NAME Key

CW DAY 12

Activity 2 Bicycle construction

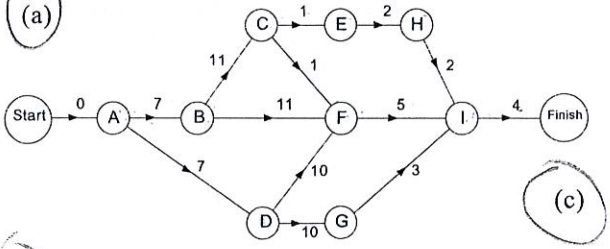
From the activity network for Question 3 in Exercise 12A find the critical path and the possible start times for all the activities in order to complete the job in the shortest possible time.

ABCEHI = 24
ABCFI = 28
ABFI = 27
ADFI = 16
ADGI = 24

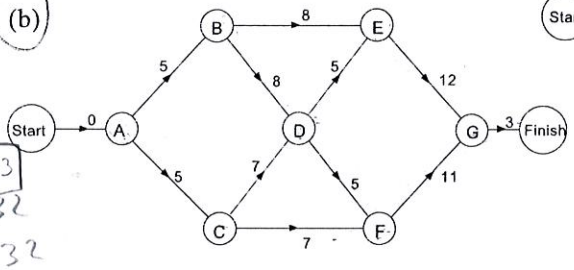
Exercise 12B

1. Find the critical paths for each of the activity networks shown below.

(a)

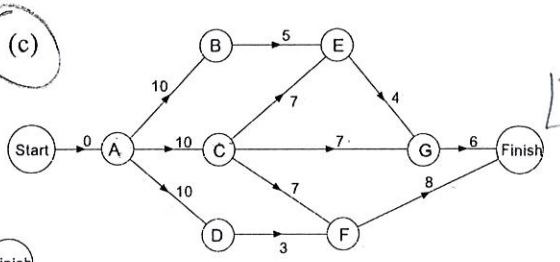


(b)



AB EG = 28
ABDEG = 33
ABDFG = 32
ACDEG = 32
ACDFG = 31
ACFG = 26

(c)



ABEG = 25
ACEG = 27
ACG = 23
ACF = 25
ADF = 21

2. Find the critical path for the activity network in Question 4, Exercise 12A.

3. Your local school decides to put on a musical. These are the many jobs to be done by the organising committee, and the times they take:

A	make the costumes	6 weeks
B	rehearsals	12 weeks
C	get posters and tickets printed	3 weeks
D	get programmes printed	3 weeks
E	make scenery and props	7 weeks
F	get rights to perform the musical	2 weeks
G	choose cast	1 week
H	hire hall	1 week
I	arrange refreshments	1 week
J	organise make-up	1 week
K	decide on musical	1 week
L	organise lighting	1 week
M	dress rehearsals	2 days
N	invite local radio/press	1 day
P	choose stage hands	1 day
Q	choose programme sellers	1 day
R	choose performance dates	$\frac{1}{2}$ day
S	arrange seating	$\frac{1}{2}$ day
T	sell tickets	last 4 weeks
V	display posters	last 3 weeks

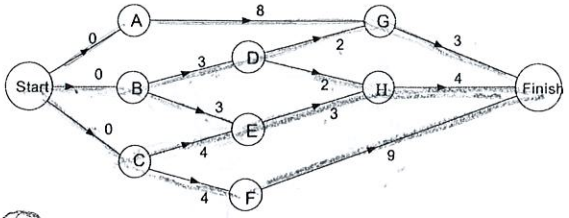
(a) Decide on the precedence relationships.

(b) Construct the activity network.

(c) Find the critical path and minimum completion time.

12.4 Miscellaneous Exercises

1. Consider the following activity network, in which the vertices represent activities and the numbers next to the arcs represent time in days.



(a) Assuming that an unlimited number of workers is available, write down:

(i) the minimum completion time of the project;

(ii) the corresponding critical path.

(b) Find the float time of activity E.

2. A project consists of ten activities, A-J. The duration (in days) of each activity, and the activities preceding each of them, are as follows:

activity	duration	preceding activities
A	10	-
B	4	-
C	8	B
D	6	C
E	8	I
F	5	-
G	10	A, D
H	2	G
I	4	-
J	10	D, F, I

Using the algorithms in Section 12.2,

(a) construct an activity network for this project;

(b) find a critical path in this activity network;

(c) find the latest starting time for each activity.

3. A project consists of eight activities whose durations are as follows:

activity	A	B	C	D	E	F	G	H
duration	4	4	3	5	4	1	6	5

The precedence relations are as follows:

B must follow A

D must follow A and C

F must follow C and E

G must follow C and E

H must follow B and D.

(a) Draw an activity network in which the activities are represented by vertices.

(b) Find a critical path by inspection, and write down the earliest and latest starting times for each activity.

4. The eleven activities A to K which make up a project are subject to the following precedence relations.

preceding activities	activity	duration
C, F, J	A	7
E	B	6
-	C	9
B, H	D	7
C, J	E	3
-	F	8
A, I	G	4
J	H	9
E, F	I	9
-	J	7
B, H, I	K	5

(a) Construct an activity network for the project.

(b) Find:

(i) the earliest starting time of each activity in the network;

(ii) the latest starting time of each activity.

(c) Calculate the float of each activity, and hence determine the critical path.