IIT ROORKEE

NPTEL ONLINE CERTIFICATION COURSE

Project Management for Managers

Lec – 38

Project Time Management – Laddering in PERT/CPM

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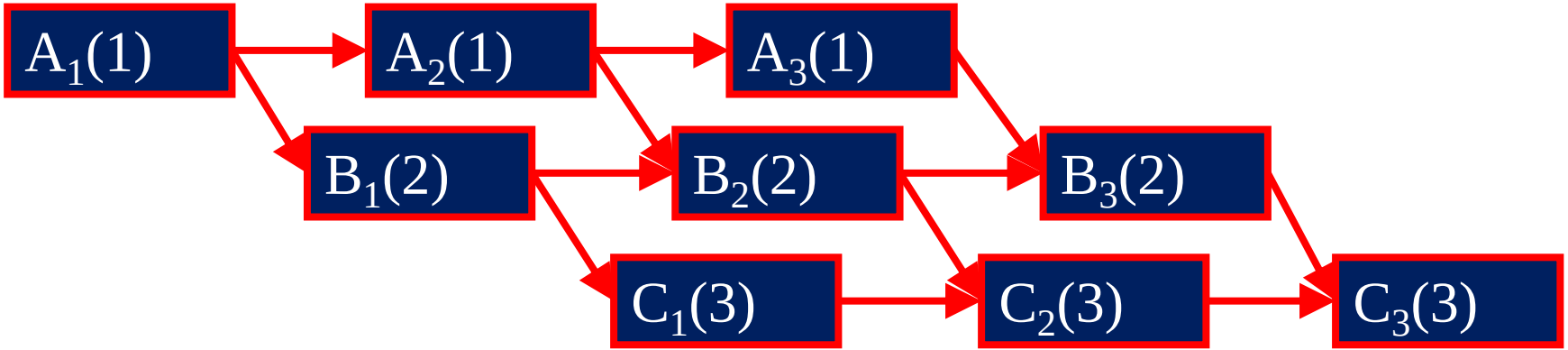
Laddering: Laddering is a technique that allows us to redraw the activity network to more closely sequence **project subtasks** to make the overall network **sequence more efficient**. It also helps in keeping project **resources fully employed.**

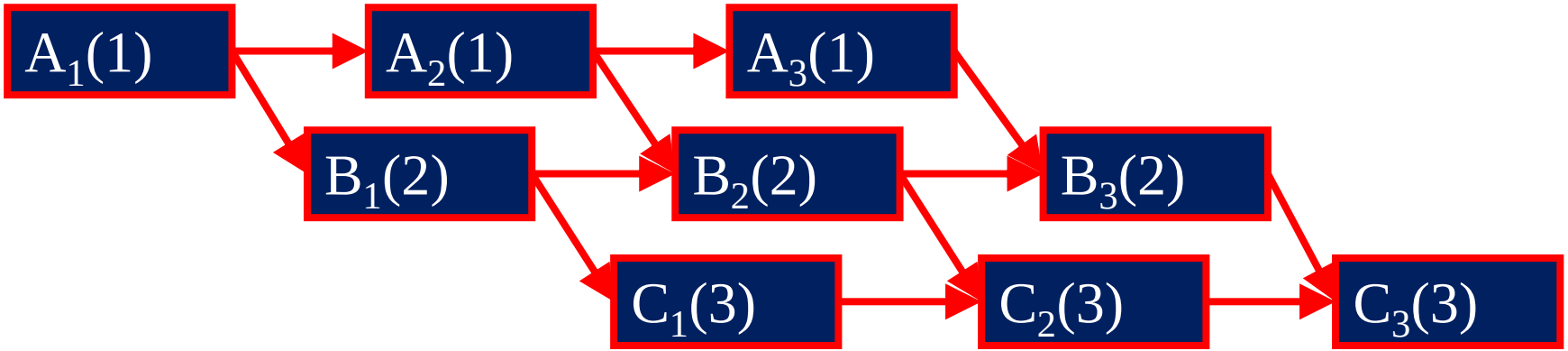
Project ABC (Design, Coding , Debugging) can be completed more efficiently if subtasks are used.



Laddered ABC=???? days

Project ABC (Design, Coding , Debugging) can be completed more efficiently if subtasks are used

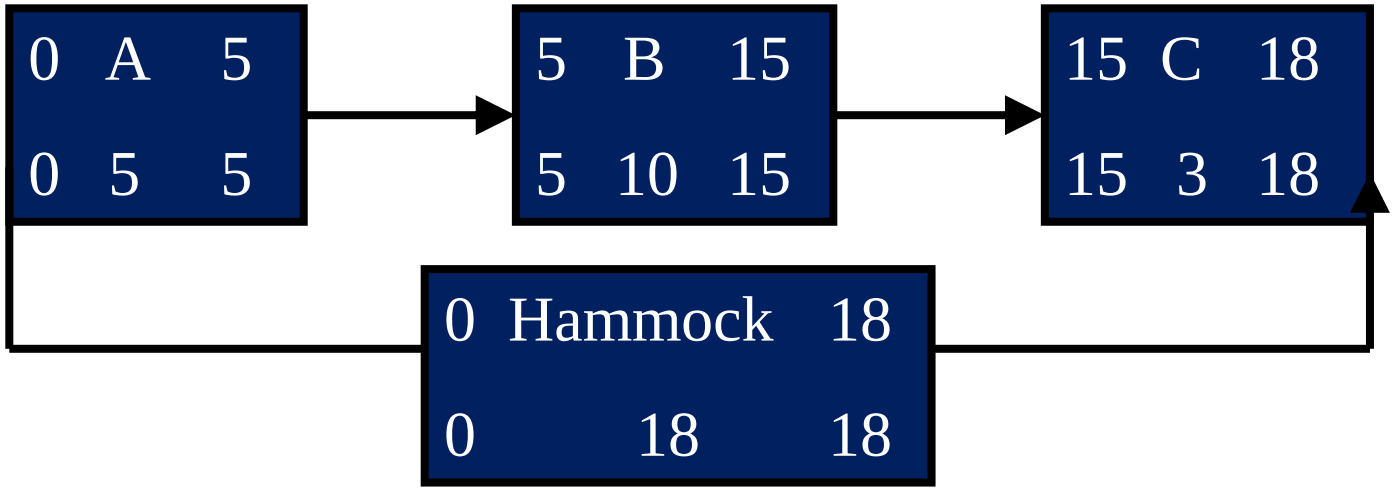
ABC=18 days



Laddered ABC=C1 can be only be started on 4 day (after 3 days)

= 3+3+3+3=12

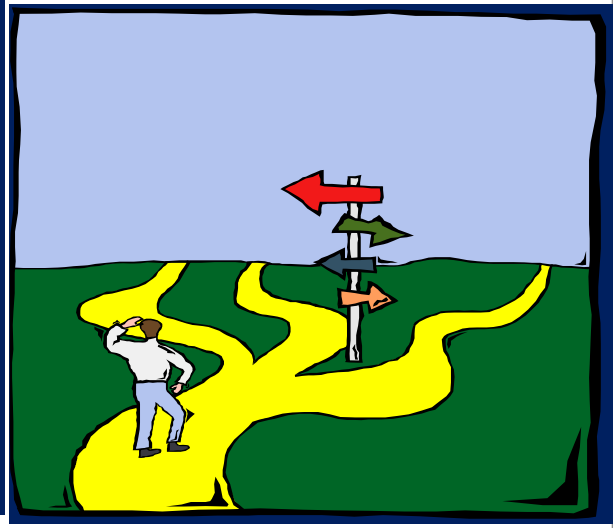
Hammock Activities: Can be used to summaries for some **subset of the activities** identified in the overall project network. It summarize tasks ,duration, and cost. The hammock is so named because it hangs **below**

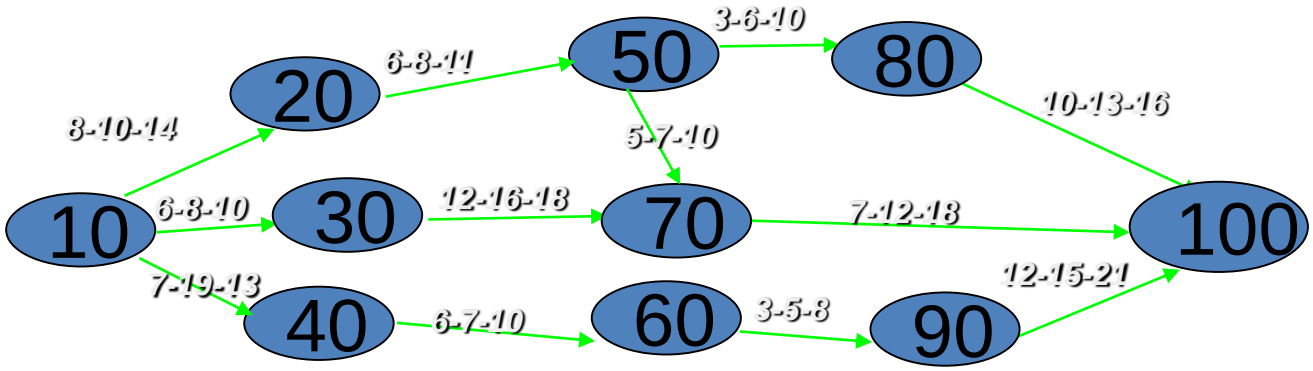


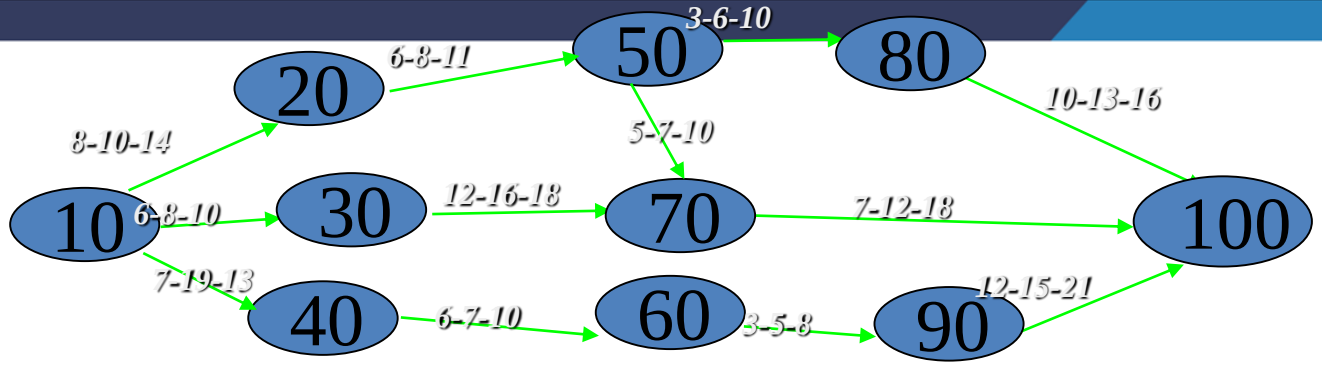
Useful with a complex project or one that has a shared budget

Critical Path

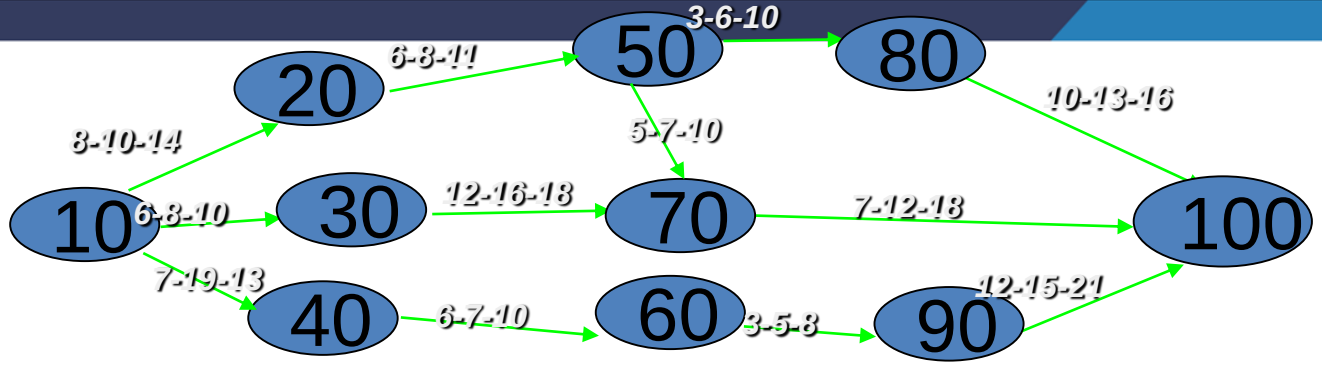
- ✓ ***A path is a sequence of connected activities running from start to end node in network***
- ✓ ***The critical path is the path with the longest duration in the network***
- ✓ ***Project cannot be completed in less than the time of the critical path***



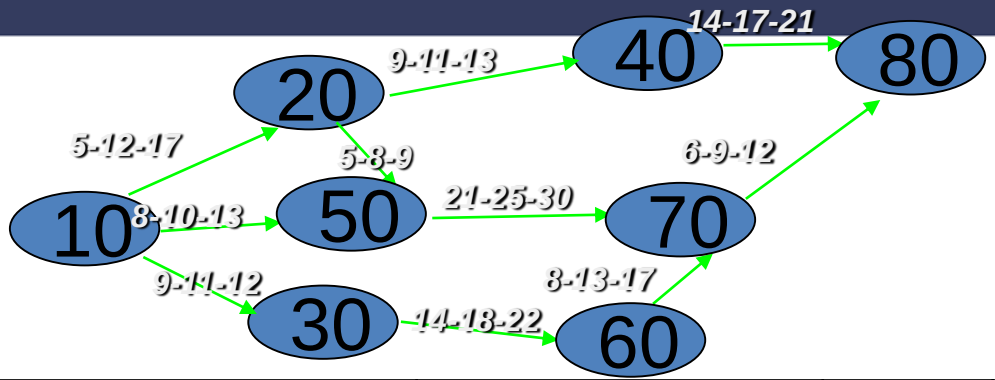

10
20
30
40
50
60
70
80
90
100
8-10-14
6-8-10
7-19-13
6-8-11
12-16-18
6-7-10
3-6-10
5-7-10
3-5-8
10-13-16
7-12-18
12-15-21



	Activity	to	tm	tp	te	Sum of - te's
Path - A	10-20	8	10	14	?	?
	20-50	6	8	11	?	
	50-80	3	6	10	?	
	80-100	10	13	16	?	
Path - B	10-20	8	10	14	?	?
	20-50	6	8	11	?	
	50-70	5	7	10	?	
	70-100	7	12	18	?	
Path - C	10-30	6	8	10	?	?
	30-70	12	16	18	?	
	70-100	7	12	18	?	
Path- D	10-40	7	9	13	?	?
	40-60	6	7	10	?	
	60-90	3	5	8	?	
	90-100	12	15	21	?	



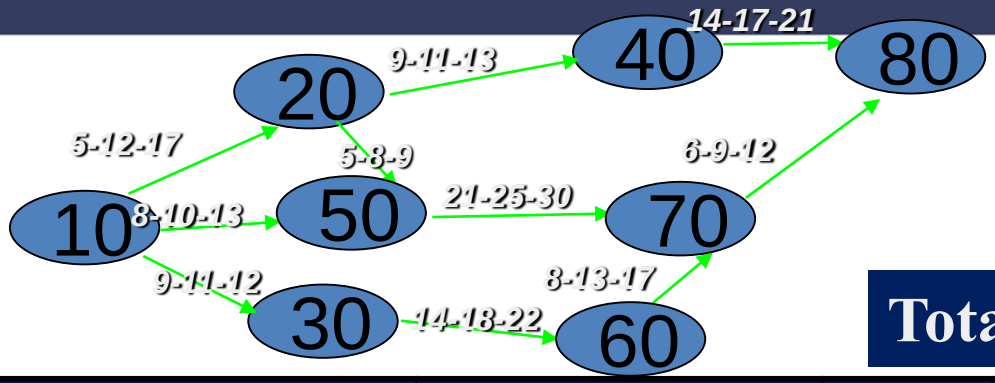
	Activity	to	tm	tp	te	Sum of - te's
Path - A	10-20	8	10	14	10.33	37.67
	20-50	6	8	11	8.17	
	50-80	3	6	10	6.17	
	80-100	10	13	16	13.00	
Path - B	10-20	8	10	14	10.33	37.84 (Critical Path)
	20-50	6	8	11	8.17	
	50-70	5	7	10	7.17	
	70-100	7	12	18	12.17	
Path - C	10-30	6	8	10	8.00	35.84
	30-70	12	16	18	15.67	
	70-100	7	12	18	12.17	
Path- D	10-40	7	9	13	9.34	37.34
	40-60	6	7	10	7.33	
	60-90	3	5	8	5.17	
	90-100	12	15	21	15.50	



$$te = (to+4tm+tp)/6$$

$$(\sigma)^2 = ((tp-to)/6)^2$$

Predecessor event	*Successor event*	*to*	*tm*	*tp*	*te*	$(\sigma)^2$
10	***20***	*5*	*12*	*17*	***?***	*?*
10	*30*	*9*	*11*	*12*	***?***	*?*
10	*50*	*8*	*10*	*13*	***?***	*?*
20	*40*	*9*	*11*	*13*	***?***	*?*
20	***50***	*5*	*8*	*9*	***?***	*?*
30	*60*	*14*	*18*	*22*	***?***	*?*
40	*80*	*14*	*17*	*21*	***?***	*?*
50	***70***	*21*	*25*	*30*	***?***	*?*
60	*70*	*8*	*13*	*17*	***?***	*?*
70	***80***	*6*	*9*	*12*	***?***	*?*



$$te = (to+4tm+tp)/ 6$$

$$(\sigma)^2 = ((tp-to)/6)^2$$

Total "te" along critical path??

Predecessor event	Successor event	to	tm	tp	te	(σ)2
10	20	5	12	17	11.66	4
10	30	9	11	12	10.83	.25
10	50	8	10	13	10.17	.69
20	40	9	11	13	11	.44
20	50	5	8	9	7.67	.44
30	60	14	18	22	18	1.78
40	80	14	17	21	17.17	1.36
50	70	21	25	30	25.18	2.25
60	70	8	13	17	12.83	2.25
70	80	6	9	12	9	1