

QUESTION

- (a) A project consists of activities A, B, \dots, K whose prerequisites and durations are given in the table below. Draw a network, suitable for analysis by the critical path method, to represent the project. You should avoid using dummy activities, where possible. For each event, write the earliest and latest event times on the network, and hence deduce all critical paths.

Activity	Prerequisite	Duration (days)
A	-	8
B	-	5
C	A	7
D	A	6
E	B	9
f	c	9
G	C	4
H	D	7
I	D,E	5
J	G,H	2
K	G,H,I	3

It is possible to transfer resources from activity B to either activity A or activity C , so that the duration of B is increased and the duration of A or C is decreased. Analyse whether such a transfer can reduce the overall project duration.

- (b) A financial analyst has £1 000 000 to invest. The entire amount must first be invested for one year in either in stocks or in bonds (but not both). At the end of the year, the entire amount that results from the investment in the first year must be reinvested either in stocks or in bonds (but not both) for one further year. The aim is to maximize the return at the end of the second year.

The annual return (in addition to the amount invested) depends on the economy, as shown in the following table.

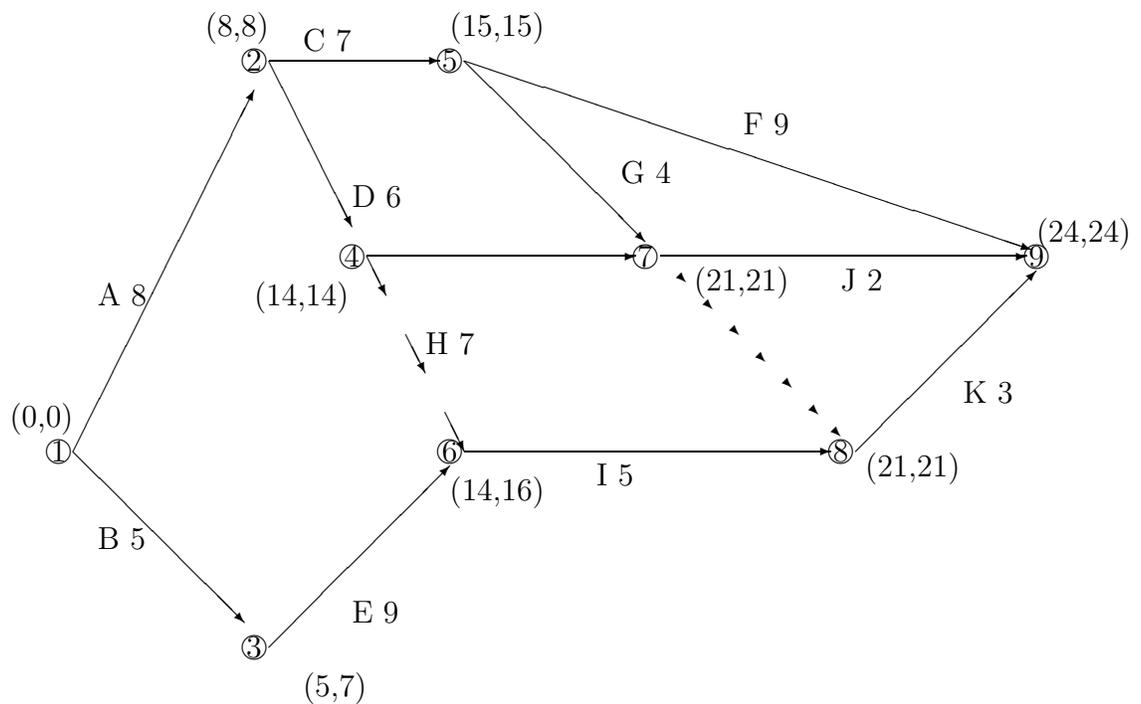
Economy	Stocks	Bonds
Growth	20%	5%
Recession	-10%	10%

The probabilities of growth and recession in the first year are 0.7 and 0.3, respectively. If growth occurs in the first year, these probabilities remain the same for the second year. However, if a recession occurs in the first year, these probabilities change to 0.4 and 0.6, respectively.

Develop a decision tree to find an optimal strategy for investing the money.

ANSWER

(a)



Critical paths A - C - F, A - D - H - K

Transferring resources to activity C does not help since C is only on one of the paths. However, transferring resources to A reduces the lengths of all critical paths. The total float of B is 2, so that provided B does not increase by 2 days the overall project duration will become smaller.

(b)

