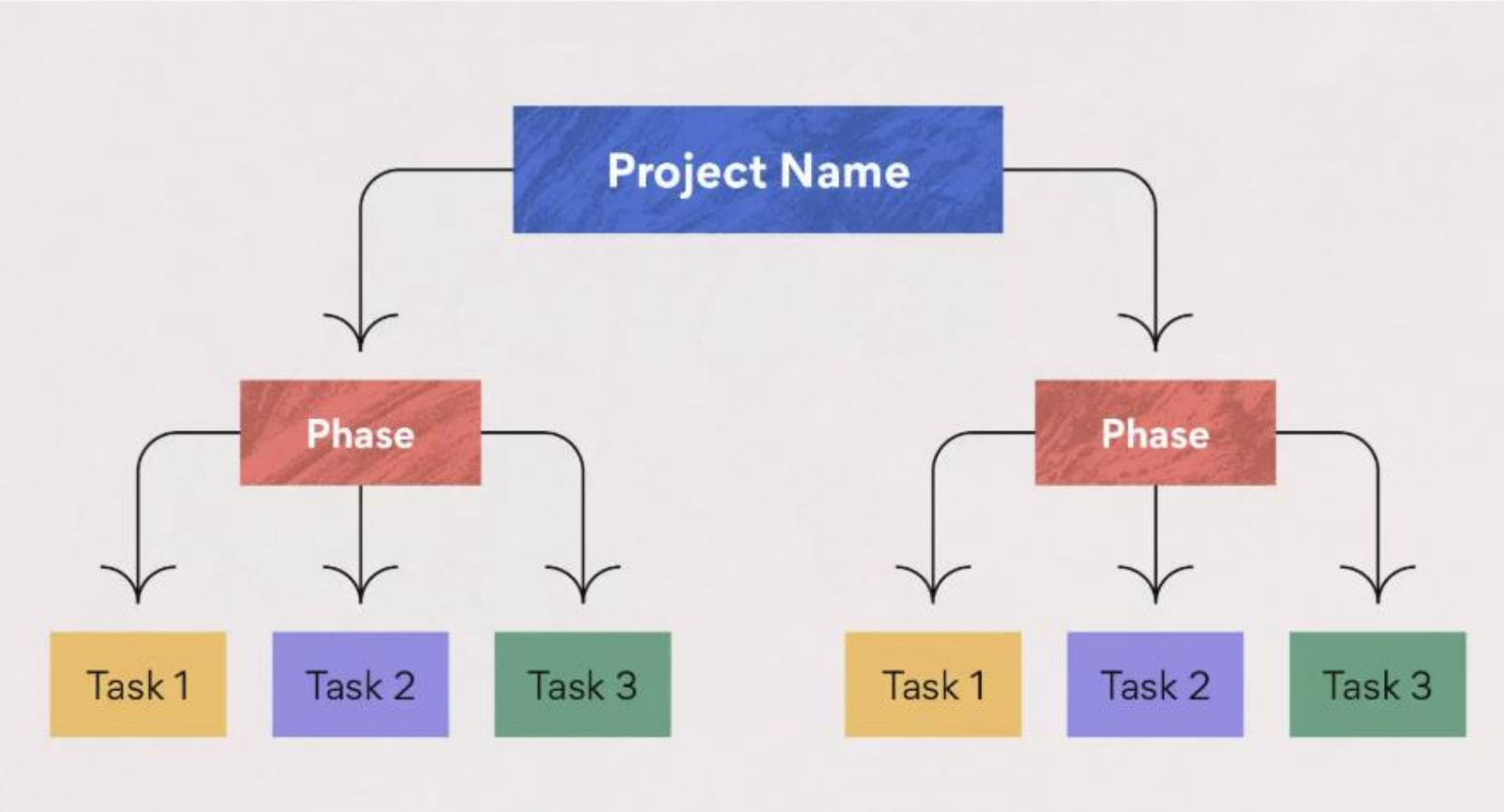
Practice

A Work breakdown structure

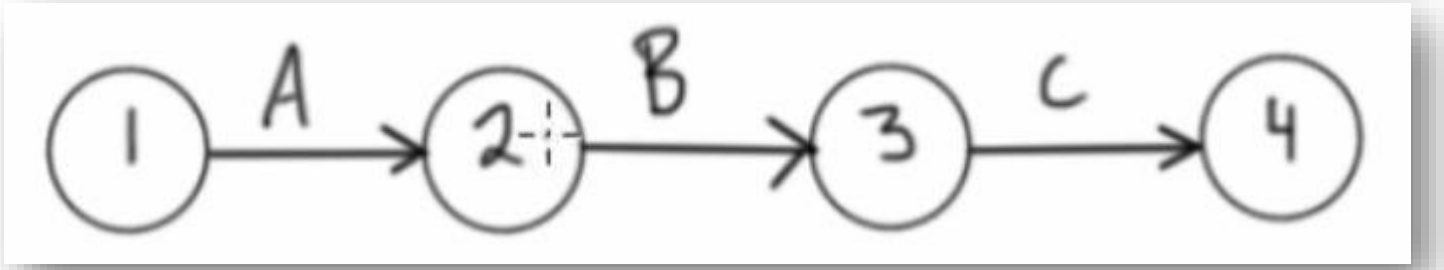


Activity Table

Task ID	Task	Duration (days)
A	Create outline	1
B	Write draft	5
C	Edit and create final draft	2
D	Design post visuals	4
E	Add animations to visuals	2
F	Upload post	1

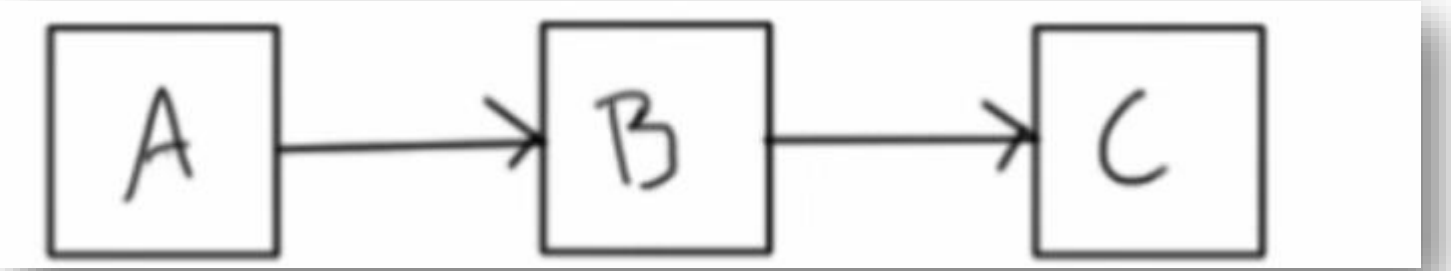
Network Diagram (PDM vs. CPM)

- CPM: Critical Path Method
- Example: AOA= Activity on Arrow



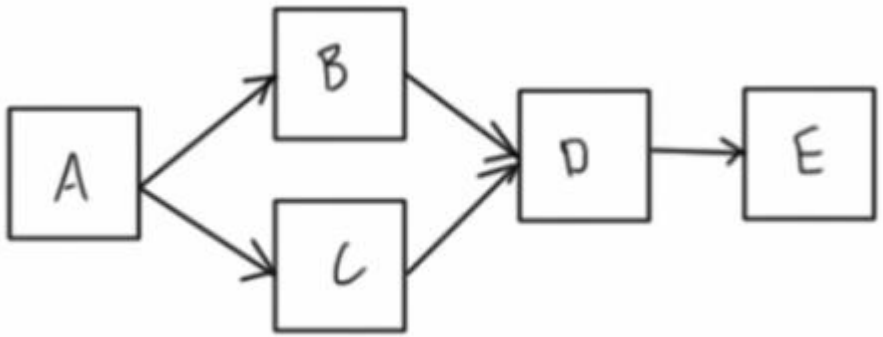
Network Diagram (PDM vs. CPM)

- PDM: Precedence Diagram Method
- Example: AON= Activity on Node

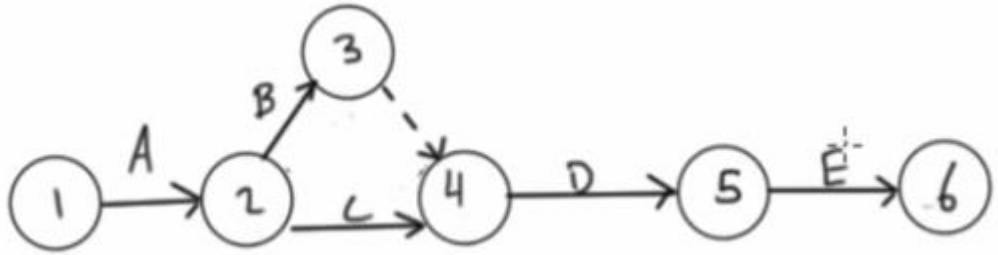


Activity	Predecessor	Duration
A	-	5
B	A	3
C	A	4
D	B,C	2
E	D	5

AON



AOA

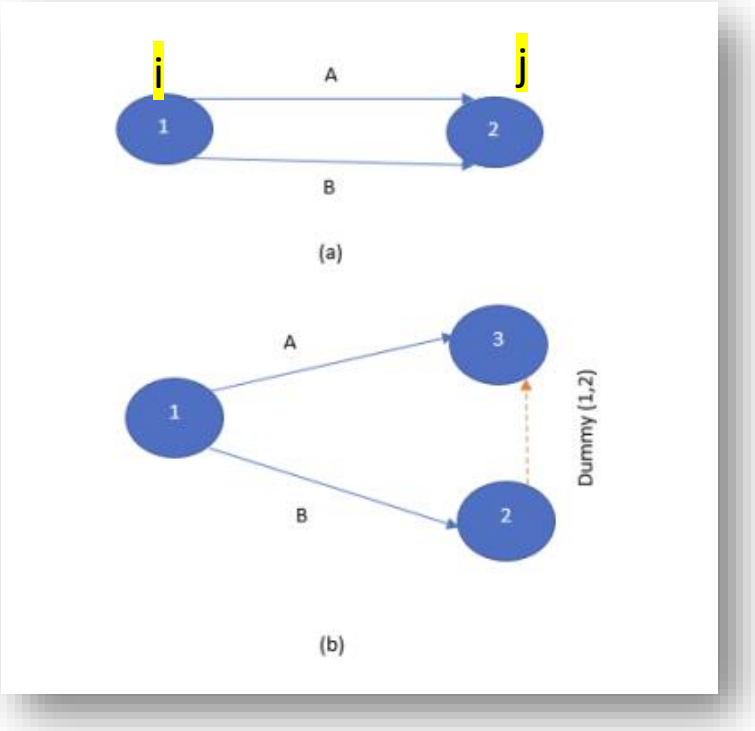


Dummy activity

- A Dummy activity is a type of operation in a project network which neither requires any time nor any resource. It is an imaginary activity shown in a project network to identify the dependence among operation.

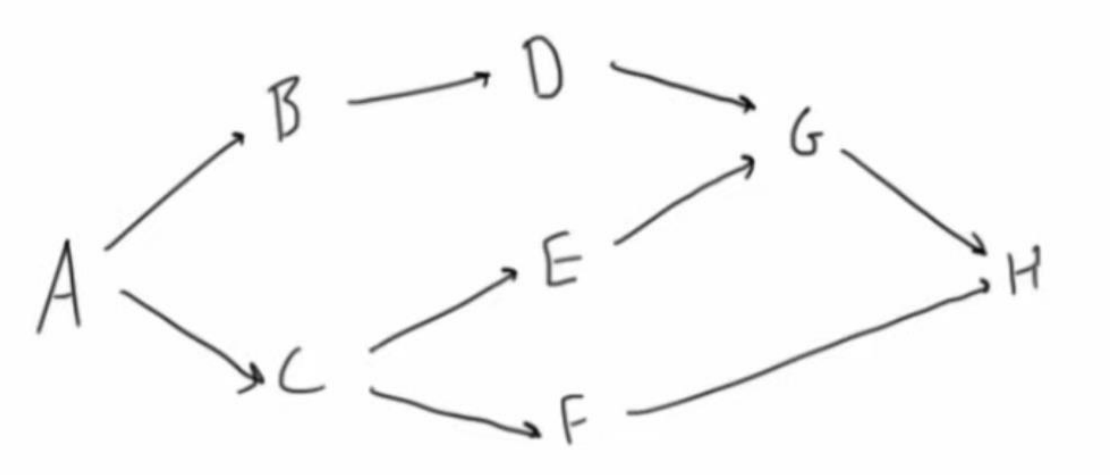
A dummy activity can be used to prevent two arrows with a common beginning and end points.

This arrangement is difficult to conduct computations and the network loses its uniqueness in its identification.



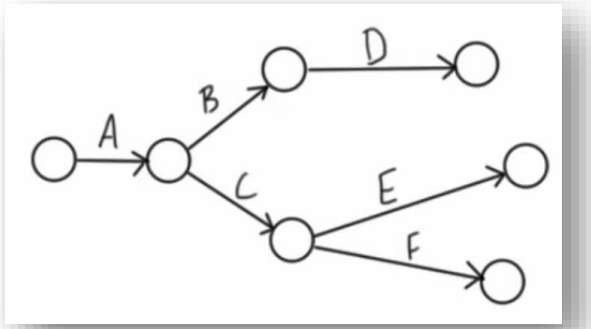
How to draw PDM?

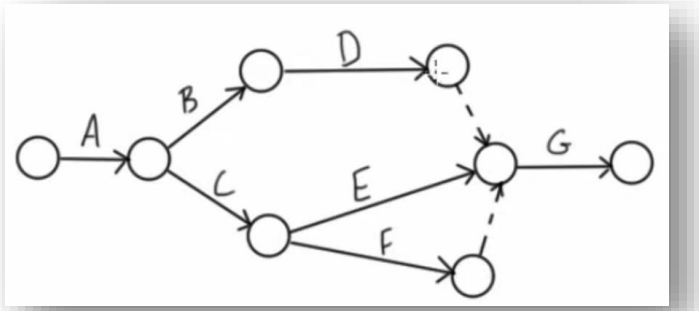
Activity	Predecessor	Duration (days)
A	-	3
B	A	4
C	A	2
D	B	5
E	C	1
F	C	2
G	D,E	4
H	F,G	3

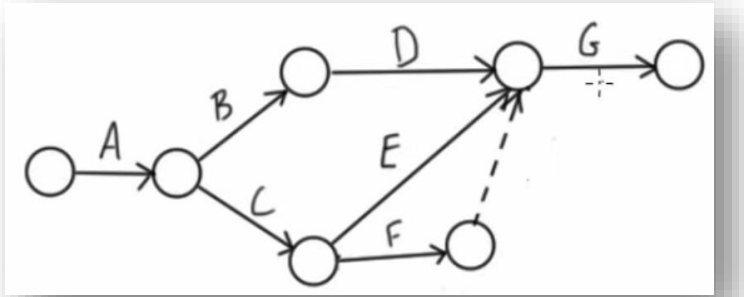


How to draw a CPM network diagram (1)

Activity	Predecessor
A	-
B	A
C	A
D	B
E	C
F	C
G	D,E,F
H	G

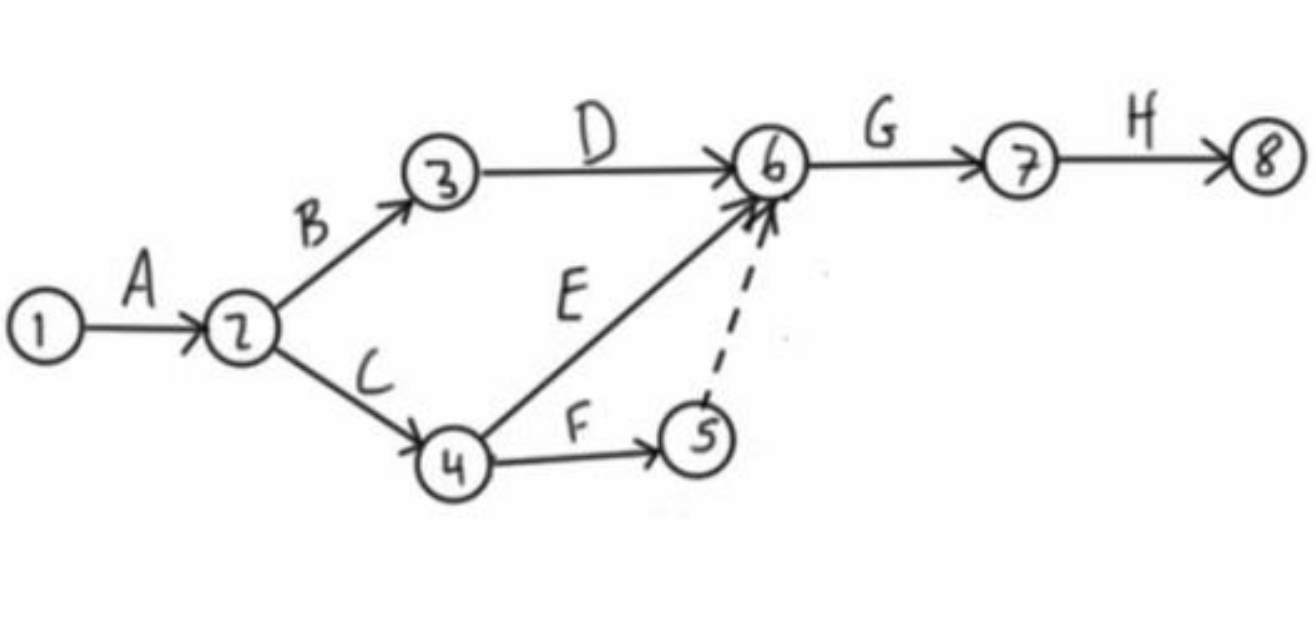






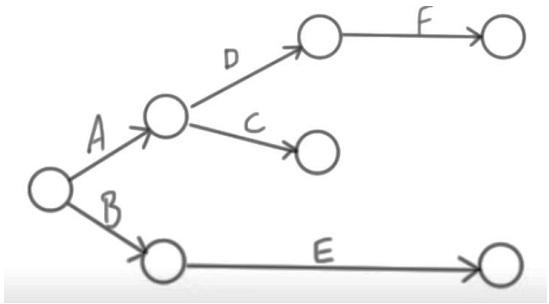
How to draw a CPM network diagram (1)

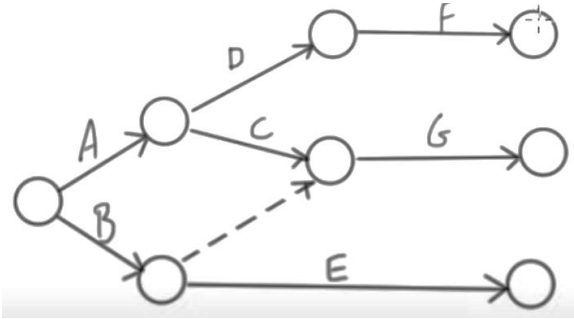
Activity	Predecessor
A	-
B	A
C	A
D	B
E	C
F	C
G	D,E,F
H	G



How to draw a CPM network diagram (2)

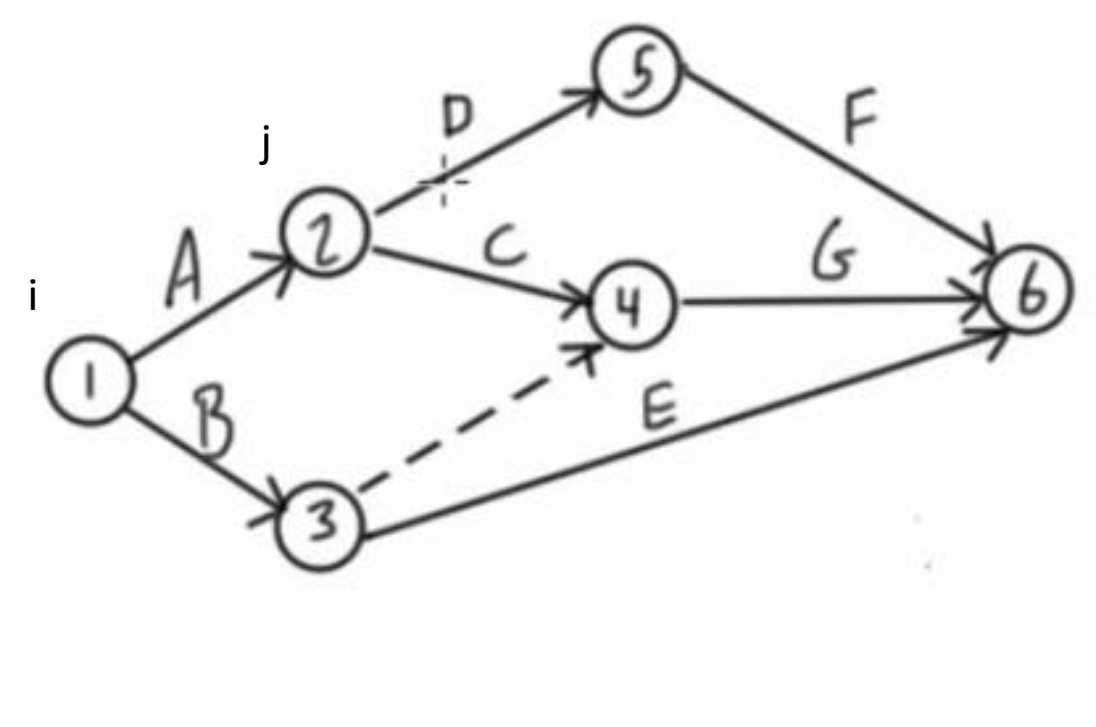
Activity	Predecessor
A	-
B	-
C	A
D	A
E	B
F	D
G	B,C





How to draw a CPM network diagram (2)

Activity	Predecessor
A	-
B	-
C	A
D	A
E	B
F	D
G	B,C



Critical Path

- The longest sequence of tasks in a project network that determines the shortest possible time to complete the project.

How it's used:

- **Finding the shortest project duration:**
  By identifying the critical path, project managers can determine the minimum time required to complete the project.
- **Prioritizing tasks:**
  Critical activities on the critical path require close supervision and monitoring to ensure they are completed on time.
- **Managing dependencies:**
  The critical path highlights the dependencies between tasks, helping project managers understand how different activities impact each other.
- **Allocating resources:**
  By understanding which tasks are critical, project managers can allocate resources effectively to ensure critical activities are completed on time.
- **Risk management:**
  Identifying critical path activities allows project managers to assess potential risks and develop mitigation strategies.
- **Creating realistic schedules:**
  The critical path helps in creating a realistic project schedule that reflects the time required for each critical task and the overall project duration.

Here's a breakdown of the key formulas and steps:

- 1. Forward Pass:

  - **Earliest Start (ES):**
  - ES of a task is the earliest it can start, which is the Early Finish (EF) of its predecessor.
  - **Earliest Finish (EF):**
  - EF of a task is the earliest it can finish, calculated as ES + Task Duration (EF = ES + t).

Cont

- 2. Backward Pass:

- **Latest Finish (LF):**
- LF of a task is the latest it can finish without delaying the project, which is the minimum LS of its successors.
- **Latest Start (LS):**
- LS of a task is the latest it can start without delaying the project, calculated as LF - Task Duration (LS = LF - t).

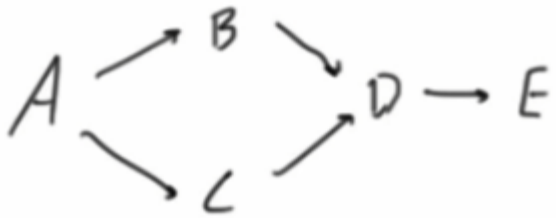
Cont

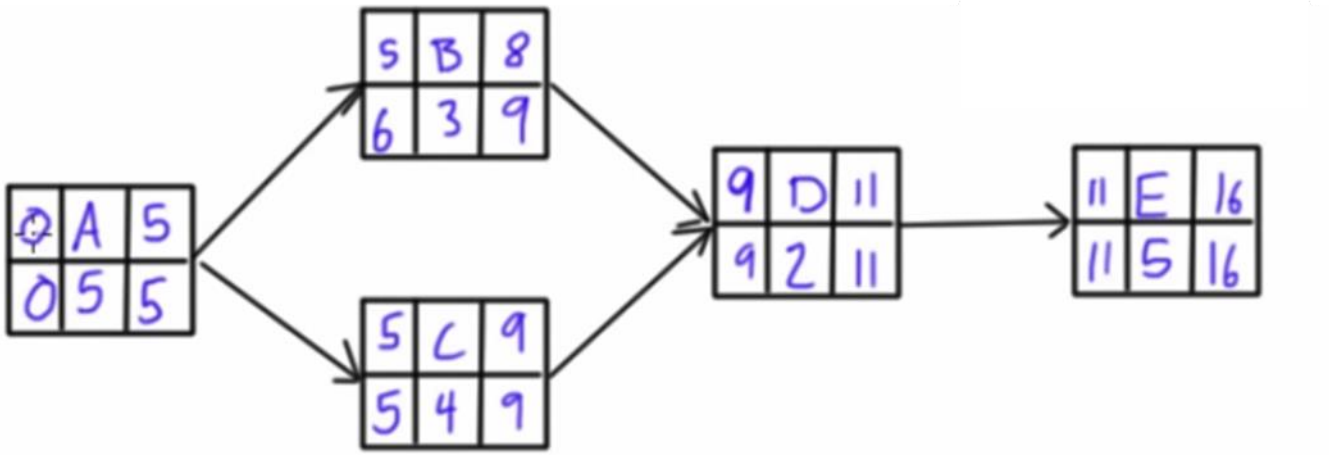
- 3. Float (Slack):

- **Total Float (TF):** TF of a task is the amount of time it can be delayed without delaying the project completion, calculated as LS - ES or LF - EF.
- **Tasks on the critical path have a Total Float of zero.**

CPM vs PDM network diagram example

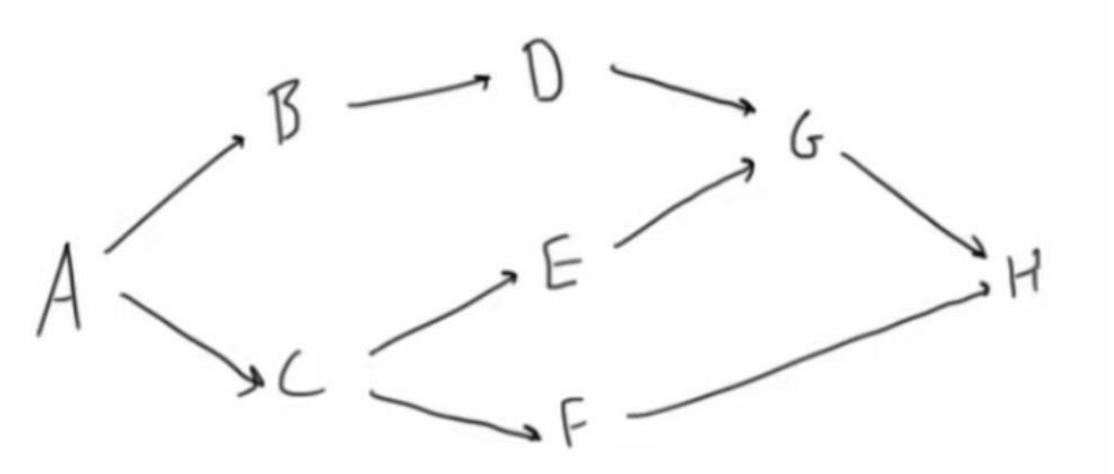
Activity	Predecessor	Duration
A	-	5
B	A	3
C	A	4
D	B,C	2
E	D	5



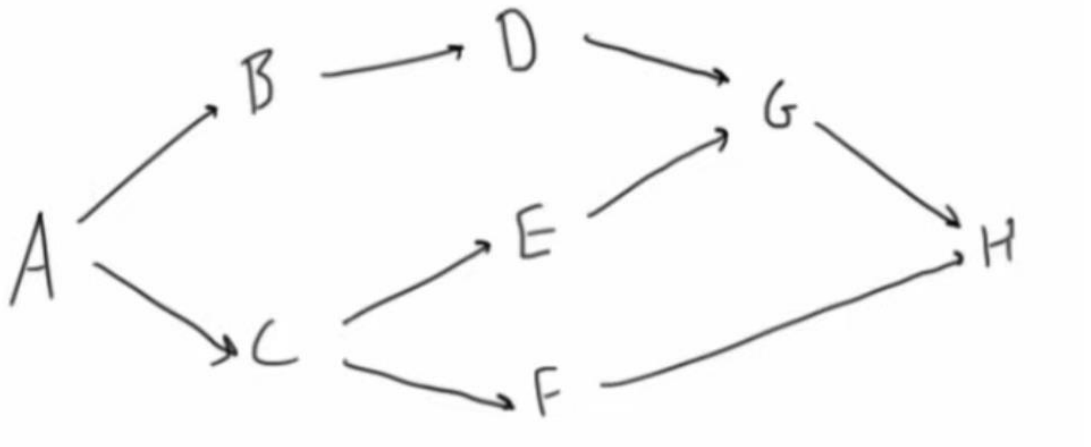


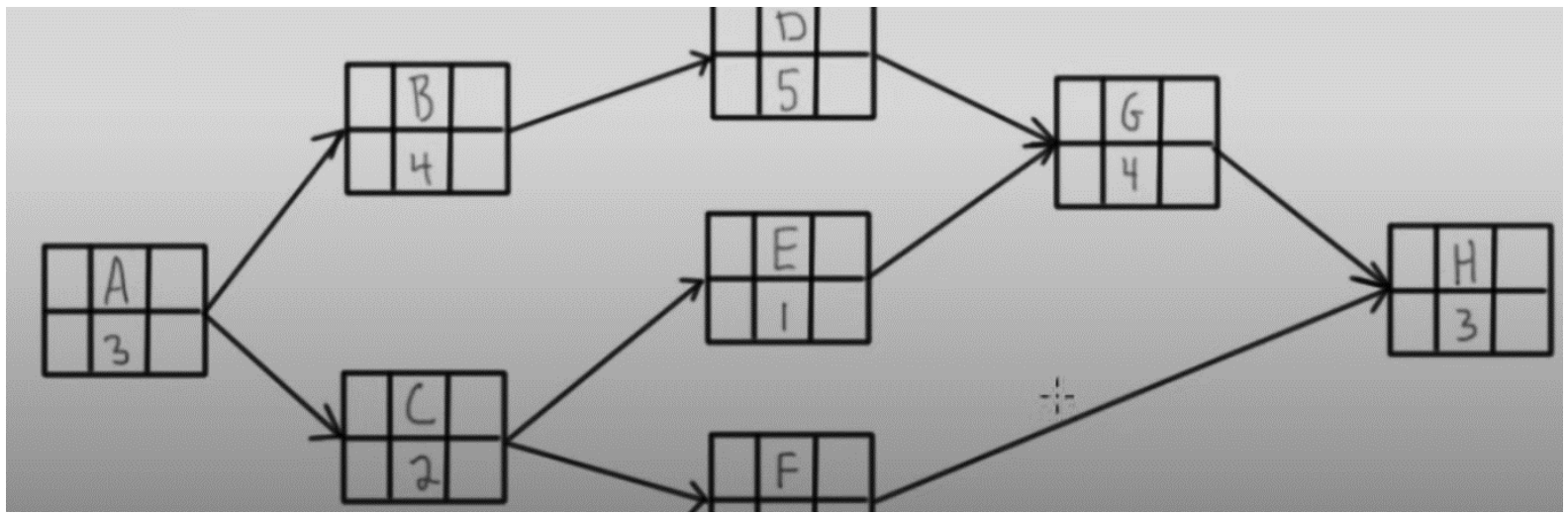
Example: Identify Critical Path

Activity	Predecessor	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

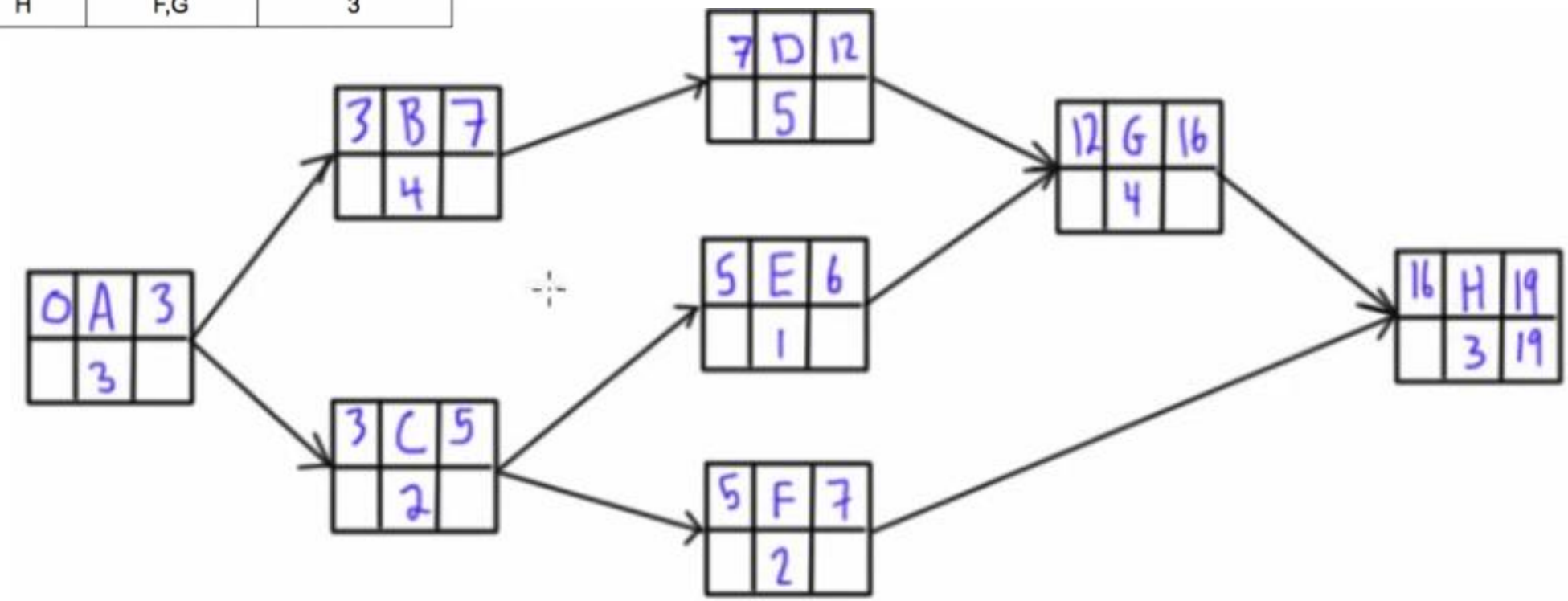


Activity	Predecessor	Duration (days)
A	-	3
B	A	4
C	A	2
D	B	5
E	C	1
F	C	2
G	D,E	4
H	F,G	3



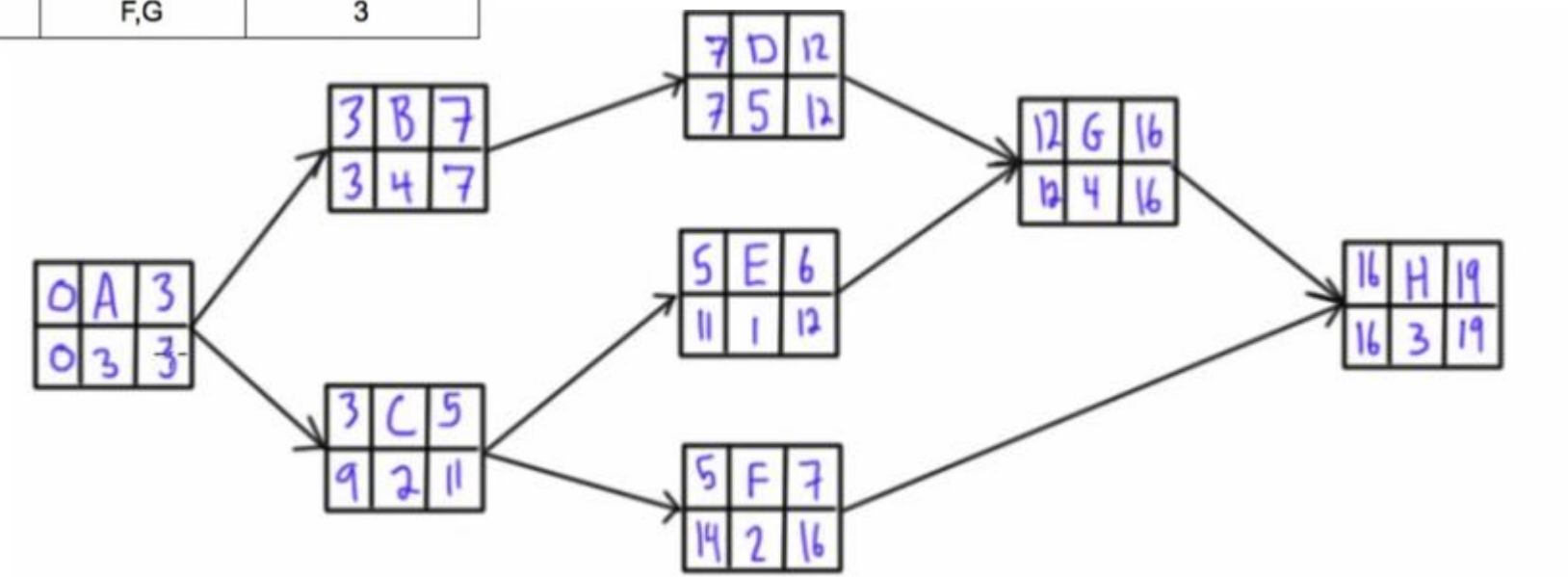


Activity	Predecessor	Duration (days)
A	-	3
B	A	4
C	A	2
D	B	5
E	C	1
F	C	2
G	D,E	4
H	F,G	3



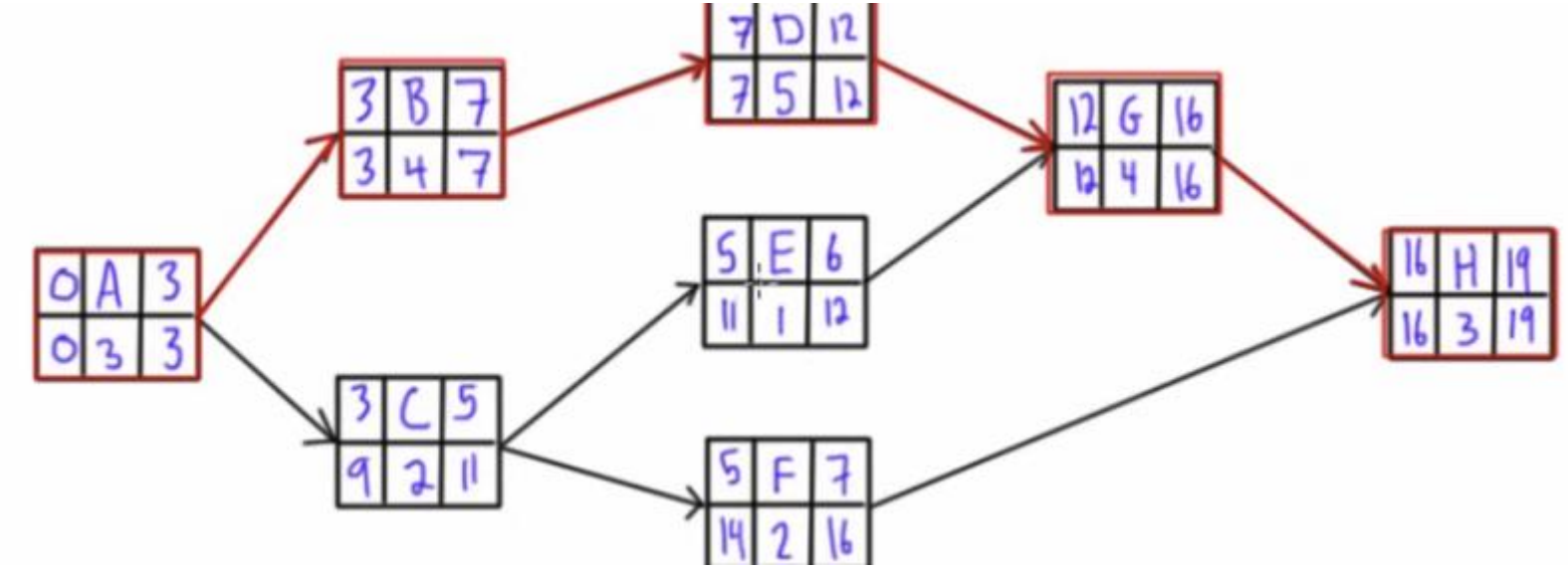
Path 1: A → B → D → G → H
Path 2: A → C → E → G → H
Path 3: A → C → F → H

Activity	Predecessor	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



Activity	Predecessor	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

- Path 2 (A → C → E → G → H) takes 13 days
- Path 1 (A → B → D → G → H) takes 19 days
- Path 3 (A → C → F → H) takes 10 days



what is float time in critical path

- In project management, particularly within the Critical Path Method (CPM), "float time" or "slack" refers to the amount of time a task can be delayed without impacting the overall project completion date.

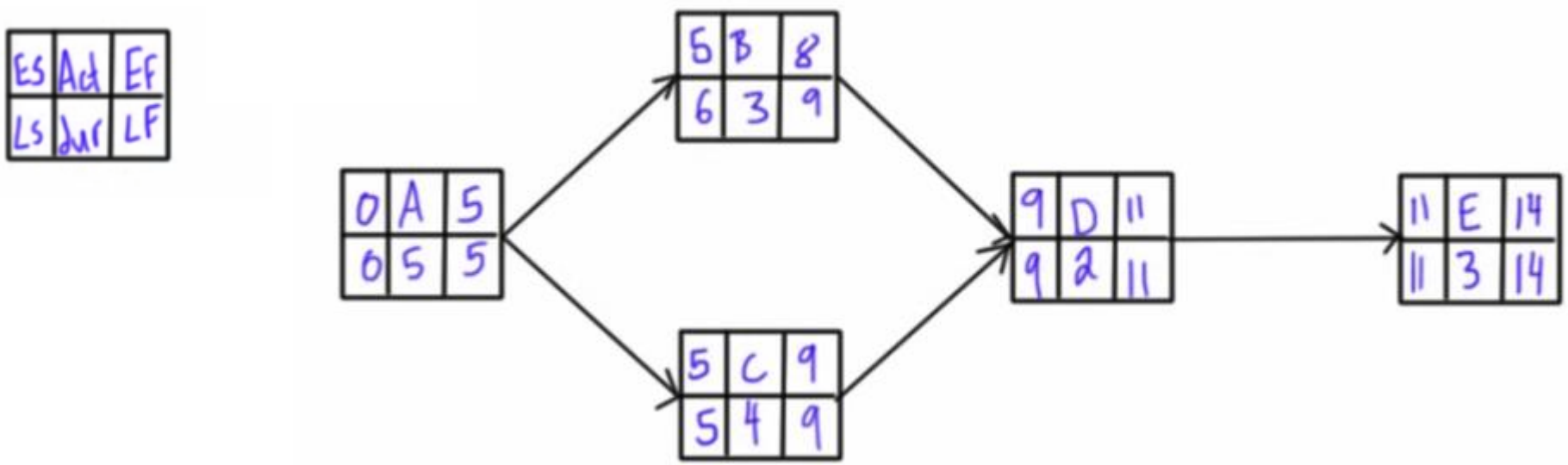
- It represents the flexibility or leeway a task has within the schedule. Tasks on the critical path (the longest sequence of activities) have zero float, meaning they must be completed on schedule to avoid delaying the project. Tasks off the critical path have positive float, indicating they can be delayed without affecting the final deadline.

Activity	Predecessor	Duration
A	-	5
B	A	3
C	A	4
D	B,C	2
E	D	3

Total Float = TF

TF = LF - EF "Finish Float"

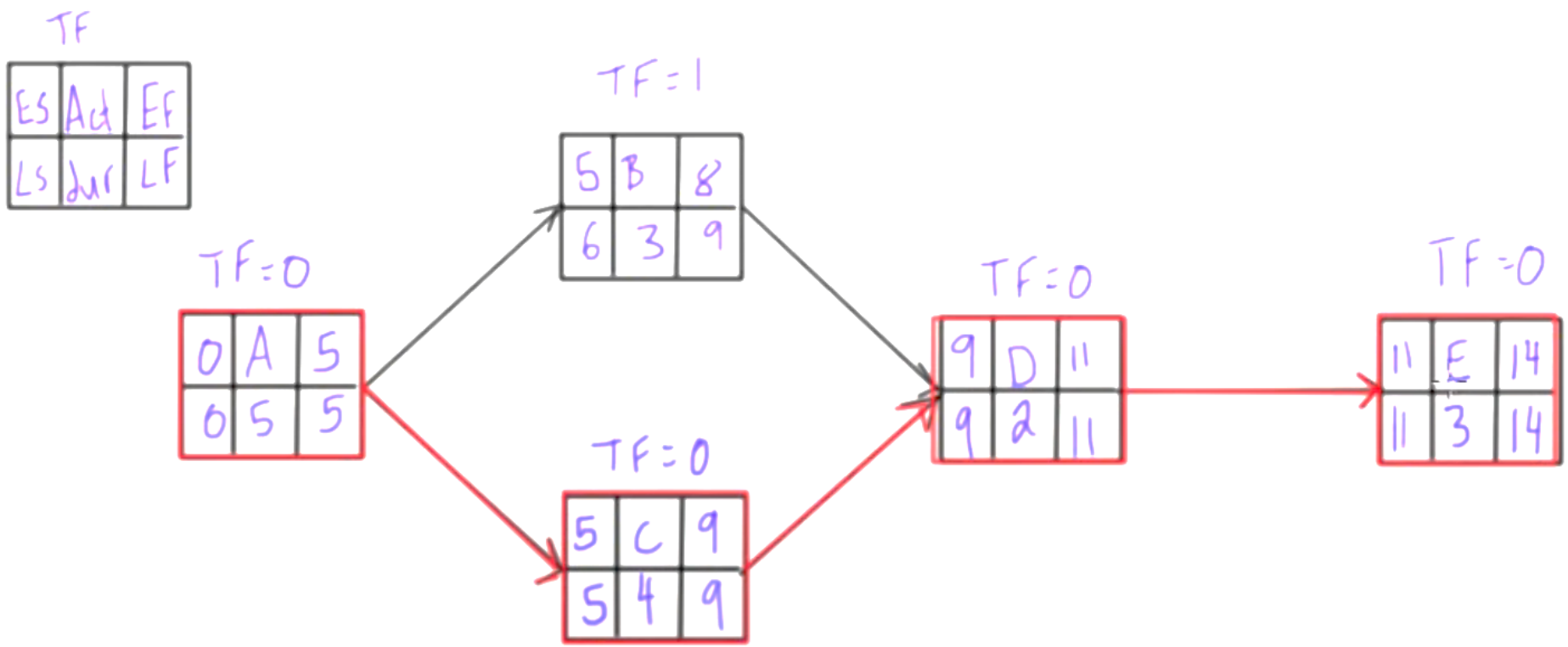
TF = LS - ES "Start Float"



Total Float = TF

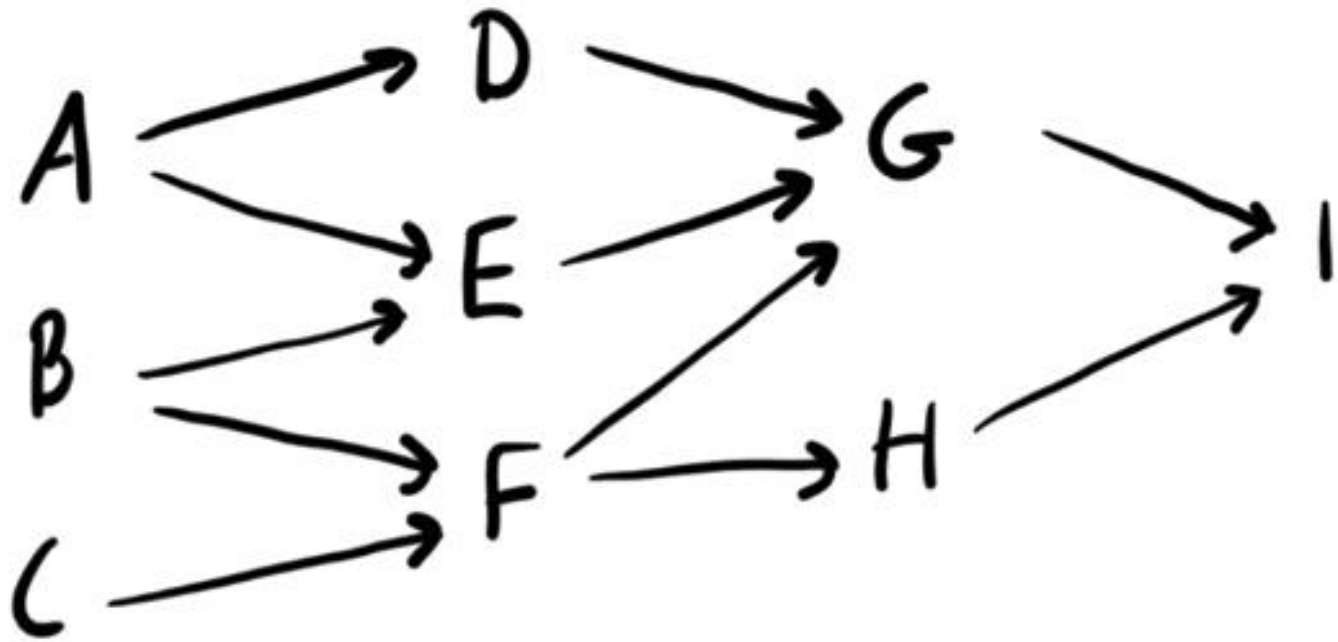
$TF = LF - EF$ "Finish Float"

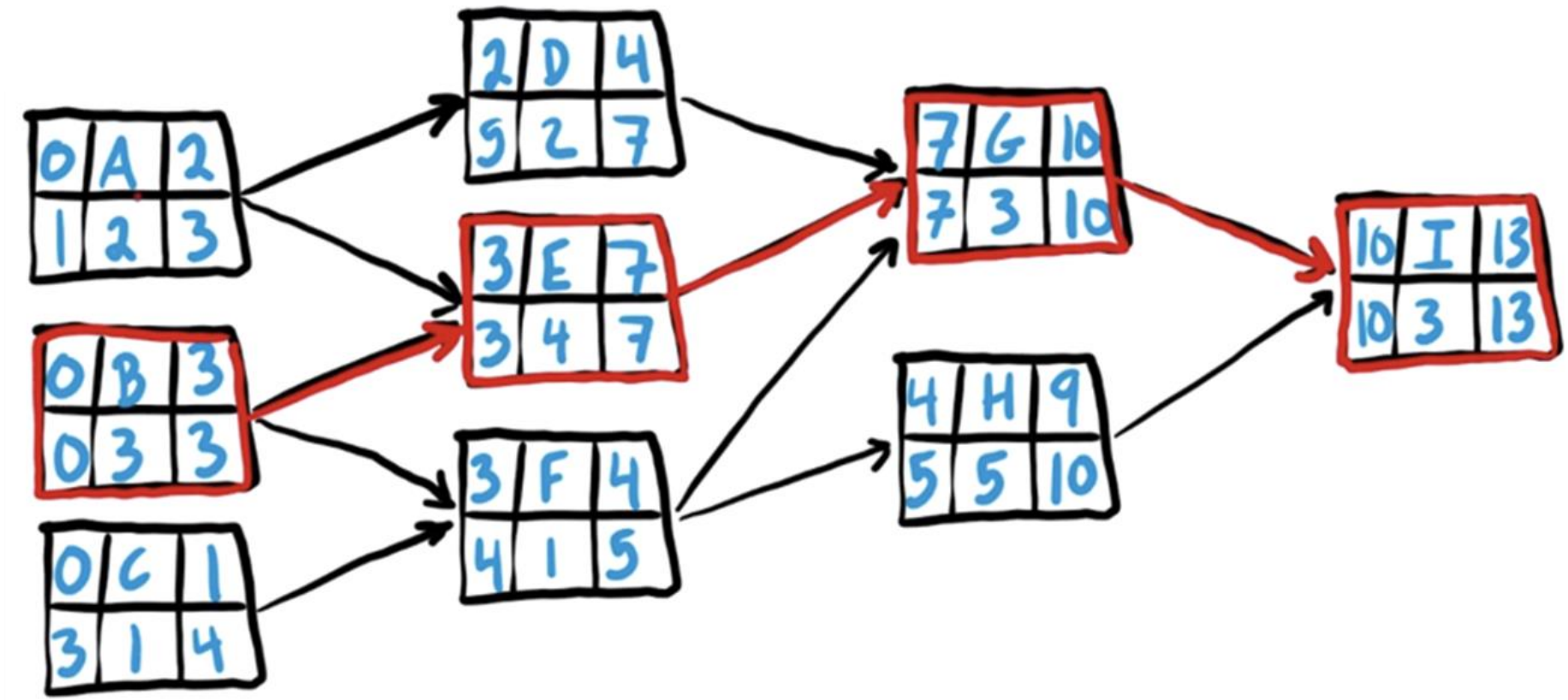
$TF = LS - ES$ "Start Float"



Your practice

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


A
B
C
D
E
F
G
H
I


0 A 2
1 2 3
0 B 3
0 3 3
0 C 1
3 1 4
2 D 4
9 2 7
3 E 7
3 4 7
3 F 4
4 1 5
7 G 10
7 3 10
4 H 9
5 5 10
16 I 13
10 3 13