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Math & Stats Department Lecture Series: The Traveling Salesperson Problem

Amanda Riehl, University of Wisconsin at Eau Claire

Thursday, November 12,4:00 - 5:00 p.m. CMC 209

When you have a list of places to visit before returning home, in which order should you visit them to save time, gas, or both? The Traveling Salesperson Problem (TSP) tries to answer that question. With applications, including making circuit boards, scheduling school buses, planning army missions, designing satellite systems, and sequencing DNA, TSP has been an intensively studied problem in mathematics, operations research, and theoretical computer science. We will discuss the history of the problem, the attempts made to solve it, how biology has helped mathematicians make progress on it, and how the problem appears invarious applications.

This talk requires no particular mathematical background, not evencalculus, and all are welcome!

REU Information Session

Thursday, November 5 12:00 - 1:00 p.m. CMC 206

If you've spent any time in the math & stats department, you've likely heard about research experiences for undergraduates, or REUs. But what are they? How do you apply? What happens once you've got one? All these questions and more will be answered at an information session on Thursday, November 5 from 12:00 to 1:00 in CMC 206. Five Carleton students who took part in REUs or REU-like summer programs will be on hand to speak about their experiences and answer any questions you have about summer research. Pizza will be provided!

Problem-Solving Group

Wednesdays4:30 - 5:30 p.m.CMC 328

Do you like solving math problems? Do you think your fellow math enthusiasts are fun to spend time with? If you answered 'yes' to at least one of those questions, consider stopping by the weekly problem-solving group! It meets Wednesdays in CMC 328 from 4:30 to 5:30 p.m., and the problems considered are many and varied.

Eric Egge hosts the meetings-- you can contact him via email (eegge) to find out more!

This Week At the Career Center: Humanities, Science, and...Wall Street?!

Thursday, November 156:00 - 7:00 p.m. Leighton 426

So you're really good at math, but you probably haven't thought about a career in finance (isn't that for econ majors?). In today's world, though, research and analytical skills are highly in demand inÂ everyÂ field, even on Wall Street. Tom Ascher '84, a Carleton graduate who majored in history who now works at the International Securities Exchange, is giving a talk specifically geared to students with a strong background in quantitative analysis (like you!) who might not have considered a career in finance. If you're already interested in finance, consider attending the talk he'll be giving immediately afterward at 7:00 as well.

RSVP via the Tunnel if you plan on going!

Math in the News: Fibonacci on the Wall

The circles in this figure, which sits under a lunette (in this case, it's a shallow, semi-circular alcove) on the church's front, have radii that increase according to the Fibonacci sequence.

Last month, the Florence edition of the Italian newspaper*La Republica* announced the discovery of the Fibonacci sequence on the facade of the church of San Nicola in Pisa that had gone unnoticed almost since its construction sometime during the 12th or 13th century. The sequence is found in the radii of circles, which represent the first nine elements of the famous mathematical progression, and is also arranged in such a way as to convey some of the properties of the sequence.

Why was such a mathematical artifact placed on the facade of a religious building? The professor of earth sciences who made the discovery, Pietro Armienti, says it could be "symptomatic of the cultural climate of the [Pisan] Republic, which at the time controlled the trade in the Mediterranean[.] The lunette could well be said to represent a milestone in the history of scientific thought of the Christian West. ... The position of the [figure], on the main entrance of the church, is an expression of the thesis supported by Thomas Aquinas in his Summa Theologiae, i.e. that knowledge is a gateway to the divine, and rational truth and revealed truth cannot contradict one another."

And why was this found in Pisa, of all places? Fibonacci is how we know the mathematician whose birth name was Leonardo Pisano -- a name that means "Leonardo of Pisa". He was born and died there, living during the late twelfth and early thirteenth centuries.

Job, Internship, and Graduate Opportunities

Human Capital Research Corporation: Research Analyst

HCRC is an Evanston, Illinois-based research consultancy firm specializing in higher education enrollment,Â is seeking individuals with outstanding quantitative and creative talents to join our group of analyst-consultants. Professional staff at HCRC work in a team setting in close collaboration with institutional clients on a wide variety of applied research and policy related projects. As a Research Analyst you will be responsible for executing significant analytic projects under the supervision of senior staff. U.S. work authorization required. Apply though the Tunnel.

Vote Smart: Nonpartisan Political Research Internship

Project Vote Smart, founded by Presidents Carter, Ford and other national leaders, is a national research center that collects and distributes factual information on over 40,000 political leaders. Our National Internship Program provides interns an insider's look into how modern day campaigns attempt to manipulate voters emotionally, instead of informing them intellectually.We accept interns year-round, and are currently seeking interns for fall, winter and spring internships on a rolling basis to begin their 10-week commitment between August 2015 and February 2016. Recent graduates are encouraged to apply as this opportunity offers a great way to transition into the workforce while living in an extraordinary environment.

GradStaff: Client Services Associate

GradStaff uses a behavioral-based interviewing technique to help job seekers better understand their marketable job skills and identify ideal career tracks. As part of our service, we will critique your resume, strengthen your interviewing skills, and provide you with job search advice. All of our services are provided at no cost to job seekers.This is an excellent entry level position for someone with an analytical background that enjoys a fast-paced environment and working one on one with a variety of co-workers and clients. Apply through the Tunnel.

Problems of the Week

Need a break from your usual routine? Here are two new problems for you to try. As usual, you are encouraged to submit your solutions to one or both of these by putting them in my mailbox in the CMC, or by sending solutions by e-mail (gnelson). I will be looking for your solutions to these problems by November 9.

1. Let α and β be real numbers. Suppose the sequence $\{a_n\}$ is defined by $a_1 = \alpha$, $a_2 = \beta$, and $a_{n+1} = a_n + a_{n-1}$ for $n \geq 2$. (Note that if $\alpha = 1$ and $\beta = 1$, this is the familiar Fibonacci sequence $\{F_n\}$.) Prove or give a counterexample: For every pair of real numbers α, β, there are constants A and B so that $a_n = AF_n + BF_{n-1}$ for $n \geq 2$.
2. A domino consists of two 1 by 1 square tiles glued together to make a 1 by 2 rectangle. Variations are called polyominoes. In particular, a monomino is a 1 by 1 square tile, while a straight tromino consists of three 1 by 1 squares glued together in a straight line (which forms a 1 by 3 rectangle or a 3 by 1 rectangle, depending on which direction the tromino is placed). You have a standard 8 by 8 chessboard, 1 monomino, and 21 straight trominoes. Your challenge is to see if it is possible to completely cover the chessboard with

while a straight tromino consists of three 1 by 1 squares glued together in a straight line (which forms a 1 by 3 rectangle or a 3 by 1 rectangle, depending on which direction the tromino is placed). You have a standard 8 by 8 chessboard, 1 monomino, and 21 straight trominoes. Your challenge is to see if it is possible to completely cover the chessboard with this set of polyominoes. Start by choosing a square for the single monomino. Can you cover the remainder of the chessboard with the straight trominoes? Does it matter where the monomino is placed? Your task is to determine all possible starting squares on the chessboard that can be covered by the monomino and still allow you to complete a tiling of the rest of the chessboard by the trominoes, or show no such tiling exists. Justification is necessary, of course. (Note: the trominoes do not have to all go in the same direction.)

Solutions have appeared to the problems from the last regular issue of the Goodsell Gazette. Marshall Ma is continuing his streak of submitting solutions. This time he gave a correct solution to the second problem and essentially correct solution to the first. Congratulations! John Snyder of Oconomowoc also solved both problems but is too far away for a prize. (But, of course, only Carleton students are eligible for prizes.) Marshall should check with Sue Jandro about receiving a prize from the B.B.O.P. (Big Box of Prizes).

-Gail Nelson

If you're having trouble seeing the Problem of the Week, try enabling images for the message.

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Web&Subscriptions: ***Sue Jandro***