

Learn About Critical Path Method Scheduling

- ✓ The [critical path method](#) (CPM) is a popular [scheduling technique](#) in the construction industry due to its simplicity and effectiveness.
- ✓ It generates a graphical view of a project and calculates how much time and resources are required to complete each activity
- ✓ It also determines critical activities requiring attention so that the project can be completed on time.
- ✓ A CPM lists all activities in a project and includes information about how long each activity will take and how each relates to the completion of other activities.

Building a CPM takes **six** basic steps.

1. Identify the Activities

- ✓ obtained from the work breakdown structure or the project scope and details.
- ✓ Sequence and duration will be added in subsequent steps.

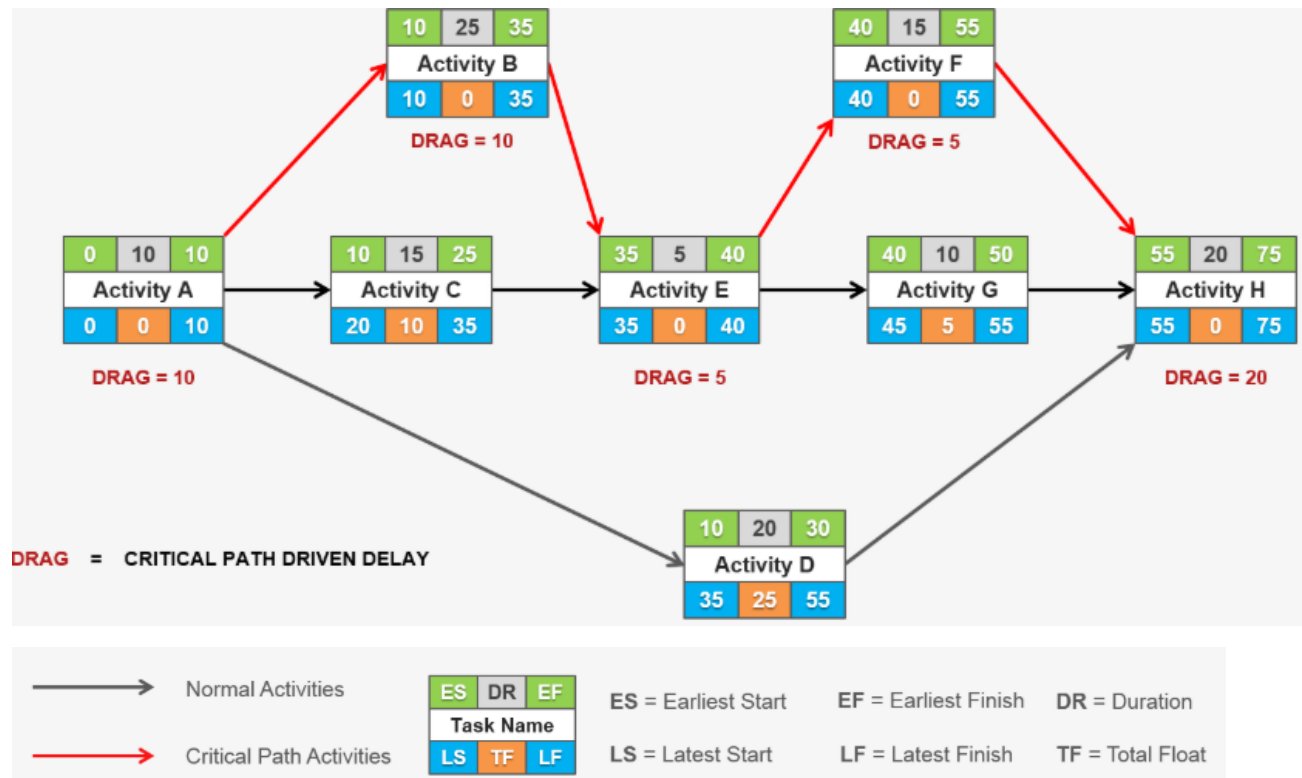
2. Determine the Activities' Sequence

- ✓ The project or construction manager needs to understand the activities that are linked or related so that they can show the proper connections in the schedule.

A Basic CPM Example

Task/ Activity		Duration(Days)	Dependent on..
High-level analysis and.	A	10	---
Selection of hardware platform.	B	25	A
Detailed analysis of supporting modules.	C	15	A
Detailed analysis of core modules.	D	20	A
Installation and commissioning of hardware.	E	5	B,C
Programming of core modules.	F	15	E
Quality assurance of core modules.	G	10	E
Development of Management Information System.	H	2	D, F, G

3. Create the Network (PERT: Program Evaluation Review Technique) Diagram



Attributes of Node of the Network:

- ✓ **DR—Duration:** of the task
- ✓ **ES—Early Start:** Earliest time to start a predetermined activity, given that prior activities must be completed first
- ✓ **EF—Early Finish:** Earliest finish time for the activity
- ✓ **LF—Late Finish:** Latest time the activity must be completed without delaying the entire project
- ✓ **LS—Late Start:** Latest start date that the activity must be started without delaying the project
- ✓ **TF/Slack Time—Total Float:** the duration, an activity can be floated or delayed without delaying the project end date

4. Estimate Activity Completion Time

- ✓ project time estimates for how long it will take to complete activities for a single resource unit.

5. Identify the Critical Path

- ✓ The *critical path* is the longest duration path through the network
- ✓ Activities located on this path cannot be delayed without delaying the project

- ✓ Its impact on the entire project, critical path analysis is an important aspect of project planning
- ✓ The path for which $ES=LS$ and $EF=LF$ for all activities in the path.
- ✓ A delay in the critical path delays the project.

6. Update the CPM Diagram as Needed

- ✓ Analyzing a new critical path may be possible when entering all the duration times of activities already completed

Assignment:

1. What is PERT chart?
2. Why PERT charts are preferable than Gantt charts?
3. Draw PERT Diagram showing all attributes of node and find out the Critical Path for the following activity schedules:

Schedule 1:

Activity	Duration (Days)	Immediate Predecessor Activities
A	2	-
B	3	-
C	4	A
D	5	A & B
E	8	C & D
F	3	D
G	2	F
H	3	G

Schedule 2:

Task ID	Task	Task Duration (mins)	Immediate Predecessors
A	Start	0	
B	Buy bread	10	A
C	Buy vegetables	10	A
D	Buy cheese	10	A
E	Buy butter	10	A
F	Buy chicken	10	A
G	Cook chicken	20	F
H	Chop vegetables	5	C
I	Toast bread	5	B
J	Spread butter on bread	5	I
K	Add vegetables	5	H
L	Add chicken	5	G
M	Add cheese	5	D
N	Combine bread slices	2	J, K, L, M
O	Finished sandwich	0	N