Subject: Construction Management and Documantation. (68873)

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Topic: 03

3.6 Network Planning in Project Management:

What is Network Planning ?

নেটওয়ার্ক হল একটি গ্রাফিক্যাল প্ল্যান। যাতে একটি প্রক্লপের সমাপ্তির উদ্দেশ্যে বিভিন্ন কাজ বা একটিভিটি যা সম্পাদন করতে হবে তাদের পর্যায়ক্রমিক গতিপথ প্রদর্শিত হয়।

Types of network planning:

নেটওয়ার্ক প্ল্যানিং প্রধানত দুই প্রকার, যথ-

১। CPM (Critical Path Metheod)

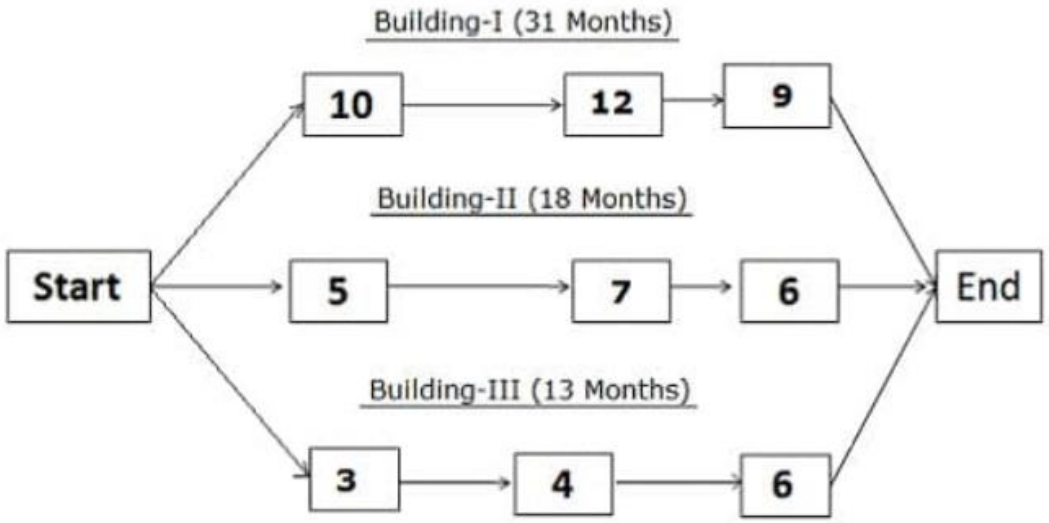
2। PERT (Program evaluation and review technique)

Activity:

Activity in general is a work or set of instructions to be followed for something to be done. For example, making tea is an activity that has few steps or instructions to be followed.

Event:

What is the difference between an Activity and an Event?
For a example, an event could be start of an activity, end of an activity, non completion of an activity within a certain timeframe, etc.



What do you mean by CPM?

The critical path method (**CPM**) is a step-by-step project management technique for process planning that defines critical and non-critical tasks with the goal of preventing time-frame problems and process bottlenecks. ... Determine the expected completion or execution time for each task.

Critical Path

- If you look at any network diagram, you will notice many paths originating from one point and ending at another point. Every path will have some duration. The path with the longest duration is known as the critical path.

1. The critical path can be defined in many ways including:
The longest path in the network diagram, or
2. The shortest duration in which the project can be completed.

Both definitions are trying to convey the same message. They might seem opposite to you because the first definition is talking about the longest path and the second definition is talking about the shortest duration.

You develop the network diagram which consists of three paths; each path resembles each building.

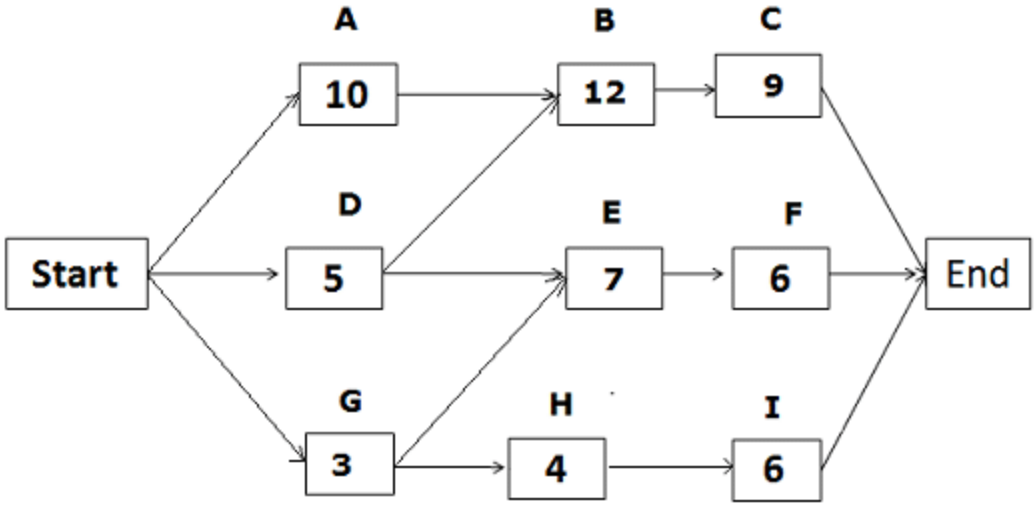
You calculate the duration for each path:

1. For the first building, the duration is 31 months,
2. the second building will take 18 months, and
3. the third building will require 13 months.

The first path represents the largest building; the second path represents the medium-sized building, and the third path, the smallest building.

Example

Based on the below network diagram, identify the total paths, critical path, and float for each path.



The above network diagram has five paths; the paths and their duration are as follows:

Start -> A -> B -> C-> End, duration: 31 days.
Start ->D -> E ->F -> End, duration: 18 days.
Start -> D -> B -> C -> End, duration: 26 days.
Start -> G ->H ->I -> End, duration: 13 days.
Start -> G -> E ->F -> End, duration: 16 days.

Since the duration of the first path is the longest, it is the critical path. The float on the critical path is zero.

- The float for the second path "Start ->D -> E ->F -> End" = duration of the critical path – duration of the path "Start ->D -> E ->F -> End"
  = 31 – 18 = 13
  Hence, the float for the second path is 13 days.
  Using the same process, we can calculate the float for other paths as well.
  Float for the third path = 31 – 26 = 5 days.
  Float for the fourth path = 31 – 13 = 18 days.
  Float for the fifth path = 31 – 16 = 15 days.

Calculate Early Start (ES), Early Finish (EF), Late Start (LS), and Late Finish (LF)

We have identified the critical path, and the duration of the other paths, it's time to move on to more advanced calculations, Early Start, Early Finish, Late Start and Late Finish.

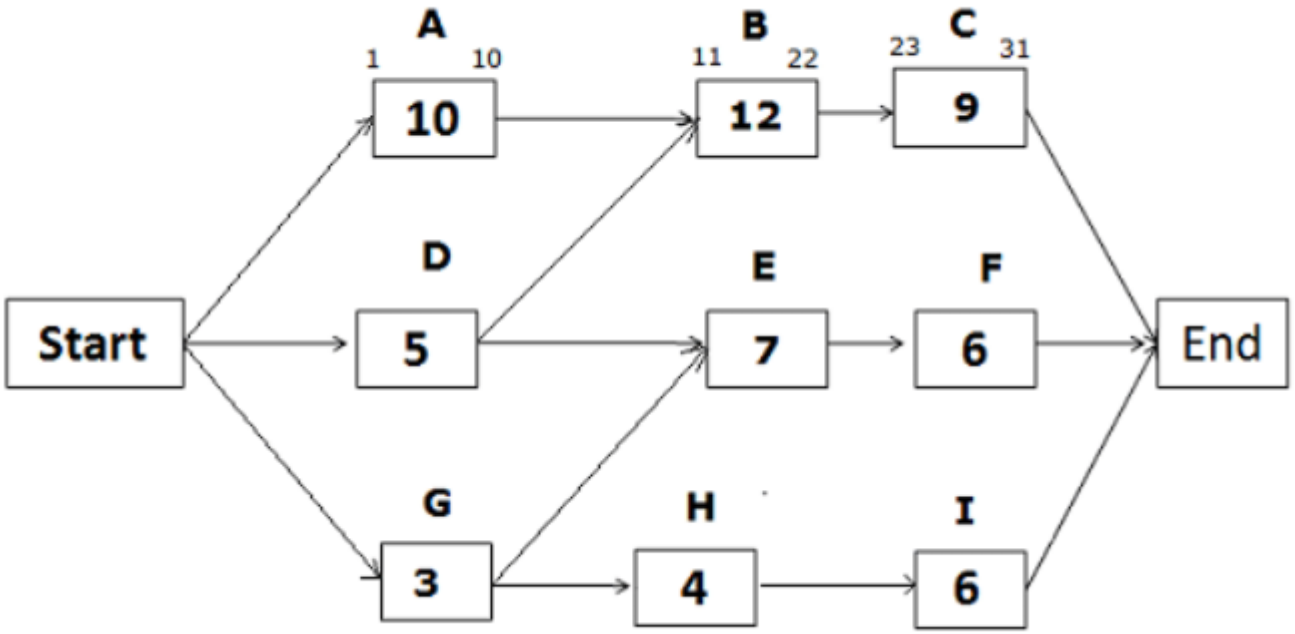
Calculating Early Start (ES) and Early Finish (EF)

- To calculate the Early Start and Early Finish dates, we use forward pass; we will start from the beginning and proceed to the end.
  Early Start (ES) for the first activity on any path will be 1, because no activity can be started before the first day. The start point for any activity or step along the path is the end point of the predecessor activity on the path plus one.

  The formula used for calculating Early Start and Early Finish dates.

  Early Start of the activity = Early Finish of predecessor activity + 1
  Early Finish of the activity = Activity duration + Early Start of activity – 1

Early Start and Early Finish Dates for the path Start -> A -> B -> C -> End



Early Start of activity A = 1 *(Since this is the first activity of the path)*
Early Finish of activity A = ES of activity A + activity duration – 1
= 1 + 10 – 1 = 10
Early Start of activity B = EF of predecessor activity + 1
= 10 +1 = 11
Early Finish of activity B = ES of activity B + activity duration – 1
= 11 + 12 – 1 = 22
Early Start of activity C = EF of predecessor activity + 1
= 22 +1 = 23
Early Finish of activity C = ES of activity C + activity duration – 1
= 23 + 9 – 1 = 31


Thank You All.