St. Olaf Mathematics Department

Math Mess

Department of Mathematics
St. Olaf College
Northfield, MN 55057

May 10, 2004
Volume 32, No. 21

This Week's Mathematics Colloquium

Title: Applied Pre-Calculus: The Mathematics of Flight Planning
Speaker: Randy Bailey, St Olaf College
Time: Tuesday, May 11th, 1:30 pm - refreshements at 1:15
Place: SC 182

This Week's Colloquium

Polar and spherical coordinates! Vectors! Balancing masses! Proper use of a ruler, compass, and protractor! Why must the number of landings always equal the number of takeoffs? Come along as we use some old-school pre-calculus concepts to go through the actual planning for a hypothetical cross-country flight in a small aircraft. Bring your own peanuts.

I'm Randy Bailey. How are you?

Randy Bailey is St. Olaf's 2003-04 Visiting Master Teacher in mathematics. He's been a licensed private pilot since 2000. When neither aloft nor at St. Olaf, Randy can be found in the mathematics department at Eastview High School, in Apple Valley.

Another Colloquium

Title: A Sea Change in Software Development Methods, and How to Survive It
Speaker: Jonathan Arthur, Ingenix Inc.
Time: Tuesday, May 11, 7:00 PM (refreshments follow the talk)
Place: SC 182

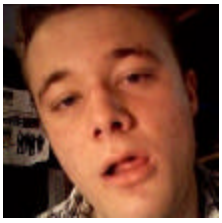
Big changes have occurred in the last three years in the software development world. These changes significantly impact the way software is designed, developed and maintained. This discussion will providea real-world overview of the rapidly shifting universe for software developers and the teams that they work within.

Jon Arthur is currently a Project Manager for a development team at Ingenix Inc., one of the healthcare industry's largest health information companies, at their Eden Prairie office. As a Project Manager, Jon oversees consumer software projects "from the cradle to the grave." He also works with data analysis teams finding new ways

to manage and analyze data for greater business performance. Jon has been working in the healthcare industry for the past five years, and within the information technology industry for ten years.

Math Picnic

This year the Math Department is hosting a spring picnic at Sechlar Park, full of fun, softball, food, and glorious math cameraderie. We couldn't find a pig to roast this year, so instead we'll be roasting the next best thing, John Lindquist '04, well-known for his hearty aroma and full-bodied flavor. Here's the info:



Place: Sechlar Park
Date: Sunday, May 16
Time: Noon – 4 pm

Rides will be leaving from the Science Center circle at noon, and food should be served around 12:30. Please sign up soon if you're planning on coming – you can find sign-up sheets outside of Professor Roback's office.

Attention Seniors!

The Math Department wants to know what you're doing after you graduate! Next week's Mess will be a salute to all of you, and we'd love it if you could provide us with a blurb telling us about your plans for next year, what your favorite memory as a Math/CS major has been, or anything else you'd like to add. Please send your blurbs to maryns@stolaf.edu no later than this Thursday, May 13!

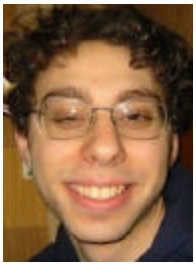
Last Week's Problem

A regular hexagon is divided into congruent equilateral triangles. The triangles are then covered by "lozenges", which are two congruent equilateral triangles stuck together, kind of like a domino, but not square. There are three different orientations possible for a lozenge. Prove that no matter how the hexagon is tiled, the same number of lozenges will appear in each of the three orientations.

Sadly, there were no solvers this week. Orient the hexagon so two of its sides are horizontal. Two of the three types of lozenge also have a pair of horizontal sides. We show that there is the same number of each of these types. Find a lozenge whose upper edge is part of the upper edge of the hexagon. This shares its edge with another lozenge, which in turn shares its lower edge with another lozenge, etc, until we have constructed a band from top edge to bottom edge. The lower edge of this band must be directly below its upper edge. So it has shifted to the left and to the right an equal number of times, meaning it contains the same number of each of the two kinds of lozenge with horizontal edges. Creating all possible bands exhausts all of the horizontal edges, so these two types of lozenge appear in equal numbers throughout the hexagon. Rotate the proof 120 degrees, and it follows that all three species of lozenges have equal populations.

Problem of the Week

This problem is honor of the knottiest man in the Math Department, the one and only Scott Harris. A knot is a closed curve (non-self-intersecting) that cannot be deformed into a simple loop. Consider curves obtained by using straight segments of unit length from a lattice point (a point with integer coordinates) to a neighboring lattice point in 3-space. It is easy to make a loop having length 6, and of course a simple little square is a loop of length 4. What is the shortest knot you can find using curves of this sort?



*** 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.

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