

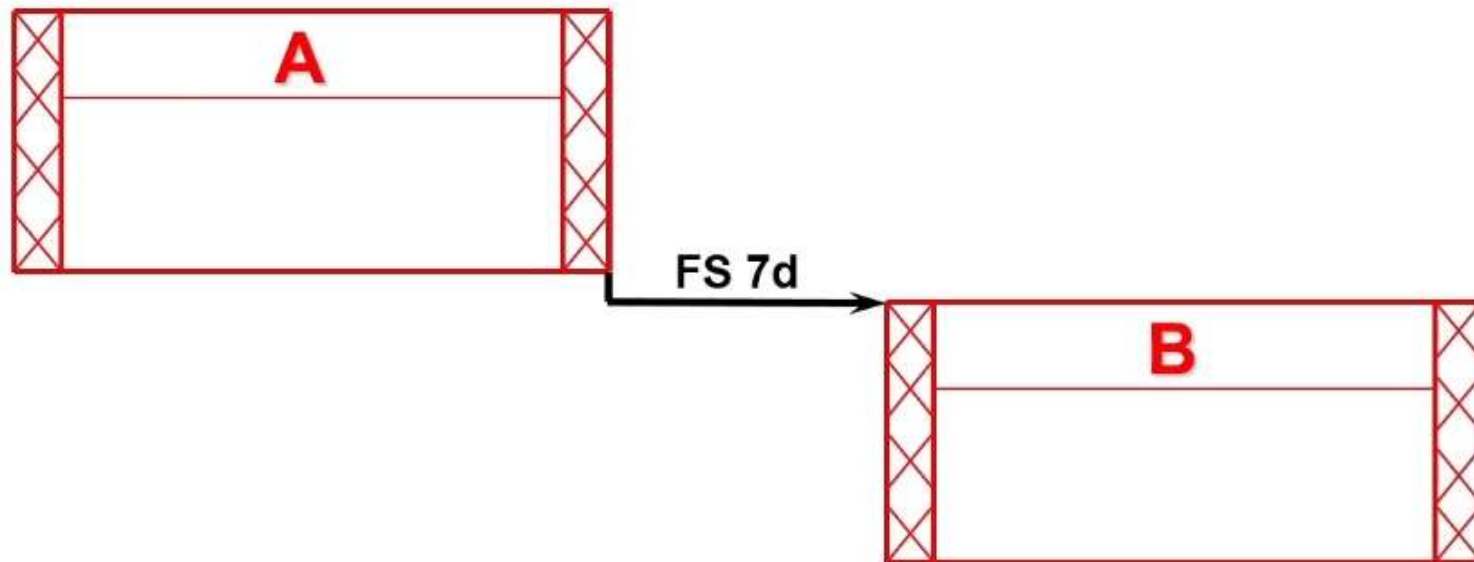
Relationships with Lag

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

Finish to Start with Lag

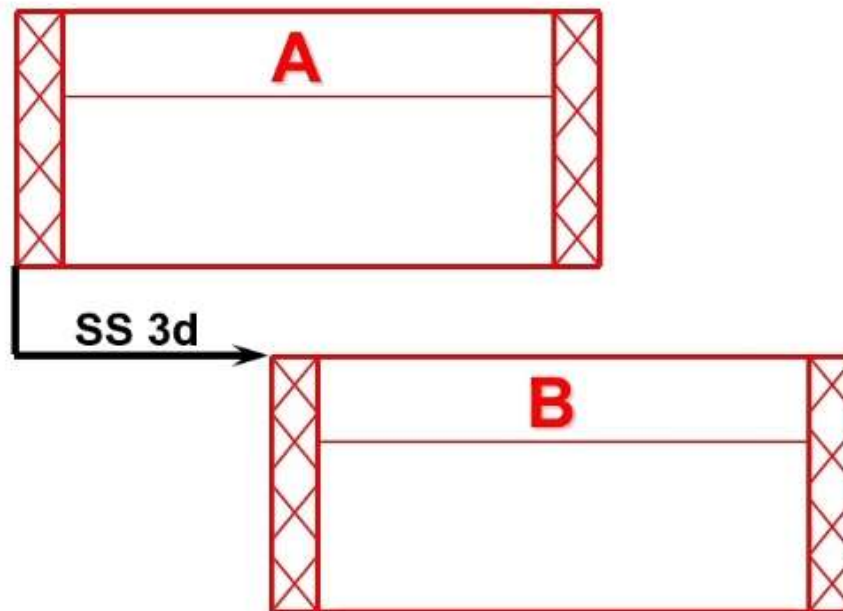
Activity B can start after activity A finishes and seven days have passed.



Example: After the concrete floor is poured and cures for seven days, we can begin constructing the walls.

Start to Start with Lag

After activity A starts and 3 days of work have passed, then activity B can start.



Example: We can start laying the drainage pipes three days after we start digging the trenches.

Question

Which of the following statements is true?

- a. A successor activity depends on the start or finish of another activity.
- b. Lag specifies a delay between an activity and its successor.
- c. Lag can be positive or negative.
- d. 1 and 2
- e. 1 and 2 and 3

تعریف رابطه بین فعالیتها در P6 :

بدین منظور کافی است در صفحه Activity Detail در پنجره Predecessors با کلیک روی دکمه Assign ، فعالیت یا فعالیت‌های پیش نیاز را انتخاب نمایید.

در ستون Relationship Type نوع رابطه در ستون Lag میزان شناوری را وارد نمایید.



The screenshot displays the Primavera P6 software interface. On the left, the 'Activity Detail' window is open, showing the 'Predecessors' tab. The 'Activity' field is set to 'A1030'. Below it, a table lists the predecessors:

Activity ID	Activity Name	Relations	Lag
A1020	شناسایی پیمانکار	FS	0

At the bottom of the 'Activity Detail' window, there are buttons for 'Assign', 'Remove', and 'GoTo'.

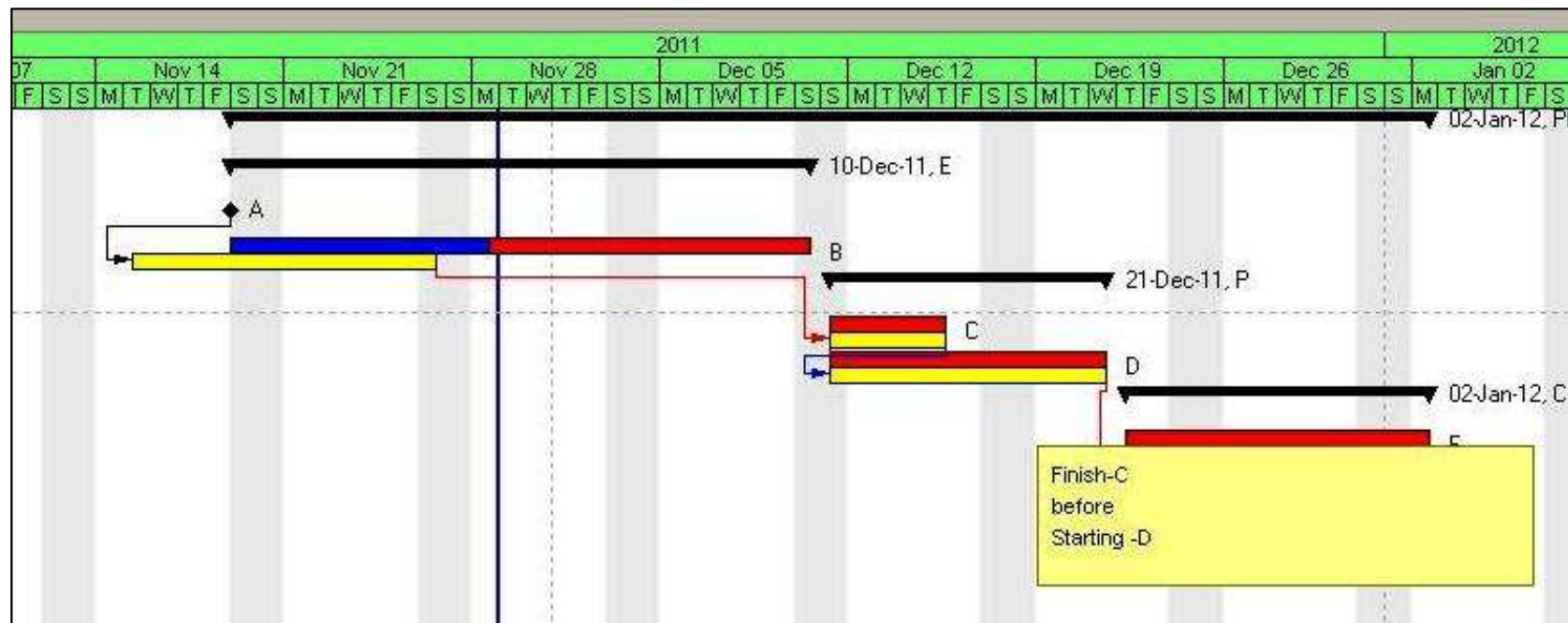
On the right, the 'Assign Predecessors' dialog box is open. It shows a list of activities to be assigned as predecessors. The 'Display' is set to 'All Activities'. The 'Search' field is empty. The list of activities is as follows:

Activity ID	Activity Name
A1000	شروع ...رو...
A1010	تهیه شرح خدمات
A1020	شناسایی پیمانکار
A1030	استعلام قیمت
A1040	... مرحله اول ...

تعریف رابطه بین فعالیتها در P6 :

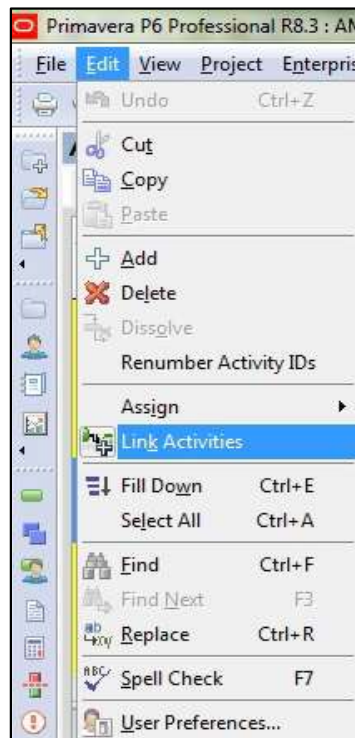
روش دوم ایجاد رابطه بین فعالیتها :

می توان از طریق نمودار گانت نیز بین فعالیتها رابطه ایجاد نمود. بدین منظور ابتدا روی آیکون  Relationship lines کلیک نمایید. سپس کافی است روی میله فعالیت پیش نیاز کلیک نموده و تا فعالیت پس نیاز Drag نمایید.



تعریف رابطه دسته جمعی :

هرگاه چند فعالیت با هم رابطه ای از نوع FS داشته باشند، می توان با انتخاب دسته جمعی آنها با کمک دکمه Shift انتخاب نمود سپس از منوی Edit گزینه



Link Activities را انتخاب نمایید.

برای اعمال رابطه های ایجاد شده کلید F9 را می زنیم و در پنجره باز شده روی دکمه Schedule کلیک نمایید.

روش مسیر بحرانی (CPM)

تعریف شناوری آزاد (Free Float): مدت زمانی است که یک فعالیت می تواند به تاخیر

بیفتد ، بدون آنکه بر فعالیت بعدی خود تاثیر بگذارد $\text{Free Float} = \text{Min}\{\text{ES for all Successors}\} - \text{EF}$

تعریف شناوری کل (Total Float): مدت زمانی است که یک فعالیت میتواند به تاخیر بیفتد،

بدون آنکه بر زمان پایان پروژه اثر بگذارد. $\text{Total Float} = \text{LS} - \text{ES} = \text{LF} - \text{EF}$

تعریف مسیر بحرانی: طولانی ترین مسیر پروژه که زمان اتمام پروژه را پیش بینی مینماید،

مسیر بحرانی پروژه گویند. هر پروژه ، حداقل یک مسیر بحرانی دارد.

برای مشاهده میزان شناوری فعالیتها ، کافی است ستون Total Float را در پروژه وارد نمایید.

میله فعالیتهای بحرانی به صورت پیش فرض در نرم افزار به رنگ قرمز نشان داده می شود.

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.



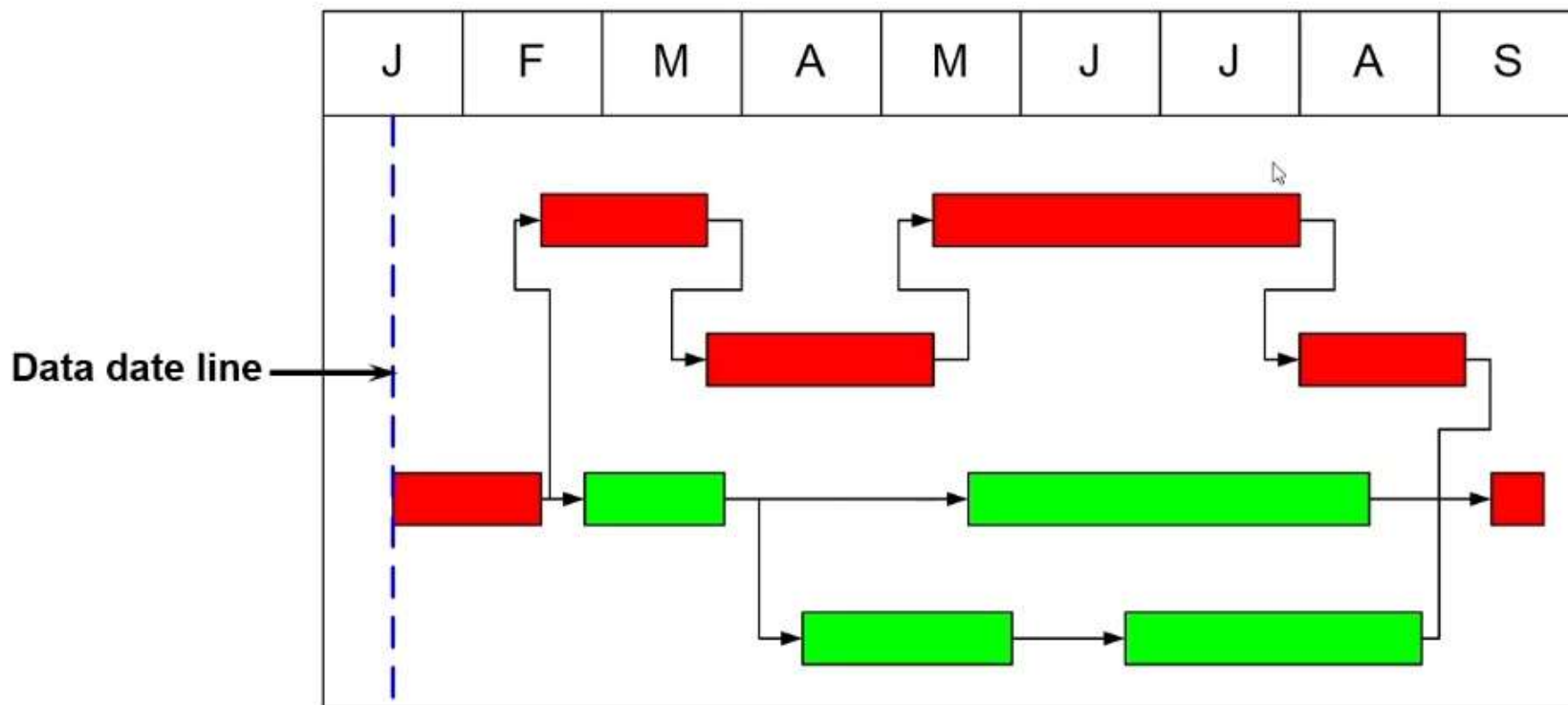
Critical Path

- 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.

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.

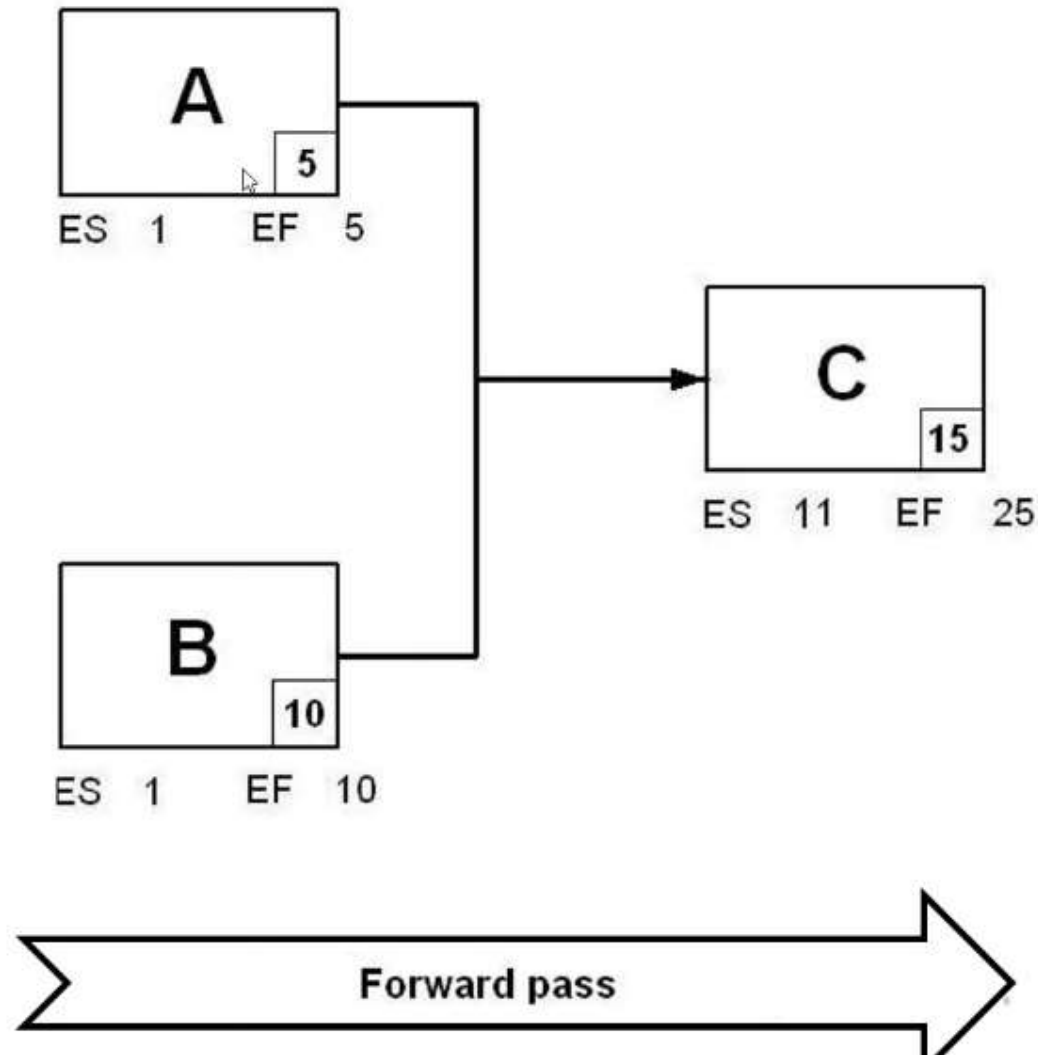
Data Date



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.
- $\text{Early Start (ES)} + \text{Duration} - 1 = \text{Early Finish (EF)}$

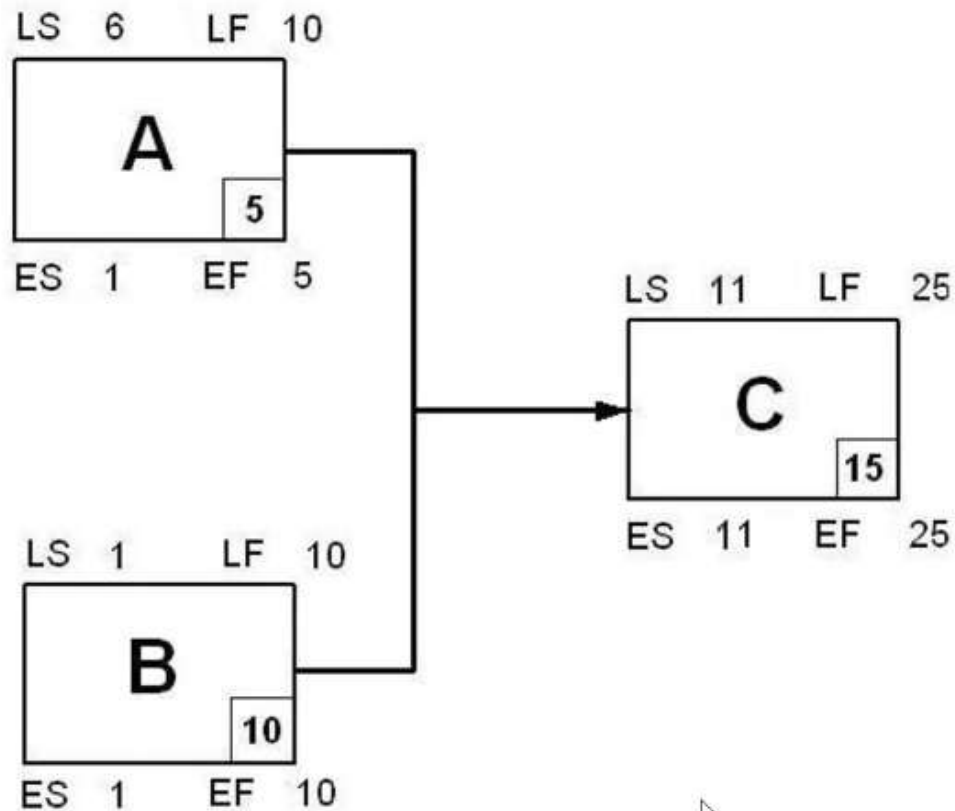
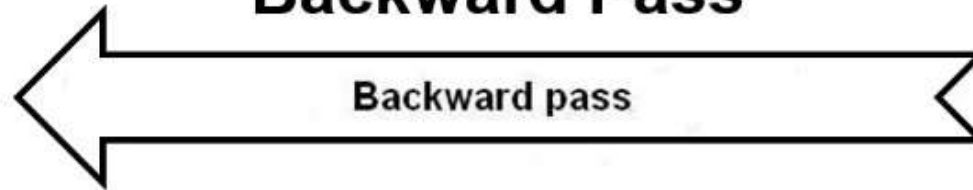
Forward Pass



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.
- $\text{Late Finish (LF)} - \text{Duration} + 1 = \text{Late Start (LS)}$

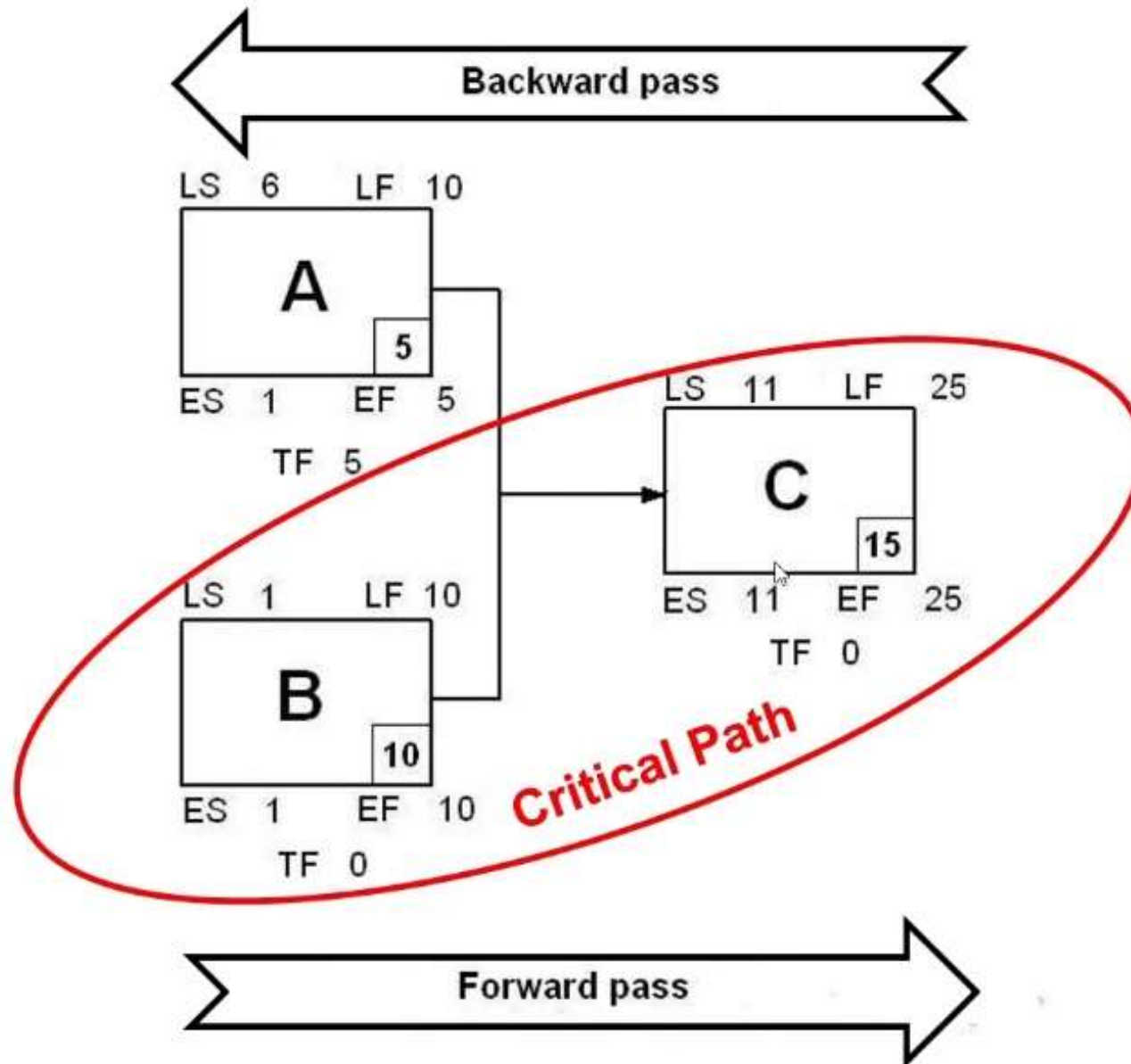
Backward Pass



Total Float

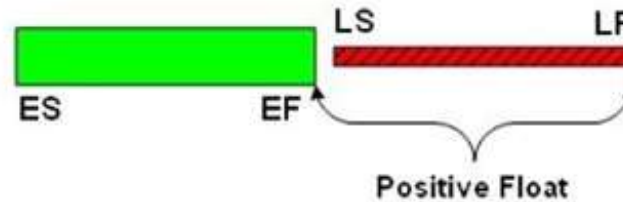
- The amount of time an activity can be delayed from its Early Start without delaying the project.
- The difference between an activity's late dates and early dates.
- Total Float is automatically calculated each time you schedule the project. You cannot edit an activity's float values directly.
- Activities whose Total Float is less than or equal to zero are critical.
- $\text{Late date} - \text{early date} = \text{Total Float (TF)}$

Total Float



Types of Total Float

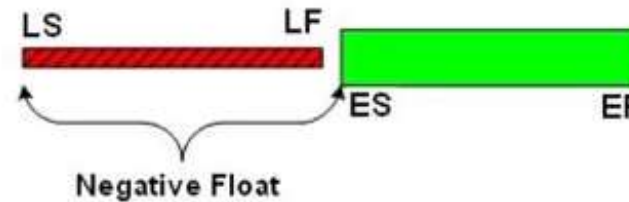
Positive Float



Zero Float (Critical)



Negative Float (Extremely Critical)



Legend

Early Dates



Late Dates

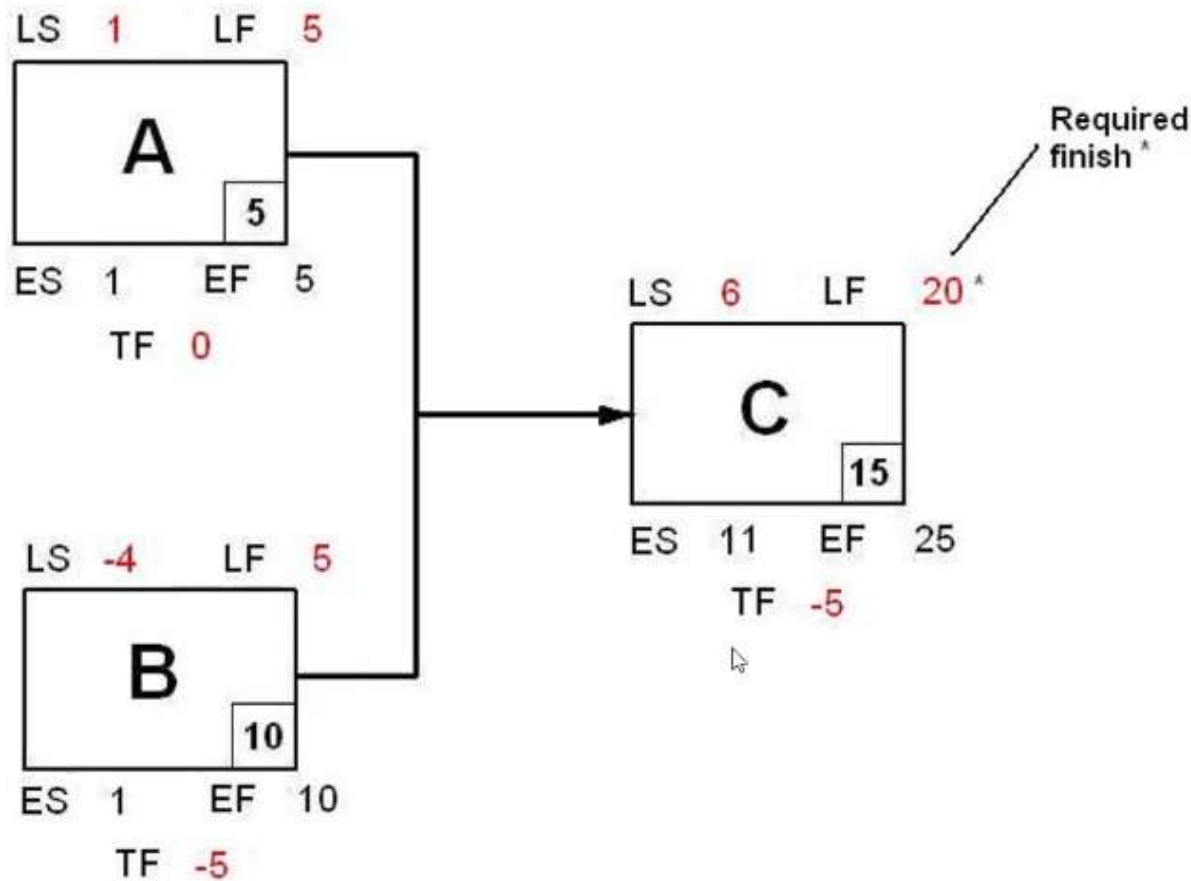
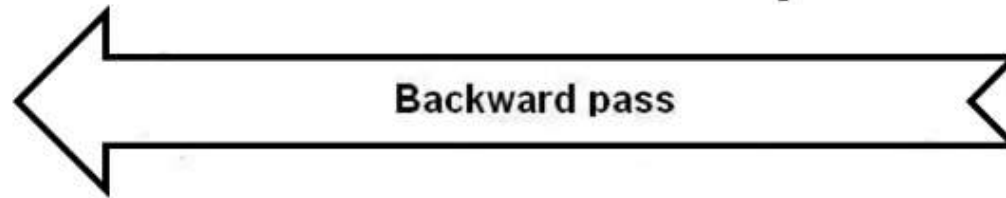


Must Finish By Date

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

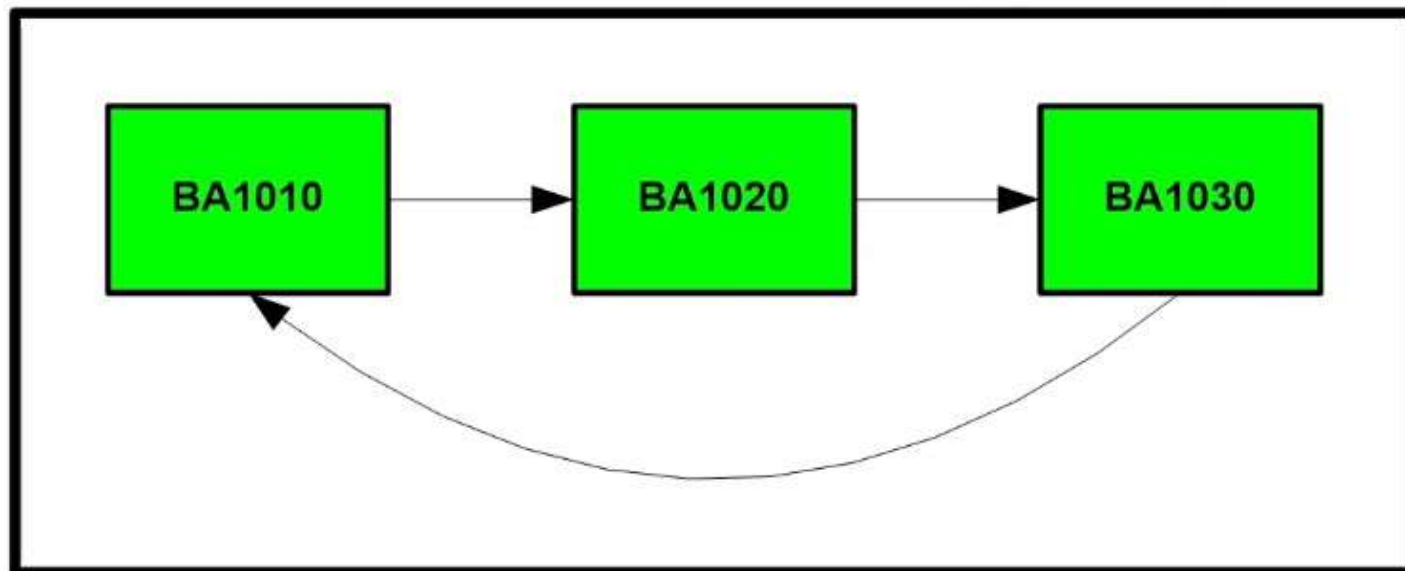
- Specifies when the project must finish regardless of the network's duration and logic.
- Is used only during the backward pass to calculate late dates.

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.

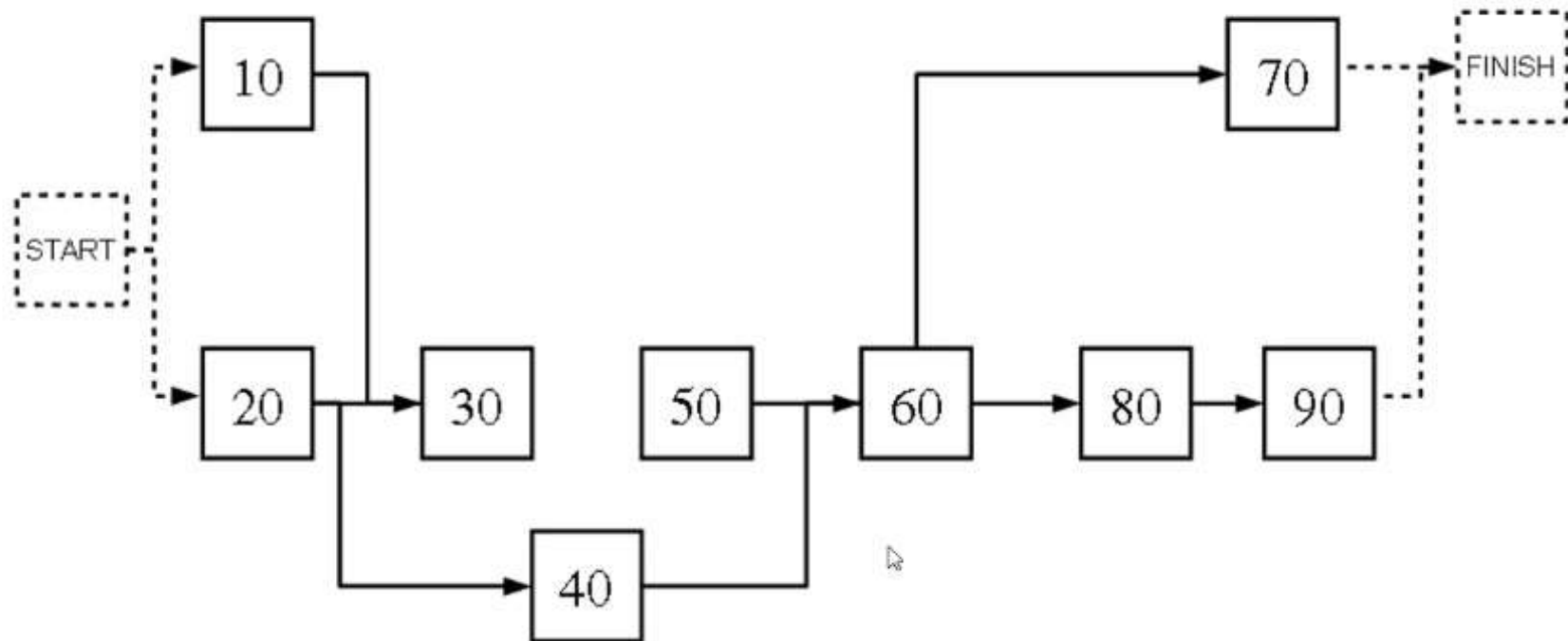


Open Ends

- Open ends are activities without either a predecessor or successor.
 - **No predecessor** — Activity uses data date as its Early Start.
 - **No successor** — Activity uses project finish as its Late Finish.
- Open-ended activities can portray an unrealistic amount of positive total float.

It is recommended that each project have only two open ends: the first activity (Start milestone) and the last activity (Finish milestone).

Question



Notice that there is no relationship between activities 30 and 50, creating two additional open ends. What will happen when this network is scheduled?

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.

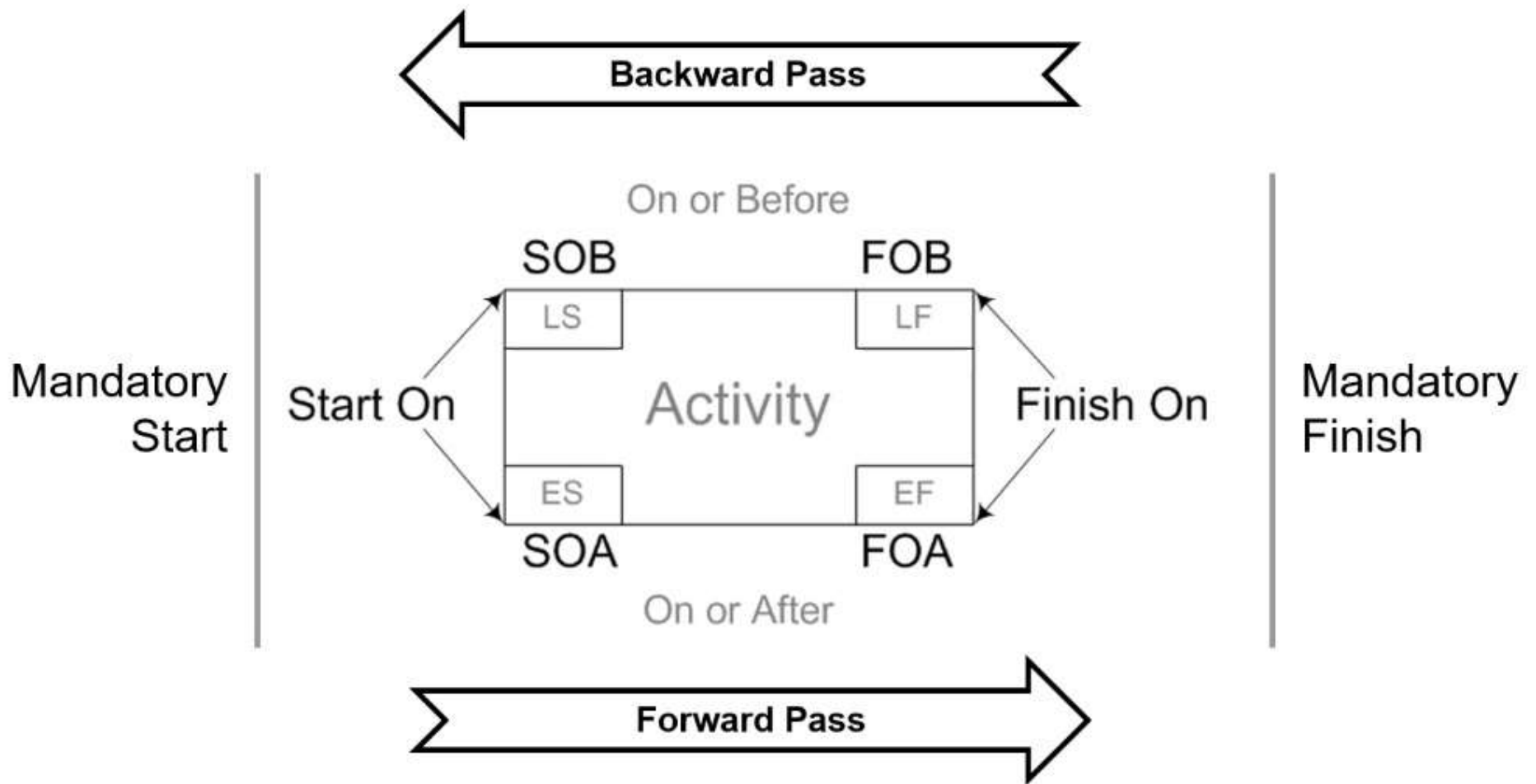
Additional Finish Constraints

- **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.

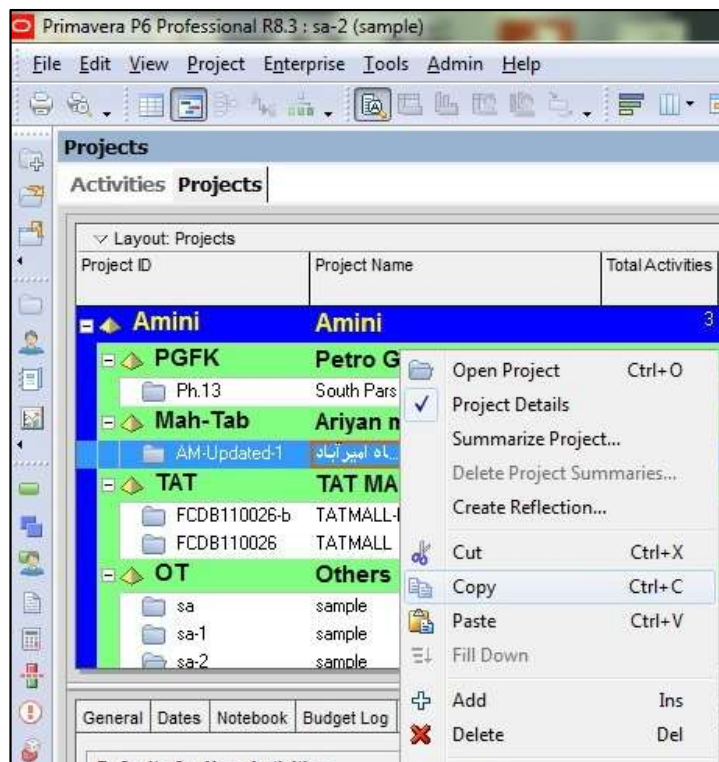
How Constraints Affect Activity Dates



Constraint Type in Primavera P6

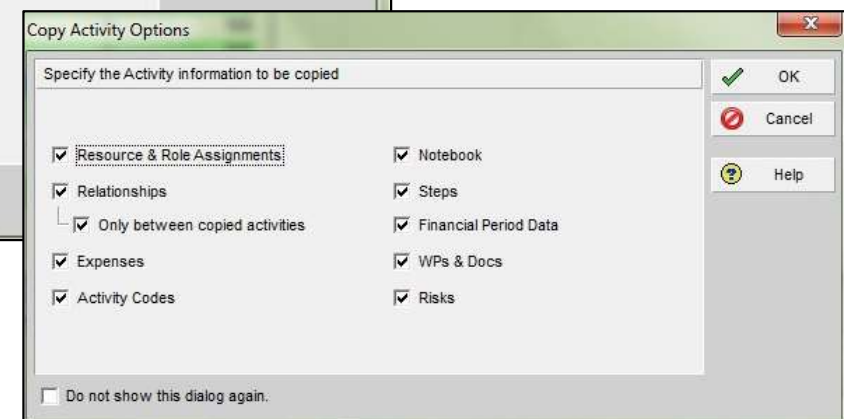
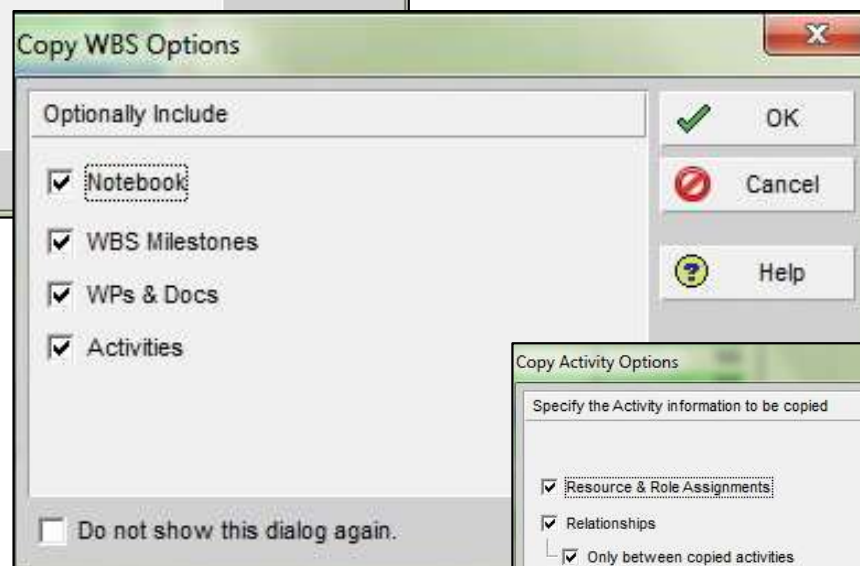
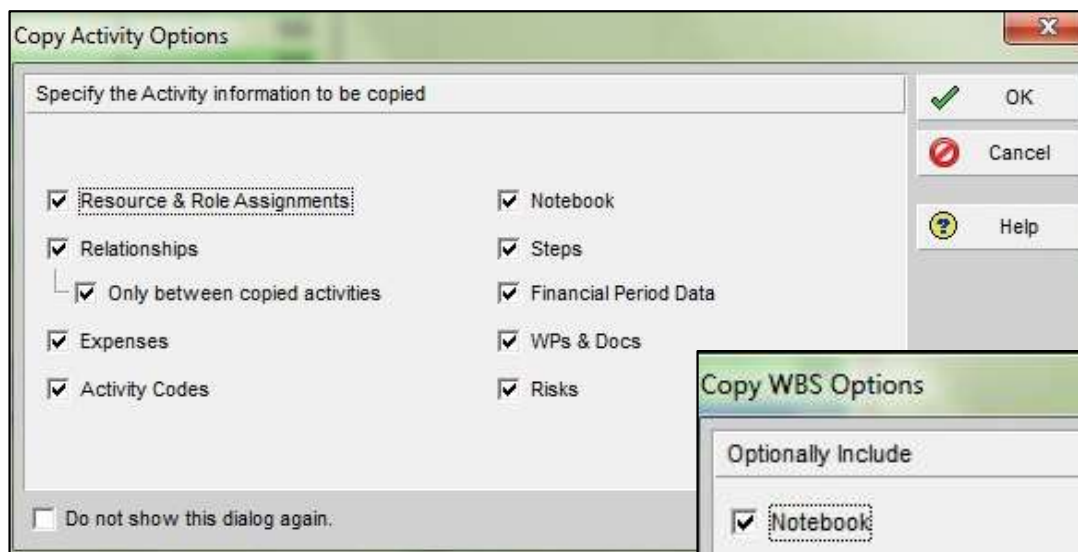
Constraint Date > LF	EF < Constraint Date < LF	Constraint Date < EF	Constraint Type
EF = LF = Constraint Date Total Float = 0	EF = LF = Constraint Date Total Float = 0	LF = Constraint Date Total Float < 0	Finish On
EF = LF = Constraint Date Total Float = 0	EF = Constraint Date		Finish On or After
	LF = 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

در محیط Project روی پروژه مورد نظر رفته و سپس راست کلیک نموده، روی گزینه Copy کلیک نمایید. سپس روی EPS که می‌خواهید پروژه در آن کپی شود راست کلیک نموده و روی گزینه Paste کلیک نمایید.



کپی گرفتن از پروژه:

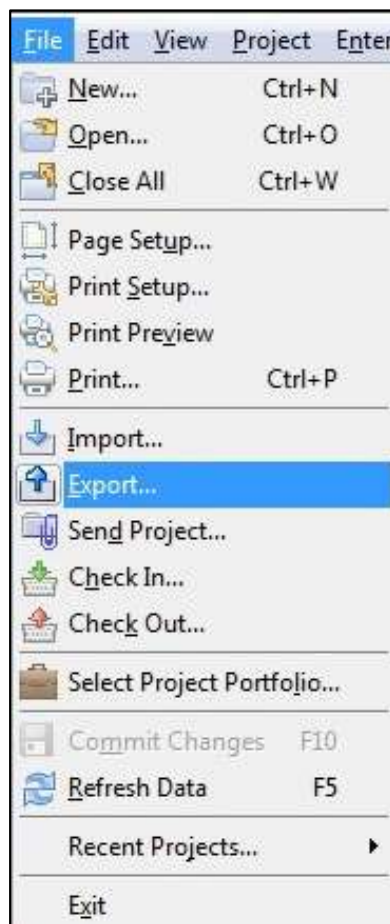
هنگام کپی گرفتن می‌توان تعیین نمود چه آیتم‌هایی از پروژه کپی گردد یا نگردد.



Backup گرفتن از پروژه:

در صورت Uninstall شدن برنامه یا پاک شدن دیتابیس اطلاعات تمامی پروژهها نیز از بین میروند. لذا لازم است از پروژهها نسخه پشتیبان در خارج از محیط نرم افزار داشته باشید.

بدین منظور از منوی File گزینه Export را انتخاب نمایید.



سپس اولین گزینه (XER) PM- Primavera را انتخاب نمایید.

Export

Export Format

Select the export format.

☒ Primavera PM - (XER) 22.12 or later

☐ Primavera Contractor - (XER) 6.1 or later

☐ Primavera P6 - (XML)

☐ Spreadsheet - (XLSX)

☐ Microsoft Project

☐ UN/CEFACT Format 6 - (XML)

☐ IPMDAR Format

Export

Export Type

Select the type of data to export.

☒ Project

☐ Resource Only

☐ Role Only

Export

File Name

What is the name of the .xer file?

File Name

D:\TAT MALL\Time Schedule\2013-12-28 (new)\2013-12-28 ...

Export

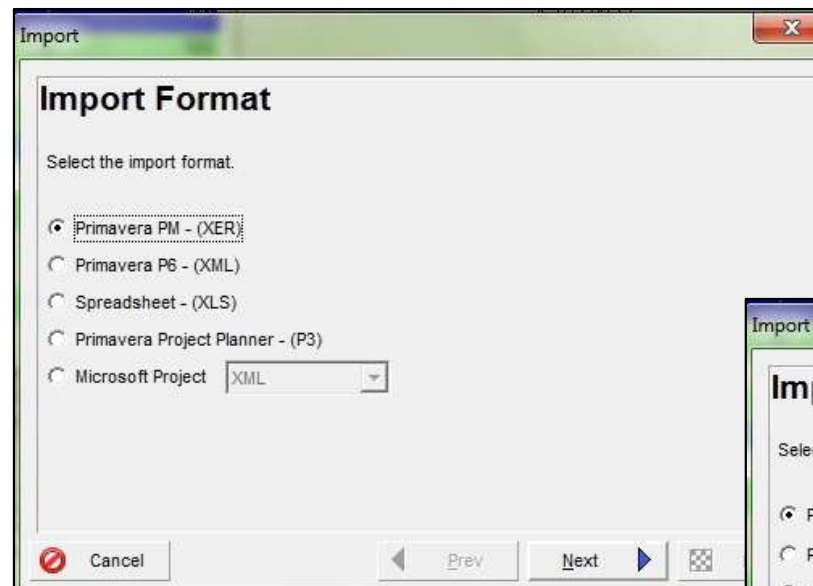
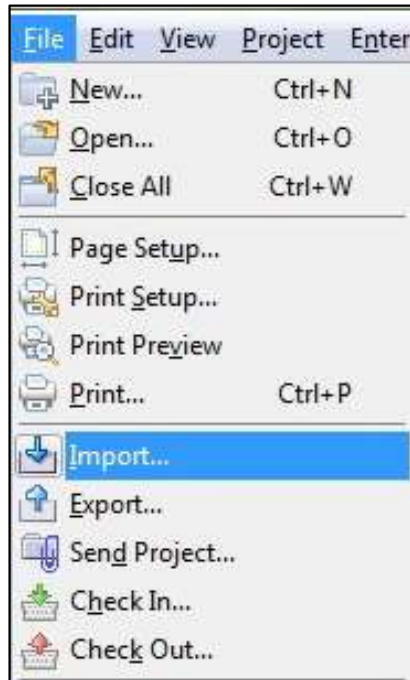
Projects To Export

The projects listed below are open and can be exported.

Open Projects

Export	Project ID	Project Name
☒	sa-2	sample

از منوی File گزینه Import را انتخاب و یا روی فایل با پسوند XER دوبار کلیک نمایید.



بازخوانی فایل‌های پشتیبان :

Import

File Name

Please enter the file name of the .xer file being imported.

File Name
D:\TAT MALL\Time Schedule\2013-12-28 (new)\2013-12-28 ...

Cancel

Import

Import Project Options

The project(s) listed in the grid below are found in your import file. If the same project(s) already exists (based on Project ID) in the database, the Match checkbox will be selected. Select the import action and destination

Project ID	Match	Import Action	Import To
FCDB110028	☒	Create New Project	OT

[Add Into Existing Project](#)
[Create New Project](#)
[Ignore this Project](#)
[Replace Existing Project](#)
[Update Existing Project](#)

Cancel Prev

Import

Finish

You are ready to import. To begin, click the Finish button.

Cancel Prev Next Finish

Import

Update Project Options

Import configurations of update options may be saved and reused. These define the action to take when imported data (e.g., resources, activities) conflict with existing data. Please choose which layout configuration to use during the import. Y layout.

Use	Layout Name
☒	Yes Default Configuration

Cancel Prev

Import

Currency Type

The import file contains the following currency which could not be found in the database.

R

Select a matching Currency
Dollar

To make another currency available for importing the file, cancel the Import Wizard, add the currency through the Admin menu, and start the Import Wizard again.

Cancel Prev Next Finish

انتقال اطلاعات از P6 به برنامه های دیگر:

Primavera Contractor–(Xer): نسخه پشتیبان به صورت فایل برنامه

Contract Management

Primavera P6 –(XML): نسخه پشتیبان به صورت فایل برنامه تحت وب

Spreadsheet –(XLS): خروجی از برنامه زمانبندی به صورت فایل اکسل

Microsoft Project: خروجی از برنامه زمانبندی به صورت فایل MSP

UN/CEFACT (XML): نسخه پشتیبان به صورت فایل برنامه تحت وب

IPMADR Format: فرمت وزارت دفاع آمریکا