

Matching Supply with Demand: An Introduction to Operations Management

Solutions to End-of-Chapter Problems

(last revised December 2011; make sure to visit www.cachon-terwiesch.net for the latest updates, excel files, ppt files and other information)

Chapter 5

5.2 10 Activities

There are three paths through the network of the 10 activities.

		P1		P2		P3	
A1	5	A1	5	A1	5	A1	5
A2	4	A2	4	A2	4	A2	
A3	8	A3		A3		A3	8
A4	5	A4	5	A4		A4	
A5	1	A5		A5	1	A5	
A6	12	A6		A6		A6	12
A7	4	A7		A7	4	A7	
A8	7	A8		A8		A8	7
A9	6	A9		A9	6	A9	6
A10	2	A10	2	A10	2	A10	2
TOT	54	TOT	16	TOT	22	TOT	40

CRITICAL PATH

EARLIEST COMPLETION TIME = 40

	EXD	EST	ECT	LCT	LST	SLACK
A1	5	0	5	5	0	0
A2	4	5	9	27	23	18
A3	8	5	13	13	5	0
A4	5	9	14	38	33	24
A5	1	9	10	28	27	18
A6	12	13	25	25	13	0
A7	4	10	14	32	28	18
A8	7	25	32	32	25	0
A9	6	32	38	38	32	0
A10	2	38	40	40	38	0
TOT	54					

5.3. Graduation Party

Dependency matrix

	Finals	Music	Evaluate Sites	Guest list	Visit sites	Hotel	T-shirt	Event planner	Beach
Finals									
Music	X								
Evaluate sites	X								
Guest list	x								
Visit sites			x						
Hotel				X					
T-shirt				x					
Event planner					x				
Beach		X				x	x	X	

The critical path is Final Exams – Evaluate Sites – Visit Sites – Event Planner – go to Beach

Thus, they can go to the beach 19 days after the beginning of their final exams.

	LCT	LST	Slack
Finals	5	0	0
Music	19	14	9
Evaluate sites	11	5	0
Guest list	13	6	1
Visit sites	15	11	0
Hotel	19	16	4
T-shirt	19	13	1
Event planner	19	15	0
Beach		19	0

5.4. Three Activities with Uncertainty

It takes an expected 5.5 days. Note that this is longer than one would expect based on the average completion time of activities A and B (both 4 days) followed by activity C (one day). The reason for this is that in order for Activity C to start after 3 days, both A and B have to be early. This only happens in 25% of the cases. In 75% of the cases, Activity C is starting late (after 5 days) leading to a completion time of 6 days. The overall expected completion time is thus $.25*4+0.75*6=5.5$ days.