MSCS Mess

This Week's Colloquium

Title: An Introduction to the Intuition Underlying
Statistical Design of Experiments
Speaker: Dr. Bill Swallow, NC State University
Time: Tuesday, May 3rd 1:30 pm
(treats at 1:15)
Place: SC182

One of the key areas in Statistics is the Design of Experiments. Courses titled "Design of Experiments" tend to focus on the technical aspects of analyzing data that came from experiments that were designed, rather than on the thought processes that go into the designing of the experiment itself (i.e., the data collection effort). In contrast, this seminar will be a non-technical, interactive (I hope) introduction to the logic of experiment design. What kinds of issues come into play as we design an experiment that will provide a fair (unbiased) and efficient ("most bang for the buck") comparison of the treatments of interest? All students should be sufficiently prepared to enjoy and understand this seminar.

Bill Swallow is Professor and Director of the Graduate Program in Statistics, Department of Statistics, North Carolina State University. Dr. Swallow received his Ph.D. in Biological Statistics from Cornell University. His research interests include group testing, experimental design, and regression diagnostics.

Problem of the Week

This week's POW comes with 3 levels. Please send solutions to any and all levels that you solve. Credit will be given to anyone solving any of these questions.

First we warm-up for the second question. Is it true that given any six numbers between 1 and 10, that at least two of the given integers have to be relatively prime to each other (meaning their greatest common divisor is 1)?

If you've got the first one, is it true that given at least k/2 integers between n and n+k then at least two of the given integers have to be relatively prime to each other? [k/2 may not be an integer, so I am assuming that the number of integers is the smallest integer bigger than k/2, or larger].

Bonus: prove that given at least n/2 integers (same comment from above applies) between 1 and n that there must be at least 2 numbers a and b with the property that either a divides b or b divides a.

*** Please submit all solutions by Wednesday at noon to Amelia Taylor by e-mail (ataylor@stolaf.edu) or by placing them in her box at OMH 201.

Senior Math Banquet

This year's math banquet for graduating seniors will be held Thursday, May 12th at 6pm in the King's Room. If you would like to attend, please send your caf ID number to Donna Brakke (brakke@stolaf.edu) by Friday, May 6th.

Last Week's Problem

What is the fifth digit from the end (the ten thousands digit) of the number

$$5^{5^{5^{5^{5}}}} ?$$

The key to solving this one is to notice that what we want to know is the first digit of the remainder mod 100,000 ? $2^5 5^5$. Since our number is divisible by 5^5, it turns out that we need only determine the remainder upon division by 2^5 ? 32. Now we make repeated use of the Euler phi function, $?(n)$. $?(n)$ is the number of positive integers which are less than or equal to n and relatively prime to n. Thus $?(2^5)$? 16. Using this idea and the fact that the number in question can be divided by 5 several times means that we can reduce the problem to wanting to know the remainder of 5^{5^5} when divided by $?(16)$? 8. Note that every odd square is congruent to 1 (mod 8) and this implies that 5^{5^5} is congruent to 5 (mod 8). Thus working backward we see that $5^{5^{5^5}}$ is congruent to $5^{5^{5^5}}$ (mod 16) and thus $5^{5^{5^{5^5}}}$ is congruent to 5^5 (mod 32) and this finally implies that $5^{5^{5^{5^5}}}$ is congruent to 3125 both mod 2^5 and mod 5^5, and hence mod 10^5 Since the fifth digit of 3125 is 0, 0 is also the fifth digit from the end of $5^{5^{5^{5^5}}}$.

3D Graphics Followup

The 3D computer graphics presentation last Tuesday night was a resounding success! The 75 people in attendance saw the lab in SC 186 officially opened with a ribbon cutting ceremony, then enjoyed 3D graphics presentations and demos (including 3D video and animations!) made by a team of CS seniors (Aaron Etshokin, Matt Handley, David Middlecamp, Chris Mueller, Justin Von Stroh), two teams of CS1 students (Anna Ericksen, Heidi Hendrickson, Heather Wiste, David Manley, Sean Pruden, Ben Swenson), and workers at IIT's Multimedia Development Center (Daniel Edwins, Anton Miakotin). Congratulations to Prof. Olaf Hall-Holt, his students, and the MDC!

Two items of followup: (1) During the talk, the team offered to collaborate with anyone interested in creating 3D visualizations (as the on-the-spot 3D picture of the audience showed, it doesn't need to be that hard!). If your interested, contact Olaf Hall-Holt at olaf@stolaf.edu. (2) Some people couldn't come because of registration or other conflicts. If you're interested in a possible repeat performance, please contact Olaf Hall-Holt (olaf@stolaf.edu) or Dick Brown (rab@stolaf.edu).

***If you would like to receive a copy of the Math Mess in your P.O. Box weekly, please e-mail Donna Brakke at brakke@stolaf.edu.