Project network Diagram

Objectives :

Construct a network representation of the project activities.
Understand the types of activity dependencies and when they are used.
Recognize the types of constraints that create activity sequences.
Compute the Early Start(ES), Early Finish(EF), Late Start (LS), and Late Finish times for every activity in the network.
Identify the critical path in the project.
Analyze the wetwork for possible schedule compression.

The activities and the activity duration are the basic building blocks needed to construct a graphic picture of the project.

This graphic picture provides you with two additional pieces of schedule information about the project.

- The earliest time at which work can begin on every activity that makes up the project.
- The earliest expected completion date of the project.

A project network diagram is a pictorial representaion of the sequence in which the project work can be done.

Benefits to network-based scheduling

Gantt chart
Network diagram

Network diagrams can be used for detailed project planning, during implementaiton as a tool for analyzing scheduling alternatives, and as a control tool.

Planning: the project netwrok gives a clear graphical picture of the relationship between project activities.

Implementation: When updating the project file with activity status and estimate-to-completion data, the netwrok diagram is then automatically updated and can be printed or viewed.

Control: While the updated nerwork diagram will retain the status of all activities, the best graphical report for monitoring and controlling project work will be the Gantt chart view of the network diagram.

Building the network diagram

The activity-on-the-node (AON) method. The term more commonly used to describe this approach is precedence diagramming method (PDM)

The basic unit of analysis in a network diagram is the activity. Each activity in the netwrok diagram is represented by a rectangle that is called activity node.

Arrows represent the predecessor/sucessor relationships between activities.

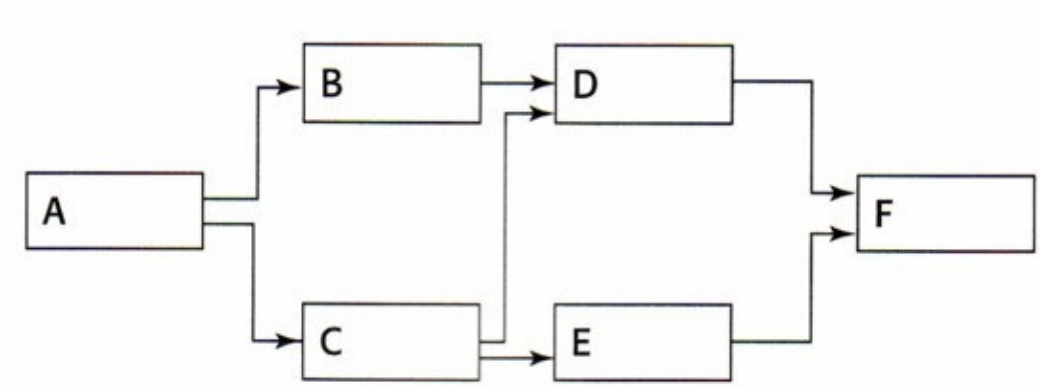

Figure 9.2 PDM format of a project network diagram.

Every activity in the project will have its own activity node. (each rectangle)

In order to create the ntework diagram using PDM, you need to determine the predecessors and successors for each activity. To do this, you ask:What activities must be complete before I can begin this activity?

Once an activity is complete it will have produced an output, a deliverable, which becomes input to its successor activities.

Work on the successor activities requires only the output from its predecesor activities.

While the list of predecessors and successors to each activity contains all the information in a format that tells the story of our project, it does not represent the information in a format that tells the story of our project.

The network diagram is logically sequenced to be read from left to right. Every activity in the network, except the start and en activities, must have at least one activity that comes before it and one activity that comes after it.

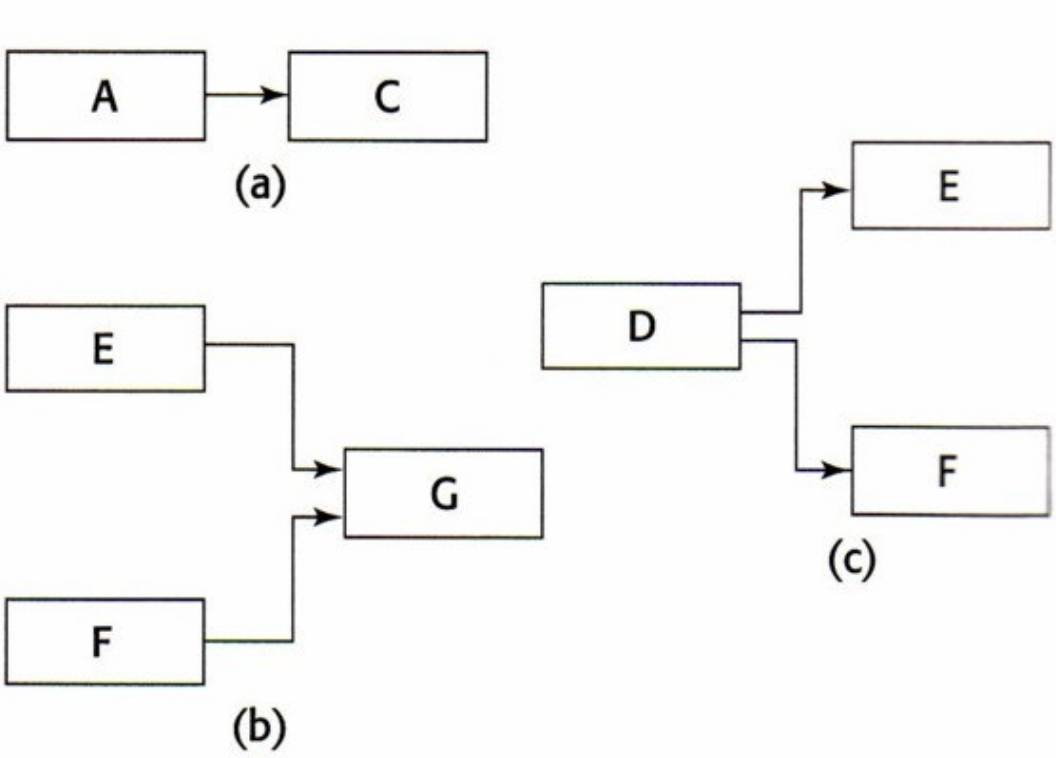

Figure 9.4 Diagramming conventions.

Dependencies

A dependency is simply a relationship that exists between pairs of activities.

There are four types of activity dependencies:

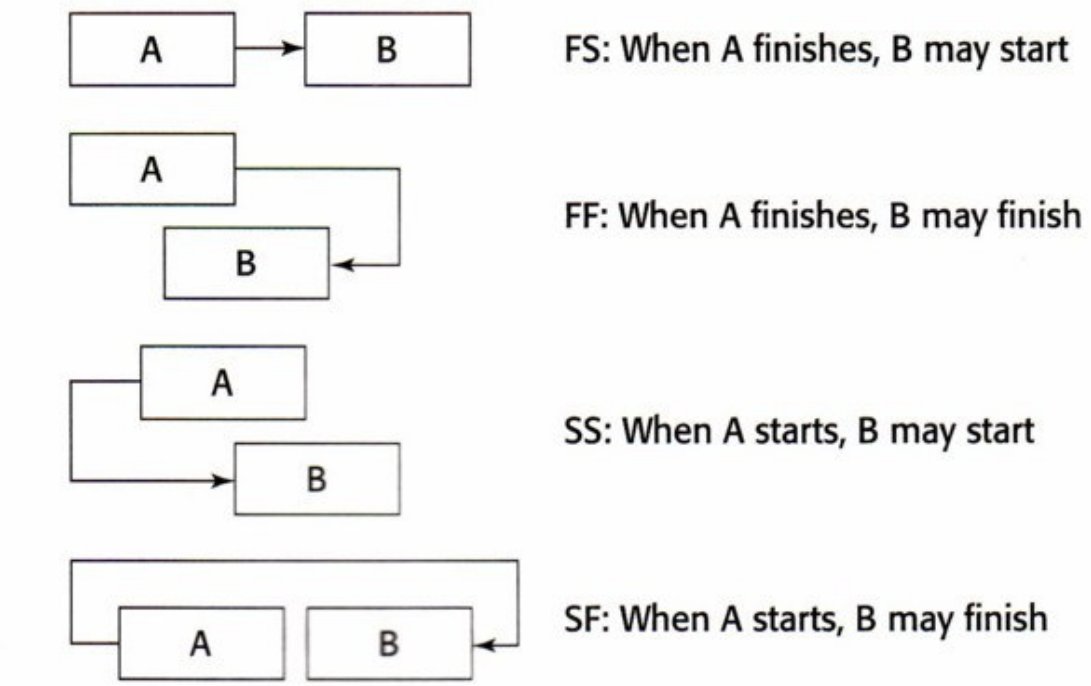

Figure 9.5 Dependency relationships.

Finish to start. The finish to start (FS) dependency say that activity A must be complete before activity B can begin.

Start to start. The start to start(SS) dependency says that activity B may begin once activity A has begun.

Start to finish. The start to finish (SF) dependency, activity B cannot be finished sooner than activity A has started.

Finish to finish. The finish to finish dependency states that activity B cannot finish sooner than activity A.

Creating an initial project network schedule.

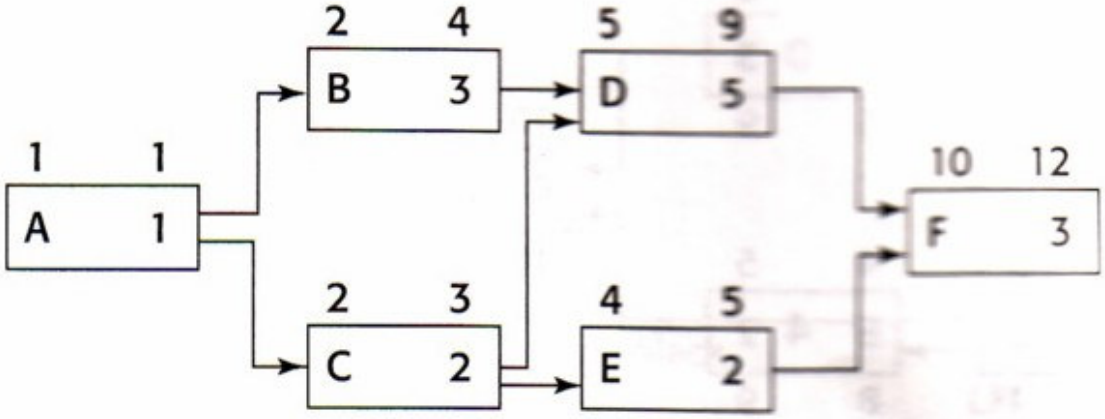

Figure 9.6 Forward pass calculations.

Schedule compression

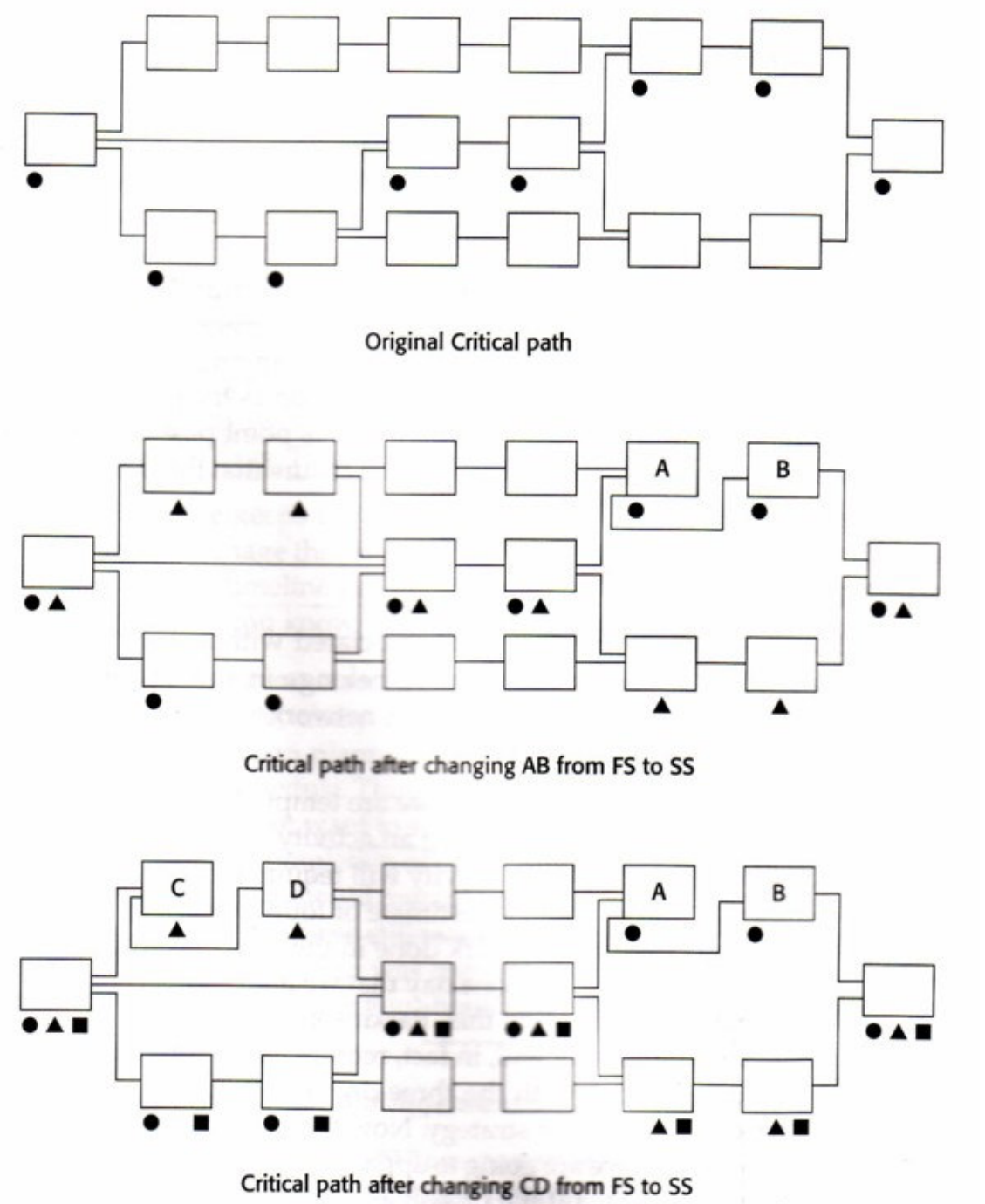

Figure 9.10 Schedule compression iterations.

Management reserve

At the individual level, we are tempted to pad our estimates to have a better chance of finishing an activity on schedule. For example, we know that a particular activity will require three days of our time to complete, but we submit an estimate of four days just to make sure we can get the three days of work done in the four-day schedule we hope to get for the activity. The one day that we added is padding.

First, let's agree that you will not do this.

Now that we know padding is bad at the activity level we are going to apparently contradict ourselves by saying that it is all right at the project level.

Management reserve is nothing more than a contingency budget of time. The size of that contingency budget can be in the range of 5 to 10 percent of the total of all the activity durations in your project.

Once you have determined the size of your management reserve, you create an activity whose

duration is the size of management reserve and put that activity at the end of the project.