IT PROJECT MANAGEMENT

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Project Schedule Management

- Sequence Activities
  - The process of identifying and documenting relationships among the project activities.
  - It defines the logical sequence of work to obtain the greatest efficiency given all project constraints.
  - Performed throughout the project.
  - Tools & Techniques
    - Precedence Diagramming method
    - Dependency determination and integration
    - Leads and lags
    - Project Management Information system
  - Documents
    - Project schedule network diagrams
      - A graphical representation of the logical relationships / dependencies among project schedule activities.
    - Project documents updates
      - Activity attribu7tes
      - Activity list
      - Assumption log
      - Milestone list.

Project Schedule Management

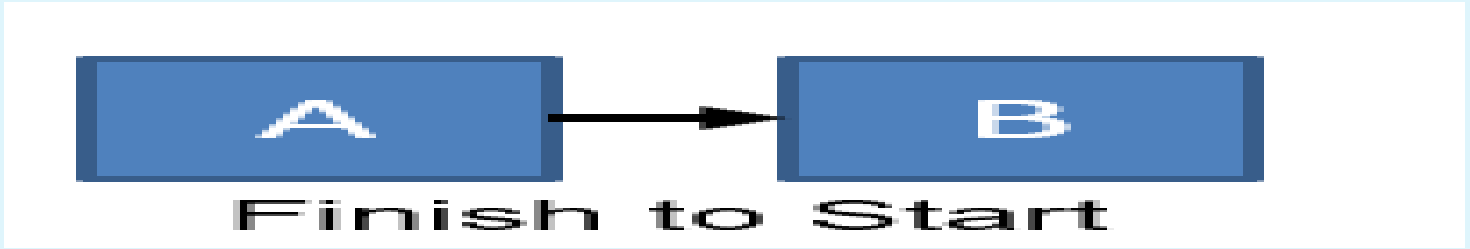
- Precedence Diagramming Method
  - A technique used for constructing a schedule model.
  - activities are represented by nodes
  - Nodes are graphically linked by one or more logical relationships
    - to show sequence in which activities will be performed.
  - Logical relationship
    - refers specifically to an established and existing reliance or dependency between two particular elements of the project.
  - Activity Sequencing
    - involves a specific process in identifying the dependencies among a series of scheduled activities.
    - involves chronicling the dependencies among scheduled activities and putting them into a logical order.
    - involves a careful examination of the relationships between scheduled activities and their precedence relationships.

Project Schedule Management

- Precedence Diagramming Method
  - Predecessor activity
    - An activity that logically comes before a dependent activity in a schedule
  - Successor Activity
    - An activity that logically comes after dependent activity in a schedule
  - Dependencies
    - Mandatory
      - Are legally or contractually required or inherent in the nature of work.
      - Physical limitation to finish Activity A before Activity B
    - Discretionary
      - Also referred to as preferred logic, preferential logic or soft logic
      - Established based on knowledge of best practices within a particular application area or some unusual aspect of the project where a specific sequence is desired.
    - External
      - Involves a relationship between project activities and non-project activities.
      - Outside project Team's control.
    - Internal
      - Involves a precedence relationship between project activities and are general within the project team's control.

Project Schedule Management

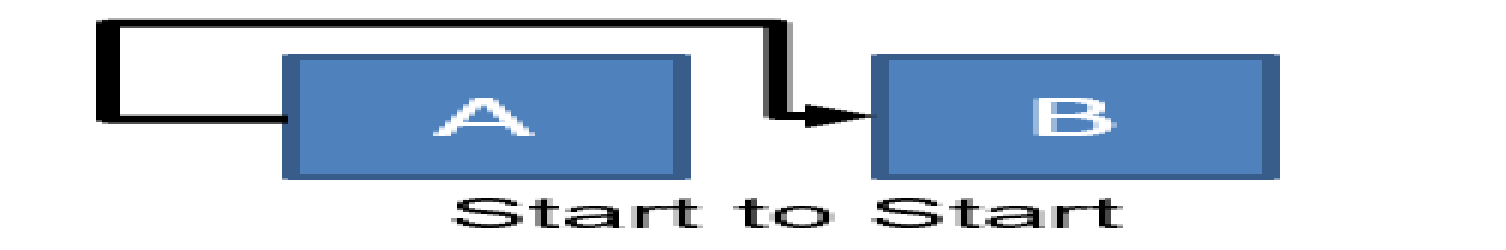
- Precedence Diagramming Method
  - Types Of Dependencies /Logical Relationships
    - Finish-to-start (FS)
      - A logical relationship in which a successor activity cannot start until a predecessor activity has finished.
      - Commonly used



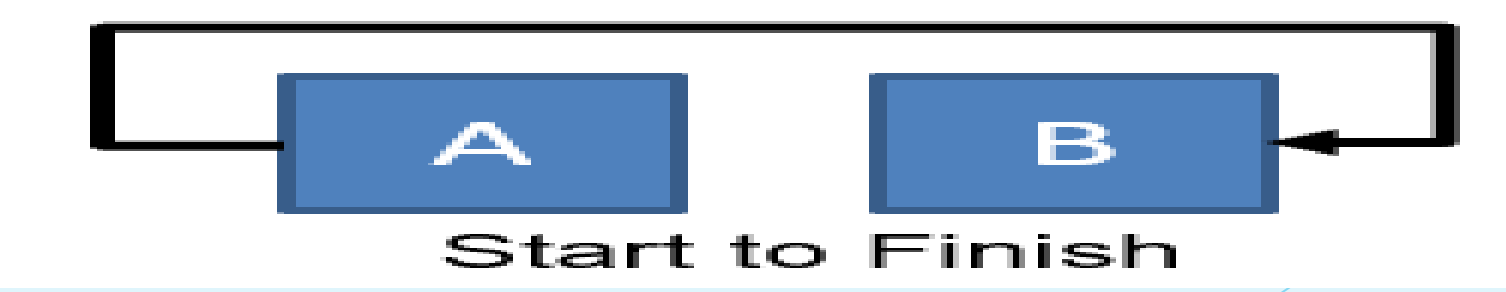
    - Finish-to-finish (FF)
      - A logical relationship in which a successor activity cannot start until a predecessor activity has started.

Project Schedule Management

- Types Of Dependencies /Logical Relationships
  - Start-to-start (SS)
    - A logical relationship in which a successor activity cannot start until a predecessor activity has started.



  - Start-to-finish (SF)
    - A logical relationship in which a predecessor activity cannot finish until a successor activity has started.
    - Rarely used.



Project Schedule Management

- Leads
  - is the amount of time a successor activity can be advanced with respect to a predecessor activity.
  - The acceleration of a successor activity.
  - the second activity can begin (and be conducted in parallel) as the first activity.
  - only found in activities with finish-to-start relationships
    - A must finish before B can start.
  - Dependency between activities must be discretionary.
    - i.e. no physical limitation on completing activity A before activity B
- Lags
  - is the delay of a successor activity
  - represents time that must pass before the second activity can begin
  - May be found in activities with all relationship types:
    - finish-to-start
    - start-to-start
    - finish-to-finish
    - start-to-finish.

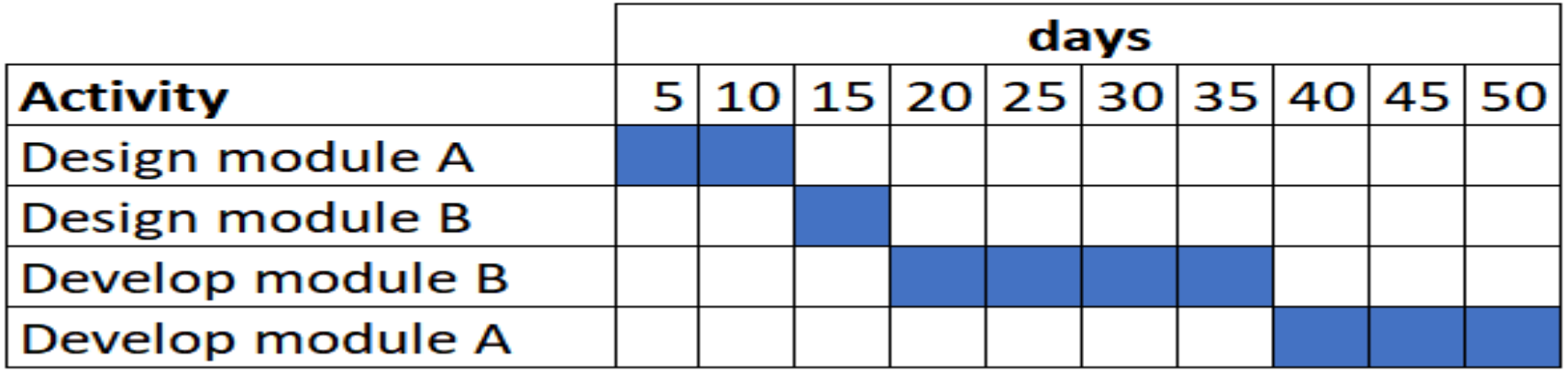
Project Schedule Management

- Example of Leads and Lags
  - Durations and Dependencies
    - In a project, the durations are estimated as follows:
      - technical design of module A: 10 days
      - technical design of module B: 5 days
      - development of module A: 15 days
      - development of module B: 20 days
  - The dependencies are:
- the technical designs of module A and B, respectively, must be completed before the respective module can be developed,
- the technical design of module B makes reference to that of module A,
- thus, the module A design needs to be 50% completed before the module B design can be started, and
- the development of module A depends on module B, which needs to be 25% completed before the team can start the development of module A.

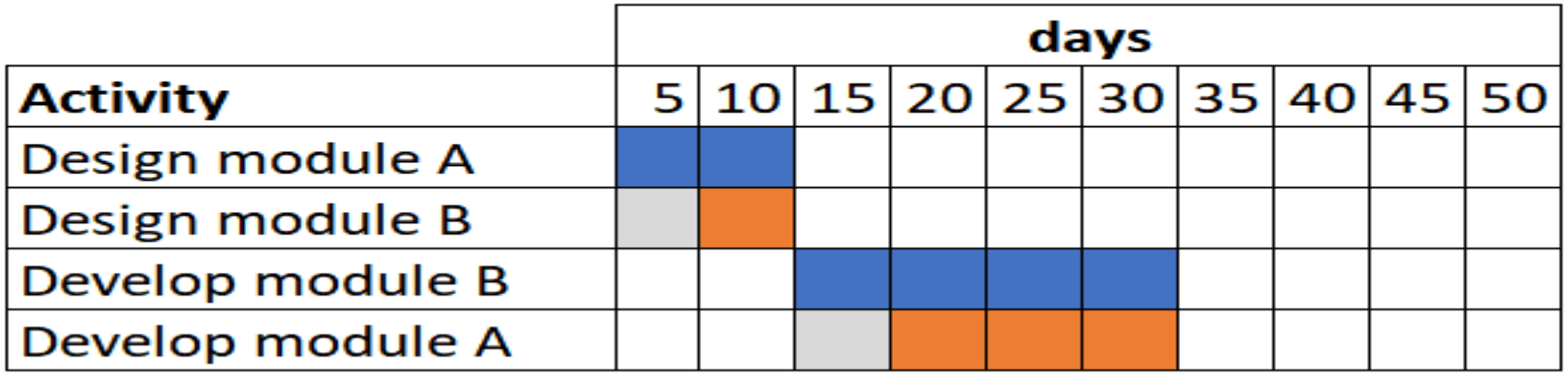
Project Schedule Management

- Leads and Lags Example

Finish-to-start relationships



Lags and Leads considered



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- Example of Leads and Lags

Activity	Dependencies and durations	Lag time	Lead time
Design module A	takes 10 days	first activity	first activity
Design module B	can start 5 days after the design of module A started and takes 5 days	5 days (after start of A)	5 days (before finishing A)
Develop module B	can start when the design of module B is completed and takes 20 days	no lag	no lead
Develop module A	can start when module B is 25% completed and takes 15 days	5 days (after start of B)	15 days (before completion of B)

Project Schedule Management

- Estimate Activity Durations
  - Process of estimating the number of work periods needed to complete individual activities with estimated resources.
  - Provides amount of time each activity will take to complete.
  - Performed throughout the project.
  - Requires an estimation of the amount of work effort required to complete the activity and the amount of available resources estimated to complete the activity.
  - Activity duration depends on
    - Number of available resources
    - Skill proficiency
  - Law of diminishing returns
  - Number of resources
    - An increase in resource numbers may increase duration due to
      - Knowledge transfer
      - Learning curve
      - Additional coordination

Project Schedule Management

- Estimate Activity Durations
  - Advances in technology
  - Motivation of staff
  - Tools and Techniques
    - Expert Judgment
    - Analogous estimating
    - Parametric estimating
    - Three-point estimating
    - Bottom-up estimating
    - Data analysis
      - Alternatives analysis
      - Reserve analysis
    - Decision making
      - Voting
    - Meetings

Project Schedule Management

- Estimate Activity Durations
  - Outputs
    - Duration estimates
    - Basis of estimates
    - Project documents updates
      - Activity attributes
      - Assumption log
      - Lessons learned register
  - Analogous Estimating
    - A technique for estimating duration or cost of an activity using historical data from a similar activity or project.
    - Usually used when there is a limited amount of detailed information about the project.
    - Less costly, less time-consuming and less accurate.
    - Maybe applied to all activities or segments of project activities
    - Maybe used in conjunction with other estimating methods
    - Most reliable when
      - the previous activities are similar in fact not just in appearance
      - Team members have the needed expertise.

Project Schedule Management

- Estimate Activity Durations
  - Parametric Estimating
    - A estimating technique in which an algorithm is used to calculate cost or duration based on historical data and project parameters.
    - Uses a statistical relationship between historical data and other variables.
    - Produce higher accuracy depending on the sophistication and underlying data built into the model.
    - Maybe applied to all activities or segments of project activities
    - Maybe used in conjunction with other estimating methods
  - Bottom-up Estimating
    - Estimates project duration or cost by aggregating the estimates of the lower level components of the WBS.

Project Schedule Management

- Develop Schedule
  - The process of analysing activity sequences, durations, resource requirements and schedule constraints to create a schedule model for project execution and monitoring and controlling.
  - It generates a schedule model with planned dates for completing project activities
  - Tools and Techniques
    - Schedule Network analysis
    - Critical path method
    - Resource optimization
    - Data analysis
      - What-if scenario analysis
      - Simulation
    - Leads and Lags
    - Schedule compression
    - Project Management information system
    - Agile release planning

Project Schedule Management

- Develop Schedule
  - Outputs
    - Schedule baseline
    - Project schedule
    - Schedule data
    - Project calendars
    - Change requests
    - PMP updates
    - Project documents update.
  - Critical Path Method
    - Used to estimate the minimum project duration and determine the amount of schedule flexibility on the logical network paths within the schedule model.
    - Calculates the early start, early finish, late start and late finish dates for all activities.
      - Does not consider resource limitations by performing a forward and backward pass analysis through the schedule network.
    - The Critical Path
      - is the sequence of activities that represents the longest path through a project
      - Determines the shortest possible project duration.

Project Schedule Management

- Develop Schedule
  - Resource Optimization
    - Used to adjust the start and finish dates of activities to adjust planned resource use to be equal to or less than resource availability.
    - Resource levelling
      - 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.
      - Used when shared or critically required resources are available only at certain times or in limited quantities, or are over-allocated, such as when a resource has been assigned to two or more activities during the same time period, or there is the need to keep resource usage at a constant level.
      - Can often cause the original critical path to change.
    - 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.
      - Project's critical path is not changed
      - Completion date may not be delayed.
      - May not be able to optimize all resources.

Project Schedule Management

- Develop Schedule
  - Schedule Compression
    - Used to shorten or accelerate the schedule duration without reducing the project scope
    - in order to meet schedule constraints, imposed dates or other schedule objectives.
    - Crashing
      - A technique used to shorten the schedule duration for the least incremental cost by adding resources.
      - Works for activities on the critical path where additional resources will shorten the activity's duration.
      - May result in increased risk and/or cost
    - Fast tracking
      - A technique in which activities or phases normally done in sequence are performed in parallel for at least a portion of their duration.
      - May result in rework and increased risk.
      - Only works when activities can be overlapped to shorten the project duration on the critical path.
      - May increase cost.

Project Schedule Management

Knowledge Areas	Project Management Process Groups				
	Initiating Process Group	Planning Process Group	Executing Process Group	Monitoring and Controlling Process Group	Closing Process Group
4. Project Integration Management	4.1 Develop Project Charter	4.2 Develop Project Management Plan	4.3 Direct and Manage Project Work 4.4 Manage Project Knowledge	4.5 Monitor and Control Project Work 4.6 Perform Integrated Change Control	4.7 Close Project or Phase
5. Project Scope Management		5.1 Plan Scope Management 5.2 Collect Requirements 5.3 Define Scope 5.4 Create WBS		5.5 Validate Scope 5.6 Control Scope	
6. Project Schedule Management		6.1 Plan Schedule Management 6.2 Define Activities 6.3 Sequence Activities 6.4 Estimate Activity Durations 6.5 Develop Schedule		6.6 Control Schedule	
7. Project Cost Management		7.1 Plan Cost Management 7.2 Estimate Costs 7.3 Determine Budget		7.4 Control Costs	
8. Project Quality Management		8.1 Plan Quality Management	8.2 Manage Quality	8.3 Control Quality	
9. Project Resource Management		9.1 Plan Resource Management 9.2 Estimate Activity Resources	9.3 Acquire Resources 9.4 Develop Team 9.5 Manage Team	9.6 Control Resources	
10. Project Communications Management		10.1 Plan Communications Management	10.2 Manage Communications	10.3 Monitor Communications	
11. Project Risk Management		11.1 Plan Risk Management 11.2 Identify Risks 11.3 Perform Qualitative Risk Analysis 11.4 Perform Quantitative Risk Analysis 11.5 Plan Risk Responses	11.6 Implement Risk Responses	11.7 Monitor Risks	
12. Project Procurement Management		12.1 Plan Procurement Management	12.2 Conduct Procurements	12.3 Control Procurements	
13. Project Stakeholder Management	13.1 Identify Stakeholders	13.2 Plan Stakeholder Engagement	13.3 Manage Stakeholder Engagement	13.4 Monitor Stakeholder Engagement	

Project Cost Management

- Includes the processes involved in planning, estimating, budgeting, financing, funding, managing and controlling costs so that the project can be completed within the approved budget.
  - Processes
    - Plan Cost Management
    - Estimate Costs
    - Determine Budget
    - Control Costs
  - Cost estimating and cost budgeting are tightly linked in smaller projects.
  - Concerned with the cost of the resources needed to complete project activities.
  - Should consider the effect of project decisions on the subsequent recurring cost of using, maintaining and supporting the product, service or result of the project.
  - Tailoring Considerations
    - Knowledge management
    - Estimating and budgeting
    - Earned value management
    - Use of agile approach
    - Governance

Project Cost Management

- Plan Cost Management
  - The process of defining how the project costs will be estimated, budgeted, managed, monitored and controlled.
  - Provides guidance and direction on how the project costs will be managed throughout the project.
  - Tools & Techniques
    - Expert judgment
    - Data analysis
      - Alternative analysis
    - Meetings
  - Outputs
    - Cost management plan

Project Cost Management

- Estimate Costs
  - The process of developing an approximation of the cost of resources needed to complete project work
  - It determines the monetary resources required for the project.
  - Tools & Techniques
    - Expert judgment
    - Analogous estimating
    - Parametric estimating
    - Three-point estimating
    - Bottom-up estimating
    - Data analysis
      - Alternatives analysis
      - Reserve analysis
    - Project management information system
    - Decision making
      - Voting

Project Cost Management

- Estimate Costs
  - Outputs/ Documents
    - Cost estimates
    - Basis of estimates
    - Project documents updates
      - Assumption log
      - Lessons learned register
      - Risk register
- Determine Budget
  - The process of aggregating the estimated costs of individual activities or work packages to establish an authorized cost baseline.
  - It determines the cost baseline against which project performance can be monitored and controlled.
  - Includes all the funds authorized to execute the project.
  - The cost baseline
    - Is the approved version of the time-phased project budget that includes contingency reserves, but excludes management reserves.

Project Cost Management

- Determine Budget
  - Tools & Techniques
    - Expert judgement
    - Cost aggregation
    - Data analysis
      - Reserve analysis
    - Historical information review
    - Funding limit reconciliation
    - Financing
  - Outputs / Documents
    - Cost baseline
    - Project funding requirements
    - Project documents updates
      - Cost estimates
      - Project schedules
      - Risk register

Project Cost Management

- Control Costs
  - The process of monitoring the status of the project to update the project costs and managing changes to the cost baseline.
  - The key benefit is that the cost baseline is maintained throughout the project.
  - Tools & Techniques
    - Expert judgment
    - Data analysis
    - To-complete performance index
    - Project Management information system
  - Outputs / Documents
    - Work performance information
    - Cost forecasts
    - Change requests
    - Project management plan updates
    - Project documents updates

Project Cost Management

- Control Costs
  - Requires knowledge of actual costs spent to date.
  - Any increase to the authorized budget can be approved through the Perform Integrated Change Control process.
  - Involves analysing the relationship between the consumption of project funds and the work being accomplished for such expenditure.
  - Includes
    - Influencing the factors that create changes to the authorized cost baseline
    - Ensuring that all change requests are acted on in a timely manner
    - Managing the actual changes when and as they occur
    - Ensuring that cost expenditures do not exceed the authorized funding
      - By period
      - By WBS component
      - By activity
      - And in total for the project
    - Monitoring cost performance against funds expended
    - Preventing unapproved changes from being included in the reported cost or resource usage
    - Informing appropriate stakeholders of all approved changes and associated costs
    - Bringing expected cost overruns within acceptable limitsS