MSCS Mess

Department of Mathematics, Statistics and Computer Science
St. Olaf College
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This Week's Colloquium

Title:	Simple Mathematical Models with Complicated Dynamics
Speaker:	Jaroslav Smital, professor at Selesian University in the Czech Republic
Time:	Tuesday, November 15, 1:30 p.m. (treats at 1:15)
Place:	SC 182

In this lecture, Professor Smital will show how dynamical systems occur in rather usual places, but with rather unexpected consequences. His talk will be introductory in nature and anyone who knows a little calculus should feel right at home.

Professor Smital is a senior researcher at Selesian University in the Czech Republic. He has published 11 textbooks and more than 70 research papers on the topic of dynamical systems.

Professor Smital will be visiting St. Olaf for three weeks as part of a National Science Foundation grant that will enable three St. Olaf undergraduates to become part of research teams in the Czech Republic and in Poland for each of the next three years. He is here to work with the students and faculty at St. Olaf and become familiar with the local modus operandi.

Problem of the Week (POW)

A classic this week. If you have done it before, we apologize; if not, this is a good one to try.

Let us assume that a given pair of people either know each other or are strangers. If six people enter a room, show that there must be either three people who know each other pair wise, or three people who are pair wise strangers.

*** 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.

Bowling with the Profs, Take Two

Forget about last Wednesday's Bowling with the Profs Night? Great! We didn't go anyway. Due to a miscommunication with Jesse James Lanes, the event has been rescheduled for THIS Wednesday, November 16, at 8:00 p.m. So come down to Jesse James Lanes and let the MAA pay for all the fun (although you'll need to rent or bring your own shoes). If you need a ride, or can offer one to others, meet at OMH at 7:50. Email Phil Schulte at schulte@stolaf.edu with questions.

Last Week's Problem

A train is made up of Boxcars, Flat cars, and Hopper cars. Boxcars weigh 25 tons, and Flat cars and Hopper cars weigh 50 tons each. How many different trains of total weight 1000 tons

(ignoring caboose and engines) can be made up? Trains are considered identical if and only if they have the same sorts of cars in the same order: eg./ HHB, HBH, and FBH are distinct trains of total weight 125 tons.

Congratulations to Thomas McConville ’09, Steve Lund ’06, and Matt Moynihan '07 for solving this week's problem. This is a problem that shows up in a number of disguises. The solution below is a bit more general than the ones I was given, but of the same idea.

Consider 25 tons to be a single unit of weight. Then we have cars that weigh one unit or two units and we need the total to be 40. Let $f(n)$ be the number of trains of total weight n. With this notation we need to find $f(40)$. To begin we find $f(1)=1$ (the only train is a single boxcar) and $f(2)=3$ (two boxcars, a single flat car or a single hopper). It is useful to think about $f(3)$ from $f(2)$. Let B denote a boxcar, F a flat car and H a hopper car. Then the possible trains are BBB, FB, HB, BF, BH. Note that the first 3 are the trains of weight 2 with a boxcar added to the end and the last 2 are boxcars of weight 1 with a flat or a hopper car added to the end. In fact, in general, trains of weight n will be the trains of weight $n-1$ with a boxcar added to the end or the trains of weight $n-2$ with either a flat car or a hopper car added. This gives the recurrence relation $f(n)=f(n-1)+2(f(n-2))$, where $f(1)=1$, $f(2)=3$. We can just do the recursion to find $f(40)$. It is also a short induction proof to prove that that this relation implies that:

$$f(2k-1)=\frac{2\text{^}(2k)-1}{3}$$

and $$f(2k)=\frac{2\text{^}(2k+1)+1}{3}$$

and therefore $$f(40)=\frac{2\text{^}41}{3}=733007751851.$$

This Week’s Special Literary Feature

Numbers
by Mary Cornish

I like the generosity of numbers.
The way, for example,
they are willing to count
anything or anyone:
two pickles, one door to the room,
eight dancers dressed as swans.

I like the domesticity of addition--
add two cups of milk and stir--
the sense of plenty: six plums
on the ground, three more
falling from the tree.

And multiplication's school
of fish times fish,
whose silver bodies breed
beneath the shadow
of a boat.

Even subtraction is never loss,
just addition somewhere else:
five sparrows take away two,
the two in someone else's
garden now.

There's an amplitude to long division,
as it opens Chinese take-out
box by paper box,
inside every folded cookie
a new fortune.

And I never fail to be surprised
by the gift of an odd remainder,
footloose at the end:
forty-seven divided by eleven equals four,
with three remaining.

Three boys beyond their mothers' call,
two Italians off to the sea,
one sock that isn't anywhere you look.

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