St. Olaf Mathematics Department

Math Mess

Department of Mathematics
St. Olaf College
Northfield, MN 55057

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This Week's Mathematics Colloquium

Title: Game On! Strategies and Techniques in Combinatorial Game Theory
Speaker: John Vano, University of Wisconsin - Madison
Time: Tuesday, December 2nd, 1:30 pm - treats at 1:15
Place: SC 182

This Week's Colloquium

There are many types of games and many ways that mathematics can be applied to analyze and help one play in an optimal manner. Using several hands-on examples we will talk about basic ad hoc strategies, and completely analyze the well known game of Nim. We will conclude with a discussion of the game of "Dots and Boxes".

John Vano, an alumnus of Gustavus Adolphus College, received his PhD in Mathematics from University of Texas in Austin in May 2002. His area of research is applied mathematics and dynamical systems. His interests and hobbies include mathematical puzzles, problem solving, collaborating with students on research, teaching, juggling and otherwise entertaining his wife and four cats. He is now a VIGRE postdoc in mathematics at the University of Wisconsin.

Problem Solvers Victorious

This should really pump you up: St. Olaf won the North Central Section Team Contest on Saturday, November 15! There were 65 teams from 25 schools in Minnesota, South and North Dakota and parts of Canada. A very hearty congratulations goes to **Michael Zahniser**, **Jason Saccomano**, and **Matthias Hunt**, who scored 87 points out of a possible 100 – ten points ahead of the second place team!

Of course, St. Olaf's strong showing at the contest was not just a one-team effort. St. Olaf had 17 people forming six teams for the contest, and again this year all of our teams finished in the top half – quite an impressive feat. For more details about how everyone placed, check with Dave Molnar. Congratulations to all of you!

Bioinformatics in the Summer

The University of Minnesota will be holding a Bioinformatics Summer Institute Internship Program for the summer of 2004. The mission of the Summer Institute is to provide the highest possible quality undergraduate level education and research experiences in bioinformatics, equipping students with the tools for a successful career in the field.

The 2004 program will run from June 7 through August 13, 2004. The stipend is $5,000 for ten weeks, quite a hefty sum for this kind of program. Students interested in becoming an intern must be junior or senior undergraduate students at the time of the internship. For additional information on this great opportunity, see the program's website at http://www.bsi.umn.edu. The deadline for applications is February 28, 2004.

Last Week's Problem

Ostebee and Zorn just got a section of whatever book they're currently working on back from the publishers. It has some obvious mistakes, like those in the previous sentence, so they both need to proofread it. There are 18 pages in the section, and they have ten days in which to do the proofreading (independently). On the first day, Zorn fixes the first two pages, while Ostebee only gets one page done. Thereafter, each does at least one page per day, with Zorn never falling behind Ostebee, and both finishing on the tenth day. Prove that there must be some span of days (not including the first day) over which both fixes the same number of pages.

This problem was only solved by people named Paul: **Tveite '07**, and of course, **Zorn**. Both proofs used the Pigeonhole Principle. If the numbers of pages that each of Ostebee and Zorn have completed after n days are O(n) and Z(n), respectively, consider the difference between these two functions, D(n)=Z(n)-O(n). Since Zorn never falls behind in this fairy tale, D(n) is always at least zero. But, since Zorn will only complete 8 additional pages beyond the minimal one per day, D(n) can never exceed 8.

Look at the ten values D(1) ... D(10). There are only nine possibilities for these values, so by the Pigeonhole Principle, two must be the same -- say D(i) = D(j). Then on the (i+1)-st day through the jth day, Ostebee and Zorn completed the same number of pages.

Problem of the Week

In the game of Sylver Coinage, two players take turns naming positive integers, which should be thought of as denominations of coins. The first player can name any positive integer, but after that you can only name a number which is not a sum of numbers previously named. Whoever is forced to name the number 1 loses (that is, 1 is the "poison cookie"). So for example, if I started by naming 2, you could win immediately by naming 3, as all positive integers greater than 3 can be written as sums of 2s and 3s. Prove that there exists a winning strategy for the first player that starts by naming 5.

This problem is a little harder than usual, but you have until February to do it. Even if you can't prove it, figure out something else interesting about this game.

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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