MSE 4.0

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Project Management and Lean Teams

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Universidade do Minho

Curriculum Development
of Master's Degree Program in
Industrial Engineering for Thailand Sustainable Smart Industry

Plan

- ✓Planning Processes
- ✓Scope
- ✓WBS
- ✓Schedule
- ✓CPM
- ✓Example

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Planning the Project

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What about Customer?

- Although the Customer must be committed to project planning, he is not responsible for planning.
- The Customer's role is to provide the product requirements (Product Scope) and its Acceptance Criteria (CAC). Scope Management
- How to keep the Client engaged and feeling part of the project without interfering is a function of Stakeholder Management and Communication Management.

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Plan the Project

	Project Management Process Groups	
Process Knowledge Areas	**Iniciation (2)**	**Planning (24)**
Integration (7)	Develop the Term of Opening	Develop Management Plan
Scope (6)		Scope management planning; Collect requirements; Scope definition; Create WBS
Schedule(6)		Schedule management planning; Define activities; Sequencing activities; Estimate resources of activities; Estimate duration of activities; Develop schedule
Cost (4)		Cost Management Planning; Estimate Costs; Determine budget
Quality (3)		Quality Management Planning
Resources (6)		Resource Planning Estimate Activity Resources
Comunication (3)		Comunication Management Planning
Risk (7)		Risk Management Planning; Identify the risks; Perform qualitative risk analysis; Risk response plan.
Acquisitions (3)		Procurement Management Planning
Stakekholders (4)	Identify Stakeholders	Stakeholder Engagement Planning

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Scope Management

- Plan Scope Management
- Collecting Requirements
- Define the Scope
- Create the WBS

➢ Always keep in mind the difference between:

Project Scope and Product Scope

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Project Analytical Structure (WBS)

Divide project deliverables and work into smaller, more manageable elements.

OUTPUT

- Scope baseline
  - •Specifying the scope of the project
  - •EAP
  - •EAP Dictionary
- Update on project documents

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Work Breakdown Structure(WBS)

It can be represented oriented towards the life cycle phases, deliveries or subcomponents developed by external organizations.

It must include all deliveries related to the project.

Each level is a decomposition.

The lowest level is called a “work package”.

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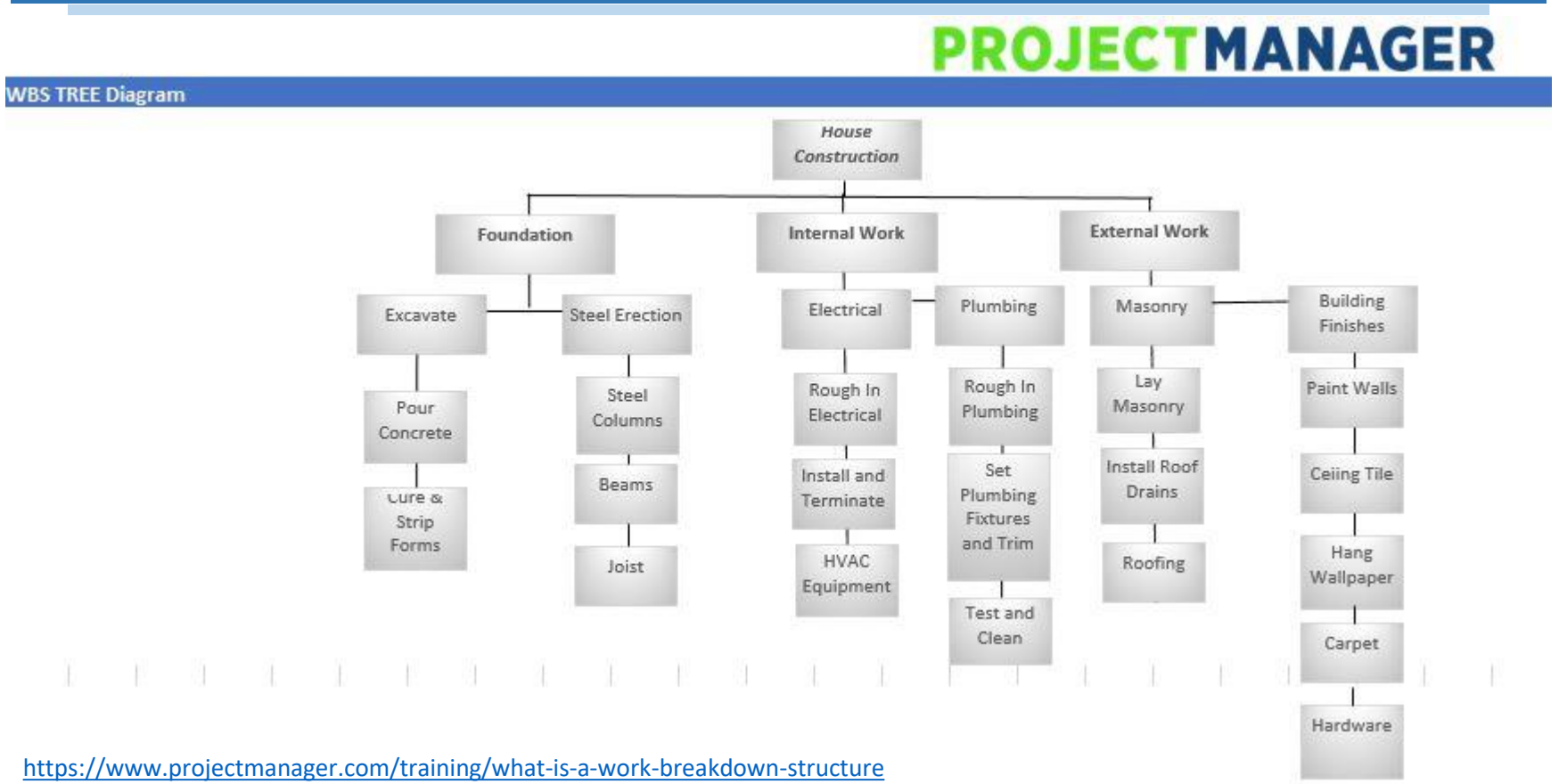
Work Breakdown Structure(WBS)



https://www.projectmanager.com/training/what-is-a-work-breakdown-structure

Video: https://www.youtube.com/watch?v=wEWhnodF6ig&feature=youtu.be

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Schedule Management

- **Processes**

  - Schedule management planning;
  - Define activities;
  - Activity sequencing;
  - Estimate activity resources;
  - Estimate the duration of activities;
  - Schedule Development.

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Define Activities

- **OUTPUTS**
  - Activities list
  - Activity attributes
  - (predecessors, successors, logical relationships, waits and anticipations, resource requirements, imposed dates, restrictions and assumptions)
  - List of milestones

    - **Decomposition**

    Subdivide work packages into smaller and more easily manageable components called schedule activities.

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Sequence Activities

- **Tools and techniques**

  Precedence diagram method (PDM)
  Dependency determination
  Anticipations and waits

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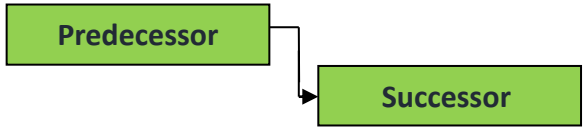
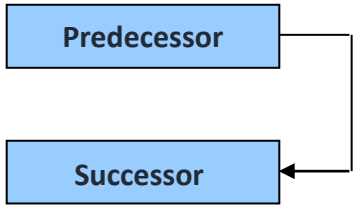
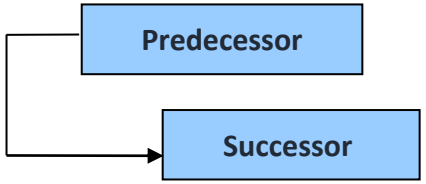
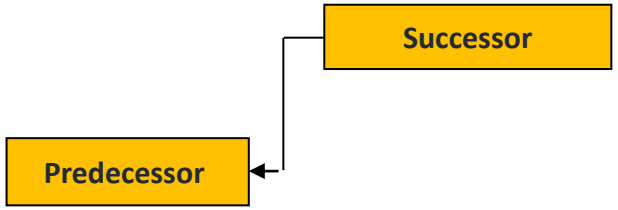
Sequence Activities

End to start. The initiation of the successor activity depends on the completion of the predecessor activity**.**		Concreting takes place after the hardware is in place.
End to end. The completion of the successor activity depends on the completion of the predecessor activity**.**		The work is completed together with the INSS payments to obtain the CND.
Start to start. The initiation of the successor activity depends on the initiation of the predecessor activity.		Construction of the walls and hydraulic installation.
Start to finish. The completion of the predecessor activity depends on the initiation of the successor activity.		Finalization of payment occurs only after handing over the keys.

Mandatory dependency

Arbitrary dependence

External dependency

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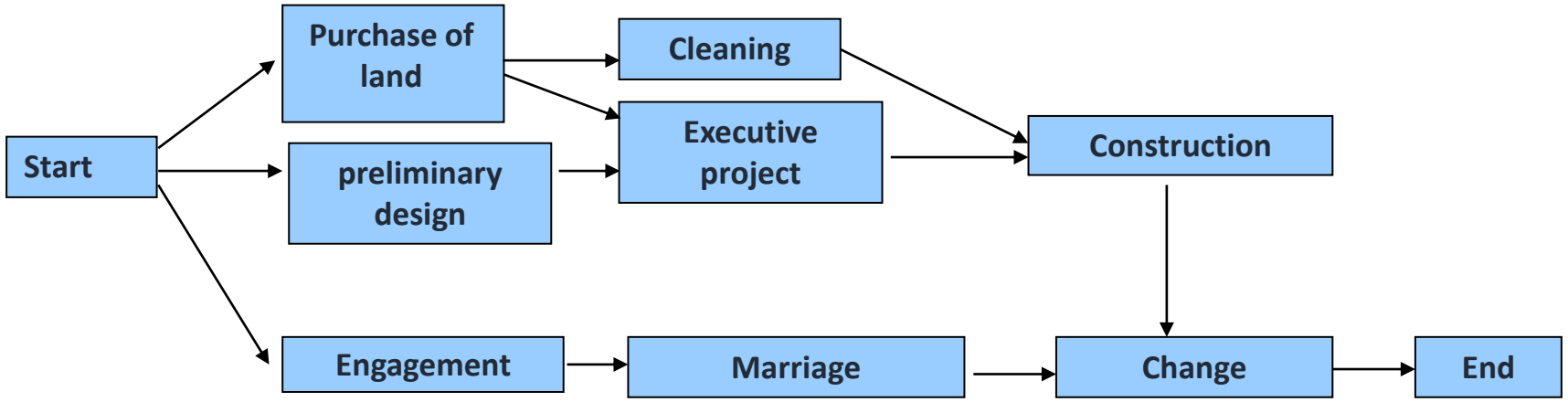
Sequence Activities



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Estimate Activity Resources

- Estimation of the types and quantities of material, people, equipment and supplies that will be needed to carry out each activity.

Always consider:

Resource calendars

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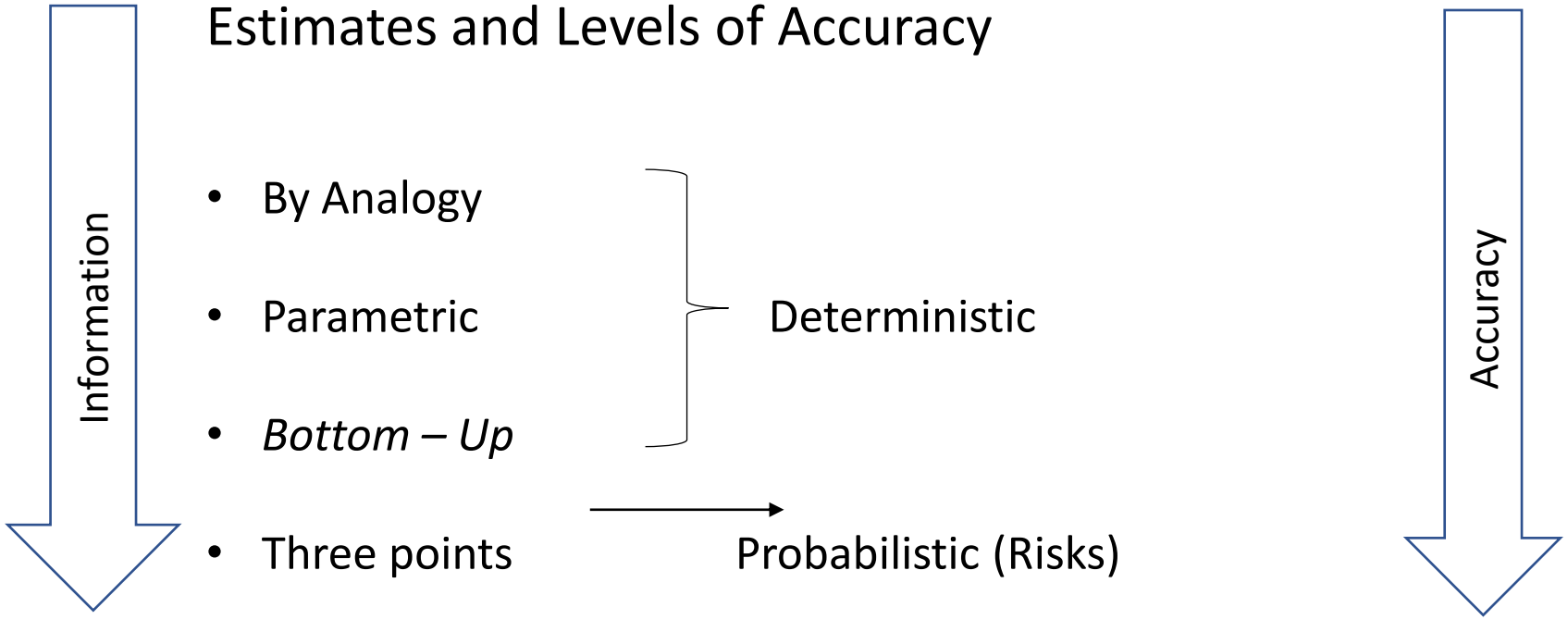
Estimate Activity Duration

- It is the process of calculating the duration of the project activities with the estimated resources.



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Schedule Development

- Consolidates the previous processes, evaluating the sequencing, the estimated resources and the calculated durations, applying anticipations, waits, parallels and compressions to the project activities, in order to obtain a schedule that meets the project needs.

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Develop the Schedule

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Tools and techniques

- Schedule network analysis
  - Critical path method
  - Critical current method
  - Resource optimization techniques
  - Model creation techniques
- Anticipations and Waits
- Schedule compression
- Timeline tool

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Critical Path Method (CPM)

- Includes determining the longest path on the network (critical path) and the earlier and later time that an activity can begin and be completed.
- Deterministic model.
- Emphasis on cost control and schedule flexibility.
- It is concerned with the time-cost ratio.
- Projects with previous experience.

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Program Evaluation and Review Technique (PERT)

- Uses a sequential network and a weighted average duration estimate to calculate activity durations.
- **Differs fundamentally from CPM because it uses distribution of averages instead of the most likely estimate.**
- Probabilistic model.
- Emphasis on the schedule with flexibility in costs.
- Research and development projects.
- Can be used to estimate time and cost.

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Critical Path Method (CPM)

- **Critical Path - Concept**

The critical path is the path formed by activities that, if delayed, delay the duration of the project. These activities, therefore, have zero slack.

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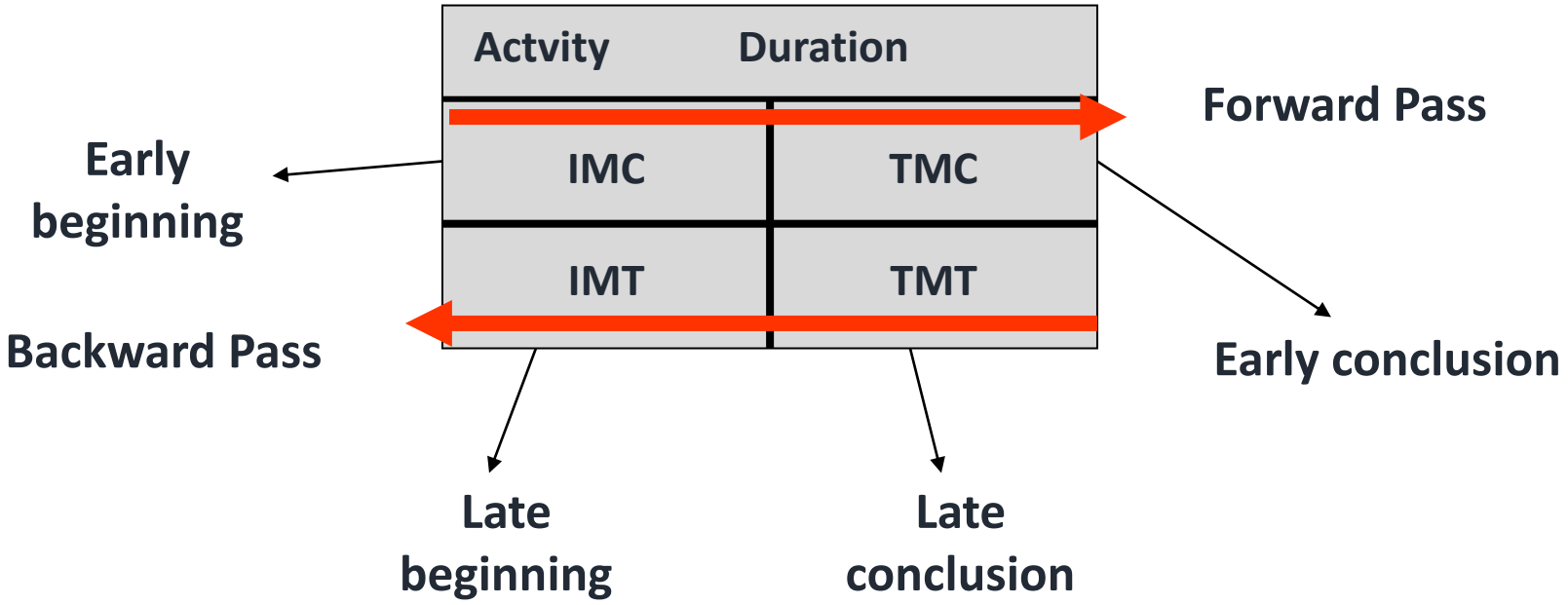
Critical Path Method (CPM)



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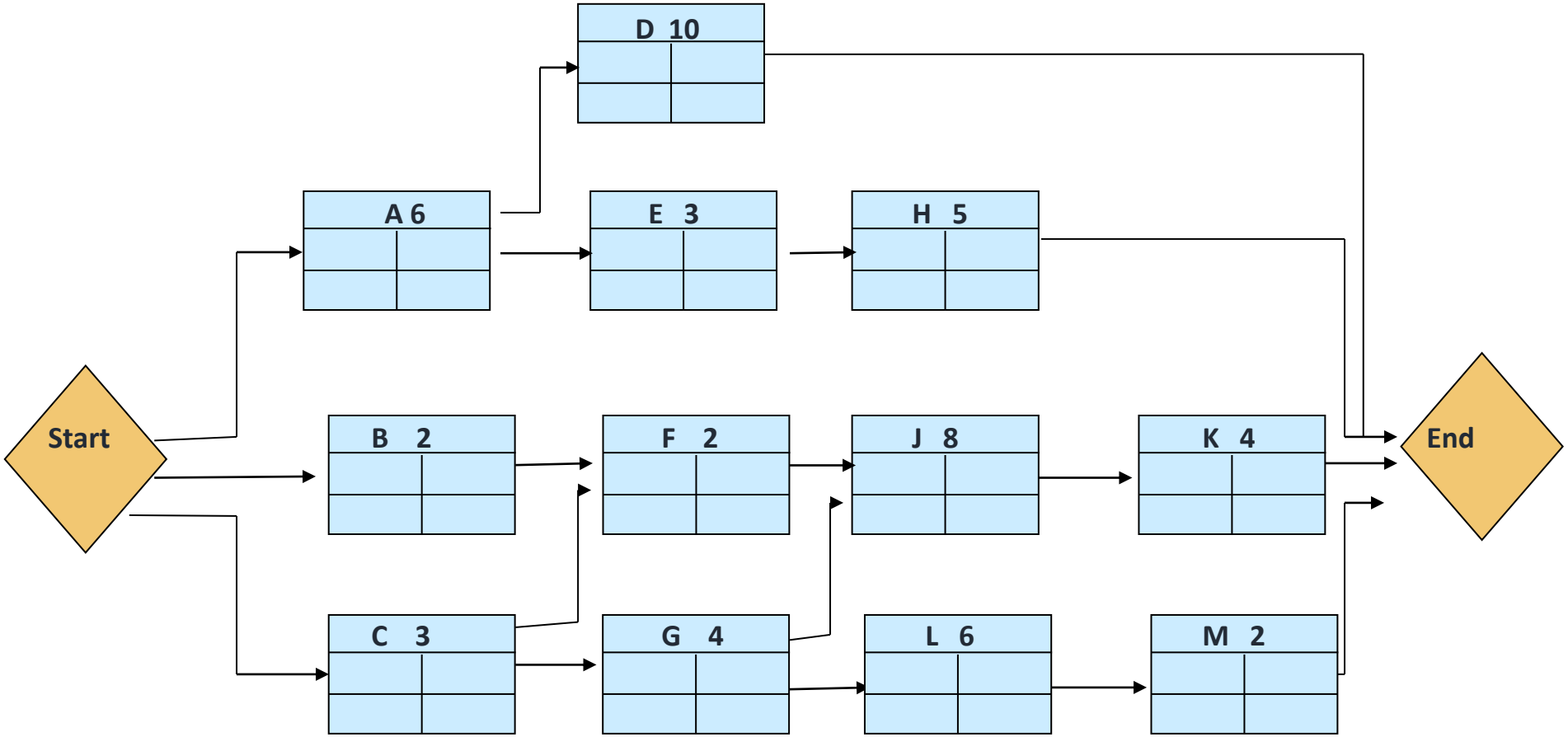
Critical Path Method (CPM)



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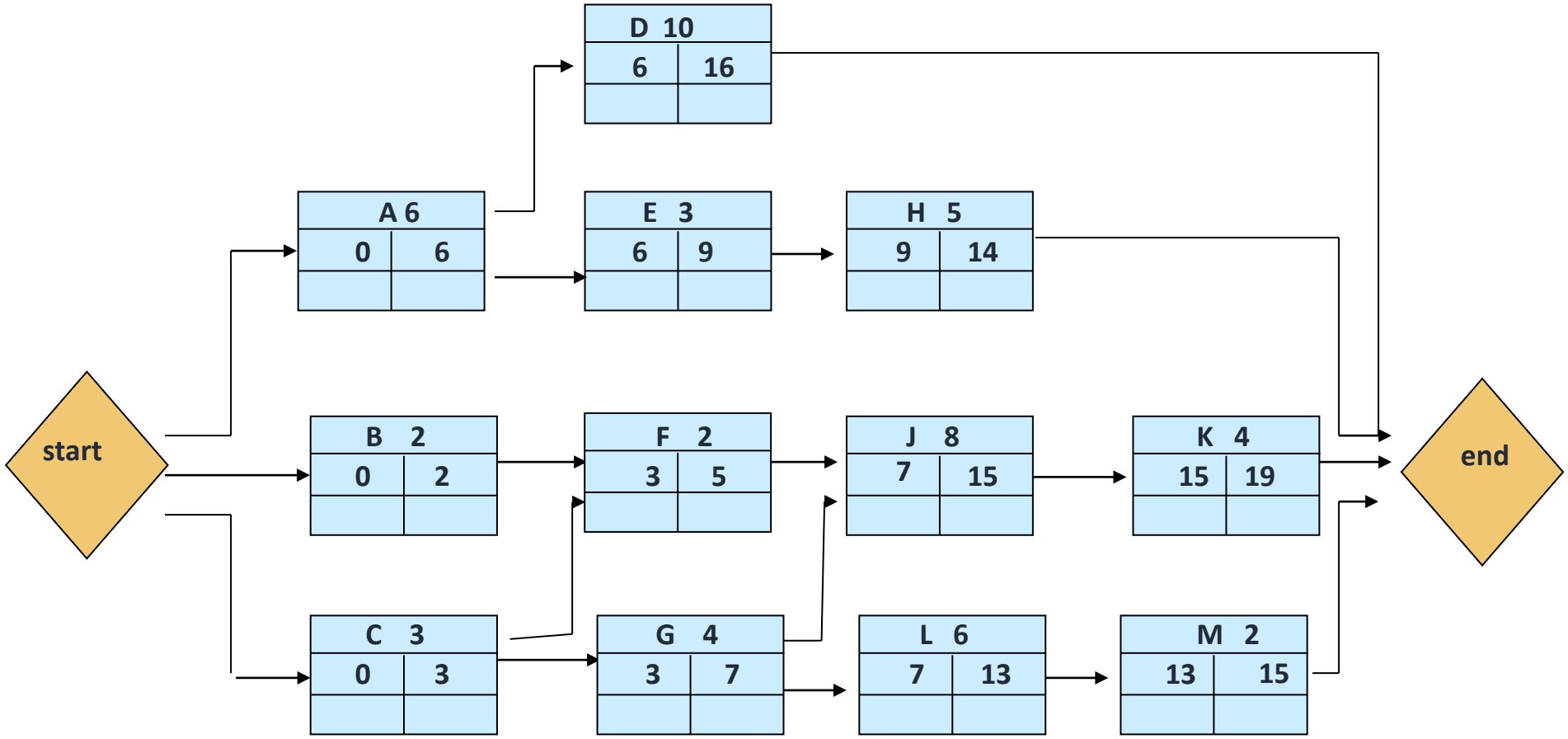
Critical Path Method (CPM)

- 1 - Walk the paths from the beginning to the end to determine the earliest dates



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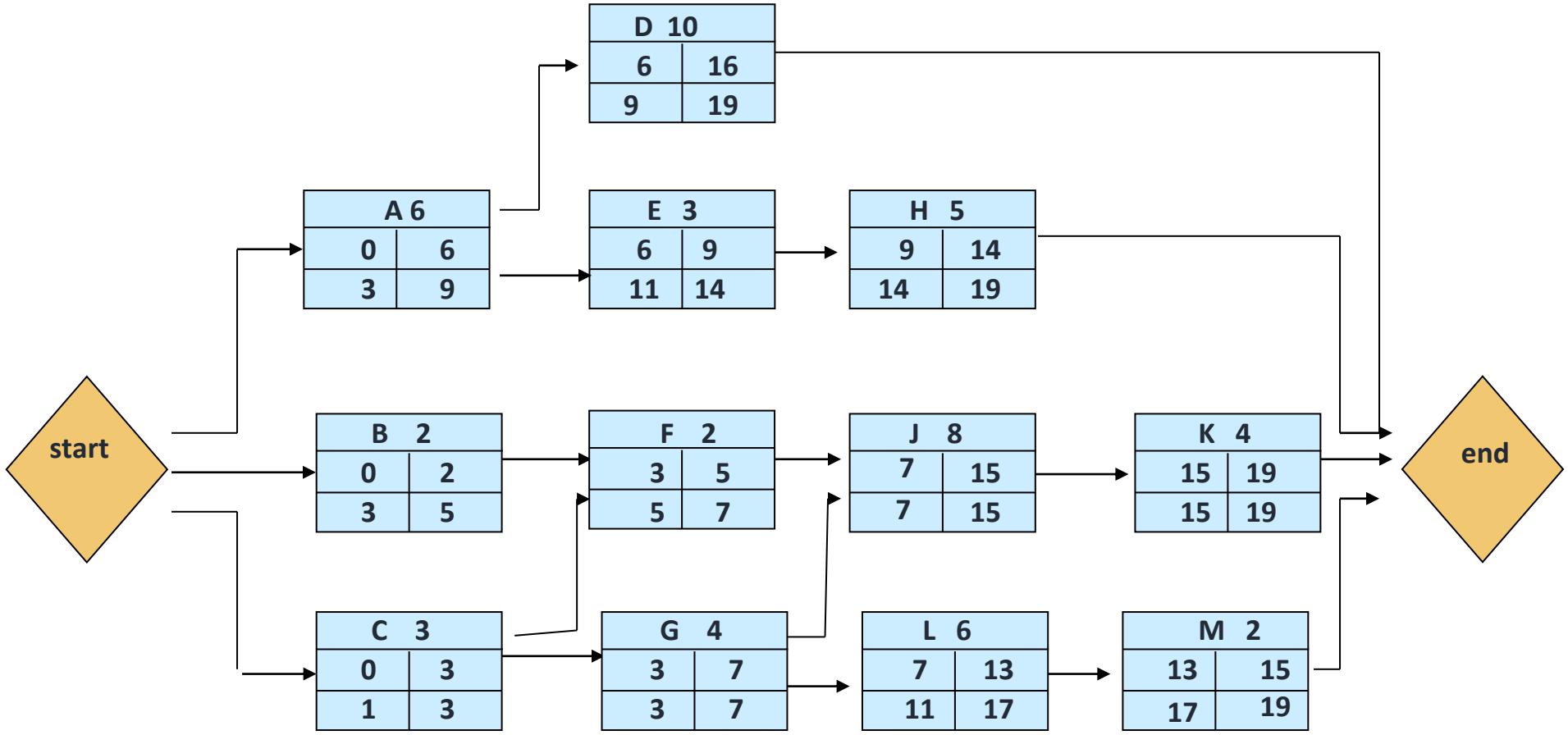

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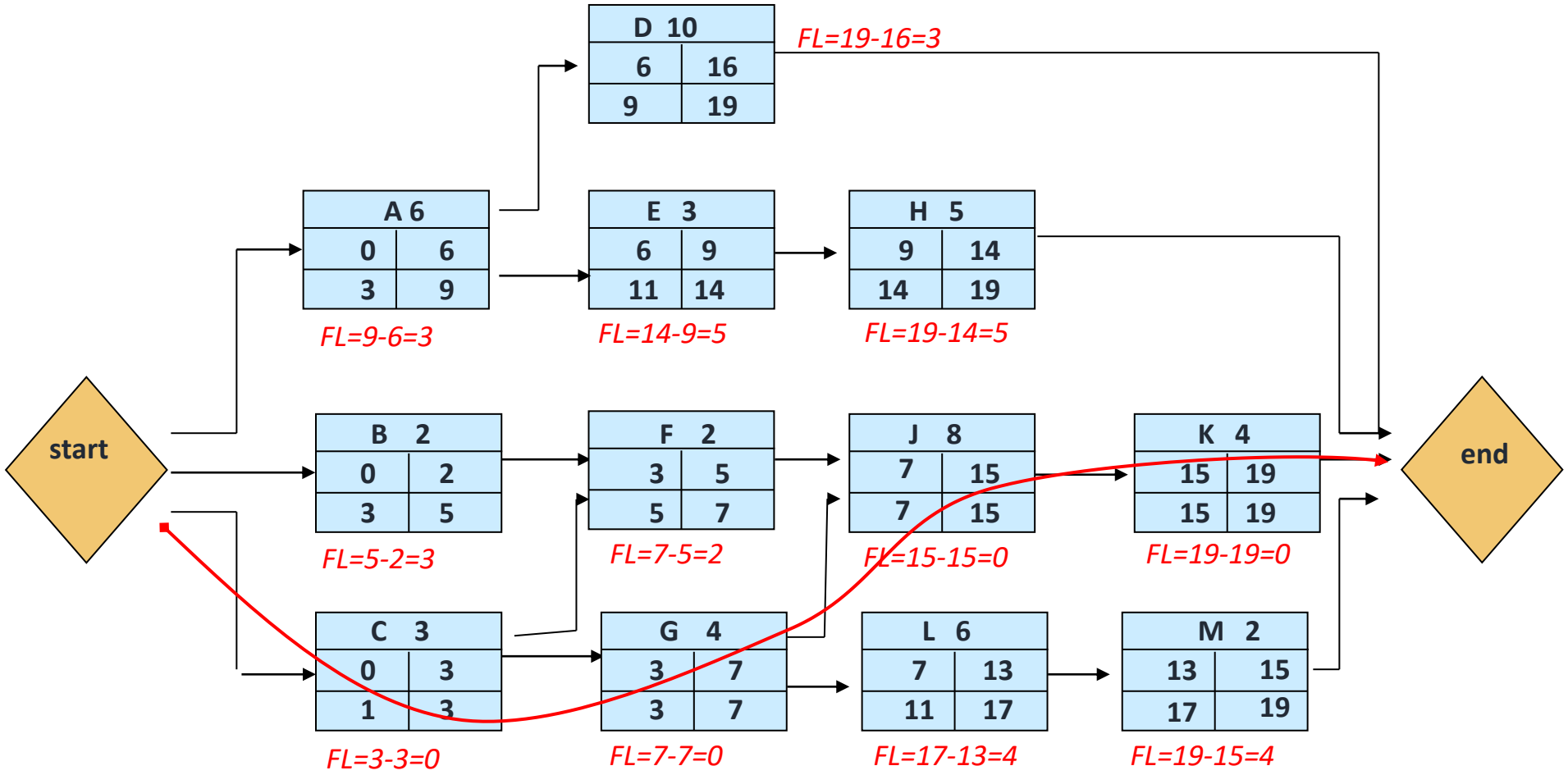

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Critical Path Method (CPM)

• Exercise

- You are the manager of a new project and must implement the following dependencies:
  1. Task A starts immediately and has an estimated duration of 3 weeks;
  2. Task B starts after Task A and has an estimated duration of 3 weeks;
  3. Task C starts after Task A and has an estimated duration of 6 weeks;
  4. Task D starts after Task B and has an estimated duration of 8 weeks;
  5. Task E starts after Task D and Task C and has an estimated duration of 4 weeks.

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Critical Path Method (CPM)

1. How long is the critical path?
2. What is the slack for task C?
3. What is the slack for task B?
4. What is the slack of path with the greatest slack?
5. Consider that Task C's feature is replaced by a less experienced one. Task C now takes 10 weeks. How it will affect the project?
6. Considering the original situation of the issue, after discussions between interested parties, a new Task F is added to the project. It will last for 11 weeks, being carried out after Task C and before Task E. The client is concerned because he thinks that adding this task will delay the project's completion by 11 weeks. But the sponsor argues that the additional time will be less than 11 weeks. Who is correct? How long will the project last?

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Critical Path Method (CPM)

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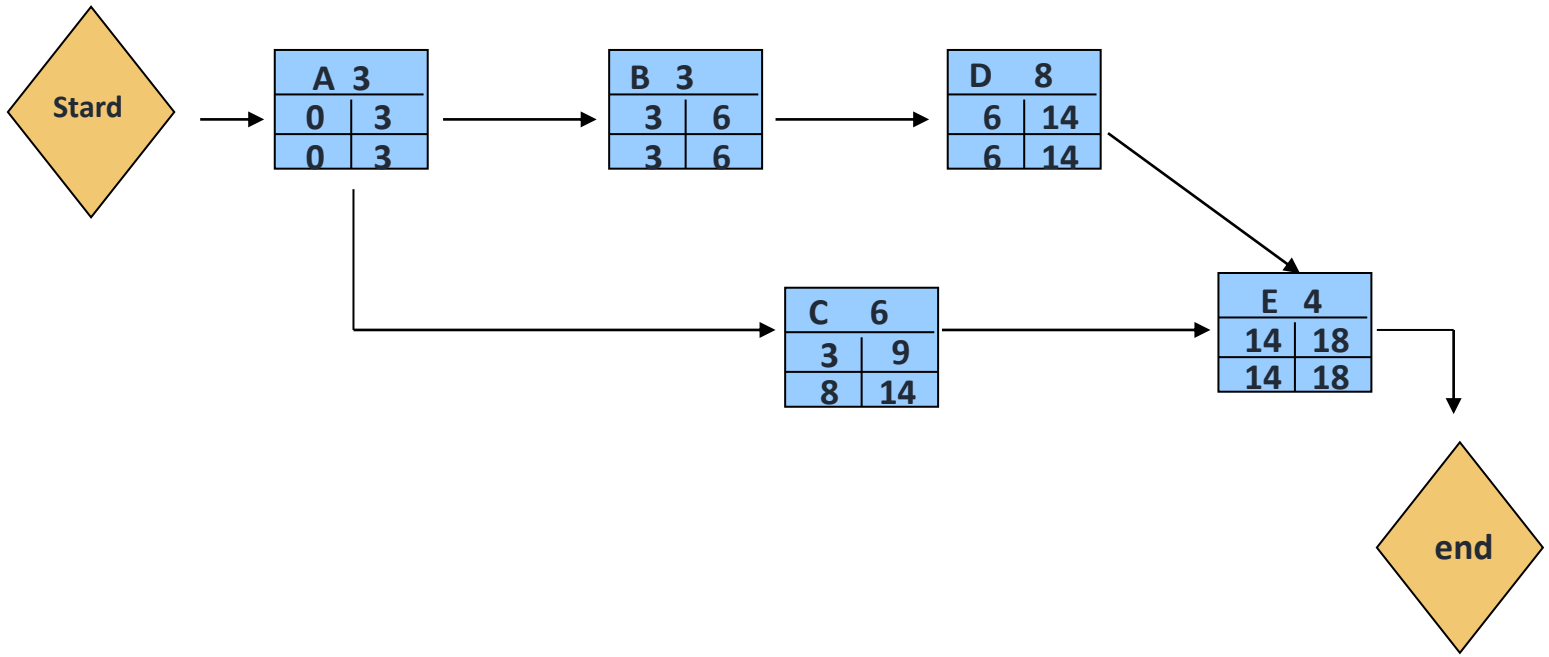
Answer



1. 18 weeks
2. 5 weeks
3. None
4. 5 weeks
5. No effect
6. The sponsor; 6 weeks

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Recommended bibliography

- Harold Kerzner (2009) Project Management: A Systems Approach to Planning, Scheduling, and Controlling; John Wiley & Sons; ISBN: 0470278706.
- PMI-PMBOK (2017) “A Guide to the Project Management Body of Knowledge (PMBOK Guide 6th ed.)”. *Pennsylvania, USA: Project Management Institute (PMI)*.
- Miguel, A. (2006). *Modern Project Management*(4th ed.): FCA.
- Martin, P; Tate, K (2001) “Getting Started in Project Management”, ; John Wiley & Sons; ISBN: 0-471-13503-8.

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Thank You

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