UW CSE 190B: DA Seminar

Autumn 2009

Course Staff

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Feel free to E-Mail any of us with any questions you may have!!

Attendance

- This is a seminar class and we hope that you will be intrigued enough to attend. However, to “encourage” you to attend, we will take attendance at the end of each class
- You may miss up to 1 class without prior permission.
- If you have the flu or any other illness, please inform us and stay home!

Upcoming Seminars

Date	Topic	Presenter
10/7	Puzzles	Dan and Steve
10/14	Security	Yoshi Kohno
10/21	How Search Engines Work	Steve Gribble
10/28	Robotics	Dieter Fox
11/4	Graphics	Steve Seitz
…more	to be announced	

Course Webpage

- http://www.cs.washington.edu/cse190b
- Contains information about:
  - Upcoming Seminars
  - Contact Info
  - Useful Tutorials and Other Information
    - Printer Setup, Email setup
    - Programming and editor tutorials
    - Link to MyCSE
    - Copies of the presentations

Q & A

Logic Puzzles

- Today we will be solving logic puzzles in small groups.
- **WHY**: Logic, mathematics, and the ability to solve problems in groups is a fundamental skill to be successful in Computer Science. You will find problems like this used by computer science employers as interview questions and you will use the same skills in many computer science related areas.

SOME OF THESE PROBLEMS MAY HAVE MORE THAN ONE SOLUTION

Question #1

- **Jelly Bean Problem**
- You have three jars that are all mislabeled. One contains peanut butter jelly beans, another grape jelly jelly beans, and the third has a mix of both (not necessarily a 50/50 mix, could be a 1/99 mix or a 399/22 mix). How many jelly beans would you have to pull out, and out of which jars, to find out how to fix the labels on the jars? Explain your answer.

Question #1 Solution

- 1 jelly bean from the p.b./grape jar will be sufficient
- The trick here is to realize that every jar is mislabeled. Therefore you know that the peanut butter jelly bean jar is not the peanut butter jelly bean jar, and the same goes for the rest.
- Once you know that jar 3 is either peanut butter, or grape jelly, then you know the other jars also. If it is peanut butter, then jar 2 must be mixed because it can't be grape (as its labeled) and it can't be peanut butter (that's jar 3). Hence jar 1 is grape.
- if jar 3 is grape, then you know jar 1 must be the mix because it can't be p.b. (as its labeled) and it can't be grape (that's jar 3). Hence jar 2 is peanut butter.
- if you pick jelly beans from jar 1 or jar 2, then you would have to pick out all of the jelly beans before you knew what that jar was. this is because jar 1 and 2 could be the mix, so in order to disprove that they were the mix, you would have to pull out every jelly bean just to make sure (since there could just be one bean of the opposite flavor in there).

Question #2

- **Email Penpal**
- You have an email penpal in Canada; you know his email address, but have no other way of contacting him. One day, you decide you want to send him a secret message that nobody else can read. To do this, you decide to encrypt your message (using a well-known encryption algorithm): now, all you need to do is find a way for you and your friend to agree on an encryption/decryption key, but to prevent anybody else from learning the key. Assuming you can only exchange email messages with your friend, and that an attacker could hypothetically intercept, read, and modify those messages, how would you go about deciding upon that key?

Question #2 Solution

- There are two answers:
- (1) you can't -- a man-in-the-middle attacker could pose as your friend to you, and as you to your friend, and learn anything that the two of you learn.
- (2) if you and your friend have some third, trusted friend in common, and you both already have a way to exchange encrypted messages with that trusted friend, that trusted friend could help you bootstrap a key. (how is complicated.)

Question #3

- **YarrMaties**
- A pirate ship captures a treasure of 1000 golden coins. The treasure has to be split among the 5 pirates: 1, 2, 3, 4, and 5 in order of rank.Pirate 1 with the lowest rank and pirate 5 is the highest rank. The pirates have the following important characteristics:
- Infinitely smart – They will always choose the outcome that is best for them.
- Greedy – They always want to get the most amount of money.
- Bloodthirsty – The less pirates the better. Although their greed precedes their thirst.
- Starting withthe most senior pirate they make a proposal how to split up the treasure. This proposal can either be accepted or the piratethat made the proposal is thrown overboard. A proposal is accepted if and only if **a majority (> 50%)**of the pirates agrees on it.

  The Question: What proposal should pirate 5 make**?**

Question #3 Solution

				Pirate 1
				1000/ A

A = Accept
R = Reject

Question #3 Solution

			Pirate 2	Pirate 1
				1000/A
			X	1000 / R

A = Accept
R = Reject

Question #3 Solution

		Pirate 3	Pirate 2	Pirate 1
				1000/A
			X	1000 / R
		1000 / A	0 / A	0 / R

A = Accept
R = Reject

Question #3 Solution

	Pirate 4	Pirate 3	Pirate 2	Pirate 1
				1000/A
			X	1000 / R
		1000 / A	0 / A	0 / R
	998 / A	0 / R	1 / A	1 / A

A = Accept
R = Reject

Question #3 Solution

Pirate 5	Pirate 4	Pirate 3	Pirate 2	Pirate 1
				1000/A
			X	1000 / R
		1000 / A	0 / A	0 / R
	998 / A	0 / R	1 / A	1 / A
997 / A	0 / R	1 / A	0 / R OR 2 / A	2 / A OR 0 / R

A = Accept
R = Reject

Question #4

- **The Rope Bridge**
- Four people need to cross a rickety rope bridge to get back to their camp at night. Unfortunately, they only have one flashlight and it only has enough light left for seventeen minutes. The bridge is too dangerous to cross without a flashlight, and it's only strong enough to support two people at any given time.
- Each of the campers walks at a different speed. One can cross the bridge in 1 minute, another in 2 minutes, the third in 5 minutes, and the slow poke takes 10 minutes to cross. How do the campers make it across in 17 minutes?

Question #4 Solution

- To get everyone across in 17 minutes, we need get the two slowest people across together; otherwise we are wasting too much time. Once we get them across, how do we not make one of them walk back with the flashlight? Just have one of the faster people already there waiting to sprint the flashlight back across.
- A&B cross – 2 min
- B comes back – 4 min
- C & D cross – 14 min
- A comes back – 15 min
- A & B cross – 17 min
- **Another valid solution is to have A bring the flashlight back in step 2.**

Next Week…

Security

with

Yoshi Kohno