MSCS ● Mess

This Week's Colloquium

Title:	The Coins Go 'Round 'n 'Round: Bulgarian Solitaire
Speaker:	Suzanne Dorée, Augsburg College
Time:	Tuesday, October 25, 1:30 p.m. (treats at 1:15)
Place:	SC 182

The rules of Bulgarian Solitaire are fairly simple. The player begins with coins stacked in several piles. At each turn she rearranges the coins according to the following rule: remove the top coin from each pile, possibly eliminating piles, and form a new collected pile of coins. The game continues until she revisits a previously encountered (unordered) arrangement, having reached a terminal cycle.

The questions Sue will raise in her talk are a bit more complicated. She will discuss the following: Where are fixed points, if any? Where are two cycles, if any? Which states are cyclic?

Sue earned her Ph.D. in character theory from the University of Wisconsin. Since joining Augsburg's Mathematics Department in 1989, she has kept busy teaching, directing undergraduate research, and raising two active boys with Ole husband Craig Meyer '83.

Math Grad School Night: How to Apply, How to Get in, and How to get out

A panel of current and former graduate students will be on campus to answer your questions about math grad school on Wednesday, October 26.

Panelists will discussion the application procedure, applying for and receiving financial aid, choosing a program to fit one's individual needs, succeeding in graduate school, working with advisors and any other topics of interest to the audience. If you are planning to go to graduate school or just thinking about it, this is a great chance to get your questions answered and learn about what to expect from application through graduation.

The panel begins at 5:30 p.m. in SC 184. Pizza will be served!

Wall of Fame Photos

If you are a major or concentrator in mathematics, statistics or computer science, you should have your picture on the Wall of Fame. If you do not, you can remedy that situation by contacting Peder Bolstad at x3288 (or stopping by the ASC) to set a time to have a mug shot—NO!—a head shot taken.

Problem of the Week (POW)

Select two integers (without replacement) from the set of integers between one and one million (inclusive). Is the sum of the two integers more likely to be even, be odd, or will the two outcomes be equally likely?

A challenge extension: Choose two rational numbers between zero and one (again without replacement, and inclusive of the endpoints). Is their sum, when written in reduced form, more likely to have an even numerator, odd numerator, or will the two outcomes be equally likely?

*** 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.

Last Week's Problem

An airplane has exactly 80 passenger seats. Eighty passengers are in a single line to get on board, and each has a reserved assigned seat. Each passenger gets on one at a time to select his or her seat. However, the first passenger does not look at the assigned seat number and randomly selects a seat on the plane. Thereafter, each passenger takes his or her assigned seat - if it is already taken, the passenger selects another unoccupied seat at random. What is the probability that the last passenger on board will be able to sit in his/her originally assigned seat?

Congratulations to Thomas McConville '09 for submitting a clever solution to this problem. The answer is 1/2, but I am going to hold off on giving Thomas' solution until next week due to the fact that there are folks out there still working on it and they have asked for one more week. Instead, I would like to congratulate Matthias Hunt '07 for giving an alternate proof of the Problem from 2 weeks ago (on time, but

I missed it) and give you his solution. That problem again, for reference is:

Let Q be a non-degenerate convex quadrilateral inscribed in a circle. Show that the four lines, each passing through the midpoint at a side of Q and perpendicular to the opposite side, meet in a point.

Here is Matthias' solution. Let ABCD be a convex cyclic quadrilateral and O the center of the circle that the quadrilateral is inscribed in (also known as the circumcenter). Draw lines connecting the midpoints of the opposite sides and call the point where they meet R. The lines described above, passing through the midpoint of a side and perpendicular to the other side are sometimes called maltitudes. Having this word will aid in stating the solution. We are going to show that there exists a point Z which all the maltitudes go through. (A picture is very helpful in navigating this solution).

Let M be the midpoint of AB and N be the midpoint of CD. We have not lost generality as the only requirement for these midpoints is that they are opposite each other. Draw OM. Because AB is a chord of circle O, it follows that OR is perpendicular to AB since it splits AB into two equal sections and passes through the center of the circle. Therefore OR is parallel to the maltitude that goes through N.

Because R is the intersection of the midpoints of opposite sides, we can say that NR = RM, which follows from a theorem that proves that the two segments through the opposite midpoints split each other in half. Place a point Z on the maltitude that goes through N so that Triangle NZR is congruent to Triangle MOR. Then ORZ is a line such that OR=RZ. Since we haven't lost generality, it is the case that all four maltitudes will go through point Z, where Z is defined as a point collinear with O and R (two points determine a line, so this line is unique and does not depend on the two

segments we use for the construction) so that OR=RZ (and this equality then makes Z unique and not dependent on the construction).

Apply to Research Abroad

Three St. Olaf undergraduate research scholars will have the opportunity to conduct research abroad during each of the next three summers. Students will join teams of professional researchers in real analysis at one of two host institutions—Lodz University in Poland or Selesian University in the Czech Republic. Grant funding from the National Science Foundation allows full support for the International Interns, including travel expenses, living expenses, and a $4000 research stipend. Students will also have the opportunity to attend professional conferences upon return.

If you are interested in applying to be an International Intern, complete the following:

1. Fill out the nine-question application form on the right-hand column of the math department website (www.stolaf.edu/depts/math) or directly at www.stolaf.edu/people/humke/REU2005-2007/REUintro.html.

2. Ask three professors to write a letter in support of your application (two references must be from mathematicians).

The deadline for all materials is November 11, 2005.

Math Practicum and You?

Want to tackle a "real"math problem? One that's challenging and open-ended, yet of great importance to a local business or organization? One that requires creativity and teamwork? Once that asks you to draw on your mathematical, statistical, or computing knowledge while potentially exploring new territory? Then the Math Practicum (Math 390, offered this coming interim) is for you!

In past years, students have conducted projects for organizations including Northwest Airlines, Medtronic, the Minnesota Orchestra, and the Minnesota Department of Human Services. The mathematical and statistical methods applied have ranged from survival analysis to transportation models to classification trees to boundary element methods. Most clients who have participated in the practicum have been extremely impressed by the professional and creative quality of the students' work, and most students who have participated have cited the practicum as among their most memorable and valuable undergraduate experiences.

Fifteen slots are available for the Math Practicum this coming January. Priority will be given to seniors, but there may be spaces available for interested juniors. We are in the process of finalizing the three projects for this interim, and it promises to be an exciting batch!

Interviews for the available slots will begin around November 1, so look for a sign-up sheet outside Professor Roback's office (OMH206). If you have any questions, please contact Professor Richey or Professor Roback.

Friday Research Seminar

The Friday Research Seminar series is open to all students and faculty. Seminars are held every Friday at 3:30 in SC 186.

This Friday, Paul Humke will give the second of two lectures involving transferring information about the size of sets from one direction to another. First he'll give a classic theorem of Sierpinski (circa 1929) showing what cannot be inferred, then show what can be said in the case of Borel sets. Finally, he'll shed a bit more light on the Sierpinski Theorem, at least enough to surprise himself!

ASC Seeks Tutors!

The Academic Support Center expects to run short of tutors in mathematics and statistics in the not-too-distant future. If you are willing to spend a few hours a week helping another student with his or her math or stats homework, please contact the ASC at x3288, or fill out the application form at: http://fusion.stolaf.edu/asc/forms/tutor/tutorapp3/tutor_app2.cfm. It is not necessary to be on student work to be a subject-area tutor.

Editor-in-Chief:	Paul Roback
Associate Editor:	Meredith Johnson
MM Czar:	Donna Brakke
Problems Editor:	Amelia Taylor