MSCS Mess

Department of Mathematics, Statistics and Computer Science
St. Olaf College
Northfield, MN 55057

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This Week's Colloquium

Title: Permutations, Young Tableaux and Fibonacci Tableaux
Speaker: Kendra Killpatrick
Time: Thursday, March 3rd, 2:30 pm
(treats at 2:15)
Place: SC182

Tableaux have long been used to study combinatorial properties of permutations and have many applications in the areas of symmetric function theory and representation theory. The most common and most studied kinds of tableaux are standard Young tableaux and many nice results exist relating these tableaux to permutations and Schur symmetric functions. Frame, Robinson and Thrall gave a nice combinatorial method for counting the number of standard Young tableaux of a certain shape, which has been useful in the representation theory for the symmetric group. In 1975, Richard Stanley introduced a second kind of tableaux called Fibonacci tableaux which also have a nice relation to permutations. However, many of the classic results for Young tableaux remain unknown for Fibonacci tableaux. In my talk, I will give all the necessary background definitions for tableaux and will discuss the major results for Young tableaux. I will also describe the Fibonacci tableaux and give a survey of the known results and the open problems in this area. My talk will be accessible to all undergraduates with some general mathematics knowledge (no specific prerequisites needed!)

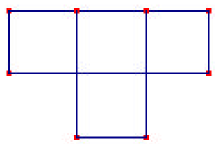
About me: I am currently an Associate Professor in the math department at Pepperdine University. I completed my Ph.D. at the University of Minnesota in mathematics (specifically combinatorics) in December of 1998 and taught for one semester at St. Olaf during the spring of 1999. I thoroughly enjoyed being a part of the St. Olaf math department for a brief time, particularly the Math Recital and the pig roast/faculty-student softball game. After leaving Minnesota, I spent three years at Colorado State University in Fort Collins, Colorado on a post-doc position and then returned to my California roots in August 2002 by coming to Pepperdine. I am a runner and love to run marathons. In fact, I will be running the Los Angeles marathon on March 6th, right after getting back from my visit to Minnesota. I have run the Twin Cities marathon 4 times and Grandmas marathon in Duluth 3 times. Although I don't miss the cold weather and long Minnesota winters, I do miss the friendly people and the great summers.

Math Recital

The annual math recital will be held at 7:00 pm on April 26th in Ytterboe lounge. If you are interested in performing at this great event, contact Amelia Taylor (e-mail: ataylor@stolaf.edu).

Last Week's Problem

From a 7x7 chessboard I remove the middle squares from one edge. Is it possible to tile the remaining board with twelve T-tetrominoes? (a T-tetromino consists of four squares in the shape of a T).



Bonus: Which Konhauser (annual, not year) is this question from and where did we go to take it?

Solution to last week's problem:

No solutions were submitted this week, but a belated congratulations to **Cliff Corzatt**, **David Swanson** and **William Vorhees** for solutions submitted for the Quaker problem. Now this week's solution: color the squares of the chessboard alternating black and white. We can assume that the corners are black (the sides are odd, so all corners will be the same color). Then the middle edge square is white. Since we started with black and have 49 squares, there are 25 black squares and 24 white. Therefore once we remove the middle, edge square there are 23 white squares. When we remove the middle white square from one edge there are only 24 white squares. We can color a T-tetromino with three black squares and one white, or one black and three white. Let B be the number of T-tetrominoes we use that have 3 black squares and W the number with three white. Then we know that $3B+W = 25$ and $B+3W=23$. The solution to these two equations in two unnkowns is $B = 13/2$, $W = 11/2$. This solution is unique and the numbers are not integers, so there is no way to tile the chessboard.
Bonus: This problem is from the second annual Konhauser contest held at Carleton College, 1994.

Problem of the Week

This weeks question, thanks to Paul Zorn, grew out of last week's question. This time remove a corner square (or in fact any black square, assuming we color the chessboard starting with black in the corners). Is it possible to tile the remaining board with twelve T-tetrominoes?

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

You: Math Teacher?

Have you ever thought of teaching mathematics to elementary, middle, or high school students? Then explore the "Be a Math Teacher" website of the National Council of Teachers of Mathematics. Go to http://www.nctm.org/teachmath/ for information especially for students who want to know more about the rewards of teaching mathematics and ideas for how to become a mathematics teacher. The site includes links to teacher licensing requirements for each state and Canadian province, available scholarships and resources for teachers. For addtional information about preparing to teach school mathematics, talk with mathematics professor Martha Wallace.

***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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