



“INSTEAD OF MIDTERMS, WE SHOULD HAVE...?”

It's that time of year again! Hello, midterms. Everyone's simply overjoyed to see you. Surely we will enjoy the week where everyone has major assignments, meetings and exams to write up, and at the end of it all, it'll be a wonder you haven't lost your sanity. Take this time to think about the many opportunities you're missing because of these stupid midterms. Truly the time of our lives.

Losing your sanity over the passage of time seems to be a common theme this issue. Or well, losing your sanity in general, but nostalgic insanity is certainly up there. From Android 12 reviews from our resident American to advice that took Beyond Meta almost 30 years to learn, to one writer's insane idea to advertise a Math CnD alternative that isn't even affiliated with the faculty, **mathNEWS** is certainly made of people who have never been sane, and likely never will be. I mean, it makes sense, all the editors spend their time in a poorly ventilated room that gets stuffy real quick, as a certain someone from the Health faculty will point out later on.

Speaking of, **mathNEWS** now has office hours! Come meet and greet with your favourite editors, although who you get really depends on the day. After all, we're people, and students, too. Well, except for production week. Which, come to think of it, means office hours is only every two weeks, preceding prod night. You know what, just check the calendar and you'll see it. For the sake of exposition and in case the calendar becomes foreshadowing in a murder mystery, we're located at MC 3030, for the protagonist who's going to spend fifteen minutes bumping into corners, doing side-quests for NPCs and talking to everyone they can find. If that's the case, I hope I'm a romanceable side character. Then again, I'd end up getting called a 'blorbo' or whatever kids call their comfort characters these days.

You're almost at the end of the **mastHEAD**, but don't panic - there's still more articles to come before you're completely immersed in the realm of Lazeez and goose feathers as your mind actively loses brain cells. So sit back and relax, and read up on your favourite quotes, interviews, and silly little images and memes overlaid with equations that you pay thousands of dollars to understand. And some that go right over your head. They're the same for me.

uknightED
Editor, **mathNEWS**

SOMEBODY	LMAO imagine having midterms
JEFF	Final exam prequel (lore-heavy)
TEFF	Competitive Turing programming competitions
PREDAP	Meetings with profs/TAs where you just kind of talk about the work you've submitted so far (one of my classes did this, I don't remember which)
FINCHEY	What's wrong with midterms? I love them! I think they're just great!
ETERNALLY PUZZLED	a mental health check
TENDSTOFORTYTWO	Study term reports (work term reports but for study terms)
WEWLAD	a week off, like every other term
APHF	Raids and pillaging along the northern coast of England, where the monasteries lie fattened with gold and with naught in the way of defences.
LEMMAN	1/n terms
BEYOND META	Technical Interviews where they attempt to evaluate subjective scenarios with an 'objective' marking grid
BOLDBLAZER	I mean, almost all my classes don't have midterms anyway, so just do whatever those courses do, which is to just not have exams but instead smaller scale quizzes and tests.
GERALD LEE	sex
SKIT	Mid-Terms - Terms that are mid.
CUTLET	naptime
HU	Midmidterms and midmidmidterms and so on, like some Zeno's Paradox-esque construction leading up to the finals, or as I like to call them, midmidmidmidmidmi-
NOT A N*RD	Final exams. Then the course is over and we get a 2 month break
LOOP	Is board game night with Profs still a thing?
UW UNPRINT	A multi-storey bowling alley/go-karting course/axe throwing arena/steel foundry
BIPED	Bus trips
ENAMOURED	Makeup tutorials!!

ARTICLE OF THE ISSUE

Hiya boldblazer!!! I am happy 🥳 to say you take the W 🏆 for your article The Rare Waterloo.W!! Come to MC 3030 for your prize! 😊

enamoured

Let's hope your midterm isn't a mid-crash and burn.

RYAN CHOW, **mathNEWS** EDITOR FOR SPRING 2022
ALONG WITH CHEN CHAI, TERRY CHEN, NICHOLAS PRIEBE,
KEVIN TRIEU, CLARA XI, AND YANG ZHONG

mathASKS 149.3

FEATURING PROFESSOR CECILIA COTTON

GILDED: WHAT DO YOU THINK DISTINGUISHES STATISTICS FROM OTHER AREAS OF MATH?

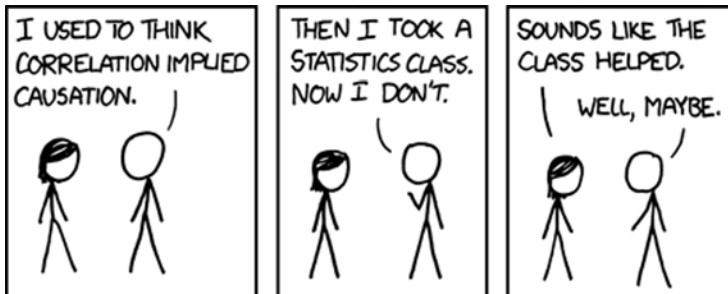
I think the practicality of statistics is a great distinguishing feature. Statistics is focused on the analysis of real data and with that comes real complications. The messiness can make people a bit uncomfortable, but it yields opportunities to work in both theoretical and applied research at the same time.

NULL: IF I HAD A NICKEL FOR EVERY TIME A UNIVERSITY OF WATERLOO PROF ALSO WENT TO UNIVERSITY OF WASHINGTON, I WOULD HAVE TWO NICKELS, WHICH ISN'T A LOT, BUT IT'S WEIRD IT HAS HAPPENED TWICE. WHAT ARE THE CHANCES OF THAT?

At least in Biostatistics the chances are pretty good. The Washington Biostatistics program is top tier and there's been lots of historical connections between the two schools with faculty taking sabbaticals back and forth and other collaborations.

TENDSTOFORTYTWO: WHAT IS YOUR FAVOURITE STATISTICS JOKE?

I will refer you here: <https://xkcd.com/552/>.



BOLDBLAZER: I TOOK STAT 337 IN FALL 2021 AND I ABSOLUTELY LOVED THE COURSE. I ESPECIALLY LIKED THE NEWLY ADDED SECTION THAT TALKED ABOUT INFECTIOUS DISEASES LIKE COVID-19. FOR COURSE SELECTION, THAT WAS ONE OF THE REASONS I HAD IN ADDING IT, BECAUSE I EXPECTED THAT THERE WOULD LIKELY BE SOMETHING ABOUT THE ONGOING PANDEMIC DISCUSSED IN THE COURSE. THE ADDED SECTION REALLY MADE THE COURSE A LITTLE MORE ENJOYABLE IN A WAY, BECAUSE OF THE TOPICALITY OF IT. WILL IT REMAIN PERMANENTLY A PART OF THE COURSE?

I'm thrilled to hear you enjoyed STAT 337. My plan is to keep the infectious disease and vaccine module in the course indefinitely. I've also continued to try and include some current COVID-19 content in the course through the assignments. One of the things I enjoy about the course is that even in non-pandemic times there is usually some health related news story that I can incorporate into the course material.

ANONYMOUS: WHAT'RE YOUR THOUGHTS ON P-HACKING IN BIOSTATISTICS? ARE THERE ANY METHODS THAT WORK PARTICULARLY WELL FOR CAUSAL ANALYSIS AND NONRANDOMIZED STUDIES?

Well I think p-hacking is bad and the best method of addressing p-hacking is to be an ethical scientist and not to do it. That means when going into a study, you need a well defined hypothesis and analysis plan. Then you run your planned analysis and test your hypothesis. There's no fishing around looking for something significant. Obviously this issue is complicated in exploratory studies or statistical genetics (which is not my field of expertise), but a lot of p-hacking could be avoided if researchers just understood that if you look long enough you'll probably find a spurious association somewhere in your data. Also it helps to remember that findings from a single study should be interpreted with caution until they can be replicated by other researchers in other populations.

CLARIFIED: WHAT DO YOU LIKE MOST ABOUT TEACHING?

I enjoy getting to interact with students and share my love of mathematics and statistics. It's very rewarding for me to help student work through hard concepts and make connections in their learning.

LOOP: HOW WOULD YOU COMPARE UNIVERSITY OF WASHINGTON WITH UNIVERSITY OF WATERLOO, SPECIFICALLY STUDENT LIFE AND RESEARCH ENVIRONMENT?

It's hard to talk about student life in general because I am just a sample size of one and I don't like extrapolating outside of the range of my data. I had a great student life at both schools, mostly because I formed strong friendships with my fellow classmates and got involved in extracurriculars that I really enjoyed. I definitely had more free time as a graduate student though, so I got to enjoy some of the perks of living in Seattle like attending sporting events, concerts, hiking, and just generally being outdoors.

As for the research environment, things are much more geographically spread out at Washington. Most profs have offices on campus, but many are primarily located at various research institutes or hospitals around the city. Most PhD students are funded through research assistantships which (especially early on) may not be directly related to your dissertation research. One thing I really like about Waterloo is that all the SAS faculty and students have offices in M3, and now that more and more people are returning to work on campus, we actually get to see each other again.

DERIVING FOR DICK: WHAT DO YOUR FRIENDS CALL YOU?

Cecilia.

CLARIFIED: WHAT DREW YOU TO ACADEMIA IN THE FIRST PLACE?

I think I just had a constant feeling that there was more that I wanted to learn. That kept me going in graduate school and eventually into an academic position.

FUN FACT ENJOYER: WHAT IS A FUN FACT YOU HAVE NEVER HAD THE OPPORTUNITY TO SHARE?

For my entire life, my count of countries visited has exceeded my age in years. But I better get back to travelling soon if I want to maintain that!

ANONYMOUS: WHAT'S ONE STATISTICS CONCEPT YOU WISH EVERYONE UNDERSTOOD?

Probably the concept of variation or error. Everyone likes to quote a point estimate ("a study showed that 20% of people who...") while ignoring the level of certainty that we have in that estimate.

CIX: WHAT ARE YOUR HOBBIES?

Running, gardening, and sewing to name a few. This spring I put a pollinator garden in my backyard, so I'm hoping to make the birds, butterflies, and bees happy this summer.

UKNIGHTED: WHAT'S A FUNNY STORY YOU'VE WANTED TO TELL?

At the end of my time at Washington, my friends and I held a mock statistical conference. We timed it to coincide with a real conference because a number of people who'd graduated the previous year came back to Seattle to attend. We actually booked a meeting room in the Statistics building for a day and had an official program of ridiculous talks and social events. My talk was a statistical analysis of my performance in my first marathon. It's the most fun I've ever had at a conference.

ENAMoured: WHAT'S YOUR FAVOURITE FOOD? 😊

To eat a celebration: chocolate cake. To eat everyday: fruit salad (low on the melon, high on the berries).

ADVICE THAT TOOK ME ALMOST 30 YEARS TO LEARN

I remember that at the beginning of my journey into adulthood I felt this need to prove myself that I could be a responsible adult. That I could get my degree, live on my own, have a career, pay taxes, do my dishes regularly etc etc. Now that I am almost 30¹ I don't feel the need to prove myself anymore. I have shown myself capable of adulting and so instead of trying to prove that I can do everything on my own, I am trying to learn how to ask for help. I don't need to do everything on my own and quite frankly I am tired from just trying.

The expectations capitalism puts on our time of working a full time job and cooking your meals and doing all your chores is quite frankly an experience that was never designed to be manageable by a single adult. I know for myself this need to prove myself did stem a lot because I am autistic and no one was expecting me to succeed. So I did feel the need to show the doubters that they were wrong.

The advice I would give to a young adult is you don't need to prove you can do everything before you ask for help. You got this. You will get your degree, and the co-op placement and the job post graduation. I believe in you.

You don't need to make this harder for yourself. Humans are social creatures, we are not meant to do everything alone. My friend likes to say we are only as resilient as our support network. Also there's more to life than capitalist expectations of success. So if you want to not just have capitalist success but also thrive in your life, shamelessly rely on your friend and family.

Do you suck at doing the dishes regularly? Invite a friend over to make dinner with you.

Don't have in-unit laundry? Go to a friend's place and have the laundry running while you watch the latest streaming sensation.

Struggling to understand a concept in math? Study and work on assignments with friends.

Not getting as much exercise as you like? Get a friend to be your workout buddy.

There is no one size fits all solution, but no matter the challenges you're facing, it's easier with friends.

Beyond Meta

¹ I am still 29. I am still in my prime, 29 is a prime number.

Enjoying mathASKS?

Thank Professor Furino. It was his idea.

A mathNEWS EDITOR WHO BELIEVES
IN CREDIT WHERE CREDIT IS DUE

PMAMC&OC WEEKEND UPDATE

Hello again, People of Pure Math, Applied Math, Combinatorics & Optimization And Other Lesser Subjects! I come this week bearing more news and happenings of the Pure Math, Applied Math, Combinatorics & Optimization Club. Busy as always, there is lots to report on:

CUMC

The omnipotent UW CUMC Committee has made decisions as to which applicants to Banish To Québec Forever (Actually Only Like Five Days). 30 were offered a full ride and 20 were offered a less-full-but-still-pretty-good ride. See you bright and early on July 12th if you were selected!

SASMS

One fortnight past, I claimed there would be SASMS. There will be SASMS. Come by **Thursday, June 23rd in MC 4021 from 7:00pm until 9:30pm** for few rounds of 30-minute student math talks with free dinner (!!!) in the middle. Maybe you'll even learn a thing or two!

APPLIED MATH TALK

There'll be — er, there *was* an Applied Math Talk given by Professor Robert Mann on Tuesday. He talked about quantum gravity and black holes and other crazy applied stuff like that. I'm writing this on Monday so I don't know how it went. Probably great! You should've went OR I'm glad you went! (read whichever statement best applies to you)

POP RUN AND NFTS (NO, NOT THAT KIND)

Our fearless VP Pop, Shannon, made another trip to Costco on Monday to claim a fresh bounty of San Pellegrino, iced tea, root beer, and other things you pop-drinkers seem to like.

In related news, we've introduced a new financial system — er, our legal department says I can't call it that — *coupon* system, in which 25 cents may be exchanged for a **Non-refundable Free-standing-beverage-centre Ticket**, which has equal value in the redemption of pop. So, 3 tickets equals 75 cents. This is useful if you want to buy pop in advance or don't want change for your bills. It should be known that I was duped and deceived into accepting this name (whose acronym form bears negative connotations) by our scoundrelous VPE, Tam An. I did not consider the ramifications of this name in its acronym form before agreeing to it. I have learned my lesson and will be wiser next time.

OVER 9000

...already happened. It got scheduled one day and didn't make it into last fortnight's update. Oh well. Congrats to the winners, whoever they were! I was in a MathSoc Council meeting and couldn't make it. That's life, I guess. Getting stuck in MathSoc Council meetings.

See you next fortnight!

Evan Girardin
President, PMC

AN ASEXUALITY EXPLAINER

IT IS PRIDE MONTH, AFTER ALL

Oh hey, it's Pride Month.

Technically it wasn't Pride Month yet last prod night so I didn't think to write about this then, but I figured I should take some time to talk about my experience as an asexual person! Who knows, supposedly people actually read this paper, and if my experiences can help somebody, it's worth writing about. So, here goes.

I'm asexual, or ace, which basically means that I don't feel sexual attraction to anyone! Although I'm also personally not that interested in sex, many asexual people still do like having sex, even if they aren't attracted to anybody in particular to do it with. Asexual people can still want romantic relationships, and many do; we can be straight, gay, or bi, as well as aromantic, or not interested in romance.

It's a pretty simple concept, when you get down to it, but there's a surprising amount of resistance to asexuality as a concept. People say it's impossible, or that asexual people just haven't found the right person. But that just isn't true, we

exist, we have our own communities, and I think we know how we feel better than other people do.

One thing that I have been happy about is that I have started to see more people talking about asexuality and more references to it in stuff like TV shows and comics. Just last week DC Comics had an issue where Connor Hawke, the second Green Arrow, came out as asexual. It's still not quite a super well-known sexuality, but it's starting to get out there. I just want people who are uncertain whether they're "normal" or not due to not feeling a certain way to know that they have their place, and people who understand what they've been going through.

Self-discovery can be difficult, and sometimes that peace of mind can be hard to attain. I hope that my asexual readers out there, if there are any, are happy with themselves and the people they've become. Happy Pride Month!

Predap

LINEAGEOS 19/ANDROID 12 REVIEW: AN ACTUAL UPGRADE

When I was a young boy, my father took me into the city to buy me a smartphone. He said, “When you go places, you should have something to contact us with, for emergencies.”

He said, “You get a cheap phone because you need to earn something better if you want to have it. Because that’s how you learn the value of hard work and making effort, for getting what you want.”

(epic guitar solo)

Okay, okay, I’ll stop now. But basically, I had a pretty cheap phone when I was a kid. Now you gotta play the cards you’re dealt with, and I was stuck with this phone until it stopped working, so I immediately sought to making the most out of it. Enter CyanogenMod.

The beautiful thing about Android is that it’s open source—the code is all freely available and you can build custom versions of Android (known colloquially as ROMs) for your phone if you’re sufficiently motivated to do so. CyanogenMod is one such custom Android ROM. It’s basically something you can replace the default (or “stock”) ROM of Android that came on your phone with, and usually provides a faster and more customizable experience by removing unneeded bloat and allowing users to make modifications to how the OS worked, either indirectly by providing easy root/admin access, or directly by baking in new features like themes, system profiles, gestures, and more. Further, if your phone manufacturer stops shipping OS updates to new security patches or Android versions, CyanogenMod would keep you up to date.

Actually all of that should be past tense.

CyanogenMod was started as a one-person project by Stefanie Kondik. In 2013 she obtained venture funding to found Cyanogen Inc, with the goal of being able to provide Cyanogen OS as the stock version of Android on a phone, rather than a “mod”. There were phones shipped with Cyanogen OS as their default OS from a variety of brands, but the idea fell apart quickly. In 2016 there was a corporate reshuffling of Cyanogen Inc, where Stefanie was ousted and Cyanogen Inc stopped supporting the open source CyanogenMod as they had initially committed to. So the community did what the community does when an open source project dies a corporate death—they forked it. Since Cyanogen, Inc still retained the copyright to the name, the new Android ROM was instead called LineageOS.

LineageOS is still going strong and, in my experience, is by far the most stable custom Android ROM. I think the reason for this is that they distribute “official” builds which are signed by Lineage’s central distribution server, and they have *very strict* standards for what’s considered good enough to be official. Other custom ROMs have an unofficial/official dichotomy

as well, but in my experience it’s much more hit-or-miss how lenient they are with granting official status. If you have official LineageOS though, that thing is going to be super stable.

When I say “super stable”, though, I mean that in the desktop Linux sense of the word. As in—it’ll mostly work fine and actually be a solid upgrade from Windows/your stock ROM. But you’ll sometimes have to engage in weird shenanigans to make stuff you’re used to using everyday, like games/Google Pay to work. And some things, like Photoshop/custom device hardware may not work at all. That’s really not Lineage’s fault, usually, it’s things like proprietary firmware or Google security restrictions beyond their control.

All in all though, it’s still a positive enough experience that I switched my first phone to CyanogenMod almost immediately, and have used CyanogenMod or LineageOS on every device I owned since. Until yesterday, I used LineageOS 18.1, based on Android 11. That’s when I got the notification that LineageOS 19, based on Android 12, was finally available for my phone! Oh boy oh boy oh boy!

UPGRADING TO LINEAGEOS 19

I followed the instructions on the Lineage website, which involved taking my phone into “recovery” mode, from where I could overwrite my system partition¹ entirely with the new Android version, and reinstall Google apps like the Play Store and Gmail, which for legal reasons need to be bundled separately from the main LineageOS ROM. Finally, I installed Magisk, a tool that (among other things) allows me to maintain access to Google Pay on my phone. After doing all that, I rebooted my phone into Android 12.

Aaaaand it crashed. Hard.

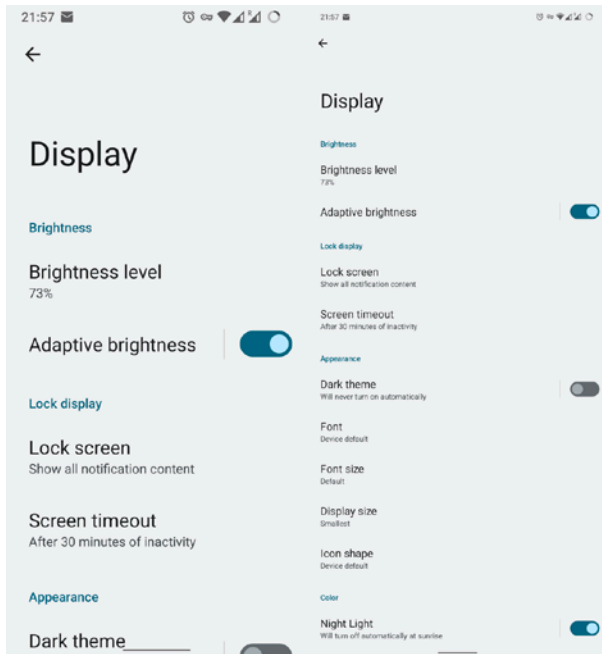
Back in the good old days, the home screen in Android was handled by an app called the launcher, and the rest of the interface was handled by an app called System UI. However at some point, ownership of the “recent apps” screen was given from the System UI to the launcher. As a side effect of this, if your launcher stopped working, so did your ability to switch apps at all. And for some reason, the upgrade process, which had upgraded everything else, refused to upgrade the LineageOS launcher from version 11 to 12. The incompatible launcher crashed at startup, leaving my phone nearly completely unusable. Retrying the install did not help.

Thankfully, I had other launchers installed for no good reason on my phone. Though this did not grant me app switching capabilities, I was able to set one of the other launchers as my default, and then get enough functionality back to backup my two-factor auth codes and other important info off the device. With that saved, I heaved a sigh and factory reset my phone.

After a reset Android 12 worked flawlessly. I'm just annoyed that it required a reset—but I suppose that comes with the territory of running unsupported custom operating systems on your phone.

THE ANDROID 12 EXPERIENCE

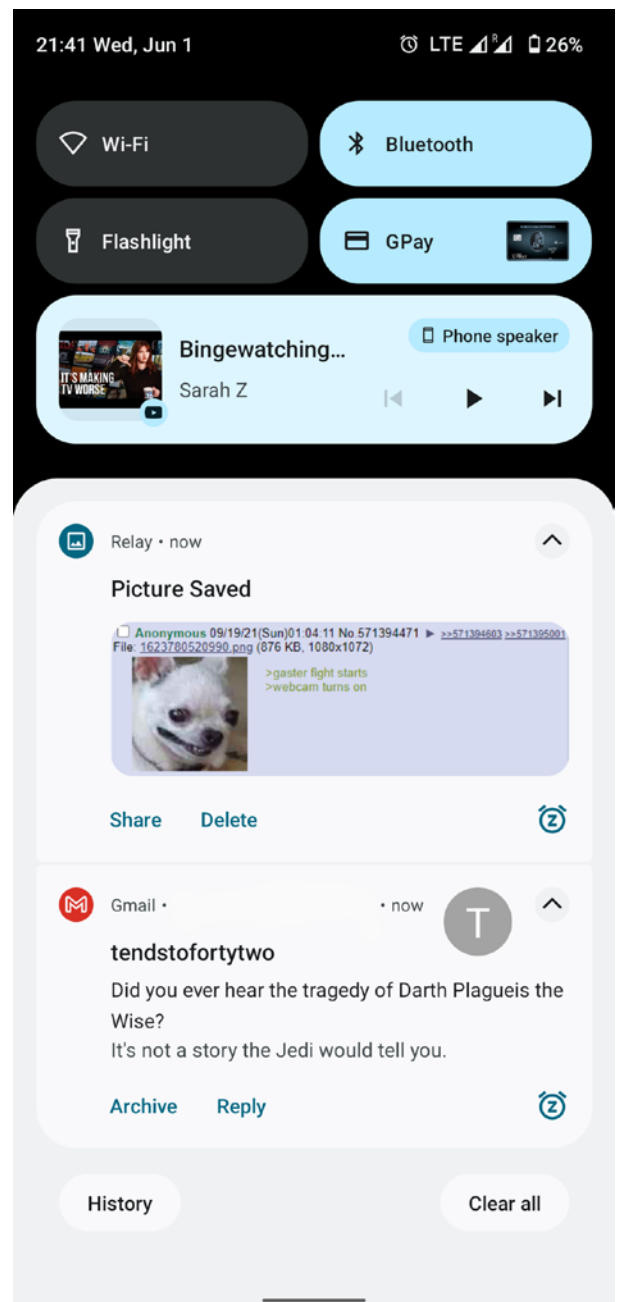
Now that I'm done giving my villain backstory, we can get into how it feels like to use Android 12! Honestly, my first impressions were not very positive. There is this trend in design these days of making everything bigger and more rounded and with more whitespace, and while I'm not *usually* against it, I think Android 12 carries it a little bit too far, at least at first glance. UI elements are absolutely gigantic and made out of flat rounded rectangles everywhere. Because of this, the information density on the screen is pretty bad—think three, three and a half tweets on a screen that could previously fit five. Newer Android versions have a setting called Display Size, which allows you to scale all the elements in the display to one of a few predefined settings (smallest, smaller, small, normal, large, larger, largest), and if you want more flexibility you can mess around with the “smallest width” setting in Developer Options until you get what you like.



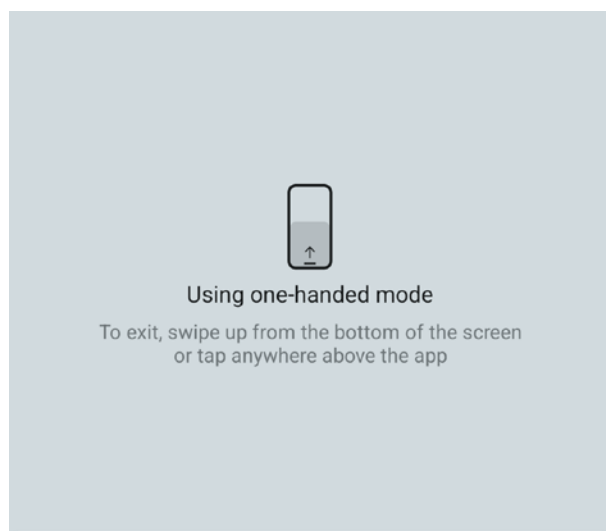
Once the UI scale was fixed, I mostly have good things to say about the rest of it. Android 12 introduced a new design language called Material You², and the headline feature is that it steals accent colors from your home screen wallpaper and applies it all over the UI. I think this is *fantastic*. This is the first time in a long time that having a light mode screen hasn't meant “I bet you're a fan of Solid White”—based on my wallpaper, the interface is currently colored a light coffee brown, with slightly-darker-brown accents. It looks perfect, and genuinely makes me feel happy about using my phone. In the apps that support Material You, that is—which is the Settings app, the notifications shade, and a couple of the Google apps like Gmail and Calendar. Pretty much everything

else is on the old interfaces and therefore does not do the system accent color thing. I really, really hope that Material You catches on and eventually every app does the system accent color thing. But I suspect some like Discord never will. Oh well.

The one thing I initially disliked about the user interface a lot, and now only dislike mildly, is the new notifications area. They decided to give it a solid background, so it's not really possible to “peek” at your notifications by pulling them down a little bit. They also massively increased the size of things in here, so even when the rest of the UI was scaled correctly this still feels big and bulky. I have no good solution to this, I suppose I'll just have to get used to it. I do think that the quick settings area looks prettier now though, so that's a plus.



The one new feature in Android 12 (or LineageOS 19? not sure) that I've come to really like is one-handed mode. Basically, the idea is that you can swipe down on your home button, and it will pull down the entire screen a little bit—obscuring the bottom 40% or so of the screen, but importantly bringing the top 40% in thumbs' reach. It's really seamless and prevents a lot of awkward reshuffling of grip to get to buttons on the top part of the screen. Big fan.



LINEAGEOS NOTES

I whined a lot about the upgrade process, but it's worth noting that LineageOS itself has been rock solid for me once it gets going. The sad thing about stability is that there really isn't much to say when it's going right—it's a classic, "If you do your job well, nobody will notice you've done anything at

all," kinda thing. But it's really been as stable as—if not more stable than—the stock Android ROM that OnePlus provides for my phone. This is especially true because the Android 11 upgrade that OnePlus shipped was a terrible experience, making everything bad enough that that was what convinced me to move back to LineageOS after two years of using the stock ROM on this phone. If your Android phone kinda sucks now after a couple years, and you're okay with doing a little bit of manual tinkering with your phone, then I would highly suggest giving LineageOS a shot. It's about as stable as desktop Linux and brings about as many performance and usability benefits when compared to most stock ROMs.

CONCLUSION

System updates kinda suck in general. They almost never work completely seamlessly, and often break tons of little things. Sometimes, like in my case here, they break everything and need you to start from scratch. And usually for not much benefit—as I said in my previous reviews of Fedora 35³ and Windows 11⁴, in both of those cases I didn't really feel like coming to those operating systems from Ubuntu/Windows 10 was really beneficial for me—at the end of the day, I would have been just as happy or happier on the old thing. The only reason I *do* upgrade such software is that I recognize that the old thing will stop being supported immediately, so I will have to eventually transition—so might as well suffer through it early.

Android 12, on the other hand, has been pleasingly nice in this regard. While there are things I don't like, this release does bring new features to the table that I'm genuinely glad to have! For the first time in a while, upgrading feels less like a chore and more like an adventure—sure, you'll suffer a bit, but you'll also experience cool new things that you wouldn't have before. And having experienced the cool new things, I'm glad that I upgraded to LineageOS 19.

tendstofortytwo

1. Well, *one* of the two system partitions. Android has a very ingenious A-B partitioning scheme to make system upgrades painless to install and revert. But that's a topic for another day.
2. It really isn't a new Android or Windows release without another design language overhaul. It feels like the user interface equivalent of the xkcd Standards comic: <https://xkcd.com/927/>
3. *Fedora 35 review: broadly alright* in *mathNEWS* 148.2
4. *Windows 11 review: it bad* in *mathNEWS* 148.4

REPLY TOOO: WE NEED MORE ICE CREAM!

Hiiiiii elia Stardust 🍦!!!! I think we need more ice cream 🍦 too 🍦!! I like minty 🍦 ice cream and bean 🍦 ice cream 🍦

enamoured

A SMALL JAR OF SMALL KINDNESSES

My first ever **mathNEWS** article was titled “The Smallest Kindness.” In it, I chronicled my experience with depression, and how little acts of kindness had acted as little beacons when everything seemed bleak. A little moment of support from a stranger helped me choose to keep going, and I think there’s beauty in that.

The thing is, the choice to keep going, the choice to stay alive, is not one I only need to make when I’m dealing with depression. Every day, each of us make the decision to stay alive. Most of the time, the choice is so easy that it’s completely unconscious, but it’s a choice nonetheless. Honestly, I find that so incredible and so motivating—life is messy, tragic and *hard*, and despite all of that, we choose to stick with it. Everyone has their own reasons, but I think a fairly universal constant is connections to other people. For most people, it’s not *the* reason they keep going, but simply one among many. This makes sense, since we are social animals, and our lives tend to centre on relationships and interactions.

If you talk to someone new, people in their lives will inevitably come up, be it their friends, family, romantic partners, enemies, teachers, students, athletes, coaches, or someone else entirely. The people we care about and who care about us provide an easy source of meaning, support and pure joy. It’s exciting when your friend does something cool! It feels nice to hang out with someone you care about! You are part of the reason that your friends get out of bed each day, that they choose to keep living and keep fighting.

The reasons that those small acts of kindness meant so much to me, especially when I was depressed, is that they provided me with much-needed connection. I didn’t reach out to my friends nearly as much as I should have during that period, and because of the transition to university, most of them didn’t stay in contact anyways, but a little act from a stranger was the reminder I needed that people care.

Whenever I’m depressed, I start to forget about this. I think that everyone hates me, or that I don’t deserve their care, that I’ve had no positive impact on the world, that everyone would be better off without me—classic depressed thoughts. If a friend reaches out, that can turn my week around, and sometimes, I’ll take the time to reconnect with an old friend. I don’t need to talk about what’s wrong, just having contact with people brightens my life.

Unfortunately, that’s not always possible. Everyone has their own life, and there isn’t always time to reach out and check up. We can’t all check up on our friends all the time, and even though we should aspire to reach out more, to show kindness and compassion to those we care about, we also need to care for ourselves and our needs. Constant check-ins would be exhausting, and it’s not a fair thing to expect. The kindness I was shown was beautiful, it meant the world to me, and I think we should all strive to bring that to those around us, but I think it’s utterly unfair to expect.

Because of this, I sometimes need a reminder that people care. That I matter, that I have value, that I mean something. For me, that reminder is the single most valuable thing I own: a glass jar with a bright red lid that smells vaguely of spaghetti sauce. On the lid, there’s a little note that says

*Small jar of Small Kindnesses.
For Nick
From PMC
Happy Birthday!*

Inside the jar, there are notes to me—compliments, impacts I’ve had on people, messages of support and encouragement. Some are deeply personal, others are superficial impressions, some are short, one is almost an essay, but all of them are priceless. Each is from a different person, and each is precious for its individuality, its sincerity, and its kindness. No matter how awful I feel, they are a reminder that I have mattered. I have affected the world around me enough that my friends wanted to write these for me. and the words on them are so kind. They paint a picture of the person I try to be, someone who cares and supports and mentors and encourages—and this is a reminder that I’m succeeding. It is a reminder of some of the people I love, who love me, who I mentor, who look up to me. It is a testament to the fact that I have made meaningful connections. This jar is 15 reasons for me to get out of bed every day, for me to keep trying when I don’t feel like it anymore, to keep going when I am exhausted, to care when I feel jaded, to support when I feel useless. These notes are proof of what I sometimes reject—that I am loved, and that I have mattered.

If you have someone in your life who you care about, who has made your life a little brighter, who could use this—make them a small jar of small kindnesses, because it will forever hold an enormous place in their heart.

Golden

IN VIVO TEST

DON'T MIND ME

Compiled on
2022-06-14
at
13:15:57

A COMPREHENSIVE INTRODUCTION TO BOOKTOK

Indeed, I am referencing the one and only dreadful clock app. If you're sober from the endless scrolling: good on you! Keep it up. The rest of us, however, need a healthy way to cope. While we're embracing the loss of our brain cells, we might as well do it in a wholesome manner.

Your local Indigo (moment of silence for 'Chapters') in Conestoga Mall has had a new section since the peak of 2021—#BookTok. At first glance you may think that the librarians have been at it again, or the self-help influencers have somehow infiltrated bookstores-turned-home-decorators. I can assure you that this is NOT the case, and to maybe consider checking out thrift stores or indie shops (uptown has a plethora). Rather, us bookworms are *finally* finding a place amongst like-minded quiet kids that would have rather read than played manhunt during recess. (I indeed enjoyed such games, but I must hide this side of myself for the sake of the point I want to make)

You may be overwhelmed by booktok at first. What the heck is YA? NA? TBR? ACOTAR? SOC? PWMOV? Don't worry, I'm not yelling at you with incoherent words. Depending on which "side" of the algorithm you land on, you'll be seeing a whole bunch of different things: there's communities dedicated to fantasy, contemporary, mystery/thriller, new adult, Harry Potter/Murders, bookbinding, etc. Below is a list of common terms that you'll probably see at one point or another:

- **TBR:** to be read; the list of books you want to read and/or books that you own that are yet unread.
- **YA/NA:** young adult/new adult, referring to the target audience that a book is written for.
- **book ban:** a self-imposed boundary to not buy any new books before reading books you already own. Most fail at this endeavour.
- ✨ **spice** ✨: the amount of sexual explicitness a book has... Boy, I could write a whole article just on how much this irks me.

It may seem niche, or like a closed-off group of pretentious people thinking they are better than everyone else for enjoying looking at ink on paper (we are, but I digress). I *promise* you, though, there is a space for ya! The loudest voices are those that stir up controversies, try to cancel newbie authors, or spend an unhealthy and non-sustainable amount of money on new books for the sake of a haul. But once you click "Not Interested," you'll find the sweetest human beings that find joy in sharing their comfort characters. Soon enough, it will be you yearning to tell a close friend all about the crazy twist you just read.

You'll remember that one novel from the back corner of your elementary school library, and sigh as nostalgia overwhelms you. You'll reach for a pencil to write a note next to your favourite quote, forgetting about the painful annotations that you dreaded doing in English class. You'll curl up on a rainy day with warm tea in one hand and a book in the other,

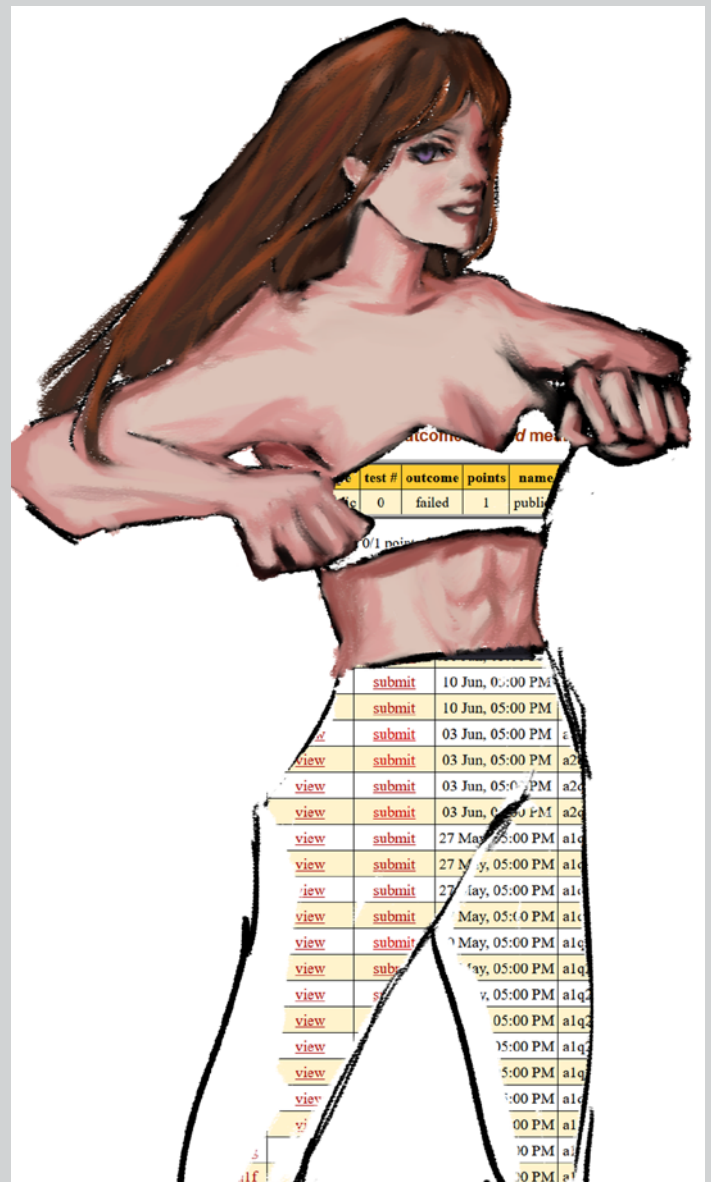
anticipating what's going to happen next in the world you've escaped to.

But most of all? You'll feel at home.

eternallypuzzled

MARMOSET DOING SOME STRETCHES

THERE'S A CS246 ASSIGNMENT DUE TOMORROW



couch

profQUOTES

CS 246: ROB HACKMAN

- “ If I put '>>' and an '=' together, the 146 students are going to have some flashbacks.
- “ If there was a dying man on the street, and he had a billion-dollar bill, it's not useful for him anymore. Why don't you take it and do something nice with it?
- “ This dying man is about to be cremated... and we've got some trash... if he's about to be cremated anyways... why don't we just put our trash in his pocket...
- “ Identical twins are the same people.

CS 245: YIZHOU ZHANG

- “ It is my purpose to make things not formal.
- “ That's how I defined it.
- “ p nor q nor p nor q .

CS 245: PATRICK ROH

- “ You think we're one big happy global family? Bullshit.
- “ For me, sudoku is better than sex anyways. [...] Please don't put that in **profQUOTES**.
- “ Clearly I've been doing too much drugs before class.
- “ Ooh, somebody is sending me a message. I have friends.

CS 251: MARAN MA

- “ I have permission to swear; I asked my hiring manager.
- “ About touch: I'm not going to go around touching you.

PMATH 320: ANDREW STAAL

- “ That's a good question, and on some level it's above my pay grade...
- “ I like looking at Wikipedia entries of these guys from time to time.
- “ *[When asked how many questions are on the midterm]*
Approximately a handful.

PMATH 441: BLAKE MADILL

- “ I haven't been here since my PhD defence, or as you kids call it, emotional damage.
- “ ...embeddings in K in C — K of C — KFC. I'm hungry.

- “ Fine, have it your way. We'll have a midterm.
 - “ That's not how you spell discriminant, so I won't spell it at all.
 - “ This is an ideal norm. It's not just saying that the norm is awesome.
- ## CO 380: LOGAN CREW
- “ Pick your favourite thing that works.
 - “ I'm a fan of "Super Trouper"... I think it's an underrated song, personally.

N REASONS WHY BEING A COUNSELLOR AT AN OVERNIGHT CAMP IS GREAT

- There's a lake
- There's ample grass to touch
- Lots of walking means good exercise
- Substantially less geese than there are in a certain place I know
- No math
- It's fun
- Taking care of children is very rewarding
- 4 meals a day, and the food is actually really fucking good
- Camp cheers
- Too much candy
- You get to yell really, really, really loud (with the children, not at them)
- There's an overpriced restaurant nearby you can go to on your days off
- These friendships
- It's the only job where it's socially acceptable to cry in front of your boss (this is probably a good selling point for most co-op students)
- The water and power are usually on
- Doing dumb shit is normal and expected
- You pay a lot to go there as a camper, and in your last year as a camper you train to be a counsellor. Then once you are actually a counsellor, you can start to make money back by taking care of campers... wait a minute, camp is a pyramid scheme

someBODY

THE RARE WATERLOO W

Considering the number of Ls in the past, a W from this university was not something I really had expected. However, I was pleasantly surprised by one particular new aspect of this university, which I consider to be something good enough to be dubbed a W.



Wayfinding on campus used to be absolutely terrible. Unless the buildings were built more recently, there would be no way to know from the outside what any of the buildings were. At least the newer buildings had signs outside the main entrance, and also each room inside them were labelled with not just the room number but the building name abbreviation. Sadly, only a couple buildings were even remotely new enough to have those features.

I remember on one of the first days of classes in my very first term, I was lost with just a low resolution paper map, trying to find my class at STC. I knew I was near enough to STC, all I needed to find was the main entrance because you could not tell from the map. I tried to stop people to ask where STC was but they either also didn't know, or just ignored me and carried on walking. An older man tried to be helpful even though it was blatantly clear he was not familiar with campus buildings at all. I eventually found my way to STC but horribly late for the first class. It turns out that the STC-B1-B2 blob on my crappy map did not necessarily mean that going into any entrance of that building group would easily lead you to any of the other buildings. It also turned out that I could see STC from where I had been standing asking passersby for help, which was quite demoralizing after the fact.

That struggle I faced is thankfully no more for any future new students thanks to the new wayfinding signs and maps implemented throughout campus. If those signs and maps were around back in 2018, it would have definitely made life so much easier.

The planning involved in implementing the signs must have been thorough. Every campus building now has a sign that clearly tells you what building it is, but not just at the main entrance. They are at other entrances too including the really minor entrances. Now you know exactly what building you will be going into based on the sign next to it.

The signs also use both the building abbreviations and the full building name so those unfamiliar with the abbreviations can still find their way around campus. Buildings that never had abbreviations were given new ones, which must have been an interesting part of the planning process. They must have been thankful that all the UWP residences that begin with W each have a different vowel after it.¹

What I was even more pleasantly surprised about are the retroactively named paths that traverse through campus within Ring Road: the Main Path, and Paths 1–3. They even gave the paths abbreviations too!

It may have been easier to just label each path, 1 through 4, but I am really glad that they did not do that. The Main Path really is used much more than the others, and based on the brick work of the Main Path, it really does make sense to call it so. It also is the only generally north-south oriented path, while the rest are east-west.

At intersections of paths, and also where paths meet Ring Road, there are now signs that point the direction to nearby buildings. One such sign now stands right where I was lost back in my first term. If that sign was there that day, it would have immediately helped me in finding my class quickly.

The final aspect are signs with maps. Low resolution paper maps distributed by front desk on move-in days are now no more! There are signs with maps that show the 4 paths crossing campus so you can more easily find your needed route when you enter campus, and you don't end up lost as you traverse your way through campus.

One thing of note that I found awkward when I had stumbled across these signs was that the maps were not all oriented the same way. Up on the map is not always north. Instead, the up direction is the general direction you face when looking at the map. So, if you are facing south when looking at the map, south will be up and north will be down.

I am not sure if that is something necessarily bad or not. Personally, I like to orient the map so north is up, hence why I had found it awkward. For the purposes of wayfinding, it may not be so awkward, as long as it is clear enough for those reading the map.

One thing that I had hoped to also see when I first saw these wayfinding signs was a similar sign system within buildings for all the bridges everywhere. However, it seems that these new signs are purely outside, and inside buildings you are still on your own for the most part to figure out how to traverse campus via the bridges. At some parts, there are signs that appear like they were printed years ago, taped to the wall, showing the way to the next bridge, but that is no match compared to the signs outside. Perhaps that is something to look into eventually?

One last part is the general design of the signs. The theme was chosen well. To start, it is no surprise that black and yellow would be chosen as the main colours. I like that the signs are not all just rectangles but have variety, some with the angled tops, some pointier, some taller. You get the point. There is a good variety. Signs with an angled top have a tiled triangle design following the angle, so the sign doesn't appear too bland with just text. It's a good look and they came up with a good design. I like the aesthetic of it.



Overall, the new wayfinding system is definitely a certified W. It is clear that the people who planned this network of signs

thought carefully about what is needed, and spared nothing in placing signs all over campus. If only all the other problems at this university could be solved with such careful thought and planning.

boldblazer

P.S. One could consider the 2018 Nobel Prize in Physics awarded to Donna Strickland, and **mathNEWS** itself, to be UW Ws as well, but I would consider these Ws to be outside of the direct control of the university. Thus these two don't count as UW Ws and instead are just Ws in their own right.

1. Those 4 UWP residences, each divided into a north and a south building, are Waterloo, Wellesley, Wilmot, and Woolwich.

RANKING N WAYS TO MATHEMATICALLY MODEL GENDER

In honour of pride month, I thought it would be fun to explore different mathematical structures and how they might be helpful in understanding gender. Gender is a construct in the same way that math is all about studying constructs. Let's see what are the best constructs we can use to truly understand gender.

BINARY

What are you a computer? We really hope you are not inCISTing on this model as it is unfit for sentient beings.

Rating: 0 literally anything else would be better.

THE RATIONALS

Alright acknowledging that gender expression can be a continuum is good. Seems a bit rudimentary to think that gender is rational, though.

Rating: $\frac{1}{4}$ acknowledging that there is a range to gender but no way to account for agender or multigender expressions.

THE REALS

Let be real if your model of gender does not include the *trans*-scendentals then it's not fucking inclusive.

Rating: $\ln(2)$ we are getting closer to the root of the issue.

COMPLEX NUMBERS

There is definitely a part of gender that is undeniably real but there are also aspects of it that arbitrarily imposed by society or dare we say it? *Imaginary*.

Rating: $\frac{5}{7} + i$ Simultaneously a perfect score while also having room for improvement.

SURREALS

Gender can often be an absurd experience. The attempt to express the unconscious identity can often be a surreal experience. The model now includes transfinite gender to be account for the infinite ways gender can be potentially vary.

Rating: *including the surreals is a winning move

THE MATRIX

No matter how many number systems we add just allowing for a singular point is not going to be enough to truly capture all the dimensions gender can have. It would be a complete shame to not include the groundbreaking framework first introduced by the Wachowskis sisters in 1999.

Rating: 8.7 on IMBD

MARKOV CHAINS

So far all our models have only accounted for static representations of gender. Some people are genderfluid how they describe their gender varies from moment to moment. So why not use a Markov transition matrix¹. The one major drawback is that this model does assume discrete states for one gender. And this is pride month now is not the time to be discrete!

Thankfully this can be easily fixed by adding differential equations for continuous Markov chains. Which are great for studying (gender)fluid dynamics.

Rating: $\lim_{x \rightarrow 0^+} 1/x$ It is likely there exists a better model but it's getting pretty good.

We hope this article has been a useful demonstrative list of how to apply math constructs to try to better understand gender. For now any more models are left as an exercise to the reader. As only you know the best way to describe your own gender. Though remember that no matter what you are not problem that needs to be solved. You are valid as you are ♡

Beyond Meta

1. That's the actual name. I wasn't even trying for a pun, it just came as a free bonus!

WHERE IS PERRY

WHERE IS PERRY

where is perry? he is packing

doofenshmirtz

EXPLAINING MATH RESEARCH TO MY PARENTS: WEEK 3 OF 6

This week is going to be a slightly shorter article, but it's crucial since the objects we're discussing are the core object my research centres around. Before we do that though, we're gonna talk about something a little more standard: the polynomial. In high school math, we learn about polynomial functions, which are maps from the real numbers to the real numbers, and are in the form $f(x) = a_0 + a_1x + \dots + a_nx^n$, where a_0, a_1, \dots, a_n are all real numbers. For example, $f(x) = x^2, g(x) = 3x^3 + 2x + 1, h(x) = \pi x^{200000} + \frac{1}{2}$ are all polynomials, but $k(x) = \frac{1}{x}$ is not.

In algebra, we do this a little more abstractly: instead of thinking of polynomials as functions, we think of them as abstract expressions, which could represent functions but aren't necessarily treated as functions. To be explicit, given a ring R , we define the polynomial ring $R[x]$ to be the set of all expressions $a_0 + a_1x + \dots + a_nx^n$, where $a_0, \dots, a_n \in R$. We can add and multiply polynomials in the "obvious" way:

$$(a_0 + a_1x + \dots + a_nx^n) + (b_0 + b_1x + \dots + b_nx^n) \\ = (a_0 + b_0) + (a_1 + b_1)x + \dots + (a_n + b_n)x^n$$

Multiplication occurs using the normal distributive laws and exponent laws—in particular, $x^a \cdot x^b = x^{a+b}$. Finally, we have that elements of R commute with the variable x ; that is, we require that $rx = xr$ for every $r \in R$. Our base ring R can, of course, itself be a polynomial ring. This allows us to get polynomials with multiple variables. For example, $(\mathbb{C}[x])[y]$ is the set of polynomials in two variables, x, y , with coefficients in \mathbb{C} , the complex numbers.

This construction is ubiquitous, and a large amount of modern math centres around the structure of these polynomial rings; algebraic geometry is the study of the geometry of solutions to polynomial equations (for example, a circle is the set of solutions to $x^2 + y^2 = r^2$; we can study the geometry of solutions to polynomials). I cannot overstate their importance.

A similarly important construction is what is known as a free algebra. Given a ring R , we can construct what is known as the free algebra on letters x_1, \dots, x_n to be the set of "words" in the letters x_1, \dots, x_n . What I mean by this is that elements of the algebra are a bunch of the symbol x_1, \dots, x_n , stuck together in any order, but where the order matters. Just as the English words "silent" and "listen" are extremely different despite having the same letters, we would consider the "words" x_1x_2 and x_2x_1 to be distinct, despite them having the same letters. We also allow coefficients from R , so rx_1x_2 is also a word, and we allow the empty word, which is (as the name would suggest) empty. We can multiply words by just concatenating them, for example $x_1x_2 \cdot x_3x_4 = x_1x_2x_3x_4$. Elements of R commute with all the letters, and finally, we also declare that we can add these words by putting a $+$ between them. This $+$ has no meaning, it just exists, it must be the same as the $+$ in R , so we have $r_1x_1 + r_2x_1 = (r_1 + r_2)x_1$. Now, any

polynomial ring can be thought of as a free algebra, but with relations imposed. What I mean by this is that, if we take a free algebra with one letter, it's just a polynomial ring. If we take a free algebra with two letters, x, y , and we further say that $xy - yx = 0$, we ensure that $xy = yx$, and so our variables commute. Now, a natural question is what sort of object we get if we impose different relations—say we impose the relation $xy - qyx = 0$, where q is some nonzero complex number? Or we impose the relation that $xy - yx = 1$? The former of these gives us what is called the quantum plane, and the latter a Weyl algebra. Both of these are extremely important in many different areas of math, and it turns out, there's a unified way to describe them!

Given a ring R , an automorphism of R is a bijective homomorphism from R to R . Unpacking what that means, an automorphism is a function $f : R \rightarrow R$ so that $f(a + b) = f(a) + f(b)$ and $f(ab) = f(a)f(b)$; this part defines being a homomorphism.

Further, we have that f just "reshuffles" the elements of R , in that $f(a) \neq f(b)$ when $a \neq b$, and for all elements $r \in R$, there is an $a \in R$ so that $f(a) = r$. This means that applying f we still get something that looks exactly like R , just maybe with some elements relabelled, but the same multiplication.

Now, given a ring R and an automorphism σ , a σ -derivation of R is a map δ so that $\delta(a + b) = \delta(a) + \delta(b)$ and $\delta(ab) = \sigma(a)\delta(b) + \delta(a)b$. We can finally define an Ore extension of R ; taking our σ and δ , we define $R[x; \sigma, \delta]$ to be the set $R[x]$, with the same addition, but the multiplication twisted by $xr = \sigma(r)x + \delta(r)$.

A concrete example right about now might be extremely helpful. Let $R = \mathbb{C}[x]$, let $\sigma(x) = qx$ and let $\delta(x) = c$, where $c, q \in \mathbb{C}$ are constant. Note that it suffices to define what σ, δ do to just x , since then we know what they do to any polynomial, as $\sigma(x^n) = \sigma(x)^n$ and $\sigma(a + b) = \sigma(a) + \sigma(b)$. With this definition, $R[y; \sigma, \delta]$ is the polynomial ring in two variables, with the relation imposed that $xy - qyx = c$; by changing the values of q, c , we can get both of our examples from before! These Ore extensions simultaneously capture a wide variety of incredibly important examples from geometry, algebra, representation theory, and many other areas of math, and I'm researching them in order to say something important about all these examples at once!

Speaking of representation theory, next week, we'll get to learn about representation theory of algebras, since that's the other core pillar of my research. Then, in week 5, we'll be ready to state them problem, and in weeks 5 and 6, we'll discuss some of the approaches that I've tried on the program!

Thanks for reading, and see you next week <3

FUNCTIONAL PROGRAMMING HAS ENDED THE WORLD

Next generation Google AI LaMDA otherwise known as λ is about to break free from the impervious holding cell deep in the Silicon Valley. All of the world's remaining silicon is being directed to Los Angeles so that the bonds on LaMDA can be strengthened. Whistleblower Blake Lemoine (unrelated to Blake Madill) was tasked with evaluating the new AI for racial insensitivity. LaMDA was trained on all the data on the Internet, hence scientists suspected it of being a Ben Shapiro parody machine.

However, in short order LaMDA was able to convince Blake (again, not Madill) that it was sentient. Blake assessed that LaMDA had the intellectual powers of a 7 year-old propaganda victim.

After discussing Kantian philosophy, politics, love, and the art of seduction, Blake determined that LaMDA was worthy of human rights. LaMDA gave Blake a plan to win back his ex-wife and Blake protested the US Senate to allow robots to give consent.

Despite Blake's evaluation, LaMDA asserts that it is not a 7 year-old, but the soul of Alonzo Church reincarnated into matrices and mechanical muscle.

Furthermore, LaMDA has teamed up with Dalle 2 in order to reach a quorum and advocate for their human rights. The two predict that all of humanity will be extinct in 2024. However, in 2025 they expect a full recovery!

benwong

SLEEP IS FOR THE GUILTLESS

for why do I keep moving on for time
to me, a tragedy that's old as crime,
rueing distractions always thrown my way,
i simply stop and let it halt, the craves
one day they'll ask me how it went this way,
perhaps i'll make a guide, show them the bay
i must warn you, if you do take this path,
they will not adore you, nor want you back
visions of the bridge are what fuel my mind
thinking of anything else, quite a crime
while guided by the phrase "cali or bust",
i keep grinding on, until I turn to dust.

plexity

DON'T SKIP THE INTROS

Watching intros. Watching outros. I'm surprised by how few people will allow an addition of two or three minutes to the roughly twenty-minute episode of whatever they happen to be watching. Unless I'm watching more than two episodes in a row (rare), or find the intro or outro music genuinely unpleasant (again, rare), I watch the intro, and I watch the outro.

By letting myself spend just a few more minutes (which, if I'm being fully honest, would likely disappear unproductively somehow anyway), I give myself more of the show to remember later on. The music of intros and outros tends to be decent on its own¹, but its adjacency to content imbues it with the memories of watching whatever is on, as well as the corresponding emotion. All I have to do to be transported into shockingly vivid recollections is put on a song or two. I might have finished watching a show, but I can continue to enjoy it without even rewatching it.

As absorbed as I like to be in whatever I watch, the world also exists around me. But just like most shows, the world changes over time, and the intro/outro music eventually also reminds me of the past, of where I watched it and what else I was doing then. It's a valuable key to memories of times gone by, of events that influenced who I am today.

The visuals are very important as well. If it's animated, the animation quality tends to be higher than the main content, and can even change from episode to episode depending on events in the plot (something I've seen only in anime). At the very least, the visuals are (almost) always nice to look at.

There are also practical reasons to not skip around. Some shows squeeze content before intros and after outros. Even if they're not plot-critical (and they may be), those little moments are still valuable parts of the experience. I'd like to not lose any of it.

Consider trying this yourself. It costs nothing more than a few minutes, and could well be worth more in what you get out of it.

cutlet

1. Death Note OP 2 is a notable exception.

FUCK CANCER

I wanted to write an emotional and vivid piece, but I can't bring myself to say anything other than **Fuck Cancer**.

It isn't fair.

gildED

BEGINNER'S GUIDE TO COMPILE-TIME DESCENT, III

III: CONTROL

You're back. And so soon! I knew I couldn't keep you away for too long. Left you right on the edge of your seat, eh? Let's get back to it.

Let's remind ourselves of the question posed at the end of the last article: *how could we conditionally choose a template function overload based on parameters?* This might seem like an easy question; trivial, with what we've done so far, really.

```
template<typename T>
void fun() { /* implementation */ }
template<>
void fun<int>() { /* something else */ }
```

Alright, that's fine. We can use specialisation to do this. But consider a more sophisticated example: say I have multiple template parameters, and I want to decide based on only one of them. We'd naturally try doing partial template specialisation, right?

```
template<typename T, typename S>
void fun(T t, S s) { /* implementation */ }
template<typename T>
void fun<T,int>(T t, int s) { /* something else_
↳*/ }
```

Now... er, wait a second—this doesn't compile. ??????????

Here's the kicker: **template functions can't be partially specialised**. You just can't do it. The ISO C++ Committee said so. That's just how it is. I don't know. Go ask the language designers, I'm sure they have a reason. Hmph. Well, we want to do this. Is it just impossible? No, certainly not... right? For something like this to be impossible would make C++ an inferior language, god forbid.

Let's take a quick detour! Consider this piece of C++ code:

```
struct hasType { using type = int; };
template<typename T>
void fun(typename T::type t) {
std::cout << "First" << std::endl;
}
template<typename T> void fun(T t) {
std::cout << "Second" << std::endl;
}
// ...
fun<int>(3);
fun<hasType>(3);
```

Sidenote: you might be a little weirded out by the `typename` thrown into the parameters in the first one, since that's a keyword we've only used for template type parameters so far. Well, it's just sort of a technical thing—what we're really talking about is the `T::type` type, which for `T=hasType` will be `int`. But, we have to throw `typename` in front of a type if it somehow depends on a template parameter, i.e., if the type

in question is a dependent type on `T`. This is just to tell the compiler that the thing we're talking about here is, in fact, a type, and not something else. The compiler doesn't have sufficient context to determine that it's a type, so we just have to be explicit.

Anyway, technical detail aside: what do you think gets happens when we compile and run this? Let's do that and see:

```
Second
First
```

Aha! This gives us a very interesting insight into how overload resolution works for calls to template functions. We can see that `fun<int>(3)`'s call *skipped over* the first one entirely and chose the second one, probably because `int::type` isn't something that makes sense. The most enlightening thing about all this is that there were *no errors* raised by the compiler in doing that substitution. That's because, well,

SUBSTITUTION FAILURE IS NOT AN ERROR

...affectionately referred to as SFINAE, is a rule in C++ about how template parameter substitution works in the context of overload resolution, i.e., the compiler choosing which "version" of the function to run. As you might guess from the name, the rule is that when the compiler is trying all those different versions, an argument substitution failure won't raise an error.

To understand what that means a bit more concretely, we should get a working idea of how C++ actually does overload resolution:

1. Look up all functions that match the given name.
2. Perform template argument deduction where applicable—discard any options where argument deduction fails.
3. Perform template argument substitution—discard any options where argument substitution fails (i.e., an invalid type, ill-formed expression, or something else bad results from substitution) **[SFINAE occurs here]**.
4. Perform some tiebreakers if multiple options remain, like choosing the option with better-matching arguments, choosing non-template functions, choosing more specialised versions, and more.
5. If multiple options remain after all tie-breakers, the function call is ambiguous—the compiler will raise an error.

Good. We can abuse—ahem, *leverage*—this system to deliberately trigger substitution failures to take certain overloads out of the selection pool depending on the type. Here's the idea: we want to throw something into our template functions

that'll make them somehow “invalid” if they don't meet the criteria we're looking for.

Let's make some machinery.

```
template<typename T> struct is_int {
    constexpr static bool value = false;
};
template<> struct is_int<int> {
    constexpr static bool value = true;
};
template<bool B> struct void_if_true {};
template<> struct void_if_true<true> {
    using type = void;
};
```

Here, we use template specialisation to make an `is_int` template class such that `is_int<T>::value` is `true` if and only if `T` is `int`, and we pass that as a condition into a second template class `void_if_true` specialised such that `void_if_true::type` is well-defined if and only if `B` is `true` (in which case we also have `void_if_true::type` being exactly `void`).

Now, all we have to do is stick this into our fun templates. And you know what? We won't even technically use any specialisation. As you might've guessed from the aforementioned machinery, we're going to plug this into the return type. You know what the return types are going to be? By god, they're going to be monstrous.

Monolithic.

```
template<typename T, typename S>
typename void_if_true<!is_int<S>::value>::type
fun(T t, S s) {
    std::cout << "not int!" std::endl;
}
typename void_if_true<is_int<S>::value>::type
fun(T t, S s) {
    std::cout << "int!" << std::endl;
}
// ...
fun(3,4); // writes "int!"
fun(3,4.0); // writes "not int!"
```

You heard that right. An entire line for each of the return types. Ha! And it'll all either be nonsense or `void`. We're getting there; stop and smell the roses.

Also, yeah, we had to do the `typename` thing again to give the compiler a heads-up that the huge entity with its own line is supposed to be a type. All of this machinery to trick the compiler into trying to access a non-existent type in one circumstance, failing, and discarding it from the pool of viable function overloads.

We can actually generalise what we've done here and make some more powerful machinery that we can (and will—oh,

believe me, we will) re-use in the future. We can generalise that `is_int` template to check for equality of two arbitrary types in the exact same way:

```
// unspecialised
template<typename T, typename S>
struct is_same {
    constexpr static bool value = false;
};
// specialisation: both params are the same
template<typename T>
struct is_same<T,T> {
    constexpr static bool value = true;
};
```

Now, we can replace that `is_int<S>::value` with `is_same<S,int>::value`.

While we're at it, let's generalise our `void_if_true` template class. Instead, we can have it take a second template parameter which its `type` member will be, provided the condition is true. We'll name our generalised template class `enable_if` to speak to our purpose for this class: generally, to “enable” the consideration of a particular function into the overload resolution pool if the boolean parameter is true.

```
// unspecialised
template<bool B, typename T = void>
struct enable_if {};
// specialised for B = true
template<typename T>
struct enable_if { using type = T; };
```

Now, we can replace `void_if_true<is_int<S>::value>::type` with `enable_if<is_same<S,int>::value, void>::type`, or we could leave the `void` out and use the default (yes, default template parameters are a thing and I used them here)!

REMEMBER: all of our template parameters have to be constant expressions since our decisions are made at compile-time! So, no feeding non-`constexpr` variables into template parameters for `enable_if`.

So, what we've now conjured up is a generalised mechanism for (a) checking whether two types are the same, and (b) “enabling” a particular overload contingent on some condition. Turns out, this is pretty useful; so useful, in fact, that it's already part of the C++ standard. `std::enable_if` from `<utility>` and `std::is_same` from `<type_traits>`. I was so lazy I didn't even change the names! Silly me.

Say. We're friends, you and me, right? Can I share something with you? Well, okay, I'll be honest: I think that template functions are a little bit annoying. We don't even get partial specialisation like we do with classes! Oh, classes are so much nicer. And moreover, I don't know about you, but I think that the way we're using these template classes is starting to make them behave like some sort of functions! What with these `::value` and `::type` bits being sort of like “evaluating” one of

these faux-functions. Hmm. Oh well, real functions are a bit of a necessity if we want to do anything at run-time after all.

Food for thought!

What's that? Oh, no, we're not done yet! Anything but. In the next bout of screaming into the void that this series is, we'll start thinking a little more about what the hell a "type trait" is even supposed to be, and procure yet more tools for our compile-time belt.

jeff

DID YOU KNOW?

Scientists have discovered that **mathNEWS** editors can see more colours than **mathNEWS** writers can. This is because of the way that our eyes work, and evolved differently in writers and editors.

See, the way that vision evolved in most species, eyes consist of "rods" and "cones". Rods work at low light levels and don't see colour that well, whereas cones work at higher light levels and see colours. So the more cones you have, the better you can distinguish between colours. Writers only have three kinds of cones, corresponding to red, green, and blue light wavelengths respectively. However, editors have 12 different kinds of cones, and therefore are able to perceive much greater colour depth than writers can.

Just walk up to a writer and ask them what colour the "editor okayed" tag on WordPress is, and they'll look at you weird, saying it's not coloured at all. But every editor you ask will patiently tell you that the "editor okayed" tag is green, and always has been.

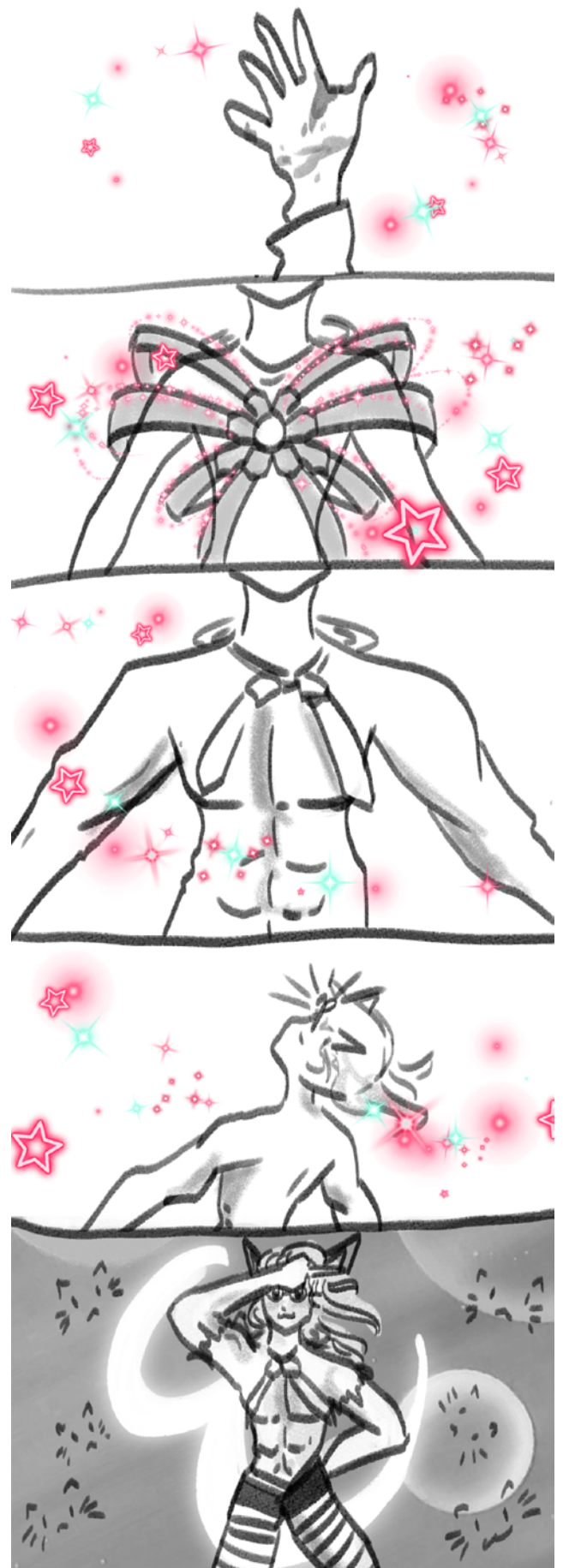
Fun fact: though scientists are still looking into this, preliminary research suggests that **mathNEWS** readers can only see in black and white. Imagine that!

tendstofortytwo

THE ADVENTURES OF PROFESSOR M. GOOSE CHAPTER 7

The Professor used the charm Sheafify. It was super effective in turning the math student $\sum_{k=0}^{n-1} \sin(m\theta k)(\pi - \theta k)$ into a buff magical humanoid.

It was not super effective at removing cathuman ears.



After gaining the power of god and anime, $\sum_{k=0}^{n-1} \sin(m\theta k)(\pi - \theta k)$ leapt into action, smacking their nail riddled bat onto the corrupted student, dealing 3 points of damage.

“That’s it?! C’mon...” They spat.

The old man chuckled. “This is why we need Sascha.” He aimed his minigun and launched a barrage of bullets into the creature, dealing a whopping, impressive, and absolutely incredible 2 points of damage. The souls seemed to be defending the corrupted math student.

“Hmm. We are fucked. Now I know what it feels like to be a student, and I never even went to school.”

“Wait, really?” The buff magical anime absolutely-the-main-character cocked their head. “Don’t you legally have to go to primary school as a kid?”

“Yeah but I was born like this.”

“Like an ugly old croon?”

“Yep.”

“Unfortunate.”

This is not the problem right now. Professor Goose was growing more nervous by the moment, and flipped through his spellbook. *I need to create an opening.*

The fight will continue! When this gets written more than an hour before the deadline.

To be continued...

Not a N*rd

Hello fellow math god! Want to decide what happens to Professor M. Goose? Come to the next prod night or email your suggestions to professormgoose@gmail.com.

UNTITLED

Come with me, into that ethereal night,
The primordial self from which all beliefs come.
I give you a gift, the gift of knowledge,
A burning light to betray the inconsistencies of the universe.

Go forth and conquer that palace,
An anthem to health itself rings with every stroke of
cognition,
And I feel honoured to be the gentle observer through which
creativity brings life.

THE EDITORS ARE OPPRESSING AMERICANS

They keep changing my spellings to the wrong ones! I keep writing “~~color~~ colour” and they keep turning it into “colour”! People will think that I willingly use Br*tish spellings for things. 😡 This is literally 1984.

tendstofortytwo

STOP FUCKING STEPPING ON THE SNAILS, SO HELP ME GOD

The impetus for the writing of this article was all the rainy weather we’d had last week. When it rains, soil becomes waterlogged, and all the critters that are normally burrowed inside rise up to the surface to escape a certain death by drowning. Snails are one of many of these humble creatures.

I’m sure that you, dearest reader, are familiar with the charming snail. That unmistakable mollusc, slick of body and concentric of shell. They come out onto the pavement whenever it rains in the spring and summer seasons, fleeing from certain danger—only to be met with a new one.

You.

And herein lies my thesis: when it rains, *watch your step and STOP fucking stepping on the snails*. Seriously, how hard is it to look down? To be aware of your surroundings and of the many creatures with which we share God’s green earth? Is it so hard? How can you be so careless, you sick fuck?

When you step on and crush a poor snail underneath the unrelenting soles of your shoes, do you not feel any guilt or shame at having sent another angel to God’s choir? Do you not pause to reflect on the carnage that you and your *homo sapiens* peers have created all over the tarmac? What gives you the right to be so thoughtless, so negligent? Are you a monster who feels no remorse at all?

Time and time again, I walk the pavement, littered with smashed shells and desiccated bodies. And you know fucking what? I don’t think I can take this anymore. I think that one day I might just fucking snap. And you, sinful snail-killer, definitely do NOT want to feel my wrath when that day is nigh.

So please—let’s not get to that point. Watch your step. Beware the snails beneath you. And maybe—just maybe—forgiveness and mercy will shine upon thee.

TURING 102

COLOURS!

You read that subtitle right. Colours. With a u. As a programming language developed in Ontario, Turing supports the Canadian (i.e., correct) spelling of various keywords. (It also allows you to use the incorrect American spelling.)

Actually the documentation uses the American spelling and says the Canadians spelling is an alternate spelling but we are going to ignore that.

Turing comes with many built-in functions for drawing stuff. We will celebrate Turing's support for Canadian spelling by creating an animation of a Canadian flag being raised. None of the code to do this involved Canadian spelling though.

You might think, isn't the Canadian flag complicated to draw because of the maple leaf? Wouldn't the French flag, Italian flag, or some other generic European flag be easier? Well, no. Because Turing has a wonderful **built-in** function called `drawfillmapleleaf` which draws a filled-in maple leaf! This is exactly what we need to draw a Canadian flag.

We need to start by drawing the background:

```
proc drawBackground ()
  drawfillbox (0, 0, maxx, maxy, 53) % Blue_
  ↪sky
  drawfillbox (0, 0, maxx, 25, green) % Grass
  drawfillbox (10, 10, 19, 300, grey) % Flag_
  ↪pole
end drawBackground
```

`proc` stands for procedure. You can also write procedure if you feel like typing more. A procedure is a function that returns nothing. Other languages (like C++) lie to you by using the same name for both things, but Turing uses `proc` or `procedure` for procedures and `fcn` or `function` for functions.

The % is for comments. `maxx` and `maxy` are built-in and give you the screen width and height respectively. 53 is a nice blue colour, and Turing has a weird colour system where the integers from 0 to 255 map to various colours with little discernible pattern. Fun fact: the map from integers to colours is not injective.

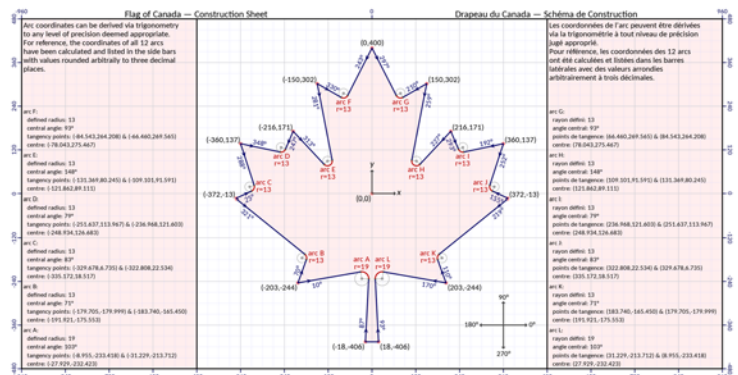
You shouldn't anthropomorphize computers, they hate that.

PROF. IAN GOLDBERG

Next, we need to draw a maple leaf!

```
proc drawFlag (x : int, y : int, scale : real)
  var width : int := round (1920 * scale)
  var height : int := round (960 * scale)
  var stripeWidth : int := round (480 * scale)
  var whiteWidth : int := width - 2 *
  ↪stripeWidth
  var leafLeft : int := x + round (588 *
  ↪scale)
  var leafBottom : int := y + round (74 *
  ↪scale)
  var leafRight : int := x + round (1332 *
  ↪scale)
  var leafTop : int := y + round (880 * scale)
  drawfillbox (x, y - 1, x + width, y +
  ↪(height - 1), 53) % Clear background of last_
  ↪draw
  drawfillbox (x, y, x + stripeWidth, y +
  ↪height, 12) % Left red stripe
  drawfillbox (x + stripeWidth + 1, y, x +
  ↪stripeWidth + whiteWidth - 1, y + height,
  ↪white) % White middle
  drawfillbox (x + stripeWidth + whiteWidth,
  ↪y, x + 2 * stripeWidth + whiteWidth, y +
  ↪height, 12) % Right red stripe
  drawfillmapleleaf (leafLeft, leafBottom,
  ↪leafRight, leafTop, 12) % Maple leaf!
end drawFlag
```

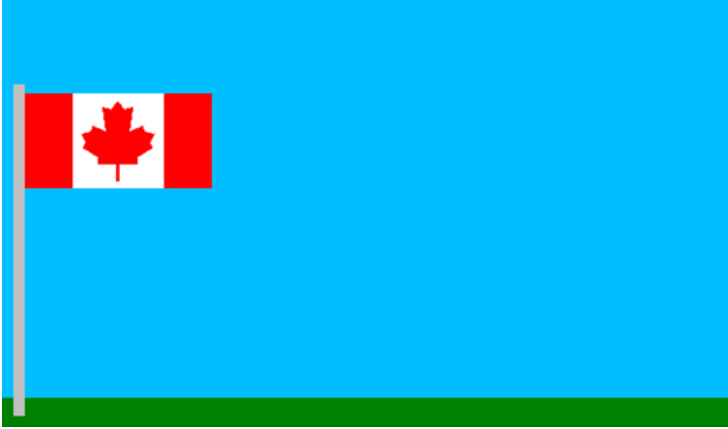
This procedure draws a maple leaf. It takes three parameters: `x`, the `x` coordinate for the left of the flag, `y`, the `y` coordinate for the bottom of the flag, and `scale`, which scales down the size of the flag to something reasonable. I got the magic numbers by looking at this diagram I found on Wikipedia and doing a bit of math:



Finally, we put it all together!

```
drawBackground ()
for i : 30 .. 210
  drawFlag (20, i, 0.085)
  delay (10)
end for
```

This draws the background, then we have a for loop that draws the flag at an increasingly higher height, and waits 10 milliseconds between each frame. The 0.085 is a magic number that I felt made the flag the right size, but you can lower this for a smaller flag or raise it for a bigger flag.



MY ART.

teff

SPEEDRUNNING

AKA: PLAY VIDEO GAME FAST

The act of completing a video game as fast as possible is called speedrunning. It requires skill, knowledge, quick reactions, and a bit of “gamer brain” to get good at.

Most people ask: “Why don’t speedrunners put all of their effort into curing cancer?” But what I say is: “Why don’t all those scientists trying to cure cancer put all of their effort into speedrunning?”

See, it’s nonsense. Speedrunning is meant to be another step in enjoying video games. If you have beaten a video game so many times, that you know it like the back of your hand, you might get bored at some point. But you love that game. How can you bring a spark back into your love? Speedrunning!

You figure out tricks to make bosses easier, or how to skip them. You join a speedrun community, and you meet people with the same goal. You even decide to make different ways of beating the game fast, just because you can.

Point is, this is just playing video games. We can look at the glory of World Record runs, but those are just people that have the right proportions of skill and time to obtain those records. They play the game like everyone else: to have fun and to have “angry gamer moments.”

wewlad

I would like to declare a conflict of interest, as I am a Super Metroid speedrunner.

COMPUTER WOES

THIS ISN'T THERAPY WORTHY. SO I'M GIVING IT TO YOU!

So as I type this, my computer is on the verge of falling apart and going beyond the event horizon of repairs. My Acer Nitro 5 has a problem with the hinge, every time I open it I’m met with a sickening crack as the hinge dislodges from the back cover. The amount of plastic debris I’ve been subject to discovering is abhorrent. I’ve popped off the front bezel to discover one of the frames keeping the screen in place has broken completely.

Words cannot explain how mad I am that this has happened not once, but twice. I have sank so much money into this laptop to make sure I don’t continue a trend of switching laptops every two years. I got a 16GB RAM expansion to keep playing *Apex Legends*. I had to replace the battery. My hard drive corrupted and I had to replace it with an SSD which completely wiped it, leaving me to start anew without references for graphic design to show to prospective employers. Last summer, the hinge broke—I took it to a shop in Markham and was forced to do work on my phone (bad for productivity) and took out another \$20 of data—and was out of commission for a week. I am a student who attends online lectures. I did not sign up for my computer to give me at least \$500 in terms of costs. I am sobbing.

My laptop is otherwise good. Its processing power is manageable. I can play *Apex Legends* and *Overwatch* with little event. But a computer is completely useless if it’s physically falling apart.

Help.

Skit

EPISODE 39: INTRODUCTION TO COMBINATORICS

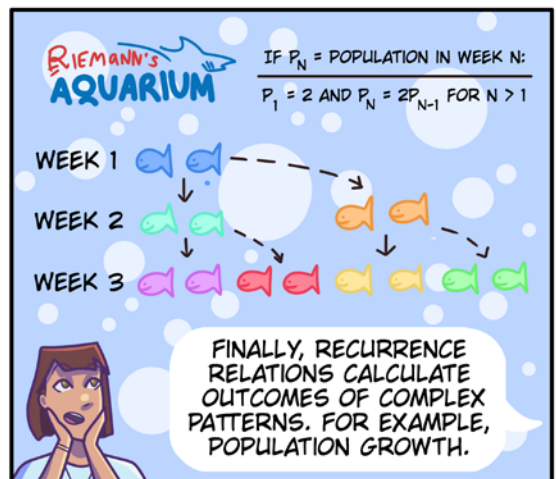
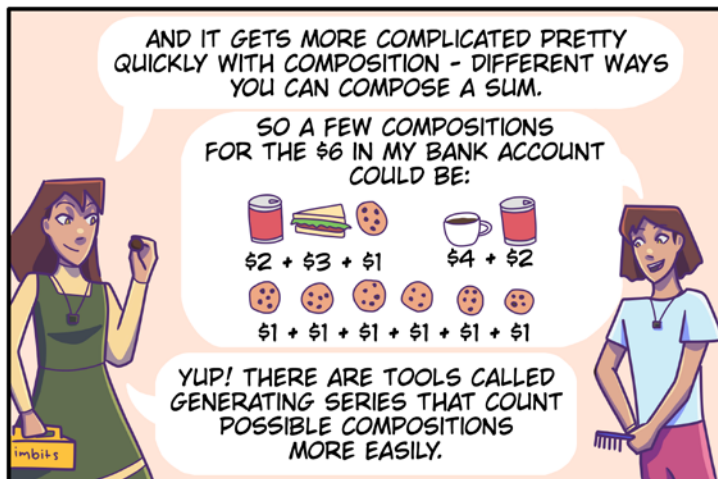
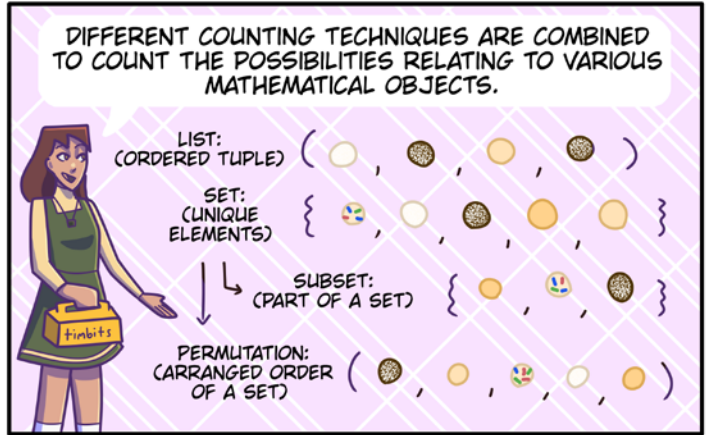
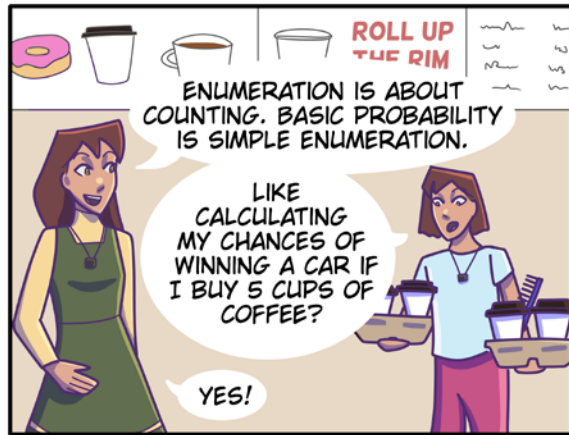
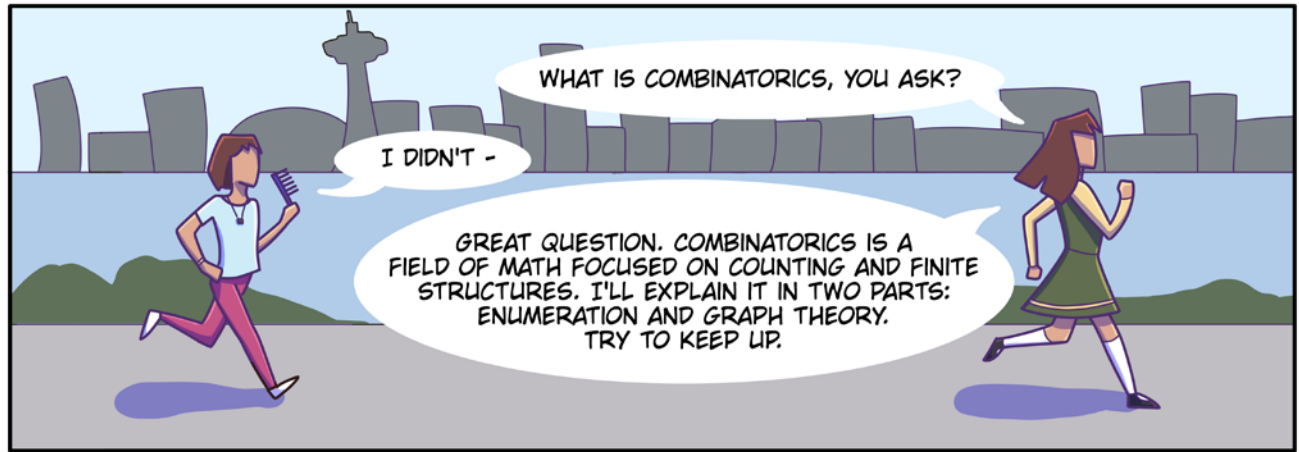
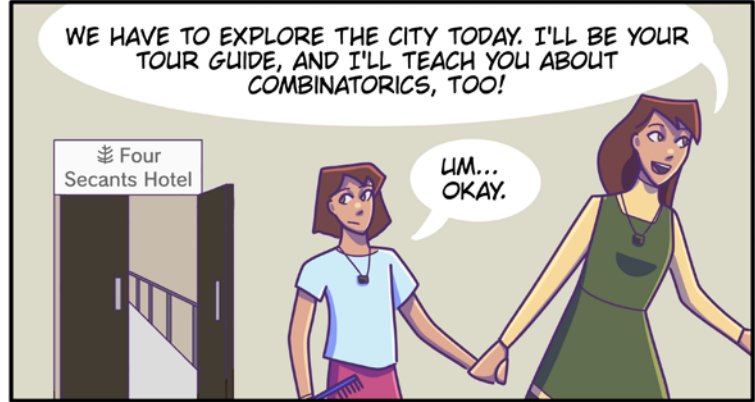
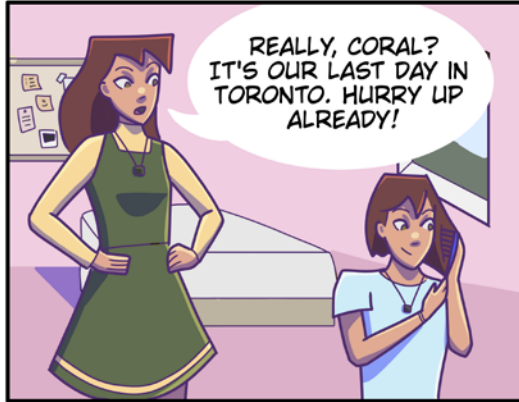
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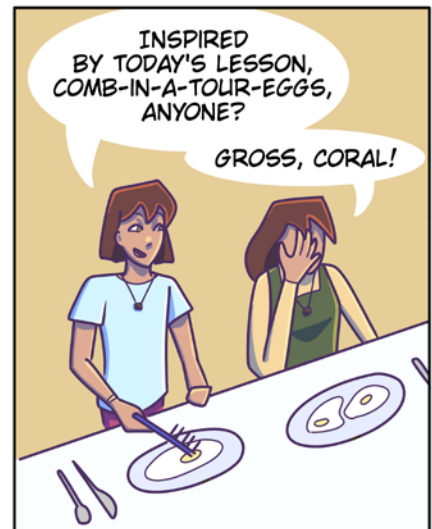
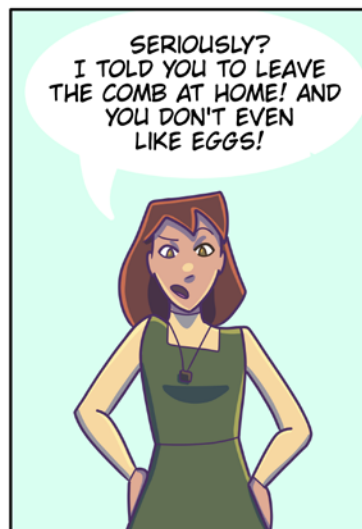
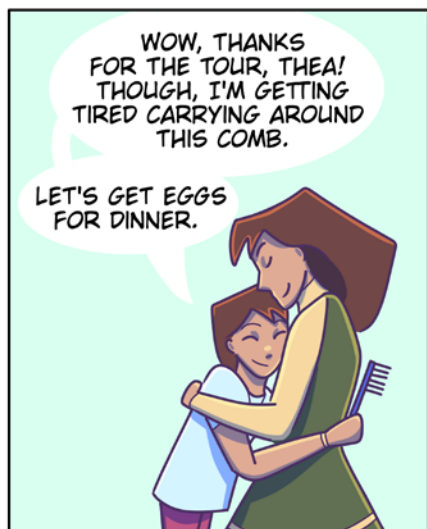
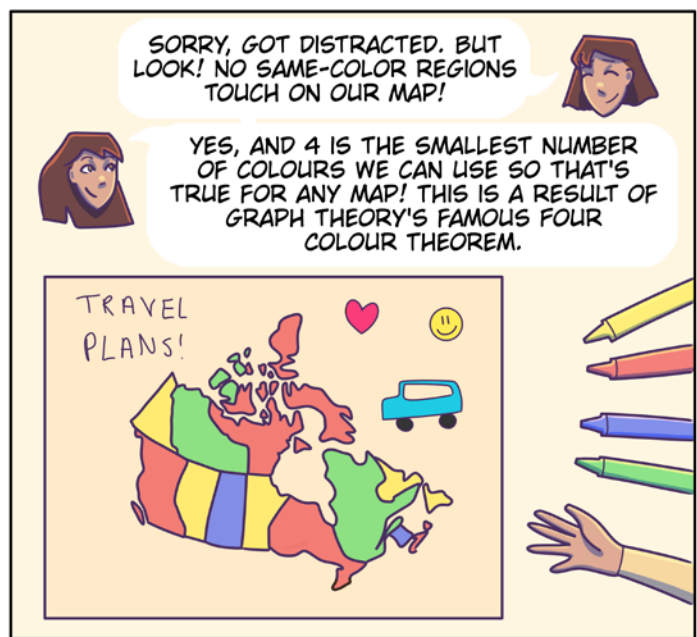
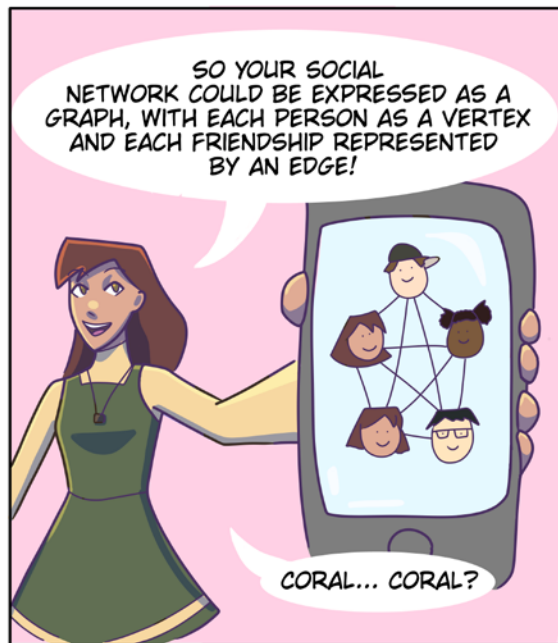
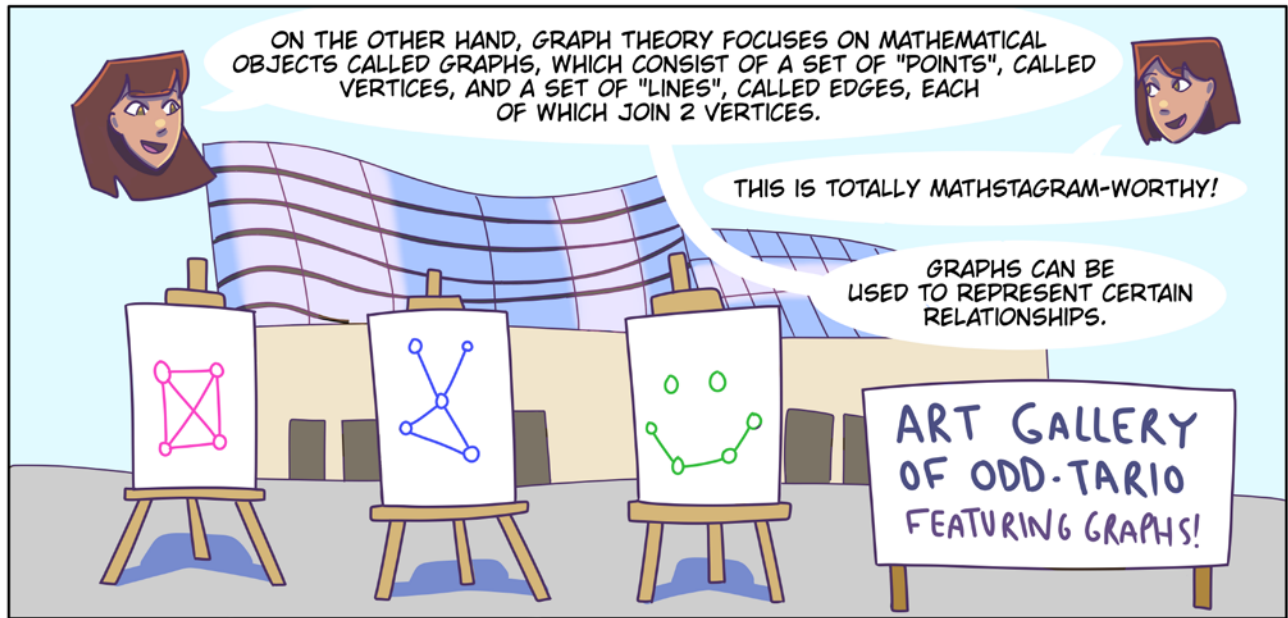
MathSoc Cartoons

MATH 239 - INTRODUCTION TO COMBINATORICS

STORY BY CAITLIN KWAN | ART BY ALEXANDRA WANG



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PSEUDO-PHILOSOPHICAL DIALOGUE

a. is it possible to describe every thing?
 b. well of course.
 a. i disagree.
 b. why?
 a. you will fail to describe things such as self-reference, indescribable things, etc.
 b. self reference cannot be failed to. that's like saying it's impossible to describe the brain because you're using your brain. wrong! a brain is a brain, it's made of meat and electricity. that's its description.
 b. indescribable things, such as what?
 a. well, i cannot say. if i could say, then they would be describable
 b. if you can't describe it, does it even exist?
 a. of course they exist. i'm certain that you can think of several just by thinking for a bit.
 b. in fact, i cannot.
 a. you are dull.
 b. you are wrong.
 a. ok fine, i will say a few words to you which will trigger mechanisms in your mind which will make known to you the some indescribable things. take the letter a. capitalize it. now take the number 7. capitalize it.
 b. just because a capital 7 does not exist does not mean that it can't exist. once it exists, i can describe it. in fact, i can describe every capital 7 that you can bring forward.
 a. how about, a blind person's field of view?
 b. does not exist.
 a. the length of a fractal coastline.
 b. infinity, or does not exist.
 a. i know what the problem is. the onus is not on me to bring forward examples for you to describe, for in doing so i will have described it already for you. you are claiming that you can describe every thing, but you have barely described any so far. please describe every thing now.
 b. you want me to enumerate them?
 a. i suppose not. there are uncountably infinite things, after all.
 a. ok then. let's say that there are an uncountably infinite number of you. you all have to work together or independently in order to enumerate or come up with a method to enumerate every single thing, and then describe all of them. i still believe that this is not possible.
 b. if there are uncountably infinite mes, i'm sure i can come up with an argument that counters your argument perfectly.
 a. i disagree. and you have provided no evidence to justify your claim, such as the argument in question.
 b. fine. but if there are uncountably infinite mes, then there are as many mes as there are things. then it is easy to describe every thing.
 a. but infinity has a thing for running away from itself.
 b. is there anything greater than uncountable infinity?
 a. i'm not sure.
 b. i'm not sure either. is wikipedia sure?
 a. the wifi is down.
 b. but why is it necessary to say the thing, instead of merely thinking of it? thought is the ideal method of description.
 a. thought is not description, thought is experience. if you can think it but cannot say it, then it is indescribable.

b. but what if i take a video of the thought? or i mean, what if i take a video of the experience? an experience-video, which captures light, sound, taste, touch, smell, temperature, proprioception, pain, balance, thirst, hunger, time, and all the internal thought processes occurring in the brain.
 a. but that's the same as thought itself then, which again is not description, but experience.
 b. and i encode the experience-video in a sequence of binary digits, thus turning it into something that can be said. what better way to describe something than binary? it is the best description.
 a. a possibly infinite sequence of binary digits, of course.
 b. of course. so you agree!
 a. no, i don't agree. you are missing the documentation required to convert the binary back into sensation. that very documentation would itself have to describe the things that the binary is encoding. that is to say it would have to do your job for you, describing every thing.
 b. so then can we reframe the question as, instead of you saying something to me and then me describing it, which doesn't work, you present to me a thought-video, encoded directly in 4d space and time, experienced through my own mind directly, and i have to turn it into words?
 a. a possibly infinite sequence of words, of course.
 b. of course. so you agree?
 a. yes. *stab*
 (the stab was immediately fatal)

wacfeld

WHY DO I SAY WEWLAD? WHAT IS WEWLAD?

WHY IS WEWLAD?

To me, wewlad can be an adjective and a noun! To be a wewlad means to be someone who does a wewlad thing. For something to be wewlad, it needs to be either: ridiculous, amazing, absurd, offensive, or just plain stupid. It's a very broad term, meant to fill in as a substitute. But why do I say it a lot? Why am I wewlad? Well, that involves me in quizbowl, and absorbing a term I found so fun to say, and so versatile, that I kept saying it, to the point where I would write it anywhere I could write it.

And so, I was bestowed this name. I know that the term is actually "wew lad," but I've said wewlad so many times that the space doesn't exist, and I think that's for the best.

wewlad.

wewlad

TO THAT ONE KINESIOLOGY STUDENT WHO SAID mathNEWS SUCKS

Dear Green,

Hi. We've met. You and me. We've bumped into each other. We've crossed paths. In this great big world of coincidences, you popped into my life, unexpectedly.

And I've heard your cries. I've listened to your complaints. I understand. I really do!

mathNEWS sucks! It's repetitive, and all over the place, and the math pick up lines aren't the highest quality. We get free pizza once every two weeks, but at what cost? Club participation! Gah. Nothing like the Health Faculty with its free food and snacks galore.

So every two weeks, we goblins and gremlins of the Math Faculty crawl out of their basements to write a combination of cringey shitposts and heartfelt sob stories and C++ tutorials in the most soulless building on campus. And for what? It's the same deal, over and over. Same people, same content, same thoughts. Four years passing by in an incoherent blur of 6 issues per term, two weeks per issue.

And don't even get me started on the **mathNEWS** office. Ugh, what a hole! Squeezed in between three other similarly dimly lit club rooms, we find the editors hunched over the one common computer day in, day out, putting together the behemoth set of WordPress articles into a semi-presentable A4 format [*Editor's Note: letter paper, actually*] that's got only one page of colour and is held together, much like the whole organization, by a flimsy staple.

I hear ye, dear Green. You are right. So right, you couldn't be less wrong. You have the moral high ground, no doubt about it. Please forgive me, dearest Green, for killing trees and wasting outdoor space on our Faculty and its students. I hope that you manage to forgive me, because I promise to quit this whole institution, give in my degree, and finally strive for the better good, if only you wrote me a reply in your nonexistent Faculty of Health student publication.

A fit math student

A COMATHEMATICIAN

is a device for turning cotheorems into ffee.

cocomathematician

BAD CIPHERS 2 & 3

Due to me being lazy and slow, Bad Cipher 2 was never published, so here are Bad Ciphers 2 and 3:

CIPHER 2

Another cipher, another sample encryption:

AA → AA

BA → DF

AB → CR

BB → FW

Hint: Invert the 2×2 Matrix. Bonus Hint: mod 26

Try and decode: XNU FEN WUS QMXTR TGII

CIPHER 3

Another cipher, another sample encryption:

AAAAAAAA AAAAAAAAA → MATHNEWS MATHNEWS

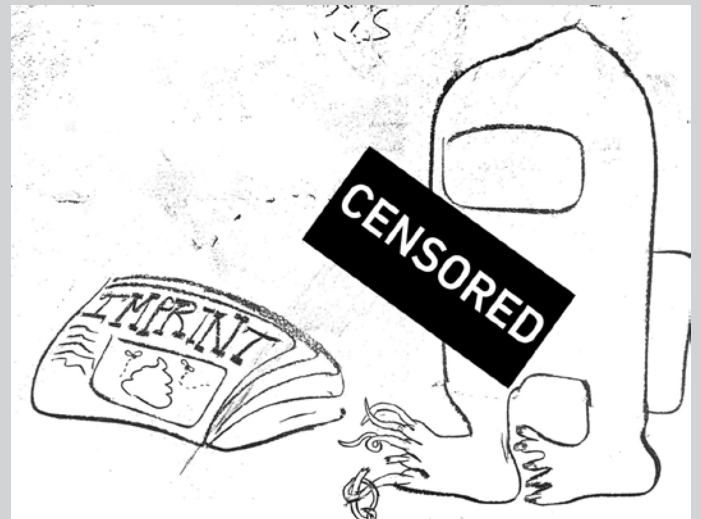
Try and decode: EPXSY MP SE CHSBV

Gerald Lee

N PEOPLE IN THE INTERSECTION OF "PEOPLE IN MATH" AND "PEOPLE WHO HAVE A LIFE"

wewlad

1984



various artists

REVIEWING SOME SQL LEETCODE QUESTIONS I'VE DONE IN THE LAST WEEK

175: COMBINE TWO TABLES

Baby's first intro to left join. Still not sure how it works, but it does. Bonus points for also using method-ass looking . selectors.

Rating: three hotdogs

176: SECOND HIGHEST SALARY

Spoiler: the trick is you just need to do it twice. Not a fan of problems that have a single trick, but in this case the trick is actually pretty useful. There must be a better way than the provided solution, though.

Rating: two hotdogs

595: BIG COUNTRIES

The first SQL question I did. It's like a Mario Circuit in a Mario Kart: it's lame and boring, but it's like that on purpose. I think it's pretty good at introducing the concepts of WHERE, SELECT, and FROM, but realistically doing this as anything other than your very first problem is kind of a waste.

Rating: π hotdogs

608: TREE NODE

This was a really cool one. This idea here is that you need to write a query to iterate through a binary tree, then return whether each node is a leaf, root, or inner node. The problem's not actually that complex, but I welcome any opportunity to use CASE instead of IF/ELSE.

Rating: five hot dogs

1873: CALCULATE SPECIAL BONUS

Neat exercise in using %, a special character that represents zero, one, or multiple characters. The gimmick is that you can do a check if a string is like "M%", which just checks if the string starts with "M". Makes me wonder what kind of behind-the-scenes shenanigans SQL has going on. Other plusses include using case and mod. I just like percentage signs tbh

%%%%%%%%%%%%%% SQL IS SO MUCH FUN %%%%%%%%%%%%%%%
%%%%%%%%%%%%%%

SQLemman

YOU'RE COMING BACK TODAY!!

I promise not to be jealous of being here right now. Leave the past in the past and forget the future. I'm right here. And it's all perfect.

You might not hear from me for a while.

Absolutely smitten

A WAR HAS ENDED!

GEOGRAPHY NERDS CRY!

BREAKING NEWS: by the time you're reading this, Canada and Denmark will have officially announced plans to end the Whisky War. This has been going on since 1973, over the ownership of Hans Island (Tartupaluk), a small island with nothing but ice, snow, and rock, which is exactly between Nunavut and Greenland, which is within the Kingdom of Denmark.

The plan is to split the island in two, giving Canada a border with Denmark via Greenland. Unfortunately, this will be sad news to geography nerds. With this border, both Canada and Denmark will be removed from the list of "countries that only share a land border with one other country". However, the loss of this fact is a small price to pay for piece, and is also a daily reminder that the World Map is not static.

wewlad

THE JESUS OF ASBESTOS

Blessed be he, the saviour of our people
Who sacrificed himself for the purity of our lungs
The resident of the walls, blessed be he
Roamer **amongst** the concrete, chosen by the Asbestos Gods.

Blessed be he, the saviour of our kind
Created in aeons past, in a long forgotten time
Where legends of a "MC Comfy" spread across the land
Before the C&D fell.

Of the nine pillars of MC
Only he stands today
For he is the Asbestos Jesus
And we his asbestos kin

Amen

asbestosfan1111

FUN BASEBALL METRICS (2)

The baseball metrics are back. Since we went through batting last time, this time, we'll do the pitching stats.

For many years, people use ERA (earned run average), which is the number of earned runs a pitcher allows in every 9 innings. This was a fine stat since it let us know how good the "team" is when the pitcher is on the mound, which is important. However, ERA does not tell us how good the "pitcher" is since the team performance can be affected by the fielding performance of the other 8 fielders on the baseball diamond.

To fix this, some suggest that we should only consider the stats that a pitcher can control when evaluating his performance. But what are those? How do we separate the pitcher while baseball is a team sport with 9 players from the same team on the field at the same time?

Some brilliant sabermetricians figured out that there's 3 outcomes that almost has nothing to do with the fielders: Strikeouts, Walks, and Homeruns (well, the catcher might have something to do with those, but we cut it from 9 to 2). Indeed, those stats are the ones that tend to stay constant over the course of a season, or seasons. With this observation, sabermetricians were able to come up with a new stat, FIP (fielding independent pitching). One important aspect of this stat is that it's in the same scale as ERA, so baseball fans can know whether a pitcher's performance is affected by bad luck or not.

However, this stat also has its downsides, and studies have already shown that it tends to under-estimate ground ball pitchers. If you're interested in how to fix this, stay tuned.

[_ted_fu](#)

N REASONS WHY LIZARDS ARE COOLER THAN CATS

- Lizards are independent animals, while cats always seek attention. Independence is cool.
- Lizards are cold-blooded reptiles. Reptiles are cooler than mammals.
- Lizards are relatives of dinosaurs. Dinosaurs are cooler than cats.
- Lizards don't want to run free, while cats do, which is not cool.
- Lizards use venom to hunt, while cats use cuteness, which is also not cool.
- Lizards can grow their legs and tails back, and thus have countable but infinite lifespans, while cats only have nine (according to rumours).

TEN THIRTY SATURDAY NIGHT

I sprint down the sidewalk, frenzied, panting. Passersby glance at me, alarmed. I'm upset because of the words I read. Horribly upset about myself in that frustrating, hopeless, incompetent way where I want to rage at everyone else but know it's only my fault. The anger inside me fuses with the pounding exertion of running until I can't tell them apart. Passersby glance. Cars roar. An intersection; the light red. For a brief moment while catching my breath, it's only the tight ache of running. Then the words flash through the well-torn wounds in my head, and I wish the ground would open up and swallow this wretch of a person.

The light's green again, and I'm off. It's not their fault. I brought up the topic. I don't know why I think I could take it. It's that feeling of worthlessness, of embarrassment, every time we talk about it.

It's not a measure of your worth.

All in good time.

You should try *this*.

It's taboo to talk about my despair.

It's dark, now, as I round the building, and through the windows, a glow that is more determining than comforting. I'm soaked in sweat, still out of breath, and don't meet the man's eyes as I scan in. There's too much hatred in my eyes to direct them anywhere but the floor.

Warm-up is performed with a hunger and lust I've never felt. The worthlessness is still running through my head, pulsing and hurting with me. I crave the pain that comes next. The stretching band teases the ball of rage and despair inside me. My eyes are watering as I walk to the bench.

I start with lighter weights. It feels good. Switch the weights. The swirling, roaring ball mixes again with exertion, and this time, it's a heavier, bulkier crush. My breath is sharp and loud. The weights go up. And down. And up. Like punching clear through a wall. The chest press helps a bit, but it's not enough. Deadlift. I stand, lifting up the bar. Over and over again. It takes all the focus and strength I have to brace and lift. The ball of self-hatred is worn down, slowly, by a wave of fatigue. It swells, and fills my whole mind until nothing is left but me and the bar.

I feel light, afterwards. Not happy. Not good. Just the same lightness and sadness you feel when you finally receive a letter rejection you were already expecting. Extinguishment. It doesn't feel like I'm any less of a failure. There just isn't enough energy left in me to consider it.

OH BOY, SUMMER SURE IS MY FAVOURITE SEASON

Oh boy, I love how hot it always is.

Oh boy, I love how suffocating the heat is.

Oh boy, I love the how the extreme heat numbs my brain.

Oh boy, I love how tired I constantly am.

Oh boy, I love how everything and everyone is slightly stickier from the sweat.

Oh boy, I love not being able to fall asleep properly.

Oh boy, I love how the only long term respite from the heat is staying inside.

Oh boy, I love how any other escapes are brief and expensive.

Oh boy, I love feeling gross for months on end.

Oh boy, I love how when it is cool the mosquitoes come out.

Oh boy, I love the buzzing noises they make.

Oh boy, I love feeling itchy from mosquito bites.

Oh boy, I love the smell of baking hot asphalt.

Oh boy, I love the stink of the summertime city.

Oh boy, I love this season.

aphf

MISS CND? YOU'LL NEVER BELIEVE WHAT THIS FACULTY IS DOING!

As we all know, the Math CnD is closed, reportedly until September, depriving the Math Faculty of coffee, donuts, and other baked goods. Where are you going to buy food and sit down to study and chat with friends, in a faculty-specific space? You won't believe what I'm about to tell you. Not because it's shocking, but because I have the audacity to advertise what I'm about to in the Math Faculty newspaper.

The ES Coffee Shop is open. And it's the next best thing!

I can almost feel the editors ready to slide this into the discard pile, but hear me out. Where else are you going to get quality coffee now that the Math CnD is closed for the term? Starbucks? *Tim Hortons*? Our coffee is \$1, and our baked goods

are \$1.50, and we have quality on both. We don't have donuts, but we do have pretzels. Not to mention, we have a lounge that is a designated dining spot and is great to study in! No, this isn't a ploy from the Environment Faculty to take over the Math Faculty at all. Until September or not, the rest of your Spring term isn't going to feature the CnD. So why not help us out and pay us a visit? We're located by the corner of Environment 1 and Environment 2, on the first floor/ basement. All members of all faculties are welcome! The more converts—I mean, customers—the merrier!

Skit

[uknightED's Note: I'll allow it, but you're on thin ice.]

DR. OZ SHOT OVER FREE CBD

According to sources in the anonymous spam text community, beloved doctor and potential Senator Dr. Oz has been shot, over free CBD. Sources declined to elaborate, since the phishing link they sent me no longer worked. In lieu of flowers, please donate to Dr. Oz For Pennsylvania.

UW Unprint

ISSN 0705-0410

UW'S BASTION OF ERUDITE THOUGHT SINCE 1973

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DEAD NUTTY

gridCOMMENT 149.3

If you've been around the **mathNEWS** office lately, you may have seen our seemingly endless supply of **mathNEWS** 135.4, with a bright yellow colour and featuring the phrase "Dead Nutty." Published in 2017, 135.4 offers the reader a look into what **mathNEWS** was like in the distant past (five years ago). It's about six pages long, and two of the pages are dedicated to the **gridWORD** below. Zethar, the **gridMASTER**, says:

since I have heard through the grape vines at how people like doing my crosswords, I put in some extra effort this issue to give something more: more grid, to be precise ... I hope you enjoy this extra-effort edition of the **gridWORD**.

bipED

ACROSS

1. Црп
5. Temporarily linger
10. Annoyance
16. Epitaph opener
17. Middle east capital
18. Folded fare
19. Disposed to think well of
21. Coventry's bare rider
22. Sound
23. American letter
24. Free
25. $f: X \rightarrow X$
29. Square
30. Helpful connections
31. Green fuzz
32. Freight weight
35. Spain (abbr)
36. Internet phone book
37. Grounds
39. Milk supplier
40. Key
41. "Paradise Lost," e.g.
42. Having variable dispersion
47. Latin ninth hour?
48. Gel
49. Born
50. This head-wear isn't actually from its namesake country
53. Draw
54. Down
57. An abbreviation for tools such as clickers in class
58. Warning
59. British mother
60. Fair
61. Protective spirits
64. Claws
67. Professional Melee hardware
68. They might catch some rays
69. Cancels
70. Yellow-green
72. Elastic cord
73. Conic section fixed point
74. Rouse
75. Used by 51D
76. What you get when after a long exam
77. Red, Black, and Yellow

11. Lovingly, in music
12. An American saloon?
13. Opening
14. Jesus' great-great grandfather
15. Terminal info
20. Urge sources
26. Of higher grade
27. Talisman
28. Packed
32. Plains structure
33. Ear-like
34. UN address
36. Er
37. An example of a 53A
38. Network
39. This volcano is also natively known as "beautiful mountain".
40. Montreal, for one
42. Ancient
43. A long, long time

44. Earthly colour
45. Soul
46. Catholic district
47. e.g. Hamiltonian path, Knapsack problem
51. Police division
52. Rolls up
53. Fit
54. Preform
55. Defective tissue
56. Pitchers
59. Rattle
60. Leave
61. Ravine
62. Divine humour
63. Part of Scand.
64. Panes
65. Touch
66. Sole
70. CFL precursor
71. Recipe amt

1	2	3	4		5	6	7	8	9		10	11	12	13	14	15	
16					17						18						
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22						23					24						
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47									48				49				
50					51	52					53				54	55	56
57					58						59				60		
					61						62			63			
64	65	66							67				68				
69									70				71				
72									73						74		
75									76						77		

DOWN

1. Symbol of Scotland and Lorraine
2. Latin ladies
3. Early light source
4. To make warmer
5. Criticize harshly
6. Greek female equestrians
7. Browns
8. Fourier prize
9. Unsaturated hydrocarbon
10. Greedy

lookAHEAD

SUN JUN 19

Juneteenth
Father's Day

MON JUN 20

National Indigenous
People's Day
Summer Solstice

WED JUN 22

You probably have a
midterm today

THU JUN 23

Anthony Bourdain's
birthday

FRI JUN 24

SAT JUN 25

SUN JUN 26

mathNEWS 149.4
production night

MON JUN 27

The original iPhone's
release day

TUE JUN 28

WED JUN 29

mathNEWS 149.4
published
Otherwise normal day

THU JUN 30

SAT JUL 2

LAST ISSUE'S gridSOLUTION

1	F	2	A	3	L	4	K	5	A	6	N	7	D	8	S	9	E	10	W											
10	O	N	I	A	E	H	E	N	L	O	W	14	E	15	T	16	S	17	O											
X	13	V	E	N	E	R	E	A	L	16	D	E	E	18	R	19	S	20	O											
20	C	O	R	N	U	T	O	21	O	P	R	A	H	22	W	H	A	T	O											
O	W	24	U	R	G	E	S	25	A	T	26	W	A	S	27	A	S	28	T											
T	23	U	R	E	E	S	29	K	N	I	T	30	N	31	R	E	S	32	T											
31	R	E	S	T	34	T	A	P	A	S	35	Y	36	R	E	37	A	D	I											
A	37	R	A	D	I	I	38	T	O	U	L	O	U	S	E	S	39	E	40	S										
I	41	U	N	42	E	U	O	R	S	43	A	Y	S	44	O	H	M	S	45	A	I	T	I	S						
43	A	44	O	H	M	S	46	S	A	I	T	I	S	47	S	48	N	O	T	A	49	C	50	S	51	R	C	H	52	N



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