St. Olaf Mathematics Department

Math Mess

Department of Mathematics
St. Olaf College
Northfield, MN 55057

November 10, 2003
Volume 32, No. 7

This Week's Mathematics Colloquium

Title: Partitions: Past, Present and Future
Speaker: Tina Garrett, Carleton College
Time: Tuesday, November 11th, 1:30 pm - treats at 1:15
Place: SC 182

This Week's Colloquium

This week's talk will discuss some of the basic ideas of integer partitions. We will introduce some classical theorems and give combinatorial proofs where possible. The talk will also cover some of the current ideas in partition theory as well as describe some open problems that the audience can take home to solve. No previous experience with partitions or combinatorics needed!

Tina Garrett did her undergraduate at MIT in Mathematics where she played rugby and basketball. She got her PhD from the University of Minnesota in 2001. Her research interests are in the areas of combinatorics, special functions and orthogonal polynomials. She enjoys teaching combinatorics and doing research with students. When she is not doing math she likes to play racquetball (with a former Ole in the Carleton department), cook, spend time with her nieces and nephews and get out of town to warmer parts as much as possible.

Summer Research in CS

We are looking for one to two summer research students with strong software design skills to assist with the development and implementation of Co-Process Extension Tool (CPET), a web-based software system to supporting "Just-in-Time Teaching" (JiTT) in Computer Science. Ten weeks, full-time during Summer 2004. JiTT, a proven approach that uses technology to enhance the student learning experience outside of the classroom, is little used in CS for lack of supporting software. CPET will satisfy that need, working together with existing course management software to provide access to language interpreters and other special-purpose systems; we will prototype CPET as a proof of concept. CS 251 "SD" (formerly CS 272) background is essential; additional CS courses beyond SD and related extracurricular experiences are assets. Contact Dick Brown, rab@stolaf.edu, x3860.

Bowling with the Profs!!

Everyone's favorite night of the year is quickly approaching! On Thursday, November 20th at 7:30pm, math students and faculty will head down to Jesse James Lanes for a night of fun, camaraderie and bad bowling. Mark your calendar and keep your eyes open for more info!

New CS Course Numbers

Numbers for all CS courses have now changed as planned for the new CS major. A few course titles have changed, too. Here's a table for converting the new to the old:

Old #	New #	Title	Code	(fmr. title)
172	121	Principles of Computer Science	CS1	
272	251	Software Design and Implementation	SD	
274	241	Hardware Design	HD	(was Comp Org)
372	253	Algorithms and Data Structures	ADS	(was Data Structures)
376	276	Programming Languages	PL	
378	300	Topics in CS	TOP	(was Sem. in CS)

These new numbers take effect in Spring term. Thus, the CS courses being offered this Spring are:

- CS 121, Principles of Computer Science
- CS 251, Software Design and Implementation
- CS 263, Ethical Issues in Software Design (ESD, new in Spring '04)
- CS 276, Programming Languages (PL)

For more information on numbers, course content, etc., see the CS web site www.cs.stolaf.edu and click on "Courses", or see Dick Brown (rab@stolaf.edu, http://www.stolaf.edu/people/rab/appts.html).

New Faculty Spotlight: Randy Bailey

Randy Bailey holds B.S. and M.Ed. degrees from the University of Minnesota and comes to St. Olaf as the 2003-2004 Visiting Master Teacher. A proud native of Austin, MN (also the hometown of Spam!), he worked in Pillsbury's Research & Development department before a tragic accident with cookie dough allowed him to find his true calling in the classroom. He now has 13 years of teaching experience, all in Minnesota. Interests include statistics education and the preparation of mathematics teachers. Outside the classroom, Randy can often can be found happily wrenching on some vehicle or working on adding an instrument rating to his private pilot's license. His lovely bride Ann is a project manager for Target Corporation, but she is better known for her patience and secret-recipe cookies.

Summer Research in Bioinformatics

Summer Research in Bioinformatics of Tuberculosis Latency. Approximately a third of the human population (~2 billion persons worldwide) have viable, but nonreplicating tubercle bacilli in their lungs. Together with HIV, it is the worlds number one killer. Using a combination of computer science and statistical thinking we build a "whole genome" view of the causative bacterium M. tuberculosis. Over the past few years, we have provided bioinformatic support for several major labs, helping them store and manage the

data on the expression all of this bacterium's genes under several hundred different growth conditions, helping discover the roles of each gene. We also build and distribute new open source software to help biologists discover new things. Knowledge of Biology is not necessary: this can be learned on the job. Lovers of UNIX/Linux and/or Statistics are especially encouraged to apply. For more information see orb.public.stolaf.edu or drop by to meet Dr. Rutherford in SC226.

More Course Offerings

Spring

CS 251: Software Design and Implementation

If you only take two CS courses in your life, Software Design and Implementation (SD) is the most strategic choice for a second course. SD opens doors, giving you many options for future choices, because it reinforces and applies the concepts of CS, develops specific technical and thinking skills that give you great advantages in both academia and the real world, and expands on your communication and teamwork abilities, the "people skills" so essential for anything you do.

SD introduces the C++ programming language and develops strong programming skills that have relevance for other programming languages. The final portion of the course is devoted to a team programming project that uses realistic software-design techniques. This combination creates a valuable background for future computing work, whether within CS or beyond it. SD is a prerequisite for most of the middle and advanced CS courses at St. Olaf. The course includes a two-hour weekly lab with more personalized instruction; Prerequisite CS1 (CS 172). For more information, see Matt Richey (richeym), Dick Brown (rab), or the news section of the CS web site (www.cs.stolaf.edu).

CS 263: Ethical Issues in Software Design

Hardly a day goes by without news of a just-discovered security "hole" in software, or more articles about illegal copying of music, movies or software, or a story of a costly virus attack, or abuse of personal information supplied by consumers. These examples illustrate ethical issues in computing, and the first challenge is to become aware of these issues and their omnipresence. ESD goes deeper, building on the understanding of software design developed in SD to study the kinds of daily choices professionals make that have (often unintended) consequences that affect people.

The new course ESD systematically studies these issues, in the context of practical application. The term project for Spring 2004 will be to complete a formal ethical impact analysis of the new student record system. ESD satisfies EIN and ORC graduation requirements, and has SD as a prerequisite. For more information, see Chuck Huff (huff), Dick Brown (rab), or the news section of the CS web site (www.cs.stolaf.edu).

CS 276: Programming Languages

PL surveys the fundamental concepts and features that appear in programming languages. At St. Olaf, students study these issues and get "hands-on" experience with them by simultaneously building a programming language interpreter of their own! As each new feature and idea emerges, students integrate it into their growing language interpreter. Then, at the end of the term, there's an opportunity of a team project, such as reimplementing the language processor in a language of your choice. PL satisfies a core requirement for the new CS major, and has SD and Computer Organization as prerequisites. For more information, see Richard Allen (allen), Dick Brown (rab), or the CS web site.

Last Week's Problem

If $x = (1 - \sqrt{1997})/2$, then what is the value of $(4x^3 + 2000x - 1997)^{2003}$? Justify your answer.

Many solutions this week! **Robert Orme '05**, **Jason Saccomano '05**, **Matthias Hunt '07**, **Jake Leibold '07**, **Sara Krohn '05**, **Noah Loome '05**, **Phillip Schulte '06**, **Anna Ericksen '05**, **Brendan Bailey '07**, **Nancy Thiede '07**, and **Heather Wood '07** all submitted solutions. And all solutions submitted were correct, illustrating that sometimes it makes sense to just do it and see what happens. There was a "trick" or shortcut: if r is a root of a polynomial with integer coefficients, then so must be its conjugate. Here, we have that $x = (1 - \sqrt{1997})/2 = 0$, so $(x - (1 - \sqrt{1997})/2)(x - (1 - \sqrt{1997})/2) = 0$, but this simplifies to x^2-x-499 = 0. We have a polynomial with leading term, so multiplying now by 4x+4, we have $4x^3$-2000x-1996 = 0. Hence $4x^3$-2000x-1997 = -1, and the 2003rd power of that is also -1.

Problem of the Week

There are six sparrows sitting on six trees, one sparrow on each tree to begin with. The trees stand in a row, with 10 meters between any two neighboring trees. If a sparrow flies from one tree to another, then at the same time some other sparrow flies from some tree to another the same distance away, but in the opposite direction. (There might be more than one sparrow in a tree at this point.) Is it possible for all the sparrows to gather on one tree? What if there are seven sparrows and seven trees?

*** 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.

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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