Chapter 8

Project Management

Exercises

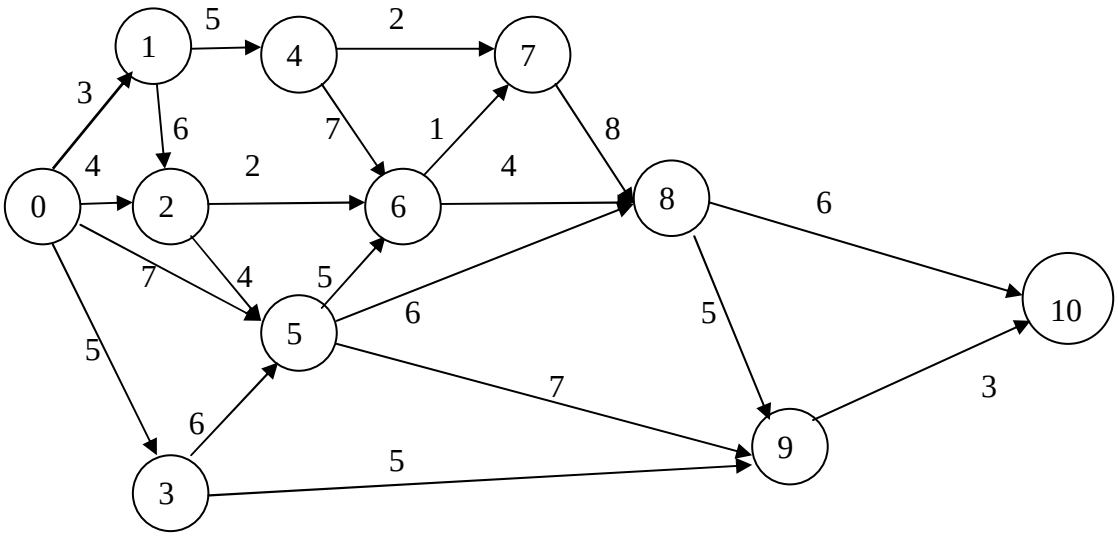
8. 1.
The owner of a shopping centre is considering modernising and expanding the current 32-business shopping complex. He hopes to add 8 to 10 new business or tenants to the shopping complex. The specific activities that make up the expansion project, together with information on immediate predecessor and completion time, are listed in the following table:

Activity	Activity Description	Immediate Predecessor	Completion Time (Weeks)
A	Prepare architectural drawings	-	5
B	Identify potential new tenants	-	6
C	Develop prospectus for tenants	A	4
D	Select contractor	A	3
E	Prepare building permits	A	1
F	Obtain approval for building permits	E	4
G	Perform construction	D, F	14
H	Finalise contracts with tenants	B, C	12
I	Tenants move in	G, H	2

Answer the following questions:

1. What is the total completion time?
2. What are the scheduled start and completion time for each activity?
3. Which activities are critical and must be completed exactly as scheduled in order to keep the project on schedule?
4. How long can the non-critical activities be delayed before they cause a delay in the completion time for the project?

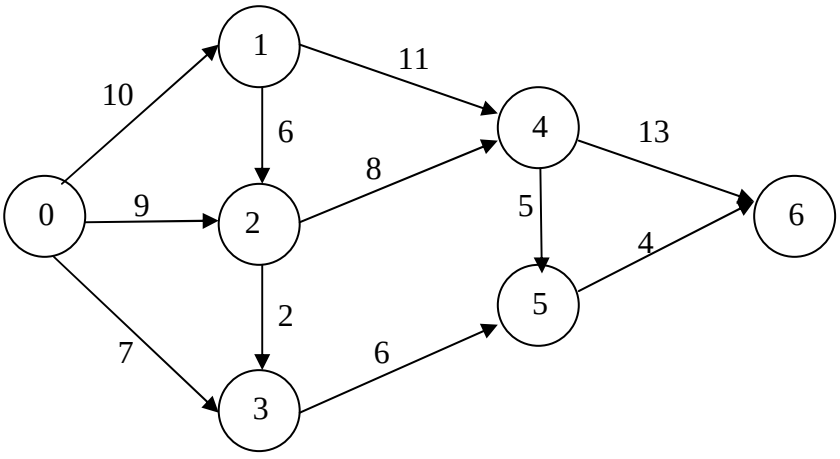
8. 2
The following diagram represents a certain project:



1. Determine the critical path.
2. Calculate the following floats.

    a. Total
    b. Free
    c. Conditional
    d. Independent

8. 3.
Consider the following nerwork diagram:



1. Find the critical path and the completion time.
2. Calculate all floats.

8. 4.

1. Construct a network diagram for a project consisting of the following activities:

Activity	Immediate Predecessor(s)
A	-
B	-
C	A, B
D	B
E	D
F	C, E
G	D

2. Suppose the project has the following activity times:

Activity	Time (days)
A	3
B	4
C	5
D	6
E	7
F	8
G	9

a) Find the critical path.
b) What is the project completion time?

3. Find and interpret the total floats (slacks) and free floats for the activities.

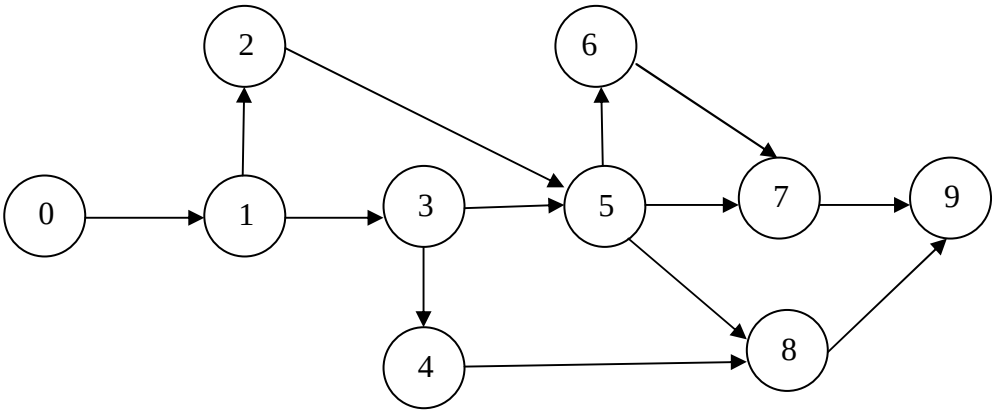
4. Suppose now the folowing estimates of activity times (days) are provided:

Activity	Optimistic	Most likely	Pessimistc
A	1	3	5
B	3	4	5
C	4	5	6
D	3	5	7
E	5	6	13
F	4	7	10
G	6	8	10

a) Determing the expected completion time and variance for the project.
b) What is the probability that the project will be completed within

i. 20 days?
ii. 25 days?

8. 5.
Consider a project with the following network diagram:



The following table lists the corresponding activities and precedence relationships:

i	j	a_{ij}	m_{ij}	b_{ij}
0	1	3	5	8
1	2	12	13	16
1	3	8	11	15
2	5	13	15	21
3	4	6	8	10
3	5	7	8	10
4	8	6	7	9
5	6	13	14	16
5	7	3	4	5
5	8	10	14	19
6	7	7	9	12
7	9	4	5	6
8	9	15	16	18

1. Determine the “critical path”.
2. What is the probability that the project will be completed in less than 65 days?
3. Calculate the probability that for each event the latest possible time to start before the earliest possible time to start lies.

(Last updated: 06.10.2014)