INF 151: Cost Management

Week 5: Tuesday

Today's Agenda

Announcements:

- Work on Assignment 5 (Due 10/27)
- Midterm: **Thursday 11/03**

Today:

- Project Time Management
- QUIZZES!
- Project Cost Management

Project Time Management

Project Time Management

- ➔ Client asks for a reduced timeline…
- ➔ Task resource fails, is unavailable, or access is delayed…
- ➔ Team member quits…
- ➔ Task underestimated, taking longer than planned…

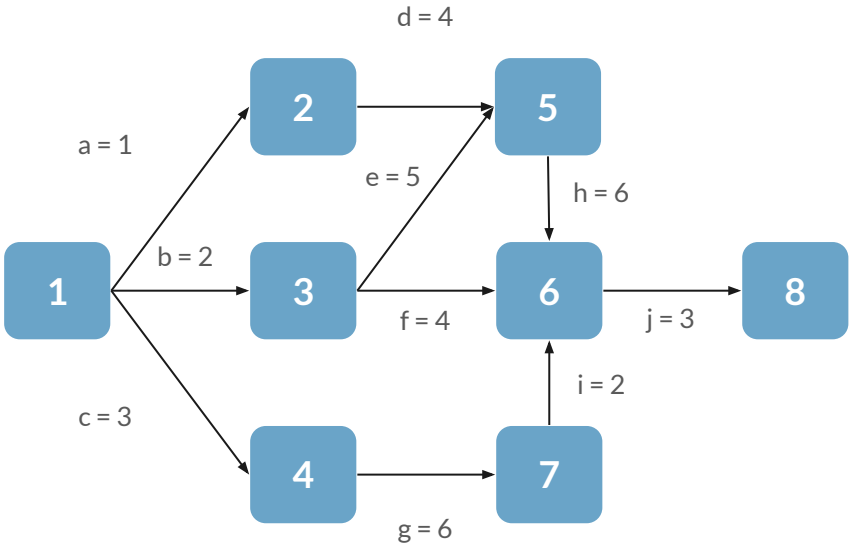
Critical Path

Critical path equals the **longest duration** of activities from start to finish.

Critical path represents the **shortest** time to project completion.

What is the critical path for our sample diagram?

Network Diagram for Sample Project Activities

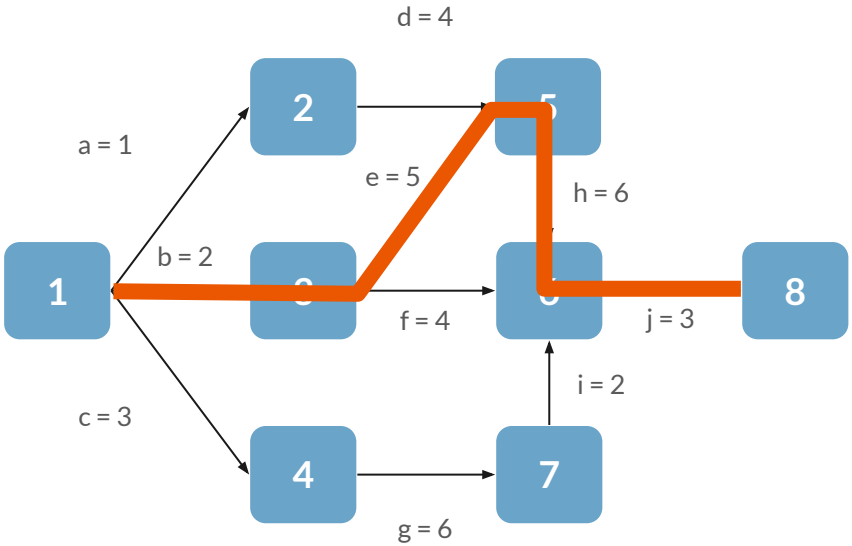


Critical Path

Critical Path = b,e,h,j

Why?

Network Diagram for Sample Project Activities



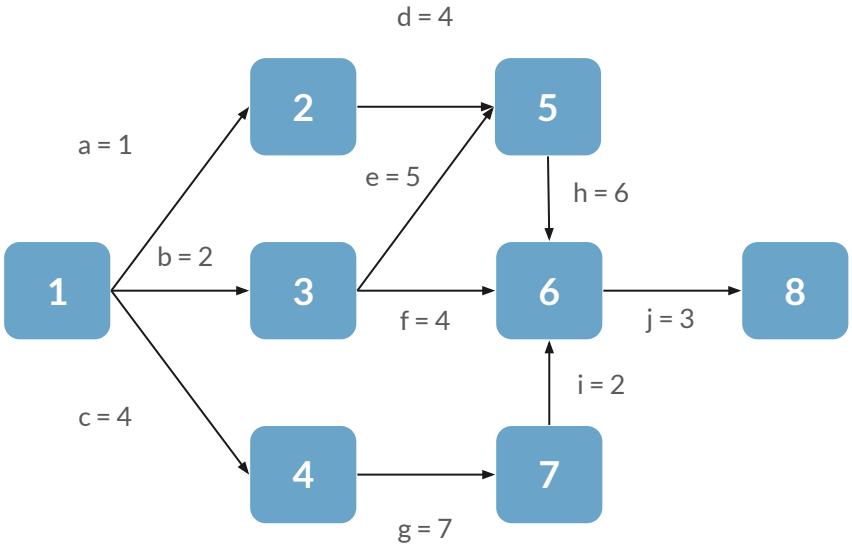
Critical Path

Critical path equals the **longest duration** of activities from start to finish.

Critical path represents the **shortest** time to project completion.

How about this one?

Network Diagram for Sample Project Activities



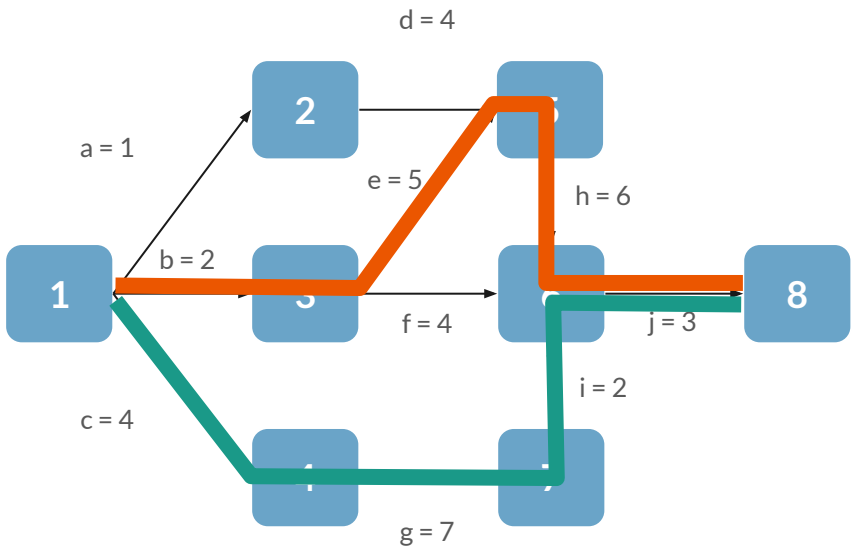
Critical Path

Critical Path = b,e,h,j AND c, g,i,j

Both paths take 16 days to complete.

It’s possible to have multiple critical paths

Network Diagram for Sample Project Activities



Critical Path

Why is the critical path important?

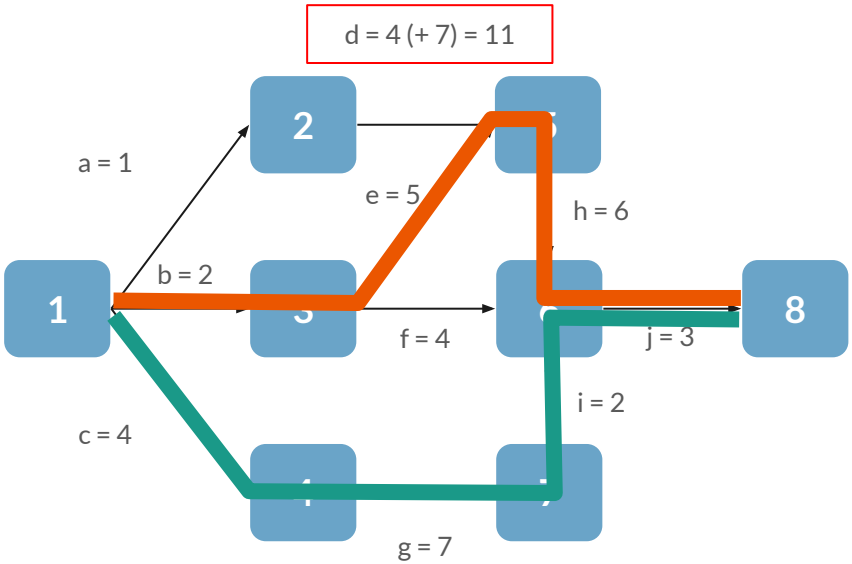
- ➔ Possible to assess and maintain project scope
- ➔ Gives project manager a focal point
- ➔ Monitoring critical path highlights when and where to apply control
- ➔ Assess and decide on trade-offs when critical path changes
- ➔ Identify where and when to shorten a project schedule

Critical Path

Activity d runs into issues, is delayed for **a week**.

What happens?

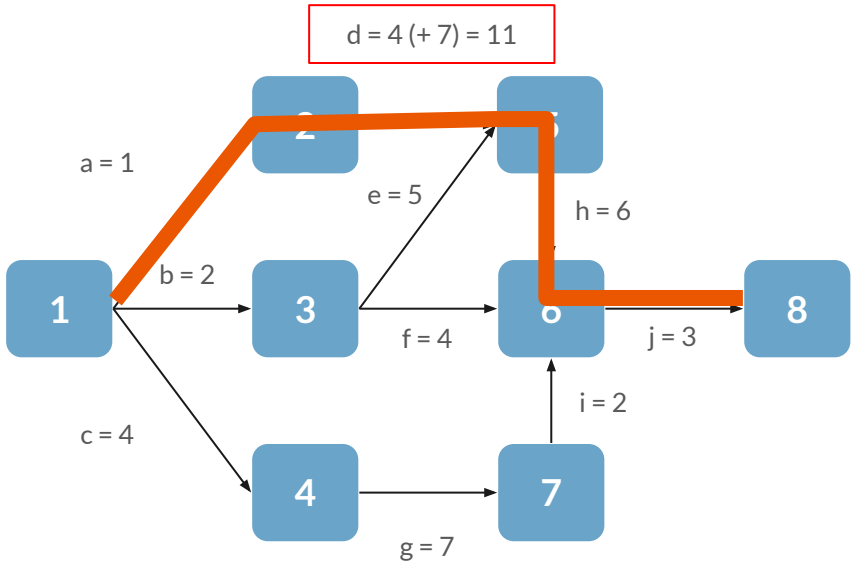
Network Diagram for Sample Project Activities



Critical Path

Critical path = 2 extra days

Network Diagram for Sample Project Activities



Quiz

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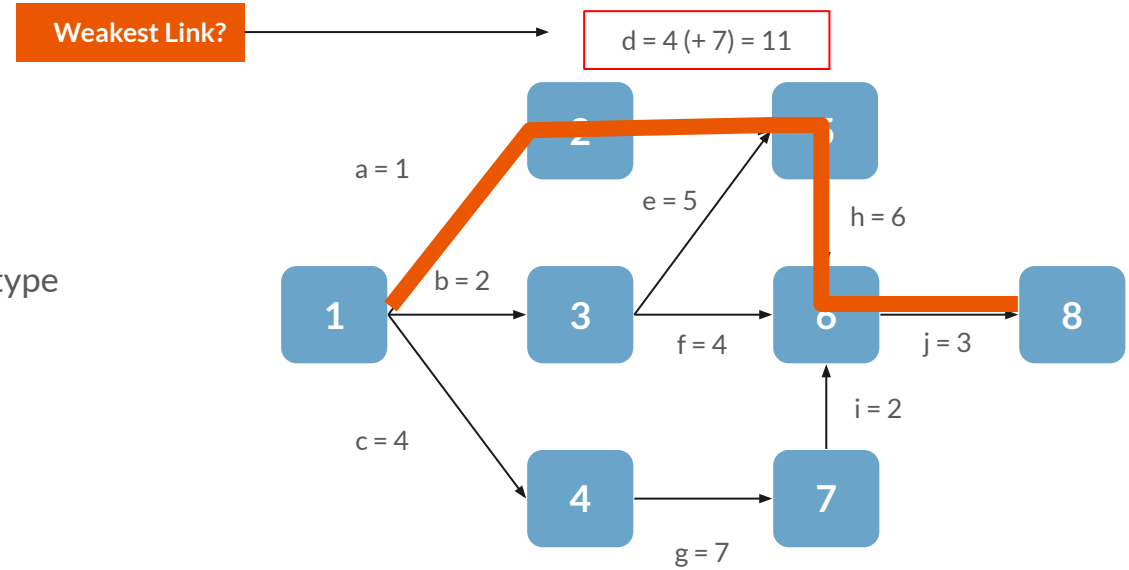
“Enter your name” = ***@uci.edu**

Critical Path

Critical path = 2 extra days

So how do project managers avoid this type of situation?

Network Diagram for Sample Project Activities



Any complex system at any point in time often has only one aspect or constraint that limits the ability to achieve more of the system's goal.

Theory of Constraints

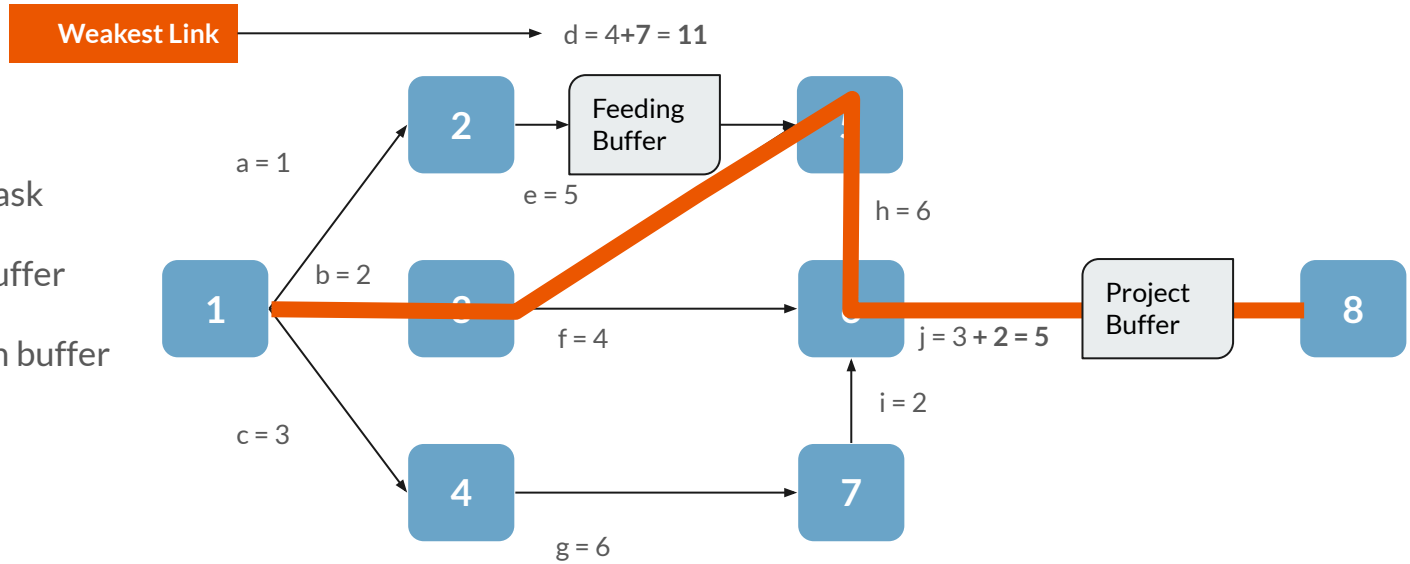
Critical Path

Identify weak link task

Protect task with buffer

Protect project with buffer

Network Diagram for Sample Project
Activities with BUFFER added



Critical Path

"work expands so as to fill the time available for its completion."

- Parkinson’s Law

Adding buffers - risks?

Critical Path

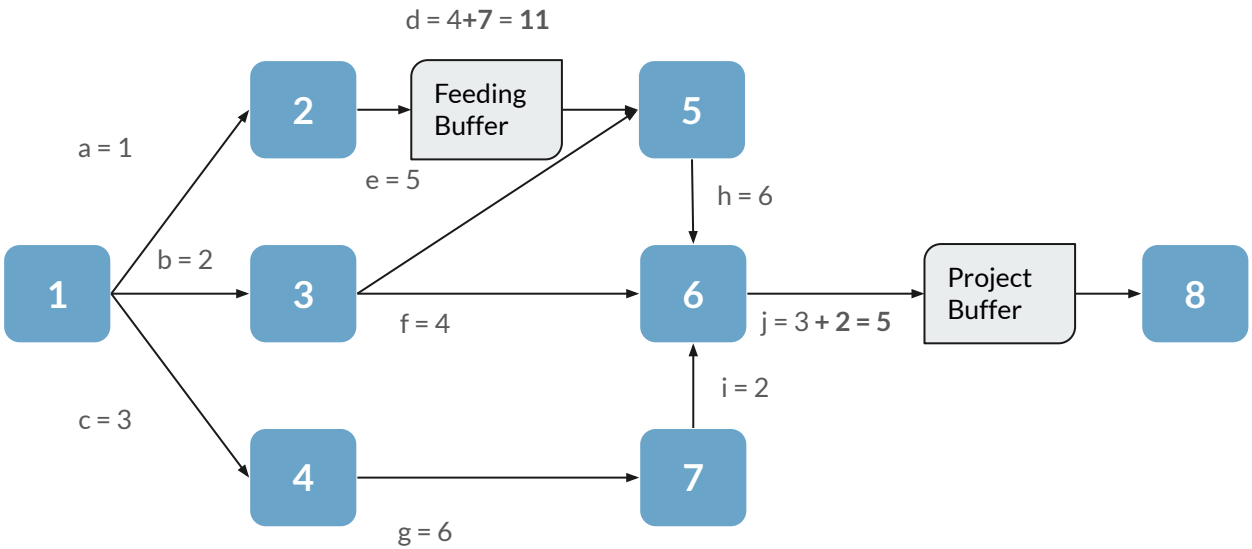
Theory of Constraints and Critical Chain Scheduling

“Do not complete work where there is none, and do not obscure the question of how much capacity is available.” - PMI

- ➔ Eliminate activity due dates and milestones
- ➔ Rely on buffers to drive schedule
- ➔ If buffer time is consumed, raise warning…address
- ➔ If activity completes early, expand buffer

Critical Path

Estimating task duration



Program Evaluation and Review Technique (PERT)

Application of a formula for estimating project duration using **probabilistic time estimates** to the Critical Path Method

$$\text{PERT avg} = \frac{ot + 4 * lt + pt}{6}$$

ot = Optimistic time

lt = Likely time

pt = Pessimistic time

Quiz

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Project Cost Management

Cost Management Processes

Planning	Estimating	Budget	Control
Policies, procedures, and documentation for managing the cost of a project	Approximating the costs of all resources required to complete a project	Allocation of estimated costs to individual work items	Controlling performance and changes to the project budget

Cost management reveals insights to the expenses and revenue of a project

Revenue - Expenses = **Profit**

Quiz

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Cost Management

Types of estimates

Usage varies by project

Rough Order of Magnitude

- ➔ Very early, before project completion
- ➔ Aids selection
- ➔ Estimates range -50% to +100%

Budgetary

- ➔ Early, before project completion
- ➔ Assign actual amounts to budget
- ➔ Range -10% to +25%

Definitive

- ➔ During project
- ➔ Includes purchases, estimates of actual costs
- ➔ Range -5% to + 10%

Cost Management

Estimating Costs

Analogous or top-down estimates apply what is already known

Bottom-up estimates calculate upward from the smallest work items

Probabilistic or three-point use a PERT-like weighted average formula

Parametric estimates rely on analogous data paired with quantifiable parameters like expertise, environment and tools. E.g., cost per line of code.

Cost Management

Importance of accurate estimates

Whoever holds the purse strings will always remember the initial estimate!

1. It is natural to underestimate
2. Accurate estimation comes with experience
3. Track and manage project data to build better estimates
4. Know the abilities of your project team

Cost Management

Earned Value Management

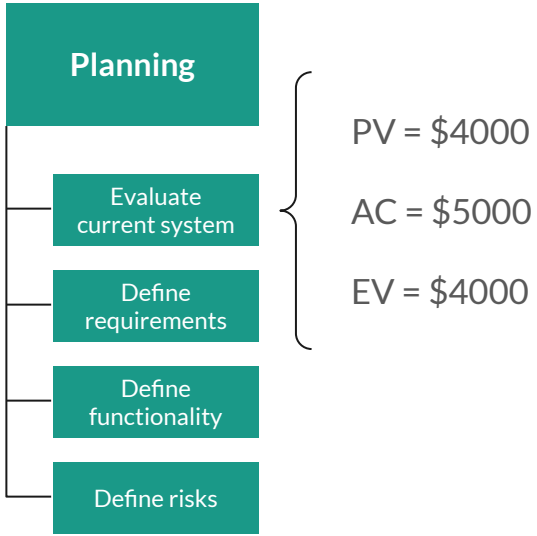
Reviewed currently *and* cumulatively

PV = Planned Value

AC = Actual Cost

EV = Earned Value

Combine scope, time, and cost data to measure project performance



Cost Management

Activity: *Evaluate Current System*

PV = $4000

AC = $5000

EV = $4000

What can we learn?

Cost variance (CV) = EV-AC

4000-5000 = -$1000

Evaluating the current system cost more than planned. We are over budget.

Cost Management

Activity: *Evaluate Current System*

PV = $4000

AC = $5000

EV = $4000

What can we learn?

Schedule variance (SV) = EV-PV

4000-4000 = $0

Indication that activity took longer or shorter than planned. We are on track, met estimate.

Cost Management

Activity: *Evaluate Current System*

PV = $4000

AC = $5000

EV = $4000

What can we learn?

Cost performance index (CPI) = EV/AC

4000/5000 = 0.8 or 80%

When less than 100% the project is over budget, greater than 100% the project is under budget. We are over budget by 20 percent!

Cost Management

Activity: *Evaluate Current System*

PV = $4000

AC = $5000

EV = $4000

What can we learn?

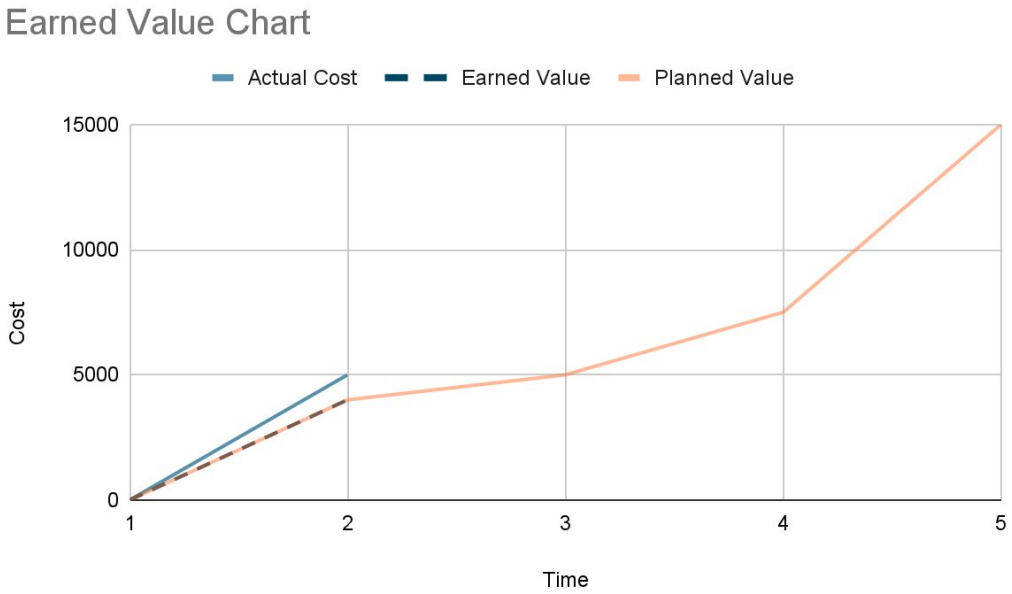
Schedule performance index (CPI) = EV/PV

4000/4000 = 1 or 100%

When less than 100% the project is late, greater than 100% the project is early. We are on schedule!

Cost Management

What can we learn?

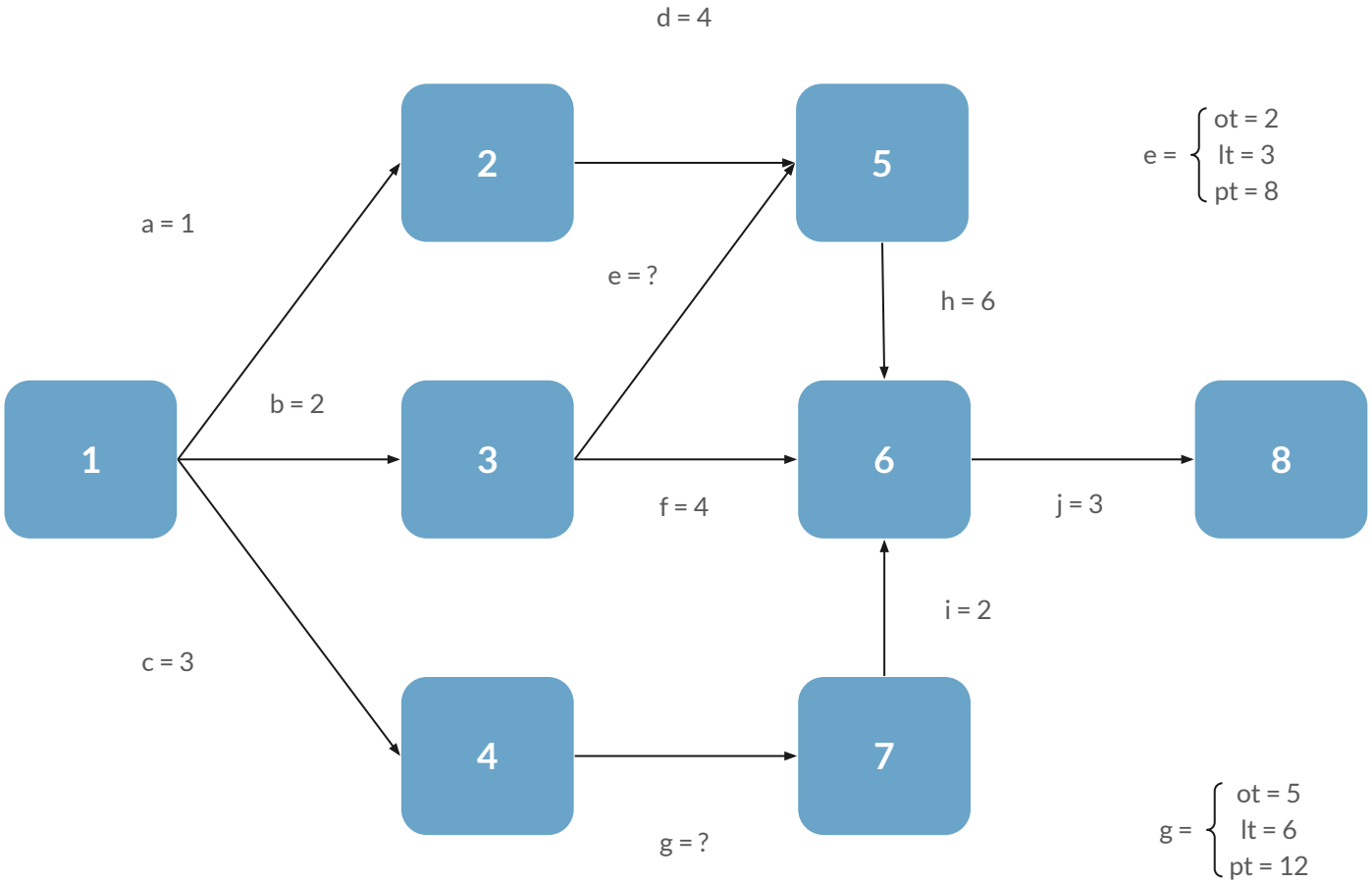


Next Class

Thursday 10/27

Quality Management

- Read chapter 8!


d = 4
2
5
e = ot = 2 lt = 3 pt = 8
a = 1
e = ?
h = 6
1
b = 2
3
6
8
f = 4
j = 3
i = 2
c = 3
4
7
g = ot = 5 lt = 6 pt = 12
g = ?