

Goodseal Gazette

Carleton College
Northfield MN 55057

The newsletter for the Carleton mathematics and statistics community

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The Last Gazette of Winter Term!

Hopefully this is not news to you, but winter term is coming to an end. We at the Gazette are hoping that this term has been a good one for you, with rewarding classes and fun experiences, despite the seemingly interminable cold and dreary days. We also hope that the Gazette has proved useful to you and your mathematical exploits.

We wish you equal amounts luck and skill with finals, a delightful and relaxing spring break, and a wonderful Spring term, where we will connect with you once more!

Last-Minute Summer Opportunity

This summer, from June 8th through August 1st, there will be a Computational & Systems Biology Summer Institute at Iowa State University. Up to twelve fellowships will be provided to students to provide travel, tuition, living expenses, as well as a stipend of \$4000. Students will learn bioinformatics, train in the use of computational biology tools, do research, and learn about careers in these emerging fields. If interested, you must act quickly! The application deadline is March 15, and the application can be found online at <http://www.bioinformatics.iastate.edu/CSBSI>.

Career Opportunities at the United States Census Bureau

If you are a student interested in Statistics, keep in mind that the United States Census Bureau always has interesting and exciting job opportunities, from creating and implementing surveys to regression analysis to applied probability. The Census Bureau's goal is to provide the public with quality data in order to help them understand various trends in our country, in realms such as politics, society, economics, resources, and culture.

The Census Bureau provides excellent benefits for its employees, from recognition for a job well done to flexible hours to dental insurance. Additionally, as a product of the Census Bureau's mission, the work environment in Washington is very much in the spirit of learning.

The Catch: in order to work for the Census Bureau, applicants must have Master's degrees or Doctoral degrees in mathematics or statistics. So, if you students are interested in such a job, you have a fair amount of work to do. If you were looking for an incentive to go to graduate school, the United States Census Bureau may be what you need to motivate you to persevere with your education.

Problems of the Week

1. A "knight's tour" on a chessboard is a sequence of knight's moves so that every square of the board is visited exactly once, with the last move returning to the original square. (A knight's move is a simultaneous displacement of two squares in one [horizontal or vertical] direction and one square in a second, perpendicular direction; for example, two squares up and one to the left, or two squares to the right and one up. If that seems confusing, ask the nearest chess player.) It is a classic problem to find knight's tours, when they exist, on "chessboards" of different sizes. The smallest square board on which a knight's tour exists is 6×6 . However, you can already come close on a 3×3 board, where you can find a closed knight's path visiting all squares except for the central square.

Now for the problem: Suppose we have a *cube*, each face of which is a 3×3 board, and we allow the knight to move from one face of the cube to an adjacent face if the move would be legal on the 6×3 (or 3×6) board obtained by detaching those two faces from the cube and folding them flat. Does there exist a knight's tour of the $6 \times 3 \times 3 = 54$ squares on the six different faces of the cube? (Note: Although a knight's move can pass from one face to an adjacent one as described, at most one such "edge crossing" per move is allowed.)

2. We haven't had much new snow in Northfield lately, but here and there in the state there has been more. In fact, one recent snowfall posed a substantial problem for the Wohascum Skating Club. Just an hour or so before a scheduled event, the rink was still under four inches of snow, while the town snowplow (which usually clears the rink after making its rounds elsewhere) was clearing the local streets. Fortunately, a dozen volunteers were found, and soon the light, fluffy snow was flying off the rink as each person threw each shovelful to the nearest point along the perimeter. Given that the rink is a 75 by 30 foot rectangle, what is the average distance that the snow was being thrown, as the entire rink was cleared?

Yuan Tian solved the first problem posed last week, and he should collect a "C" block or other B.B.O.P. item from CMC 218.

Since this is the last *Gazette* for the term, solutions to the new problems (and to older problems whose solutions aren't posted yet) will be acknowledged at the beginning of next term. Good luck on finals etc.; have a great spring break!

- Mark Krusemeyer

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