

Lecture 1:

Introduction and Review

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PMG 605

**Project Resources and
Time Management**

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- PhD in Industrial Engineering
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- Quality Assurance Certificate
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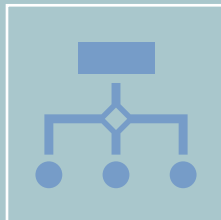


Session Outline



Introduction to the course

- Brief Description
- Topics
- Learning Outcomes
- References



Review of Project Management Fundamentals

- What is a Project?
- Project Characteristics
- Project Life Cycle
- Defining the Project Steps
- Summary

Introduction

PMG 605

Project Resources and Time Management



Brief Description of The Course

Project Resources and Time Management

This course deals with acquiring and assigning resourcing to projects, and the management of those resources. It addresses establishing and coordinating a project team; estimating and quantifying the required resources; and building, developing, and managing the team. It covers Resource Management, Acceleration and Schedule Compression, Time-Cost Trade-off Analysis, The Schedule, The Budget, Estimating Project Times and Costs, Developing a Project Plan, Scheduling Resources and Costs, Reducing Project Duration, Managing Project Teams, Outsourcing: Managing Interorganizational Relations, Progress and Performance Measurement and Evaluation, Project Management Career Paths.

Topics

Estimating Project Times and Costs.

Developing a Project Plan.

Resource Management.

Scheduling Resources and Costs.

Acceleration and Schedule Compression, Time-Cost Trade-off Analysis.

The Schedule.

The Budget.

Reducing Project Duration.

Outsourcing: Managing Interorganizational Relations.

Progress and Performance Measurement and Evaluation

Managing Project Teams.

Project Management Career Paths.

Course Learning Outcomes

Identify necessary labor and material resources, including contracted resources, and estimate the units of each that are required to meet stakeholder expectations.

Apply appropriate resource management tools and methods in each project context, including organizational breakdown structures, responsibility assignment matrices, and other means, to document and communicate project roles and responsibilities.

Evaluate and select commonly accepted methods for project managers to acquire, develop, and manage human resources that are appropriate in a specific project context and consistent with established policies.

References

- Project management: The managerial process

By Larson, E. W., & Gray, C. F.

- Project Control: Integrating Cost and Schedule in Construction

By: Wayne J. Del Pico, CPE

Review

Project Management Fundamentals



What is a Project?

Project Defined

- A complex, nonroutine, one-time effort limited by time, budget, resources, and performance specifications designed to meet customer needs.
- *A project is a **temporary endeavor** undertaken to create a unique product, service, or result. (PMBok 5th edition)*

Program vs. Project

Program Defined

- A series of coordinated, related, multiple projects that continue over an extended time and are intended to achieve a goal.
- A higher-level group of projects targeted at a common goal.

Examples:

- **Project:** Completion of a required course in project management.
- **Program:** Completion of all courses required for a business major.

Project Management

Project Manager

- Manages temporary, non-repetitive activities and frequently acts independently of the formal organization.
 - Marshals resources for the project.
 - Is linked directly to the customer interface.
 - Provides direction, coordination, and integration to the project team.
 - Is responsible for performance and success of the project.
- Must induce the right people at the right time to address the right issues and make the right decisions.

Project Characteristics

1- Defined start and finish

- A point where it starts.....a 'time zero'
- A point where it finishes.....'delivery'

2- Time frame for completion

- The implication is a time scale

3- Uniqueness

- A Unique Need distinguished from day-to-day operations

4- Involvement of several people

- The project team
- Those affected by the project (eg new plant operators)
- Provision for specific skills and approaches

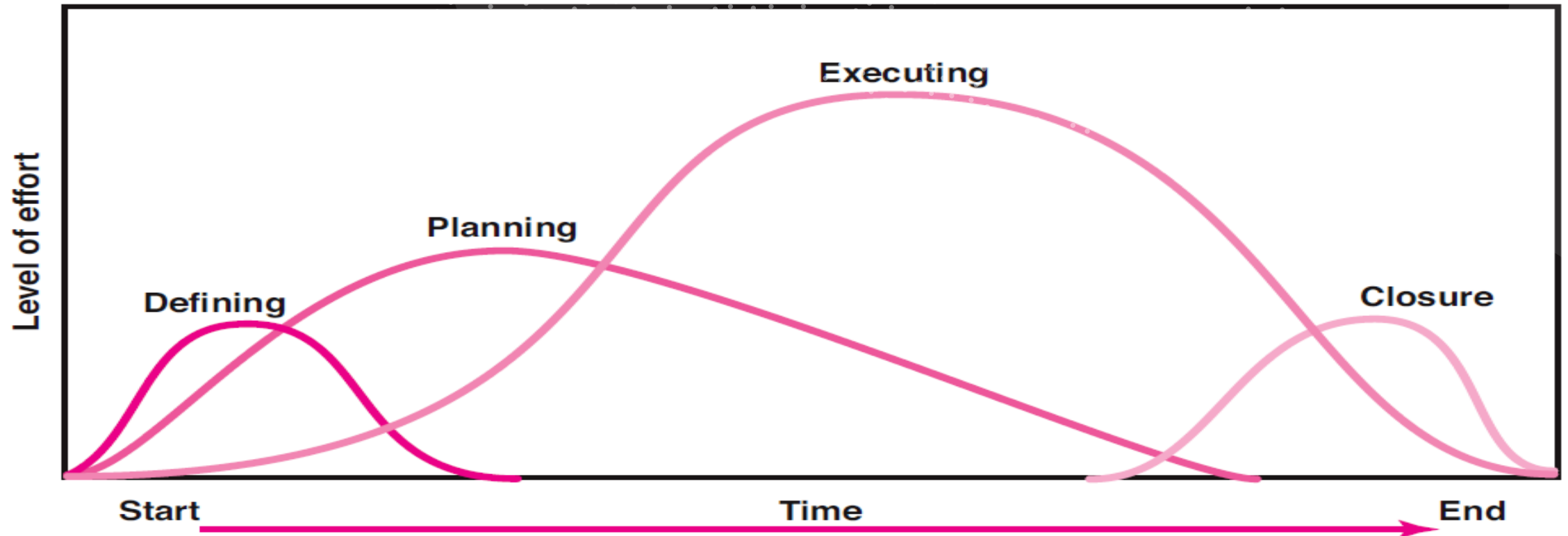
5- Limited resources

- People, materials, money and time all constrained

6- Sequencing of activities

- Interdependence of some activities
- Step by step progress
- Opportunity for overlapping
- Need for careful planning of step order

Project Life Cycle



Defining

1. Goals
2. Specifications
3. Tasks
4. Responsibilities

Planning

1. Schedules
2. Budgets
3. Resources
4. Risks
5. Staffing

Executing

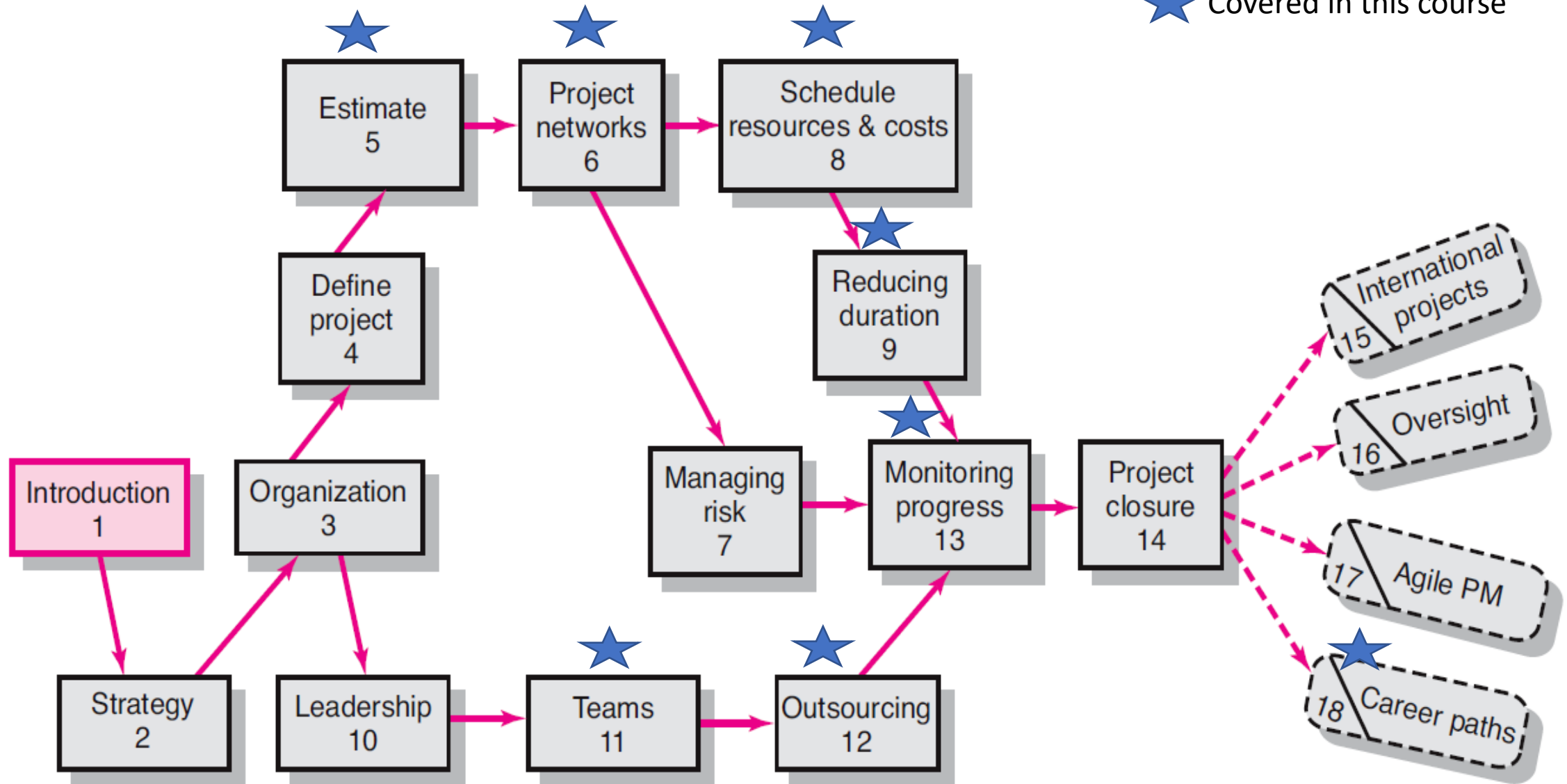
1. Status reports
2. Changes
3. Quality
4. Forecasts

Closure

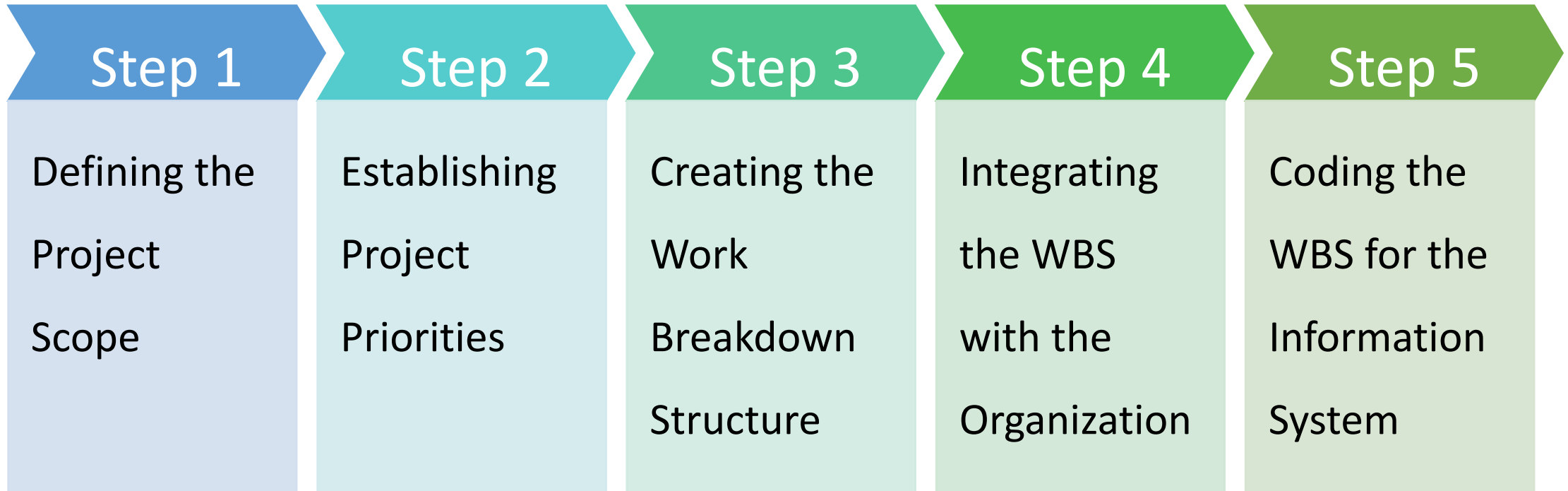
1. Train customer
2. Transfer documents
3. Release resources
4. Evaluation
5. Lessons learned

Overview of Project Management

★ Covered in this course



Defining the Project Steps



Step 1: Defining the Project Scope

- Project Scope
 - A definition of the end result or mission of the project -a product or service for the client/customer- in specific, tangible, and measurable terms.
- Purpose of the Scope Statement
 - To clearly define the deliverable(s) for the end user.
 - To focus the project on successful completion of its goals.
 - To be used by the project owner and participants as a planning tool and for measuring project success.

Project
Scope
Generic
Checklist

1- Project objective

2- Deliverables

3- Milestones

4- Technical requirements

5- Limits and exclusions

6- Reviews with customer

Project Scope: Snapshot from Practice

SNAPSHOT FROM PRACTICE

Scope Statement



PROJECT OBJECTIVE

To construct a high-quality, custom home within five months at cost not to exceed \$350,000.

DELIVERABLES

- A 2,200-square-foot, 2½-bath, 3-bedroom, finished home.
- A finished garage, insulated and sheetrocked.
- Kitchen appliances to include range, oven, microwave, and dishwasher.
- High-efficiency gas furnace with programmable thermostat.

MILESTONES

1. Permits approved—March 5
2. Foundation poured—March 14
3. Drywall in. Framing, sheathing, plumbing, electrical, and mechanical inspections passed—May 25
4. Final inspection—June 7

TECHNICAL REQUIREMENTS

1. Home must meet local building codes.
2. All windows and doors must pass NFRC class 40 energy ratings.

3. Exterior wall insulation must meet an “R” factor of 21.
4. Ceiling insulation must meet an “R” factor of 38.
5. Floor insulation must meet an “R” factor of 25.
6. Garage will accommodate two large-size cars and one 20-foot Winnebago.
7. Structure must pass seismic stability codes.

LIMITS AND EXCLUSIONS

1. The home will be built to the specifications and design of the original blueprints provided by the customer.
2. Owner responsible for landscaping.
3. Refrigerator is not included among kitchen appliances.
4. Air conditioning is not included but rewiring is included.
5. Contractor reserves the right to contract out services.
6. Contractor responsible for subcontracted work.
7. Site work limited to Monday through Friday, 8:00 A.M. to 6:00 P.M.

CUSTOMER REVIEW

John and Joan Smith

Project Scope: Terms and Definitions

Scope Statements

Scope Statements

- Also called statements of work (SOW)

Project Charter

Project Charter

- Can contain an expanded version of scope statement
- A document authorizing the project manager to initiate and lead the project.

Scope Creep

Scope Creep

- The tendency for the project scope to expand over time due to changing requirements, specifications, and priorities.

Project Charter Example

Project name: OrangeDelivery App			
Project description:	A mobile application for ordering foodstuffs and other products from OrangeSupermarket stores. The app will be available onGoogle Play and App Store.		
Project objectives:	Facilitate ordering foodstuff and other products published on OrangeSupermarket store website via a mobile phone.		
Project is considered successful when:	1. The app has a high number of downloads on Google Play and App Store. 2. The app has ratings of 4-5 stars on Google Play and App Store and more than 10 positive reviews on each platform. 3. The number of OrangeSupermarket store customers grew by 10%.		
Project participants:	Title:	Name:	
	Investor Project manager Finance manager Team members: Front-end developer Back-end developer QA engineer	Jake McKinsey John Smith Anna Murry James Thomson Andrew Michaelson Kirsty Watts	
Available resources:	Budget: \$3,000 Testing environment: Apple iPhone 11 Pro; Xiaomi Redmi Note 7		
Milestones:	Status:	Due:	Deadline:
	1. Build 1.0 Main functions presentation 2. Build 2.0 Adding new features after beta-testing	1/03/2020 1/04/2020	3/03/2020 4/04/2020
Potential risks:	1. The team may not meet deadlines due to adding unplanned in the specification features. 2. The team may run out of the budget due to extending development or testing time.		
Approval:	Title and name:		Date:
	Investor: John Smith signature_____ Project manager: Ivan Johnson signature_____ Finance manager: Anna Murry signature_____		1/02/2020

NEVER

accept

verbal

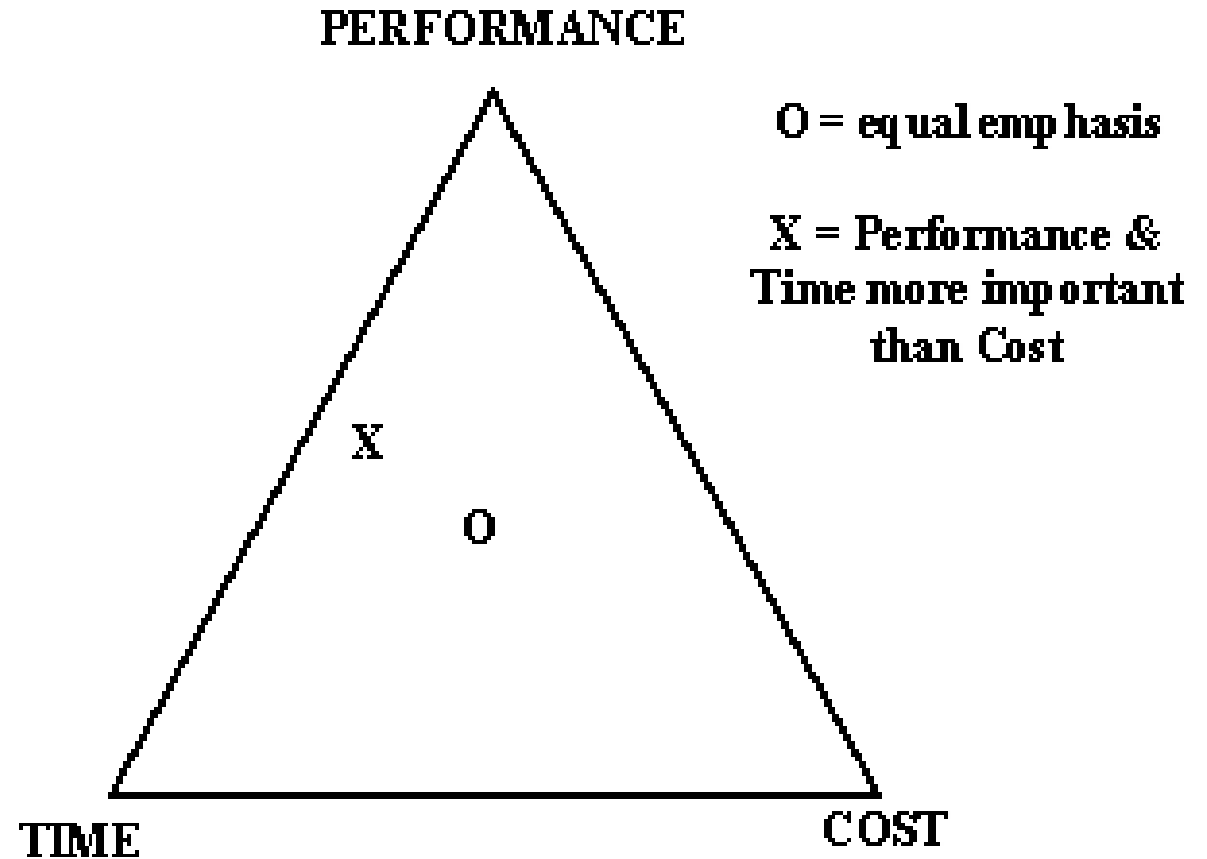
orders

Step 2: Establishing Project Priorities

- Causes of Project Trade-offs
 - Shifts in the relative importance of criteria related to cost, time, and performance parameters
 - TIME - completion by the due date
 - COST - completion within the budget limit
 - PERFORMANCE - to the required standard (e.g. quality)
- Managing the Priorities of Project Trade-offs
 - Constrain: a parameter is a fixed requirement.
 - Enhance: optimizing a criterion over others.
 - Accept: reducing (or not meeting) a criterion requirement.

Project Management Trade-offs

The O symbol in the figure represents the positioning of a project where all three objectives are equally important. The positioning of a project which must reach the required performance standard within the specified time, and cost is not a priority is represented by the X symbol.



Project Priority Matrix

	Time	Performance	Cost
Constrain			
Enhance			
Accept			

- The figure displays the priority matrix for the development of a new wireless modem. Because time to market is important to sales, the project manager is instructed to take advantage of every opportunity to reduce completion time. In doing so, going over budget is acceptable though not desirable. At the same time, the original performance specifications for the modem as well as reliability standards cannot be compromised.

Step 3: Creating the Work Breakdown Structure

Work Breakdown Structure (WBS)

- A hierarchical outline (map) that identifies the products and work elements involved in a project.
- Defines the relationship of the final deliverable (the project) to its sub deliverables, and in turn, their relationships to work packages.
- Best suited for design and build projects that have tangible outcomes rather than process-oriented projects.

How WBS Helps the Project Manager

Work Breakdown Structure (WBS)

- Facilitates evaluation of cost, time, and technical performance of the organization on a project.
- Provides management with information appropriate to each organizational level.
- Helps in the development of the organization breakdown structure (OBS). which assigns project responsibilities to organizational units and individuals
- Helps manage plan, schedule, and budget.
- Defines communication channels and assists in coordinating the various project elements.

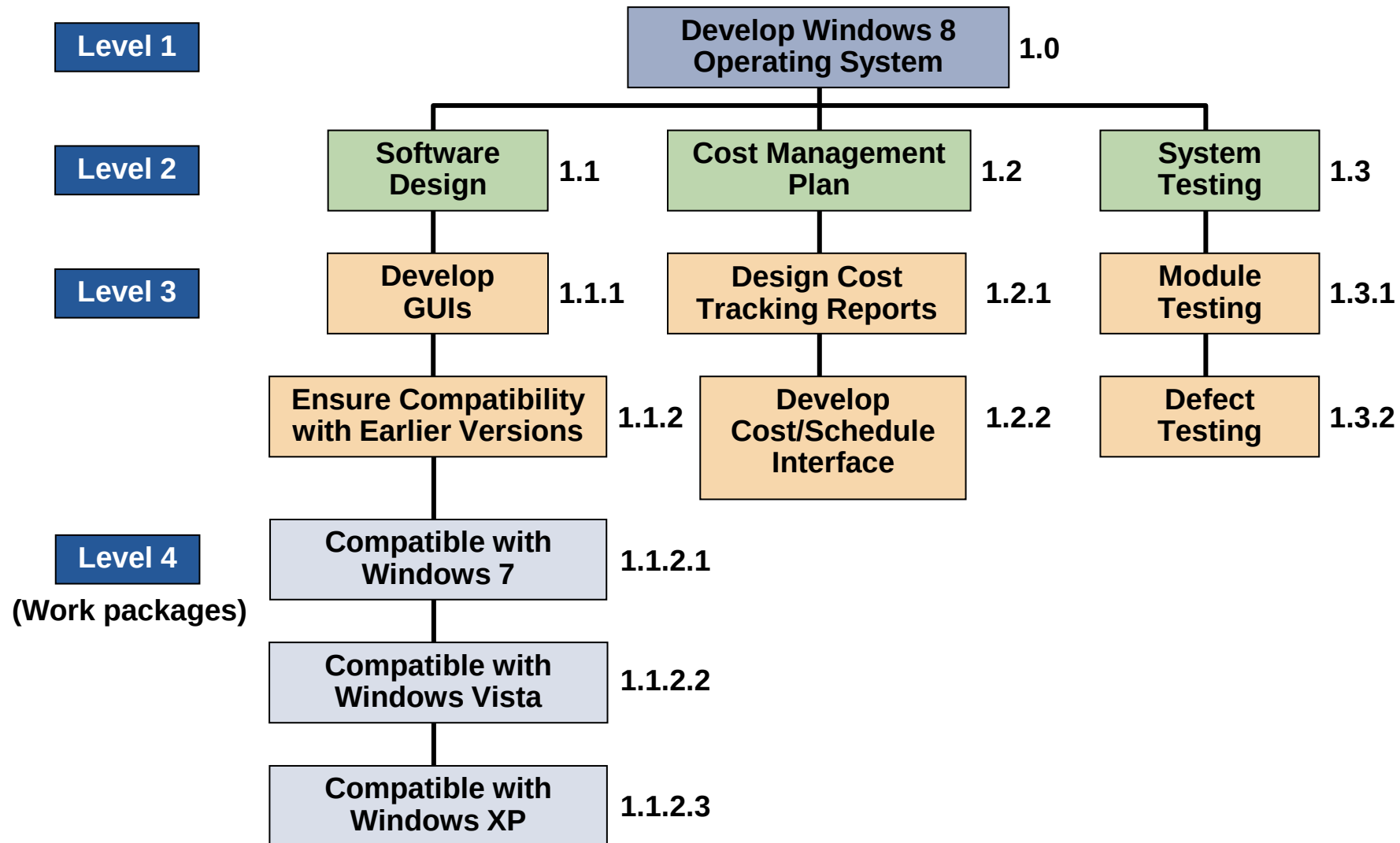
Work Packages

Work Package

A work package is the lowest level of the WBS and it is output-oriented in that it:

1. Defines work (what).
2. Identifies time to complete a work package (how long).
3. Identifies a time-phased budget to complete work package (cost).
4. Identifies resources needed to complete a work package (how much).
5. Identifies a person responsible for units of work (who).
6. Identifies monitoring points (milestones) for measuring success.

Work Breakdown Structure (WBS)



Work Breakdown Structure (WBS)

- **Levels:**
 - The depth of the WBS is dependent upon the size and complexity of the project and the level of detail needed to plan and manage it.
- **The 100% Rule:**
 - This rule states that the WBS includes 100% of the work defined by the project scope and captures all work deliverables to be completed, including project management.
 - The rule applies to all levels within the hierarchy.

Work Breakdown Structure (WBS)



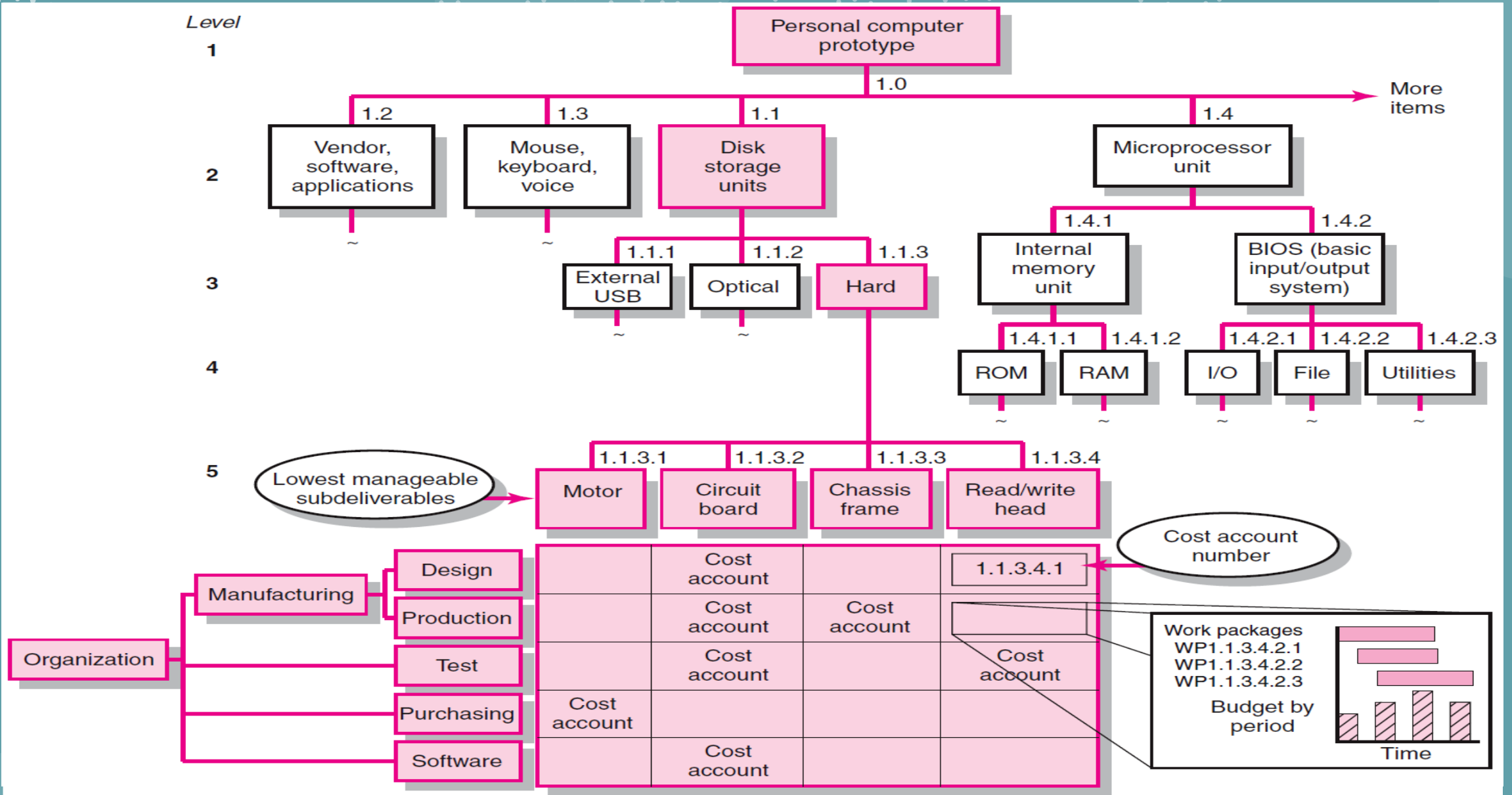
- Wait for a minute...did you clearly understand what you just read on the slide before?
- This is quite important...as a project manager your role is to achieve the project's objectives. Therefore, the deliverables must be captured effectively by the project team as part of the WBS. If it is not part of the WBS, it is not part of the project. Very simple, right?
- Unfortunately, it is not that easy, and a lot of projects have what is called "scope creep" resulting in projects that are over budget and behind schedule.

Step 4: Integrating the WBS with the Organization

Organizational Breakdown Structure (OBS)

- Depicts how the firm is organized to discharge its work responsibility for a project.
 - Provides a framework to summarize organization work unit performance.
 - Identifies organization units responsible for work packages.
 - Ties the organizational units to cost control accounts.

Integrating the WBS with OBS



Step 5: Coding the WBS for the Information System

WBS Coding System

- Defines:
 - Levels and elements of the WBS
 - Organization elements
 - Work packages
 - Budget and cost information
- Allows reports to be consolidated at any level in the organization structure

WBS Coding

- 1.0 Computer project
 - 1.1 Disk storage units
 - 1.1.1 External USB
 - 1.1.2 Optical
 - 1.1.3 Hard
 - 1.1.3.1 Motor
 - 1.1.3.1.1 Sourcing work package
 -
 -
 - 1.1.3.4 Read/write head
 - 1.1.3.4.1 Cost account
 - 1.1.3.4.2 Cost account
 - 1.1.3.4.2.1 WP
 - 1.1.3.4.2.2 WP
 - 1.1.3.4.2.3 WP
 - 1.1.3.4.3 Cost account
 -
 -
 -
- etc.

Responsibility Matrix (RM)

- Also called a linear responsibility chart.
- Summarizes the tasks to be accomplished and who is responsible for what on the project.
 - Lists project activities and participants.
 - Clarifies critical interfaces between units and individuals that need coordination.
 - Provide a means for all participants to view their responsibilities and agree on their assignments.
 - Clarifies the extent or type of authority that can be exercised by each participant.

Responsibility Matrix for a Research Project

Project Team

Task	Richard	Dan	Dave	Linda	Elizabeth
Identify target customers	R	S		S	
Develop draft questionnaire	R	S	S		
Pilot-test questionnaire		R		S	
Finalize questionnaire	R	S	S	S	
Print questionnaire					R
Prepare mailing labels					R
Mail questionnaires					R
Receive and monitor returned questionnaires				R	S
Input response data			R		
Analyze results		R	S	S	
Prepare draft of report	S	R	S	S	
Prepare final report	R		S		

R = Responsible
S = Supports/assists

RM for the Conveyor Belt Project

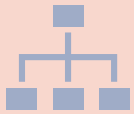
Organization								
Deliverables	Design	Development	Documentation	Assembly	Testing	Purchasing	Quality Assur.	Manufacturing
Architectural designs	1	2			2		3	3
Hardware specifications	2	1				2	3	
Kernel specifications	1	3						3
Utilities specifications	2	1			3			
Hardware design	1			3		3		3
Disk drivers	3	1	2					
Memory management	1	3			3			
Operating system documentation	2	2	1					3
Prototypes	5		4	1	3	3	3	4
Integrated acceptance test	5	2	2		1		5	5

- 1 Responsible
- 2 Support
- 3 Consult
- 4 Notification
- 5 Approval

Summary



Management of Projects



Planning - goal setting, defining the project, team organization



Scheduling - relate people, money, and supplies to specific activities and activities to each other



Controlling - monitor resources, costs, quality, and budgets; revise plans and shift resources to meet time and cost demands

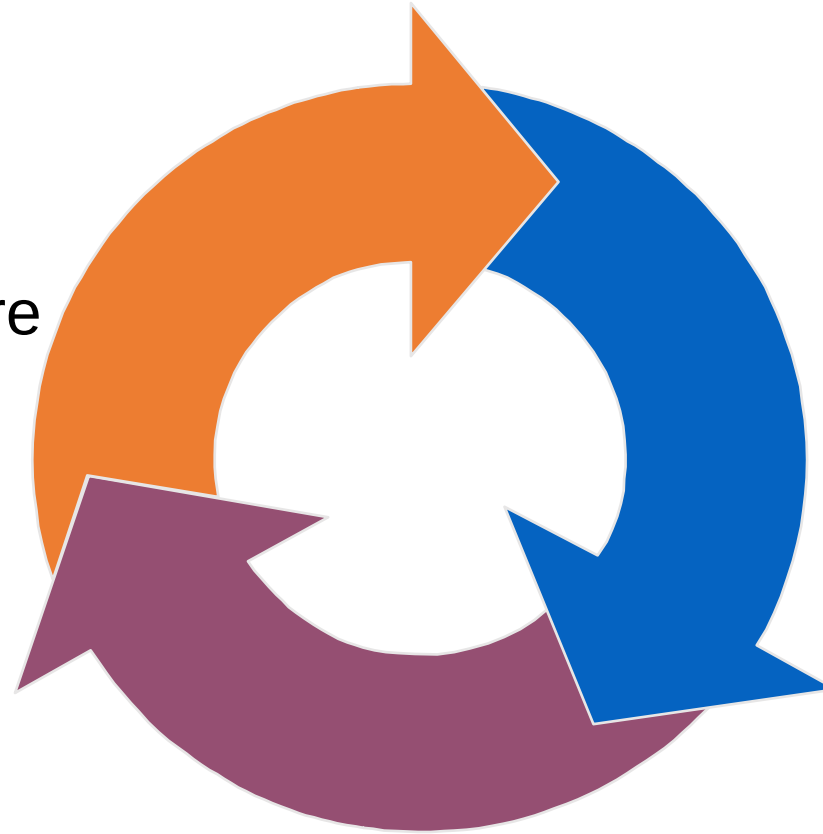
Project Management Activities

- ▶ Planning

- ▶ Objectives
- ▶ Resources
- ▶ Work break-down structure
- ▶ Organization

- ▶ Scheduling

- ▶ Project activities
- ▶ Start and end times
- ▶ Network

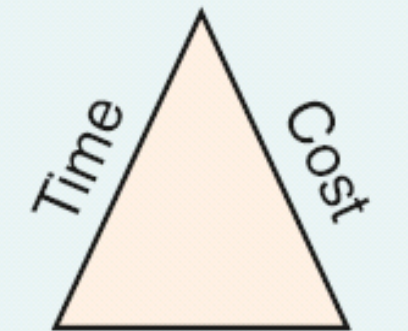


- ▶ Controlling

- ▶ Monitor, compare, revise, action

Project Planning, Scheduling, and Controlling

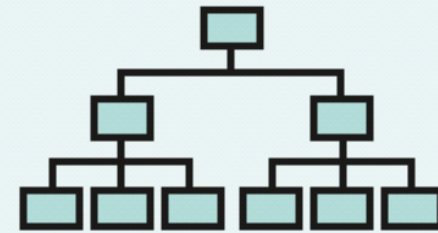
Planning the Project



Performance
Set the goals



Define the project



Develop work
breakdown
structure



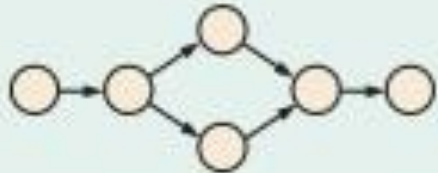
Identify team/
resources

Project Planning, Scheduling, and Controlling

Planning the Project



Scheduling the Project



Sequence activities

Adams	✓		
Smith			✓
Jones		✓	

Assign people



Schedule deliverables

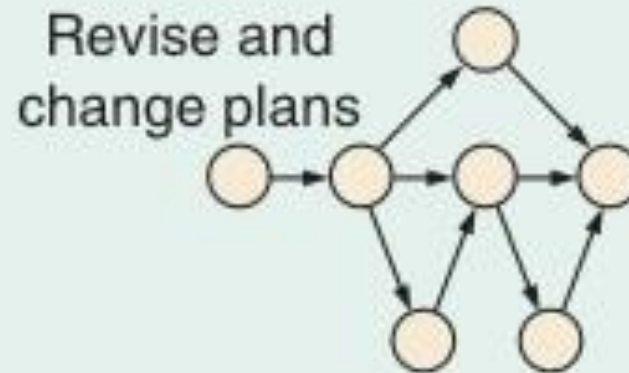
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S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13

Schedule resources

Project Planning, Scheduling, and Controlling



Controlling the Project (During project)



Adams		✓	
Smith	✓		
Jones			✓

Shift resources

Project Planning, Scheduling, and Controlling

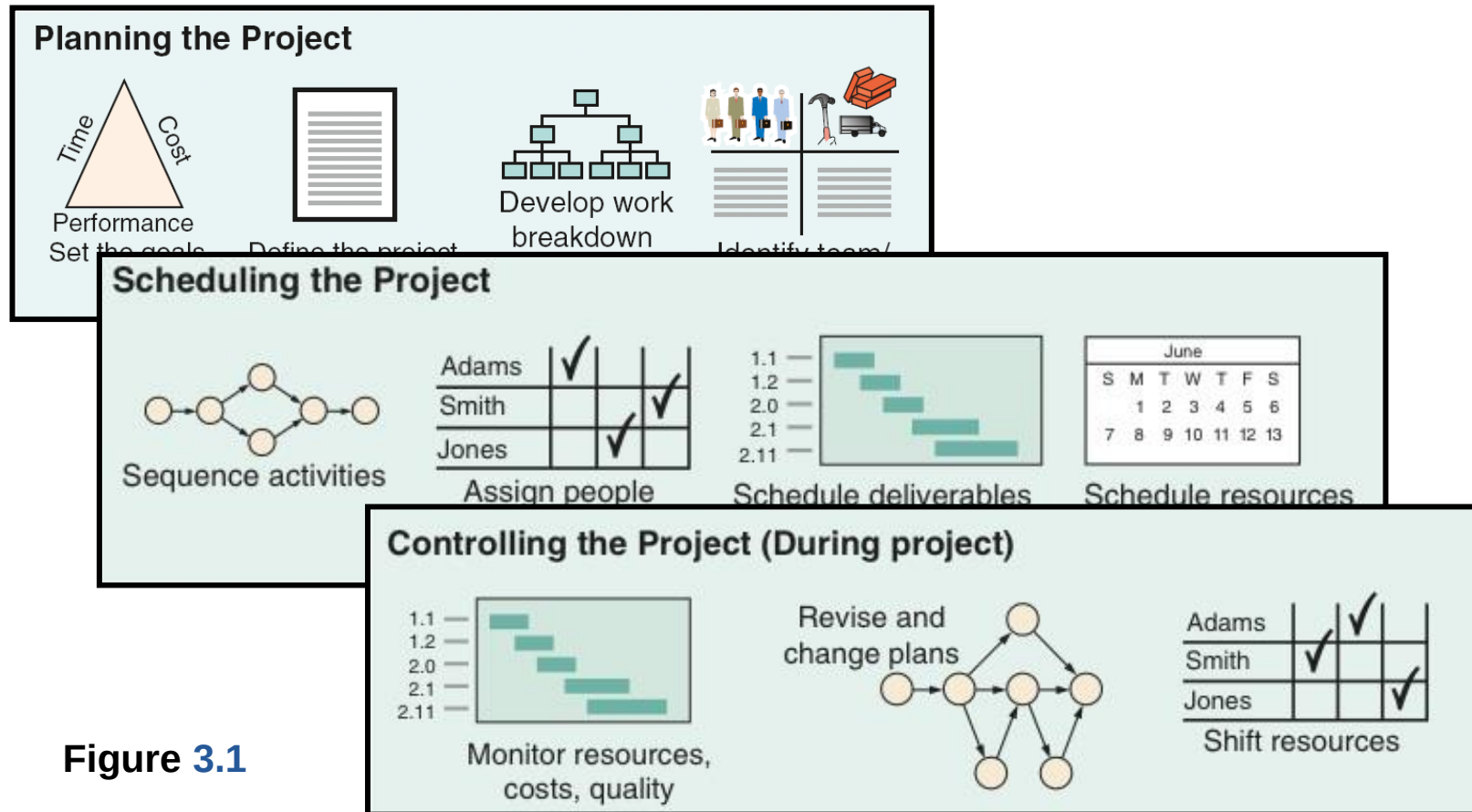
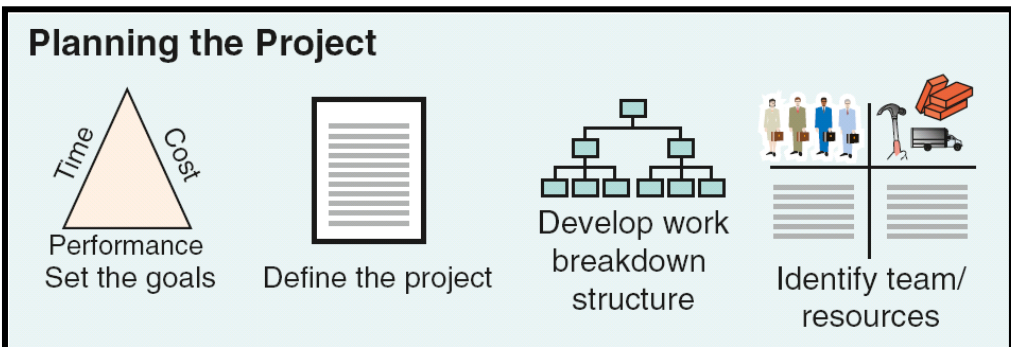
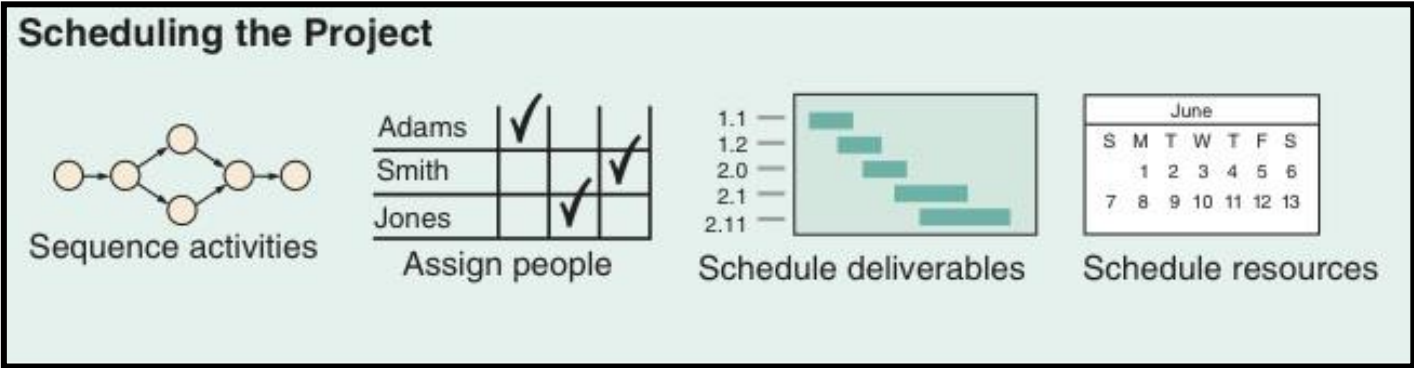


Figure 3.1

Project Planning, Scheduling, and Controlling

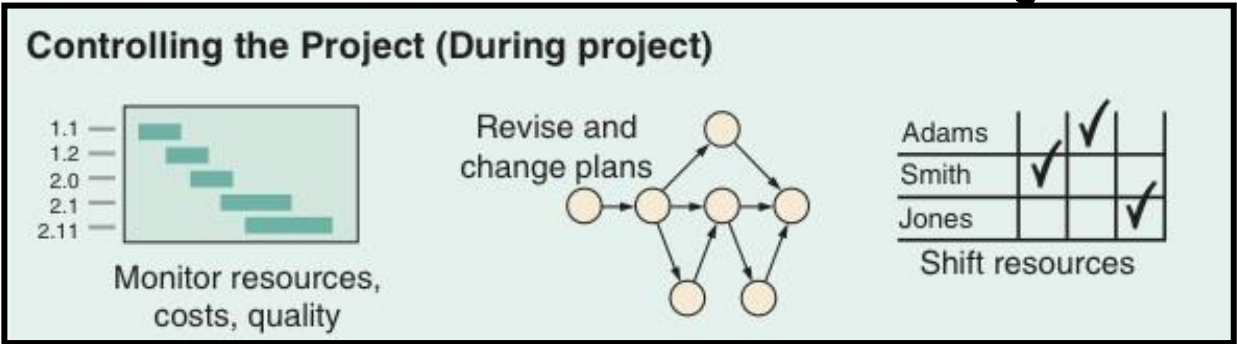


Time/cost estimates
Budgets
Engineering diagrams
Cash flow charts
Material availability details



Budgets
Delayed activities report
Slack activities report

CPM/PERT
Gantt charts
Milestone charts
Cash flow schedules



Lecture Resources

Project Management

The Managerial Process

Fifth Edition

By: Erik W. Larson

Oregon State University

Clifford F. Gray

Oregon State University