

Project Management Curriculum



Jérôme Dudragne

Executive Program Manager

IBM certified

Retired in 2025

- ❖ 06 73 48 21 59
- ❖ jerome.dudragne@umontpellier.fr
- ❖ Dudragne.Jerome@gmail.com

Course dates: 6 + 1 slots booked so far

Preparation

Curriculum launch : course pedagogy, objectives, rules, evaluation, case study

Home work

1. Tuesday September 23d

What is a Project & Project Mgt, Project vs Process Mgt, Project vs Operation Mgt, PM skills and role, Project vs Program vs Portfolio Mgt, Stakeholders mgt, Organization aspect, Project Governance

9:00 AM – 12:00 AM

2. Thursday September 25th

Project phases and life cycle, Project Mgt process groups, Project knowledge area, Project Mgt process groups versus Knowledge area, project integration, project Charter

9:00 AM – 12:00 AM

3. Friday October 24th

Develop the project plan, Scope Mgt, Schedule Mgt, Financial Baseline

9:00 AM – 12:00 AM

4. Monday October 27th

Project Risk mgt, Project work executing, Project monitoring & control, Project closing, Agile Culture

9:00 AM – 12:00 AM

5. Monday November 3d

Agile roles & Resp, Discovery workshop, Funnel and backlog, iteration journey, release planning, Wall of Work, Velocity, poker planning, Burn-Up / Burn Down trackers, Tools, Myths, Agile for operations, scrum

9:00 AM – 12:00 AM

6. Monday December 1st

Student projects presentation, revision

9:00 AM – 12:00 AM

7. Wednesday December 3d

Contingency session, student projects presentation, revision

9:00 AM – 13:00 AM

➤ Wednesday December 10th

Exam

9:00 AM – 10:30 AM

Project Management Curriculum

Session 3

Friday October 24

IAE Montpellier
2025-2026

Session 3 content

- QCM Session 3
- Q&A session 3
- Develop the project plan
 - Content of project plan
 - Key steps of project planning
- Scope Management
 - Scope key points & definitions
 - WBS
- Schedule Management
 - Definitions
 - Precedence diagram method
- Financial Baseline
- Student work assignment

Project Management Curriculum

Session 3

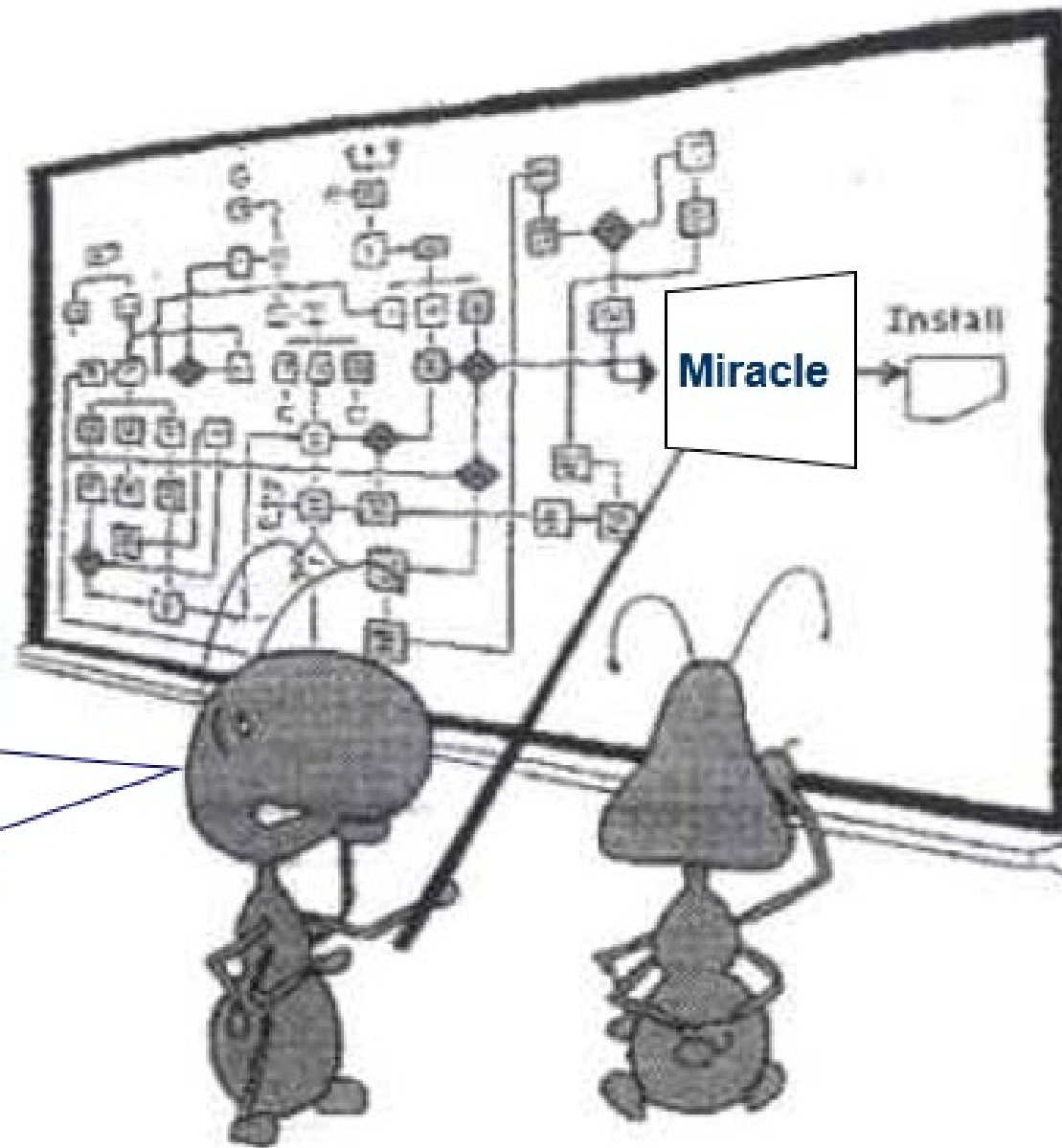
Friday October 24

IAE Montpellier
2025-2026

Session 3 content

- ✓ QCM Session 3
- ✓ Q&A session 3
- **Develop the project plan**
 - **Content of project plan**
 - **Key steps of project planning**
- Scope Management
 - Scope key points & definitions
 - WBS
- Schedule Management
 - Definitions
 - Precedence diagram method
- Financial Baseline
- Student work assignment

“Perfect!
But maybe it’s worth to
go a little
bit more into detail at
this step”



Develop the Project Plan 1/2

PM Knowledge areas						
Groups of PM Processes	PM MGT Processes	Integration Mgt	Stakeholder Mgt	Scope Mgt	Schedule Mgt	Cost Mgt
	Initiating	• <i>Develop Project charter</i>	• <i>Identify stakeholders</i>			
	Planning	• Develop Project Plan	• <i>Plan stakeholder engagement</i>	<ul style="list-style-type: none"> • <i>Plan for Scope Mgt</i> • <i>Collect Requirements</i> • <i>Define Scope</i> • <i>Create WBS</i> 	<ul style="list-style-type: none"> • <i>Plan for Schedule Mgt</i> • <i>Define Activities</i> • <i>Sequence Activities</i> • <i>Estimate Activity Durations</i> • <i>Develop Schedule</i> 	<ul style="list-style-type: none"> • <i>Plan for Costs Mgt</i> • <i>Estimate Costs</i> • <i>Determine Budget</i>
	Executing	<ul style="list-style-type: none"> • <i>Direct and Manage Project Work</i> • <i>Manage Project Knowledge</i> 	• <i>Manage stakeholder engagement</i>			
	Controlling	<ul style="list-style-type: none"> • <i>Monitor and Control Project Work</i> • <i>Perform Integrated Change Control</i> 		<ul style="list-style-type: none"> • <i>Validate Scope</i> • <i>Control Scope</i> 	• <i>Control schedule</i>	• <i>Control Costs</i>
	Closing	• <i>Close project or phase</i>				

Develop the Project Plan process 2/3

PM Knowledge areas						
PM Mgt Processes	Integration Mgt	Quality Mgt	Resource Mgt	Communication Mgt	Risk Mgt	Procurement Mgt
Initiating						
Planning	<ul style="list-style-type: none"> Develop Project Plan 	<ul style="list-style-type: none"> Plan for quality Mgt 	<ul style="list-style-type: none"> Plan for Resource Mgt Estimate Activity Resources 	<ul style="list-style-type: none"> Plan for communication Mgt 	<ul style="list-style-type: none"> Plan for Risk Mgt Identify Risks: Perform Qualitative Risk Analysis Perform Quantitative Risk Analysis Plan Risk Responses 	<ul style="list-style-type: none"> Plan for procurement Mgt
Executing		<ul style="list-style-type: none"> Manage quality 	<ul style="list-style-type: none"> Acquire Resources Develop Team Manage Team 	<ul style="list-style-type: none"> Manage communication 	<ul style="list-style-type: none"> Implement risks responses 	<ul style="list-style-type: none"> Conduct Procurement
Controlling		<ul style="list-style-type: none"> Control quality 	<ul style="list-style-type: none"> Control resource 	<ul style="list-style-type: none"> Monitor communication 	<ul style="list-style-type: none"> Monitor Risks 	<ul style="list-style-type: none"> Control procurement
Closing						

Groups of PM Processes

Develop the Project Plan process 3/3

	Develop Project Charter	Develop Project Plan	Manage Project Work
Process INPUTS	<ul style="list-style-type: none"> • Business documents • Agreements • Environmental factors • Organizational process 	<ul style="list-style-type: none"> • Project charter • Outputs from PM processes • Environmental factors • Organizational process 	<ul style="list-style-type: none"> • Project Mgt Plan • Project documents • Approved change requests • Environmental factor • Organizational process
TOOLS & TECHNIQUES	<ul style="list-style-type: none"> - Expert judgment - Data gathering - Team skills & Meetings 	<ul style="list-style-type: none"> - Expert judgment - Data gathering - Team skills & Meetings 	<ul style="list-style-type: none"> - Expert judgment - PM information system - Meetings
Process OUTPUTS	<ul style="list-style-type: none"> ➤ Project charter ➤ Assumption log 	<ul style="list-style-type: none"> ➤ Project Mgt Plan 	<ul style="list-style-type: none"> ➤ Deliverables ➤ Work performance data ➤ Issue log ➤ Change requests ➤ Project Mgt plan updates ➤ Project documents updates ➤ Organizational process updates

The Project plan

The **project plan is the document** that describes how the project will be executed, monitored and controlled, and closed.

Project plan answers those questions in detail :

- **What** must be done ?
- **How** should it be done ?
- **Who** will do it ?
- **By when** must it be done ?
- **How much** will it cost ?
- **How good** does it have to be ?

Components of the project plan 1/2

- Project plan integrates all **plans, baselines**, and other information necessary to manage the project.
- The **needs of the project determine which components of the project plan are needed.**

Key components of Project plan (1/2)

- | | |
|--------------------------------------|--|
| ➤ <u>Scope mgt plan</u> | <i>explains how the scope will be defined, developed, monitored, controlled, and validated</i> |
| ➤ <u>Requirements mgt plan</u> | <i>explains how the requirements will be analyzed, documented, and managed</i> |
| ➤ <u>Schedule mgt plan</u> | <i>explains the criteria and the activities for developing, monitoring, and controlling the schedule.</i> |
| ➤ <u>Cost mgt plan</u> | <i>explains how the costs will be planned, structured, and controlled</i> |
| ➤ <u>Quality mgt plan</u> | <i>explains how quality policies, methodologies, and standards will be implemented in the project</i> |
| ➤ <u>Resource mgt plan</u> | provides guidance on how project resources should be categorized, allocated, managed, and released |
| ➤ <u>Communications mgt plan</u> | explains how, when, and by whom project information will be administered and disseminated. |
| ➤ <u>Risk mgt plan</u> | explains how the risk management activities will be structured and performed. |
| ➤ <u>Procurement mgt plan</u> | explains how the project team will acquire goods and services from outside of the organization. |
| ➤ <u>Stakeholder engagement plan</u> | explains how stakeholders will be engaged in project decisions and execution, according to their needs, interests, and impact. |

Components of the project plan 2/2

Definition of Baseline: formal reference used as a basis for actual versus plan comparison & evaluation

Other key components of Project plan (2/2)

- Scope baseline *approved version of a scope statement, **work breakdown structure (WBS)**, and associated WBS dictionary,*
- Schedule baseline *approved version of the project schedule*
- Cost baseline *approved version of the time-phased **project budget***
- Performance baseline *An integrated scope-schedule-cost plan for the project work against which project execution is compared to measure and manage performance.*
- Change mgt plan *explains how the change requests will be formally authorized and incorporated*
- Configuration mgt plan *explains how the information about the items of the project (and which items) will be recorded and updated so that the product, service, or result of the project remains consistent and/or operative.*
- Project life cycle *explains the series of phases that a project passes through from its initiation to its closure.*
- Development approach *explains the product, service, or result development approach, such as predictive, iterative, agile, or a hybrid model.*
- Management reviews *identifies the points in the project when the project manager and relevant stakeholders will review the project progress to determine if performance is as expected, or if preventive or corrective actions are necessary.*

Minimum/simplified Project Planning steps



1. Using the project charter, **refine the scope** statement to define requirements, project work boundaries & product features (scope baseline)
2. Develop a **Work Breakdown Structure (WBS)**
3. Using the WBS, **estimate activity durations, resource requirements and costs** (as appropriate for your environment)
4. Prepare the **project master schedule** (time baseline).
5. Prepare the **project master budget** (cost baseline).
6. Work on **risks**
7. Define **project monitoring and control process** to track, review and report project progress and performance (to meet the objectives).
8. Define the **project organization** (Roles & Resp)
9. Define **project governance**
10. Create **the project plan and get it signed off** by all project stakeholders.

Project Management Curriculum

Session 3

Friday October 24

IAE Montpellier
2025-2026

Session 3 content

- ✓ QCM Session 3
- ✓ Q&A session 3
- ✓ Develop the project plan
 - ✓ Content of project plan
 - ✓ Key steps of project planning
- **Scope Management**
 - **Scope key points & definitions**
 - **WBS**
- Schedule Management
 - Definitions
 - Precedence diagram method
- Financial Baseline
- Student work assignment

Scope Management

		PM Knowledge areas				
Groups of PM Processes	PM MGT Processes	Integration Mgt	Stakeholder Mgt	Scope Mgt	Schedule Mgt	Cost Mgt
	Initiating	• Develop Project charter	• Identify stakeholders			
	Planning	• Develop Project Plan	• Plan stakeholder engagement	• Plan for Scope Mgt • Collect Requirements • Define Scope • Create WBS	• Plan for Schedule Mgt • Define Activities • Sequence Activities • Estimate Activity Durations • Develop Schedule	• Plan for Costs Mgt • Estimate Costs • Determine Budget
	Executing	• Direct and Manage Project Work • Manage Project Knowledge	• Manage stakeholder engagement			
	Controlling	• Monitor and Control Project Work • Perform Integrated Change Control		• Validate Scope • Control Scope	• Control schedule	• Control Costs
	Closing	• Close project or phase				

14

Minimum/simplified Project Planning steps

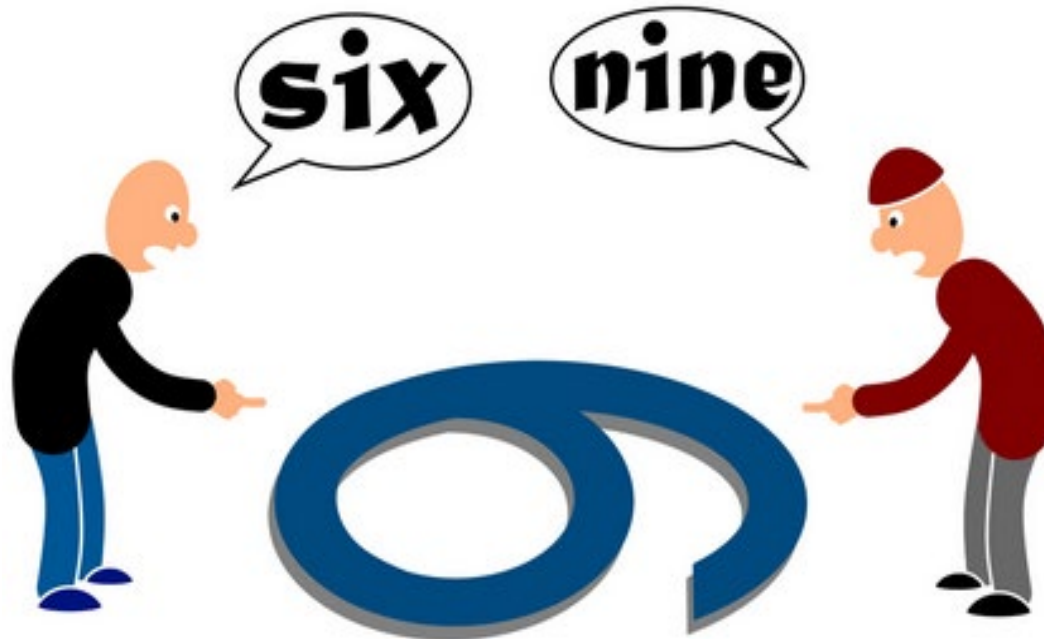


1. Using the project charter, **refine the scope** statement to define requirements, project work boundaries & product features (scope baseline)
2. Develop a **Work Breakdown Structure (WBS)**
3. Using the WBS, **estimate activity durations, resource requirements and costs** (as appropriate for your environment)
4. Prepare the **project master schedule** (time baseline).
5. Prepare the **project master budget** (cost baseline).
6. Work on **risks**
7. Define **project monitoring and control process** to track, review and report project progress and performance (to meet the objectives).
8. Define the **project organization** (Roles & Resp)
9. Define **project governance**
10. Create **the project plan and get it signed off** by all project stakeholders.

Minimum/simplified Project Planning steps



1. Using the project charter, **refine the scope** statement to define requirements, project work boundaries & product features (**scope baseline**)



Scope Management: key points & definitions

What is a 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 & functions.

What is Scope Management ?

- This is the **process of creating a scope management plan** that documents how both project and product scope will be **defined, validated, and controlled**.
- The key benefit of this process is **that it provides guidance and direction on how scope will be managed throughout the project**. This process is performed once or at predefined points in the project.

Scope Management: key points & definitions

The project's success is directly influenced by

- active stakeholder involvement in the discovery & decomposition of needs into project & product **requirements**
- the care taken in determining, documenting, and **managing the requirements.**

Requirements :

- Include **conditions or capabilities required** to be present in a product, service, or result **to satisfy an agreement or specification.**
- Include the quantified and documented **expectations of the sponsor, customer, and stakeholders.**
- **need to be elicited, analyzed, and recorded** in enough detail to be included in the scope baseline and to be measured once project execution begins.
- **become the foundation of the WBS (Work Breakdown Structure).** Cost, schedule, quality planning, and procurement are all based on these requirements.
 - **requirements documentation** should describe how individual requirements meet the business need for the project. May start out at a high level and become progressively more detailed.
 - **requirements Traceability Matrix** A grid that links product requirements from their origin to the deliverables that satisfies them. Ensure that each requirement adds business value by linking it to the business objective

Scope Management: key points & definitions

Examples of requirements documentation and traceability

Project: <Enter name of project here>																
Customer Business Requirements					Affected Elements	Customer Acceptance Criteria										M
System Requirements							Unit Test			Integration Test			System Test			
Component Requirements							Test Method	Test Case	Test Result	Test Method	Test Case	Test Result	Test Method	Test Case	Test Result	
Requirements				Requirement Status	Design Documents	Build Components										
R1	Customer business requirement with multiple system requirements															
R1	S1.1	System requirement with multiple component requirements														
R1	S1.1	C1.1.1	Component requirement		REQUIREMENTS TRACEABILITY MATRIX											
R1	S1.1	C1.1.2	Component requirement													
R1	S1.2	System requirement with multiple component requirements														
R1	S1.2	C1.2.1	Component requirement													
R1	S1.2	C1.2.2	Component requirement		Project Name: Online Flight Booking Application											
R1	S1.2	C1.2.3	Component requirement													
R2	Customer business requirement with multiple system requirements			Business Requirements Document			Functional Requirements Document				Test Case Document					
R2	S2.1	System requirement with one component requirement		BRD			FSD									
R2	S2.1	C2.1.1	Component requirement	Business Requirement ID#	Business Requirement / Business Use case	Functional Requirement ID#	Functional Requirement / Use Case	Priority	Test Case ID#							
R2	S2.2	System requirement with one component requirement														
R2	S2.2	C2.2.1	Component requirement													
R3	Customer business requirement with one system requirement															
R3	S3.1	System requirement with no component requirements		BR_1	Reservation Module	FR_1	One Way Ticket booking	High	TC#001							
R4	Customer business requirement with one system requirement					FR_2	Round Way Ticket		TC#002							
R4	S4.1	System requirement with no component requirements							TC#003							
These are examples. See the instructions on the 'terms & instructions' worksheet.						FR_3	Multicity Ticket booking	High	TC#004							
										TC#005						
										TC#006						
				BR_2	Payment Module	FR_4	By Credit Card	High	TC#007							
						FR_5	By Debit Card	High	TC#008							
						FR_6	By Reward Points	Medium	TC#009							
									TC#010							
									TC#011							

Minimum/simplified Project Planning steps



1. Using the project charter, **refine the scope** statement to define requirements, project work boundaries & product features (scope baseline)
2. **Develop a Work Breakdown Structure (WBS)**



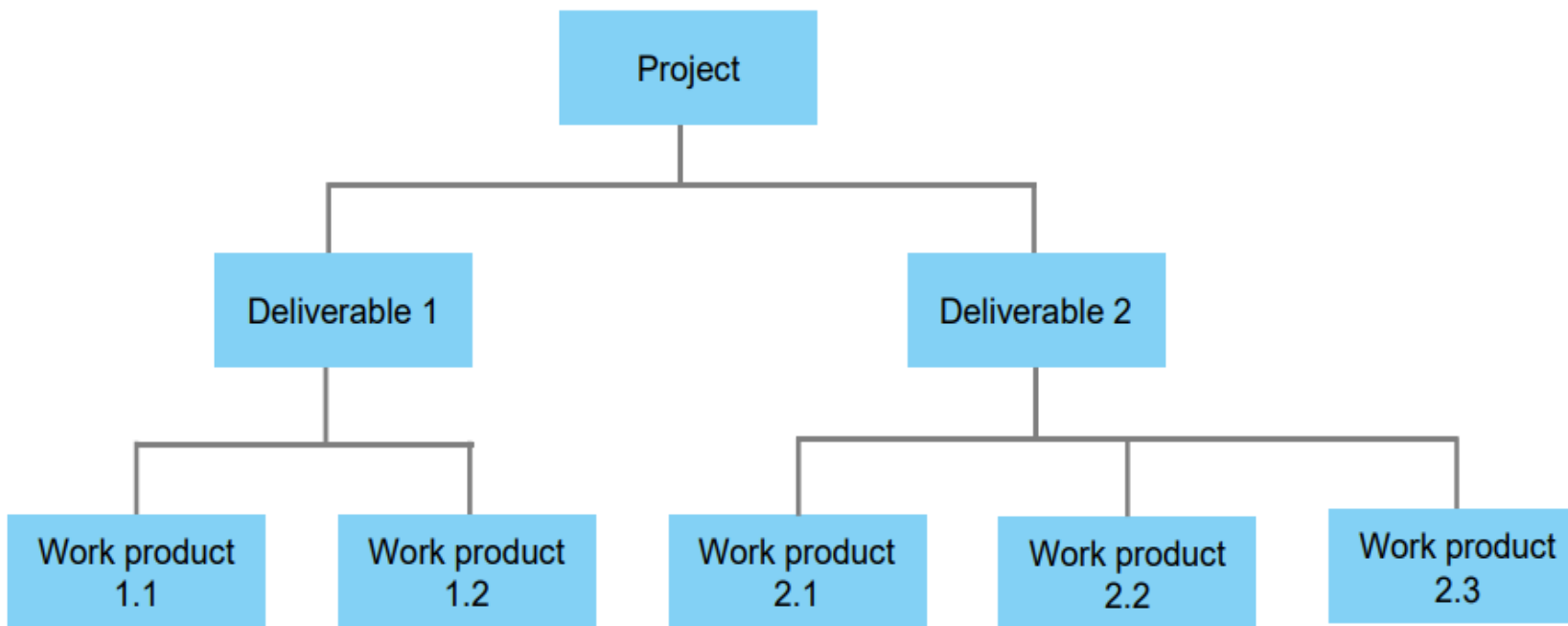
Work Breakdown Structure (WBS)

What does a WBS look like :

This is a “level 2” WBS
Decomposition might go deeper if needed

Conventions:

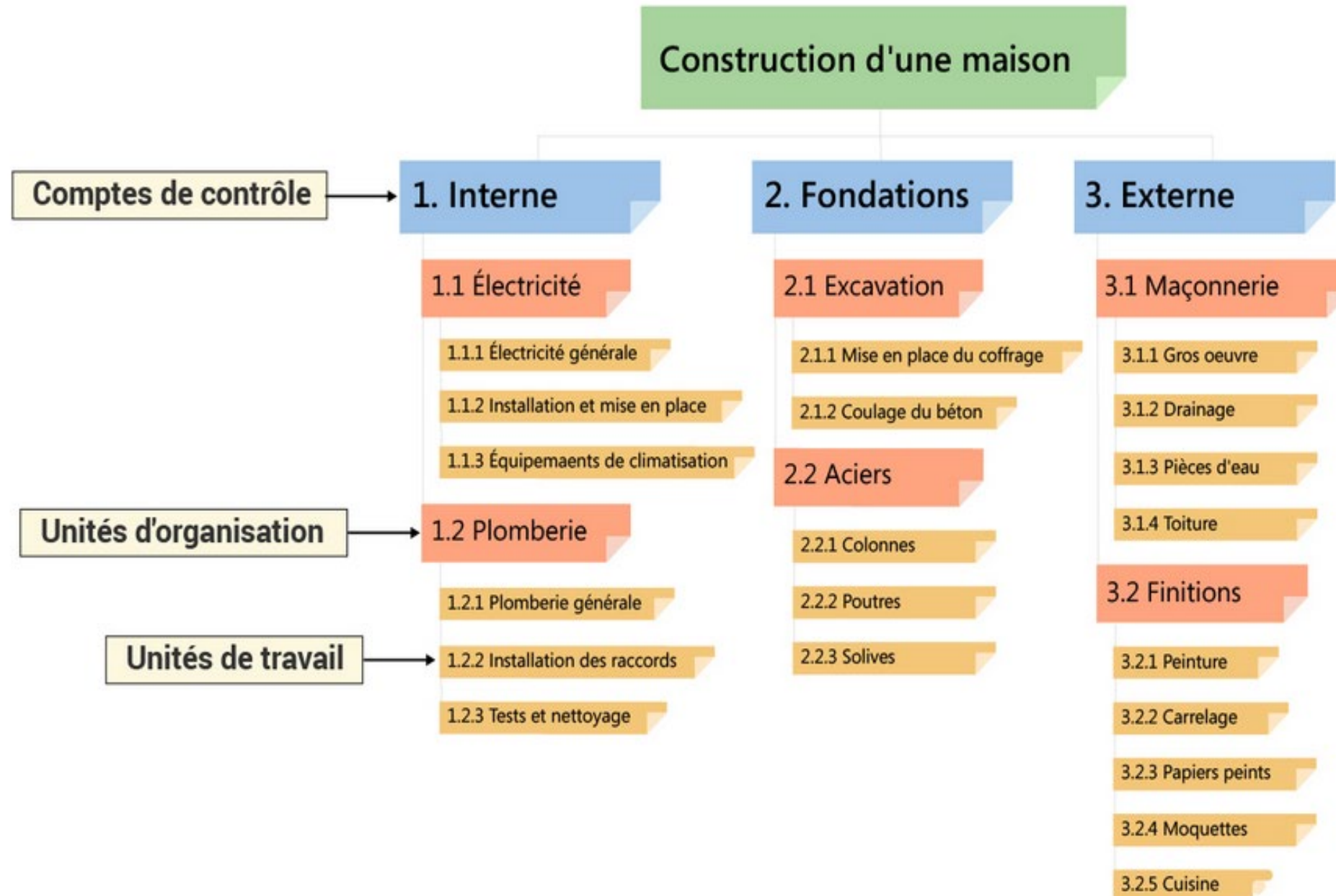
- WBS name for each item
- WBS number for each item
- Use noun and verb test to help with proper context



WBS List Format

1.0	Deliverable 1
1.1	Task 1
1.2	Task 2
1.3	Task 3
1.4	Task 4
1.5	Task 5
1.5.1	Task 5.1
1.5.2	Task 5.2
1.6	Task 6
1.7	Task 7
1.8	Task 8

Work Breakdown Structure (WBS) example



Work Breakdown Structure (WBS) 1/2

- The **WBS is a hierarchical decomposition of the total scope of work** to be carried out by the project team to accomplish the project objectives and create the required deliverables
- Create WBS is the process of subdividing project deliverables and project work into smaller, more **manageable components**
- The key benefit of this process is that it provides a framework of what has to be delivered.
- A WBS **ties the entire project together**. Dominant prerequisite for project integration (it will feed many other project processes)
- **WBS portrays scope graphically**, allows you to assign resources, permits you to develop estimates of time and costs, and thus provides **the basis for the schedule and the budget**.

Work Breakdown Structure (WBS) 2/2

- The planned work to perform is contained within the lowest level of WBS components, which are called **work packages or work product**
- In the context of the **WBS, work refers to work products or deliverables (WHAT) that are the result of activity (HOW) and not to the activity itself.**
- The **typical WBS has three to six levels**. It does not have to be symmetrical. All paths do not have to go down to the same level.

- **WBS work package attributes :**

- ✓ **Results in a deliverable (external or internal)**
- ✓ **Deliver a distinct and identifiable product**
- ✓ **Have definitive and verifiable completion criteria**
- ✓ **Can be clearly assigned to a single resource**



Do not confuse WBS with **PBS**: Product Breakdown Structure
OBS: Organizational Breakdown structure

Work Breakdown Structure (WBS) Guidelines

- **The WBS should always be developed before the schedule** is worked out, without trying to identify the sequence of activities.
- Stop breaking down work when you reach a **low enough level to do an estimate** of the desired accuracy.
- **Do not try to work out sequencing** of activities when you develop a WBS. You will do that when you develop a schedule.
- Gather project related materials and **review WBS used for similar projects**
- **Avoid developing details** prior really needed
- **Review WBS with** responsible project **stakeholders**
- Get buy in from those responsible for each work product
- Don't forget to include project related tasks (PM, QA, ...)
- Add appropriate **work package to manage risks**
- Prepare a WBS dictionary

Work Breakdown Structure (WBS) estimating

Attributes of an “estimate” in project management

- Assessment of the likely quantitative result
- Applied to project cost and the schedule
- Always used with an indication of accuracy and a modifier (preliminary, feasibility, final)
- Completed at the level that is appropriate for the decision being made with the data

Associated Terminology

- **Effort:** qty of labor units required to complete the task (staff hours). **Level of Effort (LOE)**
- **Duration:** number of work periods, excluding nonworking period required to complete an activity

Estimating Principles

- Exact estimate is an oxymoron!
- Document associated assumptions
- Make allowance for learning curve, training, holidays
- Ensure review by a “fresh set of eyes or get a parallel estimate to validate

Work Breakdown Structure (WBS) estimating Methods

Bottom-up estimating:

Estimation of Cost and duration of individual work items in hours and summarized to a project total.

+ Pro: Improved accuracy; Appropriate detail to control project; Provide team buy-in to estimates

- Con: Longer time; Higher cost; As accurate as the WBS; Team members may pad estimates

Top-Down estimating: high-level estimates of projects or summary tasks

- **Analogous approach:** Use the actual estimate of a previous, similar activities as the basis for estimating the current activity

+ Pro: Little time and effort; Less costly; Details don't need to be known

– Con: Less accurate; Historical information or expert opinion may not be available

- **Parametric approach:** uses specific measures to estimate the effort required to complete a task (such as hours per lines of code and dollars per function point)

+ Pro: Can be more accurate and detailed than analogous; Can be quicker than bottom-up

– Con: Accuracy varies widely; Can be more costly to produce; Historical information may not be available; Parameters may not be quantifiable or scalable

Project Management Curriculum

Session 3 Friday October 24

IAE Montpellier
2025-2026

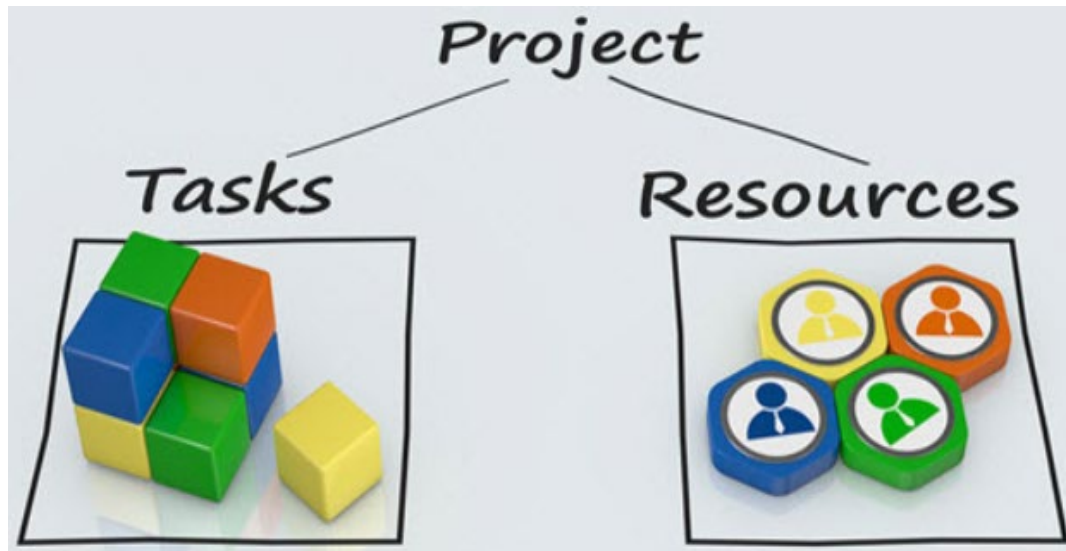
Session 3 content

- ✓ QCM Session 3
- ✓ Q&A session 3
- ✓ Develop the project plan
 - ✓ Content of project plan
 - ✓ Key steps of project planning
- ✓ Scope Management
 - ✓ Scope key points & definitions
 - ✓ WBS
- **Schedule Management**
 - **Definitions**
 - **Precedence diagram method**
- Financial Baseline
- Student work assignment

Minimum/simplified Project Planning steps



1. Using the project charter, **refine the scope** statement to define requirements, project work boundaries & product features (scope baseline)
2. Develop a **Work Breakdown Structure (WBS)**
3. Using the WBS, **estimate activity durations, resource requirements and costs** (as appropriate for your environment)
4. Prepare the **project master schedule** (time baseline).



Schedule Management

		PM Knowledge areas				
Groups of PM Processes	PM MGT Processes	Integration Mgt	Stakeholder Mgt	Scope Mgt	Schedule Mgt	Cost Mgt
	Initiating	• Develop Project charter	• Identify stakeholders			
	Planning	• Develop Project Plan	• Plan stakeholder engagement	• Plan for Scope Mgt • Collect Requirements • Define Scope • Create WBS	• Plan for Schedule Mgt • Define Activities • Sequence Activities • Estimate Activity Durations • Develop Schedule	• Plan for Costs Mgt • Estimate Costs • Determine Budget
	Executing	• Direct and Manage Project Work • Manage Project Knowledge	• Manage stakeholder engagement			
	Controlling	• Monitor and Control Project Work • Perform Integrated Change Control		• Validate Scope • Control Scope	• Control schedule	• Control Costs
	Closing	• Close project or phase				

Scheduling Project Work: definitions

Scheduling terminology

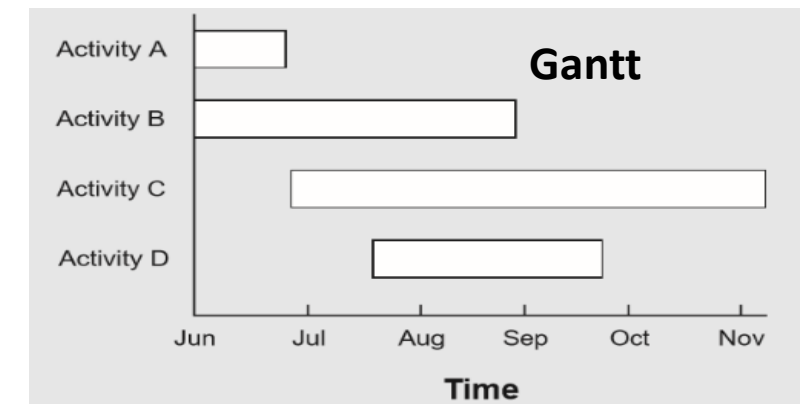
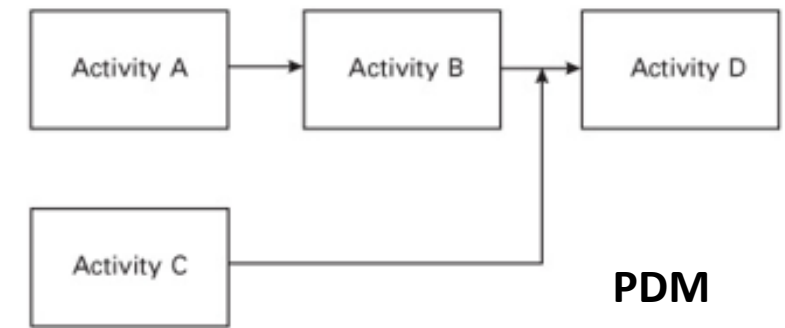
- **Task:** lowest level of WBS and a subdivision of an activity
- **Activity:** set of tasks to perform a work product
- **Milestones:** events that represent a point in a project of special significance.
- **Precedence relationship:** dependency between two activities or an activity and a milestone
- **Project network diagram:** any schematic display of dependencies among activities
- **PDM: Precedence Diagram Method** (activity-on-node) activities connected with arrows to show dependencies
- **Gantt:** bar chart format to represent activity over time

Scheduling Principles

- Don't schedule in more detail than you can manage.
- No task should have a duration greater than 4 weeks.

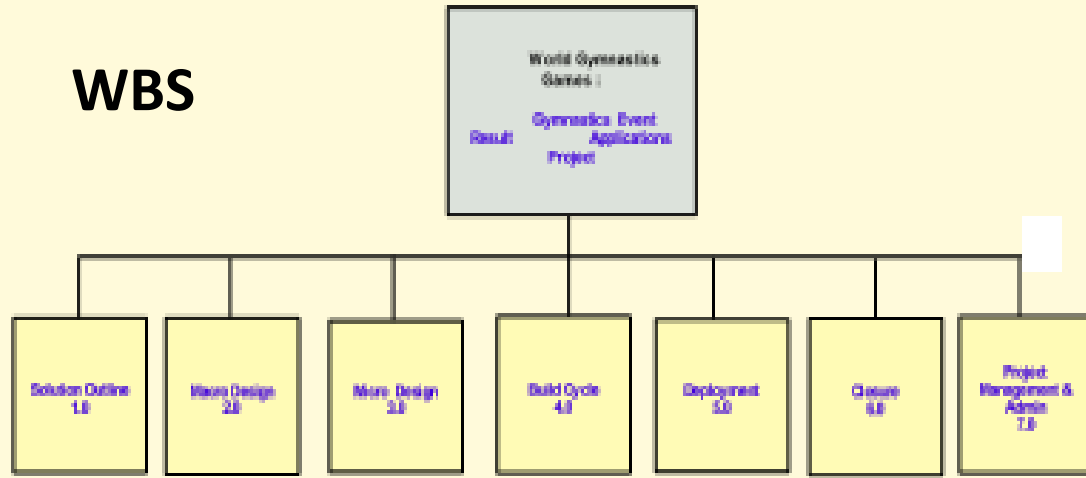
Milestones						Data Date
Event	Jan	Feb	Mar	Apr	May	
Subcontracts Signed			△▼			
Specifications Finalized				△▽		
Design Reviewed					△	
Subsystem Tested						
First Unit Delivered						
Production Plan Completed						

An activity-on-node network



Scheduling Project Work : scheduling activity

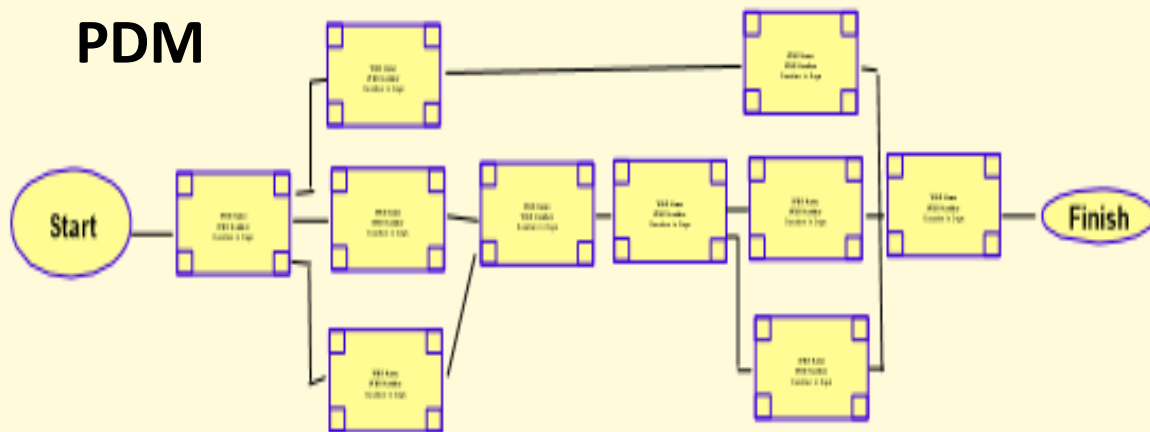
WBS



Scheduling assignment is to develop a **precedence diagram from the WBS** and to identify **the critical path**

The critical path is the longest path through a project network. All activities on the critical path must be completed as scheduled, or the Project end date will slip

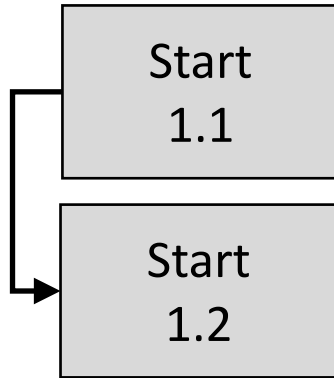
PDM



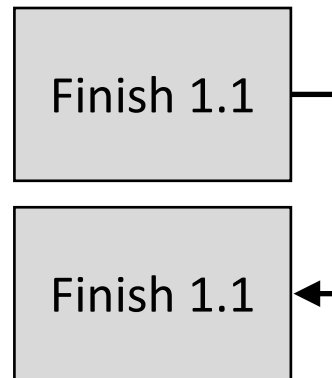
To yield the optimum schedule, scheduling should be developed according to what is logically possible, **independent of resource allocation that should be done later.**

Scheduling Project Work: definitions

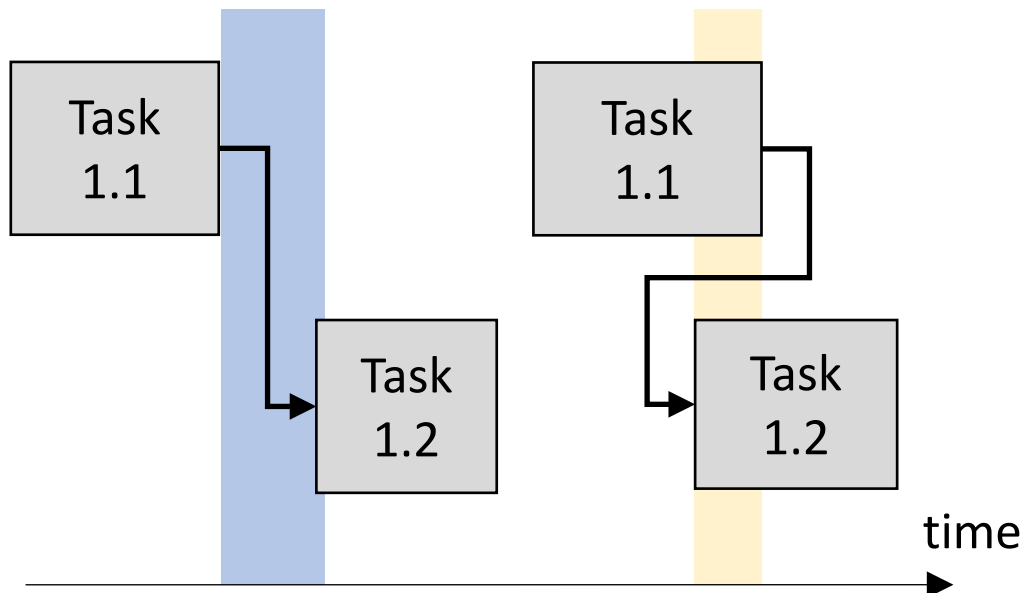
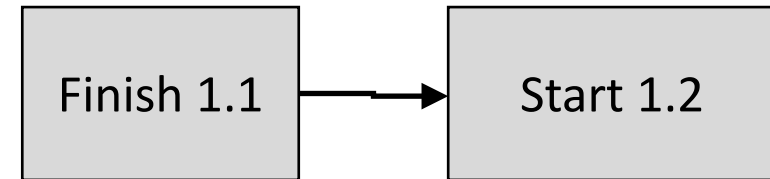
SS Start to Start



FF Finish to Finish



FS Finish to Start



Lag time

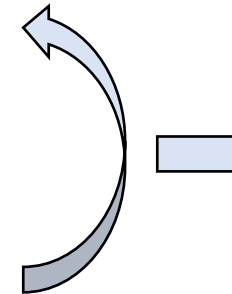
Fix **delay** between Start or Finish on one task and the Start or Finish of another

Lead Time

Overlap amount of time by which a successor task can start before the predecessor has finished

Scheduling Project Work: Precedence Diagram

ES = Early Start Earliest possible time an activity can be started	Name WBS ID number	EF = Early Finish Earliest possible time an activity can be finished
LS = Late Start Latest possible time an activity can start without delaying a successor		LF = Late Finish Latest possible time an activity can be finished without delaying a successor



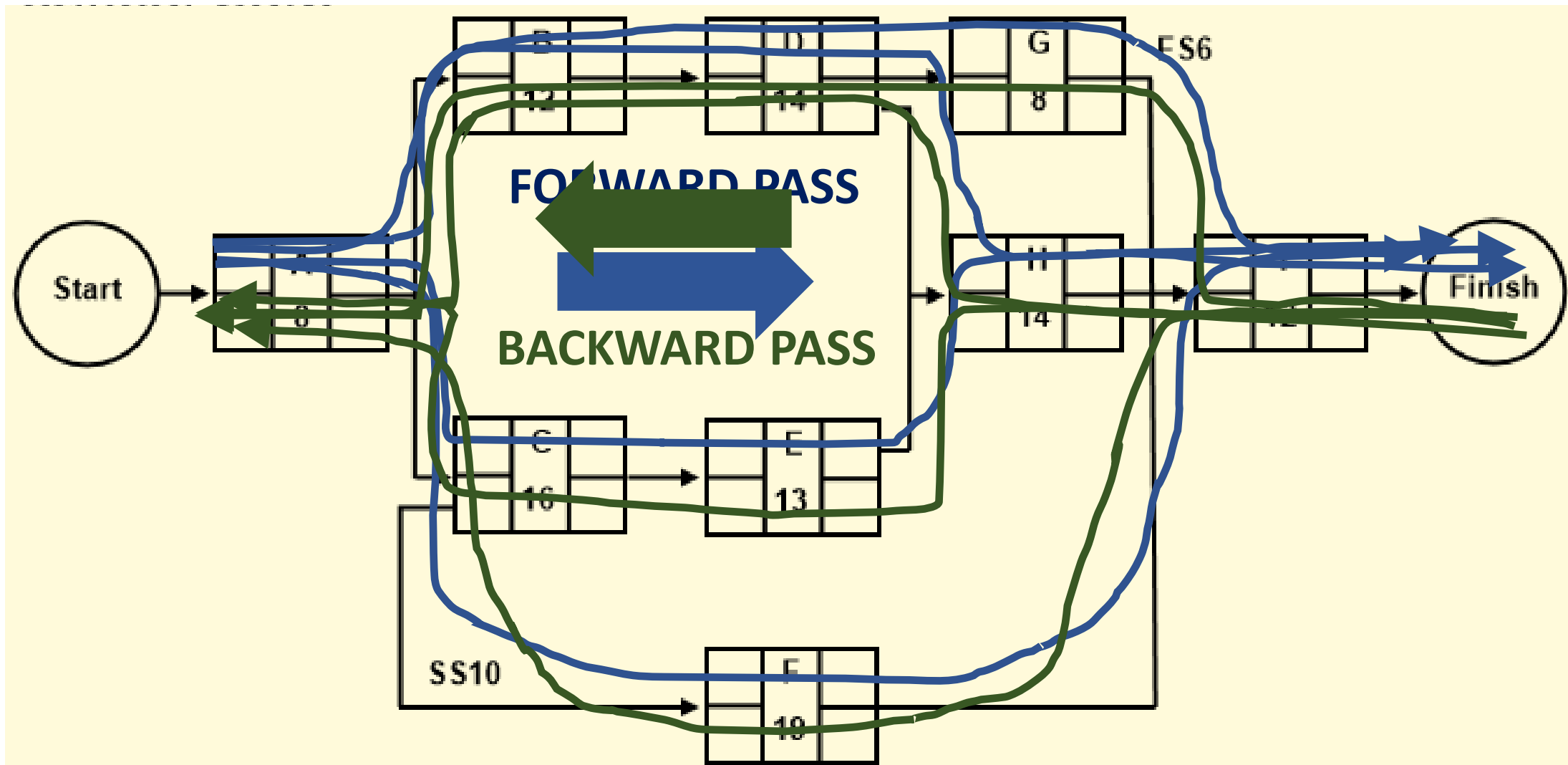
Float (Slack)

amount of time a task can be delayed from its Early Start without delaying the project End

Float = LF – EF or LS - ES

Float > 0 time available
Float = 0 critical
Float < 0 behind or late

Scheduling Project Work: Precedence Diagram Method



Scheduling Project Work: Forward pass

FORWARD PASS

ES = Early Start Earliest possible time an activity can be started	Name WBS ID number	EF = Early Finish Earliest possible time an activity can be finished
LS = Late Start Latest possible time an activity can start without delaying a successor		LF = Late Finish Latest possible time an activity can be completed without delaying a successor
Duration		

- ✓ Define project **start** date
- ✓ Work from left to right, Top to bottom of the network
- ✓ When a successor (S) has multiple predecessors (P), select the **highest Early Finish** date as Early Start date of successor (S)
- ✓ **Calculations :**

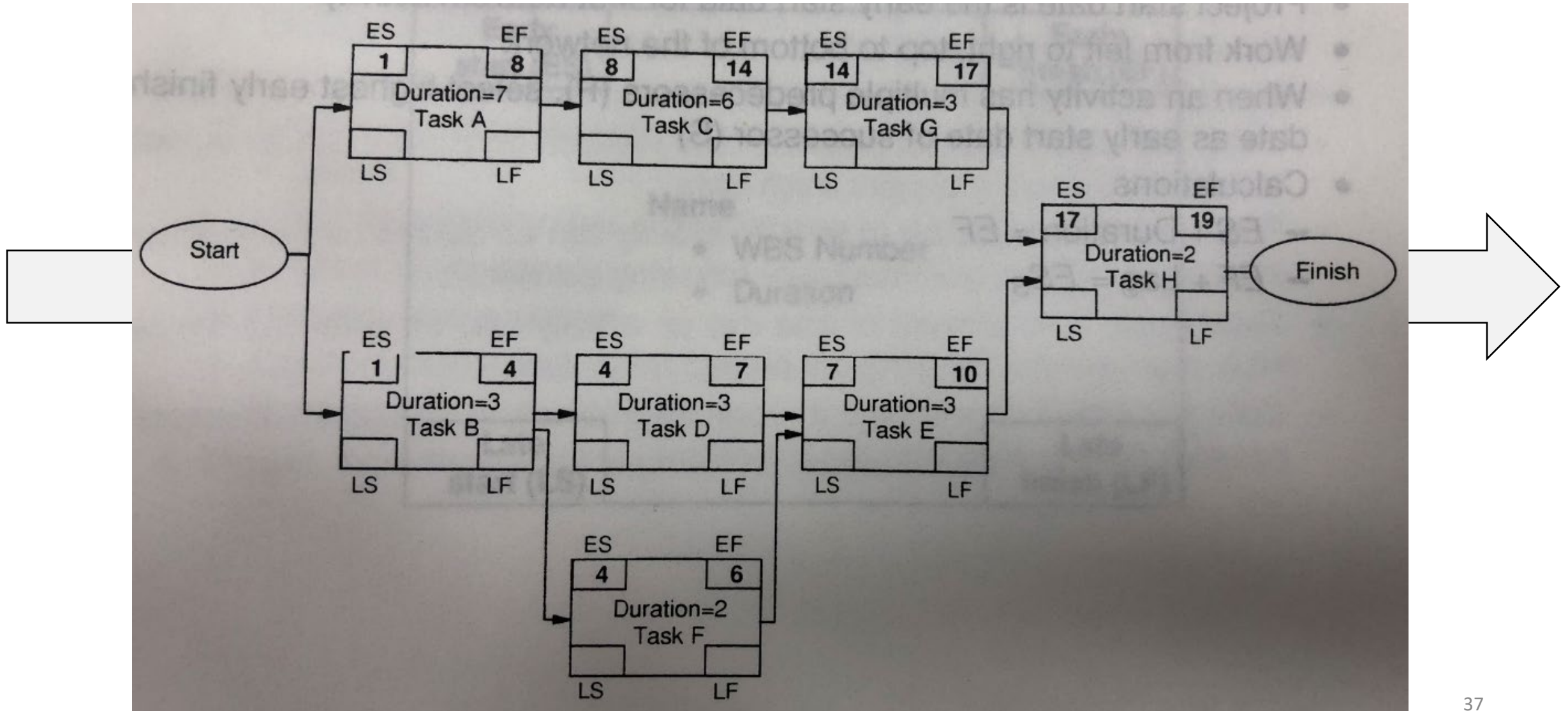
$$EF = ES + Duration$$

$$ES_s = EF_p + Lag$$

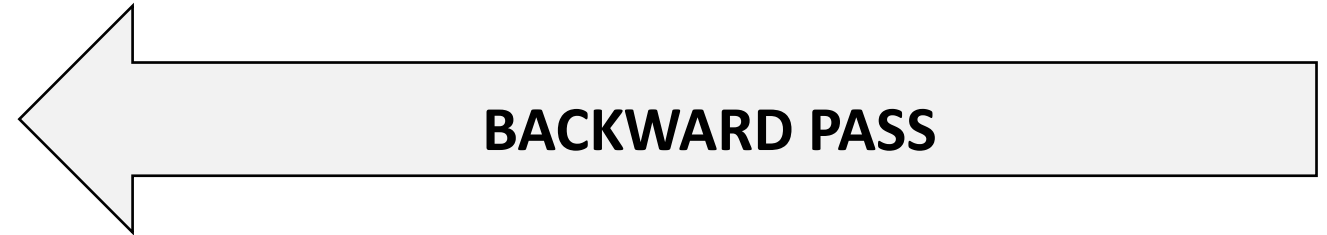
ESs : ES_{successor}

Scheduling Project Work: forward pass example

FORWARD PASS



Scheduling Project Work: Backward pass



- ✓ Define project **Finish** date
- ✓ Work from **Right to Left**, top to bottom of the network
- ✓ When a Predecessor (P) has multiple successors (S), select the **lowest Late Start** as the Late Finish date of the predecessor (P)

✓ Calculations

$$LS = LF - \text{Duration}$$

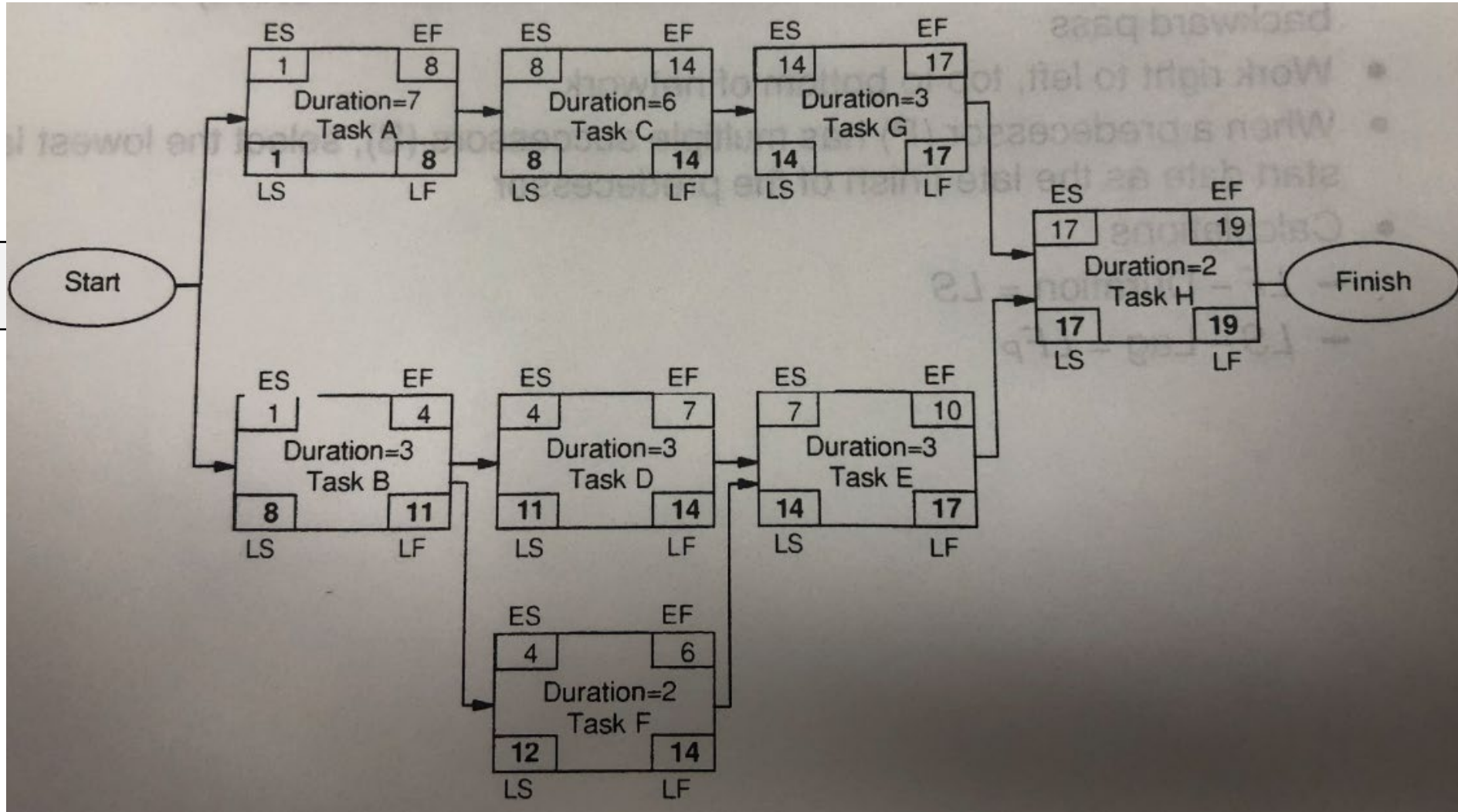
$$LF_p = LS - \text{Lag}$$

LF_p : LF_{predecessor}

ES = Early Start Earliest possible time an activity can be started	Name WBS ID number Duration	EF = Early Finish Earliest possible time an activity can be finished
LS = Late Start Latest possible time an activity can start without delaying a successor		LF = Late Finish Latest possible time an activity can be finished without delaying a successor

Scheduling Project Work Backward pass example

BACKWARD PASS



Scheduling Project Work: Summary

Project Scheduling Process STEPS

1. Using the Work Breakdown Structure, develop a precedence diagram
2. Calculate the forward pass
3. Calculate the backward pass
4. Identify float, critical path, and near-critical path
5. **Adjust the Schedule to meet objectives**
6. **Identify new risks and update the risk plan**



Scheduling Project Work: Optimizing

Ways to meet schedule objectives :

- **Fast-tracking:** change the relationships among tasks to short critical path
 - Look at doing **more tasks in parallel**, not in sequence
 - Change approach to work to create a **different set of interrelated tasks** with a shorter critical path (*Note: This may change the WBS*)
- **Change a date constraint** so that a task on the critical path can start or end sooner
- **Crash the network** to decrease the total project duration after analyzing alternatives to see how to get the maximum duration compression for the least cost

Key Points to Remember about scheduling

- ✓ **Initial schedule computations** are made assuming that **unlimited resources** are available. This yields the best-case solution, but at the end PM must consider resource allocation.
- ✓ **Failure to consider resource allocation** in scheduling almost always leads to a schedule that cannot be achieved.
- ✓ **Schedule at a level of detail that can be managed.**
- ✓ No task should be scheduled with a duration much greater than four to six weeks. Subdivide longer tasks to achieve this objective. Software and engineering tasks should be divided even further, to durations not exceeding one to three weeks.
- ✓ Do not hesitate to include contingencies as needed
- ✓ **Do not forget, project management is not just scheduling.**

Scheduling Project Work : Gantt chart example

✓	4 GANTT 3Q18 Pilots	Wed 15/08/18	85 days	Tue 11/12/18
✓	4 Time line Refurb (Pilot 1 Mako Q25 S/N 7836684 from Sweeden) to Lijn	Wed 15/08/18	33 days	Fri 28/09/18
✓	GO date	Wed 15/08/18	0 days	Wed 15/08/18
✓	preparation for customer system pickup	Wed 15/08/18	10 days	Tue 28/08/18
✓	transfer from Mktg Ctry to Rotterdam	Wed 29/08/18	6 days	Wed 05/09/18
✓	transfer from Rotterdam to MOP	Thu 13/09/18	3 days	Tue 18/09/18
✓	reception & audit in MOP	Tue 18/09/18	2 days	Thu 20/09/18
✓	repair & Test and shipping	Thu 20/09/18	3 days	Tue 25/09/18
✓	transfer from MOP to Rotterdam	Tue 25/09/18	1 day	Wed 26/09/18
✓	shipment from rotterdam (Rev Recognition)	Fri 28/09/18	1 day	Fri 28/09/18
✓	4 Time line POC Refurb (Mako Q100 S/N 7836148 from UK) to Volvo	Fri 24/08/18	25 days	Thu 27/09/18
✓	GO date	Fri 24/08/18	0 days	Fri 24/08/18
✓	preparation for customer system pickup	Fri 24/08/18	10 days	Thu 06/09/18
✓	transfer from Mktg Ctry to Rotterdam	Fri 07/09/18	4 days	Wed 12/09/18
✓	reception & audit in MOP	Wed 12/09/18	2,5 days	Fri 14/09/18
✓	repair supply availability	Wed 12/09/18	0 days	Wed 12/09/18
✓	repair & Test and shipping	Fri 14/09/18	7 days	Tue 25/09/18
✓	transfer from MOP to Rotterdam	Tue 25/09/18	3 days	Thu 27/09/18
	shipment from rotterdam to Volvo customer	Thu 27/09/18	0 days	Thu 27/09/18
✓	4 Time line POC Refurb (Mako Q100 S/N NZ30119 from belgium) to arcadia	Fri 24/08/18	49 days	Wed 31/10/18
✓	asset reception in MOP	Fri 24/08/18	0 days	Fri 24/08/18
✓	repair supply availability	Fri 07/09/18	21 days	Fri 05/10/18
	repair & Test and shipping	Mon 08/10/18	10 days	Fri 19/10/18
	transfer from MOP to Rotterdam	Mon 22/10/18	3 days	Wed 24/10/18
	transfer from Rotterdam to MOP	Thu 25/10/18	2 days	Fri 26/10/18
	Installation at customer site	Mon 29/10/18	3 days	Wed 31/10/18
✓	4 Time line Refurb (Pilot 2 Mako Q25 S/N 7836672 from Sweeden) to Lijn	Wed 29/08/18	75 days	Tue 11/12/18
	GO date	Wed 29/08/18	0 days	Wed 29/08/18
	preparation for customer system pickup	Wed 29/08/18	43 days	Fri 26/10/18
	transfer from Mktg Ctry to Rotterdam	Mon 29/10/18	6 days	Mon 05/11/18
	transfer from Rotterdam to MOP	Tue 06/11/18	4 days	Fri 09/11/18
	reception & audit in MOP	Mon 12/11/18	2 days	Tue 13/11/18
	repair supply availability	Tue 13/11/18	0 days	Tue 13/11/18
	repair & Test and shipping	Wed 14/11/18	15 days	Tue 04/12/18
	transfer from MOP to Rotterdam	Wed 05/12/18	5 days	Tue 11/12/18
	shipment from rotterdam (Rev Recognition)	Tue 11/12/18	0 days	Tue 11/12/18



Project Management Curriculum

Session 3

Friday October 24

IAE Montpellier
2025-2026

Session 3 content

- ✓ QCM Session 3
- ✓ Q&A session 3
- ✓ Develop the project plan
 - ✓ Content of project plan
 - ✓ Key steps of project planning
- ✓ Scope Management
 - ✓ Scope key points & definitions
 - ✓ WBS
- ✓ Schedule Management
 - ✓ Definitions
 - ✓ Precedence diagram method
- **Financial Baseline**
- Student work assignment

Schedule Management

PM Knowledge areas

Groups of PM Processes	PM MGT Processes	Integration Mgt	Stakeholder Mgt	Scope Mgt	Schedule Mgt	Cost Mgt
	Initiating	• Develop Project charter	• Identify stakeholders			
	Planning	• Develop Project Plan	• Plan stakeholder engagement	• Plan for Scope Mgt • Collect Requirements • Define Scope • Create WBS	• Plan for Schedule Mgt • Define Activities • Sequence Activities • Estimate Activity Durations • Develop Schedule	• Plan for Costs Mgt • Estimate Costs • Determine Budget
	Executing	• Direct and Manage Project Work • Manage Project Knowledge	• Manage stakeholder engagement			
	Controlling	• Monitor and Control Project Work • Perform Integrated Change Control		• Validate Scope • Control Scope	• Control schedule	• Control Costs
	Closing	• Close project or phase				

Minimum/simplified Project Planning steps

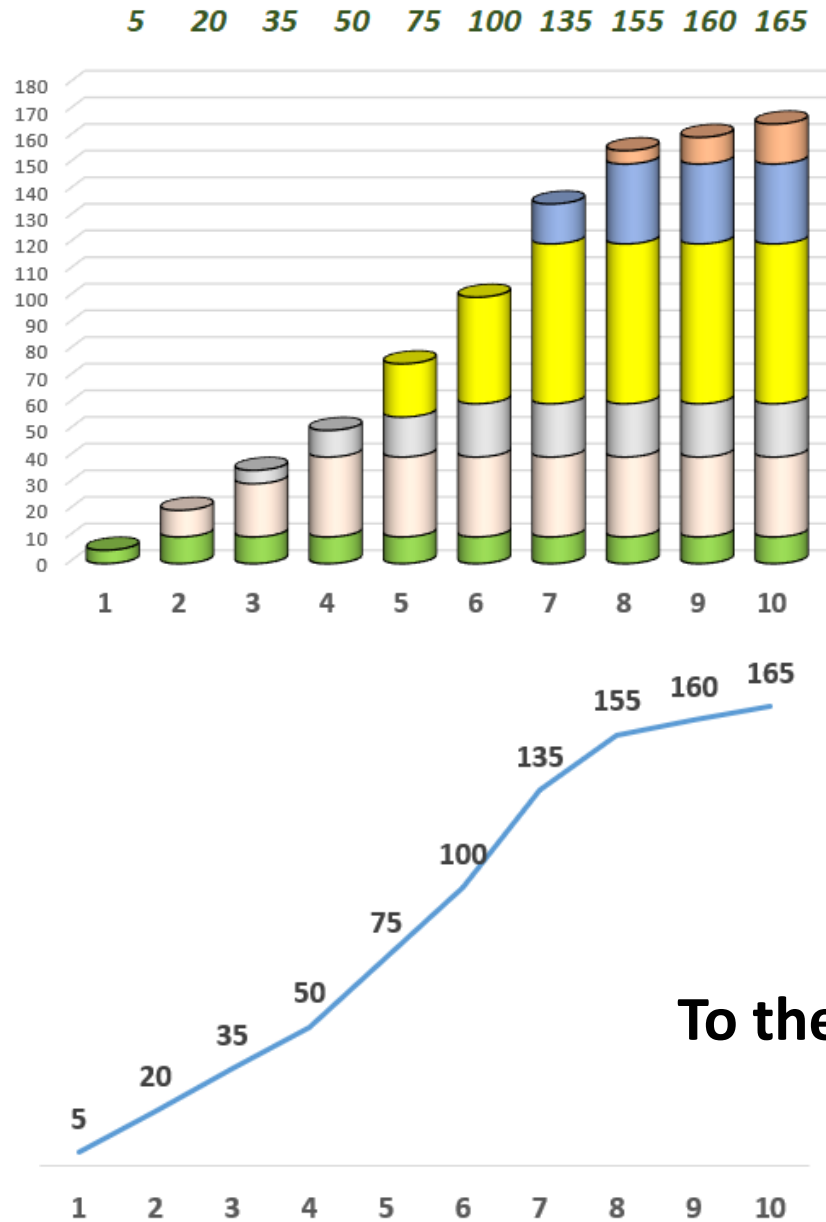
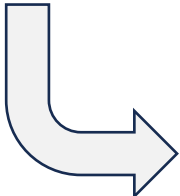
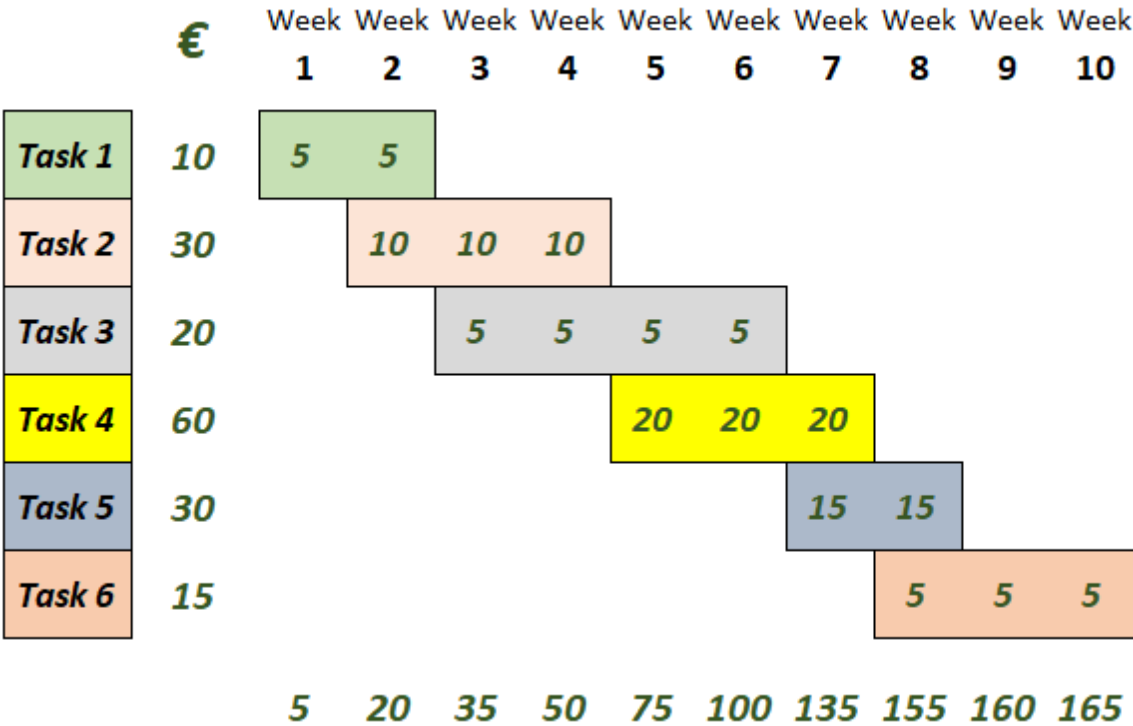
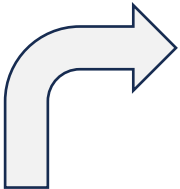


1. Using the project charter, **refine the scope** statement to define requirements, project work boundaries & product features (scope baseline)
2. Develop a **Work Breakdown Structure (WBS)**
3. Using the WBS, **estimate activity durations, resource** appropriate for your environment)
4. Prepare the **project master schedule** (time baseline)
5. Prepare the **project master budget** (cost baseline).



Financial Baseline

From the GANTT



Project Management Curriculum

Session 3

Friday October 24

IAE Montpellier
2025-2026

Session 3 content

- ✓ QCM Session 3
- ✓ Q&A session 3
- ✓ Develop the project plan
 - ✓ Content of project plan
 - ✓ Key steps of project planning
- ✓ Scope Management
 - ✓ Scope key points & definitions
 - ✓ WBS
- ✓ Schedule Management
 - ✓ Definitions
 - ✓ Precedence diagram method
- ✓ Financial Baseline
- **Student work assignment**

session 3 work assignment to prepare session 4

1. Identify the critical path of the precedence diagram provided next page
2. Document the scope baseline of your class project
3. Create the WBS of your class project
4. Estimate tasks durations and precedence's to build the Gantt and identify the critical path of your project
5. Estimate tasks resources and associated cost to build the financial baseline of your project
6. Prepare for Session 4 and the opening QCM

Target Date : - End of Day Sunday October 26th

Deliverables:

- > Scope baseline of your project (posted in Moodle)
- > WBS of your project (posted in Moodle)
- > Gantt of your project (posted in Moodle)
- > Cost baseline of your project (Posted in Moodle)
- > Find the critical pass of the next page diagram (Posted in Moodle)

Scheduling Exercise: find the critical path

