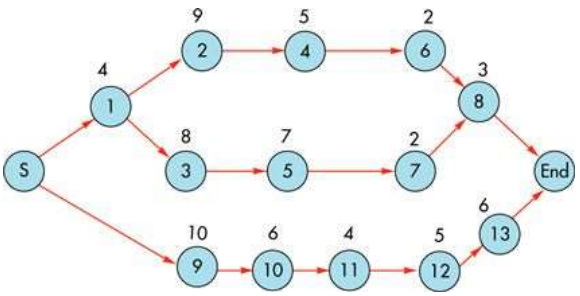
John Molson School of Business

COMM 225: POM

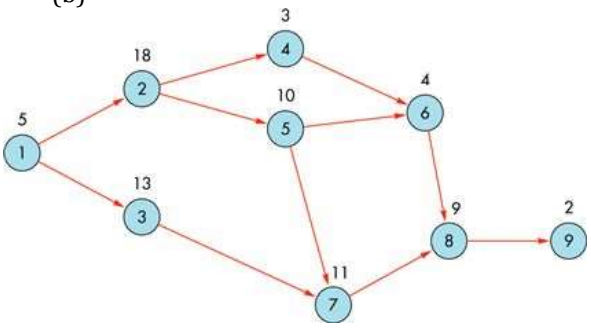
TOPIC 2: PROJECT MANAGEMENT – PRACTICE QUESTIONS

Q1 (Ref: Q. 17-1, p715 of textbook): For each of the following precedence networks, determine the critical path and the project duration by determining the length of each path. The numbers above the nodes represent activity durations (in days).

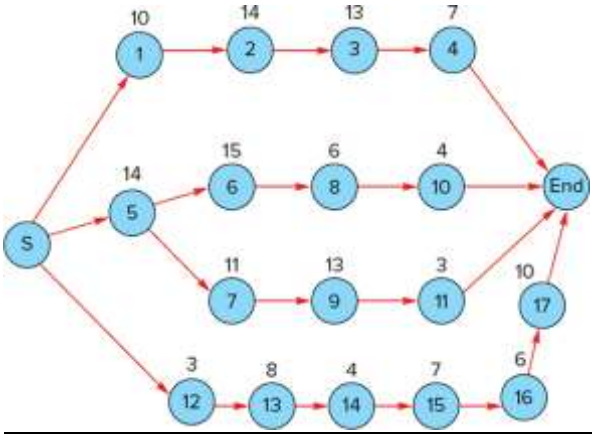
(a)



(b)



(c)



Q2 (Ref: Q. 17-8, p716-717 of textbook): The new director of special events at a large university has decided to completely revamp the graduation ceremonies. Toward that end, a precedence network of the major activities has been developed. The network has five paths with expected durations and variances as shown in the following table. Graduation day is 16 full weeks from now. Assuming that the project begins now, what is the probability that the project will be completed before:

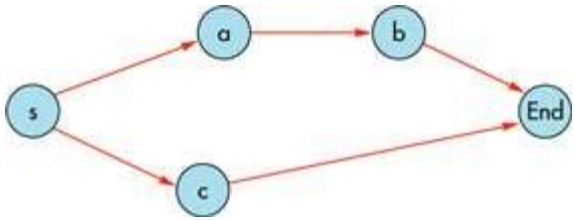
(a) Graduation day?
(b) The end of week 15?
(c) The end of week 13?

Path	Expected Duration (weeks)	Variance
A	10	1.21
B	8	2.00
C	12	1.00
D	15	2.89
E	14	1.44

Q3 (Ref: Q. 17-9, p 717 of textbook): The project described in the following table and precedence network has just begun. It is scheduled to be completed in 11 weeks.

(a) If you were the manager of this project, would you be concerned? Explain.
(b) If there is a penalty of $5,000 a week for each week the project is late, what is the probability of incurring a penalty of at least $5,000?

Activity	Mean	Standard Deviation
a	5	1.3
b	4	1.0
c	8	1.6



Q4 (Ref: Q. 17-12, p717 of textbook): A project manager has compiled a List of major activities that will be required to install a computer information system in her company. The list includes 3-point estimates of durations (optimistic, most likely, pessimistic) for activities and the precedence relationships.
If the project is finished within 26 weeks of its start, the project manager will receive a bonus of $1000; and if the project is finished within 27 weeks of its start, the bonus will be $500. Find the probability of each bonus.

Activity	Precedes	3-Point Estimates (weeks)
a	d, f	2-4-6
d	e	6-8-10
e	h	7-9-12
h	End	2-3-5
f	g	3-4-8
g	End	5-7-9
b	i	2-2-3
i	j	2-3-6
j	k	3-4-5
k	End	4-5-8
c	m	5-8-12
m	n	1-1-1
n	o	6-7-11
o	End	8-9-13

Q5 (Ref: Q. 17-15, p718 of textbook): A company builds custom equipment. It has landed a contract with a major customer. Relevant data are shown below. The complication is that the delivery has been promised ¡n 32 weeks and the company will have to pay a penalty of S375 for each week the equipment is late.

Activity	Precedes	Normal Duration (weeks)	Crashing Costs 1st Week	Crashing Costs 2nd Week
K	L, N	9	$410	$415
L	M	7	125	—
N	J	5	45	45
M	Q	4	300	350
J	Q	6	50	—
Q	P, Y	5	200	225
P	Z	8	—	—
Y	End	7	85	90
Z	End	6	90	—

Develop the minimum cost crashing schedule.

Q6 (Ref: Q. 17-16, p718-719 of textbook): The following is the list of activities, their immediate predecessor(s), and their expected duration used by a component supplier to automobile manufacturers to plan for QS 9000 (the auto industry version of ISO 9000) certification (registration).

The List of Activities in a QS-9000 Registration Project

Activity	Description	Immediate Predecessor(s)	Estimated Time (weeks)*
A	Appointment of QS-9000 taskforce	None	1
B	Preparation of a feasible plan	A	1
C	Delegation of responsibilities	B	1
D	Searching for a QS-9000 registrar	C	1
E	Preparation of three levels of documentation	C	12
F	QS-9000 awareness training	C	6
G	QS-9000 training of auditors and quality personnel	F	6
H	Preparing the plant for QS-9000 registrar	C	24
I	Conference with lead auditor	D	1
J	Examination of documentation	E, I	3
K	Internal audit of plant sections	G, H, J	12
L	Corrective actions of plant sections	K	12
M	Lead auditor and audit team audit plant	L	1
N	Audit conference and corrective action plan	M	2
O	Implementation of corrective action plans	N	12
P	Lead auditor re-audits corrective actions	O	2
Q	Lead auditor's recommendation	P	1

(a) Draw the precedence network.
(b) Determine the earliest and latest times, and identify the critical activities and the project duration.

Q7 (Ref: Q. 17-*19, p719-663 of textbook): A project consists of the following activities, normal durations (days), immediate predecessors, cost per day to crash ($000/day), and available days to crash.

Activity	Normal Duration (days)	Immediate Predecessor(s)	Cost per Day to Crash ($000/day)	Available Days to Crash
A	8	—	9	5
B	8	—	2	4
C	6	—	4	3
D	9	A	6	7
E	20	A	3	7
F	11	B, D	1	5
G	9	B, D	7	5
H	12	C, G	8	7

(a) Draw the precedence network.
(b) Calculate the project duration using normal activity durations.
(c) Determine the minimum-cost crashing plan that will take 16 days off the project duration.

Q8 (Ref: Q. 9-23, p413 of (Operation management: creating value along the Supply Chain)): The following table provides the information necessary to construct a project network and project crash data:

Activity	*Prede-cessor*	*Normal Times (Weeks)*	*Crash Times (Weeks)*	*Normal Costs*	*Crash Costs*
a	-	*16*	*8*	*$2000*	*$4400*
b	-	*14*	*9*	*$1000*	*$1800*
c	*a*	*8*	*6*	*$500*	*$700*
d	*a*	*5*	*4*	*$600*	*$1300*
e	*b*	*4*	*2*	*$1500*	*$3000*
f	*b*	*6*	*4*	*$800*	*$1600*
g	*c*	*10*	*7*	*$3000*	*$4500*
h	*d, e*	*15*	*10*	*$5000*	*$8000*

Construct project network and crash the network the maximum amount possible.