St. Olaf Mathematics Department

Math Mess

Department of Mathematics
St. Olaf College
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This Week's Mathematics Colloquium

Title: Spam and Society: Liberty and Law on Tomorrow's Internet
Speaker: Nathaniel Borenstein
Time: Tuesday, April 27th, 7:00 pm
Place: Viking Theater

This Week's Colloquium

This week's colloquium is one of this year's Kleber-Gery lectures, which are an annual series of talks focused on the interplay of statistics and economics. Here's the info:

Spam is bad. Pretty much everyone agrees on that, and nearly everyone seems to have a pet solution. But as passionately as we all hate spam, we must take care not to confuse it with far worse crimes. Attacking the spam problem with the full force of the Patriot Act could do far more harm than good. As it turns out, the different approaches to spam control reveal different underlying visions of the future of the Internet.

In this talk, I will discuss the full range of current and proposed approaches to spam control, making note of the political and social consequences of each. Although each approach carries costs and dangers, I will argue for a balanced mix of approaches as the best hope for preserving an Internet that is free but not lawless, culturally diverse, and dependable for commerce.

Nathaniel Borenstein is a Distinguished Engineer at IBM and a professor at the University of Michigan. His undergraduate degree is from Grinnell College in that state just south of us and Nathaniel has a Ph.D. from Carnegie Mellon. He has been involved in many internet and e-mail innovations over the years, including building the world's first widely-used multimedia email system, MIME: the Internet standard for multimedia data, Metamail: open source software still used on millions of machines, ATOMICMAIL, Safe-Tcl, and these are just the early years. He has numerous awards and recognitions as well, including being named "a geek's geek" by Salon Magazine, 2001.

Another Related Talk

Nathaniel Borenstein will give a second slightly more technical talk at 1:30 (usual colloquium time) in SC 182 (usual place) .

Here are those details:

IETF, ICANN, ISOC, W, & You: The Power Structure of Today's Internet

The great and persistent myth of Internet governance is often heard: Nobody runs the Internet. Like many myths, this one allows a cynical minority to manipulate a gullible crowd.

The truth is that although the Internet is in many ways still in its infancy, it has long since ceased to be either ungovernable or ungoverned. But the incumbent stakeholders' self-interested conservatism inclines them to reinforce the notion of an "ungovernable" Internet. The Internet's government to date has therefore been (mostly) benignly minimalist, but nonetheless illigitimate, corrupt, and utterly undemocratic.

In this talk I will describe a fragment of the byzantine patchwork of (mostly private) authority that governs the Internet today, the "stakes" for which the Great Game are being played, and the tangled but critical relationship between the forces of liberty and lucre in shaping the future of the Internet.

Math Auction

St. Olaf is very proud to be the only college in Northfield to hold an annual Math Auction. This year's will be the 2nd. Problems in a math auction do not necesaarily have a single "best" answer. The objective is to come up with the best answer you can find for each problem, and then on the night of the auction itself, bid (based on how good you think your answer is compared to the other groups') on the right to present your solution. Whoever presents the most best solutions will probably win. By the time you read this, the problems should be on-line at http://www.stolaf.edu/people/molnar/ps/auction.html. Teams of up to three may compete in the Math Auction. The auction itself will be held on Monday, May 3, at 6pm in SC186. Fun. Pizza.

Prime Number News

Prime numbers have long fascinated mathematicians and non-mathematicians alike. While much is known about the prime numbers, there is also much that still remains unknown. For example, it is not known whether there are an infinite number of so-called twin primes, which are prime pairs of the form $(p, p + 2)$. Another question that has remained unanswered is whether there exist arithmetic progressions of primes of any given length.

As early as 1770, Lagrange and Waring investigated this problem, and much work has been done to try to uncover an answer. Now, thanks to new work by Ben Green and Terence Tao, the conjecture seems to finally have been settled in the positive (in a 48-page monstrosity of a paper).

To read a full account of this exciting new revelation in mathematics, check out http://mathworld.wolfram.com/news/2004-04-12/primeprogressions/.

Last Week's Problem

What is the probability that at some point this season, the Twins will have either a winning streak or losing streak of six games or more? We need to make some simplifying assumptions. Assume that the individual games are independent events (they aren't) and that the Twins have a .5 probability of winning any particular game (also arguably not true). There are 162 games in the season. Ignore any actual results up to this point.

Several students tried this problem, but none were successful. We need to count strings made up of only the letters W and L, which somewhere contain 6 in a row of the same letter. Let's call such strings good. It is hard to count the good strings, because of double-counting issues. Let us count the bad strings. Let x_n be the number of bad strings of length n. Assuming equal likelyhood of all strings, our answer will then be $1 - x_{162}/2^{162}$. There are no good strings of length 5 or less, so $x_1=2$, $x_2=4$, $x_3=8$, $x_4=16$, and $x_5=32$. But $x_6=62$. What is the pattern? Given a bad string of length n, chop off the current winning or losing streak, which will be at most 5 letters. This will yield distinct strings of n-5 through n-1 letters. Conversely, given a bad string of length n-5 through n-1, it can be padded out to a string of n letters by starting a new streak, which will be less than 6 games, preserving badness. So for $n \geq 6$, $x_n = x_{n-1}+x_{n-2}+x_{n-3}+x_{n-4}+x_{n-5}$. So x_{162} is a very big number, but so is 2^{162}. The desired probability is approximately 93.3%.

Problem of the Week

Five (very smart, but absent-minded) St. Olaf Math majors go to Budapest. There are 9 dishes served at the caf there, but astonishingly no-one packed a Hungarian-English dictionary, so they have no way of knowing which dish is which. Also, the food at the caf is served family-style, so they can order 5 dishes, and they'll get 5 dishes, but not in any particular order. They make a list of the 9 dishes (palacsintas, gulyas, sajtos szendvics es leves, …) and the 9 names on the menu, which we'll just call A, B, C, D, E, F, G, H, and I. They visit the caf three times, ordering 5 dishes each time, and by clever choices figure out which dish is which. How do they do it?

*** Please submit all solutions by Wednesday at 5 o'clock to David Molnar by e-mail (molnar@stolaf.edu) or by placing them in his box at OMH 201.

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.

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