

L'Augarithms



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September 21, 2011

Mathematics Colloquium Fall Lineup

Colloquia are typically held Wednesdays 3:40—4:40 in Oren 113. Immensely appealing refreshments are served.

Sept.	7	The Annual Department Meet & Greet
	→ 21	Robert Miner, Ph.D. ¹
Oct.	4 ²	Katy Micek, Augsburg College
	19	Mike Weimerskirch, Augsburg College
Nov.	2	Austin Wagner, Megan Sutherland
	16	TBA
Dec.	7	TBA

²Note that October 4 is a Tuesday. We meet in Oren 113

¹Next week's colloquium

The Mathematics of Web Search and the Search of Web Mathematics

Robert Miner, Ph.D.
Vice President, Research & Development
Design Science, Inc.
Long Beach, California



Robert Miner

In this talk we will look at some of the mathematics and techniques underlying information retrieval on the web, including the search of mathematical notation.

The story begins with the “classical” problem of searching a collection of text documents for words and phrases.

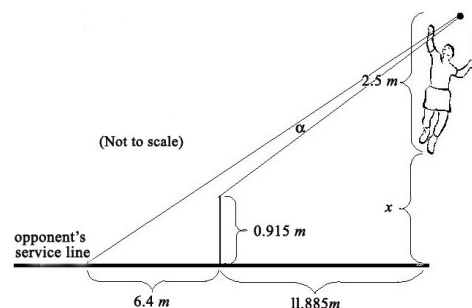
Some clever ideas together with some linear algebra and statistics produced very good algorithms that worked well in the era of databases. But the scale of the web called for new ideas, and internet search engines rose to prominence by applying ideas from graph theory to the link structure of the web to narrow in on the most relevant results.

Now, much effort is being devoted to moving beyond text to other data types. For most of these, such as images, movies and music, a chief challenge is the lack of easily machine discernible structure. However, we will end by looking at an interesting exception, namely mathematical notation. In this case, the challenge is the abundance of structure and the expectation that a computer ought to do something sensible with it.

Quality refreshments will be provided.

Problem of the week...

There were no solvers of the POTW from v24.12.



Here is a new one: Some tennis players jump up to serve. One reason for this might be in order to increase the “court angle” of the ball, α (See the sketch.). This is the angle bounded below by the straight line from the ball to the top of the net and above by the line from the ball to the service-line on the opponents side of the court. Assume that the distance from the players toes to the center of the racket with which the ball is hit is 2.5 meters. How high does the player have to jump in order to maximize his or her court angle, α ?

❖ Reprinted with permission from Bradley U's old 'POTW' page <<http://hilltop.bradley.edu/%7Edelgado/potw/potw.html>>

Puzzle of the week...

In the PZOTW from v24.12, we asked for the lowest nine consecutive numbers with exact endings (i.e., division by the final digit leaves no remainder), disregarding the trivial solution, $\{1, 2, \dots, 9\}$. The solvers were **Rebecca Seaberg** of Bethel University, and **Brian Peterman** of Century College who found $\{2521, 2522, \dots, 2529\}$. And now, a new PZOTW:

Justin asks Marty how many marbles he has. Marty: “The number has four digits. The first two together, the middle two together and the last two together are perfect squares. Justin replies: “My number is a three-digit perfect cube, and it is the product of the digits of your number. How many marbles do Justin and Marty have?”

❖ Submit POTW & POZTW solutions to kaminsky@augsborg.edu, or under Ken's door at SCI 137E, or in the puzzles and problems box just outside of Su's office.

L'Augarithms
The approximately bi-weekly newsletter
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Department of Mathematics
at Augsburg College
Editor.....Kenneth Kaminsky
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Born on this day—Dénes Kőnig³



Dénes Kőnig (September 21, 1884 – October 19, 1944) was a Jewish Hungarian mathematician who worked in the field of graph theory, and wrote the first textbook on the subject.

Kőnig was born in Budapest, the son of mathematician Gyula Kőnig. In 1907, he received his doctorate at the Technische Hochschule in Budapest (today Technical University of Budapest), and joined its faculty. His classes were visited by Paul Erdős, who, as a first year student, solved one of his problems. Kőnig became a full professor at the university in 1935.

In the days of the 1944 anti-semitic atrocities in Budapest, after aiding persecuted mathematicians, he committed suicide.



Dénes Kőnig

Kőnig's Theorem: In any bipartite graph, the number of edges in a maximum matching equals the number of vertices in a minimum vertex cover.

Kőnig's Lemma: If G is a connected graph with infinitely many vertices such that every vertex has finite degree (that is, each vertex is adjacent to only finitely many other vertices) then G contains an infinitely long simple path, that is, a path with no repeated vertices.

Note: Kőnig's Theorem from set theory is named after Gyula Kőnig, Dénes Kőnig's father.

³Source: Wikipedia, the free encyclopedia

New Face of '11



Mike Weimerskirch

Mike Weimerskirch joins the Augsburg staff from Macalester College, where he taught the previous year, and earlier from St. Olaf College. Mike earned his PhD from the University of Minnesota in 2007, working in Combinatorial Game Theory. His interests also include Probability Theory and Math Education. Mike was a high school math teacher for ten years, and coached Cross Country Skiing and Track and Field. He lives in south Minneapolis with his wife Jessica and daughter Olivia.

North Star STEM* Student Union

STEM Meet & Greet

Oren Gateway Center 113, Wednesday, September 14, 3:40 p.m.

STEM majors: Want to welcome the new incoming AugSEM and transfer students.

STEM AugSem students and new transfers: Want to meet other STEM students and learn about ways to get involved in student groups.

Come to STEM Meet & Greet for popcorn, treats, and a chance to meet other students interested in STEM. This is a student-led, informal event-come for a few minutes or stay and hang out.

For more information, contact Aklilu Dimore (dimore@augsborg.edu), Luis Hernandez (hernan10@augsborg.edu) or Rebekah Dupont (dupont@augsborg.edu).

*Science, Technology, Engineering & Mathematics

Let's all sing the \aleph_0 song

\aleph_0 bottles of beer on the wall,
 \aleph_0 bottles of beer on the wall,
If one on those bottles happens to fall,
 \aleph_0 bottles of beer on the wall. (Repeat until slapped.)

Cartoon Corner



Kaminsky '11