commerce undergraduate society

COMM 204

FINAL EXAM REVIEW SESSION

by Brad Gregory

REVIEWING QUEUING

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C_a

$E(A)$

C_s

$E(S)$

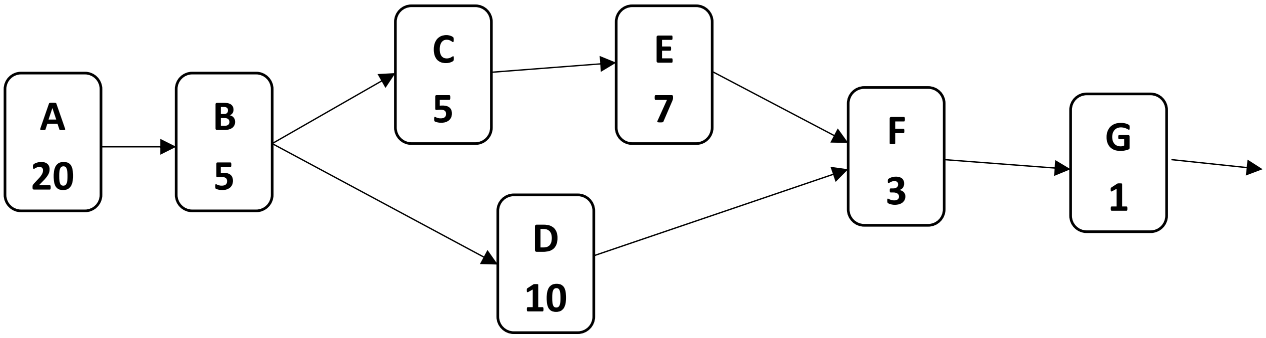
/ /

PRACTICE

Matt just finished finals and would like a beverage to celebrate but doesn't want to wait too long. Since he is a frequent customer at this beverage establishment, he has some information about the queue. On average, he estimates that 3 customers arrive every minute. He assumes that these arrivals are exponential. Each server can consistently serve exactly 2 customers per minute, with negligible variance. On this particular day, there are 2 servers at the counter. How many seconds will Matt have to wait in line?

Matt would like to make friends during the time between him lining up and him leaving the system with his beverage. How many potential friends will there be in the **entire process** on average at a single moment in time?

PROJECT MANAGEMENT



What is the length of the Critical Path?

How much will it cost us to complete the project in 30 days?

Activity	Crash Time (days)	Crash Cost ($)	Crash Cost/Time ($/day)
A	10	$300	
B	4	$300	
C	Can't be Crashed		
D	4	$60	
E	3	$100	
F	Can't be Crashed		
G			

Crash Time:

Crash Cost:

What do we crash first?

We crash Activity by days for a total cost of

Our project length is now days.

What next?

We crash Activity by days for a total cost of

Our project length is now days!

Our total cost is

PRACTICE

Fredrik has left all of his studying for his COMM 204 exam to 24 hours before it (unlike all of you). He also has other tasks to do to keep his mind healthy and fresh for the exam. How much will he have to pay to fit it all in 24 hours?

Code	Activity	Time (hours)	Immediate Predecessors	Crash Time (hours)	Crash Cost ($)	
A	Review CMP	1	None	Not Crashable		
B	Breakfast	2	A	1	$10	
C	Review Slides	13	B	8	$500	
D	Study Date	4	B	Not Crashable		
E	Lunch	2	D	1	$15	
F	Laundry	4	E	0	$160	
G	Dinner	2	C, F	1	$20	
H	Sleep	8	G	Not Crashable		
I	Practice	3	H	2	$150	
J	Cheat Sheet	1	I	Not Crashable		

Draw the Diagram

FORECASTING

Methods:

Simple Moving Average:

- *n* period moving average

Weighted Moving Average:

- Make sure w's all add to 1

Exponential Smoothing:

- α = % of the prior error term to include

How do I know if my forecast is good or not?

Mean Absolute Deviation (MAD):

- Measures the quality of a forecast

where n is the number of prior periods used in the forecast…

Greater n ⟷ Smaller n

PRACTICE

Asa is trying to forecast how many pizzas from Mercante's he will eat in December. Help him predict his December consumption using the Weighted Moving Average method. He has collected the following data for the past 10 months:

Month	Pizzas	Weight
February	1	0
March	3	0
April	8	0
May	5	0
June	3	0.1
July	4	0.1
August	8	0.1
September	6	0.2
October	10	0.2
November	12	0.3
		1.0

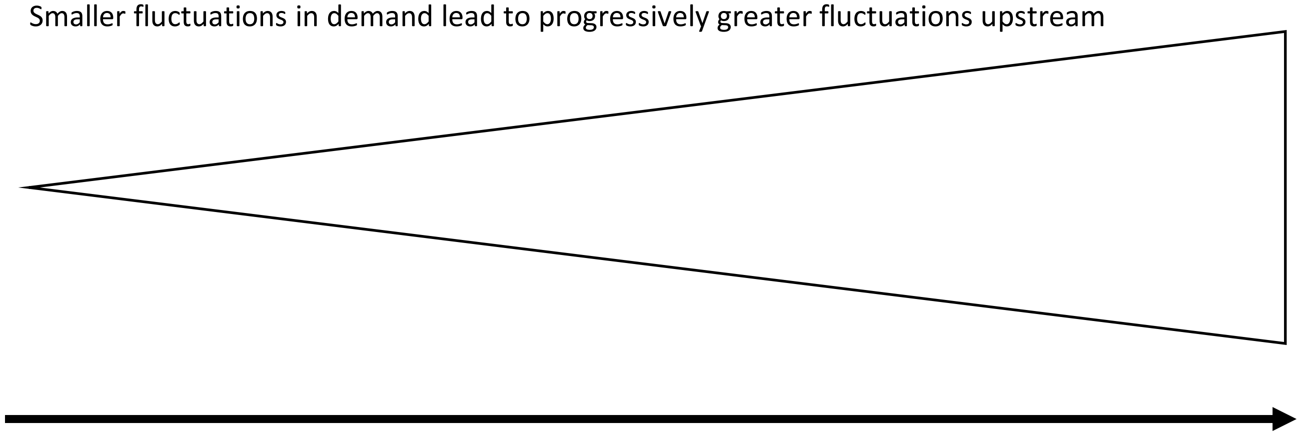
Do you think either assigning different weights to periods or including a different amount of periods would be better? Why or why not?

Asa actually consumed a whopping 15 pizzas in December. What was our forecast error?

SUPPLY CHAIN MANAGEMENT

Bullwhip Effect:

Smaller fluctuations in demand lead to progressively greater fluctuations upstream



Why it is bad:

Essentially, it makes planning difficult which is costly:

Why it occurs:

Poor ordering practices by retailers:

How to fix it:

Sharing information:

Smoothing product flows:

Eliminating pathological incentives:

Vendor-Managed Inventory (VMI):

INVENTORY: ECONOMIC ORDER QUANTITY

INVENTORY	
PROs	**CONs**

Economic Order Quantity (EOQ):

Tradeoff between **ordering** and **holdings** costs.
How much to order **each time** assuming **constant demand** with **no variability.**

$\boldsymbol{EOQ}$

Where:

D =

Q =

S =

C =

H =

i =

Where do we get the EOQ formula from? Math 104/184! We find the minimum of the Total Cost function and solve for Q.

where

and

INVENTORY: NEWSVENDOR MODEL

Tradeoff between having **too much** and **too little** inventory.
How much to order **in total** with **varying demand**.

Critical Ratio

Where:

C_u =

C_o =

Stock:

Where:

S^* =

μ =

σ =

z =

PRACTICE

Santa has shifted his business model. He now gives out lumps of coal for bad children as parents order them, as opposed to giving it all out on the same day. There are exactly 500,000 bad kids each year (needing 1 lump of coal each). It costs Santa $1,000 to transport each batch of coal to the North Pole. Santa buys his coal for $20 per lump and sells it to parents for $40 per lump. Santa's elves in the finance department have advised him to use an interest rate of 8%. How much coal should Santa order each time?

Mrs. Clause says that Santa has his ordering cost wrong and that the actual EOQ is #40,000 lumps of coal. What is the correct ordering cost assuming #40,000 is the correct EOQ?

Randolph the OpLog Reindeer knows that there will be some variation in the number of bad kids. On average, there are 500,000 bad kids per year. However, the standard deviation of bad kids per year is quite large at 75,000. Taking Randolph's points into account, what is the optimal probability of meeting demand?

Assuming the corresponding z score is 1, how many lumps of coal should Santa stock?

MORE INVENTORY

Average Inventory:

Average Flow Time:

Cycle Time (time between orders):

Ordering Frequency:

Lead Time:

Reorder Point:

Pipeline Inventory:

- If you pay for it once it *leaves* the supplier, add to your average inventory

Cycle Service Level:

Safety Stock:

PRACTICE

We had the following data from the previous question about Santa and his lumps of coal:

D = #500,000	S = $2,560	P = $40
EOQ = #40,000	C = $20	i = 8%

We also just found out that it takes 20 days from the time Santa places and **pays for** an order until he receives it at the North Pole. Find out:

How often should Santa place an order?

How many **days** should Santa wait between placing orders?

Once how many units are left in inventory should Santa place an order?

What is Santa's average inventory?

What is Santa's yearly holding cost?

If Santa actually places orders when there are #35,000 units left, what is his Safety Stock?