Video 2: Project Management Fundamentals – Companion Document

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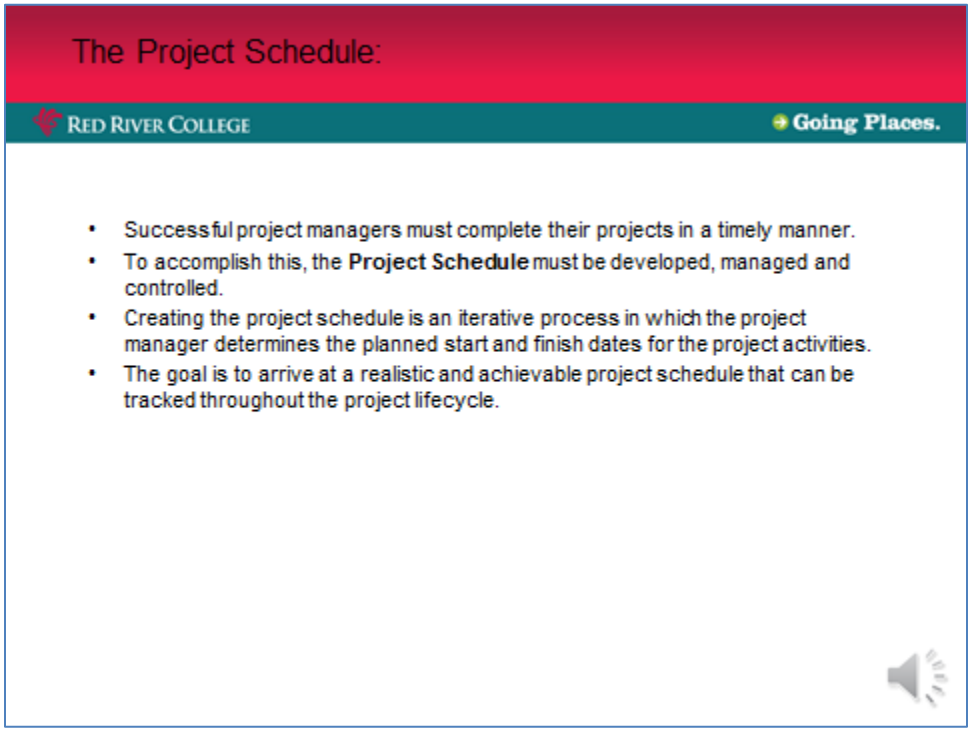


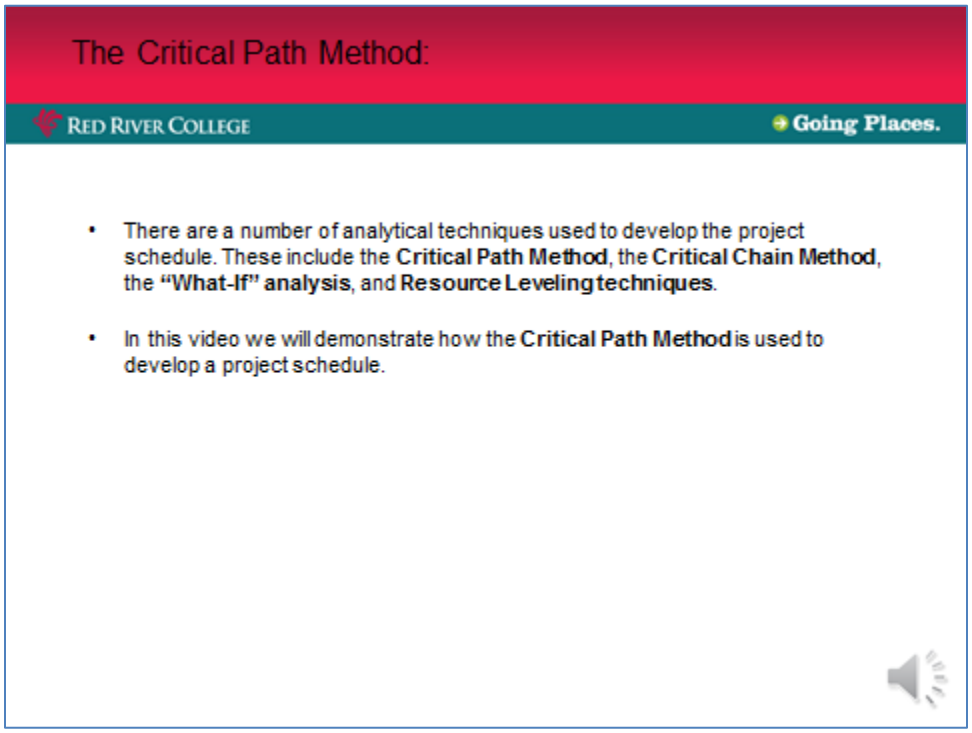
Successful project managers must complete their projects in a timely manner. To accomplish this, the **Project Schedule** must be developed, managed and controlled.

The Project Schedule answers the questions WHEN will my project be completed and WHEN will my project activities be completed.

Creating the project schedule is an iterative process in which the project manager determines the planned start and finish dates for the project activities.

The goal is to arrive at a realistic and achievable project schedule that can be tracked throughout the project lifecycle.

Slide 2



There are a number of analytical techniques used to develop the project schedule. These include the **Critical Path Method**, the **Critical Chain Method**, the **"What-If" analysis**, and **Resource Leveling techniques**.

In this video we will demonstrate how the **Critical Path Method** is used to develop a project schedule.

In a real project the Project Manager will not usually make use of the manual method illustrated in this video. Scheduling software such as MS Project will be used to simply the effort. However, if you understand the basics illustrate here you will have a better idea of how the scheduling software work.

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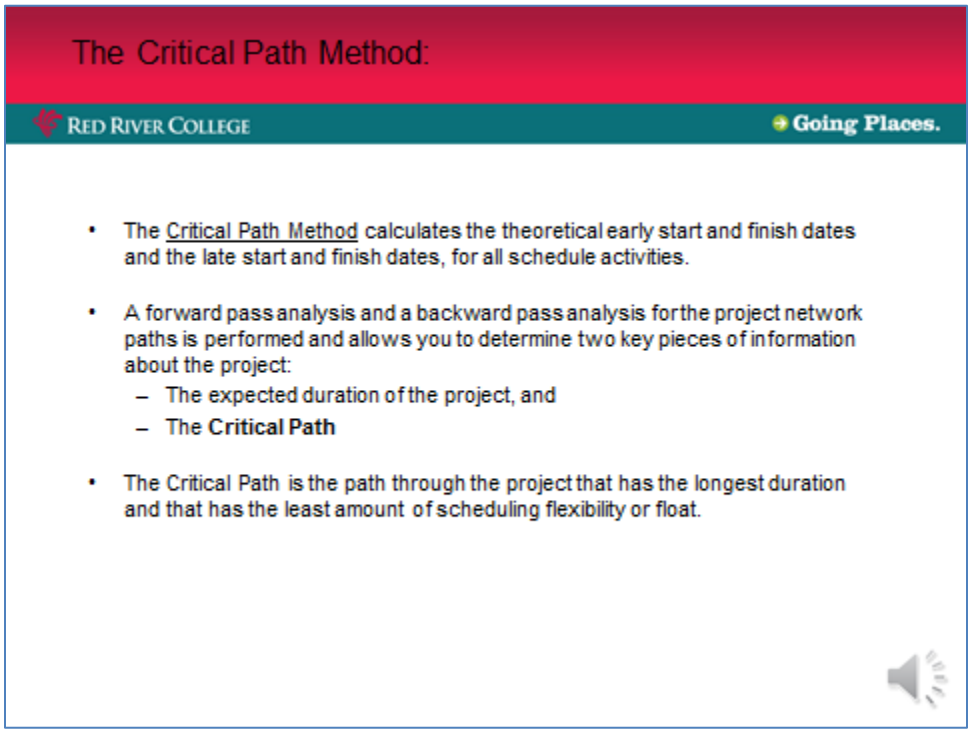

The Critical Path Method calculates the theoretical early start and finish dates and the late start and finish dates, for all schedule activities.

First you build a network diagram and then a forward pass analysis and a backward pass analysis for the project network paths is performed and allows you to determine two key pieces of information about the project:

- The expected duration of the project, and
- The **Critical Path**

The Critical Path is the path through the project that has the longest duration and that has the least amount of scheduling flexibility or float.

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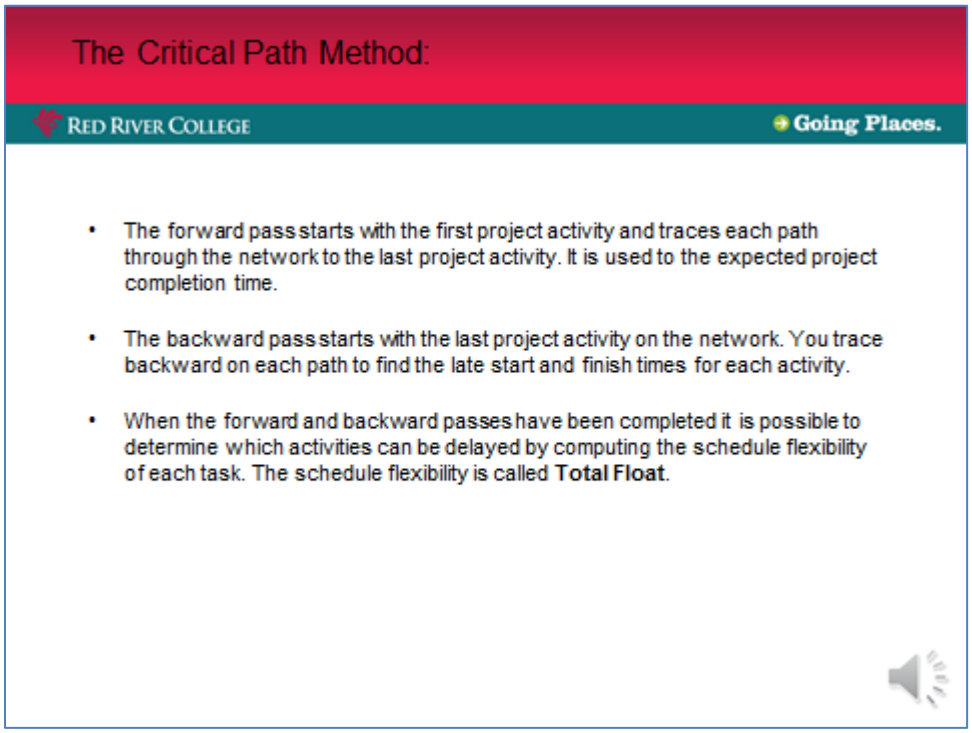

The forward pass starts with the first project activity and traces each path through the network to the last project activity. It is used to the expected project completion time.

The backward pass starts with the last project activity on the network. You trace backward on each path to find the late start and finish times for each activity.

When the forward and backward passes have been completed it is possible to determine which activities can be delayed by computing the schedule flexibility of each task. The schedule flexibility is called **Total Float**.

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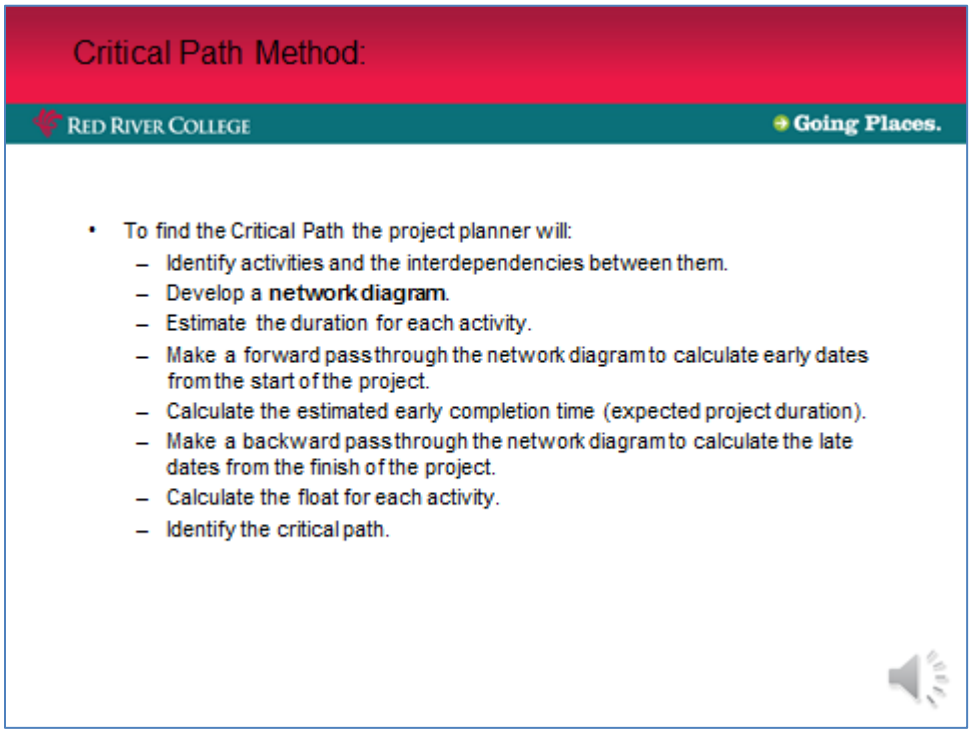

To find the Critical Path the project planners will:

- Identify activities and the interdependencies between them.
- Develop a **network diagram**.
- Estimate the duration for each activity.
- Make a forward pass through the network diagram to calculate early dates from the start of the project.
- Calculate the estimated early completion time (expected project duration).
- Make a backward pass through the network diagram to calculate the late dates from the finish of the project.
- Calculate the float for each activity.
- Identify the critical path.

You make use of the precedence relationships discussed in this course to document the interdependencies and create the network diagram.

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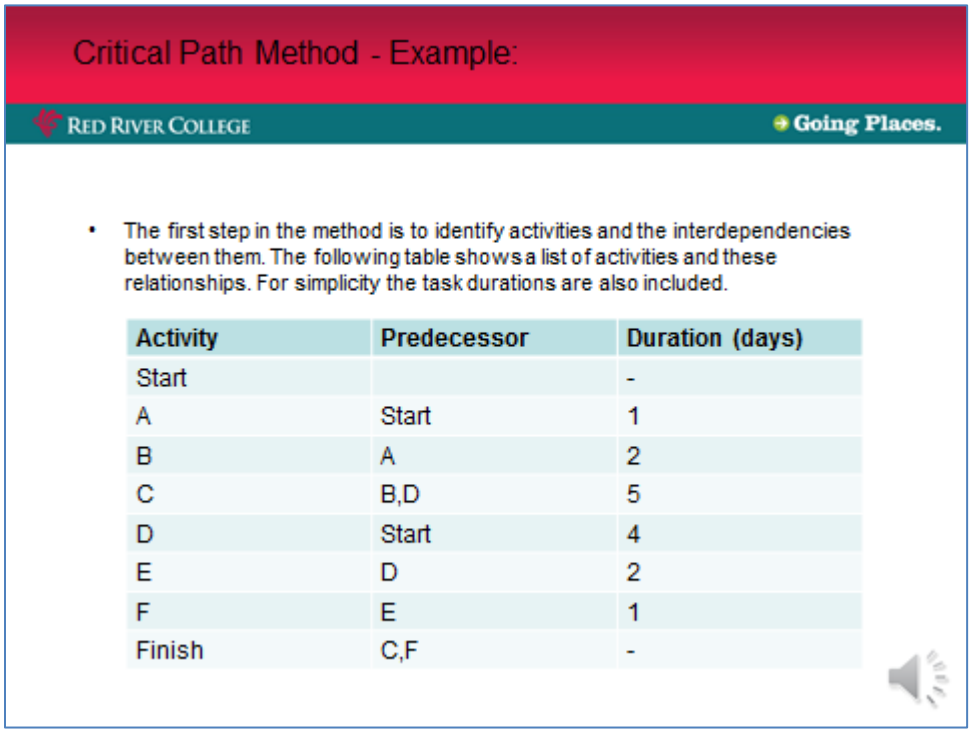

The first step in the method is to identify activities and the interdependencies between them. The following table shows a list of activities and these relationships. For simplicity the task durations are also included.

Activity	Predecessor	Duration (days)
Start		-
A	Start	1
B	A	2
C	B,D	5
D	Start	4
E	D	2
F	E	1
Finish	C,F	-

- Task B comes after Task A.
- Task A and Task D have no predecessors and immediately follow START
- Task E follows Task D
- Task F is preceded by Task E
- Task C is dependent upon the completion of BOTH Task A and Task D.

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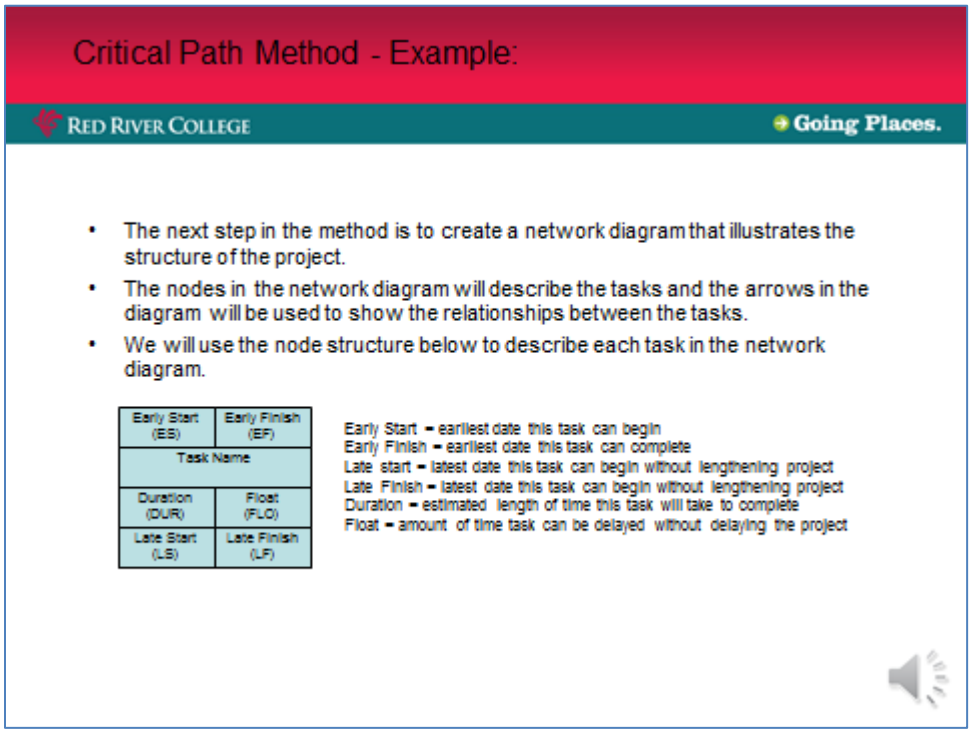

The next step in the method is to create a network diagram that illustrates the structure of the project.

The nodes in the network diagram will describe the tasks and the arrows in the diagram will be used to show the relationships between the tasks. This is called Activity on Node (AON).

We will use the node structure below to describe each task in the network diagram.

Early Start (ES)	Early Finish (EF)
Task Name	
Duration (DUR)	Float (FLO)
Late Start (LS)	Late Finish (LF)

- Early Start = earliest date this task can begin
- Early Finish = earliest date this task can complete
- Late start = latest date this task can begin without lengthening project
- Late Finish = latest date this task can begin without lengthening project
- Duration = estimated length of time this task will take to complete
- Float = amount of time task can be delayed without delaying the project

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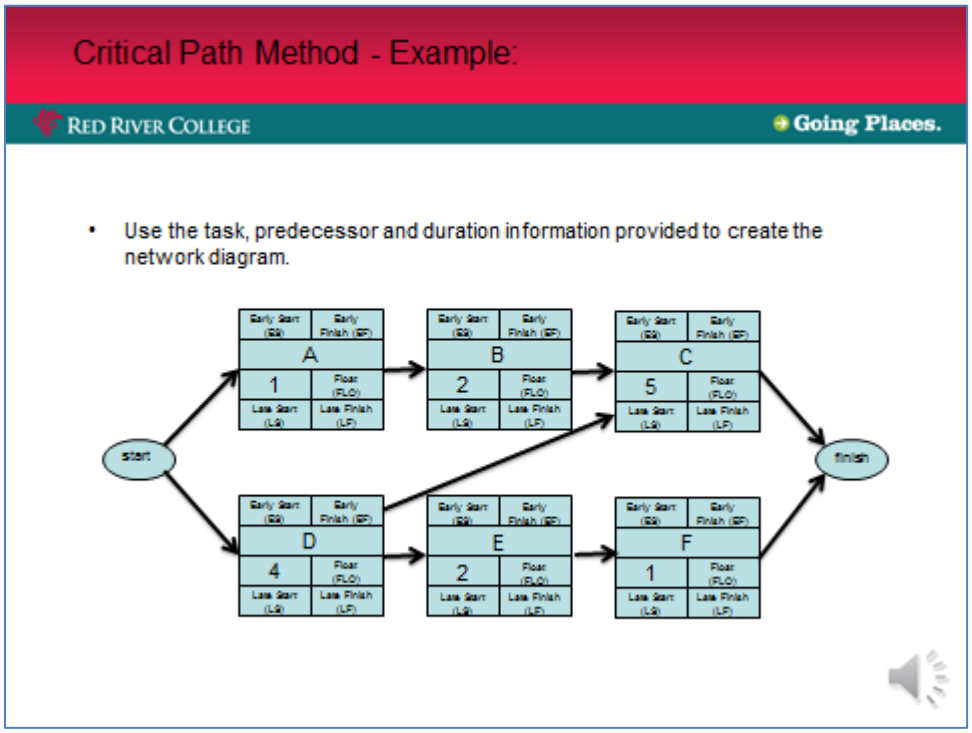
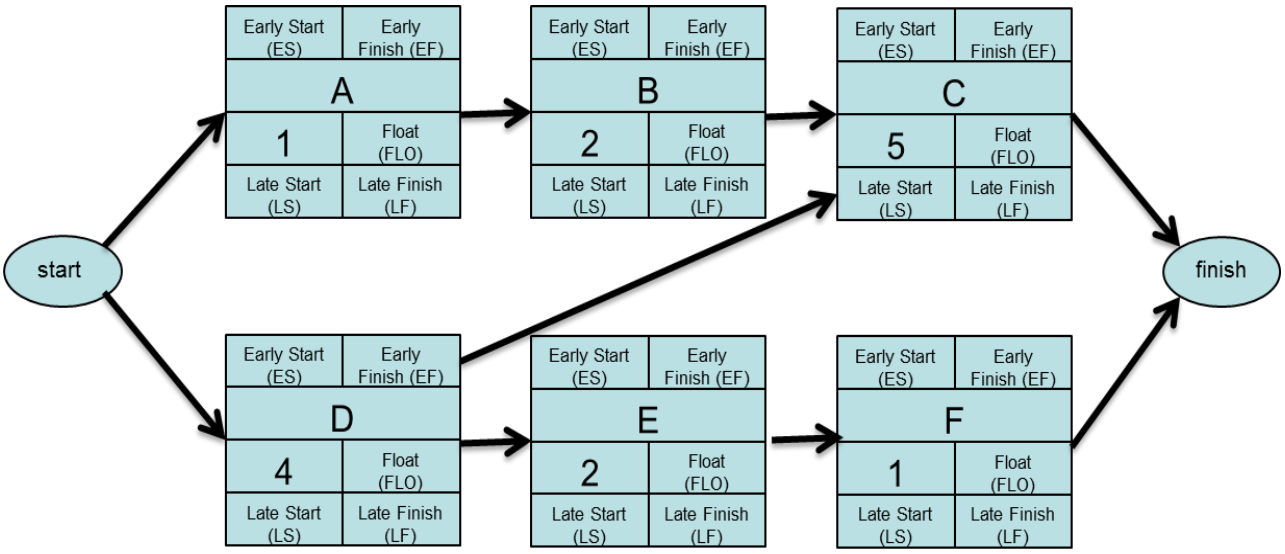


Use the task, predecessor and duration information provided to create the network diagram.



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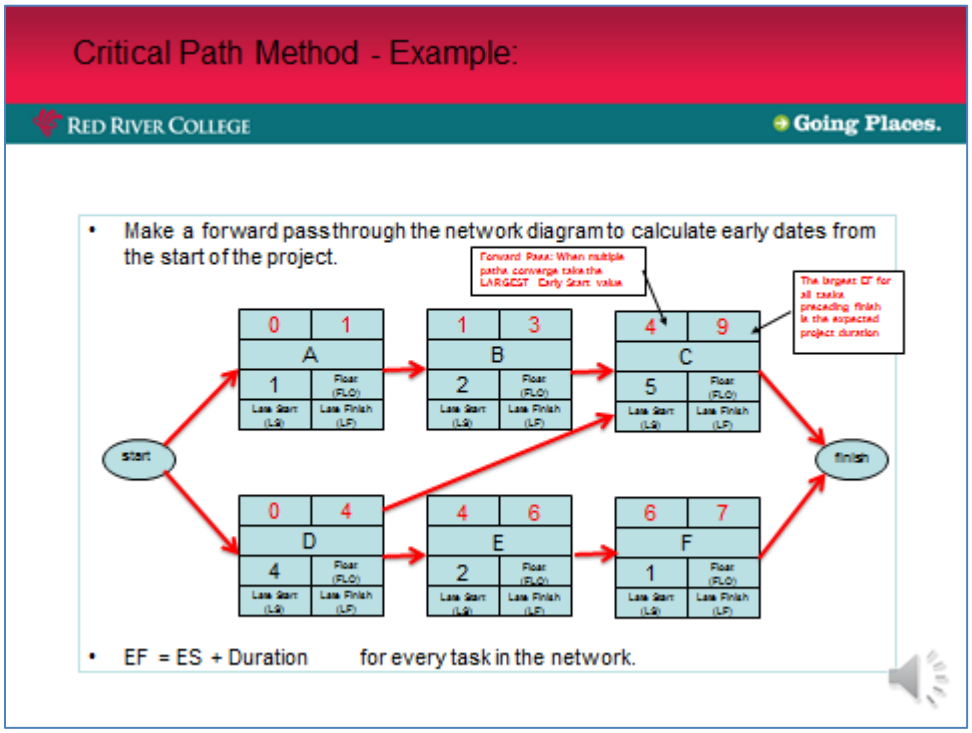
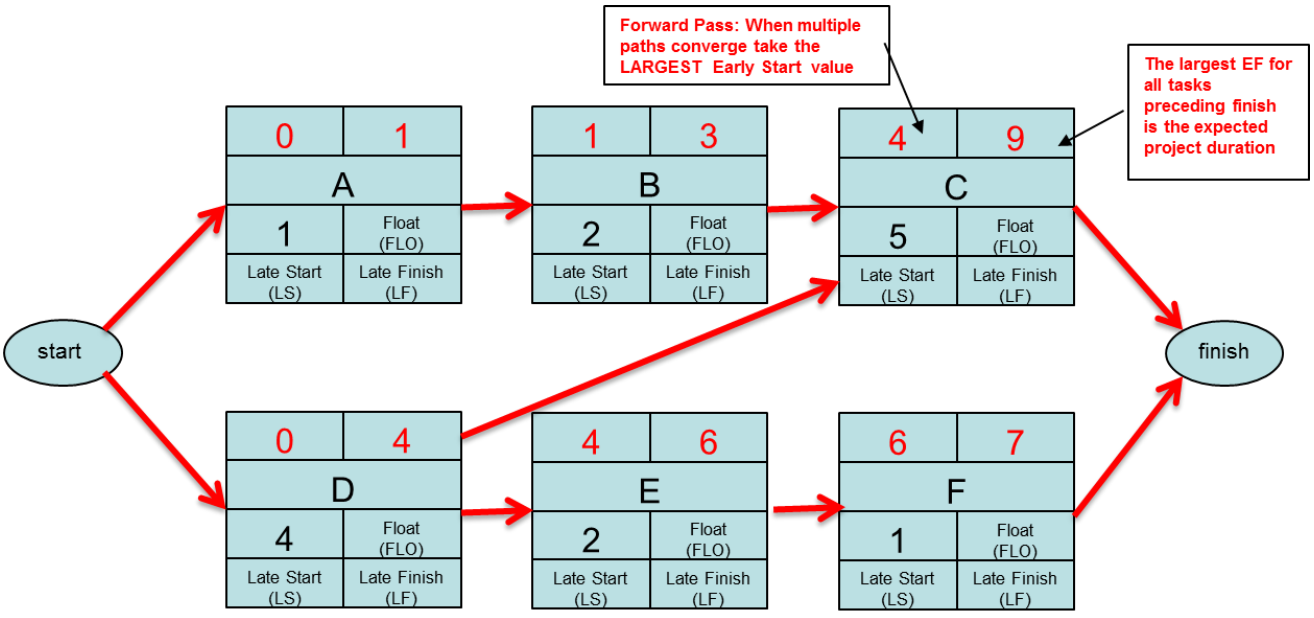


Make a forward pass through the network diagram to calculate early dates from the start of the project.

EF = ES + Duration for every task in the network.



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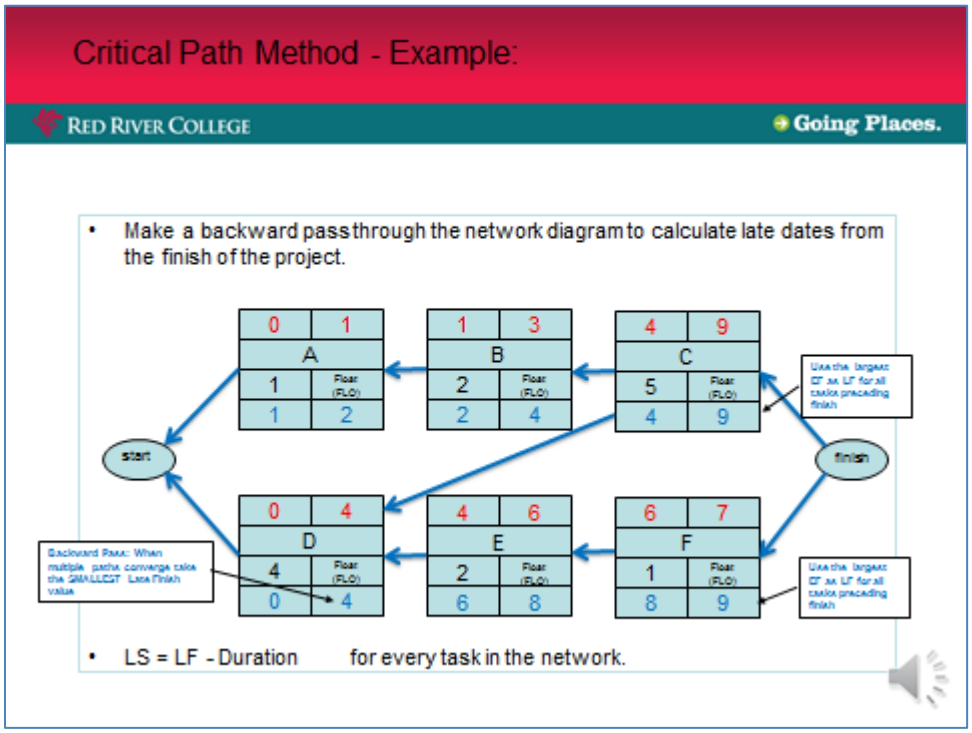
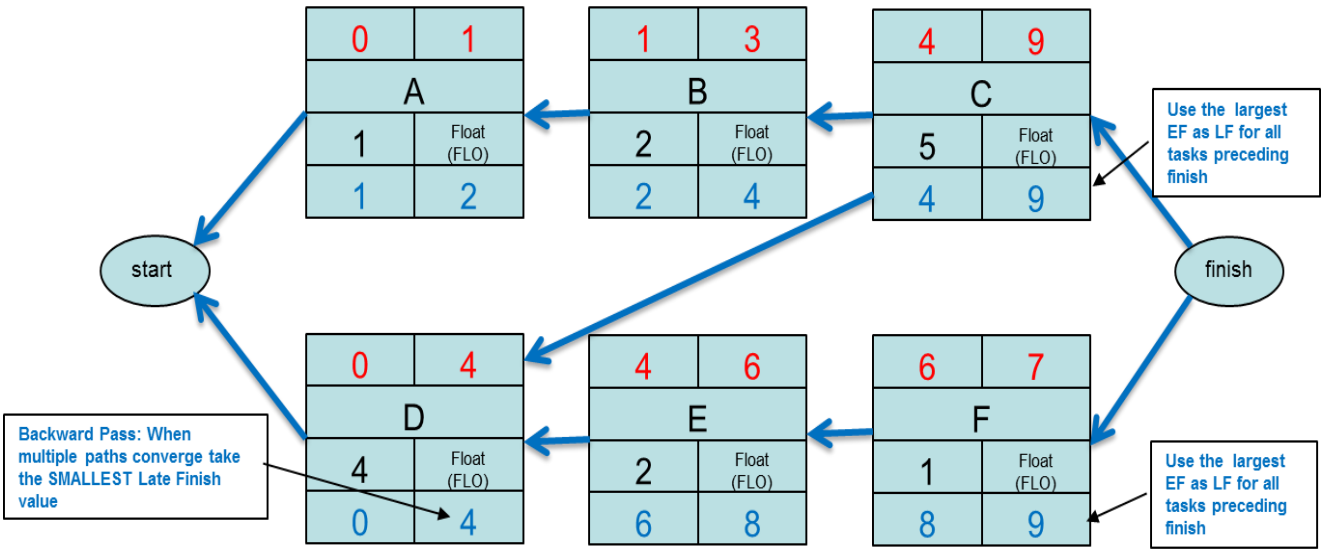


Make a backward pass through the network diagram to calculate late dates from the finish of the project.

LS = LF - Duration for every task in the network.



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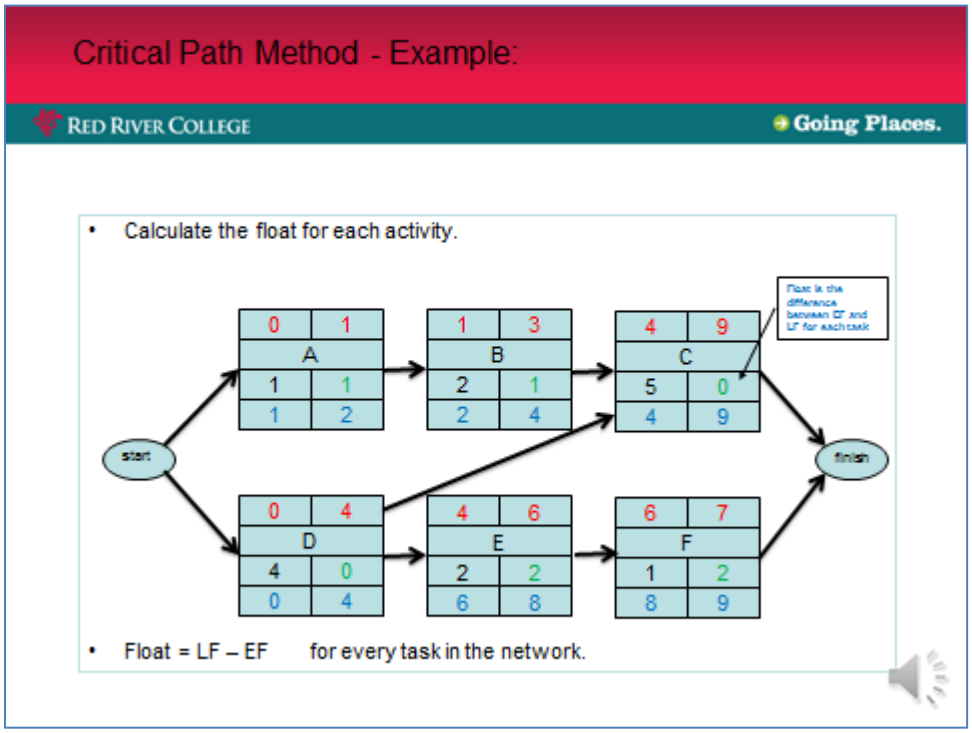
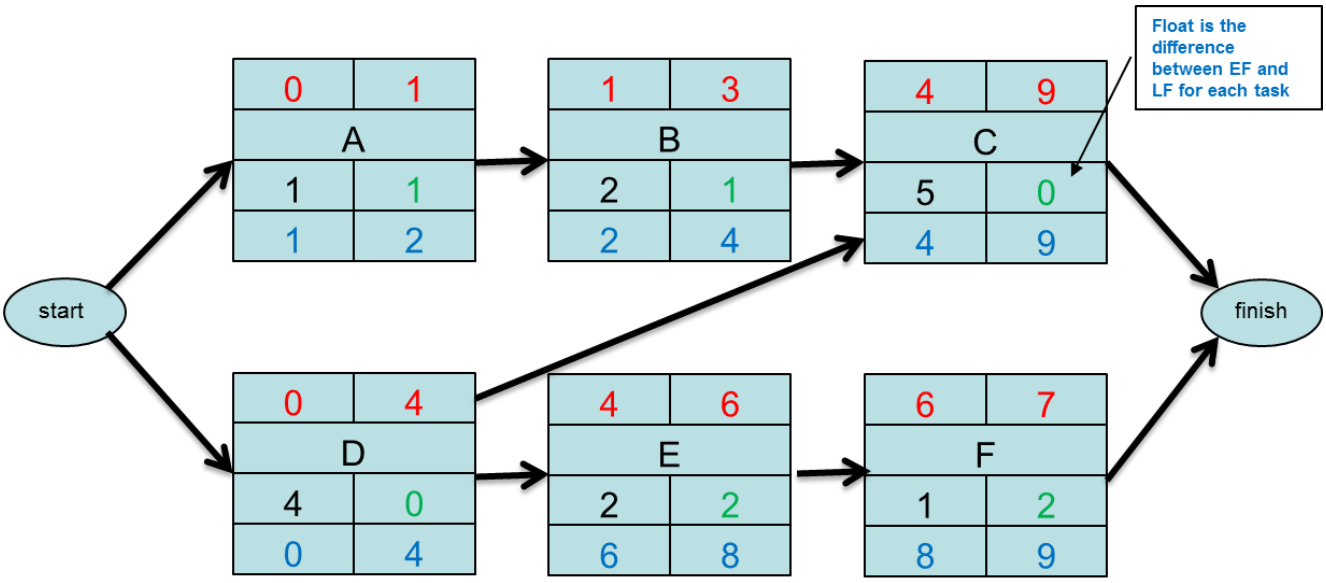


Calculate the float for each activity.

Float = LF – EF for every task in the network.



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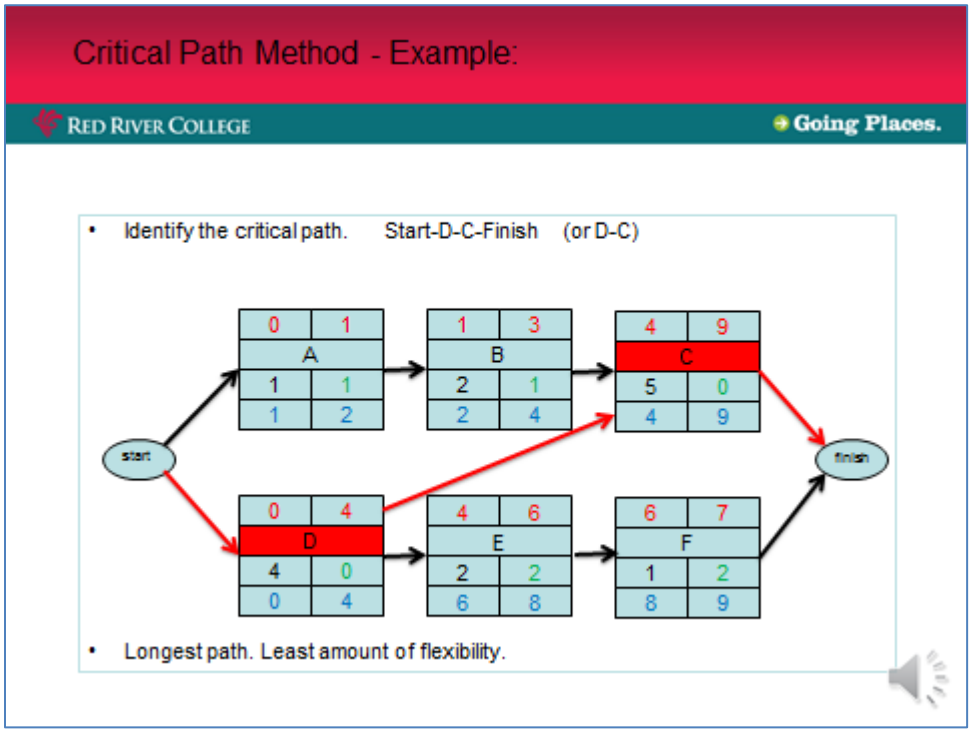
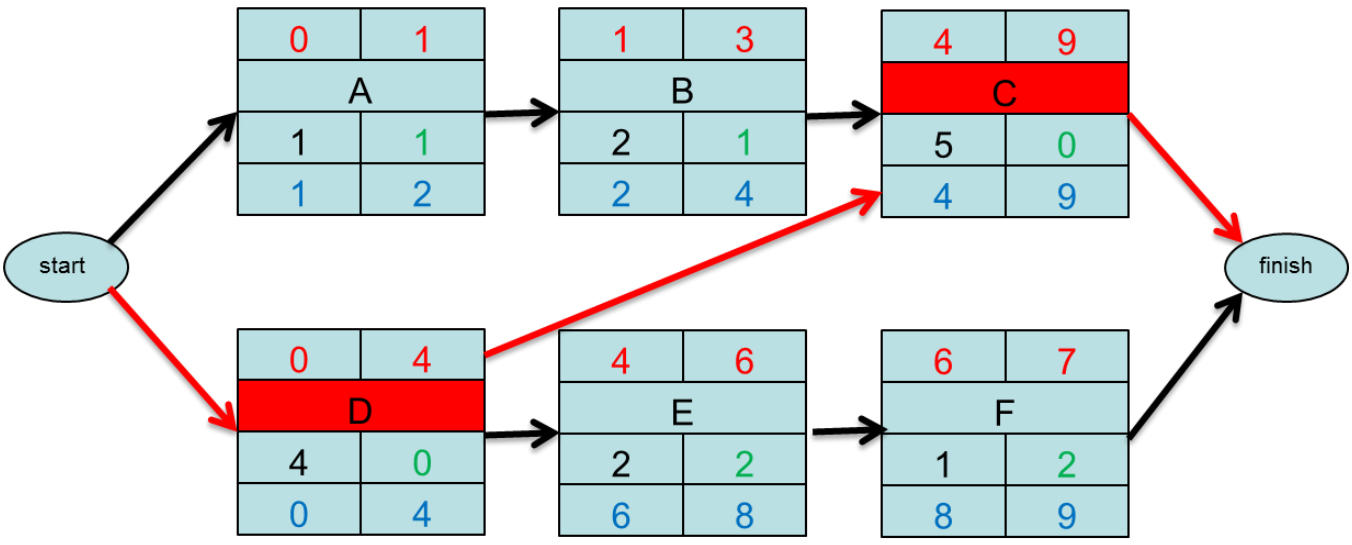


Identify the critical path. Start-D-C-Finish (or D-C)
Longest path. Least amount of flexibility.



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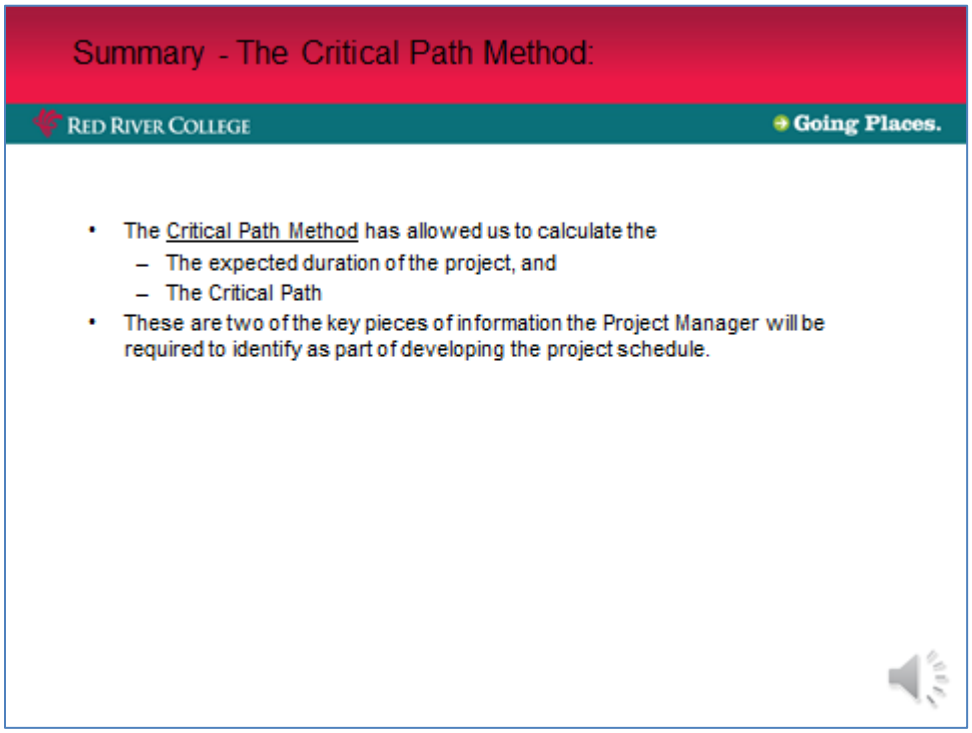

The Critical Path Method has allowed us to calculate the

- The expected duration of the project, and
- The Critical Path

These are two of the key pieces of information the Project Manager will be required to identify as part of developing the project schedule.