International Business School Suzhou at XJTLU
西浦国际商学院

Fundamentals of Project Management

MSc Project Management 2017/2018

Roland.Berberich@xjtlu.edu.cn

Xi'an Jiaotong-Liverpool University
西交利物浦大學

Lecture 8 – Reducing Duration

1. Draw a project network from the following information.

Activity	Predecessor	Duration
A	None	2
B	A	4
C	A	3
D	A	2
E	B	3
F	C	6
G	C, D	5
H	E, F	6
I	G	5
J	H, I	5

Activities B and H can be shortened to a minimum of 2 weeks. Which activity would you shorten to reduce the project duration by 2 weeks? Why?

Lecture 8 – Reducing Duration

Exercise 9-1

Which activity would you shorten and why?

Solution:

Activity H because it is on the critical path and therefore shortens overall duration

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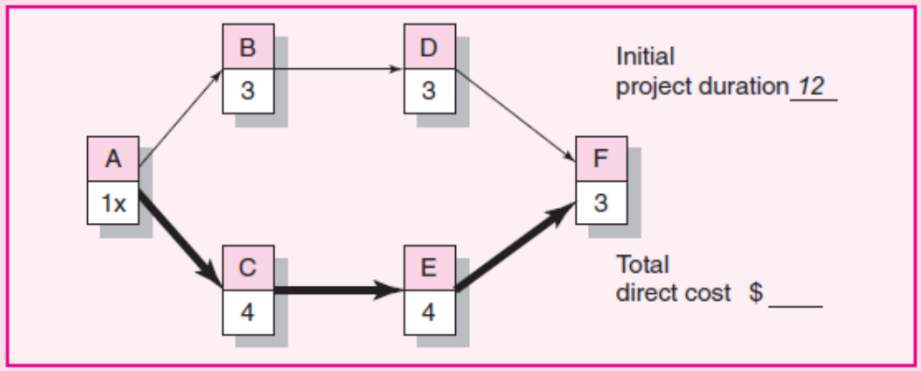
2.* Use the information contained below to compress one time unit per move using the least cost method. Reduce the schedule until you reach the crash point of the network. For each move identify what activity(s) was crashed the adjusted total cost.

Act.	Crash Cost (Slope)	Maximum Crash Time	Normal Time	Normal Cost
A	0	0	1	100
B	100	2	3	150
C	50	1	4	200
D	60	1	3	200
E	70	2	4	200
F	90	1	3	150



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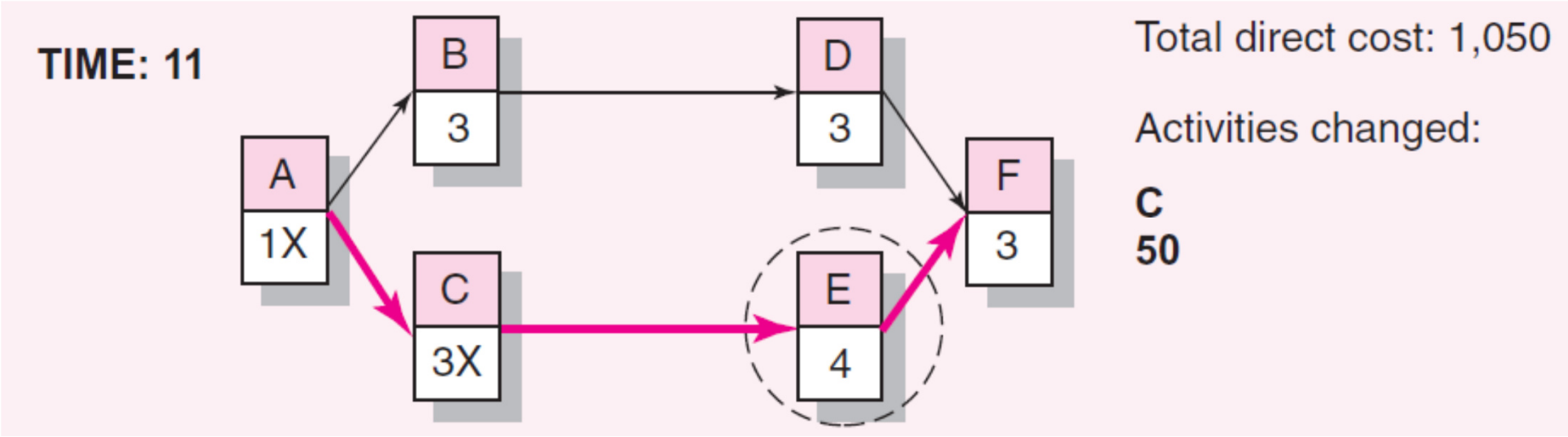

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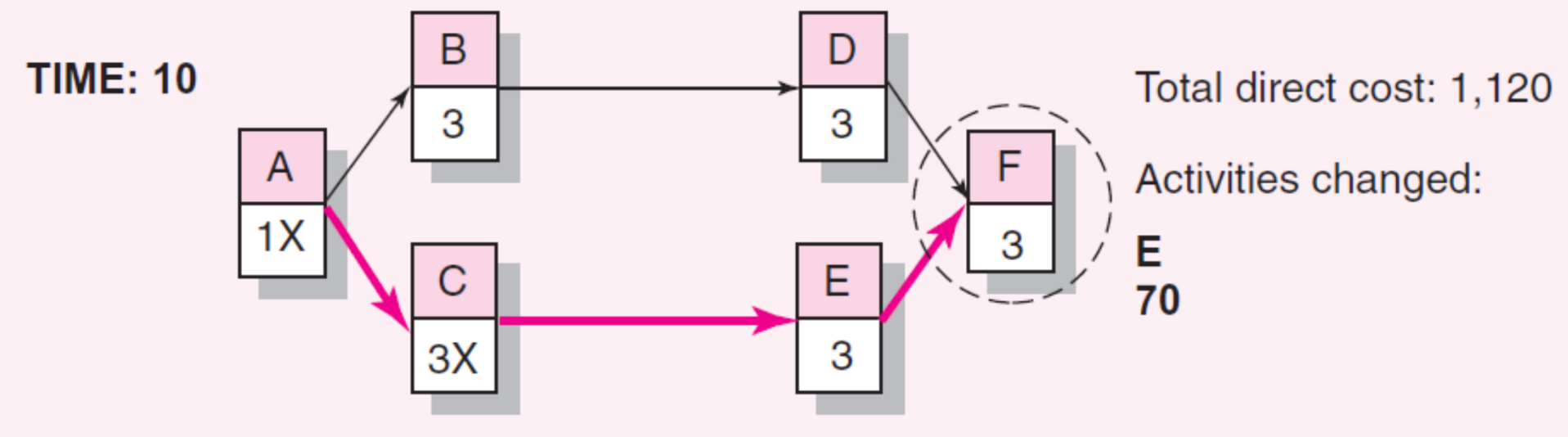

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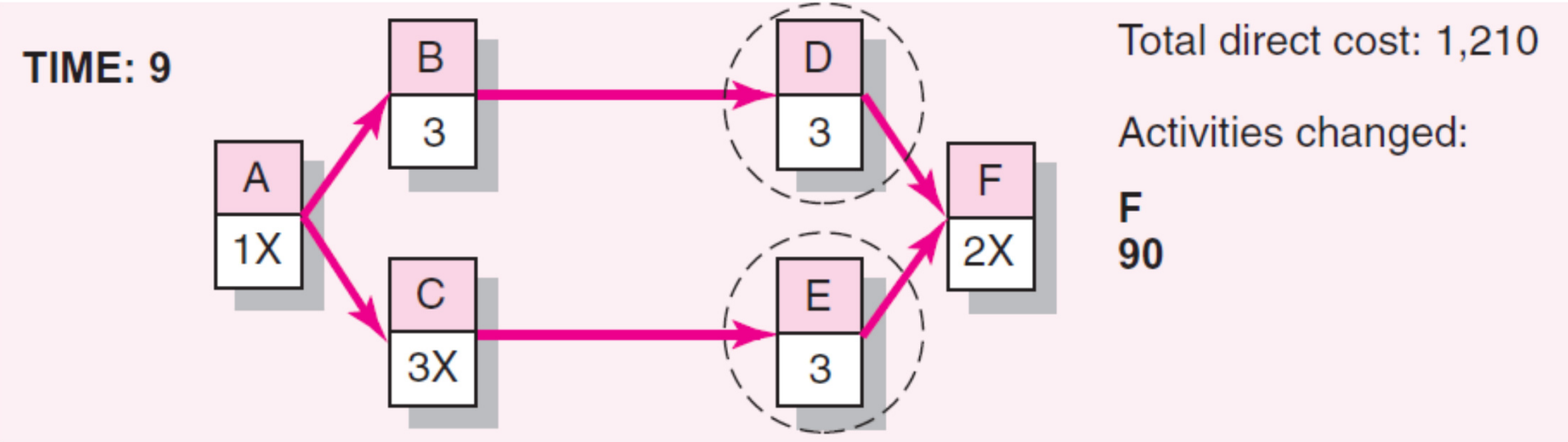

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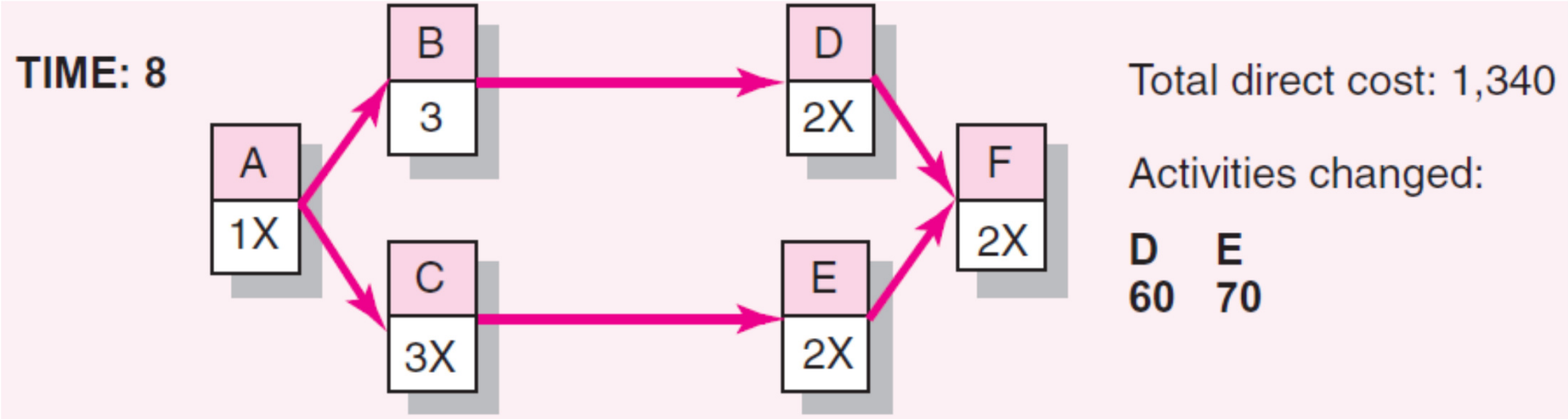

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3. Assume the network and data that follow. Compute the total direct cost for each project duration. If the indirect costs for each project duration are \$400 (19 time units), \$350 (18), \$300 (17), and \$250 (16), compute the total project cost for each duration. Plot the total direct, indirect, and project costs for each of these durations on a cost-time graph. What is the optimum cost-time schedule for the project? What is this cost?

Act.	Crash Cost (Slope)	Maximum Crash Time	Normal Time	Normal Cost
A	20	1	3	50
B	60	2	5	60
C	40	1	3	70
D	0	0	10	50
E	50	3	6	100
F	100	3	7	90
G	70	1	5	50
				\$470

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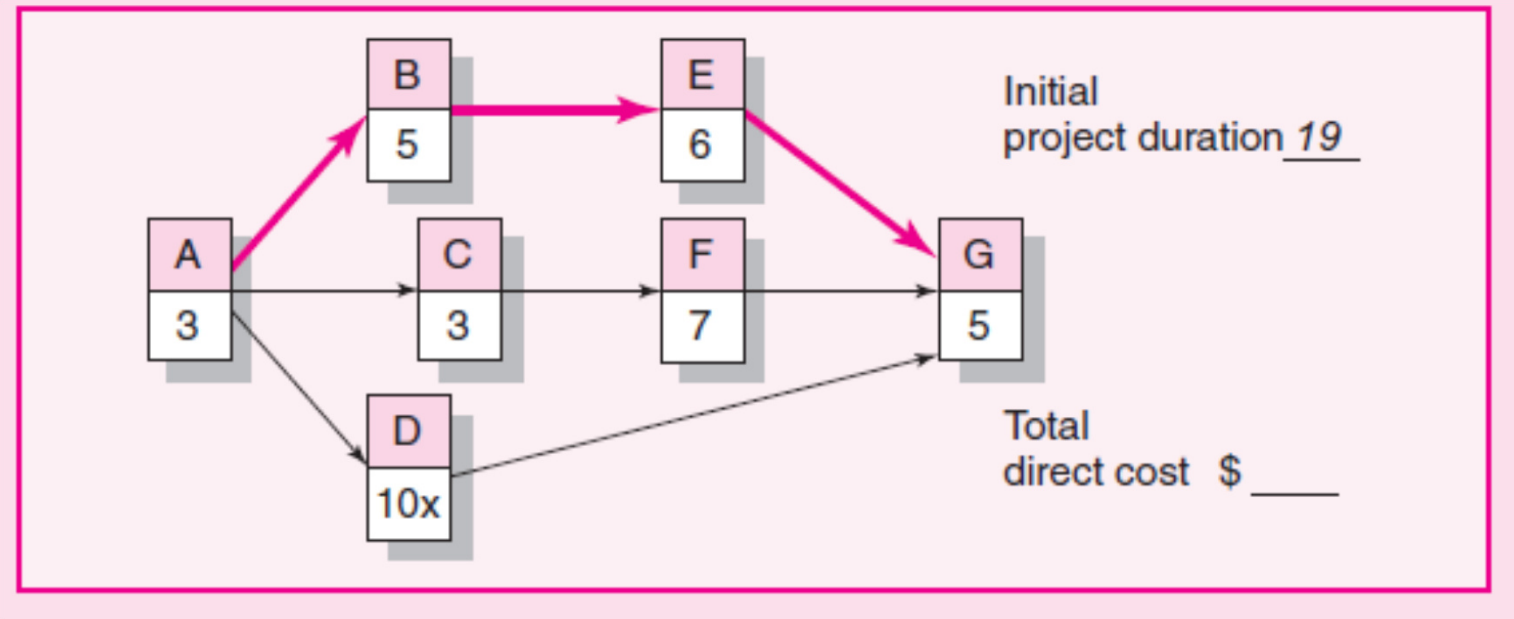

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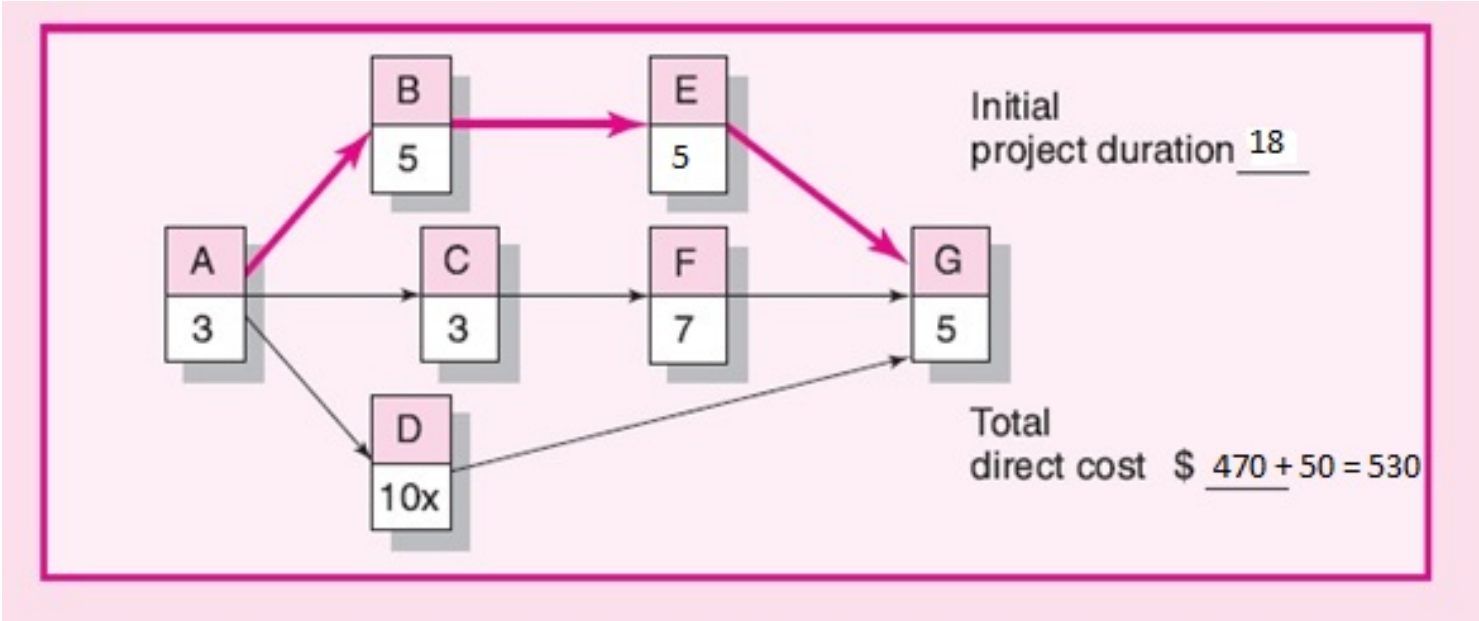

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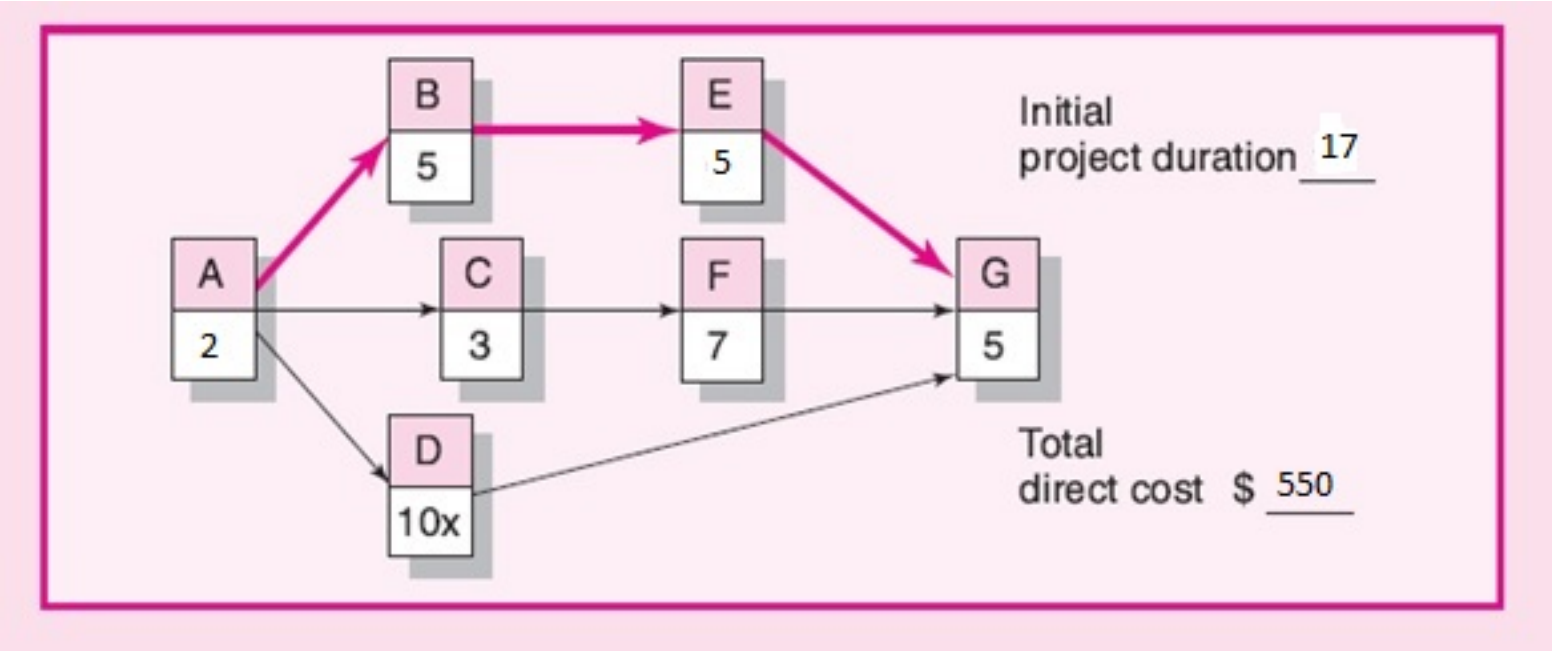

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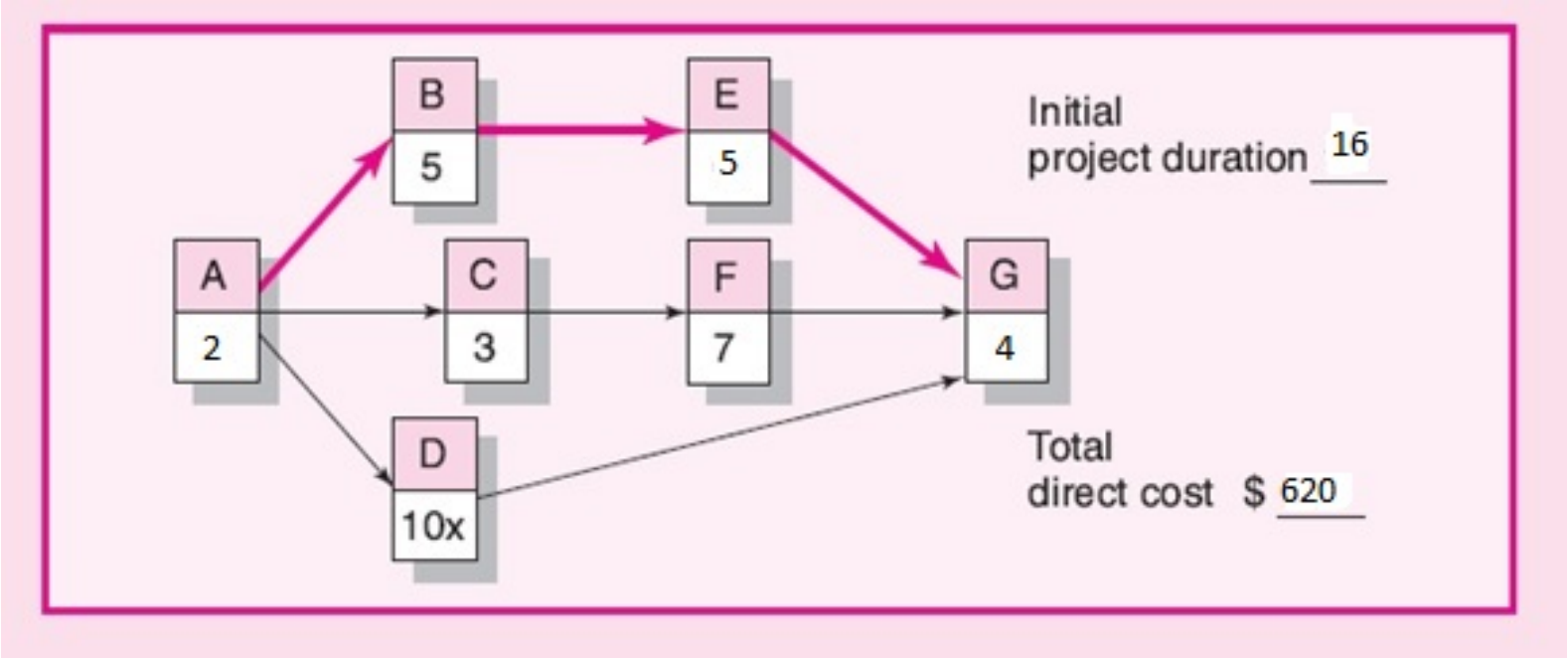
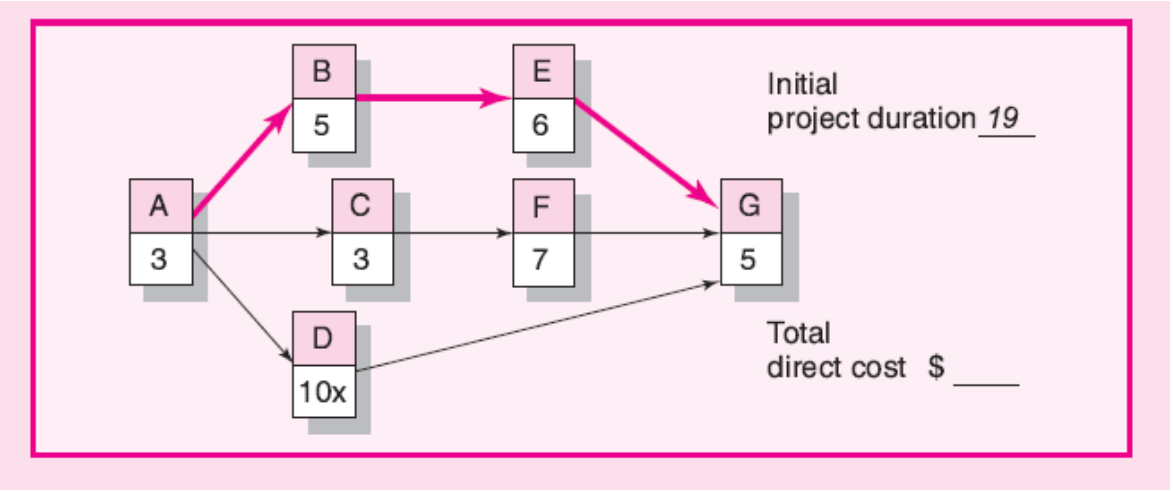


Lecture 8 – Reducing Duration

Exercise 9-3

View the Project Network
Identify Critical Path



Solution: Activity E should be shortened by 1 time unit.

Effect: We gain 3 (BE/CF/D) chains of equal (10 units) length that must be shortened together at cumulative cost.

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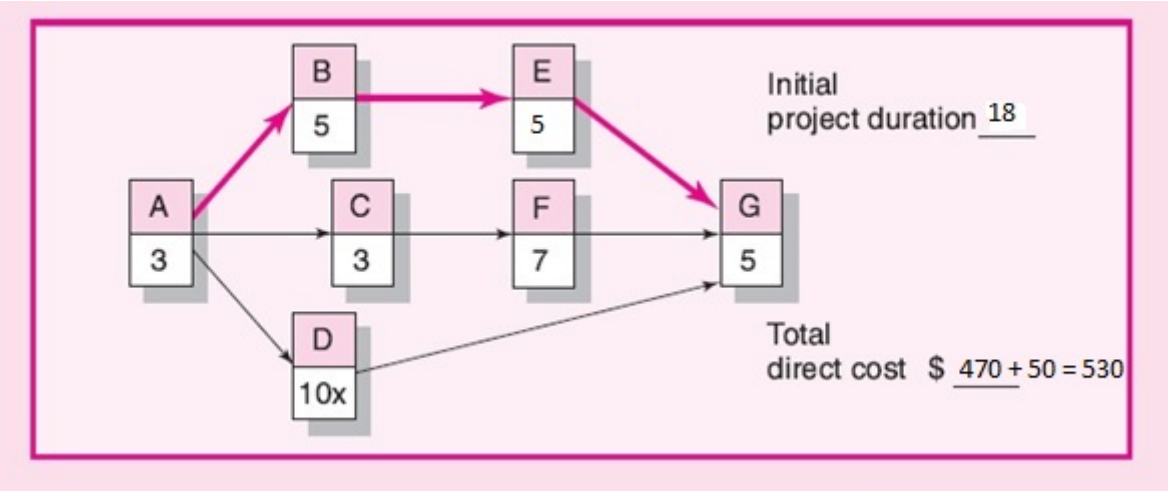
Exercise 9-3



To further shorten the Project we need to shorten B/E C/F **AND** D at the same time!

Since D cannot be shortened we can only look at A or G

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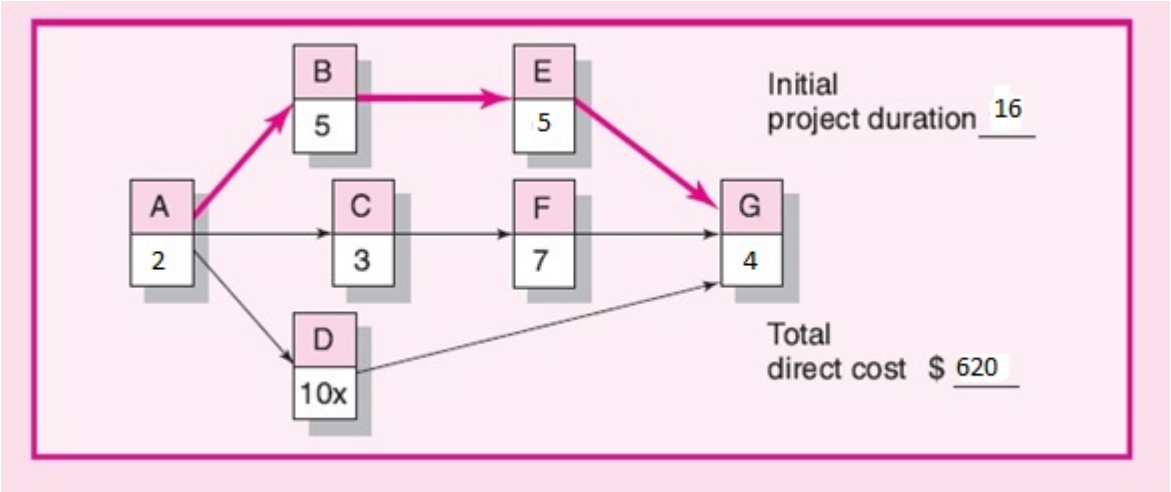
Exercise 9-3 Crash 2.

We crash A at cost of 20, then G at the cost of 70.



Lecture 8 – Reducing Duration

Exercise 9-3

We need to crash the project by two days to achieve the optimal cost/duration structure!

	Cost			
Time Units	Direct Cost	Indirect Cost	Cumulative Cost	
19	470	400	870	
18	520	350	870	
17	**550**	**300**	**850**	
16	620	250	870	

Lecture 8 – Project Scheduling

Sources

Gray, C.F., Larson, E.W., 2006/2012. Project management: the managerial process, 3.ed./5.ed, McGraw-Hill, Boston.

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Thank you for your attention!

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