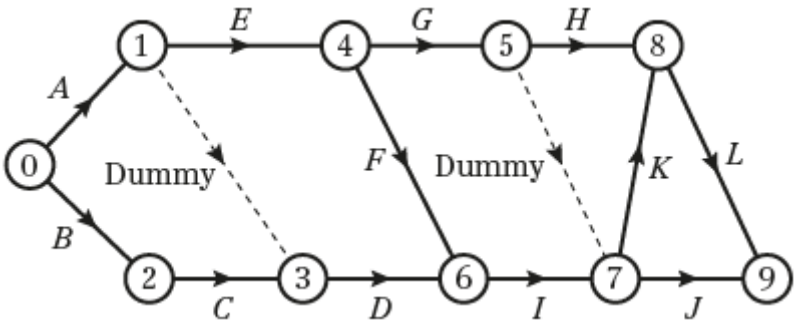
Chapter Review 6

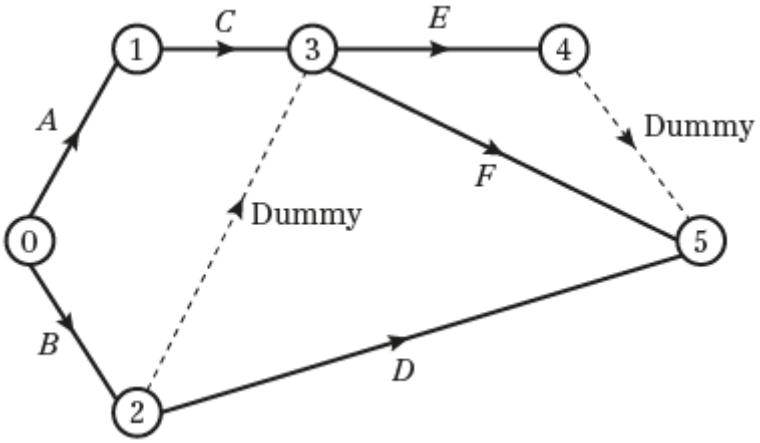
1 a Activity D depends on activities A and C, whereas activity E depends only on activity A. This shows that a dummy is required.

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



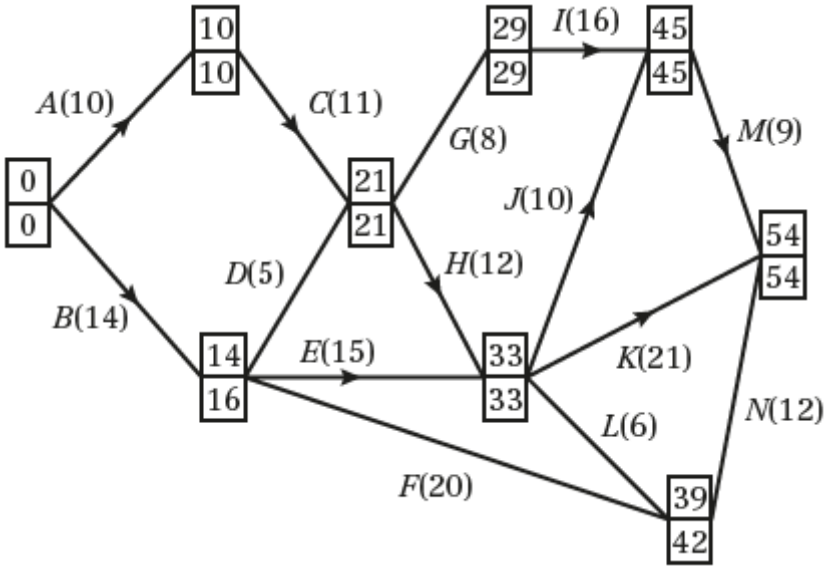
2 a



b Dummy 1 is needed to show *dependency*.
E and F depend on C and B, but D depends on B only.

Dummy 2 is needed so that each activity can be *uniquely* represented in terms of its event.

3 a

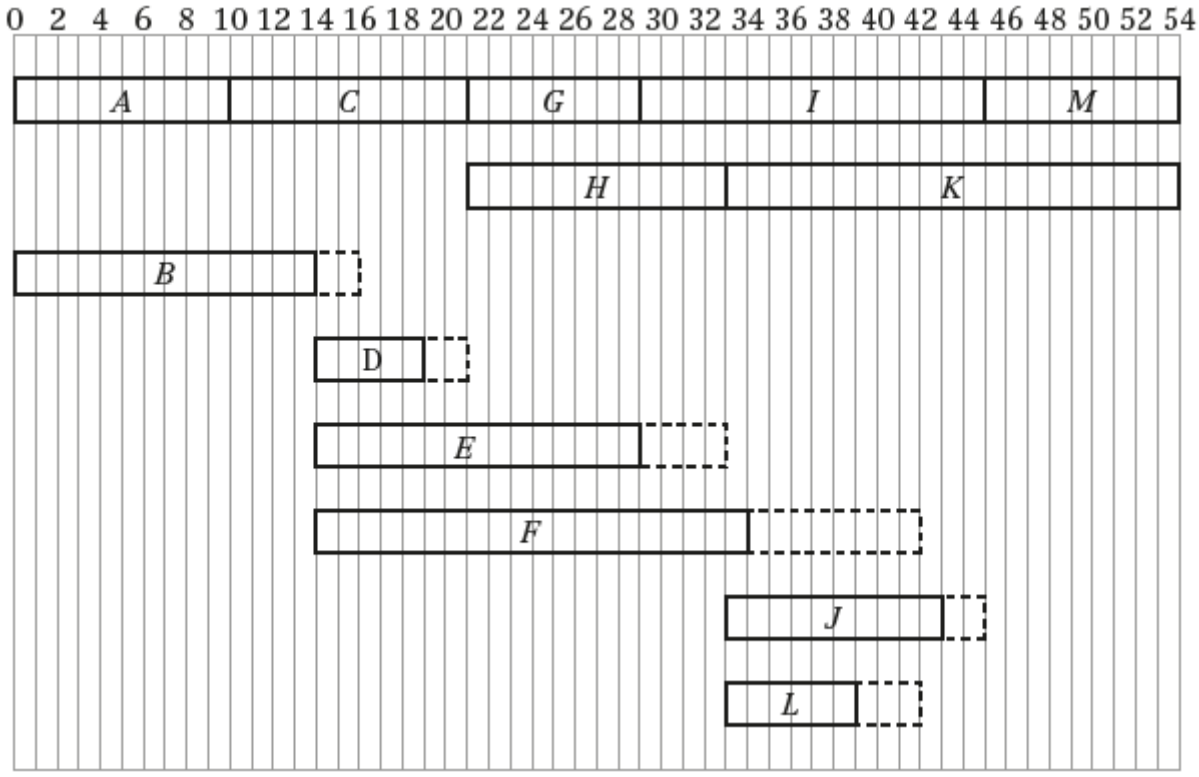


b There are *two* critical paths: *ACGIM* and *ACHK*

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

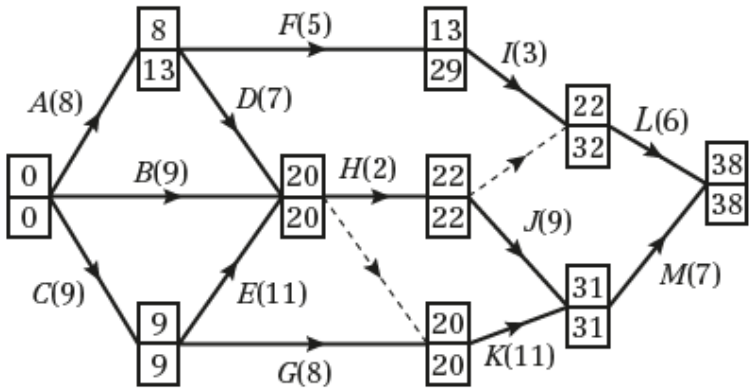
d



e Day 15: *C*
Day 25: *G*, *H*, *E*, *F*

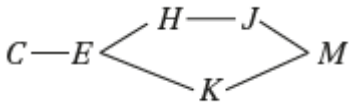
4 a J depends on H alone, but L depends on H and I.

b



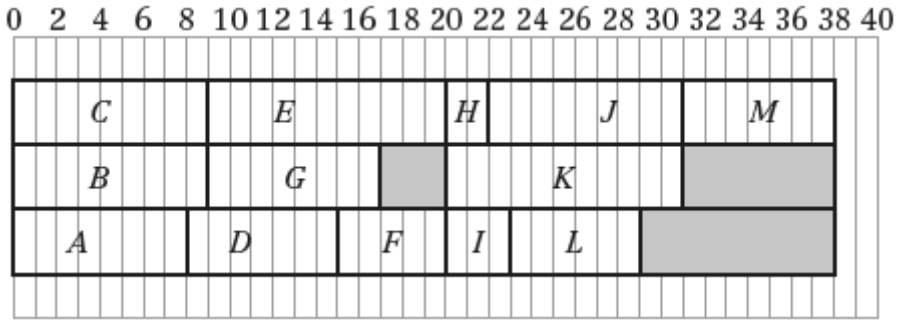
c Total float on $D = 20 - 7 - 8 = 5$
Total float on $E = 20 - 11 - 9 = 0$
Total float on $F = 29 - 5 - 8 = 16$

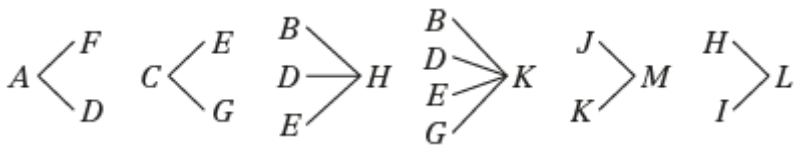
d



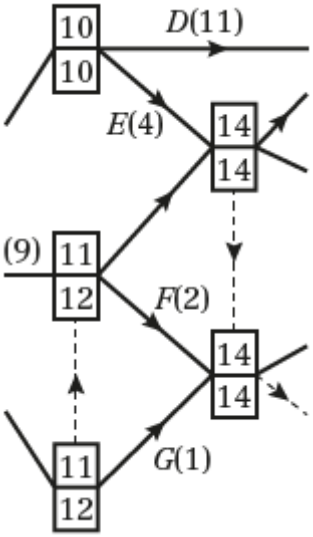
e $\frac{95}{38} = 2.5$ so 3 workers.

f For example





5 a



b 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.

c The critical paths are: *AEHK* and *AEL*.

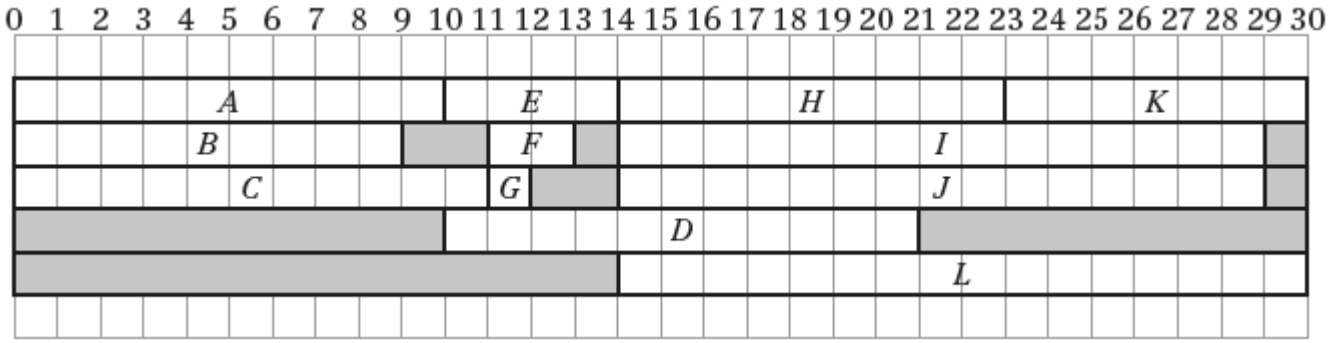
d $\dfrac{\text{Sum of all of the activity times}}{\text{critical time of the project}} = \dfrac{110}{30}$

Lower bound for number of workers is 4.

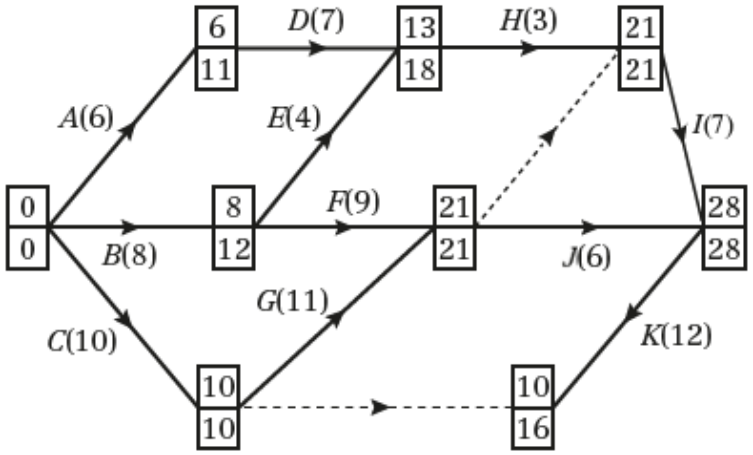
e *D*, *H*, *I*, *J*, *L*

f The answers to part **e** show that 5 workers are needed on day 20 in order to complete the project in the minimum time.

g



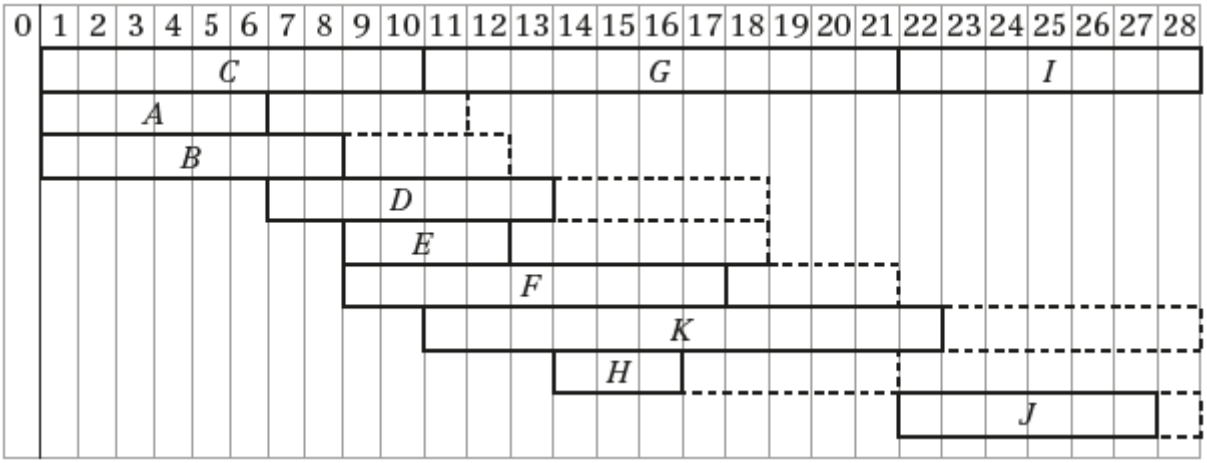
6 a



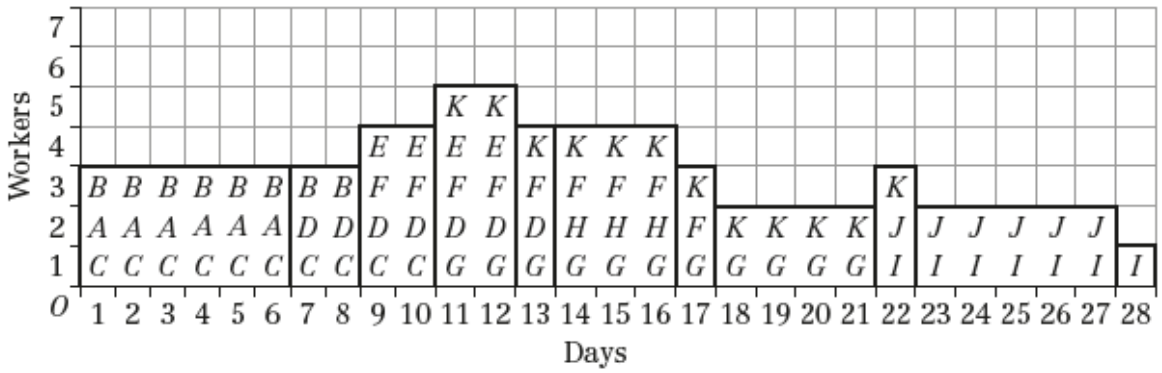
28 days

b $\frac{83}{28} = 2.96$ so the lower bound is 3.

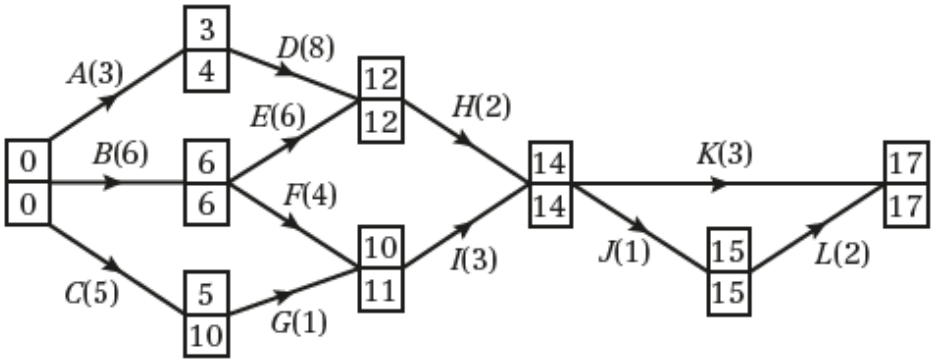
c



d

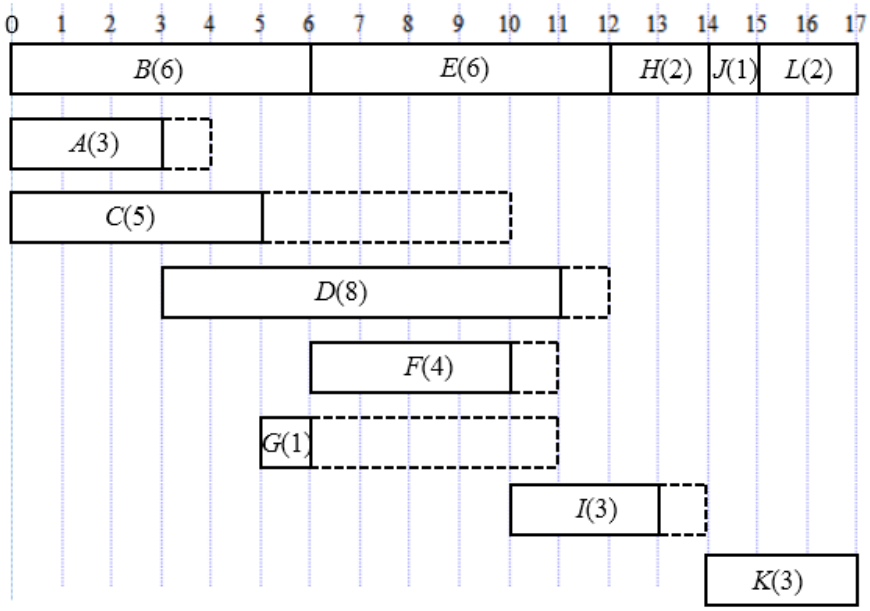


7 a Minimum time required to complete the project is 17 days.



b *BEHK* and *BEHJL*

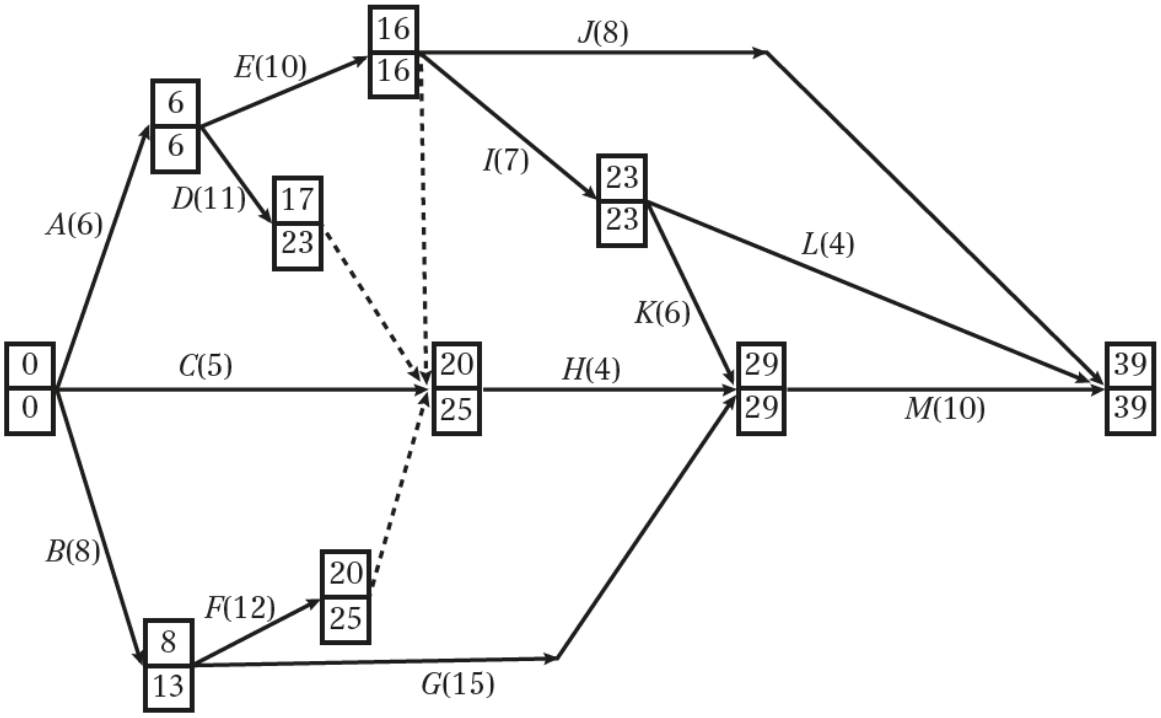
c

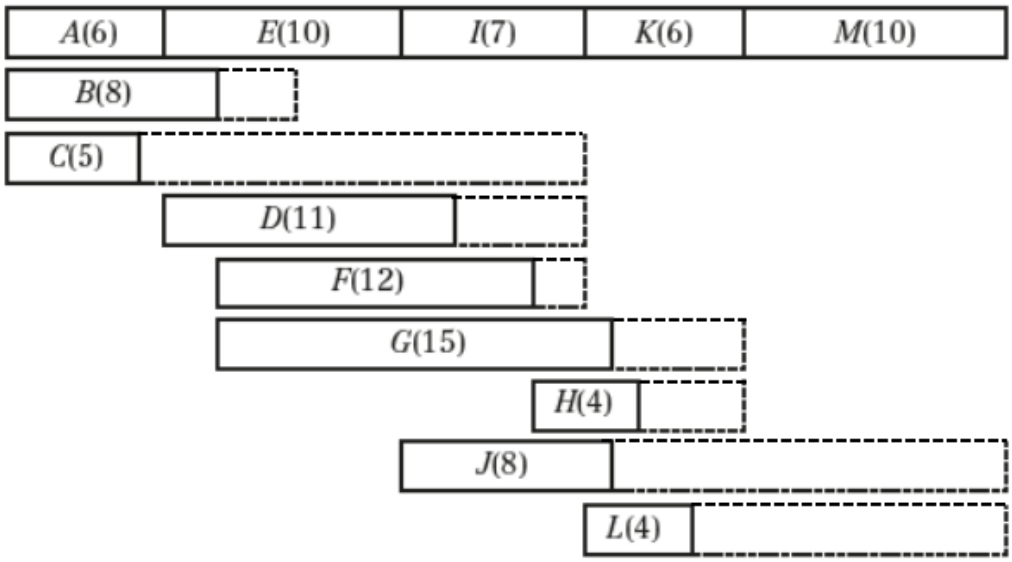


d For example,

Challenge

Minimum time required for the project is 39 days





For example,