

mathNEWS

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“WHAT IS THE WORST WAY TO START A TERM?”

I always find January to be a time of recalibration. My first winter term (in January 2022? Am I old now?) was the first real moment I had to breathe after just barely surviving my COVID 1A term. I was pushing myself so hard that I didn't have time to realize just how tired I was. Oh, and I realized that somehow, I hadn't made any friends by working on assignments in my room alone and playing *Destiny 2* until 3 in the morning. Oops!

Maybe you're a first year who just survived your first finals and are now back on campus, ready to start again. If so, congratulations! 1A is the hardest term by far. Your classes get more difficult, sure, but you get better at handling them. If you feel like I did this time 4 (!!) years ago, it might help to know that I made all of my current friends in 2A and beyond. It's never too late to get out and meet people on campus. Here's a little tip: most people like hanging out, but hate making plans. If you get over that hump and take the leap into asking people to do things with you, you'll open a ton of doors for yourself.

If you're wondering why I'm feeling so reflective, it's probably because I'm graduating this term. Uh oh! I picked a hell of a time to try and enter the workforce, but I guess if I didn't appreciate a challenge I wouldn't be taking graphics this term. Maybe I should be more worried, but mostly, I've just been thinking about how much my life is going to change this year. In January, I'm sitting in MC, procrastinating homework, like I've been doing for the last few years. In December, I'll (hopefully) have a job, and probably be living in a new city, away from everyone I know. It'll be the biggest year of change in my life since... well, since coming to Waterloo.

I've been lucky to have a gigantic issue of **mathNEWS** to keep me grounded! I've been away from Waterloo on co-op for most of 2025, and I was so happy to see a ton of friendly faces, old and new, laughing and writing the night away at our latest production night. The happiness lasted roughly until we got the customary prod night pizza orders, including “oops all olives pizza” and “BBQ pineapple”.

Hold on, stay warm, and we'll all get out of this okay.

befuddled
Editor, **mathNEWS**

SNOWDOZER	Sick
AURELIO	Buying a lab manual and doing the lab on the same day
USMAN!	falling for a stranger might do it
NOTOH	getting two concussions right before it
PTKYR	mid
■■■	n choose k
FINGERSINSOCKETS	still dealing with senioritis (from high school)
YALEVOYLIAN	By remembering that you have to apply to jobs now
MRBRIDGESKY	Asking my Prof out and procrastinating going to my crush's office hours
JOCHEMIST	With professors who are not giving organized vibes (COMMST profs get it together please!)
JUBBLE	Losing your lease and living on the street.
1000011	stepping in goose shit
ASPIRO	Relapsing on League of Legends
DIMINUTIVE REX	your apartment getting flooded by your upstairs neighbors
BEESKNEES	Breaking all my nails because it's so dry out
IS.ALL.ON	With the Flu
SMALLMOUTHBASSHATER	breaking your arm
VARICOSE	with xtra protein weevil pasta
BLATHER	cold, alone, and hungover underneath a tree somewhere by CLV
NOT A N*RD	Cutting billions of dollars in researching grant—wait what are we talking about?
ABS(JESTER)	With conditions
ABELIANKwyjibo	Not laughing at 67 because we left that in 2025
LEAH	(almost) slipping on the ion tracks and losing a glove

ARTICLE OF THE ISSUE

Congrats to FinallyToby's *Some people ask about the weather!* You'll find your prize in MC 3030. The office is cluttered, the ceiling tiles have asbestos, and there's a bottle of Orbitz threatening to kill us all. But, not unlike our neighbours, we love it here!

revivED
Editor, **mathNEWS**

It's all fun and games until sixty page issue.

SASHA NOVIKOV, **mathNEWS** EDITOR FOR WINTER 2026
ALONG WITH OWEN GALLAGHER, SARA NAYAR, NOAH NAZARETH,
AWAB QURESHI, TOM SI, AND RIVER STANLEY

mathASKS 160.1

FEATURING mathNEWS EDITOR CONTENTED

0.423: ARE YOU READY FOR THE QUESTIONS?

Yes.

APHF: HOW WOULD YOU GO ABOUT ASSASSINATING A HEAD OF STATE (ANY)?

I'd wait for Avish to become MathSoc president and kill him.

JOCHEMIST: WHAT IS YOUR FAVOURITE FLOWER?

Hydrangeas. They're extremely pretty, but when they wilt they still look really cool, which I love. Lilacs and orchids are honourable mentions—lilac is one of my favourite colours, and orchids are orchids.

THE MOON: FAVOURITE MUSHROOM?

This one I cannot answer. I absolutely love mushrooms. I don't know why, but finding them when walking around just brings me so much joy. They're so cute! As partial answers, my favorite place to find mushrooms is on (or next to) a fallen tree, and I think my favorite mushroom to eat is probably enoki.

LARS NOOTBAAR: FAVOURITE INNERTUBE WATER POLO COLOUR?

Blue. They used to be way better, and are probably now the same, but the association between blue tubes and scoring is still there in my mind.

FIVE FOOT ASSASSIN: 500K OR DINNER WITH RAHIM MOOSA??

I'm glad this has been asked, because it's something a lot of people seem to misunderstand. We just have no way of comprehending the sheer expertise and knowledge that Rahim Moosa has. He can give you the blueprint to knowing model theory and being successful, which long term is way more valuable than the short term 500k. Dinner with Rahim Moosa is actually more valuable than dinner with JAY-Z, which itself is more valuable than 500k. Rahim Moosa could make *Reasonable Doubt* but JAY-Z could never prove that a type in DCF internal to the field of constants admits a maximal image whose binding group is an abelian variety.

FIVE FOOT ASSASSIN: WHAT IS YOUR FAVORITE ALBUM??

Mos Def & Talib Kweli Are Black Star.

PAPAYABIRD: FAVORITE SUGARY SODA? FAVORITE ARTIFICIALLY SWEETENED SODA?

Spruce soda, coke zero.

FIVE FOOT ASSASSIN: WHAT DOES IT MEAN FOR $\phi(x, b)$ TO FORK OVER A IN A STABLE THEORY T??

I forgot. (I'm not even kidding)

RAPIDEYEMOVEMENT: DR. PEPPER?

Sure. Come drop it off in MC 3030 and collect your prize!

MOLASSES: WITH COMPLETE DICTATORIAL CONTROL OVER mathNEWS, WHAT WOULD YOU CHANGE ABOUT IT?

I became an editor exclusively to make us close the pizza boxes so it stayed warm for longer. Now that that's happening, **mathNEWS** has achieved complete perfection. So, I wouldn't change anything.

DOLLAR STORE PERSON: FAVOURITE VEGETABLE?

Most of the best vegetable dishes I can think of contain garlic, so I'll say that.

BEESKNEES: WHAT'S YOUR FAVOURITE WINTER TREAT?

Skiing. If I read the question like a normal person though, then that thing where you heat up maple syrup and pour it onto snow to make taffy.

TOILET: AS A VERTICALLY CHALLENGED INDIVIDUAL, DO YOU HAVE PLANS TO GET LEG-LENGTHENING SURGERY IN THE FUTURE?

I am so disturbed at the way that shit works. They cut through your bone and then slowly pull the two pieces apart to force your body to fill in the gap with bone, basically making you recover from simultaneous broken legs for like an entire year. That is fucked up. So, no. I'll just keep using stilts.

PAPAYABIRD: WHAT IS YOUR OPINION ON THE SUPPOSED INCESTUOUS RELATION BETWEEN mathNEWS AND PURE MATH CLUB?

If by "incestuous relation," you mean that many PMC execs have been editors and vice versa, then I don't think that's surprising, as they both attract people in math who want to get involved in clubs. If you mean something else, I don't want to know what it is.

FINGERSINSOCKETS: WOULD YOU RATHER HAVE UNLIMITED BACON BUT NO MORE GAMES, OR GAMES, UNLIMITED GAMES, BUT NO GAMES?

So... I could have bacon. *Unlimited bacon...* but no more games? Or I could have *unlimited* games... but *no bacon??*

PLANET B612: HOW IS PLAYING THE DRUMS GOING
 (((O(*°▽°*)O)))

Since I moved out of a house and into an apartment, it has not been going at all, because I had to sell my drum kit. Last term I wasn't on campus late enough to ever use the one in AL, but I'm taking MUSIC 240 (intro jazz) this term and it's a 6-9pm lecture, so maybe hopefully I'll be able to play more this term! I don't really have a comparable form of spontaneous self-expression in my life—I miss it a lot.

USMAN!: ARE YOU FEELING CONTENT, OR DO YOU CONSIST OF VARIOUS CONTENTS?

When I was trying to decide on an editor name, I realized that the things I do as a **mathNEWS** editor are likely to be the longest lasting impacts I have on this place, since **mathNEWS** will be around forever and the editors are ~~hoarders~~ dedicated archivists. Because of that, I wanted the name to be somehow reflective of what I want to do while I'm here, and I think a big part of that is to create the feeling of contentment for people (by contributing to things like **mathNEWS** and PMC, but also just by trying to be a good friend). So I'll answer this with a question; how can I make *you* feel content?

I'M JUST A WHEEL

I am a lowly wheel. I came in a set of two as a part of a shopping cart. I was on the way to a shopping mart. I was new and freshly unpacked. Attached to a trolley made for groceries.

And down the road I went to roll. Roll and roll and roll and roll. Unexpectedly, I came to a stop! But my twin, my friend, my companion rolled on without me. Oh and lo, the cart continued, scraping, grating, screeching by.

I was a lonely lowly wheel. Living by my lonesome laying there. Blending in with bright snow, I was a wheel of white whirl. Dismay and despair filled me as each minute passed.

A shadow passed over me as I sat in fear. To my delight, my buddy was back! With a few pats I was reattached, to roll once more as a set of two.

jayknetsch

SOME PEOPLE ASK ABOUT THE WEATHER

A REVIEW OF LA THROUGH QUESTIONS I WAS ASKED

My dad handed me a googly eyed Christmas card with three crisp and uncreased American twenty dollar bills, telling me to not spend it all in one place. I almost forgot to thank him, because the seventh president of the USA, Andrew Jackson,¹ was staring back at me from the paper in my hand. This political unease should maybe have informed me of what I should expect during a week long trip I had planned in Los Angeles.

On January 1st, I landed in Las Vegas for a layover. Here, I walked through what felt like a triumphant museum of 1960s America. There was an air force exhibit complete with old uniforms and model airplanes, a reminder that this desert had once trained soldiers for a world war. Further along, museum advertisements with large radiation warning symbols plastered the walls. A few states away, the Manhattan Project had taken shape in secret, and in the 1950s, the Nevada desert had been scarred by nuclear tests.

Between displays, there were slot machines, smoking rooms, and inevitably slot machines inside the smoking rooms. The juxtaposition of history, spectacle, and vice was disorienting. But none of it was as disorienting as the conversation I had while sitting in the lounge.

It started quite innocuously, sitting across from me, she pointed at my salt stained bag and asked me if something is

leaking inside. Realizing that it doesn't snow in the desert, I said that I'm from Canada, and to melt the ice on the road they salt the street, and the salt gets everywhere. The next thing she asked was: "How is the healthcare?" Aware of where I was, I answered as neutrally and honestly as I could. I mentioned my limited, but pain free—and entirely free—experience getting the care I needed. She proceeded to tell me about every time that she had been ripped off by the hospital. I'll spare the details but one procedure she described cost her a six figure sum. She had insurance through work to cover it but was frustrated by the bureaucracy involved in the resolution. Feeling unmoored, I went quiet.

A few minutes passed and she asked, "What about the tariffs?" For this I did not have a great answer. I told her I'm not sure, that I only buy groceries. She nodded, as if this explained everything. I nodded back, feeling suddenly homesick, stuck somewhere between a tourist and a witness to a country and a culture I was struggling to understand. She started talking about a gun she had recently bought and my mind drifted.

My friend picked me up from Burbank airport, the first airport I had ever seen with an outdoor baggage claim. He told me, almost casually, that there was a bomber flying over Los Angeles that day for the Rose Bowl. A B-2, he said. It seemed important to him that I know this.

As we drove, he told me he had opened a school. Before that, he had worked at what he described as the worst school in his home state, where gang violence was routine and school shooting threats were common enough to become administrative background noise. I told him that back home it hadn't been like that for me, that the worst we had were fist fights.

After a pause, he asked me: "What do you think is the reason the Civil War started?" I searched for something careful to say, but before I could finish he was on a tirade about how the curriculum taught in schools is so deeply intertwined in archaic state beliefs and the individual loyalties of whoever stood in front of the class.

The last stop on my trip was to Ventura, California, a small town about an hour west of LA. Driving to my destination, a conference, among the things I passed by were a recreation of the oval office as Reagan had it during his reign, as well as a President Trump souvenir and gift shop. History, reverence, sincerity, or irony, I have no idea.

The conference was great, although I heard not so much about science as I did about the United States operation in Venezuela and if it would escalate to being a larger conflict. Mercifully up to now, it has not, although it is still yet to be seen.

Some people, when they find you're from Canada, ask about the weather. I felt I had been asked enough questions in America to begin to understand that the snow back home is not of interest here. Everyone I encountered seemed haggard and besieged.

By the end of the week, I had seen the ocean, the palm trees, and the weather everyone imagines when they think of Los Angeles. None of it stayed with me. What did stay with me was the pervasive smell of garbage around the city, the haze, and the considerable number of people who came here looking for a better life that they never found. On top of that, the people I conversed with had so much strain behind them, every complaint ended with "but I love it here" as if trying to convince themselves more than me.

It became difficult to enjoy a place where so much of everyday conversation seemed weighted with history, money, and grievance. Leisure existed everywhere, but it felt provisional, as though it could be withdrawn at any moment. The city offered pleasure generously, yet beneath it ran a current of unease that no amount of sunshine could quite disperse.

I left with the sense that something essential was out of balance. When a society's casual questions turn so quickly to war, cost, and survival, it is not because people are unusually curious. It is because these things press on them constantly. In such a climate, even a visitor feels the tension. Ordinary things should not be life or death.

I am glad to be home.

1. For the Canadians in here not privy to 19th century American politics, Andrew Jackson is a polarizing political figure who notably signed the Indian Removal Act, which was called unconstitutional at the time. In his presidency he opposed the use of paper money and the national bank. Barring any last-minute change he is supposed to be replaced as the face of the \$20 by 2030.

N REAL ACTUAL FISH I HAVE LEARNED ABOUT FROM PLAYING FINSPAN THAT I HIGHLY RECOMMEND THAT YOU IMAGE SEARCH

- bigeye smoothhead
- chinese trumpetfish
- black swallower
- pelican eel
- paraliparis
- snipe eel
- binocular fish
- pygmy seahorse
- stoplight loosejaw
- wolftrap angler
- faceless cusk

macinnes

WAYS TO SPEND YOUR WINTER BREAK

- binge shows
- eat excessive (unhealthy) food
- eat insufficient (healthy) food
- say you'll do work
- do no work
- call friends
- go places
- fail to touch grass
- sleep too much (in the day)
- sleep not enough (in the night)
- forget what you were supposed to do

B(

mathNEWS

WE INTERRUPT YOUR SOCIETY WITH AN IMPORTANT MESSAGE

At exactly 8:35:03 AM on October 3rd, 2031, the sun above Toronto disappeared.

The city plunged into sudden darkness. Screams filled the streets, ringing like church bells. Pedestrians on the sidewalk ducked inside of buildings, hiding under tables in preparation for a storm or a bomb. One vehicle on the freeway slammed on the brakes out of fear, causing a pileup during rush hour.

The people of Toronto, so terrified and preoccupied with what was happening, never had time to wonder whether this was happening to anyone else. They would learn only in the following hours and days that this same darkness had swallowed New York City, Tokyo, Beijing, and the rest of the top hundred—*exactly* one hundred—metropolitan centers on Earth.

What happened next, the whole world would share. Seventeen seconds after the sun left the sky, a quiet ringing became audible in the ear of every human being. Then the ringing became louder, and louder, until it overwhelmed every other noise that anyone had ever known.

Suddenly, a voice, confident and cold, cut through the static.

WE APOLOGIZE FOR THE INTERRUPTION, BUT WE HAVE A BRIEF MESSAGE WE WISH TO SHARE. IT IS OF GREAT IMPORTANCE TO EVERY MEMBER OF YOUR SPECIES, AND THUS EACH MEMBER IS NOW RECEIVING IT IN THEIR OWN NATIVE LANGUAGE.

WE ARE PLEASED TO REPORT THAT THE INITIAL PHASE OF OUR EXPERIMENT HAS COME TO A CONCLUSION, AND THE RESULTS ARE READY TO BE SHARED.

Parents found their children, screaming silently, and tried to soothe them with words that neither could hear. Strangers on a streetcar found each other's eyes and hands, as if to say *yes, this is happening to me, is it happening to you, is this real?*

The voice continued, uninterrupted.

IN SHORT, THIS EXPERIMENT INVOLVED THE DELIBERATE CREATION, GUIDANCE AND MONITORING OF THE HUMAN RACE AND YOUR PLANET AS A SOCIOLOGICAL CONTROLLED TEST. THE FULL DETAILS ARE CURRENTLY BEING DELIVERED TO THE TOP TEN THOUSAND HUMAN LEADERS, THINKERS, AND ARTISTS, BUT WE SHALL PROVIDE A SUMMARY OF SEVERAL RELEVANT DETAILS NOW.

A woman sitting on a park bench—frozen in fear, boba tea still in hand—felt a breeze in front of her. Her eyes adjusted, and could just barely make out a black cube, the size of a clenched fist, hovering in front of her. As she made eye contact with the machine, it gave a pleasant chirp,

materialized a stack of papers on the ground in front of her, and drifted like a balloon back up to the sunless sky.

THE OBJECTIVE OF THIS EXPERIMENT WAS TO DISCOVER HOW A SOCIETY DEVELOPS FROM NOTHING, IN TOTAL ISOLATION FROM THE INFLUENCES OF THE GALACTIC COMMUNITY. TO THAT EFFECT, IT WAS NECESSARY THAT YOU BE SHIELDED FROM ALL EXTERNAL CONTACT WITH THE SPECIES OF THE KNOWN UNIVERSE.

THIS RESTRICTION IS NO LONGER REQUIRED FOR OUR RESEARCH, AND THE SENSORY VEIL AROUND YOUR PLANET HAS THEREFORE BEEN LIFTED. WE EXPECT OTHER INTERSTELLAR CIVILIZATIONS TO PROMPTLY MAKE CONTACT WITH AIMS OF MUTUAL DIALOGUE AND COMMERCE.

Those still brave enough to be outside, whose curiosity had overcome their fear, realized their eyes had adjusted just enough to look up and see... *something* overhead. It was not the familiar moonless midnight sky which was causing the sudden darkness. Lines, contours, and slowly blinking pink lights could be made out on a shape which seemed to stretch across the entire city, as far as a human eye could see.

Something above them was blotting out the sky.

YOU MAY WISH TO PRIORITIZE CONTACT WITH THE ADDITIONAL EXTRASOLAR HUMAN RACES, AND ADDITIONAL EARTHS, CREATED FOR THIS EXPERIMENT.

FOR BEST EXPERIMENTAL RESULTS, WE CREATED AND STUDIED ONE HUNDRED AND FORTY-FOUR TOTAL ISOLATED HUMAN ENVIRONMENTS, EACH WITH SLIGHTLY TWEAKED GENETIC MAKEUP, PLANETARY GEOGRAPHY, AND INTRODUCED PHILOSOPHIES.

WE EXPECT YOU TO HAVE PRODUCTIVE DIALOGUE WITH YOUR PARALLEL SOCIETIES. DESPITE THEIR INDEPENDENT EVOLUTIONARY PATHS, THEIR HISTORY OF DEVELOPMENT MATCHES YOURS IN MOST KEY WAYS. IN FACT, MANY INSTANCES INDEPENDENTLY DEVELOPED SIMILAR MYTHS AND RELIGIONS TO YOURS, WHICH IS JUST ONE OF THE FASCINATING RESULTS WE ARE SHARING WITH YOU TODAY.

Across the planet, militaries of every nation scrambled to launch fighter jets and communicate targets for their surface-to-air missile batteries. Pilots sprinted across their tarmac, sure that the world was ending. But they needn't have put in the effort.

THE REASON WE ARE INFORMING YOU OF THIS IS BECAUSE THE PARAMETERS OF OUR EXPERIMENT HAVE NOW CHANGED.

A deep, seismic rumble suddenly rolled through Toronto like a wave. Car alarms started, and windows shattered, not that anyone could hear them. But every resident could feel the terrible tremble deep in their guts.

Those still outside, despite all of their self-preservation instincts, noticed the patterns in the sky start to move. They could see the object move further and further away, getting smaller and smaller, until they could see the object's edge—a massive disk, floating in the sky, shrinking rapidly each second.

THE WHOLE OF YOUR HISTORY UNTIL THIS POINT WAS OUR ATTEMPT TO STUDY HOW A SOCIETY EVOLVES WHEN THEY BELIEVE THEY WERE CREATED WITHOUT PURPOSE, ALONE IN THE UNIVERSE.

WE NOW INTEND TO STUDY WHAT HAPPENS WHEN A SOCIETY REALIZES THEY WERE WRONG.

THANK YOU FOR YOUR ATTENTION, AND YOUR CONTINUED PARTICIPATION IN OUR RESEARCH.

Then there was noise, and sunlight.

Dick Smithers

CHECK OUT THIS SOCK PUPPET GUY I DREW

MY ENTIRE EXISTENCE
WILL END ONCE I AM
TAKEN OFF THIS HAND



HOW TF DOES THE BRAIN OPTIMIZE CONNECTIONS????

Unfortunately, I have no answers, only confusions to share.

First, how do artificial neural networks optimize their connections? This I do know.

Artificial neural networks are just functions that depend on their inputs and internal parameters (connection strengths and biases). When we want to get the network to actually do something useful, we define a loss function that depends on the internal connections and optimize them such that they minimize it. Throughout the entire field of deep learning this optimization process is conducted using gradient descent. Unsurprisingly, in order to use gradient descent we must evaluate the gradient (the derivative of the loss function with respect to all of the network parameters). For an artificial neural network, this is pretty straightforward. For a biological neural network, not so much.

First of all, biological neurons communicate with discrete spikes of activity. This is a problem for computing derivatives. But no problem! We can just assume that each neuron codes for a continuous value using its firing rate. Wow! We have continuous values again! This does restrict the types of firing behaviors that can be learned but that's proooobably fine...

Problem 2: To calculate all the derivatives for gradient descent we need a lot of specifically engineered circuits. Only problem is, these circuits don't seem to be present in the brain.

Now there does still seem to be an active debate about this and I think there is a lot of nuance that I have not unpacked yet. There may be a way to explain how gradient descent can work in the brain.

But suppose that the brain doesn't use it. Then what? Again, the entire field of deep learning is reliant on the evaluation of gradients which the brain cannot evaluate. What can we do?

Well, there are a couple interesting features that may help us a bit? Apparently real neurons modify their connection strengths (at least to some extent) due to local information, i.e. neurons will tend to connect more strongly to other neurons that make them fire.

Could local learning rules somehow result in global coherent learning? How????????

Idk. As I said, I have no answers. But I think this is a really interesting question with pretty large implications. Let me know if you have any ideas!

Shalev

SCP-672

Item Number: SCP-672



FIGURE 1



FIGURE 2

Object Class: Thaumiel

Special Containment Procedures: Before reclassification, efforts to contain SCP-672 itself were ineffectively undertaken. It is not known if and how SCP-672 can be contained.

A previous effort to contain SCP-672 has included blocking off the area, resulting in outcry from the university in which it is located. As well, this strategy led to the disappearance of those who chose to disregard signage and other indications that SCP-672 must not be accessed. It is suspected that SCP-672 may have mimetic effects, enticing people to enter it even when it is disallowed or discouraged.

Other containment procedures such as [DATA EXPUNGED] have been undertaken, all with disastrous results. It is recommended that for the safety of those in SCP-672's immediate surroundings, that it be left as is. SCP-672 was reclassified as a Thaumiel-class item on [REDACTED] and is henceforth used by the foundation as such. Notable anomalies contained by SCP-672 include SCPs [DATA EXPUNGED].

Description: SCP-672 appears to be a nondescript elevator on the south side of the [REDACTED] building on the campus of the University of Waterloo. It appears to date back to the 1950s or 1960s, but it is suspected that its true age is much older. The outside is painted orange and sounds have been recorded emanating from the inside (Addendum I).

SCP-672 causes the inexplicable disappearance of nearly (see Addendum II) anything held within it. To trigger this effect, one must press the [DATA EXPUNGED] button on the [REDACTED] or [REDACTED] floor, place the object whose disappearance is intended into SCP-062 and wait for the door to close. Foundation tools such as [REDACTED], [REDACTED] and [REDACTED] show no signs of the object in approximately [DATA EXPUNGED]. Numerous theories as to the final location of objects within SCP-672 have been posed, yet no definite conclusion has been reached.

After an average of [REDACTED] seconds, SCP-672's doors will open. The exact floor on which this will happen appears random. In approximately [REDACTED]% of cases, SCP-672's contents will have completely vanished with no traces discernible by Foundation equipment.

ADDENDA:

Addendum I: Case Log SCP-672-001:

On [DATA EXPUNGED], an experiment was conducted by [REDACTED] to test the capabilities of SCP-672 in order to ascertain the effects of its inside. Cameras with video and audio capability were mounted on its inside. For 8.23 seconds, footage from the inside was visible (Figure 1), and audio recordings [RECORDING EXPUNGED] heard loud, industrial sounds, characteristic of non-anomalous elevators of approximately the same age as SCP-672 appears.

Addendum II: Case Log SCP-672-002

Foundation official [REDACTED] collected reports from University students, [REDACTED] of whom claimed to have used SCP-672 as a regular elevator. Despite referring to SCP-672 as “the sketchy chem elevator” and making comments as to SCP-672’s age, nothing anomalous was noted. Reports from such students corroborate the industrial appearance of SCP-672’s interior, while they noted it seemed to remain unmoving for before opening on the correct floor. It is unclear whether these reports are true, as every Foundation test has resulted in the disappearance of the SCP-672’s contents.

Addendum III: Case Log SCP-672-003

On [DATA EXPUNGED], the first test of SCP-672’s capabilities on live specimens was tested. One (1) Class-D subject was instructed to enter SCP-672 and press the button for any floor once inside. Transcript is as follows:

Transcript:

Subject D-8271: So, all I do is press a button, right? You guys don’t care which floor?

Officer [REDACTED]: That is correct.

Subject D-8271: Uh... ok. [Long pause. D-8271 presses the button for the second floor.] I don’t know, this seems like a regular elevator to me. Kind of old, but.

The doors of SCP-672 are heard closing. Visual feed becomes corrupted.

Subject D-8271: Wait, what— what’s happening? OH MY GOD—

Nothing more is heard from audio connection. SCP-672’s doors open on the second floor with no trace of Subject D-8271. Logs of further tests with Class D personnel are found in Addenda IV and V.

Addendum IV: [DATA EXPUNGED]**Addendum V: [DATA EXPUNGED]****Addendum VI: Test Log SCP-672-001**

The first test of SCP-672’s containment capabilities was undertaken on [REDACTED]. SCP-[REDACTED], a [DATA EXPUNGED]-class object, was put into SCP-672. As expected, no traces of SCP-[REDACTED] were found. SCP-672 is henceforth recommended as a potential containment procedure for Keter or Apollyon-class objects, or any others that would necessitate permanent disappearance. SCP-672’s containment class has thus been changed to Thaumiel.

burgerqueen

DEHYDRATION

Dehydration. Everyone hates it. Everyone experiences it. And being back in the city we all know and love for its water from the loo, it’s a challenge to keep hydrated here. Fortunately for you, I, as a champion hydro-homie, have you covered, on how YOU can stay hydrated. Prepare yourself for a strategy that is powerful and guaranteed to keep yourself the most hydrated individual on the Earth—the secrets of Poseidon locked away by time.

The most important and probably the most effective way is to get water into your system by consuming anything even remotely water-relevant. Get the water into your body no matter what—and that means eating watermelon, water-based ice cubes, and replace your pesky bottled water with some top-of-the-line O’Hare Air. Osmose your daily water through a bucket, and eat a dinner of ice stew.

Do you keep track of your water intake daily? Make sure to set alarming, distracting reminders on your phone daily to ~~brainwash~~ remind yourself of the importance of consuming water, and if you’re a pro, go ahead and vibe-code a crappy web application with Electron that burns all the RAM on your device so that you can reorder it at exorbitant prices today all to keep yourself on top of the game. Ensure you give yourself demotivating, unconstructive messages like “are you hydrated, loser?” and “take a sip, you know you want to,” and be as visible as possible—even in lectures, even in workplaces, even tell everyone around you the taste of the water.

Another important aspect is the mental—to become hydrated, one must become in tune with it spiritually. Post constantly on social media about your daily intake, make your status everything water related, and leave a detailed caption along the lines of “Just finished my 3rd 64oz bottle. Feels good to be hydrated, feels better to be better than you. ☺ #HydrationNation #WaterIsLife” just to make yourself visible—if people take these pictures of their gym workouts or fancy dinners, why can’t you? Don’t forget to tag and shame your mutuals for being nowhere near your level.

If you’re familiar with Apple’s latest handbag accessory, ensure you buy any stupid overpriced accessory you get your sopping wet paws on just to hold your water bottle. Try this eco-friendly, BPA-free, triple-walled, temperature-controlled, self-cleaning, WiFi-enabled Bluetooth speaker water bottle (today’s sponsor) and make a fashion statement of it.

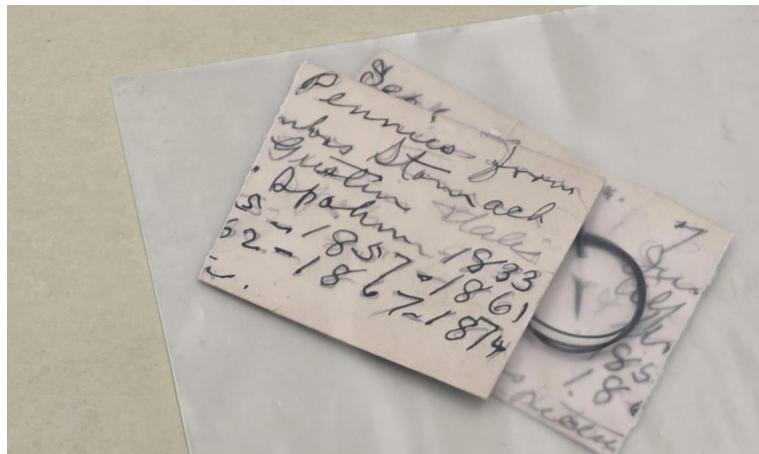
Finally, and perhaps most pressingly of all, immerse yourself in the world of water. Quite literally. Sleep when you bathe, bring your cooking appliances to the bathtub, and always leave the appearance of an elderly raisin when you emerge from the abyss! Become a fish, or whale, or whatever it is in between, and fill your house with water. Can’t breathe? No problem! What’s the O in H₂O stand for again? When you’re dedicated enough, separating the oxygen atoms out of water molecules is simple enough.

dehydrated

WHAT DO YOU DO WITH A DEAD ELEPHANT?

It's Monday, December 8th. I'm in a windowless room of a library basement in Somerville, Massachusetts. There is a cardboard box laid out before me, within it lies a treasured artifact of 1800s circus showman P. T. Barnum's most prized elephant, Jumbo:

One (1) nose hair.



ONE NOSE HAIR OF JUMBO, TUCKED BETWEEN PAPERS



Next time you're at the Kitchener LCBO, head over to the local IPAs section. If you've been keeping up with the **mathNEWS** articles chronicling the life and death of Jumbo, one might stand out to you: Dead Elephant Ale, courtesy of the Railway City Brewing Co.

The residents of the Railway City, St. Thomas, Ontario, might be a little bit obsessed.

But then, what do you do with a dead elephant?

St. Thomas is in a situation. Their sole claim to fame is that time they accidentally rammed a train full-speed into the most famous elephant in the world, killing him in about the most gruesome way imaginable.

To cope, St. Thomas is now dotted with elephant murals, found even in the furthest corners of the city.¹ St. Thomas residents name their businesses in his honour; advertisements can be found across town for Jumbo Plumbing, Jumbo Building Products, or in London to the north, Jumbo Video.

Above all, there's the statue. One of only two such statues in the world, a statue of Jumbo, larger than he was in life, stands high above the Kettle Creek, catching the morning sun.

It's, respectfully, weird. Four years before Jumbo died, the steamboat *Victoria* capsized in the nearby city of London, Ontario's Thames River, resulting in the deaths of over one hundred eighty passengers onboard. Despite this, Labatt

Brewery does not sell a One Hundred Eighty Dead Passengers Ale. That would be fucked up.²

Why is Jumbo different?



The musical *The Greatest Showman* leaves a lot out.

In it, Hugh Jackman portrays P. T. Barnum as a caring man, dreaming of a show for a more equal world.

Reality tells a different story.

His day job was to oversee the operation of circuses—rife with malnutrition and animal abuse—and “freak shows,” events where the marginalized—racially marginalized, disabled, and more—were put on display for the enjoyment of the well-off. Before this, he was a slaveowner. He was not distant from it; in one quotation, he admits to having whipped slaves himself.³

Even in life, he was discounted as a conman and a liar. The day after Jumbo's death, he spun a story that Jumbo had died trying to nobly save a smaller, baby elephant who had wandered from the tracks. Few believed it, even then.

He seemed to be aware of his reputation problem. Late in life, he began to donate to the fledgling Tufts University. But he could not shake his showmanship. He donated to Tufts, but only such that they could establish a museum of natural history in his name, filled with artifacts of his circus, the taxidermied hide of Jumbo chief among them. He insisted the building be named Barnum Hall—it was the first building at Tufts ever contractually obligated to be named for its benefactor.

He was so proud of his work that he ordered Tufts to inscribe above the building entryway the words *Barnum Fecit*. In English, “Barnum made it.”



Tufts students adored their taxidermied Jumbo. They tugged on its tail for good luck so often that in 1942, it had to be replaced. Unfortunately, their luck ran out when Barnum Hall, and everything within it, later burned, taxidermied tail included.⁴

That is, the replacement tail burned. The original remains in their possession, and the Tufts archivists welcome visitors.

On discovering this, I did the only reasonable thing someone who had spent the entire term researching Jumbo could do. I booked a train ticket to Boston.

Soon, I was in the Tufts Archival Research Center: a back office tucked in the corner of the deepest basement level of the Tufts

library. There, in a small paper box, was all that remains of Jumbo's hide.



TOP: THE TAIL OF JUMBO, BOTTOM: PIECES RECOVERED FROM HIS CHARRED HIDE.

When I first learned about Tufts' fascination with Jumbo's hide, it seemed sick. How dare they revel in Barnum's sick legacy?

But then, how dare we?

Talking to the archivists at Tufts, it became increasingly clear that Tufts' association with Jumbo is no more voluntary than that of St. Thomas. Both are involuntary benefactors of Barnum's cruel inheritance. St. Thomas will forever be known as the town that, somehow, killed an elephant. Tufts will forever be known as the university that had to deal with its corpse.

Barnum Fecit, there is no undoing it. All we can decide is how to move forward with this involuntary inheritance.

What *do* you do with a dead elephant?



Tufts is relatively easy to get to. Follow the elephants.

On local MBTA subway maps, you need only navigate to the massive blue elephant. Get on the nearest bus, and when you see the words "Home of the Jumbos" emblazoned on a nearby athletic field, that's your stop. Walk until you find an electrical box covered in one hundred tiny painted elephants. If you'd like to find the library, walk until you pass by the baby elephant statue.

Barnum Hall remains, but it's not the focus. Tufts Athletes are not the Barnums, but the Jumbos. Barnum's inscription is the only physical reminder that he was ever there.

Tufts has inherited the legacy of Barnum, a legacy of an ex-slaveowner architect of animal abuse and exploitation. They decide to own it, reframing the story to focus on that of a sweet, world-travelled elephant, and the joy he brought to thousands across oceans. Barnum, they leave deep in the library basement, his story granted no voluntary light.

St. Thomas may be weird. But weighed by Barnum's deeds, they were not the only ones to erect a Jumbo statue.

Tufts University has one too.



JUMBO, AS SEEN AT TUFTS UNIVERSITY

molasses

1. <https://theclio.com/tour/2078/6>
2. we did have a local baseball team called the London Rippers for a bit though, named after London, England serial killer Jack the Ripper though. so. there's that.
3. https://en.wikipedia.org/wiki/P._T._Barnum#Role_in_politics
4. The morning after the fire, a member of the Tufts athletics department went to the general vicinity where Jumbo once was, scooped up some ashes, and deposited them in a peanut butter jar. That peanut butter jar remains a treasured artifact to this day, passed down from athletics director to athletics director as a token of good luck. <https://d1.tufts.edu/concern/images/rn301d38z>

Give us the bridge back and then we'll talk.

disgracED, EDITOR EMERITUS

WHAT YOUR FAVORITE CLIMBING HOLD SAYS ABOUT YOU

BIG OVERHANG HOLDS (YELLOW, BLUE, & PURPLE):

You go climbing once a term when your more athletic friends drag you out. You like these because they're easy to hang on to, just like the belief that it's your strength that's lacking, not your technique which makes you fall of every other overhang.

CARROT CYLINDER HOLDS (ORANGE):

You like swinging around like a monkey. I get it, I do too. That, or it's your personal mission to see how far you'll fit into the corner the wall makes with the ceiling.

BLOCK HOLDS (TURQUOISE & LIGHT RED):

Up is only a theoretical concept. Real climbs go sideways and make you reconsider your pant choice. In your opinion, the lower the climb and worse the foot holds, the better the climb. Your idea of 'using your head' means pressing your skull against the wall for balance.

BOW TIE HOLDS (YELLOW):

Your could bend a rebar with pure grip strength, you have a thick layer of chalk from the tips of your fingers to your elbows, and you have a maximum of six uninjured fingers at once. If you could climb shirtless at PAC, you would. Chances are, you've campused my project (just to show off).

POCKETS (BLACK):

See above.

ROUND MOUNDS (YELLOW):

You like to cosplay as spiderman and wish your chest was adhesive. You're close and personal with the scent of the climbing wall (from having your face pressed against it) and the legendary experience where you 'cheese-grater' down the wall, smashing your knees on every hold as you slide down after slipping. That, or you're a pervert and like them because they're boob shaped.

ITTY BITTY KNOBS (BLUE & BLACK):

You're a masochist and openly admit to it.

SMALL OVERHANG HOLDS (RED & TURQUOISE):

You're a masochist and refuse to admit it.

DUAL-TEX (BLUE):

I climb five times a week and I've only ever seen you show up for a comp. You heavily consider spitting on your hands (for the grip) but don't because it would get you kicked out.

BASIC HOLDS (PURPLE & LIGHT GREEN):

Your favorite TV show is The Office, you climb only on weekends from 6:00–7:30, and you dislike overhangs. You've only climbed yellow tapes (and one pink tape!) and will forever.

DOUGHNUT HOLDS (DARK GREEN):

Your project is either a blue tape or a red tape, no in-between, and you either can't balance on one leg or you stick to flat surfaces. You've attempted to use your teeth on a climb.

LARGE PYRAMIDAL VOLUME HOLDS (RED):

I've seen your body bend in unnatural ways and you don't seem to notice. I can't re-create a single beta you've done without injuring myself or removing/adding limbs.

THIN TRIANGULAR HOLDS (PINK):

You're more mountain goat than human, and have either fingers or toes of steel. Heights don't scare you, but horizontal distance does. You use the arrêt more than the actual holds.

THIN VOLUME HOLDS (YELLOW):

See above.

LONG GRIPPY HOLDS (PURPLE):

You're the only well-adjusted person on this list. Good job. Now get out of here and develop a more interesting opinion.

GRAPE HOLDS (RED):

Skipping this one because this person doesn't exist.

Aspiro

IF I TREATED PROD NIGHT THE WAY I TREAT MY ASSIGNMENTS

91 WRONTE THIS IN 20 SEC

I'd definitely not stat writing this 3 hrs after prodnight starts bc i forgot it was today before rushing to do 3 other sassignments due tmr. As im definitely not do ing right now.

ilwagna

WONDERLAND HYBRID COASTER 2026!!!???

(COASTER NERD YAPS ABOUT COASTERS)

So around 3 months ago, Canada's Wonderland sent out a bunch of surveys to a bunch of random passholders showcasing **four new potential rides coming to the park**. It's not the first time they've done this (AlpenFury was conceptualized from the 2023 survey), and it certainly won't be the last, but what's crazy is that some of these rides are mind-bogglingly, world record-breaking...ly **GOOD**.

If Cedar Fair actually went through with these—which they *probably will*—Wonderland would be one of the world's best amusement parks without a doubt.

Here are my opinions on each of the options (from “worst” to best):

4) LOG FLUME

I've been on a few log flumes in my life, with all of them being well-themed, repeatable, and intense in certain parts. It's not a bad addition at all; in fact, Wonderland could definitely benefit from another water ride to accompany Timberwolf Falls and White Water Canyon in the dry park. But the other rides are just... better. That's all. It's like how (*hot take*) Silksong would've easily dominated The Game Awards if it had been released in 2024.

3) WATER PARK EXPANSION WITH A DUELING WATER COASTER

Now I'm not sure if a “water coaster” is a slide with launched sections or an actual physical roller coaster with sections in water (both exist), but either way, this would be fire. The park definitely has space for it too: the area right beside Moosehorn Falls can boast a ride of decent magnitude. And who wouldn't want to be **boosted** on a water slide?

2) XTREME SPINNING COASTER

For those who don't know, Mack Rides has built some incredible 360-degree **spinning coasters** that make for some unique rides. The fact that the coasters pivot freely makes each ride slightly different from the last and gives the coaster lots of repeatability. I've personally never been on one, but I've heard great things and would love to and forget about all my courses :)

In all regards, this would be a completely unique and fun roller coaster, probably being one of, if not the best, coasters in the park. It would have been first place in my list until I saw...

1) RECORD-BREAKING HYBRID COASTER

I genuinely tweaked out when I saw this for the first time. For context, I've been on one hybrid coaster in my entire life, Twisted Colossus at Six Flags Magic Mountain, and it was flawless. Constant intensity, amazing airtime, great inversions, and unparalleled smoothness. The manufacturer

Rocky Mountain Construction (RMC for short) has dominated world coaster rankings with their hybrid coasters—taking a *wooden coaster and refurbishing it with steel track*—combining the intensity of a wooden coaster with modern-day smoothness and engineering. RMC hybrids are so consistently good that they occupy **five of the top ten coasters WORLDWIDE**, including the top 1, 2, and 4 positions! And keep in mind, the survey specifically stated “**world-record breaking**,” which (if done right) would undoubtedly make it one of, if not the **best roller coasters in the world**. Combined with AlpenFury, Yukon Striker, Leviathan, and Behemoth, Wonderland's coaster lineup would be divine, bringing in coaster enthusiasts and guests from around the world.

Alpen was officially announced in 2024—only a year after the survey—so there's a chance that Wonderland announces one of these rides as early as a few months from now! Hopefully something happens :>

And if not, there's always next year (*I say to myself sadly*)
please give us an rmc wonderland please rmc pls rmc pls pls pls pls

Stratus :>

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UW'S BASTION OF ERUDITE THOUGHT SINCE 1973

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UWATERLOO TUNNEL/BRIDGE CHEAT SHEET

ANYTHING TO NOT TOUCH GRASS

As the winter term unfolds and the Canadian winter decides to strike its blows, it may be a good idea to learn about the tunnel (and bridge) system. Below is a choose your own adventure so you can have the knowledge of which buildings are connected.

COMMON STARTER BUILDINGS

1. Douglas Wright Engineering Building (DWE), go to #8
2. Carl A. Pollock Hall (CPH), go to #6
3. South Campus Hall (SCH), go to #28
4. Student Life Center (SLC) / Physical Activities Complex (PAC), go to #29

BUILDINGS

1. (AL) Arts Lecture Hall. Pathways from here:
 - a. EV1, go to #15
 - b. ML, go to #22
 - c. SCH, go to #28
 - d. TC, go to #31
2. (B1) Biology 1. Pathways from here:
 - a. B2, go to #3
 - b. ESC, go to #14
 - c. STC, go to #30
3. (B2) Biology 2. Pathways from here:
 - a. B1, go to #2
 - b. QNC, go to #26
 - c. STC, go to #30
4. (C2) Chemistry 2. Pathways from here:
 - a. DC, go to #7
 - b. ESC, go to #14
 - c. MC, go to #21
5. (CIM) (basically DC). Pathways from here:
 - a. DC, go to #7
 - b. E3, go to #10
 - c. EIT, go to #13
6. (CPH) Carl A. Pollock Hall. Pathways from here:
 - a. DWE, go to #8
 - b. E2, go to #9
 - c. New residence when it opens, go to #32
7. (DC) Davis Computer Research Centre. So many CS students, to get a seat is a battle. Pathways from here:
 - a. C2, go to #4
 - b. CIM, go to #5
 - c. M4, go to #20
8. (DWE) Douglas Wright Engineering Building. Pathways from here:
 - a. CPH, go to #6
 - b. RCH, go to #27
 - c. New residence when it opens, go to #32
9. (E2) Engineering 2. Pathways from here:
 - a. CPH, go to #6 (multiple connections)
 - b. E3, go to #10
 - c. PHY, go to #24
10. (E3) Engineering 3. Pathways from here:
 - a. CIM, go to #5
 - b. E2, go to #8
 - c. E5, go to #11
11. (E5) Engineering 5. Pathways from here:
 - a. E3, go to #9
 - b. PSE/E7, go to #25
12. (E6) Engineering 6. Pathways from here:
 - a. PSE/E7, go to #25
13. (EIT) Centre for Environmental & Information Technology. Pathways from here:
 - a. CIM, go to #5
 - b. ESC, go to #14
 - c. PHY, go to #24
14. (ESC) Earth Sciences & Chemistry. Pathways from here:
 - a. EIT, go to #13
 - b. C2, go to #4
 - c. B1, go to #2
15. (EV1) Environment 1. Pathways from here:
 - a. AL, go to #1
 - b. EV2, go to #16
 - c. HH, go to #18
16. (EV2) Environment 2. Pathways from here:
 - a. EV1, go to #15
 - b. EV3, go to #17
17. (EV3) Environment 3. Pathways from here:
 - a. EV2, go to #16
18. (HH) Hagey Hall of the Humanities. Pathways from here:
 - a. EV1, go to #15
19. (M3) Mathematics 3. The home of ActSci, stats, and being cut off by M4 Construction. Pathways from here:
 - a. M4, go to #20
20. (M4) Mathematics 4. The home of TBD with the famous UNDER CONSTRUCTION. Pathways from here:
 - a. DC, go to #7
 - b. M3, go to #19
 - c. MC, go to #21
21. (MC) Mathematics and Computer Building. A building I have spent way too much time in, same as you twin. Pathways from here:
 - a. C2, go to #4
 - b. M4, go to #20
 - c. SLC/PAC, go to #29
 - d. QNC, go to #26
22. (ML) Modern Languages. Pathways from here:
 - a. AL, go to #1
 - b. EV1, go to #15
23. (NH) Needles Hall. Pathways from here:
 - a. STC, go to #30
24. (PHY) Physics. Pathways from here:
 - a. E2, go to #9
 - b. EIT, go to #13

25. (PSE/E7) Pearl Sullivan Engineering Building. Pathways from here:

- E5, go to #11
- E6, go to #12

26. (QNC) Mike & Ophelia Lazaridis Quantum-Nano Centre. So aesthetic, it honestly should be a Math building tbh. We should take it from the other faculties. Pathways from here:

- B2, go to #3
- MC, go to #21

27. (RCH) J.R. Coutts Engineering Lecture Hall. The bunker. Pathways from here:

- DWE, go to #8
- E2, go to #9

28. (SCH) South Campus Hall, pathways from here:

- TC, go to #31
- AL, go to #1

29. (SLC/PAC) Student Life Center/Physical Activities Complex. Pathways from here:

- MC, go to #21

30. (STC) Science Teaching Complex. The place my roommate acts like is better than MC, but do they

have a CnD, no, and will I ever admit it looks better than MC even though it kinda does? NO! Pathways from here:

- B2, go to #3
- NH, go to 23

31. (TC) William M. Tatham Centre for Co-operative and Experiential Education, where I'm gonna spend my summer ☺. Pathways from here:

- SCH, go to #26
- AL, go to #1

32. New residence when it opens. I don't know how you got here but since you need to get out, the pathways are:

- CPH, go to #6
- DWE, go to #8

And that is the tunnel/bridges of UW. Explore them. If I missed anything... no I didn't you're just seeing something from your lack of sleep. Anyways good luck in W26, I know I'll need it.

MrBridgeSky

N FUN MATHEMATICAL PARTY TRICKS

YOUR MILEAGE MAY VARY

AGE GUESSING

- Take your age
- Multiply it by i
- That's your age

AGE GUESSING 2

- Take your age
- Multiply it by i
- Multiply it by j
- Multiply it by k
- That's your age but negative

AGE GUESSING 3

- Take your age
- Multiply it by j
- Multiply it by j
- That's your age
- No it's not the negative of your age we're working over the split complex numbers now get with the program
- Why are you mad at me

AGE GUESSING 4

- Take your age
- Multiply it by ϵ

- Multiply it by ϵ
- That's your age when you were born

AGE GUESSING 5

- Take your age
- Multiply it by $e_1, e_2, e_3, e_4, e_5, e_6, e_7$ in that order
- Problem: No one actually knows how to multiply octonions
- What did you get? Please let me know I'm curious now

AGE GUESSING 6

- Take your age
- Search "Biquaternion" on Wikipedia
- Read through the article and absorb the information in it
- Brace yourself for the incoming intense calculation, and tremble in fear of potential future age guessing tricks which you'll have to buy a textbook on Clifford algebras for to even begin to understand
- Multiply your age by 1
- That's your age

the government's only spy

mathematics
NEWSPAPER

IMPECCABLE DAY

BLACK CROWN ON YOUR HEAD

Roguelike sidemodes are a common sight in many gacha games nowadays (sometimes even as the main gamemode), such as *Hollow Zero*'s Withered Domain and Lost Void in *Zenless Zone Zero*, Career Mode in *Uma Musume* (though, are training simulators roguelikes?), Elysian Realm in *Honkai Impact 3rd*, Enter the Kaleidoscope in *Dragalia Lost*, just to name a few. I've personally had a fun time working my way through *Honkai Star Rail*'s earlier roguelike scenarios, *Simulated Universe*'s Swarm Disaster and Gold and Gears. But, there's one roguelike sidemode I've recently taken a liking to, and one that many other implementations owe themselves to.

In 2020, *Arknights*, a tower defense gacha game, released the minor limited event roguelike mode, Ceobe's Fungimist, to the CN server, to critical acclaim. Over the years, five additional permanent iterations of it have been released as what is now *Integrated Strategies*.

À la *Slay the Spire*, each run has you traverse a tree of various types of nodes, ranging from events that grant effects based on choices and conditions, to shops to exchange resources, to fights in which the core gameplay takes place. As a tower-defense, combat stages have you defeating enemies before they reach the Objective Point and deduct life points. But, life points are not limited to a single stage, and instead persist through the entire run, allowing partial victories, rewarding perfect clears and also creating opportunities for risk when one expends life points for other resources. Combat stages are also memorable, unique in their make, design, enemy distribution, and mechanics, each with a unique name, allowing them to be learned and mastered over many runs. The words "Out of Control" and "Manmade Carnival" still scare me to the core.

Additionally, while regular *Arknights* stages typically allow twelve-unit squads with any operator you have, runs often only start you off with three operators, recruited from three given classes, only allowing you to recruit more characters after battles, and in specific nodes, allowing you to bring up to 6–10 operators to a battle, all the while having their power capped at a certain threshold. An additional recruitment opportunity (or specific promotion opportunity) must be expended to "promote" the character, removing the limit on their skills and talents for the rest of the run. But as your team grows larger and varied as the run progresses, *Arknights*' large squad sizes (compared to the usual static 3–4 character teams in other gacha games), in tandem with each character having 2–3 skills to choose from, creates some interesting strategic depth.

Furthermore, operators cost a resource called Hope to recruit and promote, with operators of higher rarity requiring considerably more Hope than those of lower-rarity. Along with recruitment opportunities being restricted to random classes, and the occasional option to recruit a random character you might not own for free, it is much more difficult to solely rely on a handful of specific, strong characters, and instead encourages usage of a variety of lower-rarity operators,

who don't need the promotion as much as higher-rarity ones. With the wide range of collectibles one can obtain throughout the run, each with different effects, and large squad size, instead of forcing the same team each run, you are encouraged to think across multiple axes. I got the Hand of Purification, time to recruit Bards, Phalanx Casters and Therapists. My Reapers and Centurions (but not Ambushers) would greatly benefit from anything that increases how many enemies they can block. Deploying these Merchants might not be a good idea while I'm suffering from reduced DP generation. Should I consider taking more crowd control to disable hovering enemies? Can I take this loan now and deal with the debt collector later? Should I use up this buff now and free up my inventory space or save it for later?

Each *IS* iteration is also their own distinct experience, with their own unique setting, lore, stage selection and mechanics. In one, you might be managing your survey equipment, combining the call and response of prophecies and keeping the your Collapse index low as you explore ■■■■■. In another, you might be touring a completely normal garden, tossing coin charms and occasionally foraging into the spirit world. Or you might be instead venturing through a castle of a long-dead nation (France), engaging in the plays held by its deadly theater cult. Each one has their own unique enemies, bosses, and even endings. Each version has 4–5 different final bosses and endings one can pursue, ranging from just reaching the end and beating the regular final boss, to finding specific collectibles, shouldering on debuffs, expending certain resources, or taking detours into subareas, to maybe even escorting the final boss itself to the very end or enduring its intrusion upon the proceeding battles. The final bosses themselves are also quite fun to fight against, each requiring different strategies. Against one boss, you might reserve half of your squad to take over when the first half is disabled by its phase transition. For a different one, you might try to balance the damage dealt to both bosses, lest you end their fight prematurely and gain the attention of the one remaining. And of course, you could also be thrown into a game of Weiqi, your own operators as the pieces.

Integrated Strategies is probably the most elegant translation into a roguelike format, so it's no wonder that many other gacha games have tried their hand at making their own.



NOMINATIVE DETERMINISM IS CRAZY

Like what do you mean there's a Defensive Lineman that used to play at Alabama and Arkansas State called Dee Liner???

THE TRAINS EXPERIENCE

CS 452, one of the “big three” CS courses at Waterloo, and arguably the hardest of the three. A course fraught with warnings about how one will sacrifice everything for this course, yet still come up short.¹ Despite this, those who survive it tend to rate it as one of the highlights of their undergrad. Most of what you need to know going into this course has already been discussed on Reddit and **mathNEWS**, but as someone who has taken and been a TA in this course, there’s a few practical aspects of this course I’d like to bring up.

TRAIN IS LIKE MARRIAGE

Trains is done in groups of two (you can do it solo, but there’s no bonus marks for it). I vaguely recall Martin saying that “picking your trains partner is like marriage—you’ll spend lots of time together, so you better get along.” It turns out that around twenty people took the course in my offering, two of them being girls. One of them is now married to their trains partner, and the other is my girlfriend :). This is not to say that taking this course will help you find your One True Love (TM)—I’m just saying it does happen.

Just like marriage though, problems will inevitably crop up. There tends to be around one “breakup” per term, where one partner drops the course halfway through. There will also be disagreements on who gets what done, and for any given assignment the work tends to be split 70/30, with one person having a much better understanding of what’s going on than the other.

TRAIN IS LIKE GRAD SCHOOL

From my experience, around one student in every trains offering returns to UW for grad school. I don’t think this is a coincidence. Put bluntly, taking trains means you’re self-selecting as someone who enjoys suffering.² No one forces you to take trains, and from the first assignment you’re introduced to the idea of spending 40 hours [*Editor’s Note: multiply by 2.5 :/* in a week on a single course. Keep in mind most people can’t work more than 80 hours per week without burning out!]

The irony is that the actual features of the assignments aren’t conceptually difficult to understand—it’s just tricky to get right. Most of your time will be spent debugging your code, or discovering that your mental model of what’s going on is wrong. Just like grad school, there is a risk that at the end of the day you make no progress. However, that just makes success all the more sweeter.

TRAIN IS LIKE ENGINEERING

Trains is really a course split into two parts: you build a microkernel from scratch, then use that microkernel to route trains around a track. The first half is more “CS,” where you learn how the CPU works. The second half of the course is more “engineering,” where you keep iterating on your code until you’re satisfied. Doing well in the first half is only loosely correlated with doing well in the second half.

In the second half of the course, it’s all about learning through trial-and-error. You find out that trains have a length and a width, and you witness the different ways they can crash. You accept that your code has print statements that cannot be removed or the code breaks. You learn that the hardware—sensors, switches, trains—can and will break (often the night before demos), and your code must be able to handle that. In the first half of the course, you might use QEMU to verify that your algorithms are 100% correct; in the second half you realize that the real world is too difficult to simulate, and you just have to go into the lab enough times to feel like your code is “good enough.”

Just like when building software, the biggest limiting factor is your time. There’s a lot of work to do and the deadlines come fast, so prioritization and splitting the work is important. It’s not uncommon to see incredibly smart people struggling in this course because they’re too ambitious. There is no shortage of cool features to add, but please finish the upcoming assignment before working on that. A crude implementation is far better than an incomplete optimal one. Besides, you might need that time for other courses or job search.

SaltOverflow

1. “Reddit insight” from CS 452 webpage <https://www.reddit.com/r/uwaterloo/comments/bn6sd2/comment/en2uwy>
2. Jensen Huang “pain and suffering” <https://www.youtube.com/watch?v=v0v0SgY7Jc>

HEY GUYS

do any of you hate me? am i doing a good job

please let me know

Usman!

The world is changing.
Who now has the
strength to stand
against the armies of
Icon North and Icon
south?

mathNEWS COVER ARTIST APHF

NEW YEAR NEW US

RECIPE N° 1: CHOCOLATE CHIPS COOKIE

I can't believe it's 2016 and the world is ending. Before it does, I'd like to work on being a better person, so hopefully I make it into where better people go when they die, wherever that is. Hence: New Year's Resolution. I've got a few, but one of my biggest is to cook more (eat out less). Not only is it healthy for you, it's more cost effective for you, and a real world skill that's especially important to develop if you want to eat ever. And we all know the first step of becoming a better person, is being a better person to yourself.

Since I'm doing it, we're all doing it. So to start off the year on a good note, here's my tried and true recipe for chocolate chip cookies.

INGREDIENTS:

- 2 ¾ cup all-purpose flour
- 1 tsp baking soda
- ¼ teaspoon salt
- ½ cup butter
- ½ cup vegetable shortening
- ½ cup white granular sugar
- 1 cup packed brown sugar (press it into the measuring cup until it is full for it to be packed)
- 2 eggs
- 1 teaspoon vanilla extract
- 1 ½–2 cups chocolate chips

STEPS:

1. Ok so first you're gonna get a bowl. Put your flour and baking soda and salt in the bowl, mix it until it all looks the same colour, and then put it somewhere out of the way and forget about it.
2. Get the butter on something microwavable. You want to microwave it until its soft, maybe 1–2 minutes on the lowest setting. If it melts a little that's ok.
3. Put the softened butter and shortening in another bowl. Get a spatula and mix it up together by kinda scraping it off the sides and folding it together until it's all the same colour.
4. Add the sugar and the eggs and the vanilla and then mix it until its the same colour and like all together using the same spatula and mixing motion.
5. At this point turn on your oven to 375°F. It's gonna need time to warm up.
6. Remember that flour mixture? Yeah go find it and dump it in the bowl with the butter. Use the same scraping folding mixing motion until the whole thing looks the same.
7. Dump as much chocolate in the bowl with everything else as you want. I gave a suggestion for how much but honestly it's up to you, go crazy.
8. Get a baking sheet and cover it with some parchment paper. Then, get a little messy and make balls of dough with you hands and put it on the

sheet. I recommend golf ball-sized, but like the chocolate it's up to you. The world is your oyster. Just make sure that they're not too close together so you don't get one big rectangle cookie.

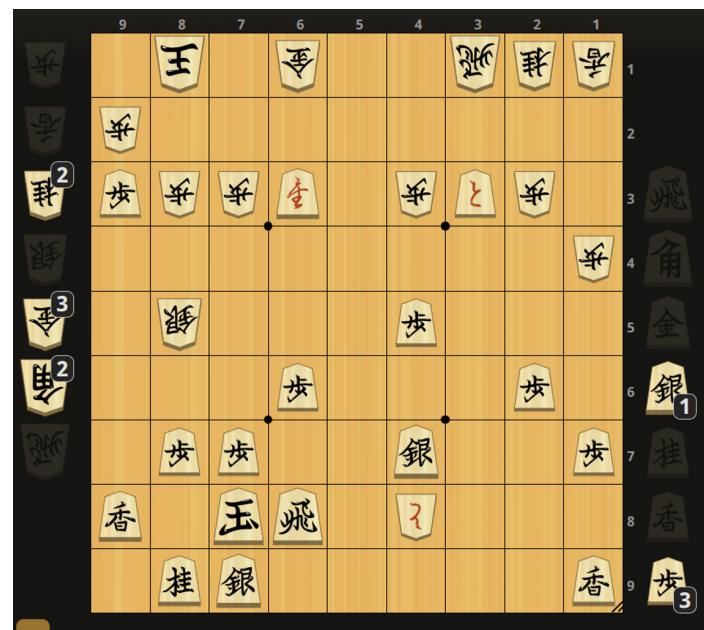
9. Put them in the oven for 8min to start. Take it out and check if the bottom edges of the cookies are very light brown. If not, put them back in for like maybe 3min? 4 if you're adventurous. Repeat until edges are very light brown, that means they're done.
10. Let the cookies rest for 10 min before even thinking about touching them. Safety first. Then take them off the tray onto a plate or into a container.
11. Repeat 9 and 10 until all your dough has been cooked or you accidentally eat the rest of it while you're waiting for your first batch to be done.
12. Eat them.

Cooking can be really intimidating, but I know no matter what, as long as we try our best, and make sure it's cooked all the way through, it will all taste delicious in the end. Good luck guys, and Happy New Year!!

smallmouthbasshater

CHESS PUZZLE 4

I'M IN A VERY CHINESE JAPANESE TIME OF MY LIFE



Solution: Px92+ forces K-71 since the promoted pawn is protected by the lance on 98. Then, S*82 is checkmate. This is puzzle #AyDAh on lishogi.org.

crimson

ERASERS CONSIDERED HARMFUL

Imagine you're already stressed, walking into PAC to write a test you couldn't possibly have studied enough for. You find your assigned table among the sea of shuffling chairs and bleak faces which mirror your own. The only thing that could possibly make this situation worse is if your desk comes pre-seasoned with eraser shavings. They don't brush easily because their high friction means they'd rather roll, and the best case scenario is for them to be swept up and sent to the landfill. Worse case they end up in the environment as tiny plastic waste.

Erasers are manufactured to be slowly eviscerated in grinding torture against a piece of paper. In their ideal use case they're slowly shredded into microplastic, but often they're lost, damaged, or dried out.

But worst of all, they engender complacency during your writing. When any mistake can be easily removed from history, it encourages you to make more mistakes. Why do it right the first time if you can just do it again?

If you can't tell, I don't like erasers. In fact, I haven't used a pencil, let alone an eraser, for any graded work since the start of university. The only exception to this was in 1A for my ECE 105 scantron, when the proctor said I **had** to use a pencil. I told them I didn't own one (on my person or in my dorm), so they provided a little golf pencil which I used to fill in my multiple choice answers. No eraser harmed in the process.

Now I certainly don't think erasers should be *erased* from existence altogether. As someone who did visual art all four years of high school, there are certain techniques that require using an eraser. Removing sketches after doing linework, and lightening pencil/charcoal are two easy examples. Further, some artists use kneaded erasers for removing light marks with the added benefit of no mess.

The other important exception is in elementary and middle school classrooms. Having access to an eraser can help lower the anxiety of making a mistake, which is an additional barrier to learning in the face of declining literacy rates. Sure, most classroom erasers may end up destroyed, thrown, or eaten well before their natural end of life. Even so, I can't in good conscience take the eraser out of a child's hands and tell them "skill issue." They can get better at formatting their thoughts and work over time. It's fine to partially erase or scribble out big chunks, draw convoluted arrows, and give the teacher a hard time reading their work, if it means they're writing something at all.

But are you, reader, a child who struggles to form basic ideas and arguments? If yes, and an eraser makes you feel better, then keep at it and I hope some day you can re-read this article from a more mature perspective. Otherwise, I recommend you try stepping away from the pencil and eraser life. Get yourself a nice pen (I love fountain pens myself), and leave the white out at home.

Thinking through your thought before inking it onto paper encourages correctness. If you make a small error, there's no shame in crossing it out and annotating with the correct text before continuing. If you make a bigger error, a clean strike through your work can preserve what you were thinking before you move somewhere else for your improved solution.

I don't write essays myself, but I'm informed that many students are successfully using pen for formalizing their thoughts. You can draw a clean arrow to replace something small within a block of text, or write double spaced to enable entire sentence replacements. If you're doing algebra or writing a proof, try focusing on the line-by-line correctness of your argument while moving in the direction of your predetermined solution. If you need to figure something out and can't afford to strike through what you write, try using a piece of scratch paper. It can help to be able to see your past ideas, correct or otherwise, while you formulate your final solution.

I can't stop you from using an eraser. I can't even prove that it's bad. All I can do is suggest that every time you erase a piece of history, you could be hurting the environment as well as your learning.

blather

BELI REVIEW

I use a restaurant rating app called Beli, and it has a few *interesting* features worth talking about.

They push heavy for referring friends right upon creating an account and lock some features behind it. The app is still useful without those features, but it gives pyramid scheme energy.

The way you rate a spot is you categorize it as good, ok, or bad, and then have head-to-head comparisons with spots you've already rated to give it a rank. They're just making you do binary search by hand, which is honestly pretty clever, even if it makes me feel like a clunker as much as running any other algorithm by hand on a CS exam.

There's also a university leaderboard for number of spots rated by people from each university. Waterloo is currently 25th, which is higher than we're ranked in any subject on US News. Kinda surprising since Waterloo certainly isn't a culinary destination.

Anyway, Beli is a nice app that I prefer to Google Maps for keeping track of restaurants you've been to because of its rating system, organization, and social aspect, but I still use Google Maps to find new spots.

lei

A COMPREHENSIVE REVIEW OF MOST (DECENT) SHAWARMA IN THE KW REGION 3

OR HOW I LEARNED TO STOP WORRYING AND LOVE CHARCOAL

For my previous 2 shawarma editorials, please see **mathNEWS** 155.1 and **mathNEWS** 155.2. I also have some updates on previously covered locations.

DAMASK "RESTO-MARKET" (645 WESTMOUNT RD E): 9.5 / 10.0 (TENTATIVE)

I'm kind of disturbed by the terminology "resto-market," but I suppose it's somewhat accurate. Damask has a restaurant, and a few other stalls where you can buy desserts and other foodstuffs. Notably, it is one of the only restaurants in the area I know of that has charcoal-grilled items. The items that are charcoal-grilled include kebab and half/whole chicken. These are very powerful items. Both are beautifully flavourful and not burnt in the slightest. The vegetables, meanwhile, are incredibly fresh. But the best part is that they give you a toasted pita, which they seem to bake themselves, and hummus that doesn't have any right to be as good as it is. If you've been to the Rosedale Diner in Toronto by any chance it kind of reminds me of their hummus (although still not as good because that honestly is the best hummus I've ever had). This honestly might deserve the coveted 10/10, but there is one problem, which is that I have not tried the shawarma dishes. Hence the tentative rating. At some point, hopefully before I graduate, I will provide an update, and ideally we will have found the king of shawarma at last.

MARHABA SHAWARMA (65 UNIVERSITY AVE E): 8 / 10

They opened recently and they gave a free drink which was pretty cool. I don't know if they're doing that anymore. I think the food was quite good, but the details evade me, because I was very tired after coming back from a 10 or 12 hour drive.

I do know that I ordered the chicken saj meal, so I would recommend that. It's also reasonably close to campus unlike many of these locations.

SHAWERMA PLUS (160 UNIVERSITY AVE W): 6.5 / 10

Shawerma Plus is, unfortunately, beginning to fall off. I ordered a beef plate and the beef was as bad as iPotato, if not worse. It is less flavourful. The portions seem to be smaller. As I bit into the chewy beef I felt perturbed. Why? I felt lost; I felt alone, I felt... like I was far from home, too far, wandering through darkness, like an animal, forgetful of whether home was even a place to begin with.

Why?

epic_waterman

HOME IS SHAWARMA

OR HOW I LEARNED TO STOP WORRYING AND FIND MY WAY BACK

And then I realized, Home is Shawarma.

Father Zeus, if you really willed it so—to bring me home over land and sea-lanes, home to native ground after all the pain you brought me—show me a sign, a good omen voiced by someone awake indoors, another sign, outside, from Zeus himself!

THE ODYSSEY (FAGLES)

Why does this place have such an obsession with shawarma? Is the Lazeez phenomenon purely incidental: a joke pulled at random from the post-modern void of comedy? I think it goes beyond that, without us consciously realizing so. Consider! Such a fanaticism isn't exclusive to us. Cities might be known by their shawarma: take the case of Ottawa, for instance. Consider! Shawarma is everywhere; it is culture agnostic, location agnostic. The Middle East, with all its turmoil, still has shawarma as its anchor point, the common thread holding things together. There is some quality of shawarma which seems to draw us in, more than other foods. Is it the food itself? Probably not; there's often better stuff out there. It is something else, something more primal...

Yes, here were a set of sea-dogs, many of whom without the slightest bashfulness had boarded great whales on the high seas—entire strangers to them—and duelled them dead without winking; and yet, here they sat at a social breakfast table—all of the same calling, all of kindred tastes—looking round as sheepishly at each other as though they had never been out of sight of some sheepfold among the Green Mountains. A curious sight; these bashful bears, these timid warrior whalemen!

Moby Dick

A shawarma joint—I love the endearing nature of the word joint—is a lonely place. It isn't somewhere one tends to take a group of friends, or family, or a date. One enters alone and exits alone, speaking only to the fellow at the register. And in that sense, it is very equalizing. No matter our stage in life; our wealth, our age, our social status, we are stripped raw as we wait, even more so if we choose to dine at the establishment. Gone is the entourage in the form of human shield! And it is this lonely nature, in my view, that makes shawarma home. For what does home really mean? Perhaps you think of family, or community, when you think of home: perhaps you

are right. But when I think of home, I think of a room, where I can shut myself off from others; I think of the comfort of coming back, time and time again, to a place that welcomed me, to a place that did not make me feel judged, to a place that I could feel warmth, comfort.

And if you are like me: then the conclusion of my thesis will be immediately evident. Shawarma is consistent. Whether times are good or bad, it fills up your stomach, and takes you away from reality for a little bit. You don't need to call upon a friend, or friends, to access it. It is right there when you want it. And so over the course of your life, even if you don't know it, you'll probably develop a bit of an emotional relationship with shawarma.

Finding more fallen-out hairs on your pillow, watching your favorite stuffed bread disappear from the convenience store...

The accumulation of those little despairs is what makes a person an adult.

JUJUTSU KAISEN

And so when a joint degrades in quality, it feels like a home away from home is slowly deteriorating. For many of us, so far away from our actual homes; or for those who maybe don't feel their "actual home" is much of a home at all, it feels worse yet. Something no longer cares for you, that once did. And how do you deal with that?

Anyway, that's what I felt in the split second between biting and swallowing a piece of that terrible beef from Shawarma Plus. Sorry, but I'd have to recommend you go someplace else now. Although that wrap student deal is pretty good.

epic_waterman

FOSSIL FIGHTERS :)

FIGHT CORRUPT POLICE OFFICERS, SHAPESHIFTING ALIENS, AND PLANET-EATING SPACE MONSTERS

As a kid, I had very niche interests such as space, sharks, and dinosaurs. When it came time to choose a game for my new DS (thank you mom), I picked *Fossil Fighters* based solely on the fact that it was the only title on the shelf with dinosaurs on the cover. One of the best decisions I've ever made to this day.

The premise behind the game is pretty simple. You start off as a rookie on Vivosaur Island, where aspiring fossil fighters come from all over to dig up fossils, clean them, revive dinosaurs with the cleaned bones, and battle each other with these vivosaurs, AKA revived dinosaurs! If you think this sounds a lot like another game where you collect creatures and fight your peers, I don't know what to tell you other than that you're crazy and it's actually a completely different concept because you dig up bones and store your little monsters in medallions instead of balls.

Despite the concept being somewhat derivative of a much more famous game series, I think *Fossil Fighters* has a lot to offer as a separate experience. The fossil digging and cleaning was addicting, and the attack animations for the vivosaurs were honestly pretty sick. You got to see five ton tyrannosaurs doing backflips and shooting fire out their mouths, ankylosaurs and stegosaurs swinging their tails around, raptors hitting you with nasty five-piece kickboxing combos, and even mosasaurs swimming around even though they technically aren't dinosaurs ☺ ☺.

The game's plot was a fever dream. I'm not gonna bother reading through the plot again and it's been a while, but I'd wager that 90% of the details I'm about to describe are accurate. It starts off pretty simple, with you encountering a big bad trio pretty early on consisting of a dog, a pretty normal woman, and a man with a nose so long he makes Gru look like an amateur. They generally cause ruckus around the

island for seemingly no good reason, until you find out that these goons¹ are actually led by the police chief of the island. When you go to confront him, you get absolutely dogwalked because this guy has found a legendary ice vivosaur that mogs all your vivosaurs, leading to a quest into the middle of an active volcano to dig up his fiery legendary counterpart. Along this quest, you're helped along by a rather strange girl who ends up actually being from a race of aliens that can transform into dinosaurs? Oh, and they're trying to wipe out all life on Earth because the seeds of life they airdropped on our planet millions of years ago developed into a comparably intelligent species (us) instead of simple biological fodder for their new environment. After teleporting into their ship, you fight the alien king and guide him to a classic change of heart, but a rogue alien lowkey broadcasts Earth's location to a giant planet-eating monster anyways. In the final act of the game, Vivosaur Island's chief scientist Dr. Diggins finds a way to teleport you and alien girl directly into this planet-eating monster's mouth, where his three brains engage in some civilized, turn-based dino brawling against your team. You win, the planet-eating monster promptly explodes, you're sent flying back to Earth fossilized so you can survive the vacuum of space (thanks Dr. Diggins), to finally be revived with a vigorous hip-shaking dance courtesy of the local Indigenous chieftain.

Nintendo, make another *Fossil Fighters* game and my life is yours.²

sheev

1. Original meaning of the word
2. A proper one, so not *Fossil Fighters: Frontier*

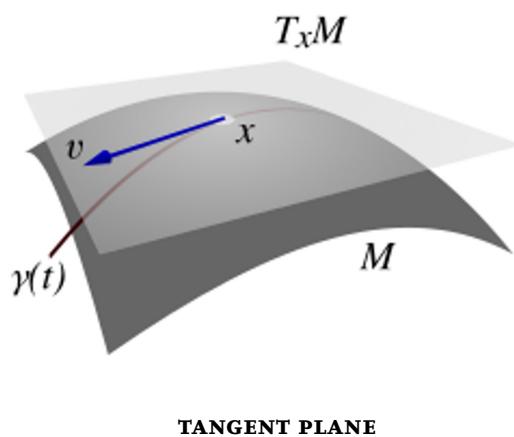
EXPLAINING A DIFFERENTIAL GEOMETRY JOKE IN ENOUGH DEPTH FOR A SHIRT MY FIANCEE GIFTED ME TO BE FUNNY

BEAR WITH ME, OK?

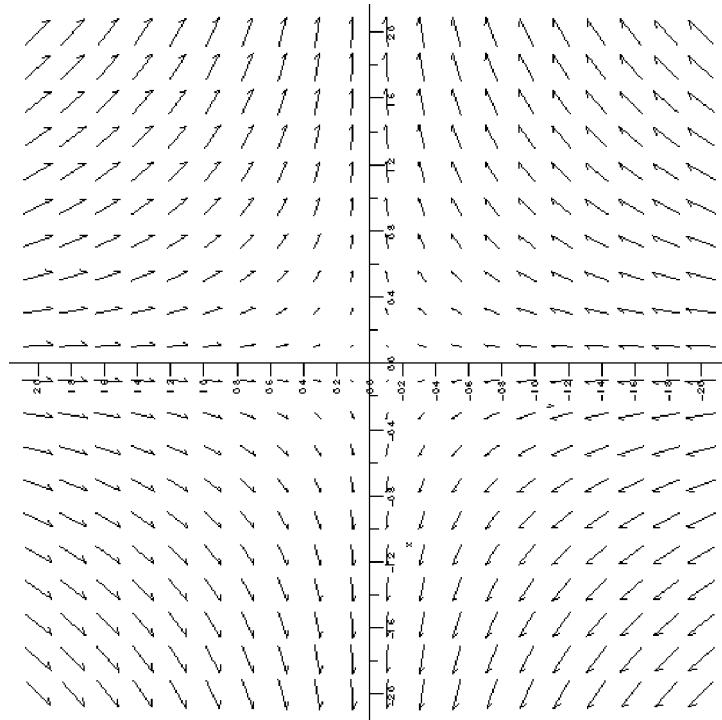
My fiancée got us matching shirts saying “We have a special connection: $\nabla = d + A$ ”, which is a hilarious differential geometry joke (that I came up with). Let’s explain it, so you realize how hilarious it is (trust me). Part 1 of the joke is “special connection,” which is to say that my fiancée and I have a special relationship. I leave this as a trivial exercise for the reader to figure out.

Part 2 of the joke is the math. A connection, commonly denoted by ∇ , is a fundamental notion in differential geometry. Intuitively, a connection is a type of derivative operator: it measures the rate of change of *something*. Accepting this part for now, if we have a *something* denoted by X on some shape of dimension n , it turns out that we can write it as $X = \sum_{i=1}^n f_i e_i$ (cool kids write this as $f^i e_i$, omitting the sum and switching up the indices), where f_i are (multi-variable, scalar) functions on the shape and e_i are “basis” *somethings.*¹ There’s the normal derivative d on functions given by the gradient as seen in MATH 237,² and we can multiply the column (f_1, \dots, f_n) by a matrix A (provided all of the *somethings* typecheck). A really cool (and not so hard) theorem proved in PMATH 868 (great course, you should take it) is that any connection ∇ is (locally) of the form $\nabla = d + A$, in the sense that ∇ acts as a derivative like the sum of d and A on the coefficient functions f_i .

The coolest people among you might be reading this and asking, “What are the *somethings*?” To you, the reader I made up, I say: great question! First, let’s make (not at all) precise what I mean by shape. Think about (the surface of) a sphere. If you zoom in, it looks a lot like a plane, which is why dumb people on 4chan think the Earth is flat. A manifold is a shape that, upon zooming in, looks like \mathbb{R}^n , just like a sphere looks like \mathbb{R}^2 . Under appropriate technical hypotheses, by zooming in, you can use this to “steal the calculus of \mathbb{R}^n ,” and use this to take derivatives. With this, just as the derivative in one dimension describes the tangent to a curve, we can sweep out a “tangent plane” to a manifold:



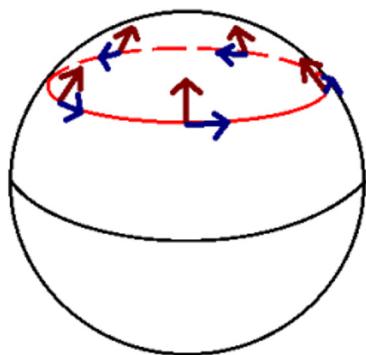
A vector in this tangent plane is a little tangent arrow pointing away from a point on the shape. We can consider a “field” of such vectors, which is a little tangent arrow attached to each point of our shape. This is called a vector field, for reasons that are hopefully obvious. Moreover, we can ask that the arrows vary differentiably from one another, using the fact that we have calculus, which gives us what’s called a differentiable vector field:



A DIFFERENTIABLE VECTOR FIELD ON \mathbb{R}^2

The *somethings* above are vector fields (or closely related objects called tensor fields, or closely related objects to those called sections of a vector bundle)!³ The “basis” above is just a choice of basis on each tangent plane, varying differentiably to give us vector fields.⁴

So what’s a connection? Well, the issue is that each tangent plane is a *different* vector space! We can’t use MATH 237 to differentiate how vector fields change, because we can’t take a difference quotient like $\lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$ because the numerator makes no sense: $f(x)$ and $f(x+h)$ are different tangent vectors at different places on the shape, in different tangent planes! So, we need to “connect” the tangent planes. There are a lot of equivalent ways to do this, but the most geometric is something called “parallel transport,” which goes by picking some curve along the shape, then moving the tangent vectors along it in a “parallel” way.⁵



WHY?

I'm not going to pretend that I don't know how much the literary world is pretentious and elitist, but sometimes it still shocks me, the way that people can, in all seriousness, believe that a book can separate levels of intellect.

In particular, there is this book. I finished it this weekend, it is the type of book where the journey was a thousand times better than the destination, as after reaching the climax, everything fizzled out very quickly. Not only that, we, the readers, were left with a number of questions on what ended up happening with most of the characters—in some ways, including the protagonist! It overall left me with a bitter taste of my mouth of “huh, so, that’s it?”

As one does, I looked for people who shared my disappointment on the internet. And so I found myself starting into an abysmal divide between those readers who would die for this book given the opportunity; and those who wished they could be reimbursed from the hours spent reading it.

I did end up reading reviews from those, like me, that loved the first half and enjoyed most of the book, but felt like the end wasn't it, maybe the book could've been helped with another round of edits, you know?

But, of course, I also found someone crying about how we were misunderstanding the book, and that it was a masterpiece, it was only that we were not “literary” enough. And they based their argument on how some X's actually symbolized Y's, and that one had to go deeper on the book, think about the things the author didn't say and on and on. This person was simply better than us, for picking up all of this.

I know what it's like to be defensive about a book you love, but I also know the importance of recognizing that some books suck and that doesn't mean you can't like them. It can still be one of your favourite books. It can still be entertaining! But no, instead, of thinking about that, you decide that people are just “too dumb” to agree with you? When really it seems like you're grasping for crumbs of relevance and meaning of the book?

Yes, it was a long and slow-paced book, so people that said it was bad just because of that, of course didn't have the “required taste” or whatever. However for those like me that stuck through the hundreds and hundreds of pages just to have a let down, and then are told we are just missing the point... That's just being delusional.

Why can't you accept that you like bad things? Why do you have to be above those who didn't like the book? I would have respected them much more if they admitted the flaws of the book instead of being immediately defensive. The ending sucked.

ward

leah

PARALLEL TRANSPORT TO CONNECT TANGENT VECTORS

Using this, we can compute derivatives with the same difference quotient, just using parallel transport first before we subtract $f(x + h)$ and $f(x)$. A connection is exactly the derivative operator we get by parallel transporting things around our shape!

Now this joke (hopefully) makes sense. Laugh now, please.

notoh

1. technical aside: this only works locally, but if you don't know what locally means, don't worry about it
2. technical aside: it's not actually the gradient, but the exterior derivative, but these are the same thing after dualizing
3. If you are reading this article and complaining I didn't explain what a tensor is or what a vector bundle is in generality (in which case we probably know each other, send me an email complaining about how I'm a bad writer), apologies. In my defense, I was in a rush (only had 13 minutes) and restricted by the word count.
4. This is why we need to say locally in footnote 1. We might not be able to pick a consistent choice of smoothly varying basis across the whole manifold—for example, the hairy ball theorem says we can't do this for the standard sphere.
5. What parallel means here is up to us, though with spheres as drawn there's an obvious geometric choice, which we can define with an ordinary differential equation describing how much the geometry changes (e.g. how much things turn).

FIVE CURSED SHINWA DAILY SPECIAL COMBINATIONS

1. General Tao's Potato
2. Black Bean Potato
3. Stir Mix Vegetable Potato
4. Sweet and Sour Beef
5. Black Bean Eggplant

LONDON, ONTARIO VENT POST

IT'S MORE OF AN INDUSTRIAL AIR CANNON THAN A VENT TBH

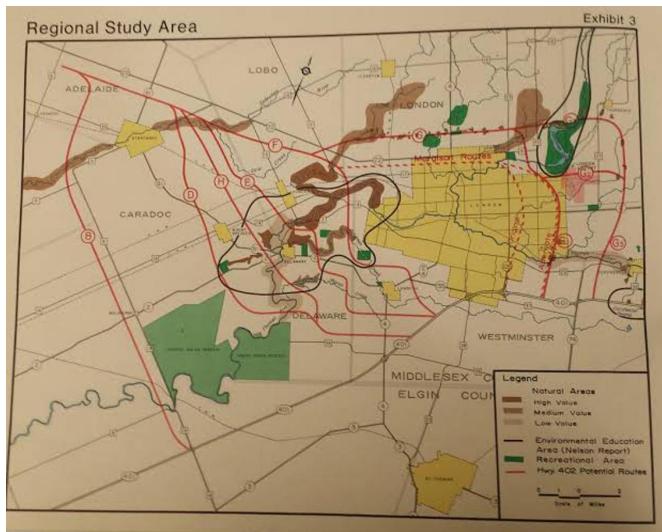
This may be one of the only posts I make that I use my actual username for, because this topic is deeply personal to me.

The year is 1796. London was founded, as a village, on questionably acquired Indigenous land. Even though its name was highly derivative, it actually had a lot going for it. Its founder even intended it to be the capital of Upper Canada (see: Ontario), though this was overruled by Toronto. Over the next century and a half, London got a university, hosted the founding of the predecessor of Canada Trust, and, most famously, Banting was apparently there for a while.

Everything was going great until World War II, and the US brought with it global influence and the idea of tearing out entire neighbourhoods for eight-lane highways. So, Canada decided to follow suit, and gave London its own opportunity for a highway for its north end. Excellent! At the time, at least. London needed infrastructure, and this was a step towards it. So obviously, they built a nice ring road around the city.

Wait, what do you mean some rich assholes lobbied against it?

Well, turns out that people protested against it. Not because people of colour would have their homes razed, but because a golf course on the north end of the city (which shut down in, like, 2021) decided it would look ugly and lobbied the city to make it run south of London instead. To show you just how ridiculous this looks:



Instead of any plan that goes around the city, in which London would have gotten a provincial highway for free, we decided to fuck ourselves over by choosing Plan H. Why? I guess as a transit advocate, I understand that car dependency is bad, so it wasn't too bad in the long run. Obviously, after they realized the effects of car-dependent architecture, they made London look better!

Here's a picture of a London intersection in 1989, and another in 2022 where they revitalized it:



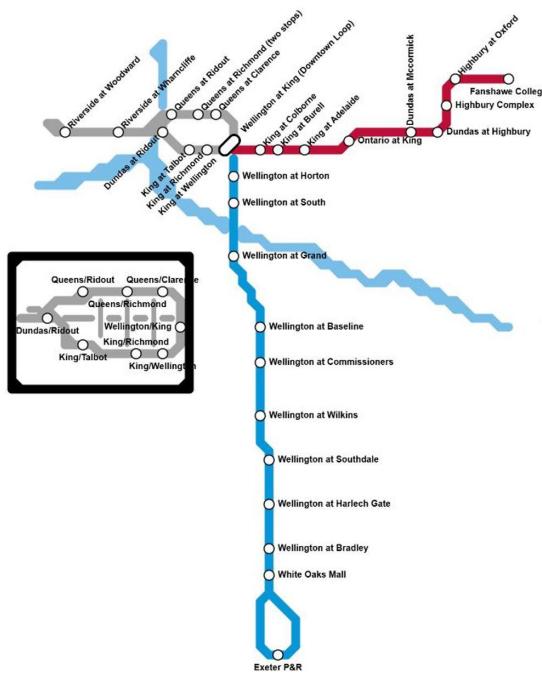
Wait, I thought London was supposed to ditch cars??? Given the fact that they rejected a highway multiple times (several ring road proposals were canned since the 402 incident), surely they'd have some decent transit, right? Why did they make the road wider and look worse???????? It's not like city council is incompetent and incredibly prone to getting lobbied, right?

Well, here's where it gets worse...

In 2015, London unveiled a plan for an LRT to fix the city's abysmal public transit. After the streetcars got ripped out of the streets back when it was cool to do that, London finally was getting a competent form of transit. It was great! Two arterial lines crossing the city, one north-south, one east-west, with a small loop around downtown. Maybe it was going to take a while (cough cough Mississauga, Hamilton) but it was a step in the right direction.

Sure, in 2018, city council voted to downgrade it to a busway due to cost issues. A bummer, but at least it could be scaled up later! This is also when ten-year-old me heard about the project, having seen China's efficient, sprawling metros the year prior. It was exciting hearing about transit coming to the city I lived in, a dream that I never thought would come true.

The very next year, for whatever reason, the city reviewed it again. This time, however, they voted on each segment (north, south, east, west) separately. And they canceled two of the four legs. It wasn't even a single line, which would at least be logical. It was the north and west legs, which were coincidentally the parts of the city with the most rich boomers. This debacle left the rapid transit project map looking like this:



This situation was so bad, it radicalized the YouTuber Not Just Bikes, who lived there, into leaving North America permanently, moving to Europe, and starting a transit channel where he reviews trains for a living (currently with 1.4 million subscribers, by the way). It radicalized ME, distraught that I wouldn't get a mini subway in my city, to start making my own imaginary maps and learning about urban planning. And, it made a lot of other people, particularly those who relied on transit, very upset.

There are some silver linings about London. It has pretty good nature and parks, better drivers than all of the GTA (because somehow transit is more messy over there *yeesh*) and Western University, which has one of the most aesthetic campuses I've ever visited (if you like Gothic-inspired stuff). It's just that, in my humble opinion, they should probably just tear it down and redo everything.

I fucking love Waterloo by the way glory to the ION.

m1ntleaf

ARCH PROPAGANDA

Me personally, I'm a proud dumpster diver. My humble abode overlooks the dumpsters and my passion is for e-waste bins. It's there where I found "Evan Penn's" used laptop. Truly a beauty with a missing battery, trackpad that can't scroll, and still-running Windows 7. It was beautiful. I took her home, cleaned her up even though she had a few screws loose when I took a lil peek under the frame. But, when she booted up, I had only one thought: wow this thing is terribly slow; I could binge all of *Stranger Things* before I can even log in to my account. So, like any normal person, I completely wiped the SSD and installed Arch Linux.

Some may think I'm mad, or utterly absurd for downloading such a preposterously oddly overcomplex operating system. Yet seeing this computer from 2009 running freely and with such ease brings a tear to my eye. This OS of *cough cough* less than 2 GB will never have an issue running on any of your devices. If you accidentally updated your MacBook to macOS Tahoe and your battery is draining faster than you can even read this article, it's time to switch to Arch. Trust me, it's not your computer degrading and getting old, it's your OS being too demanding. So just do it, jailbreak your Mac, wipe your drive, install Linux. So, if you decide to install, but you just don't have a USB stick, FEAR NOT. Use an SD card, micro SD card, CF card, CF express type A or B, TF card, floppy disk, CD, Tape. It doesn't matter; as long as your computer can read it you can download it!

Now you may wonder "Why would I use Arch? I could probably just use another Linux OS and get the same result..." but that's just not as cool *yk*. There's a certain type of aura you gain in the CS community when you say "oh yeah uh shucks I just use ARCH LINUX oh silly me!" Immediately you'll be accepted into CS Club as a national treasure, the people of the streets will know your name, your resume will pass that first screening test when applying to MAANG. But most importantly Arch is pretty, they let you customize whatever your heart desires just open up your Konsole little jabber jabber in your terminal and bam you can change whatever you want with some simple commands. Nothing unnecessary is ever downloaded unless you want it. So, don't be scared, take the leap, cause the bridge you're on right now is breaking, get to the high ground, get to the Arch.

You can't even call me a nerd for this; I didn't even tell you to start learning vim, creating your custom IDE, and modifying your keybinds to your taste.

Jubble



profQUOTES

ACTSC 372: BEN FENG

“ *[Regroup Alert Systems Test appears on the screen]* Do I need to care?

AMATH 353: FRANCIS POULIN

“ I’m going to use a proof by contradiction. I’m using that in the loosest sense of the word; some of you in pure math might object but I’m going to call it that anyway.

“ For better or for worse, I’m your instructor.

“ Last time I taught this course, COVID happened... so I’m hoping nothing so exciting happens this time.

“ The final exam will be scheduled by the scheduling gods.

“ Particles are made of atoms, and atoms are made of I don’t want to think about it.

“ So, the bigger the D, the faster the time rate.

AMATH 373: GRAEME SMITH

“ Why is now, now... and later is later? And this is the type of question we hope to answer in a quantum mechanics class.

“ I don’t know if you know... about memes... do you know about memes? I have some memes, I can teach you. Oh ya!

“ I used to work at a company, but I couldn’t stomach it anymore.

“ This is not a pyramid scheme, this is the most noble calling.

“ My inner censor is saying, this is not the time to make this joke. *[20 second pause]* No, it’s not that bad.

“ Do you know about the Nobel Prize? Go to their website, and every year, they award the Nobel Prize.

“ If you go to the United States and you stay there for a long time, you might accidentally become American. Members of your FAMILY might become American.

“ Probability is just a boring subset of quantum theory.

“ There’s, like, a million real numbers.

BU 413: GERRY RAMOS

“ Retirement is bullshit.

CIVE 353: DIPANJAN BASU

“ Be like a kid, when your parents were happy with you.

“ Do you have anyone who you don’t like at home? Like a sibling, or your mother.

“ Dump five kilograms of flour into your bathtub.

“ Do you guys know about cows?

“ Do you realize you’re useless?

“ When you’re sad, after a breakup, men turn to alcohol.

“ It proves that alcohol is detrimental to the health. Now that doesn’t mean I don’t drink. I absolutely drink.

“ Any of you overweight here? I don’t think so. I think I’m the only fat guy here. You can’t use the word fat now. You have to use obese and overweight.

“ Given my size and roundness, do I qualify here? *[points at boulders]*

CO 342: PENNY HAXELL

“ You’re being too realistic.

“ Proof? Just do it.

“ *[After drawing a graph and unintentionally drawing a matching with errors]* We will write “WRONG MATCHING” and leave it as an exercise.

CO 439: OLIVER PECHENIK

“ *Student:* What does CDG mean?

Professor: Oh, it’s the initials of the names of some people. It’s not the airport.

Student: HPW isn’t an airport.

Professor: We’d better start one then!

“ *[Final words of the final lecture]* We have now learned all of math. You may now go home.

CO 456: DAVID JAO

“ Chat, we’re falling behind.

CO 485: SAM JACQUES

“ Apple’s users are wealthy. They can afford high-bandwidth network connections ... I think I offended someone at Apple when I said that.

“ *[Course perception surveys]* are due, so naturally... *[passes bowl of chocolates around the class]*

“ If I throw a grenade into your quantum computer, then there is a computation error.

CS 135: ROBERT GARBARY

“ I learned Racket, you learned Racket... you paid to be here, I was paid to be here...

CS 136: CURTIS BRIGHT

“ You can't divide by zero. The mathematicians forced that on us.

CS 136: CAMERON MORLAND

“ I don't like changing the value of zero, that sounds like that would be a problem.

CS 136: NOMAIR NAEEM

“ If you divide 6 or 7 by 2, the result will not be an int.

CS 145: TROY VASIGA

“ This might be in one of your neurons somewhere. Maybe even two of them.

“ If you only had the lambda calculus rules tattooed somewhere on your body. Like I told you to do.

“ But I've got a problem. I've got an “f”ing problem. *[in reference to a function f]*

“ This should return f. *[runs program]* Y?????

“ I might not ask that on your exam, but Jerry Wang might.

CS 146: BRAD LUSHMAN

“ Some of you could probably speak C before you could speak English.

CS 146: ROSS EVANS

“ You'd be better off going outside and touching grass.

“ They'll be like “Racket? What the fuck is that?”

CS 240E: ARMIN JAMSHIDPEY

“ Do you hate me already? It's only a matter of time.

“ *[student asks “how long do you think it will take?”]* If you are awake and listening, probably in the middle of module 3.

“ My advice for cheating is: don't! That's it.

“ Do you consider 0 as a natural number? *[student nods]* *[prof starts walking to the exit]* It was nice seeing you, bye.

CS 241E: ONDREJ LHOTAK

“ It's like two friends: they're holding hands, they both drown because no one's pulling them out.

“ You could work with binary numbers, I guess, but that'd be kinda binary.

“ I don't think you really want to try to understand what it's doing or why it's doing it.

CS 246: BRAD LUSHMAN

“ How do you build trust with your compiler? Spend a little time with it on a Friday night and you'll get a feel for what it does.

CS 246E: BRAD LUSHMAN

“ This is one of my favourite topics in this course, because it's so bizarre, and to see the looks and shock on your faces is so gratifying.

CS 251: ZILLE HUMA KAMAL

“ My students asked [the bot] how they could get a girlfriend. [The bot] responded, “I don't have enough background information for that.”

CS 343: PETER BUHR

“ My world is just a moving pile of madness.

“ Writing concurrent programs is like white water rafting without a raft or skydiving without a parachute.

“ Hopefully we will get an AI bust soon. All of it will go in the garbage can along with Bitcoin, and the world can be a better place.

“ You are going to make a mistake, then boom! You are smashing the stack.

CS 349: JEFF AVERY

“ Apparently one of my algorithms is in Android now. *[class: ooh]* I don't even have an Android phone.

CS 350: KEVIN LANCTOT

“ We can see here that 20% of the class uses mental telepathy. That's odd, usually its 10% of the class that has mental telepathy...

CS 442: BRAD LUSHMAN

“ Why bother programming in anything other than Haskell?

“ [on Discord after class] To be clear... at the end of class, I wasn't saying “Why, oh why, oh why?...” I was saying “Y, oh Y, oh Y.”

“ Fill up your notebooks with lambdas, there's no better use of paper.

“ They're called the rator and the rand. They're short for operator and operand. I didn't make this up.

“ The word “calculus” might scare you. Maybe the word “lambda” scares you. But don't worry, we won't be doing any limits... yet.

CS 444: ONDREJ LHOTAK

“ This is not a good bird course.

“ You as the human can be Lex.

CS 451: DAN HOLBY

“ I program in Racket out of spite.

CS 454: SAMER AL-KISWANY

“ Let me change chunk 2's replicas to 7, 8, 9. You see how I avoided 6? Didn't fall for it like every other lecture!

CS 480: MARINA MEILA

“ This course is just an autoencoder.

CS 488: GLADIMIR BARANOSKI

“ Abracadabra. Let's see if this works.

“ If you think my accent's bad, wait until you see my handwriting.

“ I'm bad, but I'm not *that* bad.

“ You CS guys, you only think about power! Power! Power! Power!

“ I do not endorse Febreeze.

ECE 350: JEFF ZARNETT

“ Like the Government of Ontario says: don't skydive without a parachute at least more than once.

ECON 101: MIKAL SKUTERUD

“ When things go wrong at the nuclear reactor, it's... not good.

“ Awwww... look at Shoppers Drug Mart, giving discounts to granny and grandpa... such a nice company... NO! NOT A NICE COMPANY! They just want to make money!

ECON 102: KATE RYBCZYNSKI

“ Maybe in a year, there was a lot of cocaine...

MATH 135: ANDREW BELTAOS

“ Tell me you don't see this and think, “Wow, the universe is speaking to me.”

MATH 137: LAINDON BURNETT

“ On your exam, if the answer is not 67, please do not write 67.

“ Whenever you need to optimize anything? DIVORCE! If you need to maximize your life? DIVORCE!

“ I'm not a DIVORCE lawyer.

“ Alright, let's apply DIVORCE.

“ I woke up today, and I regretted life.

“ I do NOT trust myself with numbers that big.

“ [whispers] FUCK we are not locked in today.

“ If I ever find the person that made these dimensions, I will pack them into a box myself.

MATH 137: MAX FITZSIMMONS

“ I'm too stupid to skip this step, so Max won't skip this step today.

“ We want functions to be smooth. Smooth like my brain.

“ Corners are the devil.

“ Everyone born around 2008 is hopeless. [*he says, to a class full of '07 students*]

“ Now I can't simplify this, my day is ruined!

“ You can still factor out the 3? You made my day! [*proceeds to write $1503 = 3$*]

“ We'll redefine the position of 9.

“ Integrals are...space magic idk

MATH 145: DAVID JAO

“ [Student: *Laurier is closed!*] Laurier is a high school.

MATH 145: JERRY WANG

“ As promised, I will finish this course with 67.

“ Depending on where you did your elementary school, you may or may not have learned the cubic formula.

“ Okay, so it sounds like a you problem.

“ What does sigma do to you?

MATH 146: RACHAEL ALVIR

“ *[screen freezes]* Just give me a minute... oh wait! I'll give you an exercise to complete!

“ So I cooked up a vector...

MATH 147: RACHAEL ALVIR

“ I don't remember if it was 5, 6, or 7. 6 or 7...

MATH 147: BLAKE MADILL

“ Part b is new... not Stephen New.

“ An armadillo walks into a bar. He notices the bar is a complete metric space. The armadillo is nowhere dense.

MATH 148: ALEXANDRU NICÀ

“ *[Student: what is your favourite theorem in this course?]* I don't know, maybe there's 6 or 7 of them.

“ I'm gonna come and squeeze you.

“ We then invoke Exercise 1.11 and $\frac{3}{4}$.

“ *[Student: what kind of questions will be on the quiz?]* Hard questions.

MATH 237: DAVID MCKINNON

“ Supporting students in crime is what being a professor is all about.

“ If you believe me, which you should because I'm a genius...

MATH 249: JIM GEELEN

“ *[This proof is]* a bit trivial. I showed this to my son when he was 4. That's the kind of abuse my son gets.

MATH 249: STEPHEN MELCZER

“ I think I got confused so I'm just not going to say which is which.

MUSIC 240: BRIAN LEFRESNE

“ Do I have any refugees here from the Catholic school system?

PMATH 340: MICHAEL RUBINSTEIN

“ You can call me stupid, but you can't call Euclid stupid.

“ Who wants red? Who wants black? Who doesn't give a shit?

“ People are afraid of math. I'm afraid of math. It's an infinite subject.

PMATH 351: JESSE PETERSON

“ Any questions? No? So I have a question. What is Piazza?

“ Second question. What is Key Clues? Anyone wants a faculty member in their team?

“ The first book is Rudin. See how tiny it is. It means it should be pretty easy.

“ You caught my typo. *[gives the student a quarter]* Have a nice shiny quarter.

“ Function, function, what's your conjunction.

“ If my daughter (she's like 5 years old) says I'm infinity, and some kid says I'm infinity plus one, then my daughter can say "well I'm the power set of infinity, bitch."

PMATH 352: JASON BELL

“ It sounds like I'm obsessed with Russians, but I'm not.

“ *#blessed* ... by the way, I hate this person.

“ No idea who Bolzano is.

“ OK, here's an assignment. Very hard, I think, but that's why there's ChatGPT, right?

“ Does everyone agree? If not, we'll have to agree to disagree. I'm glad we all agree.

“ We need to finish the proof now, it's like driving a boat into a harbour. Have you ever driven a boat before? No? Well, you're doing great!

“ Gen alpha? That's pretty cool.

“ I'm not Gen alpha! So I'm not focused.

“ This is the most terrible lecture I've ever given, and it's only the second lecture of the term.

“ I apologize, I don't know what's going on with my life.

“ I haven't done an integral in 30 years. If you gave me an integral and if you gave [Jerry Wang] an integral, and only one of us got to live by solving it, I would die.

“ *[on using computers to solve integrals]* I’m not good at chess, but if you put me against—what’s that guy, Magnus Carlsen?—and if I’m allowed to use the bathroom...

“ I’ve got some facts. I’m open to proving them, I’m also open to not proving them...

PMATH 370: KEVIN HARE

“ *[to Gemini]* What is $^{159}_{987}$?

“ Aw, man. I had a 5% chance or something of impressing you guys. Not with my knowledge, but with my basketball skills. Which I do not have.

“ You can work in group sizes 1, 2, or 3, but it has to be an integer.

PMATH 445: ALEX COWAN

“ The deadline is Thursday, but the real deadline is whenever the TA starts marking.

PMATH 446: BEN WEBSTER

“ I wrote this in a bad way. I wrote this like I’m in a PID...I’m a bad person, I’m sorry.

PMATH 454: NICO SPRONK

“ I’m keeping things simple because I’m lazy and I don’t really like PDEs.

“ If you look at books on Fourier analysis, two thirds of them will use the obnoxious normalization constants as I’ve chosen them, probably out of a hangover from complex analysis.

PMATH 467: DOUG PARK

“ My first introduction to algebraic topology was in elementary school.

PMATH 863: NICO SPRONK

“ If the lecture’s shitty, it’s a whiteboard, how can anyone work in this environment?

“ I confess to you, I spent most of my break sticking my head in the sand.

“ ... write it in the teaching reviews, I guess. I’m fully promoted, so I don’t care.

“ I’ll be an engineer and use j . No, fuck it.

PMATH 945: JASON BELL

“ I don’t care that I don’t have the right. I’m an American and I’m gonna do this... I’m not actually American.

“ What do I do? Do I just teach it on Discord?

“ Tensor is the nerd functor. It’s complicated.

“ Left adjoints are nerds and right adjoints are jocks.

PHYS 121: RICHARD EPP

“ So the wheel says “uh-oh! I’m violating the laws of physics!”

PHYS 359: ALAN JAMISON

“ I wrote it in three different colours, so it must be true.

STAT 341: JACK DAVIS

“ Goku finally fired his spirit bomb attack after seven lectures of charging it through flashbacks and cheaply animated grimacing. He missed the big villain, but he left a big hole in the mountain behind the villain. Very anticlimactic.

“ Scratchy page, do do d-do do do.
Scratchy page, do do d-do do do.
Write your work, do do d-do do do.
You want unmarked, do do d-do do do.

STAT 433: JEFFREY NEGREA

“ So we’re going to make a tier list of numbers.

“ The inside of the peanut is U.

STAT 443: REZA RAMEZAN

“ *[shows family photo of himself, his wife, and two daughters]* I have three bosses to whom I report.

“ *[student]* is sober as well. *[indistinguishable]* Did you say “that’s what you think?”!

STAT 903: AUKOSH JAGANNATH

“ That’s the thing with whiteboards: they’re disgusting.

(MYSTERIOUS PROPER CLASS-SHAPED SET)

how do you do fellow sets? i too am a set

the set of all singletons

A PUZZLE HUNT THAT'S OUT OF THIS WORLD

WHY YOU SHOULD SIGN UP FOR KEY CLUES

What's a puzzle hunt? What's Key Clues? What are those beautiful eye-catching posters I keep seeing all over campus? What are the aliens ACTUALLY trying to tell us?

Never fear, all this and more will be answered here! (Okay, maybe not that last one.)

A puzzle hunt is... well, it's hard to describe. We design puzzles, a few are released each day, and then you race to solve them in teams.

What kind of puzzles? All sorts! Some build on existing styles, like a crossword, but with a twist. Some are entirely new and unique! Figuring out the rules is part of the puzzling fun.

Key Clues is the puzzle hunt run by UW, for UW. All students, staff, faculty, alumni, postdocs, and Perimeter Institute folks can participate! Teams are 3–6 people. Bring a friend! (The hunt can largely be enjoyed remotely, but some puzzles may involve being on campus).

I WANT TO SIGN UP!

Awesome! You can register a team at keyclueschallenge.uwaterloo.ca, or by scanning the QR code below.



I WANT TO LEARN MORE.

Check out our website above, or come to our Kickoff event! You can meet fellow puzzlers, learn a bit more about the hunt, and get a sneak peek at some of the puzzles. Come to DC Fishbowl (1301) on Monday, Jan 19 at 5:30pm. (If you're reading this when it comes out, that's this Monday.)

The hunt starts January 26th at 11:30am. Whether you only try one puzzle, or compete to win it all, we'd be so happy to have you.

The Enigmatologists

N THINGS YOU CAN BUY WITH THE COST OF THE TWELVE DAYS OF CHRISTMAS

For reference: Cost of the twelve days = about \$230,400 as stated in the other article.

- 10 cars
- A small yacht
- Two bachelors degrees from the University of Waterloo
- 768 years of a Netflix Premium subscription (2,400 years if you take the cheapest subscription, Standard plan with ads, which, given you have 2,400 years of Netflix, you can probably deal with)
- 76 months (12 years, 4 months) of rent in Vancouver (the most expensive city in Canada to live in)
- If you were convert the money to US dollar bills and stack them on top of each other, it would be 25 meters tall, which should be around the height of MC
- If you were to instead lay those bills along the ground edge to edge (the short edge for maximum length), it would span about 36 kilometers, just short of the 38-kilometer TTC Line 1 (or Vaughan Metropolitan Centre Station to about Sheppard-Yonge Station where the transfer to Line 4 is)
- Multiple large replicas of the King Kong Balls Statue
- The yearly salary for 6 full-time minimum-wage workers
- 136,000 Costco hot dogs. If you were to have 3 hot dogs a day, one for every meal, it would last you 124 years
- Over four times the amount of money in bribes that US Border Czar Tom Homan (allegedly) accepted from undercover FBI agents in a paper bag

fingersinsockets

[mathNEWS]

HOW MUCH WOULD THE GIFTS IN THE TWELVE DAYS OF CHRISTMAS COST?

This is what the average cost is of all the gifts in the Christmas song “The Twelve Days of Christmas.” There will be some assumptions made: that any live animals are mature when gifted instead of a chick, and that every gift involving a service gift (milkmaids, lords, etc.) will be given a day’s worth of salary and will be employed until the end of the twelve days. Additionally, service gifts will still compound like every other gift (e.g. eight maids on the first day, sixteen on the second instead of gifting only eight maids total that work for five days for each day they are in the song).

- 1. Partridge in a pear tree:** A mature partridge costs about \$12, and a pear tree costs about \$40, totaling \$52 per day over twelve days to a total of \$624.
- 2. Two turtle doves:** Two turtle doves cost about \$50 each summing to \$100 per day over eleven days to a total of \$1100.
- 3. Three French hens:** Three French hens also cost about \$50 adding up to \$150 over ten days for a total of \$1500.
- 4. Four calling birds¹:** Four mature lovebirds cost about \$100 each coming to \$400 a day over nine days for a total of \$3600.
- 5. Five golden rings:** Five plain 14k rings cost about \$300 each coming to a \$1500 price tag per day over eight days for a total of \$12 000.
- 6. Six geese a-laying:** Six mature female geese cost about \$80 each for \$480 a day over seven days for a total of \$3360.
- 7. Seven swans a-swimming:** Seven mature mute swans cost about \$2000 each for the hefty \$14 000 price each day for six days for a total of \$84 000.
- 8. Eight maids a-milking:** The average salary for a milkmaid is \$20 an hour, meaning \$160 a day, meaning \$1280 for eight, and \$19 200 total over the five days.
- 9. Nine ladies dancing:** Hiring a dancer costs about \$600 a day, \$5400 for nine, \$54 000 total.
- 10. Ten lords a-leaping:** Because it’s impossible to find the cost of hiring a lord, instead this will be a ballet dancer that we will buy one of those scam novelty land purchases that doesn’t actually give you a real title for each of them to satisfy the “leaping.” A ballet dancer costs about \$600 a day as well, \$6000 for ten, and \$36 000 overall. A novelty land purchase from a company like Established Title costs about \$50 each, \$1500 overall² to a total of \$37 500.
- 11. Eleven pipers piping:** A piper costs about \$300 a day, \$3300 for eleven, \$9900 total.
- 12. Twelve drummers drumming:** A marching band drummer costs about \$300 a day, \$3600 total.

In total, the bill will add up to \$230 384 without taxes. If you plan to go through the twelve-step Christmas program

for your special someone, you better start saving as soon as possible, maybe even drop out for more money.

fingersinsockets

1. While doing research I learned that it was originally “four colly birds,” referring to blackbirds (colly meant black because the Old English word col → coal). While blackbirds are songbirds, I couldn’t find any info on cost and thus we are buying lovebirds.
2. I am also assuming we have the same dancers over each day, so we only need to buy 30 titles, 10 per day for each new dancer

WHAT IS THE BEST BUILDING ON CAMPUS

- E5 (2)
- MC (18)
- United College
- Conrad Grebel (2)
- Health Expansion
- Hagey Hall
- EV3 (3)
- EV2
- PAS
- QNC (4)
- EV1
- SLC
- M3 (2)
- ERC (2)
- EIT (2)
- GSC
- E7 (2)
- M4 (3)
- STC (3)
- DC (2)
- RCH 101
- ECH
- CIF
- SJ1
- DP
- M2
- Whichever building mathNEWS is in that term



mathgeek

PDEEEZ NUTS

got em

notoh

CORPORATIONS WANT YOU TO BECOME A VICTIM

Last month, I was, ironically, recommended a reel on Instagram talking about how Meta is now taking your private messages on their apps to train their AI. This reel then showed how to submit a claim to Meta to opt out of this. Firstly, Meta has already tried to make this near impossible to navigate to. You can't do it on the app and you must go to their website. Then you have to navigate this maze of options on their website before you reach the contact form, which has a shitty UI. I attempted to fill out this form. Then I reached this prompt:

"To address your request, we need information about whether AI at Meta's models have knowledge of you. Please provide any prompts you entered that resulted in your personal information appearing in a response from an AI at Meta model, feature or experience. We also need evidence of the response that shows your personal information."

Before they can allow you to have privacy, they must see proof that the AI has leaked your private information online and that you have become a victim. Having your right to privacy isn't enough for them. To them, your personal information must have been publicly accessible, completely available for people to see, then dox you, send death threats, or even come to your front door before they will try to give a shit. They want your life to be fucked over before they will drag their asses over to give you any help.

In this late-stage capitalistic world, we are seeing a peek into the full extent of how a "free" market affects the tech industry. Companies are pressured by the stock markets to constantly output better and better returns each quarter,

and all of a sudden, buying is no longer owning, AI chat bots man all customer support services, and social media content online become more and more rotted to keep us wired into consuming and buying. On top of this, they keep making living more expensive, needlessly jacking up prices, smothering affordable competition, and throwing down waves of layoffs upon layoffs. Alas, in the eyes of the stock market, unless the company has caused deaths or immediate natural disaster through their actions, morals can always be thrown out the window to see that candlestick chart turn green.

They've created so much shit just for a bit of profit. Purdue Pharma chose to trigger an opioid crisis to make billions off of OxyContin. Online shopping companies, automotive corporations, and oil corporations chose to kill off community areas like movie theatres and malls for their own profits. Now, we are seeing graphics card and AI companies fuck over consumers by making graphics card impossible for people to buy, and fucking over the environment to have LLMs hallucinate and spit out absolute slop.

We deserve better than this. We should be able to live in society where we aren't put at the will of those with the most money. Where we don't have to worry about companies lobbying governments to allow them to fuck us over more. Where politicians work for us who pay their salary instead of the billionaires that pay their bonuses. To live in a world where we can be free of all of this, and to never have to deal with more of this shit.

fingersinsockets

AN ODE TO INDECENCY

Shame has conspired with fashion.

Skin banished to private moments.

I was born unclothed—

Blessed with indifference to indecency.

But hastily,

My mother clothed me. Her bloody cheek!

She wrapped me in humility,

Herself the only soul to see me bare.

Alas! Humility grew unchecked—

Slowly wary of my unrequited gaze;

And my growing years turned unkind to her.

Even maternal eyes became—
Strangers to my gentler flesh.

An age of adolescence condemned an age of innocence.
Sin acquainted indecency behind bars.
All were sorted to enshrouded preachers—
the rest, shameless and dissenters at heart.

How then must I save my innocence today?
For they must unclad me,
Lest they cremate my shroud as well.

Today, as I burn,
So, chars the humility I wear.
And mother grieves as she sees once again,
My body and dignity lay bare.

nudist6000

+-×÷

AN INCONSEQUENTIAL DATA ANALYSIS PROJECT'S RESULTS

I have had a persistent habit lately¹ of hunting out batches of numbers in the wild — on clock faces, serial numbers, URLs, etc.— and seeing if they form a sequence, or if there's a way to combine any couple numbers in the list to make the next number; this useless pattern-seeking rooted in my brain reared its head one day when I saw that it was 12:35 AM, my mind immediately hallucinated the following overtop the clock's digits:

1.) $1 \times 2 = 2$
2.) $2 + 3 = 5$

I noticed that both of these expressions are of the form $(\text{previous number}) * (\text{list index} + 1)$, where $*$ denotes some operation and list index is the.

This got me curious; What sequence would be formed if I were to continue with the other operations, say, using \div then—as the operations for the 3rd & 4th expressions respectively, before then looping back to \times , $-$, and repeating indefinitely? What is the Nth sequence element that would be generated by placing $(\times, +, \div, -)$ between the previous value of this sequence and the Nth natural number?

And what if the operations were in a different order?



After taking a normal amount of time y writing up some python code to generate all possible permutations of operation orderings (instead of writing all of them out by hand, only a fool bumbling around who doesn't know how to program right would do that), I wrote code to compute the sequences each of the 24 orderings of $\{+, -, \times, \div\}$ up to the index $n = 256$, and outputted all the final results to a CSV file (which was named a very descriptive *bingus.csv*, naturally). Then I loaded it up in excel, plotted it, & started *looking*.

Once I had plotted, it was clear that there were three main genera of sequences: The “triple-linear-divergers,” the “upwards curve + flatliners,” and the “downwards curve + flatliners.”

GENERAL TRENDS

All of these patterns had pretty wobbly sequence values near the starting indices, but past around $n = 50$ the distinct curves in the data start to crystallize;

All of these patterns typically have fit curves that intersect data if one were to sample once every 4 data points (every “operation cycle”); Although, one of the fit curves has the highest “density” of datapoints in its neighborhood, with 2 datapoints fitting the fit curve each operation cycle. These curves could be considered the “truest” functions the sequence converges to, although in all of these cases there are still clear divergent patterns even for large N just one iteration later.



FIGURE 1: THE OUTPUT VALUES OF SELECT SEQUENCES, PLOTTED OVER 256 ITERATIONS, SORTED BY GENERAL SEQUENCE TENDENCIES

TRIPLE-LINEAR DIVERGERS

These ones are the ones with the most interesting behavior if you ask me; They consist of one line that's basically $y = 0$, a larger-slope one angled at around a 30 degree tilt with the line $y = 0$, and a smaller-sloped line, 20 degrees with $y = 0$, tilted opposing the larger-slope line. The larger-slope line diverges positively and negatively an equal amount of time.

All the sequences in this category are characterized by having \div **right before** \times in their operation order, keeping the pattern linear such that the Nth sequence element from the sequence S is proportional to $(S[n-2]) \cdot (n/n-1)$ which as n grows larger is a value just greater than 1; Why this creates several linear trendlines escapes me.

Sequence with the largest magnitude: $(\times, +, -, \div) \rightarrow 178.04$

UPWARDS CURVE + FLATLINERS

Interestingly, due to the general properties of these sequences listed above, there are actually 3 distinct curves that fit the patterns in this sequence, it's just that one of them appears to be diverging upwards (quadratically?), and the “flatliner” is, in fact, 2 curves (one of which being a pretty stable, positive linear function, and the other being a decreasing line (or very shallow curve?)).

These upwards curves all have the characteristic quality of having **+** **before** **×** in their operation order, and as both of those are (with positive index values as summands/multipli-cands) magnitude-increasing operations, it's no surprise that the champion for largest maximum sequence magnitude goes to an upward-curving + flatliner pattern.

Sequence with the largest magnitude:
 $(-, \div, +, \times) \rightarrow 1706364.41$

DOWNWARDS CURVE + FLATLINERS

As both the previous sets of sequences have featured in fact ALL of the possible permutations with the progressions $(\div \rightarrow \times)$ and $(+ \rightarrow \times)$, naturally, the Downwards Curve + Flatliner sequences feature all the other combinations,

which, by the pigeonhole principle means all the rest of the sequences must contain the progression $(- \rightarrow \times)$. Due to this, the patterns in these sequences appear to be basically a vertically flipped version of its upwards counterpart, so all the stuff I wrote about that basically applies here.

Sequence with the largest magnitude:
 $(\div, -, \times, +) \rightarrow 1686553.60$

If anyone finds out what the function for the upward curve is pls seek me out at a **mathNEWS** prod night sometime in the future & let me know.

abs(Jester)

N ISLAND FACTS — MIDDLE ISLAND

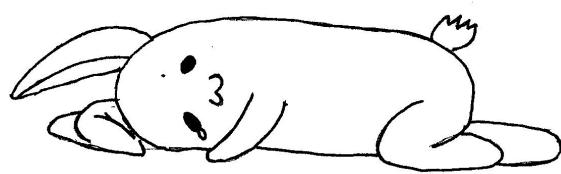
This issue's island is a little closer to home, still far mind you, but not halfway around the world like the last few issues. I present to you, Middle Island.



- The island is part of a small archipelago stretching across Lake Erie, which forms a migratory corridor for birds and animals across the lake. This includes use by humans, with army deserters and slaves having used the island chain to seek asylum in Canada.
- Historically used mainly for agriculture (boring), up until the prohibition era, when the island's unique positioning instantly made it a key rum-running and smuggling hub (not boring)
- Famous gangster Joe Roscoe built a huge “clubhouse” on the island during this time, featuring electricity and an underground casino, and routed much of his smuggling across the lake through it. The island also featured a large mansion, rumoured to be a brothel
- This “clubhouse” ended up being very popular, attracting 200 guests daily via boat, plane, and in the winter, cars driven across the ice
- Rumours say Al Capone (an alleged clubhouse visitor) stashed his lost fortune somewhere within the casino walls, where it's hidden to this day
- Despite being a Canadian island, the island was held by various US owners until being purchased by Canada in 1999. It is now part of the Point Pelee National Park

That's all on this island, let me know if you have an island you want me to cover (fatcullen2@gmail.com).

FATCullen



- A very small Canadian Island in lake Erie, lying only 150 meters above the Canada—US border (about 260 km South West of **mathNEWS**, for those wondering)
- Fittingly named, as it lies almost directly in the middle of its section of the lake
- It is the Southernmost point of Canada, reaching a staggering 41.7 degrees North (which is not very far South at all, but impressive for Canada)

HIGH ROLLER



High Roller never looked at his cards. He didn't need to.

After all, a game of poker isn't played on a table, between shuffled hands of cards. Poker is played in the mind; a match of wits and shrewdness. Can you notice the twitch of an eye, a particular fidget, the pattern in the clouds in the windows behind him?

High Roller could. It's why he was still here, playing with the best in a tower high above the frozen pavement below, leaning back and smiling as his opponents told him everything he ever needed to know.

The real trick, he knew, was to keep every other player off their guard. It meant unpredictability, and it often meant being crass, but damn if it didn't work. Earlier in this evening's game, he had intercepted a waiter carrying one of his opponents drinks, and simply took the drink for himself, maintaining steely eye contact with her throughout.

He scanned across the table. Confusion and pity had settled like a thick fog over the entire floor. The whole casino, it seemed, was looking at him. Of course, that was the plan. If they were looking at him, they weren't looking at their cards. Just like him. He'd leveled the playing field.

He had seen enough. He slid his entire stack forwards, leaning in, daring anyone else to try and match him. He was all in.

High Roller knew he was in control, and he was just on the cusp of winning big.



High Roller didn't look at the crowd around him. He didn't need to.

He didn't need to turn his head to perfectly picture the looks of fear on their faces. Did he regret that this intimidation was necessary? Maybe, but there were worse things to happen to someone than getting startled by a man with a gun.

His focus needed to be on the woman in green across the table from him. Watching people, seeking opportunities, exploiting

a tell. It's what he was best at. To be honest, it's the thing that made him feel most like himself.

The real art of it was in balancing how much of a threat he seemed to be. All he needed was a few hundred dollars from the register. He needed to make the threat of violence seem real, but not *so* real that the cashier's fight or flight instincts kicked in.

The push and pull was a delicate dance, and required the utmost attention to his own body, not to mention hers. Never taking his eyes off hers, he slipped his hand lower down his thigh towards the pistol he had already made sure she could see.

She immediately stiffened, choking back a sob. Alright, that was pushing it. High Roller pulled his hand back up, and listened as she sharply exhaled. He felt for her, of course—this must have been quite frightening—but on the other hand, isn't this just how one plays the game? You need to know when to hold and when to fold, so to speak.

He heard noises outside. No one in the building had left, he thought... had they? Wouldn't he have heard the door chime?

High Roller didn't dare look away from the woman in front of him, but he saw her looking past him, to something that made her eyes widen.

Not a problem, he thought. The balance of what counted as threatening had changed, that's all. He just needed to tilt it back.

High Roller knew he was in control, and he was just on the cusp of winning.



High Roller didn't look at the churning waters below. He didn't need to.

Really, if he focused on anything, there was a chance he'd start to vomit. He was quite susceptible to seasickness, which is why he insisted he not get in the barrel, particularly since it was too big, and he kept getting thrown from side to side as it hurtled down the Niagara River.

But the man who seemed in charge insisted that he get in, his goons seemed willing to back him up, and in the interest of picking his battles, High Roller ultimately agreed. He had to begrudgingly admit that yes, since they had paid for the clothes on his back and the gun in his pocket, they had the right to take it back if they so chose. Given all his outstanding debt, he was lucky he even got the barrel.

Anyways, it was all in the past, and it seemed far more urgent to keep his mind focused on the oncoming edge, the *Maid of the Mist* surely below. It was hard to pay attention, given the

noise, but he had to make sure he never broke eye contact with the churning waters ahead.

Gravity was a powerful force, sure, but it was nothing he couldn't outwit if he put his mind to it. He would just need to figure out how to convince the rocks below to get smaller, to pull the sky towards him when it least expected it. Maybe he

could confuse time into moving backwards long enough for him to make his escape.

High Roller knew he was in control, and he was on the cusp of making it out of this alive. He just had to think of something.

Dick Smithers

WORKING TIE-TLE: A TIE REVIEW BY TWO UNQUALIFIED CRITICS WHO LOVE COOL PINK TIES

Obviously, if you're in the math faculty, your pink tie is your most prized possession. But all the pink ties in recent years have been too similar (i.e. BORING), and we need some diversity. Here's our ratings of the types of ties and our proposal for the next Math Orientation tie!

STANDARD TIE. 6/10 (+1 IF PINK, +1 IF COOL DESIGN)

The classic, and our benchmark. It's solid but boring, unless they're pink and have cool designs. That may or may not be a description of the wearer.

KIPPER (WIDE) TIE. 7/10

Congrats, you're old! And wise, hopefully. It's not the most flattering proportion, unfortunately. But you do have more space for neat patterns, and the name is fun (kipper fish) which more than makes up for it.

SKINNY TIE. 6/10

Congrats, you're old too! But at least you can match the Beatles.

BOW TIE. 9/10

If it's a black bow tie, you're probably going somewhere fancy; if it's red, you're a cartoon (think Donald Duck or Wheezy the penguin from Toy Story). Either way, you're putting in some effort, and we'd be impressed if you tied it all by yourself!

WESTERN TIE. 3.5/10

Honestly, this one just looks like a fancy bow. Could be good if you like ribbons, but otherwise it's just ok. Little space for designs.

KNIT TIE. 8/10

As knitters, we're biased. It has an interesting texture and a distinct flat bottom.

SIX/SEVEN-FOLD TIE. 6.7/10

It looks like origami, no further comment.

ASCOT TIE. 2/10

You need an extremely wide piece of cloth for this one. Why not just use a scarf and tuck it into your shirt? No one would be able to tell.

STOCK TIE. 3/10

Looks like a napkin. Apparently, it's necessary if you ride horses, but we do not ride horses.

SAILOR TIE. $\pi/10$ (3.14)

Useful for a Sailor Moon cosplay, so it could be cute. But otherwise, when else are you going to wear it? On a sailboat, I guess...

BOLO TIE. 7/10

Yum, makes me want a bolo bun. Anyway, this is the closest you can get to jewellery while still wearing a "tie." The clasp is unique, multi-dimensional, and can be as intricate as you like.

CLIP-ON TIE. $\varphi/10$ (1.618)

Everybody secretly knows you can't tie a tie, and they're silently judging you! C'mon, it's easy enough to ask a friend (or Google a video, if you have no friends...). However, we do acknowledge that it is good for accessibility and safety (if you don't want to be choked).

ZIP-UP TIE. e/10 (2.7182)

Slightly better than the clip-on tie, but you can do better! Plus, what if the zipper gets stuck?? Embarrassing, you're going to be stuck wearing a tie until the end of time.

So the winner is bow ties! Pink bow ties for Math Orientation 2026!

Ninja and Knot

AN INTRODUCTION TO LIMBUS COMPANY (GACHA, IDS, E.G.OS)

GLORY TO KIM JI-HOON.

Limbus Company is a Korean gacha game developed by Project Moon, released on February 26, 2023. Unlike most other gacha games such as *Honkai: Star Rail* and *Genshin Impact*, there are twelve fixed 'sinners' that you can pull for, instead of the usual system of adding new characters every few patches. Each of the twelve sinners have their own 'Identities' which are mirror world variants of themselves, which you can think of as somewhat similar to Spider-Man variants from *Spider-Man: Into/Across the Spiderverse*.

You start the game with each sinner's 'base Identity' (or 'ID'), which corresponds to the base universe you play in. These are generally regarded as the weakest IDs (officially known as 0- or 1-star IDs) in the game (other than support passives but don't worry too much about that for now).

From the gacha, 00/2-star and 000/3-star IDs can be obtained with 000 IDs being equivalent to a Genshin/HSR 5-star and 00 IDs equating to a 4-star character. Naturally, the odds of pulling a 000 ID is much lower than pulling 0 IDs and 00 IDs, and 000 IDs are typically far stronger. There is no traditional pity system in Limbus Company and instead, there is a 'spark system' that converts each pull done on a banner into 1 'Ideality.' Once you reach 200 Ideality on a specific banner, you can claim that ID or featured E.G.Os/announcers. Once the limited banner expires, all unused Ideality is converted to 'thread' which is used to raise sinners' 'uptie levels.'

Additionally, when you receive a duplicate ID, you gain 'egoshards' for the corresponding sinner. Duplicate 0 IDs are 3 shards, 00 IDs are 15 shards, and 000 IDs are 50 shards. Now you may be asking; what can you use shards for? Shards have two main purposes:

1. Sharding characters from the dispenser

- You can exchange shards to obtain IDs and E.G.Os
- 000 ID / E.G.O = 400 shards
- 00 ID = 150 shards
- Seasonal IDs are shardable 1 week after their release

2. Uptying Identities

- We previously mentioned that thread is used to uptie Identities
- However, for uptie levels 3 and 4, you also need a sinner's shards
- You can also convert shards to thread, but not the other way around

What sets *Limbus Company*'s gacha system apart from most other gacha games is their amazing dispenser system. You pick and choose any ID that you like if you save up enough shards rather than praying to the gacha gods for a favourable pull. Additionally, there is a battlepass that gives you 'E.G.O crates,'

which give you 1–3 sinner shards per crate. If you spend ~\$10 CAD, you can buy the upgraded battlepass which unlocks additional repeating E.G.O crate reward nodes beyond the usual 120 reward nodes. This allows you to get pretty much any ID you want with a few limitations.

An important thing to note is that there are 'seasons' in which the IDs are released. IDs that were released the previous season are unshardable this season. Generally speaking, most players try to shard all of the season's IDs before the season ends, so they don't have to wait for next season to come around. Note: Each season usually lasts around 6–7 months (Not an official statistic, just general observation).

Moving on, let's talk about E.G.Os and how they work in the gacha system. For the sake of simplicity, E.G.Os can be thought of as ultimate abilities that use resources accumulated during battle. Each sinner has their own base ego and there are five different tiers of E.G.Os, ZAYIN, TETH, HE, WAW, and ALEPH. Each sinner can equip one E.G.O of each tier at a time. However, at the time of writing this article, there are no ALEPH E.G.Os so currently, you can only equip four different E.G.Os per sinner.

In terms of gacha, E.G.Os are a little bit different from sinners. For one, they are rarer than 000 sinners (1.3% v.s. 2.9%) and there are far fewer of them in the game. Another way they differ is the fact that once you pull a E.G.O, it is removed from the gacha pool (i.e. You cannot pull duplicate E.G.Os). For new players, E.G.Os aren't particularly useful as their biggest use cases are for late-game content such as Mirror Dungeon and Refraction Railway. If you are starting a new account, it is generally advisable to prioritize 000 IDs over E.G.Os.

Onto the final and most important event in Limbus Company: Walpurgis Night. Walpurgis night is an extra special featured banner that only happens about twice a year max. New Walpurgis units and E.G.Os are shardable starting from the NEXT Walpurgis Night banner, meaning during the current banner, you can only obtain them by pulling. The previous Walpurgis IDs are shardable, but only during the two week Walpurgis Night banner. The Walpurgis IDs/E.G.Os are some of the strongest (and coolest) in the game. Hence, many players like to save up 'lunacy' (gacha currency) for Walpurgis Night and shard seasonal/regular IDs rather than pulling on normal banners.

Since I'm approaching the word limit, lastly, a niche late-game strategy that can be employed to guarantee Walpurgis E.G.Os is to obtain EVERY other E.G.O in the game so that the gacha pool for E.G.Os is reduced to only the Walpurgis E.G.O(s). This is impractical for new players and you will eventually accumulate many E.G.Os while playing anyways, so please don't try to shard all the E.G.Os (unless you REALLY REALLY like E.G.Os for whatever reason).

If you like gacha games and were bored (or interested) enough to read this entire article, I beseech thee, give *Limbus Company* a go, you won't regret it!

The next article will likely be a basic overview of combat mechanics and there will also be much shorter Identity reviews. Stay tuned!

Faust's Gesellschaft

DSC DATASET!

NEW YEAR + NEW TERM OF NOT BEING BANNED FROM MATHNEWS!!!

hello everyone! hope you all had a good winter break reading my DSC mafia boss fanfic and are ready for another insufferable term 😊 !!! i'm sure DSC can help make your time a bit better with our...

...upcoming events!

- job bootcamp: are you crying through water-looworks like me wondering if you will be employed or if there's any reason to live? well join us jan 19th at 7pm for one-on-one resume reviews, mock interviews, leetcode and application tips! and if you'll still searching for joy outside of the grind, we will have bubble tea and cookies to comfort you <3
- intro to computational linguistics workshop: come jan 26th at 7 to satisfy your inner etymologynerd and learn how we turn words into data in the world of computing. did i mention free food? yum!

socials:

if you want to see some silly little reels w/o a dooms scroll, follow us on instagram @uwaterloodsc!! i swear we're entertaining and pres' resolution is to reach 6k followers so please help an asian baddie out 🙏

also join our Discord (at <https://discord.com/invite/VFVkyP5mgm>) to keep updated with our upcoming events bc you may have noticed the lack of locations (prob stc basement)

office hours:

come visit us at MC3031 from 10–5 weekdays to pay your fee in cash, rent a stats/ds textbook or just come chat w our lovely execs!! we are very friendly and fun + have a nice cozy place to sit :) also we have avalon, pls pls come visit and tell us you want to play so i can lovingly force events team to run this♪

quotes:

now my favourite part, embarrassing our exec team anonymously (yk this could be you babes but anyway)

- we love femboys
- i love drinking
- trust bro just goon
- im like the loving hands of rngeus

- is this horse girl slang
- i think dsc should be a gooner club
- i will help u remove ur brother
- i call everyone a bitch its an affectionate name
- thanks queen we love child enslavement
- damn is ur snowmen single
- hes actually dehumanizing himself into a veggie
- feet
- do u love me if i sort my memories in randomized non-linear algo
- liquid courage helps the jester jive
- lifes too short baldings not worth it
- im schrodinger single

fun little drawing:

final, courtesy of design team (ty design!!!!), here is our pres telling you a very important message



ENTERING WITHOUT LEAVING

for the most part, building doors on campus follow two rules:

- you pull when entering a building
- you push when exiting a building

often, one must perform this action twice in order to clear the vestibule keeping out the canadian winter. yet a better way of doing this is not have people leave the building at all, achievable through a system of tunnels, skybridges, and directly adjoining façades.¹ but now we must ask, between these connected buildings, which way should the doors open?

consider the building with trivial connections, that is, an isolated 1-building. recall the doors open outwards out to the *outdoors*; we presume to save space in the *indoors*. suppose we construct a 2-building by adjoining another building to the first's façade. now, doors exiting the first building into what was once the outdoors will exit into the second building. it is easy to conclude that we push from old buildings into newer buildings.

suppose instead that we construct a de facto 2-building by tunnelling. we may choose to have doors on none, one, or both sides of this connection. if the first, then can we consider this de facto 2-building as just a de jure 1-building. if the second, then we have constructed a 2-building by adjoining. if the third, is the tunnel a building? if the tunnel is a new building then doors should open into the tunnel, yet this is not the case by inspection. thus, the tunnel must be an older pre-existing building that has always been here as part of the ground. alternatively, we may treat the tunnel as a meta-building from within which we push to exit into its outdoors, which is in fact a normal non-meta-building.

now suppose we construct a 2-building via skybridge. is a skybridge isomorphic to a tunnel? can we apply the same logic that the skybridge has been part of the air since time immemorial? is a skybridge a meta-building?

after all of this, we must remember that buildings are not math. with that being said, why do i have to pull both sets of doors going from B2 to QNC? this does not feel right i do not understand what is going on? is QNC a meta building but also a building, perhaps in superposition as a form of meta-ironic postmodern construction?? i think im crashing out rn let me walk without pulling doors

Whole Number Haver

1. omg is this a reference to my tunnels and skybridges of the university of waterloo map originally published in 2023?!? what's that the 6th edition is now available in which minor changes have begrudgingly been made for this year? <https://student.cs.uwaterloo.ca/~wkennedy/media/UW-Building-Connections-Map-v6.png>

THE MOST IMPORTANT LESSON FROM TFT AND MAHJONG

BEYOND NEVER GAMBLE WITH MONEY, OF COURSE

it is possible to,
(considering all circumstances),
make the optimal choice, and
a possible outcome arising from that choice
is that nothing goes as planned.
do not think that the decision was bad, as
it is a possibility
a decision is
The Best Choice, yet
still results in a bad outcome.
life is just
like that sometimes, where
the only thing to do in that case is keep calm and carry on.

papayabird

RADIO SILENCE

at the wound in the ocean floor
where the myriad colours gather
and the milk of memory thins to mist
you were on your knees, Pa, begging for passage—

through the earpiece, i did not ask you to stay
only described to you of the rosy blush upon
my son's cheeks—how his eyes were your eyes
instead of of mine or hers

i did not ask you to lift your head from the shimmering silt
only described to you the color of his first sunset
how it was like a bruise splitting up the sky, how the parting
clouds
left a cavity for your hands to point him to polaris in the dark

i did not ask you to reach out for the floating tether
or turn away from the warmth offered by the void
or to unjoin your limbs from the myriad-colours
or to stay with me—
or to stay.

in my arms, my son giggled at the summer breeze
i once hoped his voice could be your anchor
but seven miles below the board-walk
hearing his laughter must have given you the courage to leave.

varicose

ANIME REVIEWS PART 16

SURELY I'LL HAVE TIME TO MAKE MORE OF THEM THIS TERM RIGHT

VIOLET EVERGARDEN — 8/10

The same friend that recommended *Steins;Gate* to me some years back is also a huge fan of this one, and man—I really ought to have watched it sooner. Despite being a relatively recent release from 2018, I've heard so much about it that it felt to me like a well-established classic of the genre, and will no doubt be regarded as one in a couple decades' time.

In spite of her serene-sounding name, the titular Violet Evergarden is a girl who for most of her life knew nothing other than war, having been orphaned and taken in by a major to fight as a child soldier. The setting isn't in the midst of the war, though, but rather its aftermath—one in which Violet is employed at a postal company as a traveling letter-writer with the curious job title of "Auto Memories Doll" (has something to do with the profession being named after a kind of robot... but that's not important).

The story is largely about emotions and how people express them, which is what Violet sets out to learn through her writing work—and being that it takes place after a war, many of those emotions are sad ones. Perhaps it's hardly a surprise that in an anime about emotions, the music is truly amazing.

I cannot overstate how phenomenal the soundtrack is. This show has literally, no exaggeration, *distractingly* good music—in the precise sense that I found myself unable to focus on the first episode's dialogue because I was too occupied with mentally dissecting the orchestral textures in the music (granted, that might just be me being a nerd...). The composer Evan Call might nowadays be better known for also doing the music of *Frieren*, but this soundtrack is easily as good, if not better.

The visuals and scenery are phenomenal too, but I will say that the writing and plot left a little to be desired in my opinion, in particular I think the former verged on being too melodramatic at times. But still, really great stuff. And objectively speaking, it seems like most anime fans liked *Violet Evergarden* even more than I did, so all the more reason to go watch it.

BACCANO! — 9/10

I almost never open with a quote in these reviews—I tend to think doing so would be cheesy, and a little too reminiscent of an 8th grade English essay—but it feels right here:

"Depending on who you place in the same situation, the characteristics of said incident change kaleidoscopically. In other words, there is one incident. However, there are as many stories explaining it as there are people involved in it."

Those are the words of a certain "information agent," and it really is an apt description of *Baccano!*, a show whose thrilling action and drama are characterized both by a multitude of perspectives and by an utter lack of linearity in its storytelling.

See, ordinarily this is the part where I describe the protagonist and their conflict that drives the plot, but *Baccano!* defies such simple expectations. In some sense every character is the lead of their own slice of the story, and when everyone's a protagonist, no one is. Taking place in and around Prohibition-era New York, the anime follows three different events across three different years: In 1930 an alchemist and his potions cross paths with a young up-and-coming mobster, in 1931 a gang of bootleggers find themselves in the midst of a massacre on board a transcontinental train, and in 1932 a young girl searches tirelessly for her missing older brother (who, given his history of hooliganism, may well have attracted the ire of rivals to their wealthy family). And what's more is that a pair of small-time bandits, Isaac Dian and Miria Harvent, manage to find their way into all three of them.

Now if that sounds confusing, believe me, it is. In fact, when I was 6 episodes into this show I realized I had basically no idea what was happening, so I more or less rewatched the episodes from the beginning just to make sense of it all. It only half-worked. But the amazing thing is that you don't even have to understand the show to enjoy it—the art, the atmosphere, and the music singlehandedly elevate it to such heights that you should watch it for those aspects alone. I've not seen any of Quentin Tarantino's films, but *Baccano!* is likened to them so often that I ought to mention it here.

The English voice acting is also phenomenal, and even the most hardcore sub-over-dub purists agree that the dub is better. And why shouldn't it be when the show is literally set in the US? I think my favourite performances have to be Caitlin Glass as Miria and Joel McDonald as Jacuzzi.

In spite of my earlier griping about the plot being hard to follow, I ultimately believe that the mark of a truly great anime (or work of fiction more generally) is its memorability—the best shows are ones that you still think about years after watching. And I have no doubt that *Baccano!* will stick in my mind for quite some time.

yalevoylian

COOLEST DATA STRUCTURES I'VE WORKED WITH ACROSS 6 CO-OP TERMS 😎

- hashmap
- array

sheev

CHAT, WRITING A MAGAZINE BY YOURSELF IS ACTUALLY NOT TOO HARD

HOW TO BE AS COOL AS ME: STEP 1 OF 100,000

So each year since 2024, I've been making a magazine, my *Year In Review*, to look back at how eventful my life actually is because to me? I think it's boring. To everyone else, it's interesting enough to read about. And today, I want to give a loose guide as to what **YOU** can include in your own magazine encapsulating your year, as well as programs to use and general formatting.

Let's start with my staples:

Editor's Note—This is where you can give a brief summary of the magazine/year, talk about who you are, and give a thank you to readers.

Word/Colour of the Year—I no longer trust Pantone to give an accurate colour of the year (cloud dancer gives bad vibes), so now I'm giving the power to everyone to define the year in a colour and to tell of the significance of the colour in society or their lives. It could just be your favourite colour (mine is yellow), but it has to have meaning. You can also choose a word that you think summarizes the year, or a term that comes into focus. For 2024, it was brainrot, and for 2026 it might be *lowkirkenuinely*, where I write about language and word combos as a whole.

Best of the YEAR—A photo-based summary of what your favourite happenings of the year were. Could be your favourite food spot, favourite moment in Minecraft, favourite concert, person who influenced your vocabulary the most, favourite outing... the list goes on. Highlight the things that made your year.

The Main Characters — *[Note: must have friends to write this one]* With a Picrew avatar creator and 4–6 of your favourite people, you too can introduce your magazine readers to the wacky people you call friends. One of your friends is the friend group leader? They now have harem members and discord kittens. Start spending loads of time with a special someone? Hard launch them here. Even if they're a situationship. DO IT.

In My (Your) Headphones — Move over Spotify Wrapped, the REAL music summary is here. Just yap about what songs and albums you listened to, and about the moments you had with the songs. For example, last year (3 weeks ago) I wrote about *Sparks* by Coldplay and how I want to slow dance with this song and that the CEO who got caught at the concert had it coming. Include album covers and you're good to go.

Creative Works—For STEM students, talk about how you solved a leetcode problem or built an app prototype. For non-nerds, talk about the things you made. YouTube videos, songs, artworks, cool school creative projects, romantic playlists, anything! Anything you made or brought together is yours to explain and brag about.

There's many more topics one can include, such as: a video game highlight, articles on world news, love/relationships (or lack thereof :(), a term overview if you're active on campus or want to yap about academia, movie reviews (Letterboxd but better), random hangouts, a celebrity highlight, a quote wall, and an article on the future and what next year has in store. The point of the Y.I.R. magazine is to visually summarize your year in an aesthetically pleasing manner while also writing from your unique point of view as the only person to show up for 365 of those days. You're a journalist, getting the scoop/tea on the complete life of yourself for a year you can never repeat.

Make it yours.

...

Of course, it doesn't have to be a magazine, but did you consider that I'm extra? Now as for programs, I started with compiling several templates from Canva Free, which has the plus of utilizing frames and illustrations to help decorate. For most people, this is all they need. For freaks like me who want to use their own fonts that they found from totally legal sources, InDesign (if you have access to the Adobe suite) is a great tool *[Editor's Note: some masochism required]*. With Photoshop and Illustrator, your magazine can be as precise as you are. And you know, something something industry standard for print/pdf making. HOWEVER, unless you're pirating Adobe products, you should look into my GOAT Affinity, which is owned by Canva and combines InDesign, Photoshop and Illustrator into one. And it's free. And ever since I got it I can say it's the perfect tool for magazine making.

ANYWAYS, that's enough of being a graphic design nerd. For formatting, look up the components of a magazine, or better yet, buy one and keep the concepts you like and skip what you don't. I like listing all the contributing writers, so I kept that by listing the people who made my year. I don't like ads, so unless it's a project, I don't put any in. And with anything, this takes some set up and practice. Bad at writing? Write more to find your voice (or just voice-type). Bad at remembering to take photos? Ask your friends for theirs if they take photos at whatever hangout you do. Need a proof reader? I charge \$30 an hour. Need a laptop/PC that runs design software? ...Above my paygrade. My advice is to live your days and write about the big things and the little things with equal importance. I will write about a video game expansion and my very first date within three pages of each other and both will be Very Big Things™ because they're in the magazine. In reality, both barely changed my life in the grand scheme of things, but at the time? Peak.

And if you feel like you really have nothing about your life worth writing about, start by living the life you would like to write about.

Jochemist

LEARNING TO LOVE BUSY

I know you're a busy person, but I have to tell you something... you might not be busy enough. We spend so much time busying ourselves with school, job hunting, and general keeping-yourself-alive, it seems like the natural antidote to the stress that builds would be to spend as much time as possible being not-busy! However, if your two main states of being are (1) busy with stressful things or (2) doing absolutely nothing, you begin to trap yourself in an endless cycle that makes it feel like all you do is work. Our brains need down-time, but when thinking back they don't tend to remember much of it, so if you look at your last year and feel like all you did was work, you're doing busy wrong.

I've gone back and forth on how I feel about being busy in my life. I used to say I loved it, that I thrived on it, and that I would never burn out. And that didn't really work. So, I switched up and decided I wanted to prioritize leaving as much time for nothingness as possible in my life. Not surprisingly, that also didn't work out. The thing was, I liked being busy when I was busy with things I liked (shocker), but I considered busy to be a binary state. Instead of seeing what my schedule was composed of, I saw it as either full or empty. When all I was doing was work and I didn't love it, I had a totally different attitude to when my time was full of fun.

So, here's the real solution: you have to get **busier**. I know, it sounds like this makes the problem of too much to do worse, but you have to make yourself busy with non-work things. More than just having a hobby you default to here and there, schedule real take-up-space time in your week to go do something fun, enjoyable, interesting, and new. Put it in your calendar or whatever system will make you feel like you *have* to do it, just as much as you have to do your work or have to sleep. It's not easy: when you're tired from other busyness going to more plans can sound awful. But when you look back on what you've been up to, you'll have tons of enjoyable achievements and moments in your mind and not just that stupid assignment you spent too long on last week (you know the one, there's always one).

This term, I'm filling my schedule with time dedicated to going out with friends, going to the gym, creating art, volunteer work, and learning new skills. I am scheduling myself to be busy with more than just my schoolwork, and loving being busy again. I highly suggest you do the same, and find as many ways as possible to get the most out of your free time—don't just leave it free.

BeesKnees

I'LL LEARN TO LOVE IT TOO

Only one path
Before us, the city
Big Uni
The chalk dust, the sweat, the philosophy
Chasing king dollar sign
Choosing CS degree
Logic's beautiful. Drives
Our world order
Decided, delimited,
Study ten days a week
Break out in hives every spring, stuff your coughing
Stagger through, killing you, backpack too heavy
There is this dream I've been having
But I know reality. So good at existing
I am the machine. I built this machine
It takes what I give it. It gives me a ticket
To lottery—I mean, to a successful life—
So I'll eat playgrounds. Eat birthdays
Eat playdates and fireflies
Eat hang-outs and late-nights
Reading text just for thrills
And eat board games. Eat children.
Just spit up the drone
Like I'd someday make king bee
Get to sit on the throne.

e

MY 2025 GOTY

Here are your nominees:

- 魔法少女ノ魔女裁判 aka manosaba aka *Magical Girl Witch Trials*
- Hollow Knight: Silksong*

That's it, that's all I played. The winner is.....

manosaba!!! Jougasaki Noa >>> bug yuri I'm afraid. If you know japanese or chinese do yourself a favour and check it out. We will follow Acacia's career with great interest (they have two new games slated to release this year!)

ptkyr

I want to defeat you.

PROF. JASON BELL

N+1 WAYS TO SURVIVE THIS TERM

HOW IS IT 2026 ALREADY!?

With the start of this term comes exhaustion, attempting to complete New Years Resolutions, and somehow already having work to do. Here are some tips to (hopefully) survive this term:

1. **Starbucks:** lots of Pink Drinks and Egg Bites will be purchased (you know I just have to use up those meal plan dollars)
2. **Scheduling:** let's not procrastinate this term! Make a plan on what you want to get done each day and stay true to it.
3. **Sleep:** This is my first term without 8:30 am lectures, so guaranteed I will be sleeping in! Everyone please get at least 8 hours of sleep.
4. **Baking:** hoping to bake more this term! It's a great way to destress and who doesn't love eating some cookies.
5. **Exercise:** go for a walk, hit the gym, or take a yoga class (please everyone prioritize your physical health)
6. **Chill:** sometimes you just need to take a break. One grade doesn't define you, so it is not worth stressing over!

7. **Book Study Rooms:** a great way to designate time for studying is to book a study room at one of the libraries. Plus they have whiteboards if that's your vibe.

8. **Office Hours:** if you are confused, go to office hours!!!! Professors are more than willing to answer your questions.

9. **Volunteer:** get involved on campus; it is a great way to fill your time! Maybe even write for mathNEWS :)

10. **Eat Healthy:** eat your fruits and veggies everyone!!! Personally, I'm loving some strawberries and blueberries right now.
(...)

N. **Movies:** currently in a big rom-com era... who doesn't love a predictable ending (sue me, I want to be happy)

N+1. **Friends:** you know who you are <3 Hanging out with friends and making memories is a great way to spend your term. You only live once (this is my new motto)!

Hope everyone has a great term! You got this :)

is.all.on

ANIMAL DESCRIPTIONS?

UNICORNS ARE THE LEAST ABSURD ANIMAL

We accept unicorns as a myth and call someone absolutely stupid if they believe in them.

However, it's the most reasonable animal compared to other horse-like animals we do have in real life. Unicorns have a random ass horn in the middle of their head. I wouldn't even think twice if I saw one in real life if it were not for the constant reaffirmation that they don't exist.

Let's list some horse lookalike animals:

- Black and White striped animals which we can't tell the difference apart. However, that's how they identify each other.
- Long necked horse who eats leaves from trees in Africa. They give birth to an animal that can walk since birth. One kick from them can kill a lion.
- Horse that lives under the sea and the males give birth to 10 at a time.

BUT, we have the audacity to look at someone with a dumbfounded face when they say that a horse with a horn in the middle of its head is real.

We have animals like antelopes and moose with two horns. In fact, we also got animals with one horn called a Narwal, Rhino (if they aren't all dead by the time this releases), etc.

Sometimes, an animal can lose one of its horns and hence becomes ONE HORNED!!!!

For those of you who couldn't identify the animals from the descriptions above: it's a zebra, giraffe and sea horse. All three animals I have never seen once in my life. I have simply accepted this truth since, ye old time.

Go look at old pictures of African animal paintings from Medieval times. These are mostly pictures drawn from descriptions. ALL OF THEM LOOK GOOFY! In comparison, a horse with a horn; that's where we draw the line!

Unicorns are the laziest myth ever! Hence, I believe there is some truth in them for this global delusion and stories of them being passed down.

.....

Okay my friend just read this over and she just told me that in some myths, they tend to fly and in others they turn into little girls. Didn't know this was the magical aspect of them. Apparently having a horn isn't anything special :(I told her to grow up and stay grounded in reality.

Delicious

INTRO TO TOUHOU MUSIC

Touhou Project is a Japanese bullet hell game series with many gorgeous music. For those who are new to Touhou music, they are the background sound tracks when fighting the bosses (the anime girls) in the video game. A boss fight sometimes contains many stages, and each stage features a unique sound track. As Touhou characters and their music getting popular, people start to make fan (aka doujin) music for them. As many new fan music circles pop up, it becomes a popular culture. Some songs even become viral across the globe like *Bad Apple!* By delving into the hole of Touhou fan music, I've discovered many new genres that I like.

I initially discovered Touhou music from my friends' recommendations. I love listening to instrumental music when studying/working/falling sleep, and many Touhou tracks feels very cozy to listen to, e.g. DDBY's *Café de Touhou*¹ series. DDBY is a circle who made many beautiful jazz instrumental covers. Aside from that, I also like Foxtail-Grass Studio's music for their folk/instrumental style. Later on, I got myself into the genre of Bossa Nova, e.g. *Toho Bossa Nova* by Shibayan Records.³

As I dived deeper, I started following some youtubers who either talk about Touhou music or make fan music themselves. Yuunarii was one of them. She is an animator and made many videos⁴ talking about the circles of Touhou, especially circles in the Eurobeat genre.⁵ They are very fun to watch and the art is so cute! Go watch them plzplzplz... Personally I listen to NJK Records⁶ a lot and bought their physical album to support the artists. Another example is YaboiMatoi.⁷ He's done many gorgeous metal covers while having fun the music. I like his vibe.

If you are into classical music or symphony, you mustn't miss 交響アクティブNEETs / Kokyo Active NEETs.⁸ Their arrangement are the most luxurious ones among Touhou circles. Every track was played by professional musicians who also share the love for Touhou music. Speaking of, they made some of the opening songs for the anime *Touhou Memories of Phantasm* together with senya from 幽閉サテライト.⁹ Their sister circle Tokyo Active NEETs specializes in jazz music. Their style is very chill and professional.¹⁰

For music in pop or rock, my personal favorite is Akatsuki Records.¹¹ Stack's voice matches perfectly with the stylish arrangement, not to mention the gorgeous music videos. I got one of their physical albums (with a free wristband!!) as well.

A wonderful example. By the time of writing at this line of my article, YouTube's algorithm loves me so much that it plays this Touhou-ish song next.¹² I will pass it on to you to enjoy. The video description tells the backstory,

"figured I could make this as an excuse to do something, hopefully it's still relevant. I did structure this like a Touhou extra stage song since I thought it suited. I also hope this doesn't get taken down, I worked hard on it."

Touhou is such a vibrant community with a lot of cool people.

Kk back to the topic. If you are bored and want to listen to something new, Touhou fan music is a very good pool for you to dive into. You may discover music genres you have never heard of but end up liking.

eralogos

1. <https://youtu.be/RY7FpB9BZH4>
2. <https://youtu.be/4hGmqIpxA8w>
3. <https://youtu.be/21CNYNyC54o>
4. <https://youtu.be/M0sqbzMWcmg>
5. <https://youtu.be/zR1fYIupk0A>
6. <https://youtu.be/E1swzPJfst0>
7. <https://youtu.be/o3YLqap0J-M>
8. <https://youtu.be/Ck-kyei7gSk>
9. <https://youtu.be/iBHEfatvAyI>
10. <https://youtu.be/OPY0kdLQNFw>
11. https://youtu.be/qMe2ibx_RwY
12. <https://youtu.be/dLNenC0EBA0>

I AM ALWAYS PEEING MY PANTS!

WHERE IS MY BLADDER?

Currently, I need to pee really bad, and in my mind, this means I am about fifteen minutes out from peeing my pants. What started as an exaggeration has now taken over my life; I genuinely will pee my pants. It could be due to age, time is fleeting, and my bladder is shrinking. Gosh, I just googled how the human bladder works and realized it is much more probable that I have a kidney problem, not a shrinking bladder. Anyway, here are the top 10 places I've peed my pants (from worst to best peeing experience), hope this helps someone who also struggles with wet pant syndrome.

1. The walk between my bed and the washroom (I think I could have tried harder)
2. Milton GO line (my train car did not have a washroom)
3. Lakeshore East GO line (my train car did have a washroom—I was simply too weak)
4. Pottery class (too much focus, not enough bathroom breaks)
5. TFC game halftime (the excitement of the crowd and of the drums, added to the rush of looking for a washroom)
6. Raptors game (during a timeout, good music)
7. Jazz concert at Conrad (calming music)
8. Walk from campus back home (cut the walk time down by 60%)
9. Escape room (traumatized, there were fog machines, I learnt my lesson)
10. ION train tracks (fell and peed)

Buggins

YOUR TURN TO DIE IS NEVER FINISHING </3

NANKIDAI YOU LIAR...

For those who don't know what *Your Turn to Die* is (aka everyone), it's a mystery visual novel akin to the likes of *Danganronpa* and *Zero Escape*. It's also unfinished and has not seen an update since 2022. Some of y'all might sit and think: "well four years isn't that bad." And to that I say, you do not understand the mendacious scumbag that is Nankidai, the dev for the game.

This guy promised at the start of 2025 that the final chapter will be released by the end of the year. How did he promise this? By saying that he will be broke if he doesn't release the final chapter. Well I guess that man is living a life of poverty now because it's now January 12th, 2026 and the game is still not out. And what does the lying scoundrel have to say for himself? "Sorry, I'll need some more time." How vague of you, my dude.

This man has been promising and promising and promising for years that the final chapter will be released soon, but all of those promises are emptier than the notes I took for CS 135 last term. This year, he's once again hopping on Twitter and promising that the last chapter "will be released soon," and it's making me feel like a girlfriend giving his chud toxic boyfriend endless last chances.

In all seriousness, I hold a lot of respect for game devs. As a failed game dev myself, I understand how difficult it is to make an indie game. However, that doesn't stop me from ranting about this goddamn game and its goddamn developer.

1000011

N REASONS WHY THE PHANTOM MENACE IS BETTER THAN A NEW HOPE

- In *A New Hope*, one of the main characters SHOOTS another person unprovoked. In *The Phantom Menace*, the main character frees a slave
- Vader vs Obi Wan was boring as hell. Qui-Gon vs Darth Maul was incredibly choreographed, exhilarating, and memorable
- Duel of the Fates > the Imperial March
- The pod race was *not* boring, but watching the rebels take multiple attempts to shoot a very small hole *was*
- Jar Jar is funny sometimes

closeted atheist

THE OBITUARY OF SAMUEL LOUIS JAMES

HE DIED THE OTHER DAY

There once was a man named Sam
He found himself in quite a jam
A wizard arose
Sam lay in repose
Sam found himself turned into a parallelogram!

Sam mistakenly angered the wizards
hated on the lizard wizard king gizzard
now he is a shape
he has no escape
the only rhyme left is blizzard!

He will be missed in a fashion nearly global
His last words, one final proposal
I dance flamenco
I had a long torso
Eyjafjallajökull

Sam asked to be written an obituary
my writing is not exemplary
asking me was a blunder
now he's six feet under
your wish, it was not left in jeopardy!

Cruz

THE ROCK GARDEN

I am floating.

The snow flutters down lazily. Pine needles poke through the bright piles it has formed on the trees. Snowflakes brush across my face and get stuck in my eyelashes, but it doesn't bother me.

I am floating.

Cascading white and green branches, as far as i can see in any direction. I don't know what's beneath me. A slight wind makes me sway peacefully, back and forth.

I am floating.

It's very cold, but the forest is calming. It is full of memories of daydreams. So full that it overflows, crashing over hills and roads, obliterating everything in its wake.

But it cannot hurt me any longer; I am floating.

nazz

N EXCEL ERRORS I ENCOUNTERED ON MY LAST CO-OP

- An unexpected error has occurred. Autorecover has been disabled for this session of Excel.
- [Expression.Error] There weren't enough elements in the enumeration to complete the operation.
- Run-time error '-2147024882 (8007000e)': An issue with the Data Model is preventing Microsoft Excel from opening this workbook. Try restarting Microsoft Excel.
- ActiveX component can't create object.
- A normal error message, and then a button labelled "Send A Frown"

hyperlynx

I FEEL THE WATERLOO PAIN WHEN I LOOK INTO YOUR EYES

I felt the Waterloo pain when I looked into your eyes,
avoiding the gaze of strangers along the 202 bus.
As if an extra moment under their watch
would expose the dread of failing you quietly hid.

I counted each restless night until your demise,
until the last exam released you from the PAC.
I knew you'd run to the cold lake afterwards,
for your dreams were ones that demanded you awake.

I memorized patterns of anguish you normalized,
skipping another meal and drinking away your next.
How can I keep you from drowning this time,
when I'm underwater too, right next to you?

I made a home in the weeds beneath Columbia Lake,
because my lungs were so used to breathing water.
Yet it pained me when I looked at you,
and saw the salt in your eyes, too.

chucklemonkey21

mathSNEW

DON'T RECOMMEND HEATED RIVALRY TO YOUR FAMILY

OR DO, I'M NOT THE BOSS OF YOU

While I was home over Christmas, my family began discussing the recently-released hit show, Heated Rivalry.

If you are somehow on a corner of the internet that hasn't been obsessed with this show, all you need to know is that it's about hockey players, it's quite gay, and they really don't shy away from showing ass. Like full ass (x2) in the first ten minutes.

So we're talking about this show (not about ass, to be clear, just that it's popular), and my uncle really likes hockey, so he was like "maybe I'll watch it."

And here arises the dilemma. I'd just been gushing about how I really like this show, and how it's fun, and interesting, and romantic. What's not to love? How do I warn my uncle that in addition to all of those things, there's also copious amounts of nudity?

I have nothing against it, and these scenes serve an important purpose, but the man deserves to be warned.

It's not that I don't think he could enjoy this show. I stand by the fact that it's fun and romantic and beautiful and scenic and sentimental. But I can only imagine the thoughts he'd have in his head when the first intimate scene starts—remembering in the back of his head how I raved about it, and what he would think that means about me, and we really just don't need to go there. Too many questions lie down that road.

Aiming for casual, I ended up saying: "I think there's more sex scenes than hockey scenes." He can make his own decision.

normalparameters

FUN FACT: THE WAIT LIST FOR COUNSELING SERVICES IS REALLY SHORT RIGHT NOW *NOW GO GET THERAPY*

Like, you can get an appointment for counseling next week. I know that none of you guys are okay, so at least make the commitment to self-improvement this winter.

Shahabee

WATERLOO NEEDS MORE ARCHES

Given that I recently learned that Waterloo has a campus located in Rome, I think it is time that the main campus learned the one (and only) lesson you can from mainland Europe: one can never have too many arches. Waterloo has a tragic lack of any fancy arches on its campus and I firmly believe that the introduction of even one arch (pillars or a truss would also suffice) would boost the student experience to levels it has never seen before. If you compare the campus to any other major university one will immediately notice the surplus of arches scattered across the campus (Even UofT has some). This is one drawback that we, the student body of Waterloo, cannot let stand. Think of all the benefits that would come with the arches:

- Credibility
- Something to look at other than campus
- Chance for ornate goose stonework
- More arches
- Something to keep the engineers busy

To start, I propose we start with MC, and slowly expand across all of campus. This is the one (and only) thing that separates us from the Oxbridge universities, and we cannot let it stand.

Note: For the purpose of this article, we will pretend that DP does not exist.

slightlystretched-x^2

PARDON MY FRENCH

n choses que j'ai vues (aimées, bues, etc) pendant mes études d'échange en France:

- une femme qui attendait anxieusement devant la sortie du train pendant cinq minutes avant que le train arrive, avec une cigarette dans la bouche
- une collection de plus de cinquante mini peepees (sur plus de cinquante Sonny Angels)
- le plus beau coucher de soleil de ma vie à Marseille
- beaucoup, beaucoup de vin rouge + du chocolate noir
- beaucoup, beaucoup, beaucoup de bière + rage cage (merci aux Allemands)
- la phrase: "je voudrais une baguette tradition s'il vous plaît"
- les étudiants erasmus
- le Rhône + la Saône
- la belle langue française et toutes ses expressions magnifiques (putain, merde, ta gueule)

headphones97

WEIRD THING I SAW TODAY

I HATE CO-OP TERM

It feels so good to be back on study term. I hated my last co-op. Honestly, I hate co-op in general. Me personally, I can't stand when people tell me what to do. Like, why do I have to do everything in one sitting? Why can't I work for 2 hours, go for a walk, do a little bit here, play some games, do a little there, etc.? School is that way, even down to its structure. Sure, there's a lot of classes, but schedules are sporadic and there's lots of moving and variety. I was having a conversation with my friend and this topic came up. She said she was the opposite. She loved that the structure dictated exactly what she did at every second. She says that she can deallocate all work related stress from her mind as soon as EOD hits. I agreed with her, but after work is over—and I barely got anything done that day, I get so bored and tired. There's nothing for me to do, but I'm so spent after focusing so much mental energy for such a long time. At this point she asks me why, then, don't I call her to talk or hang out, working in the same city and all. I tell her I mean to but usually I'm just tired after working. She says that she feels like she's doing all the heavy lifting in our friendship, but I tell her that it's not that big of a deal, and that we should just let things be. She kinda tensed up for the rest of the day, but I didn't wanna say anything to aggravate her further, so I sorta just ignored her. It's been a couple of days since, and she hasn't messaged back. Maybe that wasn't the best move. I'm worried because she hasn't reached out in so long. The other day, in the middle of the silence I try to break the ice, but she leaves it on seen. I always enjoy her daily DMs, it's just that I never have the mental bandwidth to remember to reach out to people first. Anyway, today after class I was bored and it was early enough in the term to not have real responsibilities, so I went campus spelunking. I never take the same path through campus more than a couple times, so I've basically seen everything at this point. However, there was this one weird little rickety shack in the middle of V1 green. I wasn't sure if I was allowed to enter, but it was dark and nobody was around, so taking a small peek wouldn't hurt. When I opened the door, I found a lavish looking staircase with a shiny banister spiralling downward. I couldn't even see the bottom. Dropping a pebble down the centre never returned an echo, so I had to see what this was about. I almost forgot it was prod night today lol, so I'm writing this as I'm sitting on a step. I'm surprised that eduroam goes all the way down here. I must have been walking for nearly an hour haha. Anyway, I'll let the readership know what's at the bottom in the next issue.

LavenderTownEnjoyer



CONTEMPORARY QUEER PLAY BY POPULAR YOUTUBER COMING TO KW

The Prince, a new play by Abigail Thorn (better known for her web show *Philosophy Tube*), is coming to Waterloo this February at the Kitchener-Waterloo Little Theatre.

The Prince is a reimagining of the classic Shakespeare play *King Henry IV Pt. 1*, set in a world of warring British clans in the early 1400s.

In the original, Harry “Hotspur” Percy, a ‘roided up warrior tough-guy from Northumberland, takes issue with Prince Hal, crown Prince of England, a man who is much less macho and prefers not to fight. At the end of the play, Hal kills Hotspur, proving that Hal is capable of being a warrior and worthy to be king. Prince Hal is the main character, and he goes on to star in two sequels.

The Prince, meanwhile, is about Hotspur. The twist? Hotspur is trans. Well, sort of. Hotspur starts the play as an “egg,” or a trans person who hasn’t quite realised it yet. Her transness, her being a woman, becomes more and more obvious, both to her and to the audience, as the show goes on.

I won’t spoil the ending, but let’s just say this is not a... straight... retelling of the original. There’s meta-narration, and other Shakespeare plays grafted in, and, of course, Prince Hal has become a flaming homosexual.

If that’s not enough to sell you, there’s also sword-fighting, thrillingly close to the audience; digitally remixed hurdy-gurdy music; a very pleasing Scottish accent; and not one, but two **mathNEWS** writers among the cast.

If any of this piques your interest, *The Prince* opens in exactly two weeks, on Friday, Jan 30th, at 8PM at KWLT in Uptown Waterloo. The show runs for three weeks, on Fridays & Saturdays at 8, and on Sundays at 2. Closing night is Feb 15th. Tickets are \$25, or \$20 for KWLT members, and are available on Eventbrite.

DiminutiveRex

NOT BUYING ON BOXING DAY

Big question... is there anyone that didn’t buy nothin’ on Boxing Day??? Either I’m some sort of genius for not falling for some hidden scam, or I am the biggest idiot in Loo :P

tmdevera

N SEMIFUNNY THINGS MY FAMILY HAVE SAID TO ME AFTER LEARNING I STUDY GEOMETRY

AT LEAST THEY'RE INTERESTED?

- “How does quantum physics work?”
- “How does general relativity work?”
- “How does string theory work?”
- “Can you prove the existence of God?”
- “Are you interested in Einstein’s theory of general relativity?”
- An AI slop video explaining (incorrectly) how hyperbolic space works
- An AI slop video explaining (incorrectly) how curvature works
- An AI slop video explaining (correctly but badly) how spheres work
- “People still study geometry? I thought it was all figured out.”
- “So you study geometry in dimension 7? That sounds fake”
- “I read the Wikipedia article on differential geometry, and it says there are applications in artificial intelligence. Are you going to make a startup competing with ChatGPT?”
- “How do you pronounce cohomology?”
- “Do you know any fun facts about triangles?”
- “So calculus is actually useful?”
- “I was pretty good at math myself until they introduced letters”
- “Can you explain your latest research to me in detail?” [Replies no] “You don’t understand it well enough then.”

notoh

Get help. Get help. Get help. I know every person in this room is not okay. Go get therapy. There's no waitlist. Go right now.

FORMER MATHSOC DIRECTOR
MICHAEL ALEXANDER

N FUN FACTS ABOUT THE UNIVERSITY OF WATERLOO

ACTUAL NEWS? IN MY mathNEWS?

- MC is built by the same construction company as the CN tower.
 - The C in both stands for concrete.
 - i lov eating conrete
- The WatCard meme isn't true; it's the other way around, he had a glowup!
- There is no C1.
 - Why isn't there a C1? We should totally have C1.
 - what if the chem elevator is C1
- E10 is in development even though E8 and E9 are not.
 - E10 is not its actual name. Its real name is AVRIL (Autonomous Vehicle Research and Intelligence Lab).
- Waterloo's water is one of the hardest in Canada.
 - hard water? no, water liquid
- Geese aren't real.
- We're known for making good poker players.
- There are 5 buildings that have been built in the BuildTheEarth project: United, Renison, St. Jerome, Health Services, and M3.
 - The BuildTheEarth project is a community that wants to build the earth in *Minecraft*.
- Beckie Scott is an Olympic gold medalist in cross-country skiing. She is from this university.
 - Can you tell I'm running out of ideas? Because I'm running out of ideas. I can only write shitposts.
- The *Valorant* streamer Tarik mentioned us once.
 - yeah i'm done

crimson

POPE LEO TRAVELS TO BRIDGE GAPS BETWEEN MIDDLE EAST AND MID WEST



Lars Nootbaar

YOUR AI GIRLFRIEND IS AN EXTREMELY PROFITABLE ADVERTISER

AN ESSAY INTRODUCTION, BECAUSE I'M TOO LAZY TO WRITE THE WHOLE THING

Whenever change comes quickly, society has to scramble to draw legal lines before companies find and exploit the legal loopholes. We saw it with Europe standardizing charging ports so Apple won't scalp the entire world, Australia preventing kids under 16 from making social media accounts, and most recently, Anthropic losing a \$1.5B class-action because apparently you can't steal 500,000 textbooks and get away with it anymore.

Next up on the list of lines we should draw is one that separates acceptable advertisements from unacceptable ones. People are fine with Google showing sponsored results first, but it's only a matter of time before your AI girlfriend starts insisting she really, *really* wants the latest Sony VPL 4K HDR Projector (\$18,999) for your next movie night.¹ I'm a little less sure that people will be fine with that.

Capitalism has this funny way of finding and exploiting profit-making machines before our clunky legal systems have any semblance of awareness. Language model ad placements have just started, and they won't go out without a bang. I say sit back, relax, and enjoy the show, folks.

no pun indented

1. <https://www.youtube.com/watch?v=TcG157VFbuY&t=61s>

LEAVING WATERLOO

A student common refrain is “the best thing to do in Waterloo is to leave.” As I near graduation, my time here is almost up.

I have minimal complaints about the city itself, and really, I've never spent much time outside student spaces. As an undergraduate, my life almost entirely revolves around the University of Waterloo. I have hobbies and go to community events; however, every single one of my friends in Waterloo is affiliated with the universities. I know very few non-local students who are involved with the broader community in any meaningful way. Do I really know Waterloo, not just the University of Waterloo?

I am glad to leave my bachelor's behind, but I'm still not sold on leaving the city. I wish I took the time to get to know it as a non-student.

A Graduating Student

WEIRD GOOSE (NOT) IN YOUR AREA

WHAT THE FUCK IS THIS?



WHAT THE FUCK??

Seriously what the fuck is this weird-looking goose thing???

TotallyNotAGoose

CORRECTION

In the **profQUOTES** section of **mathNEWS** 159.6, I was quoted as stating that a certain graduate student, Justin Toth, had done all of the work on a particular paper. The quote paraphrases a joke I made on the order in which the authors are listed but omits necessary context. In reality, the authors are listed in alphabetical order following common practice in the field. We may only infer that all authors made substantial contributions to the work. No other information can be deduced about the published paper.

David Jao

WISE WORDS FROM PETER GRIFFIN

And I'll finish with a quote... from my late father: "My brain can't even think thoughts no more cuz of the internet."

AbelianKwyjibo

IS GOD A 144,000X ENGINEER?

ARMY OF GOD?? MORE LIKE ARMY OF AGENTS 😎

Irrefutable evidence that The Bible teaches us that God is a 144,000x engineer:

- 🐦 Revelation 7:4 proclaims "And I heard the unbridled coding power of His Almighty was deployed at a hundred and forty and four thousand of all the apprentices of the profession."
- 🚧 He made the world very quickly.
- 🍴 Revaluation 1:8 announces "I am the Alpha and the Sigma," says the Lord God, "who cooked, and who is cooking, and who will never be chopped, the Almighty."

And on the 8th day, God built a robust React app.

no pun indented, juice1984

I LOVE YOU PLUTO

a sweet child. drooling, loud, and my brother. when your hand wrapped itself around my pinkie, i was in love. swaddled in a blanket, in a plastic bin—my birthday was lonely because of you, but none of that mattered because finally, finally, we could meet.

our relationship began with sacrifice but that's okay. as long as you smile a bit more, languish in childish idiosyncrasies—you have to become more than me. i don't know if you can feel the weight of this on your shoulders. if you can glean my unspoken words with every gift i give you —*have more than me. be more.* but i want you to know that you're already doing that. every laugh you make and every word you say and every step you take is being more than me.

i love you, pluto.

charon

IN MTHEL 298

straight up socially implicating it

and by it

well lets just say

i mean my mathematics

smallmouthbasshater

T4T REIGNS SUPREME!!!!!!

INSIGHTS INTO RELATIONSHIPS BETWEEN TRANS PEOPLE

If you know anything about computer science, then you should be familiar with the abundance of transgender women in the field. Being a trans guy, I also quickly learnt that a lot of trans girls are into trans guys. Before university, I knew very few trans women. This is not the case anymore. Considering these factors, it makes sense that I started dating a trans girl at the beginning of my first semester of university.

Since I'm a trans person dating another trans person, my type of relationship can be referred to as trans-for-trans, or T4T. The abbreviation was popularized in the early 2000s on forums such as Craigslist,¹ but has since moved beyond online listings to describe any relationship between trans people. A T4T relationship can be lesbian, gay, straight, or another label altogether. T4T does not necessarily have to be romantic. For example, I consider my relationship to trans media as T4T.²

T4T disproves societal sentiments about being a trans person navigating social structures. From what I've found, spending time with other trans people alleviates the expectation of me having to explain my identity to them. When I've usually had to justify myself to cis people, the trans people I meet just get it.

Forming friendships with other trans guys has allowed me to learn a lot about myself and the trans experience.³ There is a sort of unspoken brotherhood that exists between trans guys. A knowing glance across the room. A nod as you walk by each other on the street. Knowing that someone nearby is going through the same thing as you is a comforting feeling.

Understanding something so fundamental about someone else can make it easier to support them. In the case of my straight T4T relationship, although we are transitioning in opposite directions, I can still understand my partner's experiences. We both have relationships to womanhood and manhood which compliment one another. T4T is watching the person you care about grow into themselves, as you do the same.

T4T is subversive in the way it defies trans alienation, demanding a better alternative. It creates space for trans people to grow, share joy, and just exist freely. At a time where being trans can feel especially difficult, T4T requires innovation and growth in the way trans people form communities.

alba_z

1. <https://en.wiktionary.org/wiki/T4T>

2. Some of my favourite trans musicians: Um, Jennifer; Jane Remover; June Henry; Bells Larson.

3. If you ever want to know the incredibly niche side effects of T, you should consult your local tboy.

LOVE HEARTS CANDY

I have finally caved and bought the love hearts candy that is on the counter in Flock Stop. You've probably seen them, these giant sized tablet candies that look as if they are just a novelty big version of the rockets candy you got for Halloween, the ones that were chalky but were nonetheless enjoyed and a staple of the candy you grew up with. These ones have a heart on either side of the tablet, with one side also having "cute" little inscriptions on it, "i'm shy," "i love you," or "you're loved," whatever. I have now tried them and man... they are SO ASS. like i came into this expecting it to just be like a bigger version of rockets and in a way they are, but with none of the flavour and charm that rockets have. For one, the charming chalky texture that rockets have have been replaced by what i can assume is actual chalk, with a harder give and less satisfying crumble. They taste so funny and so weird. There's this sourness to them that doesn't quite feels like it was there on purpose like other sour candies, but rather an unintended, malicious taste that, paired with the weird aftertaste, make me have this weird feeling in the back of my head that I bought something that was dosed with something that was out to get me. I have written this before the semester has ended and hopefully if this has not endangered my life, I will signal my well-being by having an article in the following issue.

fingersinsockets

AN OPEN LETTER TO A CERTAIN PROF

HINT: THEY TEACH PHYSICS

ChatGPT ain't allat vro 🤖 ↗

swagboyshifu

OLD

What do you mean you want to know what electives to take? I still struggle to choose mine every semester. What do you mean you want my advice on which major to declare? I'm scared I made a bad choice. What do you mean you want my thoughts on your résumé? I have no idea how I got my past co-ops. What do you mean I'm supposed to know how to answer to your questions? Not long ago I was asking them to someone. What do you mean I'm—

leah

mathNEWS

gridCOMMENT 160.1

dear gridWORDers,

welcome back!!!!!! i hope everyone had a fantastic winter break and that we are all starting 2026 off on the right foot for wherever you may need it in life. guess what though, today is NOTHING DAY. today we celebrate the act of DOING NOTHING. that's right fellas, i am giving you permission to skip class/co-op. just let them know that "the **gridMASTER** said so." personally, i am writing this on the train at 7 am with my desktop cat cursor (an extremely worthwhile purchase i have been enjoying for several days now), so it's not really "nothing day" for me just yet, but i look forward to observing this incredible holiday soon.

okay, 'nuff said. it's nothing day. our very first **gridQUESTION** of 2026 is: how are you observing/how did you observe nothing day? please please please submit your completed **gridWORD** and **gridQUESTION** answer with a pseudonym to mathnews@gmail.com or the **mathNEWS** office (mc 3030) by 6 pm on january 26 for a chance to win a PRIZEEEE

happy solving,

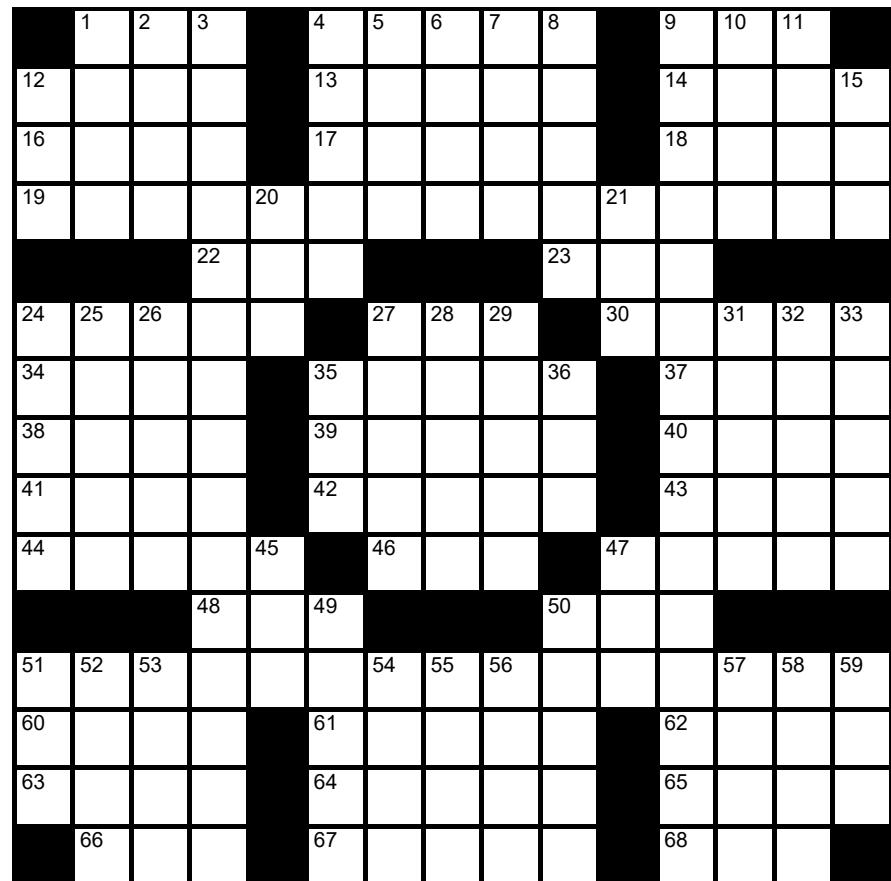
spaghettiinhalers

ACROSS

- Barbie's beau
- What Gayla Peevey might get for Christmas if Santa couldn't make it to her house*
- Monk's title
- Italian money
- Notions
- Gusto
- Smack
- Line of a song
- Spanish sherry
- Mild aversions
- "___ la la!"
- Fled
- Winery process
- *
- Kind of wave
- City in Cebu
- *
- ___ Bell
- Special type of pointer that tries to point to your brain*
- *
- Bouncing sound
- Small wild ox
- *
- "Excuse me"
- Pit
- *
- Military bigwigs
- ASMR action
- Swing
- Those who engage in the scientific study of humanity
- Tortoise's opponent
- Hammerin' Hank
- What am I?
- Eve's partner
- Bonnie's partner
- Channel
- Plugs
- Cursed
- Number of lower body limbs on a quadruple amputee*

DOWN

- Flightless New Zealander
- Historic periods
- Songs sung at sporting events
- What the calf of a dry cow in Germany might get*
- Romantic interlude
- Prefix with scope or meter
- Hurt
- Grouchy Muppet
- The most common word in the English language is one
- Mishmash
- "Death in Venice" author
- Hallucinogen
- Taboos
- Yuletide beverage
- Tit for ___
- Kournikova and Pavlova
- Thin
- Ice house
- *
- *
- *
- Russian villa
- Partner of pains
- Weaving equipment
- *
- *
- Listener
- Moola, slangily
- Take illegally
- Like a filet
- Eureka!"
- What you might get at an orchestral and vocal religious concert if you were deaf*
- Customary: abbr.
- Whitish
- Endangered African antelope
- Mine supply
- Waste
- ___ sahur
- Understand



FREE

A  EDITOR

lookAHEAD

SUN JAN 18	MON JAN 19	TUE JAN 20	WED JAN 21	THU JAN 22	FRI JAN 23	SAT JAN 24
Wake up and think it's Monday for a second Day		Co-op cycle 1, posting A applications close, 9am	Squirrel Appreciation Day		Tuition and fee refund deadline – 100%	Drop with WD begins
					Last day to drop without WD	
					Co-op interview period begins	
SUN JAN 25	MON JAN 26	TUE JAN 27	WED JAN 28	THU JAN 29	FRI JAN 30	SAT JAN 31
	mathNEWS 160.2 production night QNC 2502, 6:30pm	Co-op cycle 1, posting B applications close, 9am	National Kazoo Day		mathNEWS 160.2 releases	

A NONCONSTRUCTIVE PROOF THAT THERE EXISTS A MULTIPLE OF 2 THAT IS NOT A MULTIPLE OF 4

Suppose for contradiction that all multiples of 2 were multiples of 4. Let $x \in \langle 2 \rangle$, the ideal generated by 2 in the integers. Then $2 \mid x$, so by assumption $4 \mid x$. Hence we have $\langle 2 \rangle \subseteq \langle 4 \rangle$. Since $2 \mid 4$, we also have $\langle 4 \rangle \subseteq \langle 2 \rangle$, so double-inclusion gives $\langle 2 \rangle = \langle 4 \rangle$. We can then conclude that the ring quotients $\mathbb{Z}/\langle 2 \rangle = \mathbb{Z}/\langle 4 \rangle$. However, $|\mathbb{Z}/\langle 2 \rangle| = 2$ and $|\mathbb{Z}/\langle 4 \rangle| = 4$, and $2 \neq 4$, contradiction.

virchau13

NEWS ABOUT THE MC EGG

The egg is actually fibreglass and not stone. Imprint has made an article on the statues around campus that mentions this but not enough people know.

fingersinsockets

BUZZ BUZZ

YOU KNOW WHAT THEY (THE BEES) SAY...

Bzzzzzzzzzzzz. Bzz. Bzz.

Bzzzzzzzzzzzzzzzzzzzz.

BeesKnees

COURSE LOAD N' CRAP LIKE THAT

3 courses. 2 double credits. Am I cooked gang? If I'm cooked, am I Texas Barbecue, Church's Chicken or Korean Fried Chicken?

tmdevera

THEY TOLD ME TO INTEGRATE MYSELF!

