GOVERNMENT CONTRACTING AND ITS MATHEMATICAL NECESSITIES

ALI PRENGAMAN
AGENDA

- About me
- My math background
- LMI
- Army G4
- Transportation & Distribution
- Fun Problem
- Wrap up
ABOUT ME

• From Riverside, RI
• Favorite Hobbies: Dancing and reading
• Rising 4th year
• Applied Math BS/MS
• Two rotation co-op with a small government contractor, LMI
MY MATH BACKGROUND

- Elementary School had the Chicago Math curriculum
- Visual learner
- Logical defined processes
HIGH SCHOOL INTEREST

- Career Day - Speaker for Pixar
- Math as an aid for animation
- They model real life phenomena and program them to make animation easy
- New life goal - “That’s what I want to do!”
As the parameter $t$ increases, the point $(x(t), y(t), z(t))$ traces a right-handed helix of pitch $2\pi$ and radius 1 about the $z$-axis, in a right-handed coordinate system.

$x(t) = \cos(t)$,
$y(t) = \sin(t)$,
$z(t) = t$.
RIT – FAVORITE CLASSES

- Complex variables
- Probability and Statistics
- Stochastic Processes
- Linear algebra
- Calculus
- Physics
• RIT Career Fair – Eric Gentsch
• Corrosion on Army vehicles
• Interesting projects, team based work
• Took the co-op!
LMI – CONTINUED

• Founded in 1961
• Aim to offer solutions to complex government problems
• Current work: Amtrak, FedEx, NASA, DoD, etc
• Recently won a contract to help develop other countries’ supply chains
OPERATIONAL LOGISTICS – ARMY G4

• Assigned to client site at the Pentagon with the Army G4 (Logistics Division)
• Mentor John Storm
MY WORK WITH ARMY G4

- SecDef Chuck Hagel announced downsizing the military to pre WWII levels
- If the Army will be small in terms of personnel, what about all their stuff?
- That’s to me!
TRANSPORTATION AND DISTRIBUTION

- Assigned to a contract for the Veterans Canteen Service
- Problem: Many locations in all 50 states with many shipments
- Need well placed distribution centers
THE PROCESS

• Given data based on tracking numbers and shipment weights
• Given FedEx shipment database
• Had to link databases and extrapolate highest volume shipment locations
SQL CODING TO JOIN TWO DATABASES AND PULL DESIRED DATA

Forces you to think of the “big picture” of simple math processes
A POPULAR LOGIC PROBLEM

Albert and Bernard just become friends with Cheryl, and they want to know when her birthday is. Cheryl gives them a list of 10 possible dates.

- May 15
- June 17
- July 14
- August 14
- May 16
- June 18
- July 16
- August 15
- May 19
- August 17

Cheryl then tells Albert and Bernard separately the month and the day of her birthday respectively.

Albert: I don’t know when Cheryl’s birthday is, but I know that Bernard does not know too.
Bernard: At first I don’t know when Cheryl’s birthday is, but I know now.
Albert: Then I also know when Cheryl’s birthday is.

So when is Cheryl’s birthday?
SOLUTION

• Note: There are only 2 dates with unique numbers May 19 and June 18. If Bernard is told 18 or 19 he knows right away.

• Albert goes first: I don’t know when your birthday is, but I know Bernard doesn’t know, either.

• Albert knows only the month, but he knows it’s a month with a non-unique number, otherwise Bernard would already know the birthday.

• Therefore: not May and not June
• Bernard says: *I didn’t know originally, but now I do.*
• Bernard could have been told 14, 15, 16, or 17
• If he was told 14, he wouldn’t know Cheryl’s birthday because July 14 and August 14 are both options
• Bernard must have been told 15, 16, or 17
SOLUTION CONTINUED

• Albert now says: **Well, now I know too!**
• Albert knows the birthday is either July 16, August 15, or August 17.
• For Albert to know Cheryl’s birthday for sure now, he must have been told July
• Answer: July 16!
WHY THAT PROBLEM?

- No set path to solve it
- Forced to deduce and make connections
- Solving problems like this, I follow the same thought process as I do when I work in databases
- Connect my knowns with my unknowns to get my desired information
SOME RECOMMENDATIONS

Great free SQL websites
• Sqlzoo.com
• Sqlcourse.com
• Sqlcourse2.com

• Keep students interested by allowing them to use computers
• Give them problems that force them to think outside the box or in a different way than they’re used to
ANY QUESTIONS?
PLEASE FEEL FREE TO CONTACT ME

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