Advanced Leadership Course
Monday, PM, Part 2
The Critical Path

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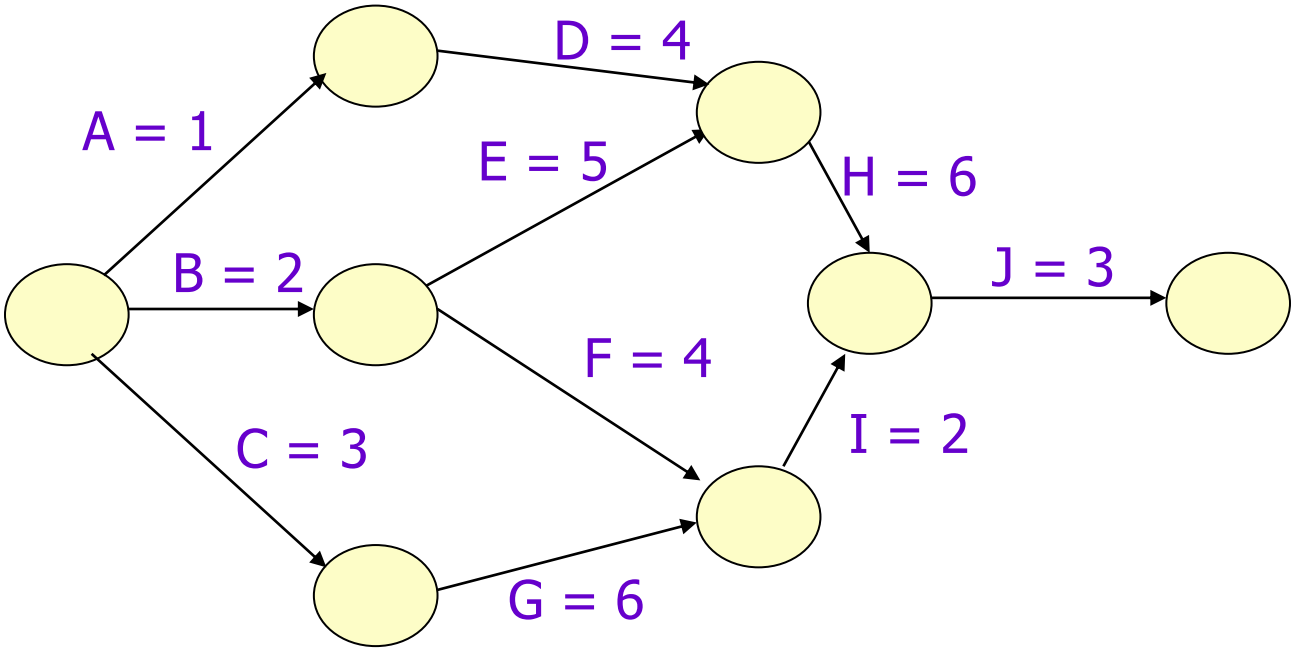
Dependency Diagrams

- Project Schedule Network Diagrams
  - Provide a quick and easy way to see snapshot of tasks and their dependencies.
  - Either Activity on Node (AON) or Activity on Arrow (AOA).
  - Let's focus on AOA diagrams here.
- Project Management software often allows to produce network diagrams from Gantt charts.

3

Example Network Diagram



- A,B,C,… are activities. Activity A needs 1 day, activity B needs 2 days, etc.

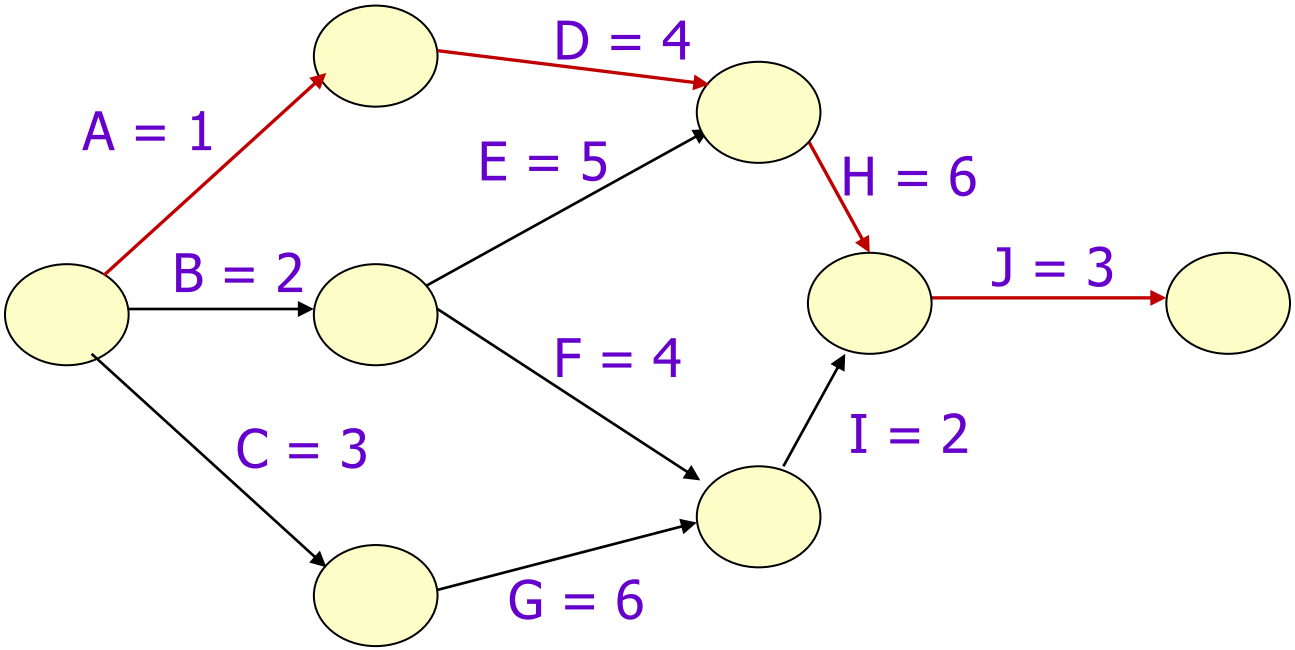
Critical Path – What is it

- A *critical path* for a project is the series of activities that determine the *earliest* time by which the project can be completed.
- It is the longest path through a network diagram and has the least amount of slack or float.
- Slack (or float) – amount of time an activity may be delayed without delaying a succeeding activity or project finish date.

Critical Path Analysis

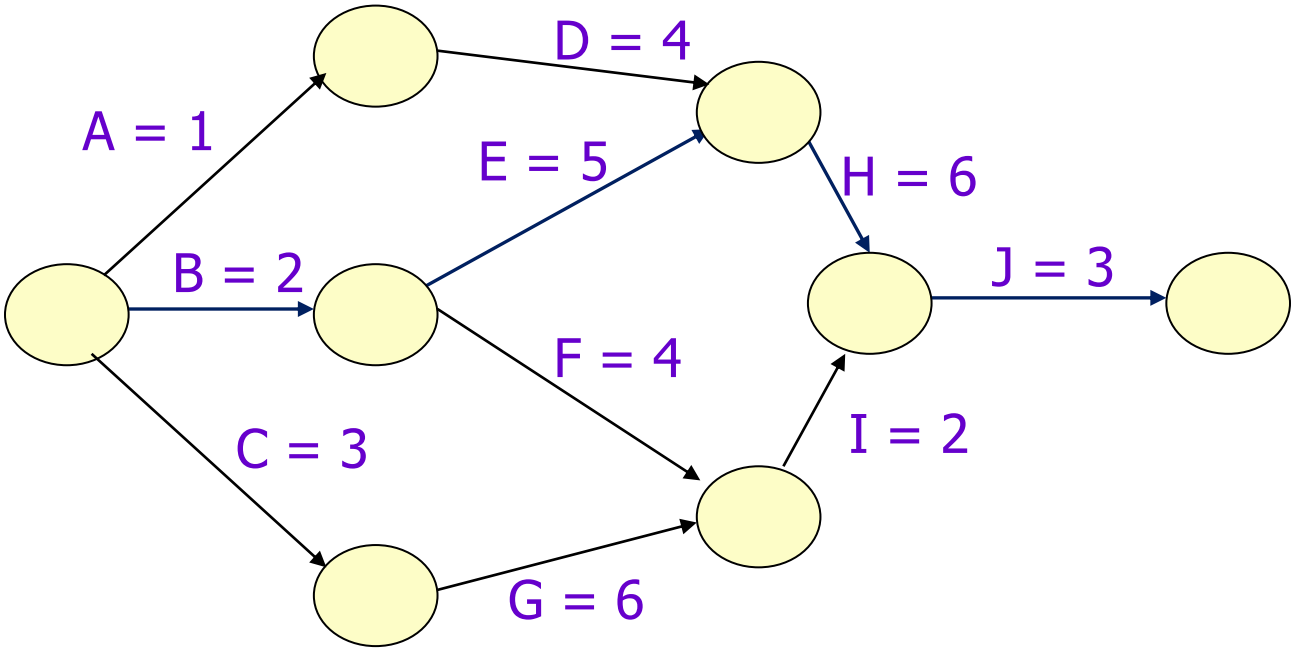
- Critical Path analysis is the process of identifying the critical path for a project.
- Use the critical path to keep an eye on how things are progressing, and can use this as a benchmark.
- Without knowing what the critical path is we cannot (necessarily) know how we are doing, or what the earliest finish date is.
- Allows to make so-called schedule trade-offs (more later)
- Calculating the critical path involves adding the durations of all activities on each path through the network. The longest path is the critical path

Example



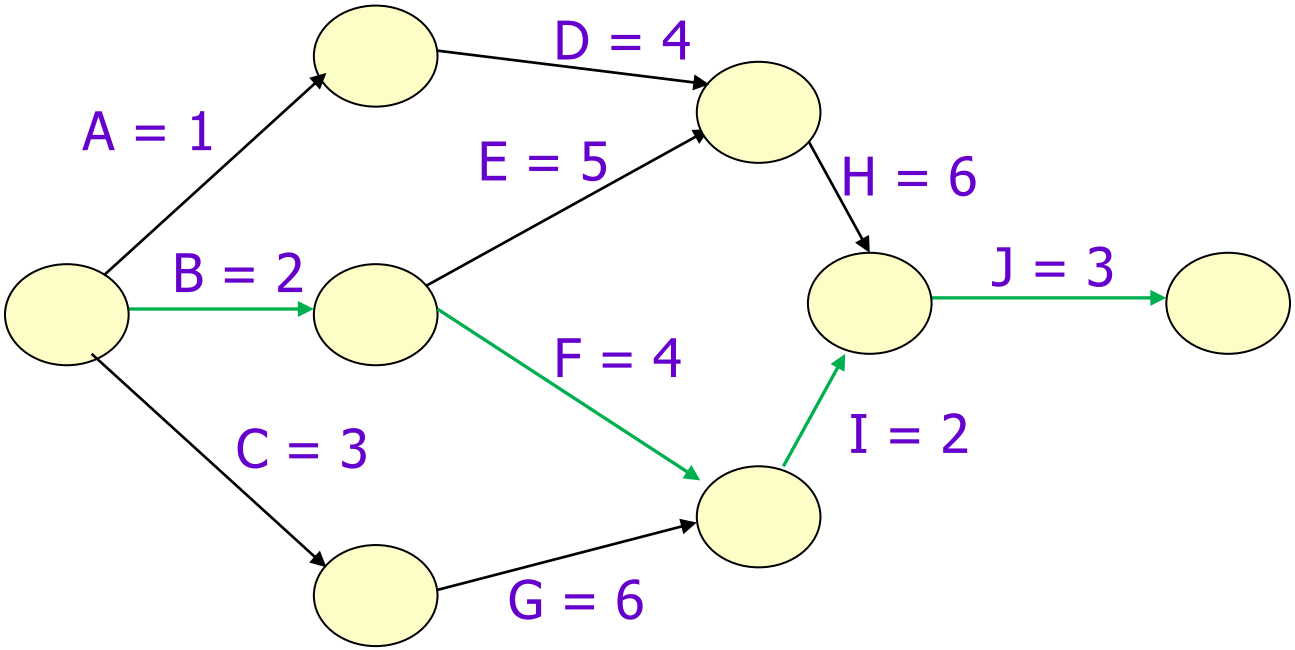
- Path 1: A-D-H-J: 1 + 4 + 6 + 3 = 14 days

Example



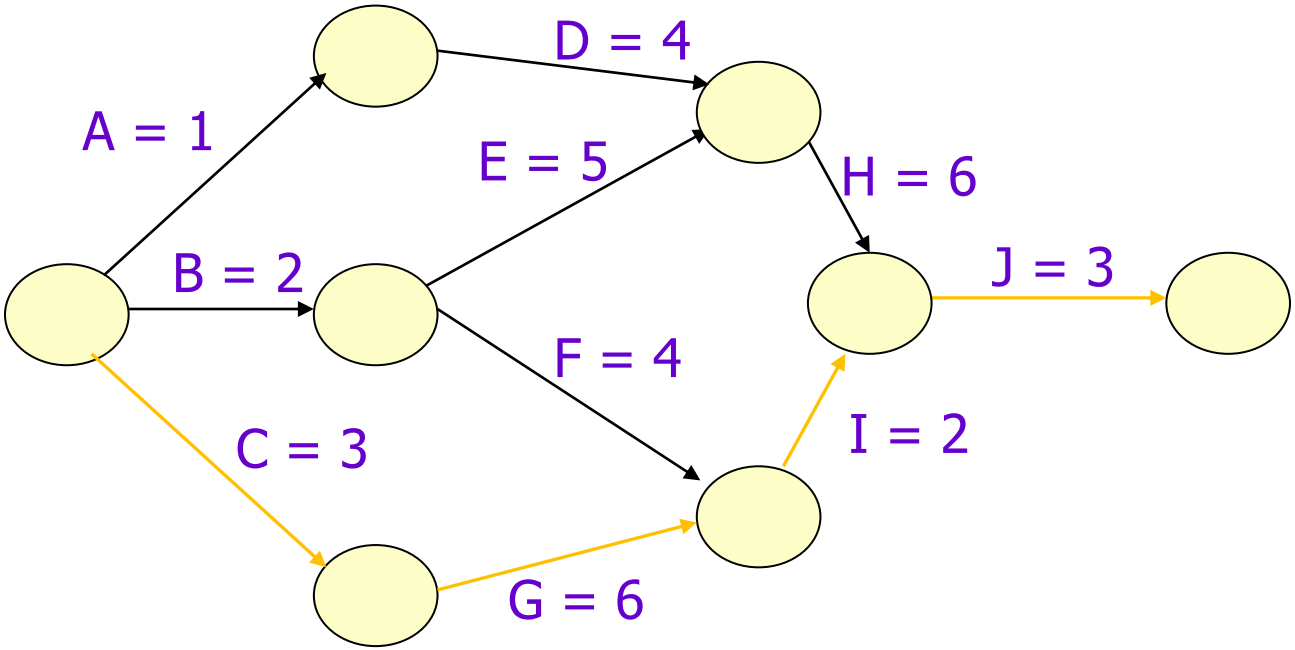
- Path 2: B-E-H-J: 2 + 5 + 6 + 3 = 16 days

Example



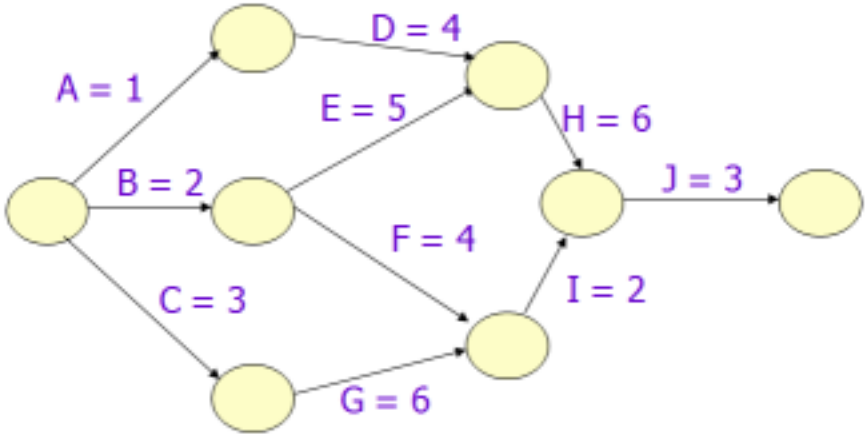
- Path 3: B-F-I-J: 2 + 4 + 2 + 3 = 11 days

Example



- Path 4: C-G-I-J: 3 + 6 + 2 + 3 = 14 days

Example Summary



- There are four paths:
- A - D – H - J = 1 + 4 + 6 + 3 = 14 days
- B – E – H – J = 2 + 5 + 6 + 3 = 16 days
- B – F – I – J = 2 + 4 + 2 + 3 = 11 days
- C – G – I – J = 3 + 6 + 2 + 3 = 14 days
- The path B-E-H-J is the longest, and is therefore the *critical path* !

Properties of the Critical Path Summary

- The critical path shows the shortest time in which a project can be completed.
- If one or more activities on the critical path takes longer than predicted, the whole project schedule will slip.
- We can only reduce the time a project will take if we reduce the duration of tasks on the critical path.
- There can be more than one critical path.