



Goodsell Gazette

Carleton College

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Northfield, MN 55057

The newsletter for the Carleton mathematics and statistics community

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Work in the Math and Stats Department Next Year!

Are you interested in working for the Mathematics and Statistics Department next year? Are you looking for a flexible job on campus and an opportunity to work with and for your professors? Do you want to help other students learn mathematics and statistics with the added benefit of learning the material *better* for yourself?!

We are looking for students to work in a variety of positions, including math and stat course graders, teaching assistants, prefects, and Gazette editor. Teaching assistant's duties may vary depending on the course and instructor preferences, but they could include some combination of office hours, grading, and one-on-one help for students in a specific course. Prefects will be working for Kathy Evertz (Academic Support Center) and will need to meet the criteria for that program. We ask that graders and TAs received at least a B+ in the class you would like to grade (or have had an AP score that tested you out of the course). If you took a class in the spring of 2020 and you did well in the class, let us know in the comment section of the application.

We also need students to work in our Stats Lab (CMC 201) to assist students from a variety of stats courses on HW, project and R questions. We ask that students interested in working in the stats lab be comfortable with R and R Markdown, have a B+ or higher in Stat 120 (Math 215) or Stat 250 (Math 275) and Stat 230 (Math 245), and we highly recommend taking Stat 220 (Math 285) though this isn't a requirement.

The [application](#) for these positions is now available and due on Sunday, April 10.

The Math Skills Center will also be hiring tutors for next year and you can apply [here](#).

If you have questions about the math and stats positions outlined here please contact Sue Jandro. If you have questions about tutoring in the Math Skills Center please contact Russ Petricka.

Lending Library

The Mathematics and Statistics Department started a lending library this year. If the price of your textbook is an obstacle for you, there are a number of campus resources to support you including a small [CSA](#) lending library and the [Dean of Students Office](#). [TRIO](#) students can use the TRIO lending library. If you've exhausted these resources, and are not a TRIO student, then you can make use of the Mathematics and Statistics Department lending library. We have a limited number of textbooks to lend out for Stat 120, and Math 111, 120, 210, 211, 232 and 236. Contact Sue Jandro (sjandro@carleton.edu) in

the Department of Mathematics and Statistics to reserve a book for the term.

Carleton Teams Compete in Konhauser Problemfest

On Saturday, February 26, three teams of Carls participated in the 30th annual Konhauser Problemfest, tackling a set of ten challenging (but fun!) problems. The team of Bowen Li, Ton Meesena, and Sebastian Vander Ploeg Fallon took home first place out of 15 teams, meaning that the famed pizza trophy will remain at Carleton for another year. Check it out in the area near Sue's office the next time you're in the department. The team of John Byun, Alejandro Gonzalez, and Erin Watson finished in a strong fifth place. Also making a very good showing was the team of Nick Pandelakis and Michaela Polley. Congratulations to all who participated!

Job, Internship, & Other Opportunities

Berkshire Hathaway Annual Shareholders Meeting & Alumni Networking in Business Opportunity

Apply for a unique, funded opportunity to travel to Omaha for both the Berkshire Hathaway Annual Shareholders Meeting (Saturday, April 30) and an opportunity to network with local, prominent Carleton alumni (Friday, April 29). Applications are due by April 6. Find more details and apply at carleton.joinhandshake.com/stu/jobs/6112532.

Summer Analyst Programs - Bank of America

The following opportunities are for current sophomores for summer 2023. These opportunities are brought to you by a Carleton alum, Debra Ponce de Leon '81 (poncedeleondebra@gmail.com). You are welcome to reach out to Debra with any questions regarding the organization or the position prior to applying. Note that the application deadline date isn't for a while however these roles fill very fast so you are encouraged to apply as soon as possible.

- [Wealth Management Sophomore Summer Analyst](#)
- [Global Corporate Strategy Summer Analyst Program](#)
- [Global Capital Markets Summer Analyst Program](#)
- [Global Investment Banking Summer Analyst Program](#)

Client Service & Research Position - Ulland Investment Advisors, LLC

This hybrid role in an all Carleton alumni-staffed firm will encompass client service responsibilities along with some light research/paralegal work. If interested, please email Jared Plotz (jared.plotz@ullandinvestment.com) with a brief description of yourself and include a resume, or complete application in Handshake at carleton.joinhandshake.com/stu/jobs/6107825. Applications are being reviewed on a rolling basis.

Problems of the Fortnight

To be acknowledged in the next *Gazette*, solutions to these problems should reach me by noon on Tuesday, March 29; that is, during (or even before) the break or right at the beginning of spring term.

1. Suppose you have an $n \times n$ checkerboard and an unlimited supply of pieces in the shape of a Greek cross, so that each piece can exactly cover five squares of the checkerboard: a “central” square (central for the piece, not for the checkerboard) and the four squares adjacent to it. The object is to cover as many squares of the checkerboard as possible using the cross-shaped pieces, in such a way that each piece does exactly cover five squares of the board (in particular, the pieces are not allowed to stick out beyond the edges of the board) and there is no overlap between pieces. For small values of n there isn’t much you can do; for example, for $n = 3$ and $n = 4$ you will be able to get only one cross at a time onto the board, and for $n = 5$ you can manage just two (don’t put one right at the center of the board, or you won’t be able to get a second one along with it). Thus the ratio of the number of squares of the board that can be covered by crosses to the total number of squares is $5/9$, $5/16$, and $10/25 = 2/5$ for $n = 3, 4, 5$ respectively. Here’s the question: As $n \rightarrow \infty$, does this ratio have a limit? If so, what is the limit, and how do you know? If not, how do you know that?

2. Consider an $n \times n$ matrix (square array), all of whose entries are 0 and 1, for example

$$\begin{array}{cccc} 1 & 1 & 0 & 1 \\ 1 & 0 & 0 & 1 \\ 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 \end{array} .$$

If we look at the n rows of this matrix and interpret them as binary representations of integers (in the example, $n = 4$, and the integers are $1101_2 = 8 + 4 + 1 = 13$, $1001_2 = 9$, $0001_2 = 1$, $0000_2 = 0$), then add up those integers, we get an integer R (in the example, $R = 13 + 9 + 1 + 0 = 23$). If, instead, we interpret the *columns* of the matrix as binary numbers and we add those numbers, we get another integer C (in the example, the columns yield the integers $1100_2 = 12$, $1000_2 = 8$, $0000_2 = 0$, $1110_2 = 14$ and so $C = 12 + 8 + 0 + 14 = 34$). Finally, we can subtract R from C to get a single integer $D = C - R$ (in the example, $D = 11$). Now for the problem:

- As a function of n , what is the largest possible value of D (for all possible $n \times n$ matrices with entries chosen from $\{0, 1\}$)?
- Still as a function of n , how many different values of D can occur? How do you know?

Whether because of horrifying current events, the press of other work, the Konhauser contest (see the good news elsewhere in this *Gazette*), or something about the problems themselves, so far no solutions to the problems posed February 25 have arrived. But hope springs eternal! Good luck finishing up the term, and enjoy the break ...

- Mark Krusemeyer



