BE1401 Business Operations and Processes
More Practice Problems for Project Management

Question 1

NTUC Bank, a new community-based thrift bank, is planning to install a new computerized accounts system. Bank management has determined the activities required to complete the project, the precedence relationships of the activities, and activity time estimates, as shown in the following table:

Activit	Activity Description	Activity Predecessor	Time Estimate (weeks)		
			a	m	b
A	Position recruiting	-	5	8	17
B	System development	-	3	12	15
C	System training	A	4	7	10
D	Equipment training	A	5	8	23
E	Manual system test	B,C	1	1	1
F	Preliminary system changeover	B,C	1	4	13
G	Computer-personnel interface	D,E	3	6	9
H	Equipment modification	D,E	1	2.5	7
I	Equipment testing	H	1	1	1
J	System debugging and installation	F,G	2	2	2
K	Equipment changeover	G,I	5	8	11

a. Determine the expected project completion time and variance and determine the probability that the project will be completed in 40 weeks or less.

b. What is the likelihood the project will be finished within 30 weeks?

Question 2

The Aswan Software Company has been contracted by Shana-Cuna Bank to develop "*Card-Track*" a software for tracking the spending pattern of credit-card holders. The Bank wants this software developed as quickly as possible. Aswan has identified the list of activities (and their precedence relationship) that are required to be performed for completing this software development project. The precedence relationships and time required for each activity are given in the table below.

Activity Code	Activity Description	Immediate Predecessor Activity	Minimum Time required (Weeks)	Maximum Time required (Weeks)
A	Basic design	--	2	6
B	Detailed design for I/O interface.	A	4	6
C	Coding for I/O interface.	B	6	12
D	Detail design for main code	A	10	16
E	Coding for module 1	D	6	10
F	Coding for module 2	D	8	16
G	Integrate system	C, E, F	2	4
H	Alpha-testing of software	G	4	6
I	Beta-testing of software	H	3	5
J	Documentation	G	4	8

The time required for completing each activity follows a **uniform distribution** between the minimum and maximum times given above. Note that the variance of a uniform random variable is $(b - a)^2/12$, where a is the minimum value and b is the maximum value.

a. Draw the PERT network for this project. Based on the expected time for each activity, determine the critical path and the expected time required to complete the critical path.

b. What is the probability that the project will be completed in 44 weeks?

Question 3

Schedule the following activities using the CPM:

Activity	**Intermediate Predecessor**	**Time (Weeks)**
A	-	1
B	A	4
C	A	3
D	B	2
E	C, D	5
F	D	2
G	F	2
H	E, G	3

a. What is the critical path?
b. How many weeks will it take to complete the project?
c. Which activities have slack, and how much?

Question 4

The following activities are part of a project to be scheduled using CPM:

Activity	Intermediate Predecess	Time (Weeks)
A	-	6
B	A	3
C	A	7
D	C	2
E	B, D	4
F	D	3
G	E, F	7

a) What is the critical path?
b) How many weeks will it take to complete the project?
c) How much slack does activity B have?

Question 5

Suppose you are in charge of a project. The project completion time has a mean of 33 weeks and a standard deviation of 3.87 weeks. What is the probability that the project cannot be completed in 38 weeks? In 33 weeks? In 28 weeks?

Question 6

Suppose you are in charge of a project. The project completion time has a mean of 41 weeks and a standard deviation of 3.266 weeks. What is the minimum project completion time that you must commit in order to guarantee a 90% likelihood of completion? 99% likelihood?