

Critical Path Analysis – Example

Develop an Activity on Node Diagram and for each activity, detail the following:

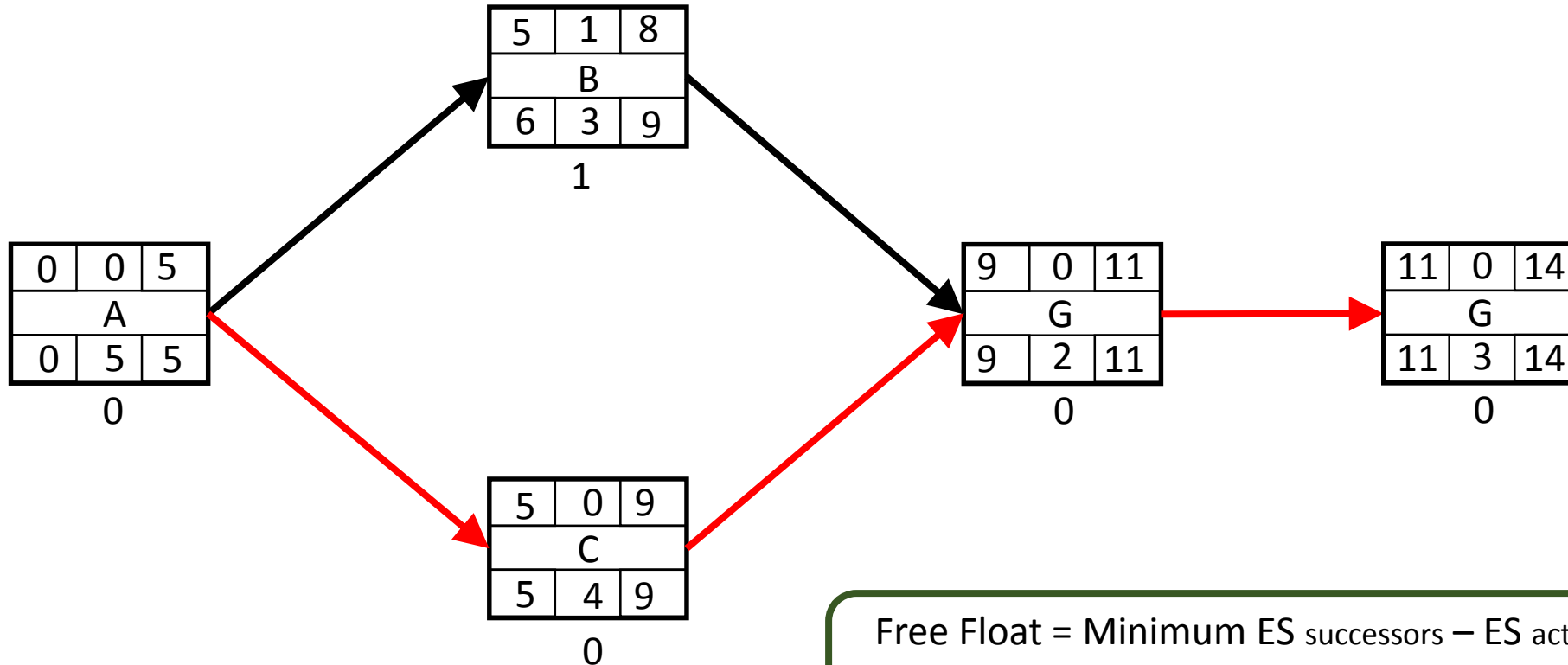
- Earliest Start time
- Earliest Finish time
- Latest Start time
- Latest Finish time
- Total Float/Slack
- Free Float/Slack

Activity	Predecessor/s	Duration (days)
A	-	5
B	A	3
C	A	4
D	B,C	2
E	D	3

Key Stages in CPA

- Sketch out the network diagram
- Complete a forward pass
 - Earliest Start + Duration = Earliest Finish
 - If two predecessors, highest value wins
- Complete a backward pass
 - Latest Finish – Duration = Latest Start
 - If two successors, lowest value wins
- Total Float = Latest Finish – Earliest Finish
 - or Latest Start – Earliest Start
 - This gives you the longest you can delay any activity before you impact on the total project duration.
- Free Float = Minimum ES successors – ES activity – Duration activity
 - Remembering that: Free Float = $\leq$ Total Float
 - This gives you the longest you can delay any activity before you impact on the start time of the subsequent activities.

$$\begin{aligned}\text{Total Float} &= \text{LS} - \text{ES} \\ &= \text{LF} - \text{EF}\end{aligned}$$



ES	TF	EF
Activity		
LS	DUR	LF

FF

Where:

ES = Earliest Start

EF = Earliest Finish

LS = Latest Start

LF = Latest Finish

TF = Total Float

FF = Free Float

→ = Critical Path

Free Float = Minimum ES successors – ES activity – Duration activity

Remembering $FF \leq TF$

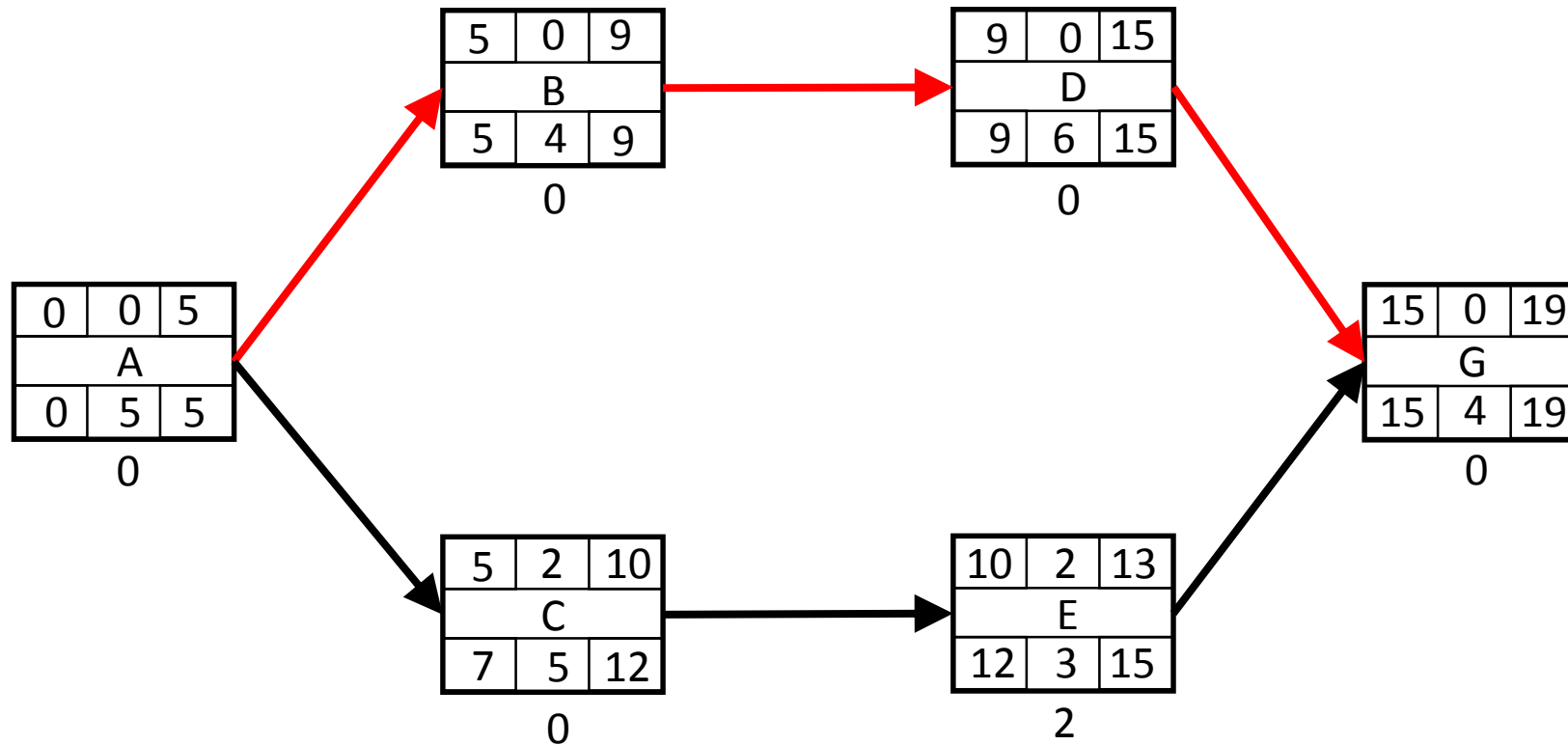
Critical Path Analysis – Example

Develop an Activity on Node Diagram and for each activity, detail the following:

- Earliest Start time
- Earliest Finish time
- Latest Start time
- Latest Finish time
- Total Float/Slack
- Free Float/Slack

Activity	Predecessor/s	Duration (days)
A	-	5
B	A	4
C	A	5
D	B	6
E	C	3
F	D,E	4

$$\begin{aligned}\text{Total Float} &= \text{LS} - \text{ES} \\ &= \text{LF} - \text{EF}\end{aligned}$$



ES	TF	EF
Activity		
LS	DUR	LF

FF

Where:

ES = Earliest Start

EF = Earliest Finish

LS = Latest Start

LF = Latest Finish

TF = Total Float

FF = Free Float

→ = Critical Path

Free Float = Minimum ES successors – ES activity – Duration activity

Remembering $FF \leq TF$

Critical Path Analysis – Example

Develop an Activity on Node Diagram and for each activity, detail the following:

- Earliest Start time
- Earliest Finish time
- Latest Start time
- Latest Finish time
- Total Float/Slack
- Free Float/Slack

Activity	Predecessor/s	Duration (days)
A	-	3
B	A	4
C	A	2
D	B	5
E	C	1
F	C	2
G	D,E	4
H	F,G	3

