

Calendars

Objectives

After completing this lesson, you should be able to:

- Explain the difference between global, project, and resource calendars.
- Define work time types.
- View calendars.
- Edit a project calendar.
- Assign a calendar to an activity.



Calendars

- Specify work time and nonwork time.
- Used for scheduling and leveling resources.
- An unlimited number of calendars can be created.
- All activities must have an assigned calendar.

Available Calendars

There are three sets of available calendars:

- **Global** – Available to all projects, resources, and activities
- **Project** – Available to one project and its activities
- **Resource** – Available to resources only

Available Calendars

- Global
 - Contains calendars that can be used by all projects and resources.
 - Create standard corporate calendars for all projects, resources.
 - Example: Standard 5-day workweek, 8 hours/day, with holidays from corporate calendar.
- Project
 - Contains project-specific calendars.
 - Example: 6-day workweek calendar to accelerate project.
 - Example: Calendar for project with work that occurs on weekends only.
- Resource
 - Contains calendars for use by resources.
 - Example: Record vacation time/leave of absence for individual resources.

Resource Calendars

There are two types of resource calendars:

- Shared:
 - Can be shared among multiple resources.
 - Convert to personal resource calendar.
- Personal:
 - Assigned to single resource.
 - Calendar is deleted if resource is deleted.
 - Resource can edit personal resource calendar.
 - Can be converted to shared resource calendar (if assigned to one resource or fewer).

Work Time Types

A calendar consists of four types of work time:

- Standard
 - Time normally spent working, according to standard work week (e.g., a full, normal day of work).
- Nonwork
 - Time spent not working, according to standard work week. (e.g., a weekend day on a calendar where weekends are not typically worked).
- Exception
 - A deviation from Standard or Nonwork time (e.g., a half-day of work on any day).
- Nonwork Exception
 - A full day of nonwork time not covered by the standard work week (e.g., vacation).

Calendars and Activity Types

Activity Type determines the calendar used when a project is scheduled.

- **Task Dependent**
 - Resource assignments scheduled according to calendar assigned to the activity.
- **Resource Dependent**
 - Resource assignments scheduled according to the resource's calendar.

Administration Menu – Enterprise Data – Global / Project / Resource Calendar

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Administration

Application Settings **Enterprise Data** Scheduled Services User Administration User Interface Views

Enterprise Data

- Global
 - Currencies
 - Financial Periods
 - Global Calendars**
 - Locations
 - Overhead Codes
 - Stored Images
 - Timesheet Periods
- Projects
- Activities
- Resources
- Risks
- Issues
- Documents

Global Calendars

+ Add Get Usage Data

Calendar Name *

- 7-Day Workweek
- Standard 5 Day Workweek
- 4 - 10hr Days Workweek
- 37.5 Hour Workweek
- Standard 5.5 Day Workweek**

Standard 5.5 Day Workweek

Summary Calendar Standard Work Week Used By

Standard Work Week

Sun	08:00 AM - 12:00 PM
Sun	01:00 PM - 05:00 PM
Mon	08:00 AM - 12:00 PM
Mon	01:00 PM - 05:00 PM
Tue	08:00 AM - 12:00 PM
Tue	01:00 PM - 05:00 PM

Time Periods

Hours/Day

Between 1 and 24

Hours/Week

Between 1 and 168

Hours/Month

Between 1 and 744

Hours/Year

Exceptions

Start Date	to	End Date
01-Jan-23		31-Dec-23

Date	Time Period
30-Apr-23	Nonwork

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Import/Export Enterprise Data

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Standard Work Week : Set the working & nonworking time

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Enterprise Data

Global

Projects

Baseline Types

Funding Sources

Notebook Topics

Project Calendars

Project Codes

Project UDFs

WBS Categories

WBS UDFs

Activities

Resources

Risks

Issues

Documents

Import/Export Enterprise Data

Project Calendars

+ Add Open Project...

Search

Calendar Name*

South Azadegan Oil Field

5.5 Days Work

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5.5 Days Work

Summary Calendar Standard Work Week Used By

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
8:00 AM	8.0h	8.0h	8.0h	8.0h	4.0h	0.0h	8.0h
09:00 AM	08:00 AM - 12:00 PM	08:00 AM - 12:00 PM	08:00 AM - 12:00 PM	08:00 AM - 12:00 PM	08:00 AM - 12:00 PM		08:00 AM - 12:00 PM
10:00 AM							
11:00 AM							
12:00 PM							
01:00 PM	01:00 PM - 05:00 PM	01:00 PM - 05:00 PM	01:00 PM - 05:00 PM	01:00 PM - 05:00 PM			01:00 PM - 05:00 PM
02:00 PM							
03:00 PM							

Calendar: Set the working & nonworking days

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Enterprise Data

Global

Currencies

Financial Periods

Global Calendars

Locations

Overhead Codes

Stored Images

Timesheet Periods

Projects

Activities

Resources

Risks

Issues

Documents

Import/Export Enterprise Data

Global Calendars

+ Add Get Usage Data

Calendar Name *

- 7-Day Workweek
- Standard 5 Day Workweek
- 4 - 10hr Days Workweek
- 37.5 Hour Workweek
- Standard 5.5 Day Workweek**

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Standard 5.5 Day Workweek

Summary Calendar Standard Work Week Used By

Today < > Apr 30 - May 06, 2023

Day Week Month Year

	Sun 04/30	Mon 05/01	Tue 05/02	Wed 05/03	Thu 05/04	Fri 05/05	Sat 05/06
08:00 AM							
09:00 AM							
10:00 AM							
11:00 AM							
12:00 PM							
01:00 PM							
02:00 PM							
03:00 PM							

Set to Standard

Nonwork

Standard Exception Nonwork

Adding activities

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EPS **Activities** Team Usage Assignments Issues Documents Risks

Activities of South Azadegan Oil Field

Schedule... Actions ▾ Expand All Collapse All Views Default View

ID/Code *	Name *	Start	Finish	Remaining Duration	Activity % Complete
⊖ SAZ	South Azadeg...				
⊖ 1	Engineering				
⊖ 1	Basic Design				
⬆ A1000	Start	28-Apr-23 08:0...	28-Apr-23 08:0...	0.0d	0%
⚙ A1010	New Activity	28-Apr-23 08:...	04-May-23 0...	5.0d	0%

Add Activity

Delete

Activity Details - General

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EPS **Activities** Team Usage Assignments Issues Documents Risks

Activities of South Azadegan Oil Field

Schedule... Actions ▾ Expand All Collapse All Views Default View Grid Calendar Diagram Filter Help Print Refresh Search Q

ID/Code *	Name *	Start	Finish	Remaining Duration	Activity % Complete	Primary Resource
SAZ	South Azadegan Oil Field					
1	Engineering					
1	Basic Design					
A1000	Start	28-Apr-23 08:00	28-Apr-23 08:00	0.0d	0%	
A1010	New Activity	28-Apr-23 08:00	04-May-23 08:00	5.0d	0%	

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General Assignments Codes Discussion Documents Expenses Issues Notebooks Relationships Risks Status Steps Update History Trace Logic Tasks UDF

ID *

Name *

Activity Type

Location

Project ID

WBS *

Duration Type

Activity Owner

Percent Complete Type

Calendar *



Creating Relationships

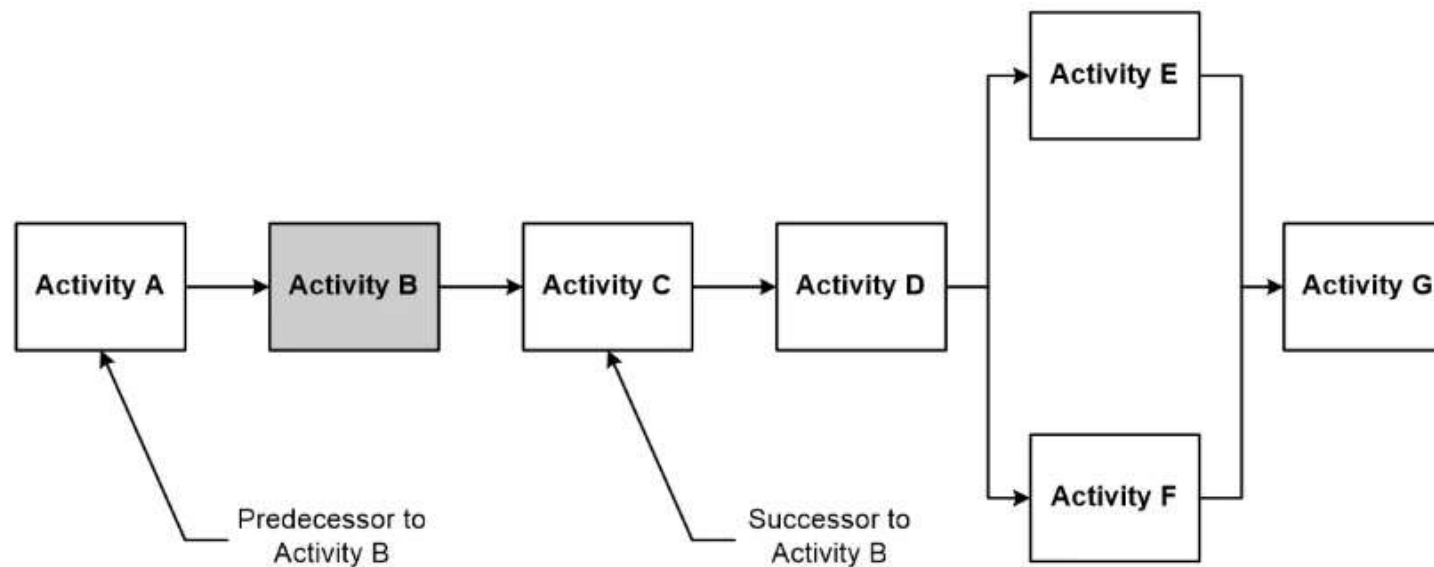
Objectives

After completing this lesson, you should be able to:

- Understand a network logic diagram.
- Describe the four relationship types.
- Create relationships in the Gantt chart.
- Create relationships in Activity detail windows.

Network Logic Diagram

A network logic diagram is a graphic representation of all of the activities in a project and their logical (dependent) relationships.



Precedence Diagramming Method (PDM)

PDM is a technique for creating network logic diagrams.

- A box or rectangle represents each activity.
- Lines with arrows connect the boxes and represent the logical relationships between the activities.
 - **Predecessor** - Controls the start or finish of another activity.
 - **Successor** - Depends on the start or finish of another activity.
- Start with either the first activity in the network and enter each successor, or start with the last activity in the network and enter each predecessor.

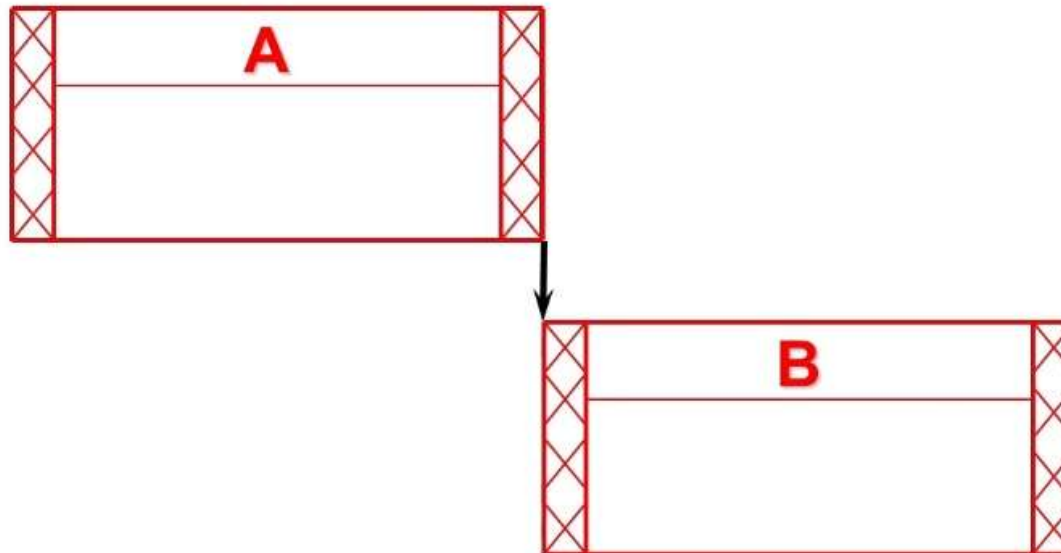
Relationship Types

There are four relationship types:

- **Finish to Start (FS)** – When A finishes, B can start.
- **Start to Start (SS)** – When A starts, B can start.
- **Finish to Finish (FF)** – When A finishes, B can finish.
- **Start to Finish (SF)** – When A starts, B can finish.

Finish to Start (FS)

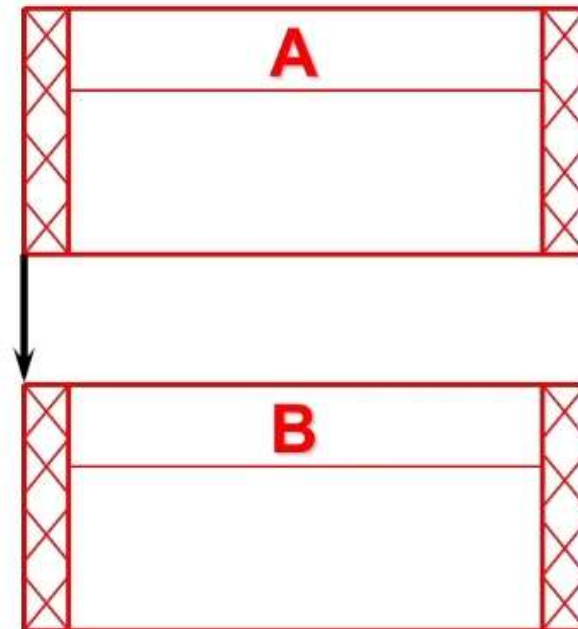
When activity A finishes, activity B can start. This is the most common type of relationship.



Example: When we finish writing the report, we can send it to the client.

Start to Start (SS)

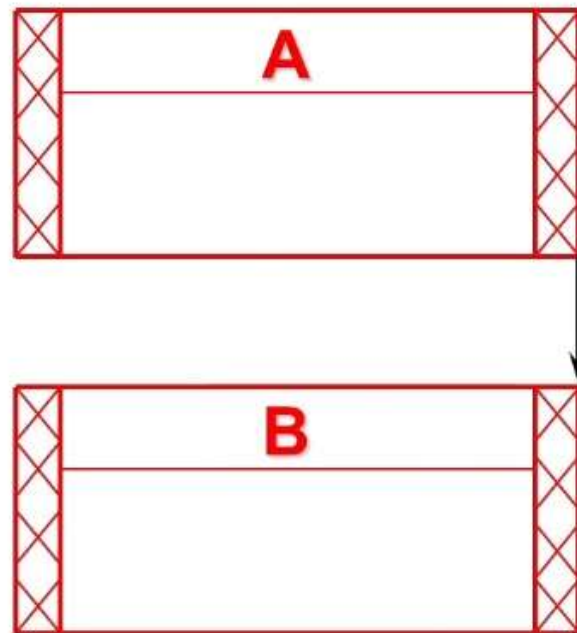
When activity A starts, then activity B can start.



Example: When we start selling our new software, we will start offering support service.

Finish to Finish (FF)

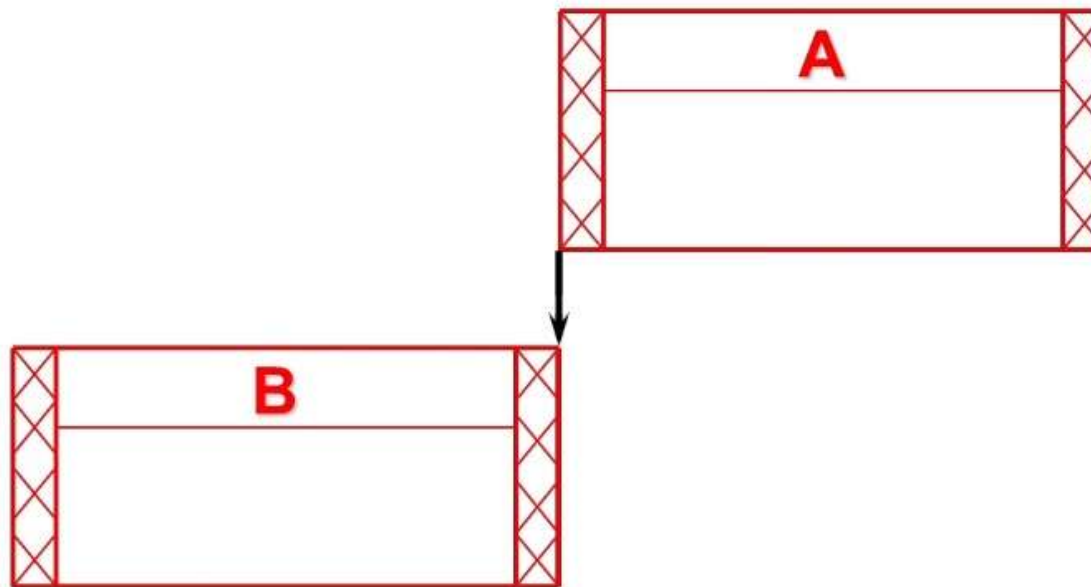
When activity A finishes, then activity B can finish.



Example: When we finish testing, we can finish collecting data.

Start to Finish (SF)

When activity A starts, then activity B can finish.



Example: When we begin manufacturing our own components, we can stop outsourcing them.

Relationships with Lag

Lag specifies an offset or delay between an activity and its successor.

- Can be added to any relationship type.
- Can be a positive or a negative value.
- There are four calendar options for scheduling lag:
 - Predecessor activity calendar
 - Successor activity calendar
 - 24-hour calendar
 - Project default calendar

Activity Details – Relationships - Predecessors

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EPS **Activities** Team Usage Assignments Issues Documents Risks

Activities of South Azadegan Oil Field

Schedule... Actions ▾ Expand All Collapse All Views Default View

ID/Code *	Name *	Start	Finish	Remaining Duration	Activity % Complete	Primary Resource
SAZ	South Azadega...					
1	Engineering					
1	Basic Design					
A1000	Start	28-Apr-23 08:00...	28-Apr-23 08:00...	0.0d	0%	
A1010	New Activity	28-Apr-23 08:00...	04-May-23 0...	5.0d	0%	

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General Assignments Codes Discussion Documents Expenses Issues Notebooks **Relationships** Risks Status Steps Update History

Predecessors + Add ✕ Search

Activity ID	Activity Name	WBS	Relationship Type	Lag	Comments
A1000	Start		Start to Start	0.0d	

Successors + Add ✕ Search

Activity ID	Activity Name	WBS
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KEY NOT FOUND: label_ui.activity_assign_relationships

KEY NOT FOUND: label_ui.activity_assign_predecessor

Search: [] [] []

ID/Code	Name	Start	Finish
SAZ	South Azadega...	28-Apr-23 08:00...	04-May-23 05:00...
1	Engineering	28-Apr-23 08:00...	04-May-23 05:00...
1	Basic Design	28-Apr-23 08:00...	04-May-23 05:00...
A1000	Start	28-Apr-23 08:00...	28-Apr-23 08:00...
A1010	New Activity	28-Apr-23 08:00...	04-May-23 05:00...

KEY NOT FOUND: label_ui.activity_rel_tray_assign

KEY NOT FOUND: label_ui.activity_assign_successor

Search: [] [] []

Scheduling

Objectives

After completing this lesson, you should be able to:

- Describe Critical Path Method (CPM) scheduling.
- Perform a forward and a backward pass.
- Describe float and its impact on a schedule.
- Identify loops and open ends.
- Calculate a schedule.
- Analyze the scheduling log report.

Critical Path Method Scheduling

The Critical Path Method (CPM) is the traditional technique for calculating project schedules and determining the minimum total project duration.

- Uses activity durations and relationships between activities to calculate schedule dates.
- Calculation is done in two passes – forward and backward – through the activities in a project.

Critical Path

- The series of activities that determines a project's minimum total duration and completion date.
- The duration of the activities on the critical path controls the duration of the project.
 - A delay to any critical activity will delay the Finish date of the entire project.
- Critical activities are defined either by Total Float or by the longest path in the project network.

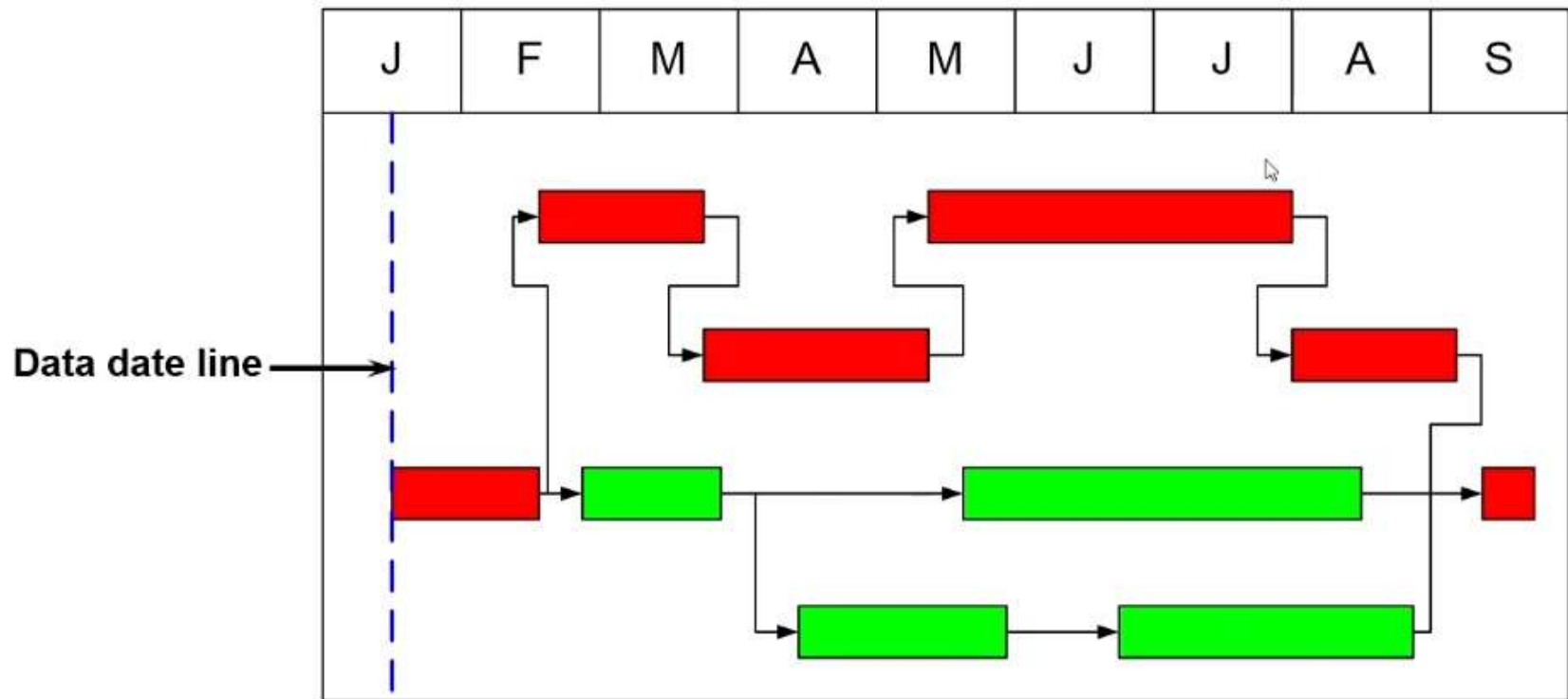
Critical Path

- The series of activities that determines a project's minimum total duration and completion date.
- The duration of the activities on the critical path controls the duration of the project.
 - A delay to any critical activity will delay the Finish date of the entire project.
- Critical activities are defined either by Total Float or by the longest path in the project network.

Data Date

- The date that is utilized as the starting point for schedule calculations.
 - Used to schedule all remaining work.
- During the Planning phase, the data date should match the project Start date.

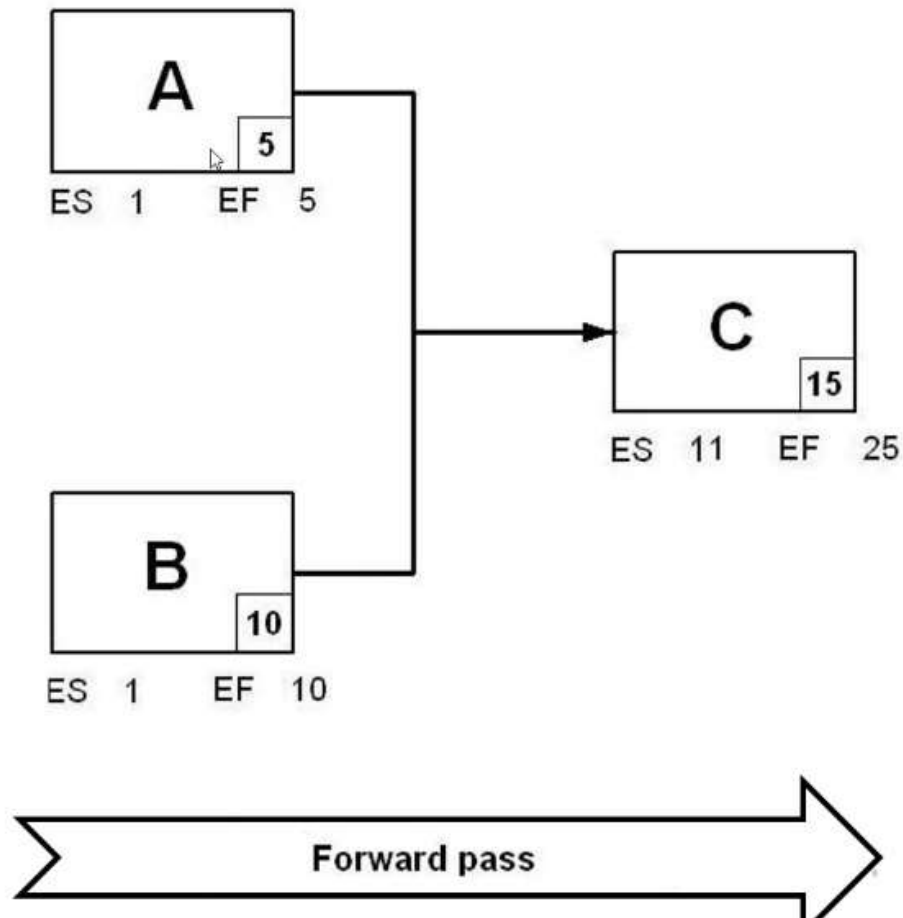
Data Date



Forward Pass

- The forward pass calculates each activity's early dates.
- Early dates are the earliest times an activity can start and finish once its predecessor relationships have been satisfied.
- The calculation begins with the activities without predecessors.
- $\text{Early Start (ES)} + \text{Duration} - 1 = \text{Early Finish (EF)}$

Forward Pass

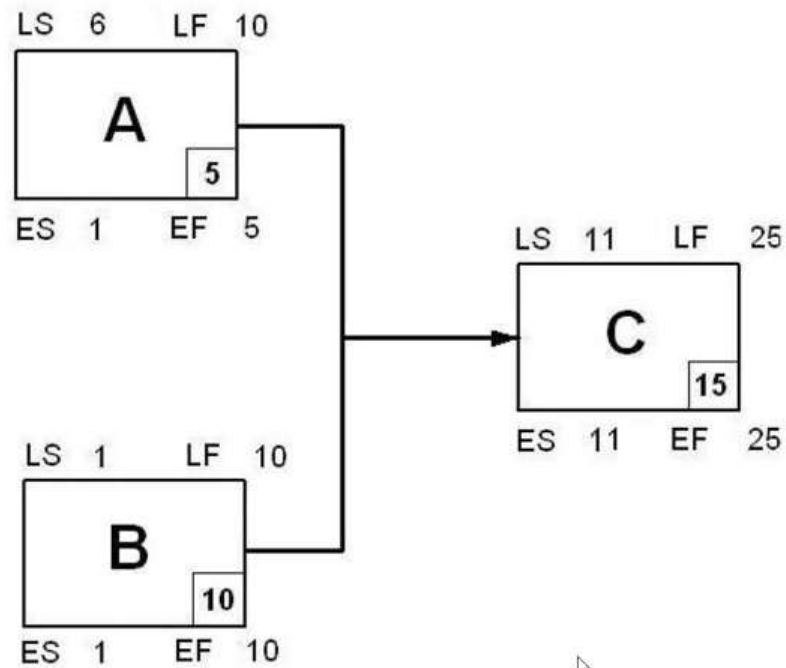


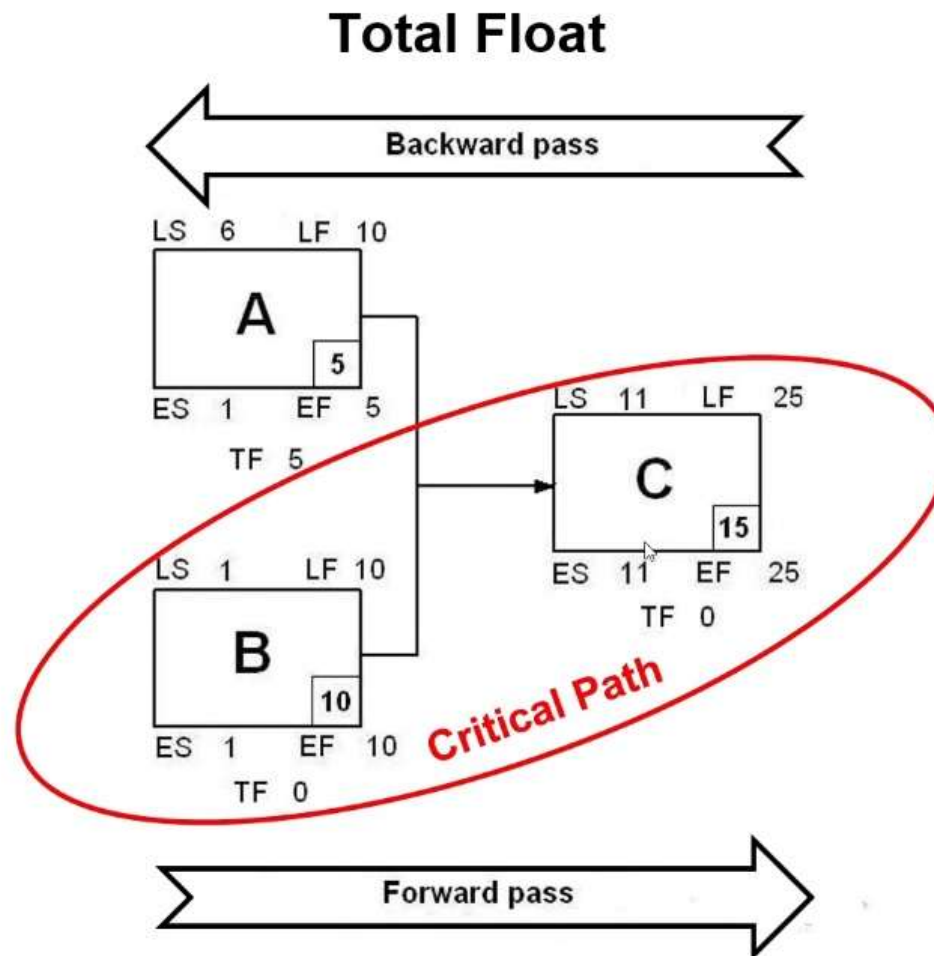
Backward Pass

- The backward pass calculates each activity's late dates.
- Late dates are the latest times an activity can start and finish without delaying the end date of the project.
- The calculation begins with the activity with the latest Early Finish date without a successor.
- For projects without a Must Finish By date, activities without successors are assigned a Late Finish equal to the latest Early Finish date.
- $\text{Late Finish (LF)} - \text{Duration} + 1 = \text{Late Start (LS)}$

Backward Pass

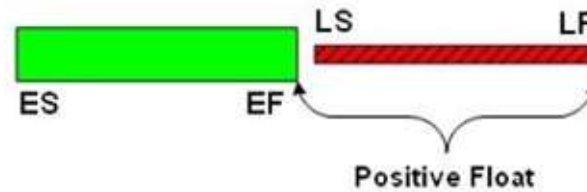
Backward pass





Types of Total Float

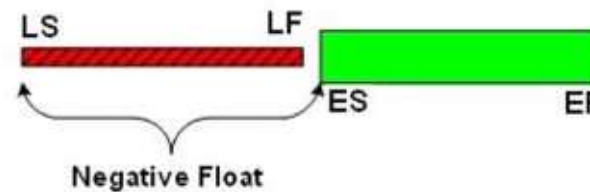
Positive Float



**Zero Float
(Critical)**



**Negative Float
(Extremely Critical)**



Legend

Early Dates



Late Dates

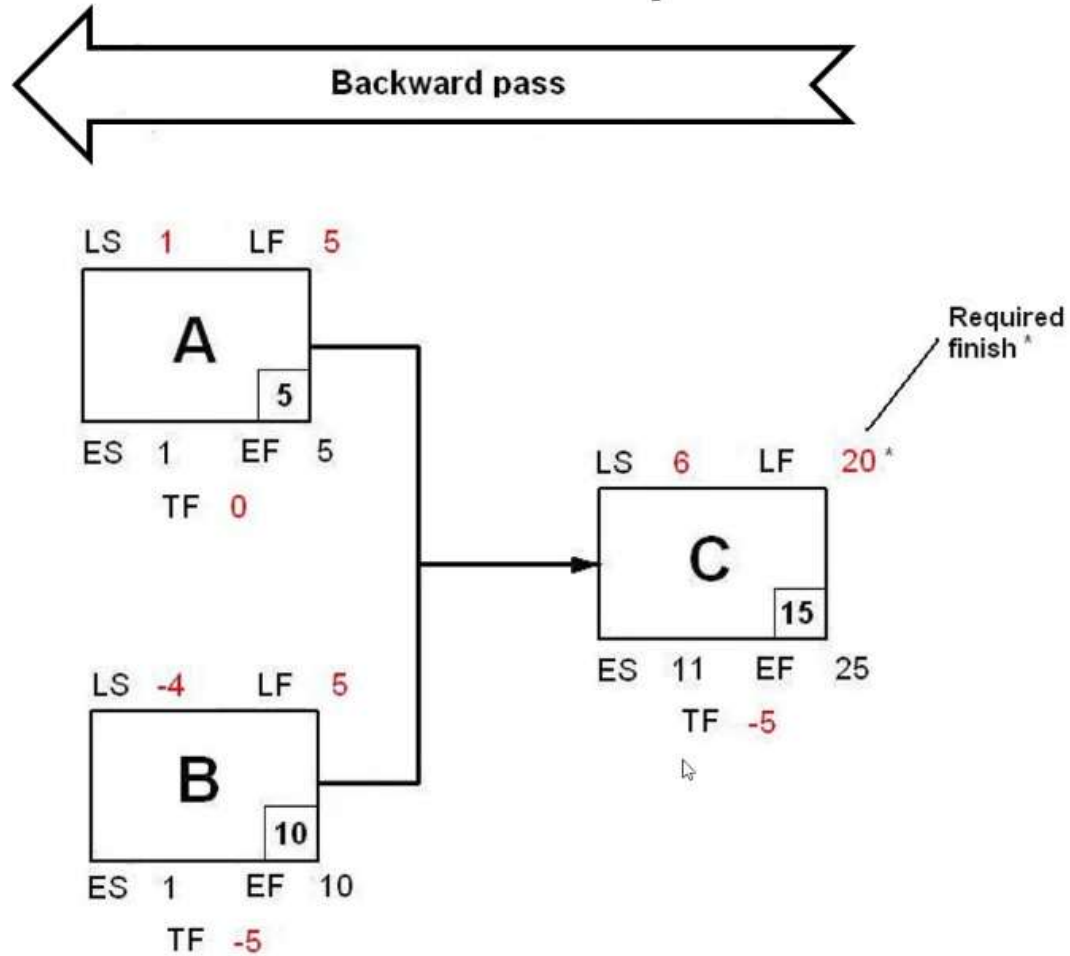


Must Finish By Date

A common scenario is a project with a required Must Finish By date. This date:

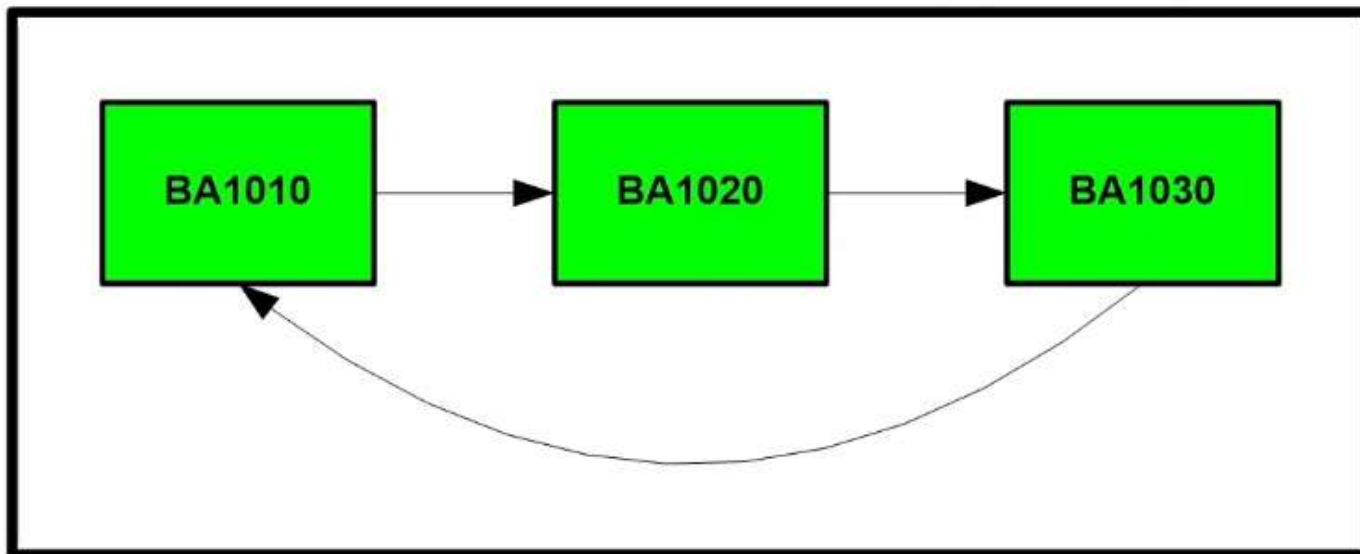
- Specifies when the project must finish regardless of the network's duration and logic.
- Is used only during the backward pass to calculate late dates.

Backward Pass with Required Finish



Circular Relationships (Loops)

- Loops indicate circular logic in an activity path.
- The schedule can not be calculated until the loop is eliminated. To eliminate a loop:
 - Determine proper logic.
 - Re-run the schedule.



Assigning Constraints

Objectives

After completing this lesson, you should be able to:

- Describe available constraint types.
- Apply a Must Finish By constraint to a project.
- Apply a Start On or After constraint to an activity.
- Add a Notebook topic to a constrained activity.

Constraints

- Date restrictions used to reflect project requirements that cannot be built into the network logic.
- More accurately reflect real-world aspects of a project.
- Provide added control of a project.
- Apply to the entire project or to individual activities.
 - Commonly used project-level constraint: Must Finish By
 - Commonly used activity-level constraint: Start On or After
- No more than 10 percent of a project's activities should be constrained.

Must Finish By

- Used when an overall project deadline must be met.
- Forces all activities in the project to finish by the date (and time) specified.
- Establishes the date from which late dates are calculated in the backward pass.
- Affects the Total Float of the entire project.

Start On or After

- Used to set the earliest date an activity can begin.
- Forces the activity to start no earlier than the constraint date.
- Pushes the activity's early start date to the constraint date.
- Affects the early dates of the activity's successors.

Additional Start Constraints

- **Start On** — Forces an activity to start on the constraint date.
 - Shifts both early and late start dates to the constraint date.
 - Used to specify dates submitted by contractors or vendors.
- **Start On or Before** — Forces an activity to start no later than the constraint date.
 - Shifts the late start to the constrained date.
 - Affects the late dates of its predecessors.
 - Used to place a deadline on the start of the activity.

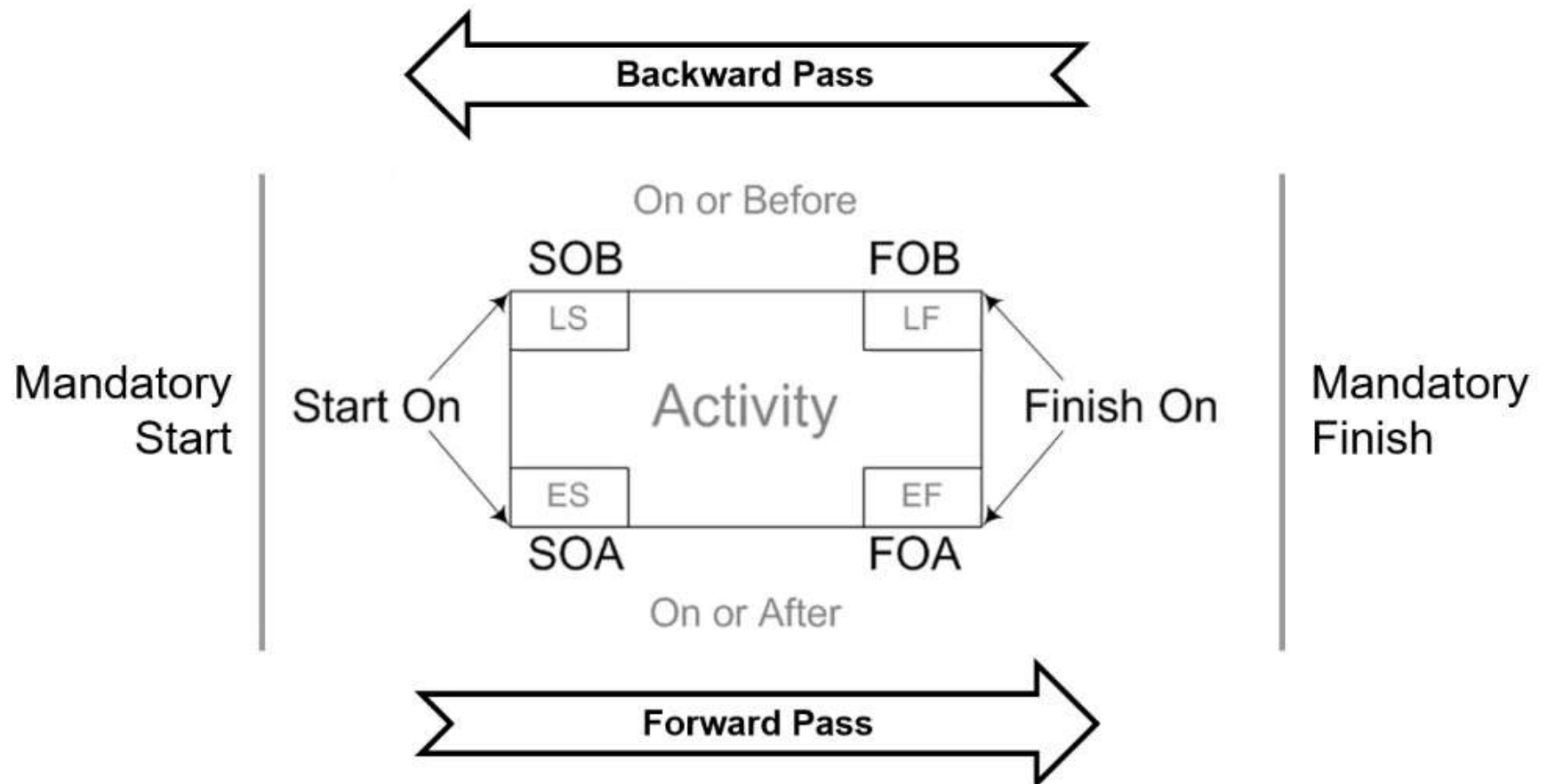
Additional Finish Constraints

- **Finish On** — Forces an activity to finish on the constraint date.
 - Shifts both early and late finish dates to the constraint date.
 - Used to satisfy intermediate project deadlines.
- **Finish On or Before** — Forces an activity to finish no later than the constraint date.
 - Pulls the late finish date to the constraint date.
 - Affects the late dates of its predecessors.
 - Used to set intermediate completion points in the project.
- **Finish On or After** — Forces an activity to finish no earlier than the constraint date.
 - Shifts the early finish to the constrained date.
 - Affects the early dates of its successors.

Additional Constraints

- **As Late as Possible** — Delays activity as late as possible without delaying successors.
 - Shifts early dates as late as possible.
 - Also called a zero free float constraint.
- **Mandatory Start and Finish** — Forces early and late dates to be equal to the constraint date.
 - Affects late dates of predecessors and early dates of successors.
 - May violate network logic.

How Constraints Affect Activity Dates



Constraint Type in Primavera P6

Constraint Date > LF	EF < Constraint Date < LF	Constraint Date < EF	Constraint Type
EF = LF = Constraint Date Total Float = 0	EF = LF = Constraint Date Total Float = 0	LF = Constraint Date Total Float < 0	Finish On
EF = LF = Constraint Date Total Float = 0	EF = Constraint Date		Finish On or After
	LF = Constraint Date	LF = Constraint Date Total Float < 0	Finish On or Before
EF = LF = Constraint Date Total Float = 0	EF = LF = Constraint Date Total Float Predecessors = 0	EF = LF = Constraint Date Total Float Predecessors < 0	Mandatory Finish
Constraint Date > LS	ES < Constraint Date < LS	Constraint Date < ES	
ES = LS = Constraint Date Total Float = 0	ES = LS = Constraint Date Total Float = 0	LS = Constraint Date Total Float (and Predecessors) < 0	Start On
ES = LS = Constraint Date Total Float = 0	ES = Constraint Date		Start On or After
	LS = Constraint Date	LS = Constraint Date Total Float (and Predecessors) < 0	Start On or Before
ES = LS = Constraint Date Total Float = 0	ES = LS = Constraint Date Total Float Predecessors = 0	ES = LS = Constraint Date Total Float Predecessors < 0	Mandatory Start
Free Float = 0			As Late As Possible

Lesson Review

- Constraints are user-imposed date restrictions that reflect the real-world aspects of scheduling the project.
- After applying a constraint, the project must be rescheduled to calculate the new dates.
- P6 allows you to apply constraints both at the project level and at the activity level.
- On the activity level, you can add a primary and a secondary constraint.
- For record-keeping purposes, add a Notebook topic when you assign a constraint to an activity.

Review Questions

1. True or False: Use the Start On or After constraint to set the earliest date an activity can begin.
2. True or False: A Finish On or Before constraint pulls the Early Finish date to the constraint date.
3. Which constraint is the most appropriate to use to set an overall project deadline?
 - a) As Late as Possible
 - b) Must Finish By
 - c) Finish On or Before
 - d) Mandatory Finish



Customizing Activity Views

Objectives

After completing this lesson, you should be able to:

- Manage activity views.
- Customize activity views.
- Sort and order columns.
- Manage detail windows.

Activity Views

A selection of data presented in a visual layout and format on the Activities page.

Activity views can be customized by:

- Adding and removing data columns
- Renaming data columns
- Grouping and sorting data
- Applying filters
- Customizing bars in the Gantt chart
- Arranging detail windows



Grouping

- A flexible way to organize data into categories that share a common attribute.
- Can be used to create customized views.
- Organized by grouping bands.

ID/Code *	Name *	Start
January 2029		02-Jan-29
HR-ADMIN	Project administration	02-Jan-29
HR1000	Start development milestone	02-Jan-29
HR1010	Define operational concept of new system	02-Jan-29
HR1020	Perform system requirements analysis	08-Jan-29
HR1030	Perform interface requirements analysis	09-Jan-29
HR1040	Design system architecture	22-Jan-29
February 2029		01-Feb-29
HR1050	Perform high-level software design	01-Feb-29
HR1060	Design database	01-Feb-29
March 2029		01-Mar-29
HR1070	Design external interfaces	01-Mar-29
HR1080	Perform detailed software design	15-Mar-29



Grouping

ID/Code *	Name *	Start
⊖ January 2029		02-Jan-29
■ HR-ADMIN	Project administration	02-Jan-29
◆ HR1000	Start development milestone	02-Jan-29
■ HR1010	Define operational concept of new system	02-Jan-29
■ HR1020	Perform system requirements analysis	08-Jan-29
■ HR1030	Perform interface requirements analysis	09-Jan-29
■ HR1040	Design system architecture	22-Jan-29
⊖ February 2029		01-Feb-29
■ HR1050	Perform high-level software design	01-Feb-29
■ HR1060	Design database	01-Feb-29
⊖ March 2029		01-Mar-29
■ HR1070	Design external interfaces	01-Mar-29
■ HR1080	Perform detailed software design	15-Mar-29

Activities can be grouped:

- By hierarchical fields (WBS, activity codes, project codes).
- By data fields (dates, costs, Total Float, other numeric data).

Can be used to:

- Quickly view subtotal data in grouping bands.
- View summary bars in the Gantt chart.
- Summarize data for reporting purposes.

Sorting

- Determines the sequence in which activities are listed within grouping bands.
- Based on data item, you can sort:
 - Alphabetically
 - Numerically
 - Chronologically
- Click on column header to sort ascending or descending or use Sorting tab to sort on multiple columns.

Name *	Start 
	02-Jan-29
Project administration	02-Jan-29
Start development milesto...	02-Jan-29
Define operational concep...	02-Jan-29
Perform system requireme...	08-Jan-29
Perform interface require...	09-Jan-29
Design system architecture	22-Jan-29
	01-Feb-29
Design database	01-Feb-29
Perform high-level softwa...	01-Feb-29
	01-Mar-29
Design external interfaces	01-Mar-29
Perform detailed software ...	15-Mar-29
	19-Apr-29
Implement the database	19-Apr-29
Implement the software	19-Apr-29
Perform design walkthrou...	19-Apr-29

Sorted by Start date
Ascending

Name *	Start 
	02-Jan-29
Design system architecture	22-Jan-29
Perform interface require...	09-Jan-29
Perform system requireme...	08-Jan-29
Project administration	02-Jan-29
Start development milesto...	02-Jan-29
Define operational concep...	02-Jan-29
	01-Feb-29
Design database	01-Feb-29
Perform high-level softwa...	01-Feb-29
	01-Mar-29
Perform detailed software ...	15-Mar-29
Design external interfaces	01-Mar-29
	19-Apr-29
Implement the database	19-Apr-29
Implement the software	19-Apr-29
Perform design walkthrou...	19-Apr-29

Sorted by Start date
Descending

Lesson Review

- The Activities page allows you to customize activity views, which determine how data is displayed.
- You can save a customized activity view and then share it with a list of users or all users.
- To make a copy of an existing activity view, copy and paste the view in the Manage Views window, or modify a view and select Save View As...from the Save View menu.
- Detail windows can be made visible or invisible, and can be moved according to your preferences.

Review Questions

1. True or False: You can remove a grouping by selecting Delete from the Context menu next to the Group by item.
2. Sort activities in the Activity Table by:
 - a) Clicking the column header.
 - b) Using the Sort by and Sort order lists in the Customize Activity View dialog box.
 - c) Right-clicking any column and selecting Sort.
 - d) a or b
3. True or False: On the Activities page, you can customize Activities-related detail windows but not WBS-related detail windows.