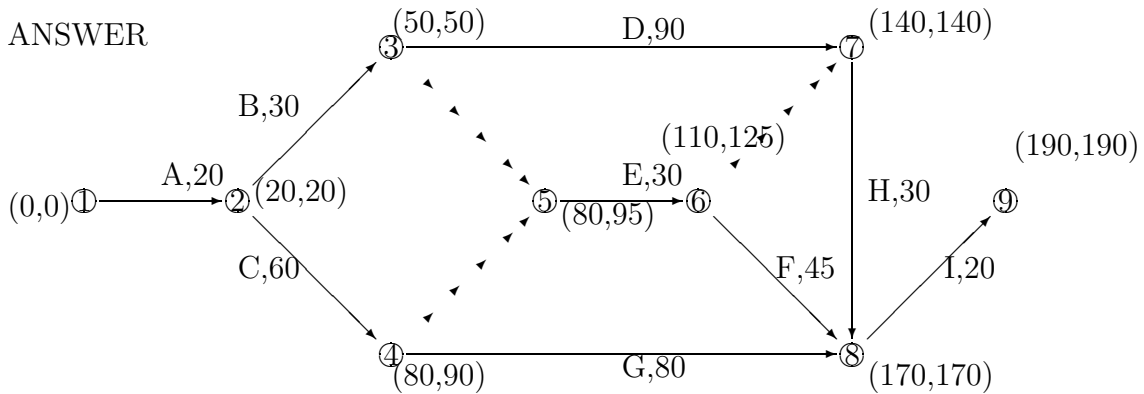


QUESTION

The activities described below must be performed each time a ship carrying passengers and freight enters the dock.

Activity	Description	Prerequisites	Duration (mins.)
A	Tow ship to berth	-	20
B	Passengers disembark	A	30
C	Unload cargo	A	60
D	Clean ship	B	90
E	Perform safety check	B,C	30
F	Refuel	E	45
G	Load cargo	C	45
H	Passengers embark	D,E	30
I	Tow ship out of dock	F,G,H	20

- (a) Management requires that each ship spends at most three hours in the dock. Can this be achieved?
- (b) By employing extra workers, the time required for the unloading and loading of cargo can be reduced to 50 minutes and 70 minutes respectively. Alternatively, the same money can be used to employ extra cleaners to reduce the cleaning time to 75 minutes. Which proposal do you recommend?
- (c) What would be the effect of increasing the refueling time to 50 minutes?



Critical path is A - B - D - H - I.

- (a) No, 3 hours and 10 minutes are needed.
- (b) Unloading and loading of cargo (C and G) are non-critical, so there is no advantage in reducing their durations. However cleaning (D) is a

critical activity. Reducing the duration of D by 15 minutes reduces the project duration to 3 hours (A - C - G - I becomes critical).

- (c) The total float for refuelling (activity F) is $TF_F = 170 - 110 - 45 = 15$. This exceeds the increase in duration of F, so there is no effect on the project duration.