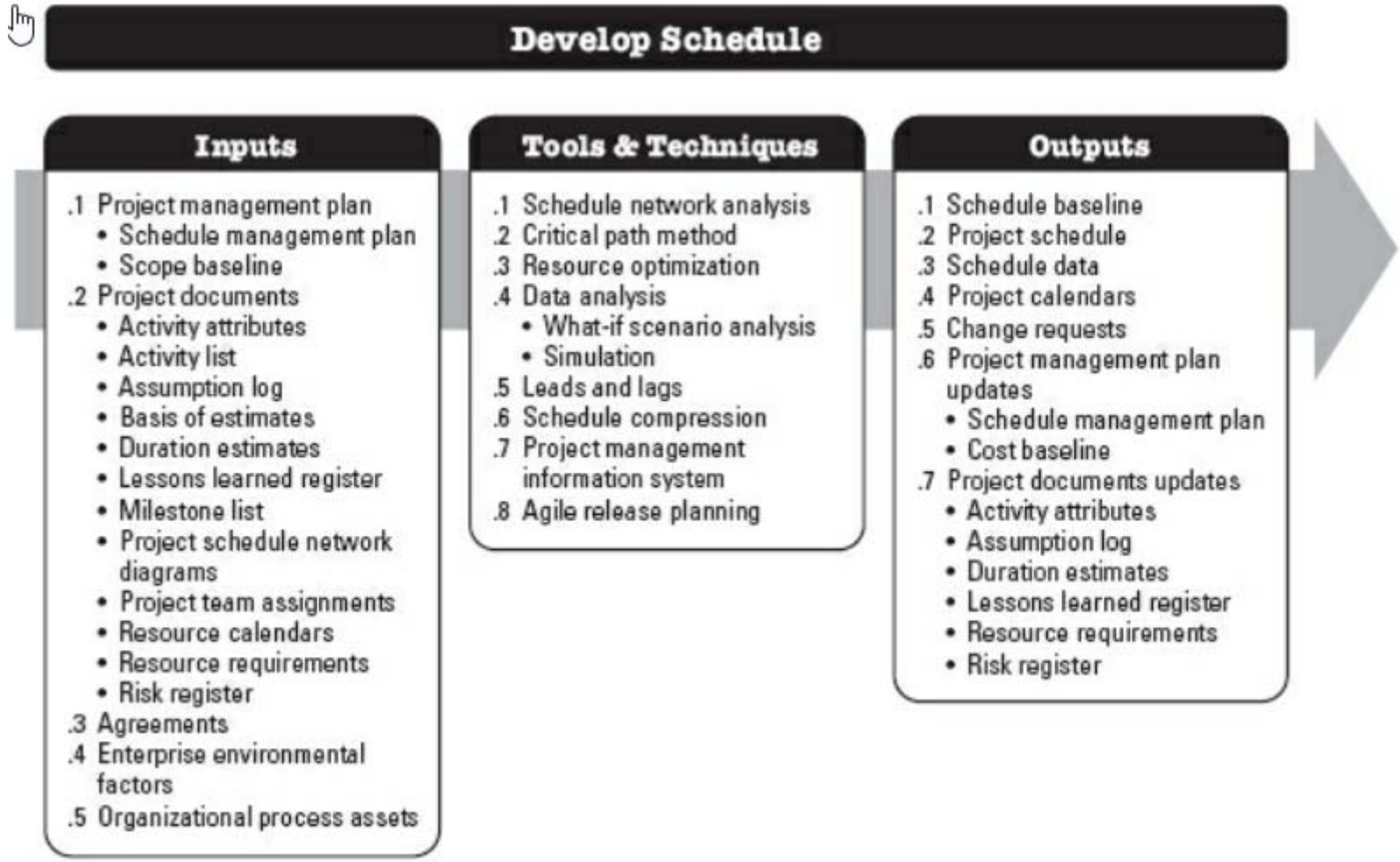
Project Schedule
Network Diagram



Estimate Task Durations



Develop Schedule



Develop Schedule

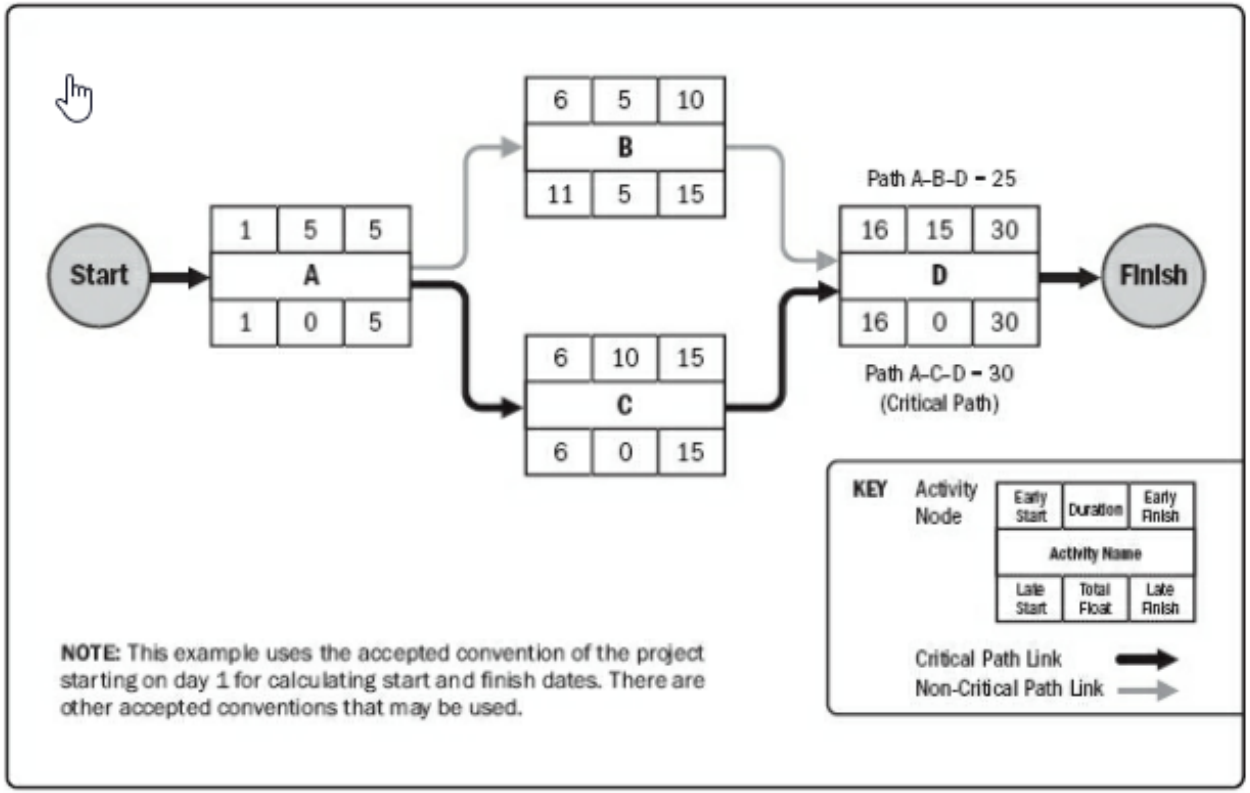


Figure 6-16. Example of Critical Path Method

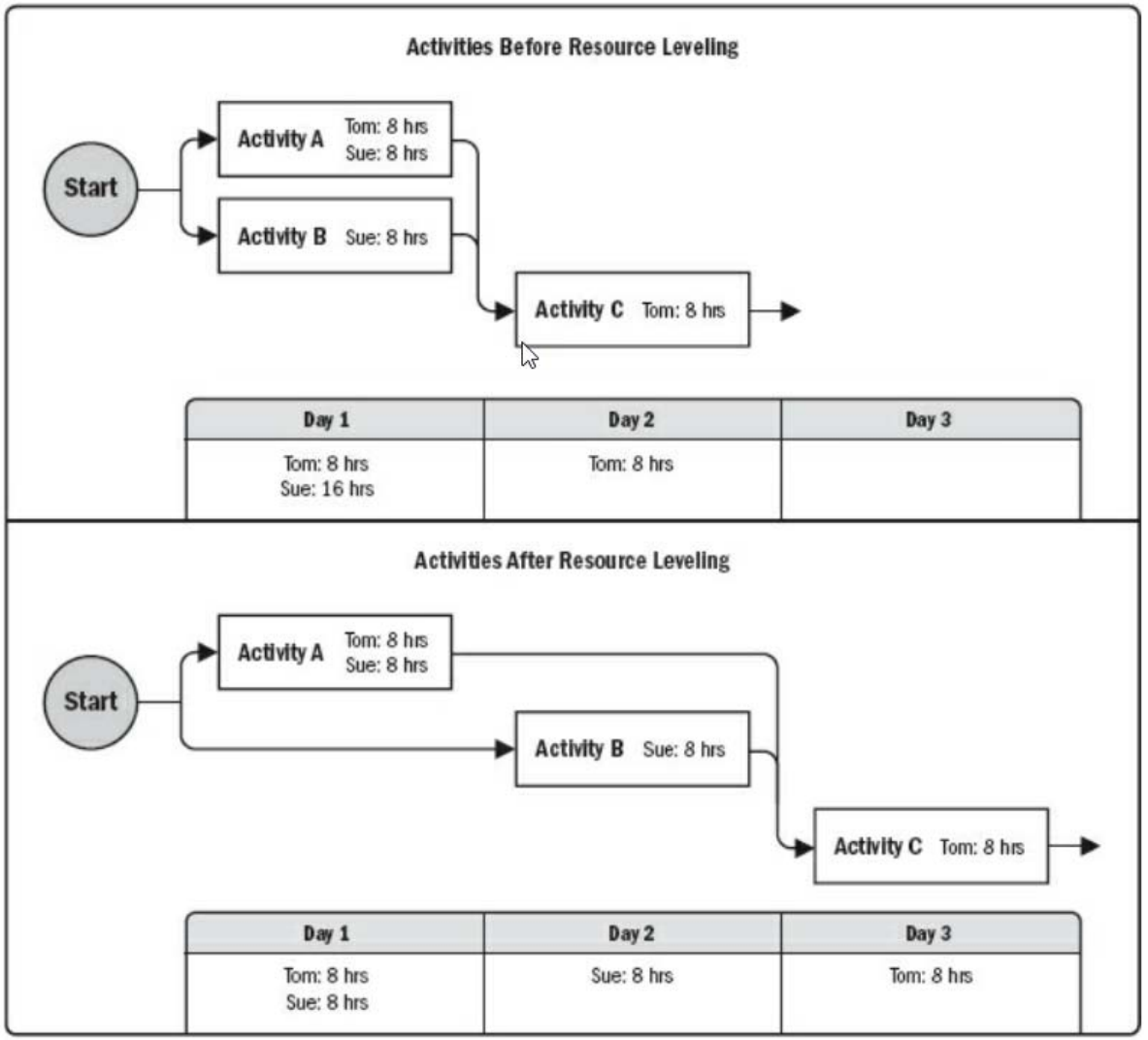
Resource Optimization

- Resource leveling.
  - A technique in which start and finish dates are adjusted based on resource constraints with the goal of balancing the demand for resources with the available supply.
  - Consequently, the critical path through the project schedule may change.

Resource Optimization

- Resource smoothing.
  - A technique that adjusts the activities of a schedule model such that the requirements for resources on the project do not exceed certain predefined resource limits.
  - Critical path is not changed.
  - Resource smoothing may not be able to optimize all resources.

Resource Levelling



Schedule Compression

- Crashing.
  - A technique used to shorten the schedule duration for the least incremental cost by adding resources.
    - Ex: Approving overtime, bringing in additional resources, or paying to expedite delivery to activities on the critical path.
    - Crashing works only for activities on the critical path where additional resources will shorten the activity's duration.
    - May result in increased risk and/or cost.

Schedule Compression

- Fast tracking.
  - A schedule compression technique in which activities or phases normally done in sequence are performed in parallel for at least a portion of their duration.
    - Ex: Constructing the foundation for a building before completing all of the architectural drawings.
    - Fast tracking may result in rework and increased risk.
    - Fast tracking only works when activities can be overlapped to shorten the project duration on the critical path.
    - Using leads in case of schedule acceleration usually increases coordination efforts between the activities concerned and increases quality risk.
    - Fast tracking may also increase project costs.

Schedule Compression

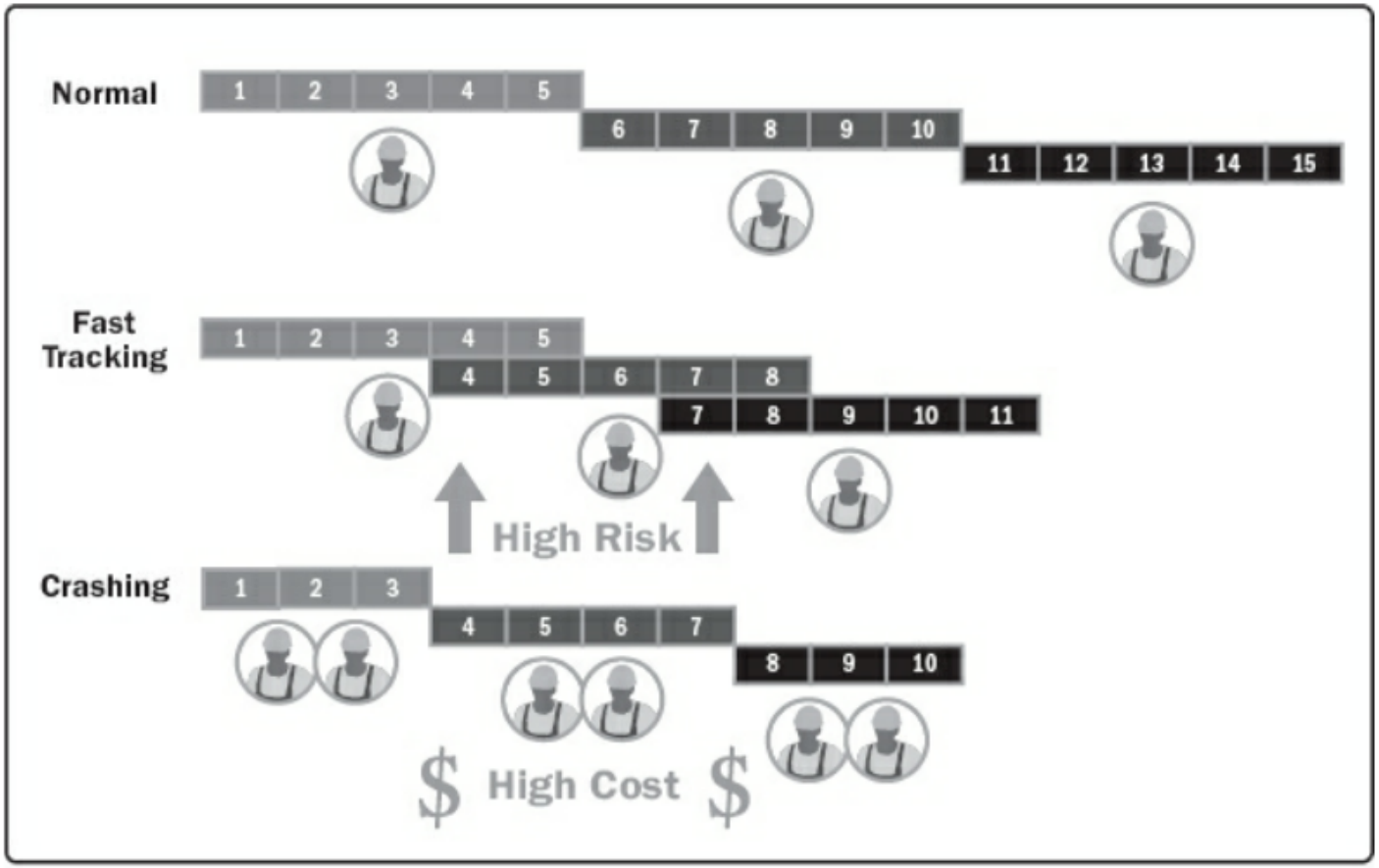


Figure 6-19. Schedule Compression Comparison

Schedule Control

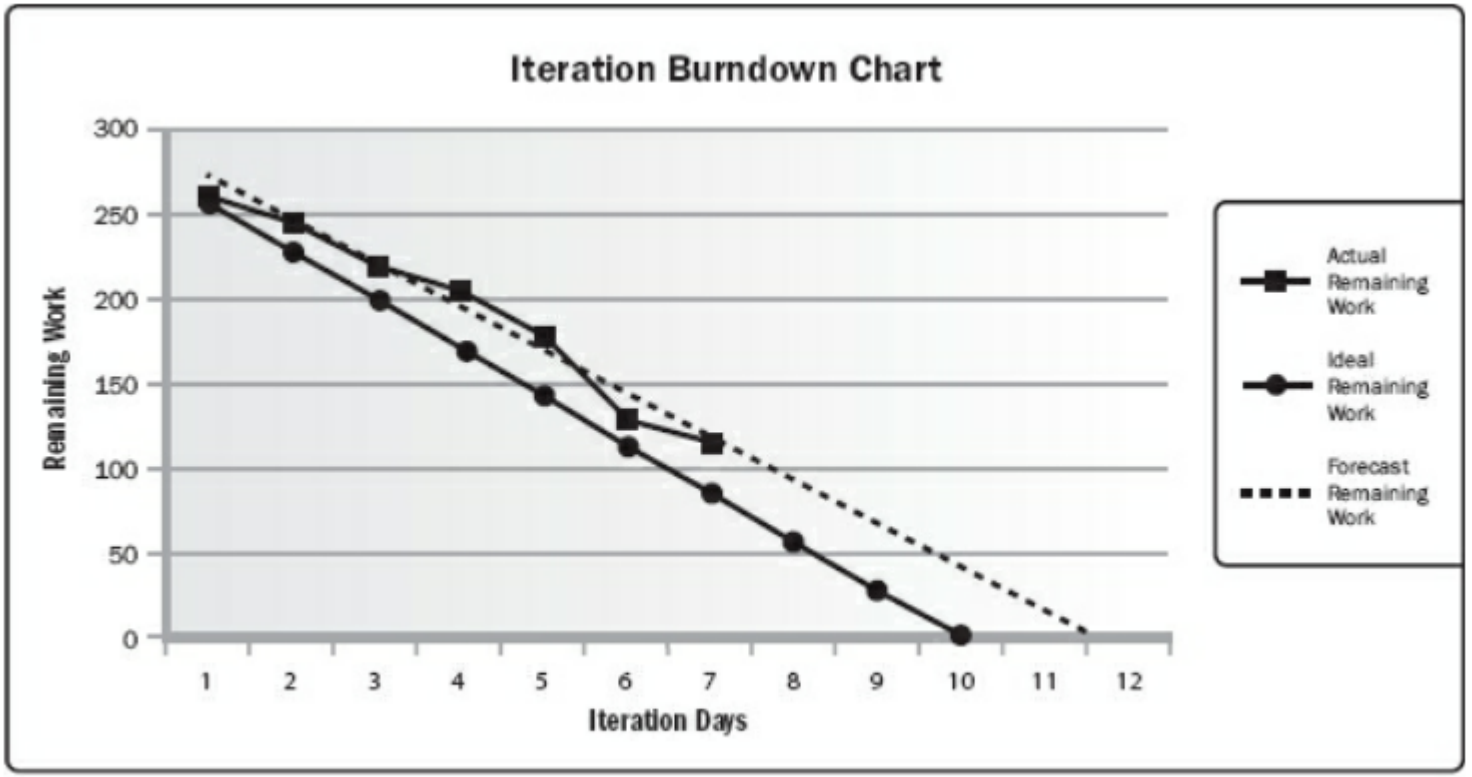


Figure 6-24. Iteration Burndown Chart

Project Cost Management

		Project Management Process Groups				
		Initiating	**Planning**	**Executing**	**Monitoring & Control**	**Closing**
e Areas	**1. Project Integration Management**	a. Develop Project Charter	b. Develop Project Management Plan	c. Direct and Manage Project Work d. Manage Project Knowledge	e. Monitor and Control Project Work f. Perform Integrated Change Control	g. Close Project or Phase
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	3. Project Schedule Management		a. Plan Schedule Management b. Define Activities c. Sequence Activities d. Estimate Activity Durations e. Develop Schedule		f. Control Schedule	
	4. Project Cost Management		a. Plan Cost Management b. Estimate Costs c. Determine Budget		d. Control Costs	

Project Cost Management

- Planning Process Group:
  - Plan Cost Management
  - Estimate Costs
  - Determine Budget
- Monitoring & Control Process Group:
  - Control

Estimate Costs

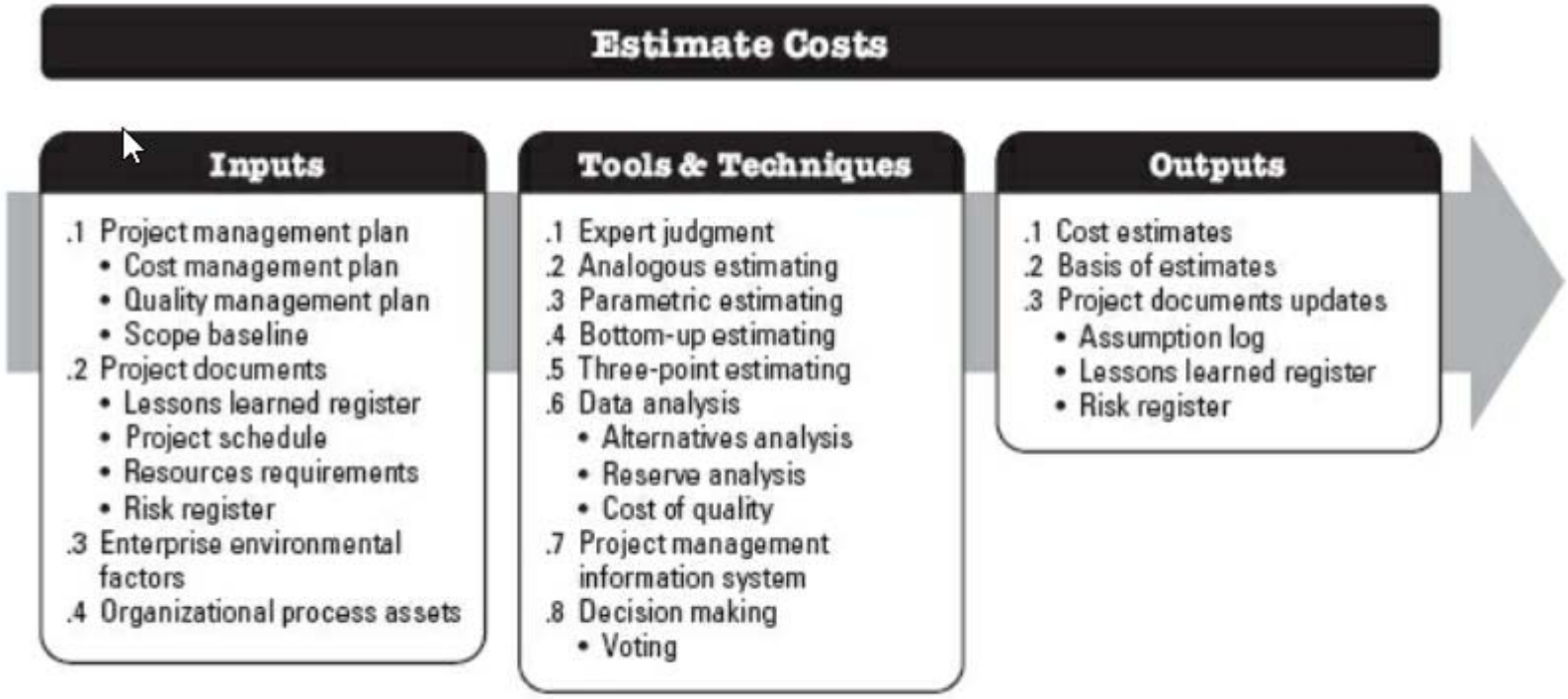
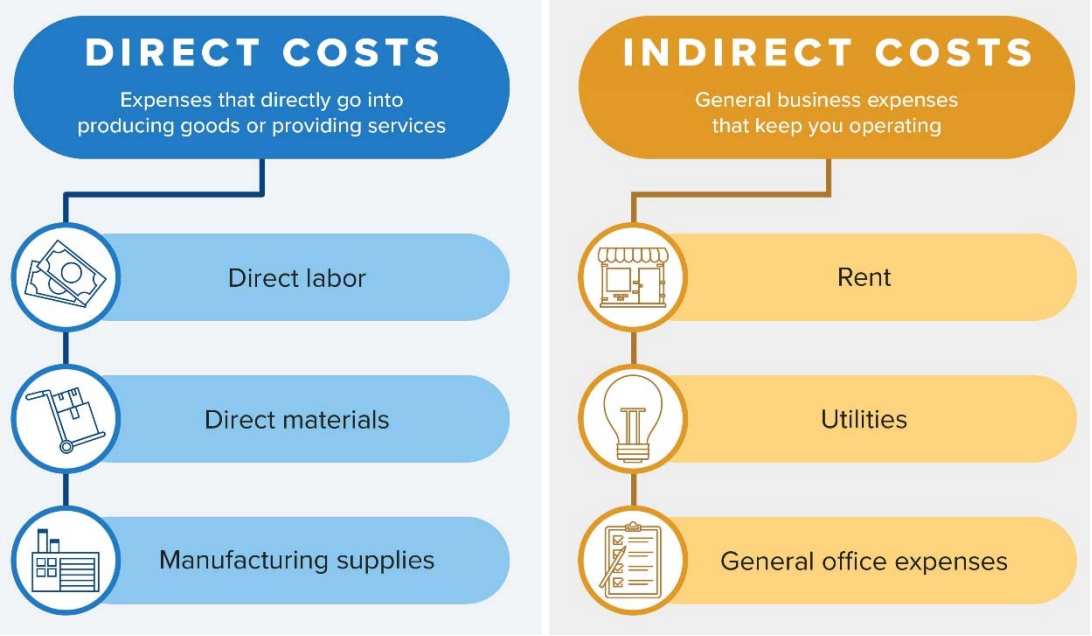


Figure 7-4. Estimate Costs: Inputs, Tools & Techniques, and Outputs

Work element costing

- Direct (Variable)
  - Labor
  - Material
  - Equipment
- Indirect (Fixed)
- Overhead
- General & Administrative (G&A)



Project costing by task and month

Table 7-2 Project Budget by Task and Month

		Monthly Budget (£)							
Task	**Estimate**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
A	7000	5600	1400						
B	9000		3857	5143					
C	10000		3750	5000	1250				
D	6000		3600	2400					
E	12000				4800	4800	2400		
F	3000				3000				
G	9000			2571	5143	1286			
H	5000					3750	1250		
I	8000						2667	5333	
J	6000								6000
	75000	5600	12607	15114	14193	9836	6317	5333	6000

Source: F.L. Harrison *Advanced Project Management*. Hants, England: Gower, 1983.

Determine the Budget

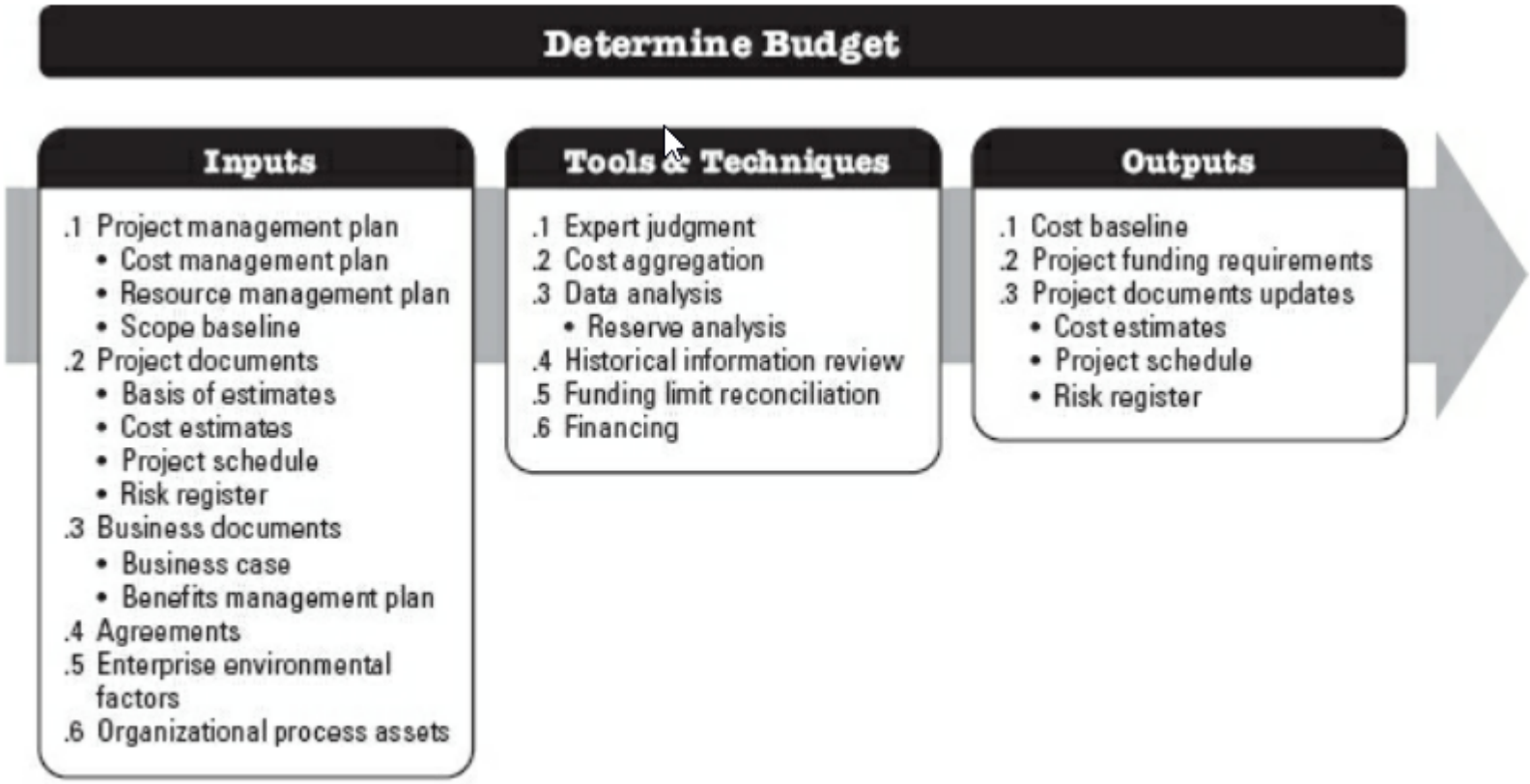
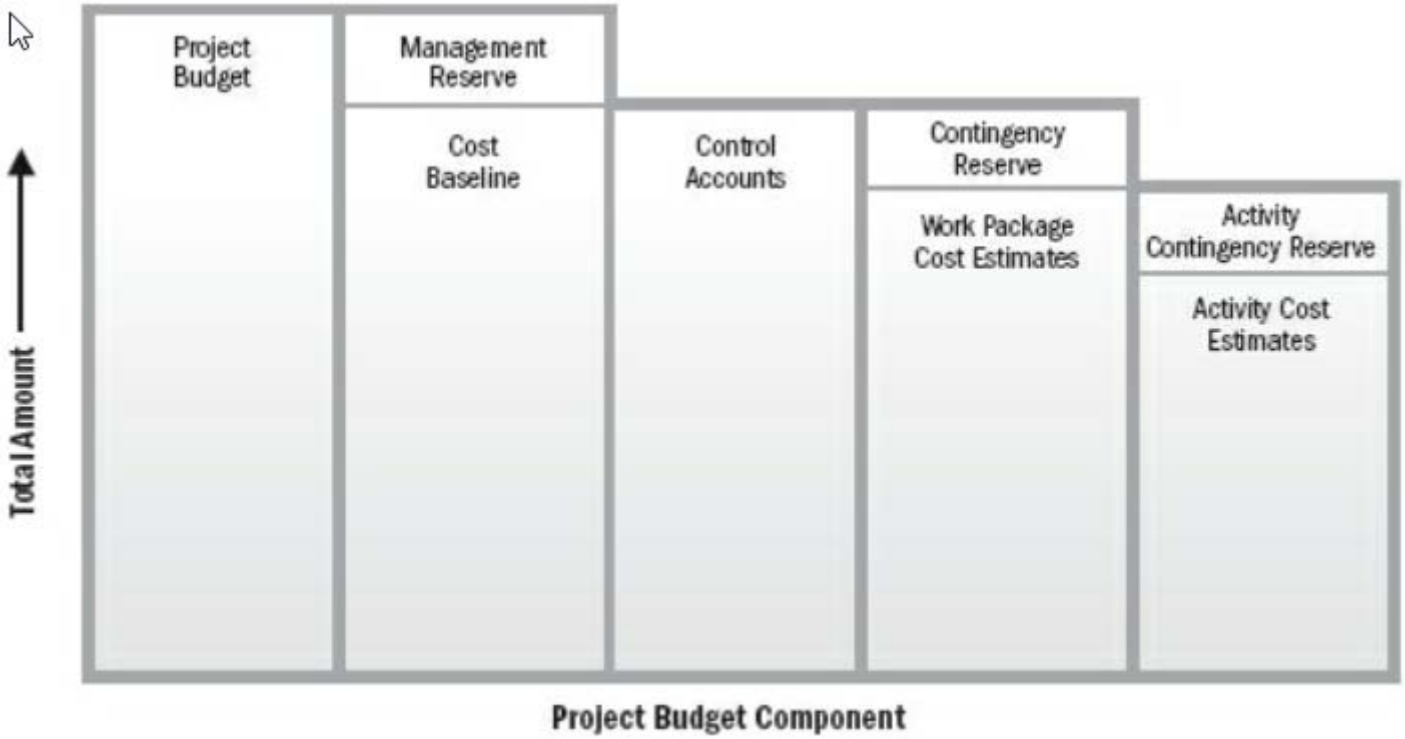


Figure 7-6. Determine Budget: Inputs, Tools & Techniques, and Outputs

Determine the Budget



Determine the Budget

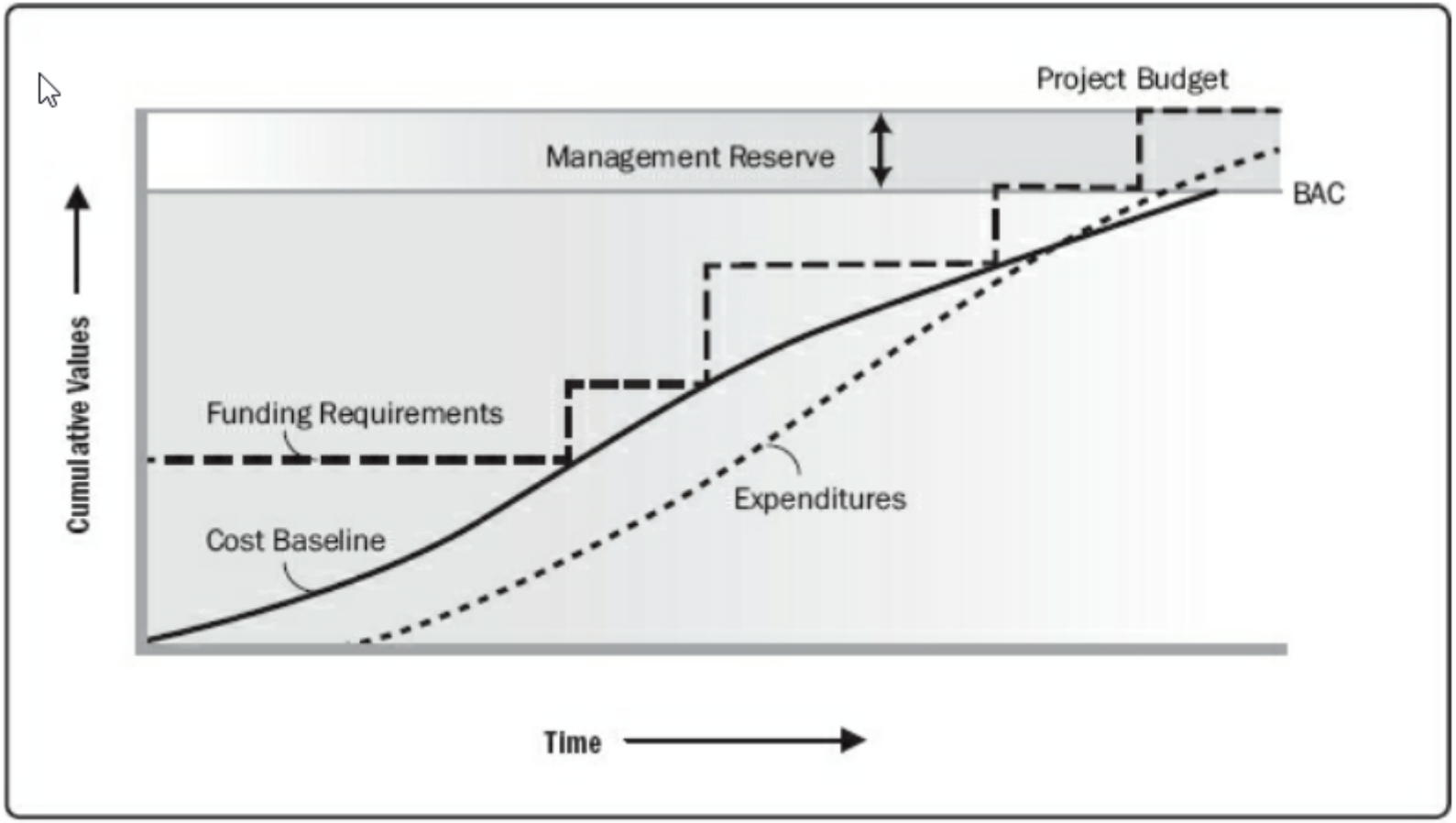


Figure 7-9. Cost Baseline, Expenditures, and Funding Requirements

Control Costs

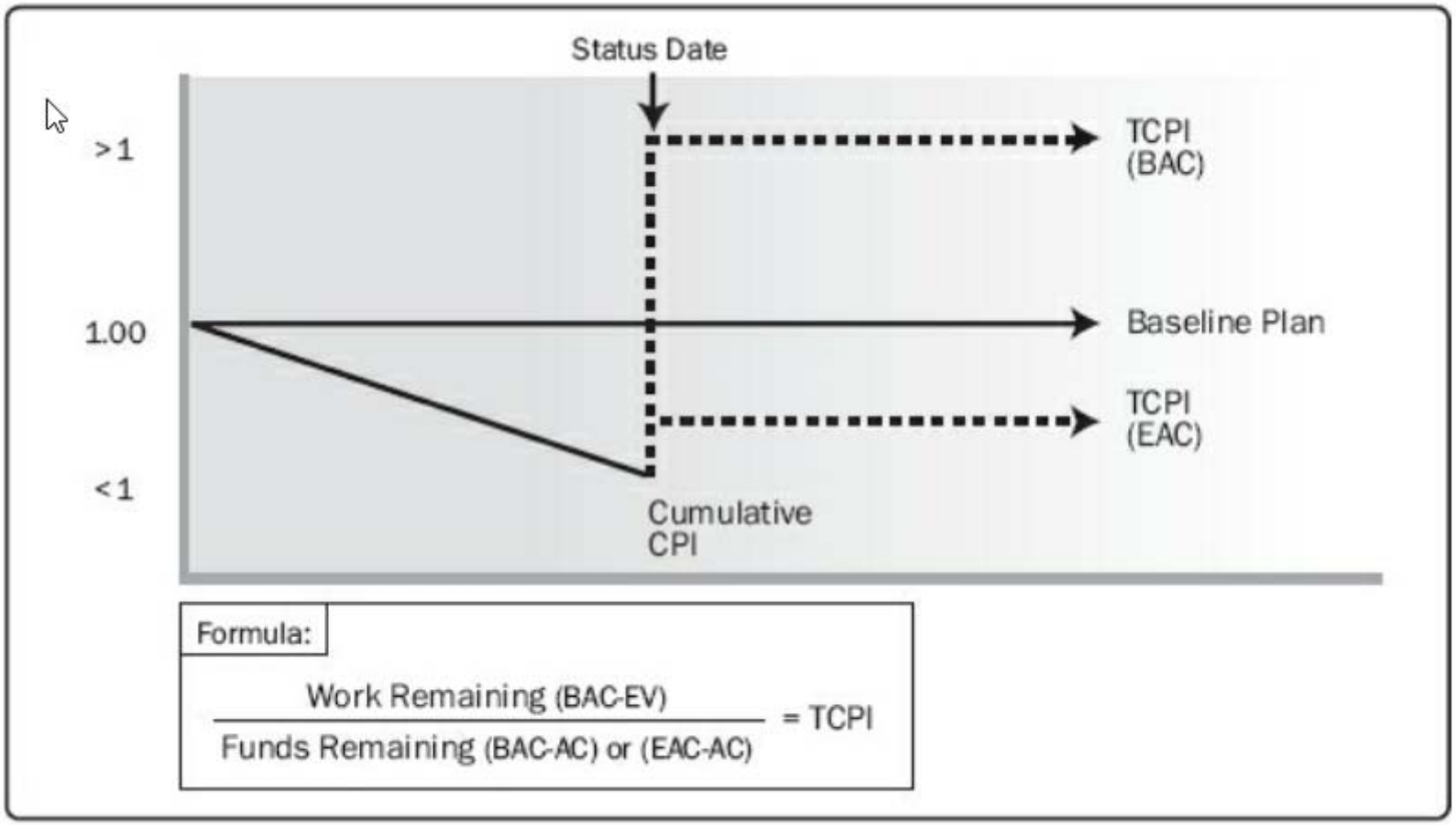


Figure 7-13. To-Complete Performance Index (TCPI)

Resources


PROJECT
MANAGEMENT
A MANAGERIAL
APPROACH
9th Edition
JACK R. MEREDITH
SAMUEL J. MANTEL, JR.
SCOTT M. SHAFER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PLANNING AND CONTROL USING
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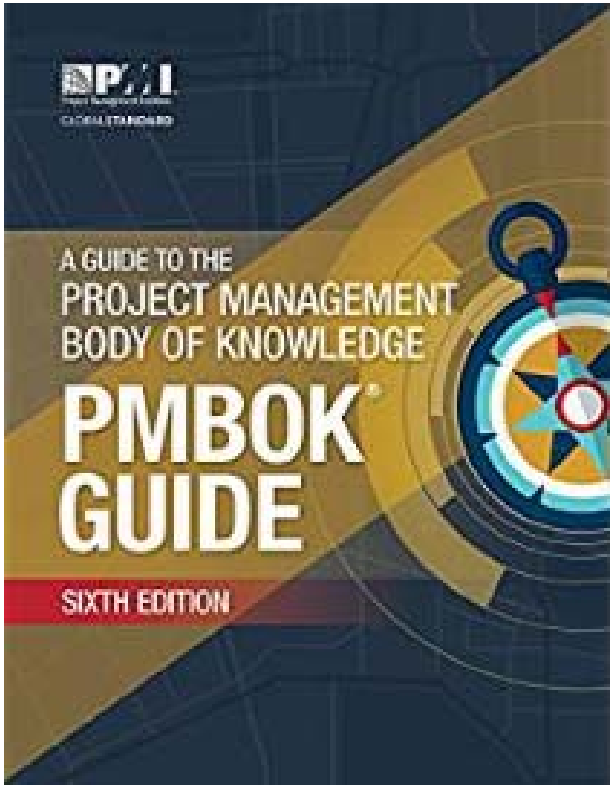
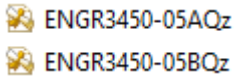

A GUIDE TO THE
PROJECT MANAGEMENT
BODY OF KNOWLEDGE
PMBOK®
GUIDE
SIXTH EDITION

Make up Quiz



You may do both of the quizzes on lectures.yasar.edu
Highest grade will be counted.
If previous quiz grades are lower they will be upgraded to highest too.

This is your last chance. There will be no other quiz.

Questions

- Questions

hp@quiztechnology.com

NEXT WEEK: Project Scheduling
Network Techniques PERT – CPM
MS-Project way
Precedence relations
Uncertainties in Completion
Problem solutions for Midterm