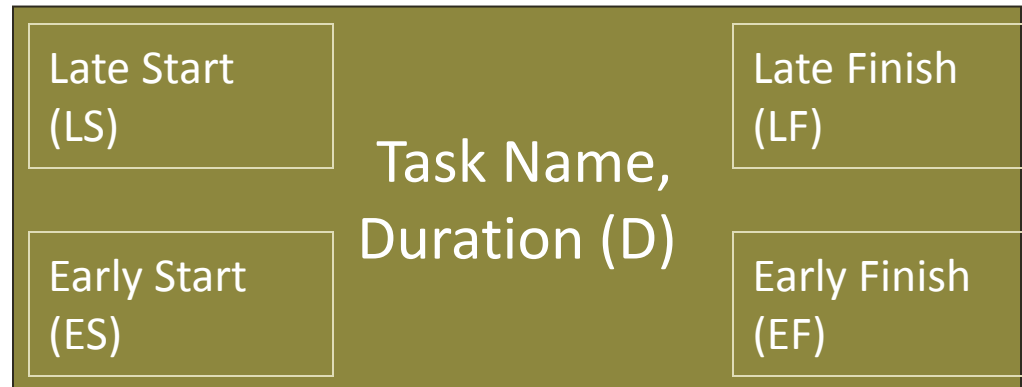


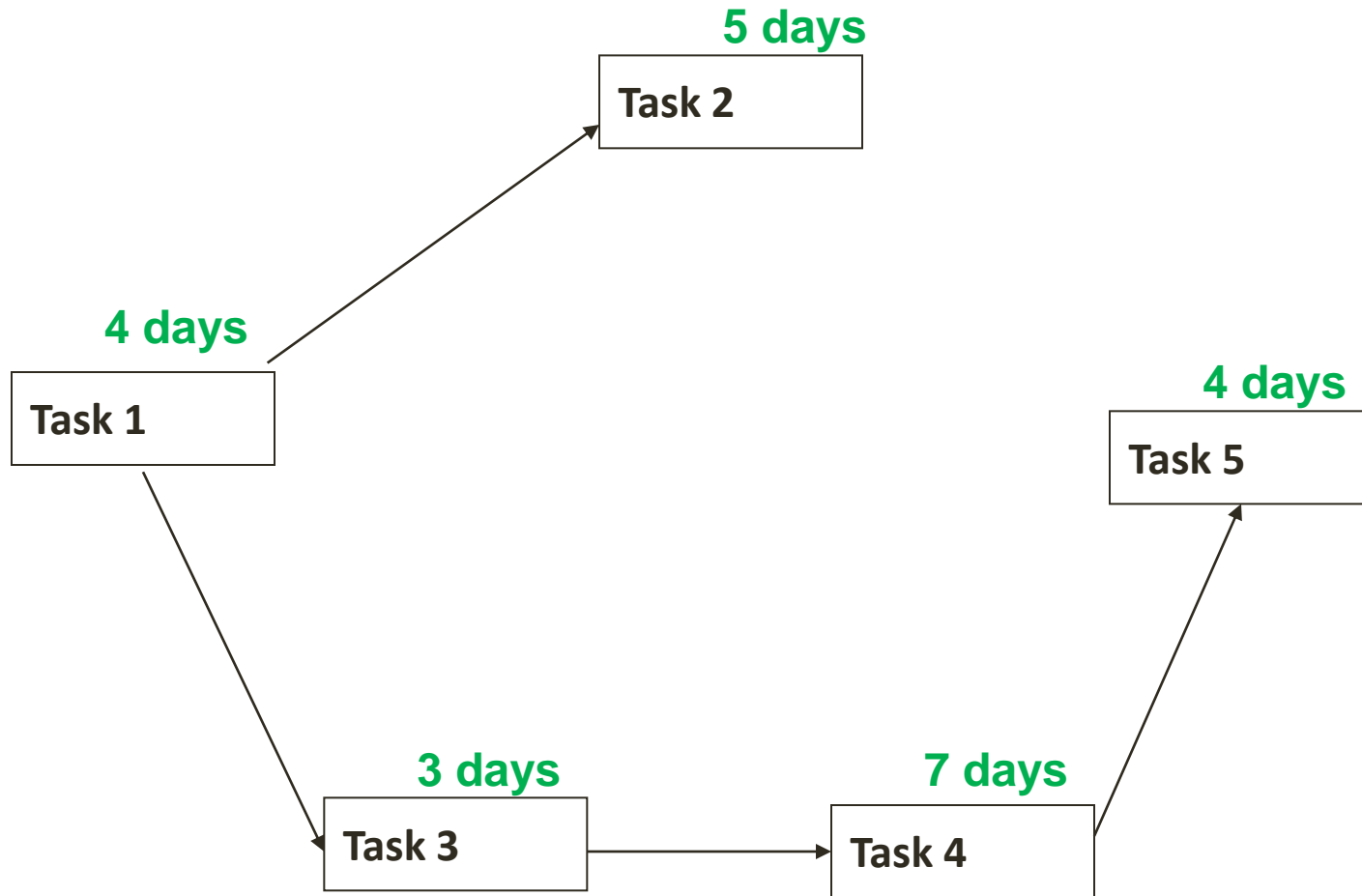
Calculating Critical Path & Float for a Network Diagram



- Find out the length of all the paths in the network diagram
- The longest path is the critical path
- $\text{Float} = \text{EF} - \text{LF}$
 $= \text{ES} - \text{LS}$

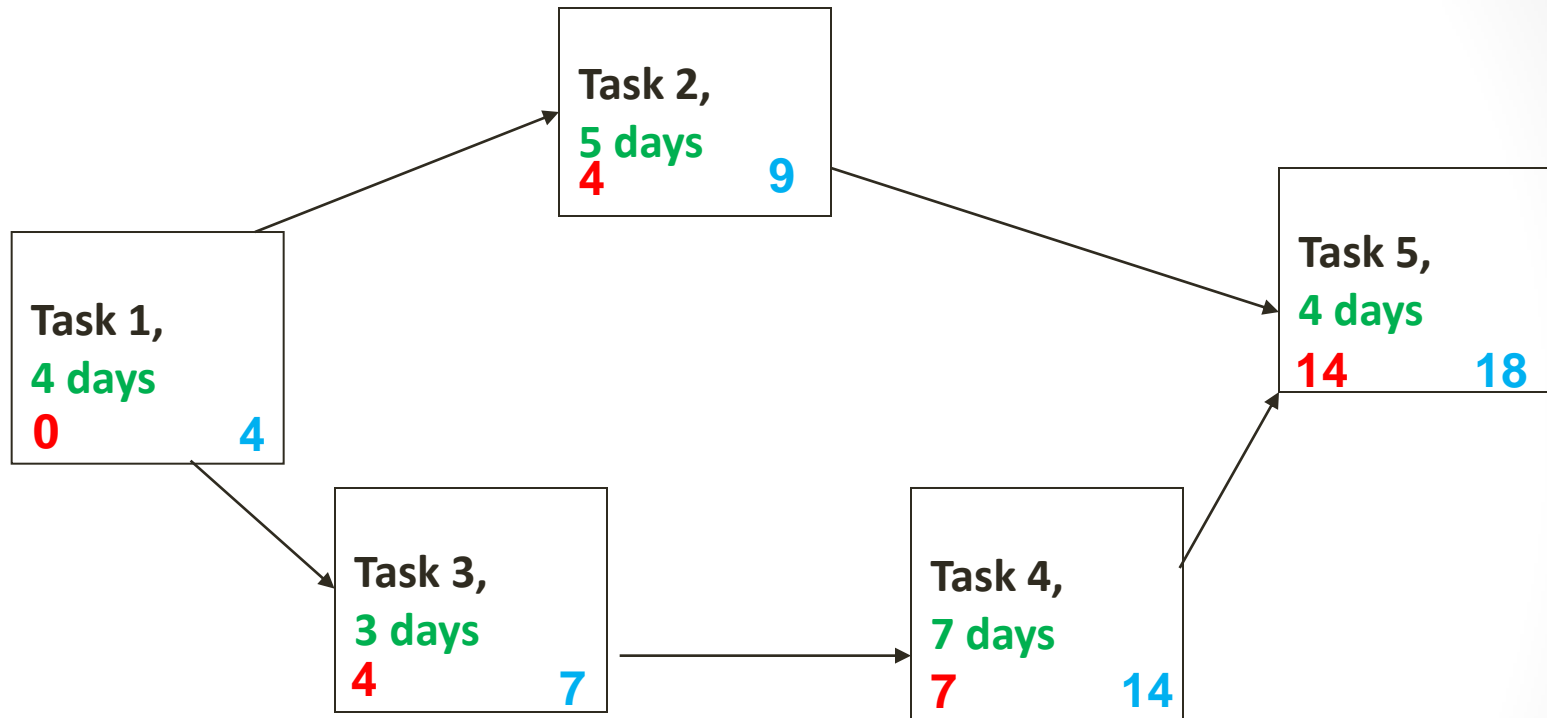
Calculating Critical Path for a Network Diagram

Identify tasks, durations & dependencies.



Step 1: Draw a Network Diagram

For forward pass, calculate the **Early Start (ES)** and **Early Finish (EF)**.



Task 5 is dependent on Task 2 and Task 4 being complete.

So, ES for Task 5 is 14 days (dependent on Task 4, which is the longer task).

Step 2: Determine Critical Path

To determine critical path, calculate length (durations) of all the paths:

➤ Length of all tasks:

- Task1 → Task2 → Task5 = $4 + 5 + 4 = 13$ days
- Task1 → Task3 → Task4 → Task5 = $4 + 3 + 7 + 4 = 18$ days

➤ The longest path is the critical path

➤ Critical path = longest path = 18 days

➤ Critical Path = Task1 → Task3 → Task4 → Task5

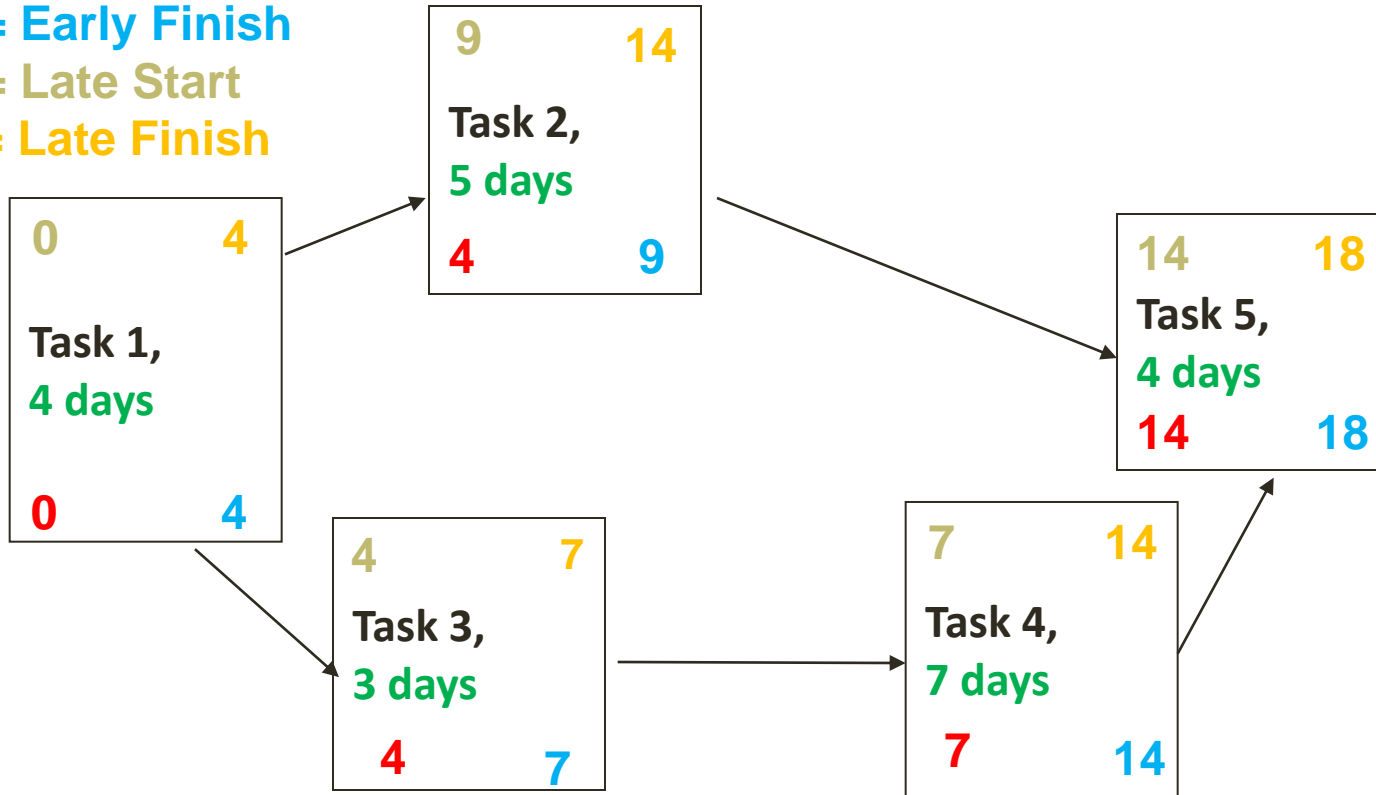
Step 3: Calculate Float in all tasks – Backward Pass

ES = Early Start

EF = Early Finish

LS = Late Start

LF = Late Finish



For all tasks on Critical Path (Task1, Task 3, Task 4, Task 5), $EF = LF$ & $ES = LS$

Thus, float (slack) for tasks on Critical Path = $LF - EF = 0$

Float for Task 2 = $LF - EF = 14 - 9 = 5$ days

Step 4: Calculate Project Float

- Customer requests an end date of 25 days.
- Project Float is the total amount of time that the project can be delayed without delaying the project completion date required by the customer.

$$25 \text{ days} - 18 \text{ days} = 7 \text{ days.}$$

- Project float can be negative when the date imposed by the customer is before the duration required in the project schedule.
- For negative project float, the project must be crashed or fast-tracked.
- Crashing is a technique used to decrease the duration of the project by assigning additional resources to tasks and decreasing the duration required for those tasks.
- Fast Tracking is a technique used to shorten project time by scheduling some activities concurrently that were originally scheduled sequentially.