Goodsell Gazette

Carleton College *May 20, 2022*

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Math/Stats Department Picnic

Math and Stats Majors and Math Minors, join us for the annual department picnic on May 31 from 12-1pm! It will be on the CMC/Boliou Terrace, or the CMC second floor in case of rain, with lunch from El Truinfo.

Please RSVP by May 22 so there is plenty of food!

Job, Internship, & Other Opportunities

Data Analyst Summer Intern - Pace Gallery

Pace Gallery in New York is looking for a data analyst summer intern to compile and organize data from the various systems at Pace, as well as develop methods for presenting the data effectively. This is a great opportunity for a Carleton student who wants to exercise their data entry, cleaning, analysis, and visualization skills while gaining exposure to the professional art world.

Apply on Handshake: carleton.joinhandshake.com/stu/jobs/6491357.

J.P. Morgan Private Bank Information Session with Nia Harris ’21

Tue, May 24, 2022 • 4:30pm - 5:30pm (1h) • Willis 204.

J.P. Morgan Private Bank works with innovators, entrepreneurs, industry leaders, and their families to help them achieve what they envision and make a difference.

All students are welcome to join Carleton alumnus, Nia Harris ’21, Private Bank Analyst, and members of Nia's team to learn more about Private Bank, the recruiting timeline for the summer internship and full-time analyst roles, and get answers to any of your questions about the wealth management field.

They will provide food from El Triunfo. Please register on Handshake to allow for an appropriate count: app.joinhandshake.com/stu/events/1044393.

Problems of the Fortnight

To be acknowledged in the next *Gazette*, solutions to these problems should reach me by noon on Tuesday, May 31 (that is, the next-to-last day of the term).

1. Let n be a fixed positive integer. Let's play "Wordle" with n-digit integers, or more precisely, with strings of n digits (the difference being that the first digit of a string is allowed to be 0). The idea is that you get a certain number of guesses to guess a hidden string. After each guess, each digit of the guess turns green if it is correct, yellow if it is wrong but that digit does occur elsewhere in the hidden string, and black if that digit does not occur at all. It's a bit harder to describe what happens if a digit occurs multiple times in the hidden string (which is allowed), or in your guess; with luck, the following examples should clear up any confusion: If the hidden string is 1133 and you guess 3913, the final 3 of your guess will turn green, the first 3 and the 1 will turn yellow, and the 9 will turn black.
If the hidden string is 1133 and you guess 1118, the first two 1's of your guess will turn green, while the third 1 and the 8 will turn black.
If the hidden string is 1249 and you guess 9973, the first 9 of your guess will turn yellow and the other three digits will turn black.
If the hidden string is 1249 and you guess 9999, the last 9 of your guess will turn green and the other three digits will turn black.
(In other words, in case of multiple matches green has first priority, and after that earlier digits of your guess have priority.) Let $W(n)$ be the *least* number of guesses you have to make to *guarantee* that one of your guesses will be correct. (Naturally, you can and should use information from previous guesses to decide on what to guess.) Suppose $1 \leq n \leq 5$.

   a) For which value of n in this range is $W(n)$ the largest, and what is that largest value W_{max} ?
   b) Show that for all other values of n with $1 \leq n \leq 5$, we have $W_n \leq W_{max} - 3$.

2. Let P and Q be distinct points in the plane. Give a geometric description of the set of points R in the plane such that you can accomplish a rotation with center R by first rotating around the point P through some angle and then rotating around the point Q through some (perhaps different) angle, if:

   a) The rotation around R should be a 180° rotation;
   b) The rotation around R should be through a fixed angle θ (instead of through 180°).

So far, no solutions to the problems posed May 6 have arrived, but this may change soon: A Carleton student who is in Paris at the moment reported that riding the metro was conducive to thinking about at least one of the problems. Now that everything in Northfield seems to be in bloom at the same time, you might find other good "outside" opportunities; as always, I'm looking forward to seeing your solutions to the new problems, as well as to previously posed ones ...

- Mark Krusemeyer

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