Critical Path Analysis: Examples

Question 1

The precedence table for activities involved in producing a computer game is shown opposite.

An activity on arc network is to be drawn to model this production process.

a Explain why it is necessary to use at least two dummies when drawing the activity network.

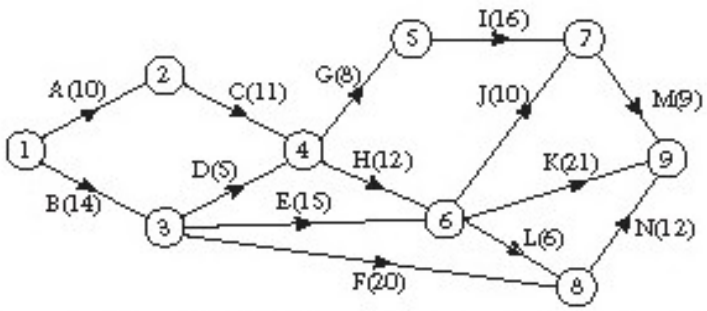
b Draw the activity network using exactly two dummies.

E

Activity	Must be preceded by
A	—
B	—
C	B
D	A, C
E	A
F	E
G	E
H	G
I	D, F
J	G, I
K	G, I
L	H, K

Answer:

Question 2



An engineering project is modelled by the activity network shown above. The activities are represented by the arcs. The number in brackets on each arc gives the time, in days, to complete the activity. Each activity requires one worker. The project is to be completed in the shortest time.

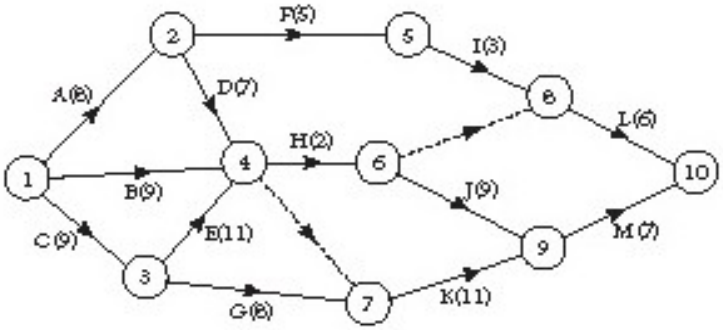
a Calculate the early time and late time for each event.

b State the critical activities.

c Find the total float on activities D and F. You must show your working.

Answer:

Question 3



A project is modelled by the activity network shown above. The activities are represented by the arcs. The number in brackets on each arc gives the time, in hours, to complete the activity. The numbers in circles are the event numbers. Each activity requires one worker.

a Explain the purpose of the dotted line from event 6 to event 8.

b Calculate the early time and late time for each event.

c Calculate the total float on activities D, E and F.

d Determine the critical activities.

Answer:

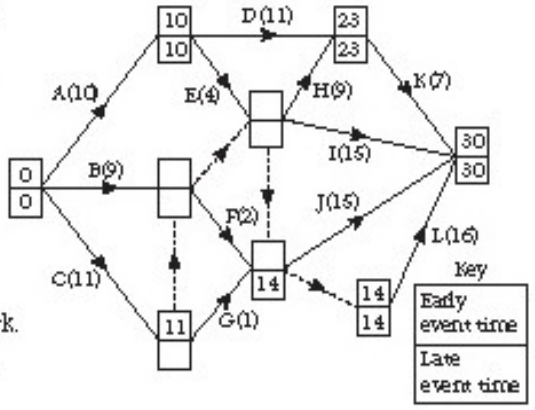
Question 4

The network shows the activities that need to be undertaken to complete a project. Each activity is represented by an arc. The number in brackets is the duration of the activity in days. The early and late event times are to be shown at each vertex and some have been completed for you.

a Calculate the missing early and late times.

b List the two critical paths for this network.

c Explain what is meant by a critical path.

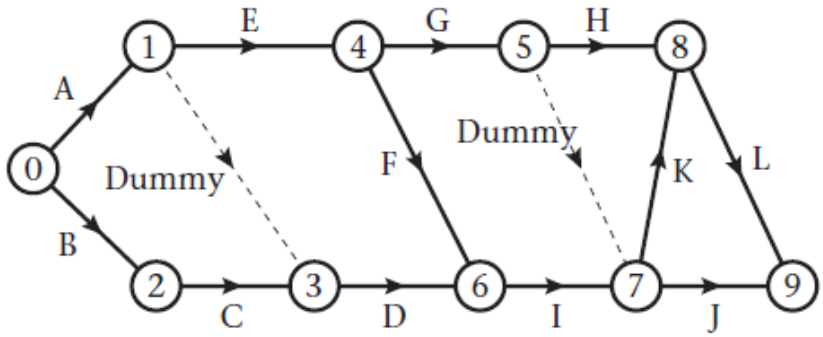


Answer:

Answer to Question 1:

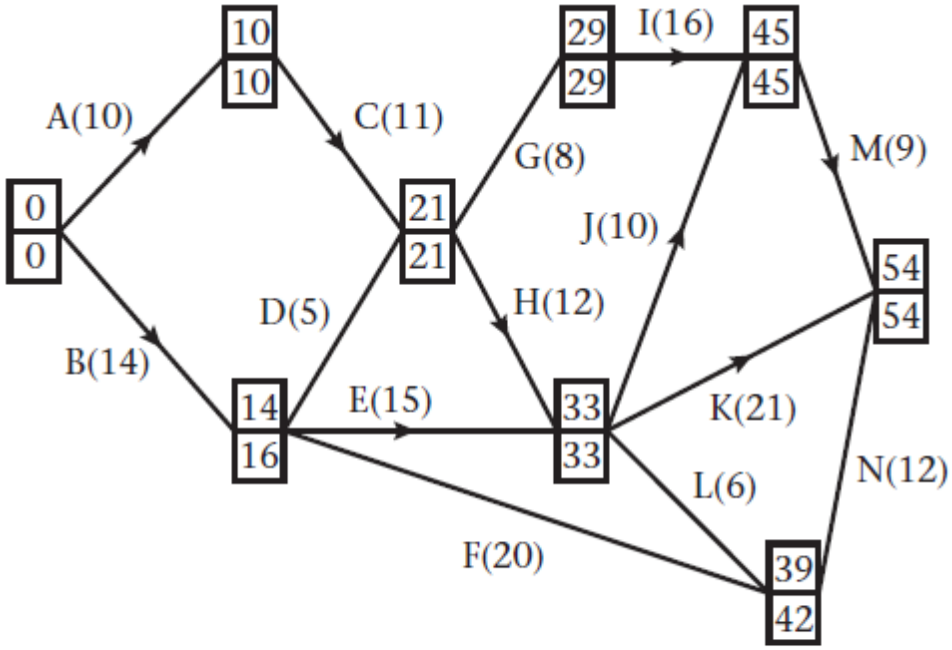
a Activity D depends on activities A and C, whereas activity E depends only on activity A.
This shows that a dummy is required.
Activity J depends on activities G and I, whereas activity H depends only on activity G.
This shows that a second dummy is required.

b



Answer to Question 2:

a



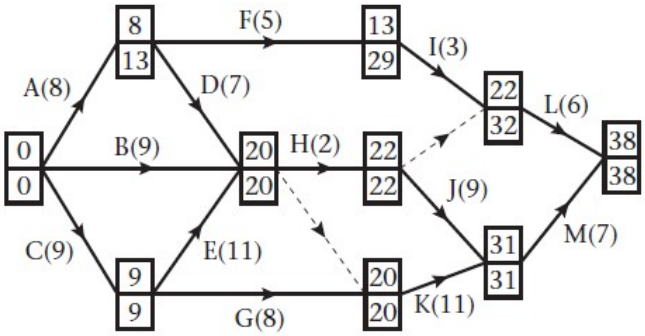
b There are *two* critical paths:
A – C – G – I – M and A – C – H – K – M
The critical activities are A, C, G, H, I, K

c Total float on D is 21 − 5 − 14 = 2
Total float on F is 42 − 20 − 14 = 8

Answer to Question 3:

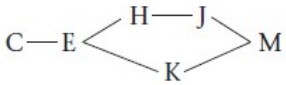
a J depends on H alone, but L depends on H and I

b



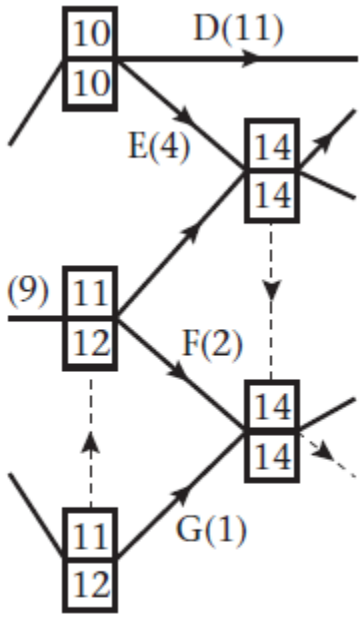
c Total float on D = 20 − 7 − 8 = 5
Total float on E = 20 − 11 − 9 = 0
Total float on F = 29 − 5 − 8 = 16

d



Answer to Question 4:

a



b The critical paths are: A − E − H − K and A − E − L

c A critical path is a continuous path from the source node to the sink node such that a delay in any activity results in a corresponding delay in the whole project.