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"WHAT KIND OF PERSON IS YOUR IDEAL PARTNER?"

Greetings, **mathNEWS** reader, and a happy new year to you!

You may have read the sentence above and thought, *"Gee, the* **mathNEWS** *editor voice in my head sounds very different today."* And you would have very good reason to think that, because I am a new editor!

I am caffeinatED, nice to meet you! I have heard great things about the position of editor from many a **blackBOX**, and I look forward to helping produce **mathNEWS** for all of you to enjoy. The other editors have assured me that the stories about tired editors trapped inside MC 3030 for days on end because the ghost of **mathNEWS** would not let them rest until they finished layout are mere propaganda. Having heard that, I am very excited about my new responsibilities, and not nervous about anything whatsoever. Yay!

Speaking of **mathNEWS**, this issue looks like a treat – I wouldn't stop reading, if I were you. On the next few pages, we have gems such as:

- Lovely course discourse, on taking certain courses and not taking certain others,
- Exquisite poetry, some of which I understand and all of which is beautiful,
- Intriguing **profTHOUGHTS**, providing a deep look into topics that I wish my MP would take seriously,
- Thoughtful retrospection of the last year and a glimpse of how we as people grow,
- A *very* detailed look into building BSD programs that can be easily containerized,

and much more.

Well, that's all I have for you today, folks. We'll meet again soon, on another **mastHEAD**, or perhaps in an article. Maybe someday you'll come to our lovely production nights, say hi, and write an article of your own! But that's the future, and this issue is now. Go forth and let your brain feed on some delicious, delicious **mathNEWS**, because God knows the winter break is too long a time to have lived without it.

Have a nice day!

caffeinatED
Editor, **mathNEWS**

WALDO@<3.LE-GASP.CA	Soviet Canadian
BOLDBLAZER	Wait… We're not doing that "Hindsight is 20/20" **mastHEAD**?!?!?!?!?!?!?!?!?!?!?!?!
TENDSTOFORTYTWO	2022 Subaru BRZ
DERIVING FOR DICK	They're cute and stupid oh wait that's meee
APHF	Is not so much a person, but rather more the Wittelsbach Diamond, which has an estimated value of 23.4 million dollars. This is more than enough to permanently rid me of any financial worries for my lifetime
SEAGULL MAN	another seagull hmu thanks
ROYAL NO.69 MILK TEA	someone with a pulse
BeyondMeta	Harmless Trickster
CC	Thoughtful, charismatic, a touch of ambition— and someone I'd be lying about if I said I didn't find them attractive.
JEFF	yeah
WHILD	Captain America
Bhaffling	Iron Man
WHAT A DEAL!	someone who enjoys thrifting
IRON GODDESS IS BETTER	someone whose favourite Alley menu item isn't royal no.9 milk tea
Abald Man	Someone who writes for **mathNEWS** ;)
ALYSSNYA	anime girl who is also a millionaire
FINCHEY	A redhead in a sundress because I'm a basic Reddit user. Hah! Just kidding. My real answer is five beavers in a trench coat.
CLOAK AND VORPAL DAGGER	None of the above
CLARIFIED	Someone with a voice as deep as Steve Blum's. Throw a talent for cooking and singing in there as well.

ARTICLE OF THE ISSUE

The inaugural article of the issue for this term goes to *A Poem About My Winter Break,* by methNEWS. As a fan of winter break procrastination, cults, and methamphetamine, this one was a no brainer.

Your prize this week is the secret meth formula: $C_{10}H_{15}N$.

god ⚡ peED
Editor, **mathNEWS**

So... where's the small pencil icon I need to click?

NAMAN SOOD, math**NEWS** EDITOR FOR WINTER 2021
ALONG WITH KEVIN TRIEU AND CLARA XI

mathASKS 145.1

FEATURING LECTURER BYRON WEBER BECKER

ROGUE ENGINEER: IS THE 40-FOOT SUSPENSION BRIDGE YOU BUILT IN HIGH SCHOOL STILL STANDING?

When I was growing up, we had a creek running through our back yard. It was pretty shallow, but still good for catching crawdads, building dams, and throwing rocks to make a big splash! However, the only way to reach our property on the far side (the creek ran through our city lot) was to walk over the adjacent road's bridge.

In my high school physics course we studied various kinds of forces with one of the examples being a suspension bridge. Lights flash! I told my parents that I thought I understood enough to build one across our creek. To my surprise, they agreed to let me try! It was a success!

My family moved away but I went back with my oldest son when he was about 4. It was still standing then. So, it lasted at least 15 years. According to Google Maps and StreetView, the bridge is now gone and the creek is dry. Sniff.

CC: YOU GRADUATED WITH A BACHELOR OF ARTS (MATHEMATICS) FROM GOSHEN COLLEGE. WHAT WAS YOUR FAVOURITE THING ABOUT GOSHEN COLLEGE, AND HOW DID YOU FEEL ABOUT BEING ARTS?

One of the main reasons I went to Goshen was the international study program. One of the graduation requirements was spending a term in a third world country. I went to Haiti, lived with a local family, studied local language/history/etc. and worked on a service project to help out. It was an eye-opening experience to learn first-hand just how privileged I am, that there are different ways to look at the world, and that there is lots of joy to be had that doesn't come from things. It was a formative experience and I've often wondered how our world would be different if more people had similar cross-cultural experiences.

How did I feel about being in Arts? Pretty good! My goal was a broad education and I got it! Even then, I was more interested in CS than in Math but Goshen didn't have a CS major. Math was my second choice. But I got to sit on the committee that hired the CS department and defined the CS curriculum. I was one course shy of a CS minor but decided a human nutrition course was more important.

TERRIFIED: WHY DID YOU CHOOSE NOT TO REGISTER FOR THE DRAFT, AND HOW DID YOU MANAGE THE STRESS OF BEING CRIMINALLY CHARGED FOR IT?

Uh, yeah. There's nothing to make your day go worse than running into a friend who says, "Oh, by the way, the FBI was looking for you again today." Shoot.

When I was 18 the Soviets invaded Afghanistan. The USA (I was a citizen at the time; not now) didn't like that. In retaliation they wanted to register all their young men (yes, just the men) so they could be drafted at a moment's notice. But I've always thought there are far better ways to solve problems than fighting (use your words!) and wasn't willing to be drafted. So, I decided if I wasn't willing to be drafted, I wasn't willing to register for the draft either. Anyway, the FBI found out. Could have been that letter I sent to the editor of the local paper…. Or maybe the letter I sent to the draft board….

How did I deal with the stress? I had a great community around me. Great friends who made the same decision. Others who supported me (I married one of them!). Adults to help me navigate the legal system. I also got a loan from my grandpa, bought a 750cc motorcycle and went on a 5,000km trip.

ABALD MAN: ANY LIFE UPDATES SINCE 2002 NOT ON YOUR WEBPAGE?

Ahh, you've been looking at my webpage. I might have known from the first three questions. Let me see…. Together with my wife, we raised two wonderful sons; got a 2 year-old grandson. Testified to a parliamentary committee on electoral reform. Renounced my US citizenship. Visited Europe. Got rid of our ICE car. Tried (and failed) to get rid of a wart on my left foot.

Wait, you got rid of your "ICE car"? What's that? Something a snowman drives?

ICE stands for "Internal Combustion Engine".

So, you've got no cars. How does that work in a pandemic?

Didn't say we don't have a car.

So…. Go on.

Our ICE car gave up the ghost about five years earlier than expected. Transmission problem. Not worth fixing. We had said for a long time that our next car would be an electric, but that was supposed to be in 2025, not 2020. Given the climate crisis, we decided to go for an electric sooner rather than later. After exploring all the options, we decided to get a Tesla. It's very, very nice. We love it.

TENDSTOFORTYTWO: WHAT HAS BEEN YOUR FAVOURITE COURSE TO TEACH?

It was CS133. Our first-year courses had been in Pascal for a long time. Other schools were shifting to C++ because it was object-oriented, but we couldn't see inflicting C++ on first year students and so held out. Finally, Java came along (just in time) and I was asked to develop a 1A, object-oriented course using Java as the language of instruction.

After some false starts, I realized that an object-oriented course really needed an interesting object to use. Something more interesting than java.lang.String. Building on work by

Rich Pattis, I wrote a library with (virtual) robots that could be programmed to move around a city and interact with things in the city.

An early lecture on the difference between "if" and "while" might consist of putting two small programs on the board and then "executing" them by acting the part of a robot. Or write an infinite loop turning right and ask the students what the problem is (while you, the robot, continue spinning). For added fun, get a student to volunteer to be the robot.

SARAH: YA GOT FAVOURITE SONG?

Favourite? Singular? You've gotta be kidding. In the last couple of years I've listened to a lot of Johnny Clegg (South African white guy that formed a band with black people when it was still illegal), Digging Roots (Canadian Indigenous group), Bruce Springsteen (especially the Live in Dublin and High Hopes albums), and most recently, Birdtalker. Their song, Heavy, seems especially applicable these days.

JEFF: WHAT'S YOUR FAVOURITE FUNCTIONAL LANGUAGE AND WHY IS IT HASKELL?

But it's not Haskell. You're sadly misinformed. I've done a lot of programming in Scala. It's a multi-paradigm language that strongly encourages functional programming but also has the full suite of object-oriented tools. I love having a full tool belt and being able to easily use the best tool for the job.

πLLOW PRINCESS: WHERE IS YOUR FAVOURITE TOILET ON CAMPUS?

Now you're really scraping the bottom of the interview question barrel.

No, really! We've asked this of all the profs we've interviewed! It's been really illuminating!

I've noticed that you ask it a lot. I guess my favourite is the one that's closest to my office. Except when it overflows. It does that way too often. Are we done now?

ON ELECTORAL REFORM, PART 1
prof**THOUGHTS** *145.1*

One of the things I'm passionate about is improving the way we elect our leaders. I was fortunate to be able to testify to a parliamentary committee on the topic and am currently providing some technical support to a group that is challenging the constitutionality of our current electoral system in court.

Here are some brain teasers from the 2015 federal election.

First teaser: Mr. Trudeau's Liberals won 54% of the seats and 100% of the power in spite of the majority of voters (60%) voting against them. Explain how this happens under our electoral system.

Second teaser: Our First-Past-The-Post electoral system could have given Mr. Trudeau's Liberals a clean sweep of all 338 seats. Explain how. Assume the same vote distribution as the 2015 election (40% vote Liberal, 32% vote Conservative, 20% vote NDP, and the rest vote Green or other).

Third teaser: In our electoral system the Liberals could have lost every seat in spite of having more votes than any other party. Explain how. Again, assume 40% vote Liberal, 32% vote Conservative, etc.

Fourth teaser: Explain how the majority of citizens can think such a volatile electoral system is OK.

For some answers, see .

Byron Weber Becker

HINDSIGHT IS 2020: FEATURE UPDATES AND BUG REPORTS FROM THE PAST YEAR

FOR THE LAST YEAR OF "2020 VISION" JOKES, MY EYESIGHT SURE SEEMS TO HAVE GOT WORSE...

Well, that year felt like an eternity. It is now behind us, though, and I'll be honest, it might have been a terrible year for the world, but it was pretty alright for me. Don't get me wrong; I *really* want the university experience back, and I can't help but wonder how many amazing connections I missed cooped up in my small student apartment bedroom. But 2020 has been a year of some major personal growth for me, and I would not be doing the year justice if I didn't mention that. So, firstly, in no particular order, here are some personal milestones I achieved this year:

- I learned how to cook! As a kid the thought of messing up in the kitchen scared me so much, and that *did* happen — the highlight of the year was when I served a dish of raw chicken to myself and roommates — but I learned from those experiences and now I'm confident in being able to feed myself, for survival and for fun.
- I started to read again! I joined a reading group near the end of last year, and we're halfway through our first book right now. I always enjoyed reading as a kid but I kinda lost the attention span required sometime in 12th grade. It's always been one of my more productive hobbies so I'm glad I was able to come back to it, using the regular group meetings as motivation to keep reading ahead even if the pages seem daunting at times.
- I started to write again! Not to toot my own horn, but I was a bit of a poet back in 7–9th grade, and there are some works that I can look back on even now and be proud of (most make me cringe but still, the good ones count). math**NEWS** has been awesome here, it's given me some purpose to write… not that writing just for myself wasn't fun sometimes, but it's so much more satisfying to have an audience, and to get that occasional token of appreciation from someone who enjoyed my articles.
- I became *much* better at writing code! I fully credit Brad Lushman and his excellent offering of CS 246E here. The final project annihilated me, but it also taught me so much… now I'm going back to my old side projects and realizing the things I could do differently, how I could make stuff more extensible, more maintainable, more *plain better.* Who'd have thought I'd come to an educational institute for a field I enjoy and learn lessons that I deeply appreciate?
- I shifted to Linux full-time! I've been trying to ditch Windows for a few years now, and I finally managed to pull off the transition at the beginning of winter 2020. So it's been almost a full year now,

and while I wouldn't recommend the move to everyone, it's been kinda revolutionary for me — it's like I'm Neo in the Matrix, finally able to bend the operating system to my will… though I guess the final "red pill" is that there *is* no operating system, since everything is a file anyway.
- I surpassed 42k karma on Reddit! Honestly, this is just sad… *moving on.*

With all that being said, I don't need to tell anyone that 2020 wasn't the *perfect* year. A lot of things went wrong when they could have, y'know, *not,* and while a lot of those things were out of my control, some were in my hands, and if I could do them differently, I would. So here's a few things that I wish I did differently in 2020, and I hope to do differently in 2021 *(not so detailed cause no time to be a downer; consider all these my new year resolutions!)*:

- I hope to pay more attention to my existing relationships and keeping them going.
- I hope to work on my time management more, and try to spend more of my year working more consistently and hopefully not burning out as much.
- I hope to work on some of my inner prejudices — thoughts about sets of other people that are long-ingrained in me, and that I've slowly come to realize are harmful for both me and those people.
- I hope to maybe actually kinda sorta idk try to finish my side projects… haha jk… unless..?

Finally, here's a bit of a shoutout to all the new people I met in 2020 who made the year much more bearable:

- the person I love to exchange songs with
- the gentlemen who talked to me about religion, life, and Hindi insults at a pub (when it was safe to go out!)
- the aforementioned reading group
- the stranger who sent me her mug cake recipe
- the guy who reads my username wrong on purpose
- the one dude who watched my New Year live stream on Twitch till the end
- math**NEWS** and its amazing band of writers and editors — the old hats in their last years and the young ones who joined in their 1A term alike

It wasn't a great year. Some might even call it pretty bad, all things considered. But if this is what pretty bad looks like, I think I can handle it. Bring it on, 2021, I have high hopes!

tendstofortytwo

HINDSIGHT IS 2020: I CAN SEE THE STARS AGAIN

Epiphany: sometimes it strikes like lightning. Sometimes it settles like an autumn leaf. And sometimes it insists on being wrestled out like an obstinate knot of hair.

I had an epiphany the other night, of the latter sort. I was feeling a little heartbroken — I'd just found out a girl I had a crush on had just asked out someone else. It was past midnight, and I felt a few things:

Anguish. Some self-hate for not being good enough. A touch of jealousy, of course. More loneliness than usual. Beneath it all, a steely determination: to keep my chin up, to move on, to find someone else. Most of these feelings were familiar, but the last was oddly unnerving, and as I dug into why, I uncovered my epiphany.

☙

I grew up a very sheltered kid. I didn't understand what love, crushes or relationships were. The songs and movies didn't make sense to me. In my senior year of high school, a girl asked me out and I declined — reason being I didn't know her very well, and I didn't go to dinner with strangers. It was a blissful ignorance: no drama, no heartbreak. I stuck to a very close circle of similarly sheltered friends, and the rest of the world passed me by.

Then I fell for someone in my first year of university, and the entire world changed colour. She was, of course, beautiful — regal features and a charming wardrobe to complement. She moved with a fluid elegance I'd only seen in film. In talking, she'd don a warm, intent gaze that said: yes, you have every ounce of my attention. I was smitten.

The highlight of each week was my class with her. After seeing her or talking with her, I'd be floating. If she was away from class, I'd be dejected. The love songs started making sense.

I worked up the courage and asked her out, and to my utter delight, she said yes. It remains the happiest moment of my life. Take your furthest, most impossible ambition. And imagine it all coming true, rushing into the present, in an instant. An inhuman thrill at the unbelievable.

A friend quoted me Stephenie Meyer:

"Before you, Bella, my life was like a moonless night. Very dark, but there were stars, points of light and reason. …And then you shot across my sky like a meteor. Suddenly everything was on fire; there was brilliancy, there was beauty. When you were gone, when the

meteor had fallen over the horizon, everything went black. Nothing had changed, but my eyes were blinded by the light. I couldn't see the stars anymore. And there was no more reason, for anything."

I suppose I'll call her Bella, then.

Because the next day, right before our date, Bella changed her mind and told me she wasn't actually interested in a relationship.

☙

It broke me. It broke me gradually. To say I was devastated wouldn't truly encompass what happened to me over the next few months. I'd built so many sublime fantasies of us, and as they unraveled, so did I.

But it did start with a simple, brutal heartbreak. She'd been my most important person, and I wasn't hers. I thought I'd had a chance, and that made it all even worse. I cried. A lot. The songs about heartbreak started to make sense too.

I talked to her a few more times over the next few weeks, with desperation and listless hope, trying to figure out if "not looking for a relationship" left any room for being attracted to me. I didn't get an answer from her.

My mental health collapsed. I'd had a taste of loving someone and (at least the feeling of) being liked back, and the crushing hole I was left with ate away at me.

As I gradually came to the realization Bella wasn't attracted to me, I started doubting myself. When someone becomes your definition of an ideal partner, that person's preferences become the definition of an ideal you.

It started with doubt, built to disdain, and on my worst days, spoiled into disgust. I'd shudder when I looked in the mirror, and look away quickly — I couldn't bear my appearance anymore, for it was a part of me, and Bella didn't want me. The same went for almost every other aspect of me: my clothing, my voice, my gait; not just physical things, but my hobbies too, my career path, my inexperience.

I'd go to sleep many an evening terrifyingly lonely, fighting the part of me that said I wasn't good enough.

I'd become obsessed with women who'd show me the slightest bit of attention — I wanted validation from them, I'd reach out and try to set things up, and I'd overthink every message.

I reeked of desperation, and each time I was rejected, I cried, hated myself. Then I vowed to pick myself up again, hold my head high, and move on.

It continued for months and months and months. It's been almost a year of struggle. On good days, I was okay. The down days crushed me. I assumed it just came with the lockdowns. After all, Bella was a year ago, right? I couldn't possibly still be reeling from that.

~

And the other night, as I was nursing another implicit rejection, I cried and I hated myself. And as I working up the determination to carry on, I dug up my epiphany: I hadn't actually healed from the tailspin-inducing brush with Bella. I hadn't moved on. The determination, quick attachment to people, and self-disdain were all symptoms of a broken me, only exacerbated by the pressure of a global pandemic.

The past me got along just fine and happy without being in a relationship, and though some people I've talked to don't think one can go back once their eyes have been opened, I think I need to try to reach some equilibrium. My new year's resolution was originally to find a girlfriend this year, and it was driven by all of the ugly, broken emotions I listed in the last few paragraphs. I've changed it: it's now to heal.

I can't go on looking for validation from other people. To stop obsessing over finding a girlfriend. I need to be able to look myself in the mirror and believe: *I am one sexy man.* I need to be able to take my accomplishments, each of my skills, and believe: *I am freaking good at this.* I need to be able to look at all my relationship inexperience and believe: *it's not a judgement of my worth.*

It's a lot to ask of myself. In the little time since then, there have already been bumps. But I'll just keep doing my best. If there was one aspect of me I never doubted, it was a certain ragged, stubborn, foolhardy consistency to keep showing up.

~

I still talk now and then with Bella. She gave me a gift a few days ago. She told me, on her own initiative, and in no uncertain terms, that she was not romantically attracted to me. It was a courageous and beautiful gift, and closed all uncertainty and hope I'd been harbouring. I've told myself many times that I'd moved on, and been wrong every time. This time it feels different. Bella gave me the gift of closure.

This is the culmination of over a year of reflection and anguish. It has been the single most traumatic and transformative event of my life. Now it draws to a close, and if were given the chance to strike it out of my story, I would say no in a heartbeat.

Against all odds, my eyes lighten, and *I can see the stars again.*

CC

profQUOTES 145.1

CS 350: LESLEY ISTEAD

❝ We understand shit happens. Shit always happens.

❝ I have my lovely Windows tablet here — lovely in quotes.

❝ What's my favourite operating system? I hate them all. They're all terrible.

❝ I don't recommend defenestration of your computer.

❝ What programmer isn't lazy?

❝ Refresh your memory: what was it like in the DC bathroom?

❝ This is a computer. It doesn't get angry. It has no emotions.

❝ Somebody texts you and you're like, oh my gosh do I have a match on Aphrodite?

LOCAL IDIOT REALLY THOUGHT COVID WOULDN'T BE A BIG DEAL

TORONTO — A local idiot really thought COVID wasn't going to be a big deal back in the beginning of 2020, **mathNEWS** sources can reveal.

This utterly stupid person was often heard saying that COVID would not gain a foothold in Canada, and was in fact not worried about COVID right up until everything closed in March. In fact, this person still believed COVID would be over quickly, and it is reported that the reality of the severity of the situation did not fully sink in until summer, at which point —

The idiot is me. I'm the idiot. That's the joke.

UW Unprint

MATHSOC EDU-ACTION! PRESENTS…

Introducing Mathieu, Vectoria, Thea, and Lem! These all-new characters will star in future MathSoc Edu-Action! comics, so if you'd like to see more of their adorable faces, follow @mathsoccartoons on Facebook or Instagram!

Ava Pun

MATHSOC EDU-ACTION! PRESENTS...

MATHIEU

MATHIEU'S ENTHUSIASM FOR MATHEMATICS KNOWS NO BOUNDS. INDEED, HE'LL PREACH TO YOU THE JOYS OF DERIVATIVES WHEN ALL YOU'RE WONDERING IS "WHO IS THIS KID AND WHY IS HE ON MY LAWN?"

HE'S A LITTLE ANGEL WHO HAS **NEVER** DONE ANYTHING WRONG IN HIS LIFE, AND HE CAN **PROVE** IT WITH, LIKE, **MATH AND STUFF.**

VECTORIA

VECTORIA WILL PLAY ANY VIDEO GAME IN ONE TO $2^{31}-1$ DIMENSIONS. WHICH IS TO SAY, ALL THE VIDEO GAMES. IF YOU FIND A VIDEO GAME IN LESS THAN ONE OR MORE THAN $2^{31}-1$ DIMENSIONS, PLEASE LET HER KNOW SO SHE CAN PLAY IT.

DESPITE GAMING FOR 7π HOURS A DAY, SHE'S FOCUSED AND ALWAYS MAKES SURE TO MOVE IN THE RIGHT DIRECTION. HER FAVOURITE TOPIC IS LINEAR ALGEBRA.

THEA REM

SIMPLE, ELEGANT, AND BEAUTIFUL...AT LEAST, THAT'S WHAT THEA *TRIES* TO BE. USUALLY, SHE ENDS UP AS MESSY AND DISORGANIZED AS THAT ONE ASSIGNMENT YOU SUBMITTED WHICH MADE YOUR MARKER CRY.

SHE LOVES HER LITTLE SISTER, *CORAL ARI,* WHO'S ALWAYS FOLLOWING HER AROUND.

LEMUEL MA

LEM MAY BE SMALL, BUT HE HAS A BIG HEART! OR SO HE CLAIMS. IN REALITY, HE'S A HUGE SHOW-OFF WHO WANTS TO BECOME RICH AND FAMOUS BY BREAKING AS MANY OBSCURE WORLD RECORDS AS POSSIBLE. (WHERE DID HE EVEN *GET* ALL THOSE DOMINOES?)

HIS FAVOURITE PASTIME IS TRYING TO HELP THEA WHEN SHE DOESN'T ACTUALLY NEED HELP.

STORY & ART BY AVA PUN | CHARACTERS BY AVA PUN & ALYSSA BAKSH

MATHSOC   MEVF

CIEN ANOS DE SOLEDAD

1

Many years later, as I faced the firing squad, I was to remember that distant afternoon when my father took me to discover ice. Time was young then, and I had full faith in myself, in the universe. *Arma virumque cano,* I said. *"We were like gods at the dawning of the world."*

It hasn't been a long time since then, but it feels like many lifetimes have passed. I'm barely an echo of my past confidence; when you've tasted what seems like a millennia's worth of *sometimes you can fight tooth and nail and in the end even though you did your best you still lose,* you tend to have a lot less faith in yourself.

I fill the lost parts up with memories and premonitions. Mute gold sunsets off the brick paths on the edge of the city. Cut strawberries that garnish a bowl of shaved ice on a hot day. The frozen air and frozen marble of a train station: every Wednesday morning at 9:00 am a train leaves for Vancouver, and I have to try my hardest to not hop on that train. Lake-grey eyes, fading theorems on a blackboard (chalk dust sieves like the sands of time), the aroma of chili during lunch hours.

I want them all, and I want to create the circumstances that make them possible with my own hands. It would be nice to feel that accomplished, that capable again.

Time and countless failures don't scrub the sun-yearning from my mind; I set my compass and keep running.

2

You are alone in the back rows of the bus, hurling into the dim void with only the highway and the forest for company.

Ambition watches you from an empty bus seat. He wears the face of someone who you haven't met then, though you know that he will haunt you until the end of your days in this rain-soaked town.

You command him, *don't be a coward, and show me what you've brought me here to see.*

Suddenly, you are there at the beginning of everything — concrete interior, pale lights, those uncomfortable chairs with a writing platform built into them, the coldness of that one row in the room (was it MC 2065? I don't remember). Time, space, and emotions speed past you into the abyss, and one by one, you remember everything you've lived through and done either for love of knowledge or self-aggrandization.

(You feel something that you haven't felt since first year: the torment of uncertainty, also called the desire to make yourself seem better than you actually are. What would everyone say about this?)

And it hits you then — all that pride, all the plans, superficial glory-chasing and bargaining with the universe for things to miraculously go your way, had been useless in the first place. Maybe you are wrong to begin with — you were never going to become a star. At best you are a dead planet, tidally locked with a dying star while it tears away everything you wear as an armour: the desire to prove that you can do as well as your brilliant friends, golden afternoons in the Math CnD, isolated nights at the dining table in your apartment, hashing out proofs until all the symbols have turned into lights in your eyes — until what's left is a core as heavy as the longing in your heart. Ambition has another name, and it is Obsession; but names go out the window now, as you, like a tragic hero who recognizes too late that they were tricked into fighting your friend, realize who your companion is.

Something about his eyes had always made you confuse yearning and aching regret.

Wait, you say, *take my heart too.*

3

I'm in my room again. Not the cramped one in the townhouse, not the bedroom under the ruins of a walled city, but where I physically am. There's no fire and the flood of the first life, nothing like the echoing melancholy of the last. Things don't hit with such intensity as they did before: in a past epoch a yellow light lit up when it was our last time seeing each other and we'd hug and say *thank you it has been enough I love you and will always do,* but now endings come suddenly with no real warning — one minute you're in the middle of doing something and the next it was a long time ago and I'm now a different person and it's not coming back again.

It's just life, it's just school, it's just how it is sometimes. Then why does it hurt me so?

Maybe I don't have any of the divine confidence anymore, and prior experience has shown that I can do my best and still fail, and sometimes things spin out of control from terror and *love,* yet I must try. With all these weariness and fault (and accursed back pain), I choose to keep going.

(Am I allowed to feel proud of myself at this point?)

The air fills with the scent of bitter bark and burning clove; all the visions and hopes leave me then. I shake out my wrist, leaving a *clack* and a short black line on my iPad screen.

"What did the lectures say about finding the maximum likelihood estimator again?"

4

…

10

The Fall 2020 STAT 330 final was so long and hard that I felt like I had been writing it ever since the moment of my birth, had been writing it for my entire life, and would still be writing it when the last of the rivers flow away and the last of the stars go out.

…

n

tfw the STAT 330 final traumatizes you so much that you go through an entire character arc and existential crisis while writing the exam

[Author's Note: STAT 330 is a foundational course for statistics students and has a lot of good content — you'll benefit from the course. It might hurt while you're going through it though.]

royal no.69 milk tea

FROM THE GIRL WHO WROTE THAT ABSOLUTELY UNHINGED STAT 330 ARTICLE

I got like a low 70-smth on that exam post-curve. Can I get an F in the chat lmao.

Don't wax poetic about your past and future on an exam; just focus on the fucking questions. Also do all the tutorial questions **at least twice** as preparation.

This is also a PSA to take STAT 241 because apparently that really helps with understanding the material in STAT 330.

royal no.69 milk tea

TOP 10 THINGS THAT MAKE MANITOBA THE BEST PROVINCE IN CANADA

1. Say you disagree with me and my polar bear will eat you.

A cool pen name

RATING BUILDINGS ON CAMPUS BY THE FIRST THING THAT COMES TO MIND ABOUT THEM

1. **MC:** third floor, bright lights, MC Comfy, computer labs, the hall with the lockers, the vacant look in the eyes of the people in the trains lab
2. **SLC:** Tim Hortons, first floor study rooms, the tables near the restaurants in the back, WUSA stuff everywhere, CIBC
3. **DC:** *cold* entrance in the winter, study carrels, hanging out in the basement study area, CS advising office
4. **E3:** secret indoor route from Plaza to MC
5. **TC:** interviews, airport vibe, basement rooms, changing in the washroom
6. **STC:** demos in the basement, Starbucks, exam halls in the basement
7. **QNC:** one of those full-size whiteboards where someone from Reddit used to write puzzles and such
8. **DP:** Study carrels, studying with friends, private rooms, making notes, Bowser's Cafe (haha the Mario villain)
9. **E5/E7:** ION, modern, empty, engineers, Coffee 'n' Code, photography bridge
10. **M3:** empty halls, modern and lonely, feels abandoned other than M3 1006 and the one washroom right next to it
11. **RCH:** armpits, sadness, construction zone, SPCOM

All other buildings were deemed too unimportant to rank. Sorry, B1!

tendstofortytwo

QUÉBEC RUINS WRITER'S CHILDHOOD DREAM

This new year is off to a promising start with the complete crush of childhood aspirations of becoming a pokémon trainer by the province of Québec. This development came about as a result of the fact that no company in the world wants to deal with how ridiculously stringent Québec contest laws are. This is the reason why almost every sweepstake contest has a section saying the contest is void in Québec. The writer only moved to Québec because it was cheapest option within walking distance to downtown Ottawa. As a backup, the writer plans to be hired by Stats Can and move back to Ontario so they can enter a contest again, permitting themselves the delusion that they could win a global contest anyways.

Beyond Meta

CAPSICUM CASE STUDY: GOT

I've been working with Capsicum for some time as part of my internship with the FreeBSD Foundation. This article details my process of applying the Capsicum sandboxing framework to a large program called Got. Along the way, I'll give a simple and concrete introduction to Capsicum: what problems it deals with, the reasoning behind its solutions, and how to use it. We will find that Got is particularly well-suited to Capsicum, and I'll discuss how Got's structures make the program Capsicum-friendly.

CAPSICUM CONCEPTS

Capsicum exists to fix a straightforward problem with computer programs: they have too much power. I like to think of it like this: In a world without Capsicum, if I log in to my computer and run some program, *there is nothing stopping that program from deleting my entire home directory without warning*. Of course the program probably will never do that intentionally, but it has enough power to do so. This becomes a real concern when thinking about security: if someone finds a vulnerability in a program, they could exploit it to do anything the program can do. Therefore, if the program is wielding an excessive amount of power, the attacker can use it to do an excessive amount of damage.

In comes Capsicum[1], which provides tools to control a program's power. One important concept Capsicum deals with is that of a *global namespace*. Essentially, a global namespace is a group ("space") of objects, each of which have an identifier ("name") that uniquely identifies it among all objects ("global"). An easy example of a global namespace is the file system: the space is the group of all files, and each file's absolute path is its unique 'name'. The FreeBSD operating system has many global namespaces[2], but the file system is ubiquitous and very important; I'll be talking about it a lot from now on.

Capsicum-less programs deal frequently with global namespaces. When these programs want to `open()` a file, they can pass in a file's absolute path. While this seems normal enough, the program is actually using its tremendous power here: "Out of every single file on this computer, I want this one!" While file permissions and such will prevent the program from accessing *every* file, this amount of power is certainly in the 'delete-your-whole-home-directory' range.

Even worse, when the program is exercising its power like this, it's exercising the power *implicitly*. It does not say: "I would like to exercise my power to access every file, and here is a 'key' to verify that I have this power"; the program just always has the power. This power to do things 'by default' is called *ambient authority*[3]. When accessing these global namespaces, programs are always exercising their ambient authority.

Therefore, Capsicum recognizes global namespaces as basically an uncontrollable source of power, and so introduces *capability mode* – a state in which a program cannot use global namespaces at all, and therefore also have no ambient

authority. Programs 'enter' capability mode by calling `cap_enter()`[4], and cannot ever leave. In capability mode, a program cannot `open()` new files, and is therefore restricted to file descriptors that it `open()`-ed before calling `cap_enter()`, or file descriptors provided through a connection to a different process. This environment that limits the resources a program has access to is called a *sandbox*, which is why Capsicum is described as a *sandboxing technique*.

Capsicum does more than this. Another important concept is that of *capabilities*, which in Capsicum's case are objects that extend file descriptors; they let you finely limit what any file descriptor is capable of doing, and serve the more hidden role of making capability mode actually work. There is also the Casper library, which provide common services for Capsicumized programs.

THE TARGET: GOT

So, with these tools, we'd like to adapt some existing programs to use them. I was tasked with adapting to Capsicum the version-control system Game of Trees, or Got for short. It's being developed by and for OpenBSD developers, but the Foundation is looking to add Got to the FreeBSD base system. So as part of this effort, it was my job to figure out how to tweak Got to be more amenable to Capsicum, without drastically changing anything: Ideally, we would make structural changes clean enough to incorporate into the upstream version of Got, so that the FreeBSD Capsicum version of Got is as similar to it as possible.

CAPSICUMIZING GOT

On a high level, a common pattern for Capsicumized programs has the program be separated into two parts. In the first part, the program acquires the resources it needs; in the second, the program does its 'work' of reading from and writing to those resources. The program enters capability mode right after the first part. Since the program is stuck in capability mode after this, its power is limited in the dangerous second part, in which it works with the external and untrustworthy resources it acquired in the first.

Many programs are not separated in this way. Often, they acquire resources wherever it's convenient, resulting in the two parts being delicately interleaved. Before Got, I dealt with this issue in the program `sort()`. In these situations, helper libraries like Casper are invaluable, as they exist to solve common Capsicumization problems that would otherwise take a lot of setup work to fix. You can see a simple example of the interleaving issue in *Case studies of sandboxing base system with Capsicum*, by Mariusz Zaborski (EuroBSDcon 2017) on YouTube, part of which describes the process of Capsicumizing the program `bspatch()`.

Fortunately for me, Got is structured in how it gets its files. Got works with two main directories: a *repository* and a *worktree*. If you know Git, these are quite similar to Git

repositories and worktrees[5]. Got then has the functions `got_repository_open()` and `got_worktree_open()`, responsible for looking for the repository/worktree and returning a struct — `struct got_repo` and `struct got_worktree` respectively — containing information about the two directories[6].

After this point, Got exclusively works within these two directories (and /tmp), which means that it never tries to acquire anything 'new'. This avoids the interleaving problem discussed earlier, but Got still uses the global file system namespace to actually open new files — for example, the `got_repo` struct contains the absolute path to its associated repository, and so Got would open the directory using that path whenever it needs to. This is not compatible with capability mode.

In that case, must I pre-open every single file inside the two directories, so that I can use them in capability mode? Thankfully not. When you `open()` a file, you get its file descriptor. For non-directory files, its descriptor lets you access just that file. However, a directory's file descriptor allows you to access everything inside that directory.

For this purpose, FreeBSD, by way of POSIX, provides the `*at()`-family of system calls. Where the normal calls take in absolute paths, the `*at()` calls take in a file descriptor and a relative path. If I wish to open the file "/dir/subdir/a", and I have a file descriptor *fd* for dir, I can call `openat(fd, "subdir/a")`. This form of access is allowed in capability mode, barring some exceptions[7], since we are no longer searching through the global namespace of all files.

It's easy to see how this helps us with Got, as we know that Got will always work within two specific directories! If we pre-open the repository and worktree directories and store their file descriptors inside the `got_repo` and `got_worktree` structs, we can later use those descriptors to open files inside those directories, even in capability mode. In Got, functions that operate on files inside the repository or worktree will take in a `got_repository` or `got_worktree` as a parameter, meaning that the file descriptor we added will be easily accessible there.

```
static const struct got_error
update_blob(struct got_worktree *worktree,
    struct got_fileindex *fileindex,
    struct got_fileindex_entry *ie,
    struct got_tree_entry *te, const char *path,
    struct got_repository *repo,
    got_worktree_checkout_cb progress_cb,
    void *progress_arg)
{
    const struct got_error *err = NULL;
    struct got_blob_object *blob = NULL;
    char *ondisk_path;
    unsigned char status = GOT_STATUS_NO_CHANGE;
    struct stat sb;
    if (asprintf(&ondisk_path, "%s/%s", worktree→root_
path, path) == -1)
        return got_error_from_errno("asprintf");
    // example of usage
```

```
    int opened_file_fd = open(ondisk_path, 0);
    ...
```

The above snippet of Got's code shows a function that takes in a `got_worktree` struct, and uses it to construct a path to a file in that directory. I've added an example of how the function would typically use the new path.

Below is the same code, converted to use our new file descriptor strategy.

```
static const struct got_error
update_blob(struct got_worktree *worktree,
    struct got_fileindex *fileindex,
    struct got_fileindex_entry *ie,
    struct got_tree_entry *te, const char *path,
    struct got_repository *repo,
    got_worktree_checkout_cb progress_cb,
    void *progress_arg)
{
    const struct got_error *err = NULL;
    struct got_blob_object *blob = NULL;
    char *ondisk_path;
    unsigned char status = GOT_STATUS_NO_CHANGE;
    struct stat sb;
    int path_fd_part = worktree→root_fd;
    char *path_relative_part = path;
    // example of usage
    int opened_file_fd = openat(path_fd_part,
        path_relative_part, 0);
    ...
```

It's quite simple! Simpler than the first one, even, since the `asprintf()` call is no longer needed. In these types of situations, adapting Got to support Capsicum is easy.

Some functions don't take in these structs, but instead take in an absolute path that they operate on. Adapting these functions to be Capsicum-compatible takes more work, as we must change their parameters from an absolute path to a pair of (relative path, directory file descriptor), in order for the function to be able to access the file in capability mode.

In practice, this is usually only a small problem. The absolute path the function takes in doesn't come from nowhere — it must have been created by using the `got_repo` or `got_worktree` structs, and therefore the file descriptor we need won't be far away. Below is a function whose parameters needed to be changed as a part of Capsicumization.

Before:

```
const struct got_error *
got_fileindex_entry_update(struct got_fileindex_entry *ie,
    const char *ondisk_path,
    uint8_t *blob_sha1,
    uint8_t *commit_sha1,
    int update_timestamps)
{
    struct stat sb;
```

```
    if (lstat(ondisk_path, &sb) ≠ 0) {
        if (!((ie→flags & GOT_FILEIDX_F_NO_FILE_ON_DISK)
            && errno = ENOENT))
            return got_error_from_errno2("lstat",
                ondisk_path);
        sb.st_mode = GOT_DEFAULT_FILE_MODE;
    } else {
        ...
```

After:

```
const struct got_error *
got_fileindex_entry_update(struct got_fileindex_entry *ie,
    int wt_fd,
    const char *ondisk_path,
    uint8_t *blob_sha1,
    uint8_t *commit_sha1,
    int update_timestamps)
{
    struct stat sb;
    if (fstatat(wt_fd, ondisk_path, &sb,
        AT_SYMLINK_NOFOLLOW) ≠ 0) {
        if (!((ie→flags & GOT_FILEIDX_F_NO_FILE_ON_DISK)
        && errno = ENOENT))
            return got_error_from_errno2("fstatat",
                ondisk_path);
        sb.st_mode = GOT_DEFAULT_FILE_MODE;
    } else {
        ...
```

Since the parameters of the function changed, we also need to alter all the places where it was called. In some places, the calling function created the path, using the `got_worktree` struct, that it passes into `got_fileindex_entry_update()`; for these, we already have the necessary file descriptor, and so adapting to the new parameters is easy.

Before:

```
    ...
    * Preserve the working file and change the deleted
    * blob's entry into a schedule-add entry.
    */
    err = got_fileindex_entry_update(ie,
        ondisk_path, NULL, NULL, 0);
} else {
    ...
```

After:

```
    ...
    * Preserve the working file and change the deleted
    * blob's entry into a schedule-add entry.
    */

    err = got_fileindex_entry_update(ie,
        worktree→root_fd, ie→path, NULL, NULL, 0);
} else {
    ...
```

Some calling functions took in the path as a parameter as well, simply passing it through to `got_fileindex_entry_update()`. For these, we must similarly change the calling function's parameters:

Before:

```
static const struct got_error *
sync_timestamps(char *ondisk_path,
    unsigned char status,
    struct got_fileindex_entry *ie,
    struct stat *sb)
{
    if (status = GOT_STATUS_NO_CHANGE &&
        stat_info_differs(ie, sb))
        return got_fileindex_entry_update(ie, ondisk_path,
            ie→blob_sha1, ie→commit_sha1, 1);
    ...
```

After:

```
static const struct got_error *
sync_timestamps(int wt_fd,
    const char *path,
    unsigned char status,
    struct got_fileindex_entry *ie,
    struct stat *sb)
{
    if (status = GOT_STATUS_NO_CHANGE &&
        stat_info_differs(ie, sb))
        return got_fileindex_entry_update(ie, wt_fd, path,
            ie→blob_sha1, ie→commit_sha1, 1);
    ...
```

Ultimately, the path must originate from a function that has access to `got_worktree`, and so the file descriptor can always be threaded through the calls. It's certainly not a clean solution, especially if the thread gets long, but I've yet to find a thread longer than two calls.

WRAP-UP

I hope you've been convinced at this point that making Got work with capability mode is simple. While I've only committed to Got the very beginnings of the work needed, I suspect that most of the necessary changes will be similar to what you've seen.

Of course, not every program is so amenable to Capsicum. Fundamentally, capability mode works well with programs that deliberately manage their resources. Got makes its main resources – the worktree and repository directories – into structs in the code. If a function wants to operate on one of these resources, it needs the struct to do so.

In this way, the code is explicitly saying, "This function will need this resource." Additionally, since Got works with few other resources, the code is saying, "This function will need this resource *only*." This explicitness is opposite to ambient

authority, and is exactly what capability mode wants! The rest of the work lies in just enforcing these limitations.

Yang Z

1. …Along with other frameworks, with similar goals but different designs, such as seccomp for Linux and pledge/unveil for OpenBSD. Much has already been written comparing these frameworks; Jonathan Anderson's "A Comparison of Unix Sandboxing Techniques" takes a detailed look.
2. You can find a comprehensive list in "Capsicum: Practical Capabilities for UNIX" by Robert N.M. Watson et. al.
3. "Capability Myths Demolished" by Mark S. Miller et. al. gives a clear description of ambient authority.
4. Practically, you'll be using the 'Capsicum helpers' and calling `caph_enter()`, but it's essentially the same thing.
5. In fact, Got can be used with normal Git repositories, hence the similar name.
6. One of the big mistakes I made here was that I tried to enter capability mode *before* the `got_worktree_open` and `got_repo_open` functions – it did work after a lot of hacking, but it left a huge mess, and later the lead developer of Got helpfully told me that those functions weren't doing anything dangerous anyway so it's okay to call them without capability mode. From this I realized that it's very important to *understand the code before trying to apply Capsicum*. It sounds obvious, but I learned it the hard way.
7. The path can't be absolute, the path can't use "\.\." components to 'escape' out of the directory, and the file descriptor can't be AT_FDCWD.

WHY YOU SHOULDN'T TAKE MATH 249 IN 1B

Recently, the majority of my so called "friends" have all simultaneously decided that it would be a good idea to take MATH 249 in 1B. This is a disastrously stupid decision. Instead of enjoying their second semester of their post-secondary education, joining any of the fantastic extracurriculars (**mathNEWS**) that are offered at Waterloo, and in general not indulging in extreme mathematical masochism, these drunk-on-power first years have chosen to overload their schedules and take what is somewhat considered to be the hardest MATH course.

There are several reasons why this is a terrible decision. To begin with, no internet acquaintance of mine should be smart enough to study combinatorics right now. That is absolutely unacceptable. Secondly, MATH 249 authorizes first years to bully their friends into also taking MATH 249, which further propels this problem and total menace to society. Thirdly, now I'm all alone by myself while the cool kids are out having fun. Oh dear God it's high school all over again.

A cool pen name

A CONSPIRACY RAP

How come all the co-op jobs that used to buy us snacks
Now are sitting on their fat backs
Counting down their fat stacks
And instead of giving it back they keep their racks
And the money that was ours was just seized by their attacks

And when our perks hit the lows then it finally shows
They did it under our nose and yet nobody knows
Where this snack money goes besides boats for CEOs
So let's disclose all the shit that they try to impose

They closed our jobs and our offices
Made us feel like some carcasses without coffee or consciousness
Man it's rude and preposterous what they do to be profiters
In these times of atrociousness they pretend to be one of us
Then they pulled the rug under us with a speed that is wondrous
Making all of us wonder how they turned rad to so ravenous

You'd think surviving a plague would provide us plenty more merit
But those execs give us shit and they all expect us to bare it
I only wish our starving students got less sticks and more carrots
So go demand the snack-less schemers give us Uber Eats credit

*meth*NEWS

CAPTAIN AMERICA: CIVIL WAR 2

Today, writing for **mathNEWS** is a sister bonding activity, and when presented with the question "What kind of person is your ideal partner?" we launched into an argument over which Marvel bae is the ideal partner, leading to another feature film in the MCU, Captain America: Civil War 2.

I (Whild) voted Captain America. Obviously the sweetheart. Will keep his promise to dance with you. Has America's ass. What more do you need?

The sister (Bhaffling) voted Tony Stark. In her words: he is funny. Will help me live out my engineering dreams (UW Eng '31). Not bad looking either. We could be each other's soundboards, and we'll be smart together. <3

This writer is obviously biased in choosing a winner. Thus, dear reader, that is up to you.

Lots of Love for the Avengers,

Whild and Bhaffling

sexNEWS

"HOW DO I STOP BEING SINGLE?", BUT ASKED IN LIKE A DOZEN DIFFERENT WAYS

Welcome to **sexNEWS**, a biweekly column where I answer questions about relationships and sex, because I'm one of the few **mathNEWS** writers who isn't single and so I am automatically one of the most qualified writers Q.E.D.

Answers will vary in quality and seriousness by about as much as my grades vary numerically.

If you have your own questions, send them to mathnews@gmail.com and they will be anonymously shared with me to answer in the next issue. You can also include additional information that you want passed on to me, but not included in the question when published: if you're worried that giving enough detail will reveal your identity, just specify what part of your question can be included in the issue.

HOW DO I RESOLVE MY FEAR OF INTIMACY?

This is above my pay grade, I recommend therapy. https://uwaterloo.ca/campus-wellness/counselling-services

THERE'S THIS GIRL I LIKE. WHAT DO I DO?

Ask her out! For help with that, see the next question.

WHAT IS THE BEST WAY TO ASK SOMEONE OUT?

Just do it! In person is better, but that's not really a thing during the pandemic (unless they're your roommate I guess? Don't ask out your roommate during the pandemic though). So after that I would just say text them something like "I think you're cute/handsome/whatever, do you want to go out with me for dinner this weekend?"

What happens next was not in the scope of your question, if you have further questions submit again for the next issue.

HOW DO YOU DO RELATIONSHIPS WITH COVID?

Starting a new relationship during COVID? Seems hard man. Try dating websites, or honestly just wait until things get better.

Continuing an existing relationship during COVID? That would be similar to a temporary long distance. I have experience with this because my girlfriend once did co-op in a far away remote town. We video called and texted nearly every day, and I think that's the way to go here.

HOW DO I GET A BOYFRIEND?

Step 1: Find a guy you like.

Step 2: Ask him out.

Step 3: When (guys are horny and almost guaranteed to say yes) he says yes, don't creep him out on your date.

WHAT DO I LEAD WITH WHEN I SLIDE INTO SOMEONE'S DMS?

I like to go with a classic. Some of my favourite openings are "Hi!" "Hello!" and "Hey, what's up?". If you want to be really deep you can go for "How are you?"

MY BOYFRIEND HAS A MINECRAFT GIRLFRIEND IN A SERVER THAT I ALSO PLAY ON, WHAT DO?

You should have a honest conversation with your boyfriend and establish boundaries about what you're comfortable with. You could also consider polygamy. Although if you're in a monogamous relationship this could be a sign of a deeper problem in your relationship that needs addressing. You should definitely sit him down for a long conversation about your expectations with monogamy and virtual relationships.

I HAVE HAD A FEW BAD RELATIONSHIPS, AND I THINK I'M BAD AT COMMITMENT — I'LL ENJOY SOMETHING FOR A WEEK OR TWO AND THEN START GETTING AFRAID OF SEEING THEM FOR VARIOUS REASONS. WHAT SHOULD I DO TO MAKE THIS BETTER?

Maybe you're not at a stage of your life where you're ready for commitment yet, or maybe you just haven't met the right person. If that's the case, you should just be upfront with people you're dating that you're not looking for commitment. On the other hand, if you think you've ruined good relationships that you could see becoming something long term, you should engage in some self-introspection. What is making you afraid? Did you have a bad experience in the past? You might find that you're able to identify the problem easily and deal with it. You might also find it hard, in which case, consider seeing a therapist to help you through it.

WHAT IS THE MOST VANILLA SEX POSSIBLE?

Missionary where both partners are completely silent and have the lights off.

HOW DO I KNOW IF A GUY LIKES ME?

Ask.

HOW DO I KNOW IF A GIRL LIKES ME?

Ask.

HOW DO I KNOW IF A GIRL IS GAY OR JUST BEING NICE?

Ask.

HOW DO I POLITELY ASK FOR A GUY'S HEIGHT?

Ask him, "How tall are you?"

HOW DO I TELL SOMEONE I LIKE THEM?

Say "I think you're cute/handsome/whatever and I like you, do you want to go out?"

WHAT TO DO IF SOMEONE YOU LIKE LIKES YOU BACK?

Ask them out, or just do a bunch of horny texting until it fizzles out.

WHAT TO DO IF SOMEONE YOU DON'T LIKE LIKES YOU?

This happened to me once! I ignored them until I found a partner then casually mentioned it and I never heard from them again.

HOW DO I REJECT SOMEONE WHO HASN'T ASKED ME OUT YET?

You can't; by definition, to reject someone they must have asked you out or told you that they like you.

WHAT'S THE BEST FLAVOUR OF LUBE?

I don't think there is a best flavour. The flavoured lube is more to mask the taste of other bodily secretions, not to be enjoyed.

HOW MUCH OF A HEALTH HAZARD WOULD IT BE TO DRINK 2 LITERS OF THE BEST FLAVOUR OF LUBE?

Depends on how quickly you drink it. 2 litres over a few years is probably not a problem. 2 litres in one night is a problem.

WHICH PUSSY IS THE BEST PUSSY?

Wet ass pussy.

WHEN YOU FIND OUT SOMEONE WHO YOU REALLY LIKE DOESN'T LIKE YOU BACK, HOW DO YOU MOVE ON?

This is a tough one. If you **really** liked someone, there isn't much you can do to get over the pain faster. All you can really do is try to lessen it. Picking up some hobbies or putting some more effort into your studies can be good distractions until you're ready to deal with it at a later point. It's probably a good idea to give yourself some distance between you and them, at least for a few weeks. My high school girlfriend and I broke up about a week before I started at Waterloo because we didn't want to do long distance for 4–5 years and it took me until well into my 1B term before I was fully over it. I don't know how special they were to you, but you may very well think about this person for a long time, even once you're over your feelings for them, and that's normal and okay. Being rejected can really hurt when it's from someone you care deeply about, and there isn't really much you can do besides distract yourself and tough through it. Good luck, and I wish you all the best. <3

Senior math**NEWS** *Relationship Correspondent*

A POEM ABOUT MY WINTER BREAK

With nothing to do 'til I'm at least 22
I could work on my project all break
With some luck from the valley I would find work in Cali
And never again see Columbia Lake
But computer science is hard and very soon I felt barred
From getting a single thing done
So I quickly decided in the situation provided
I might as well do something fun
To increase my job chances and improve my finances
I built Mr. Goose a shrine
I put it on Reddit and thought I'd forget it
But it assembled a whole crowd of geese fans online
Now I envision this group a religion
That exempt me from paying my duties and fees
As the church leader, the law can't be clearer
I can dodge taxes as much as I please
But the geese were displeased with my clever endeavour
They fight for what's good and what's fair
And my tragic loss brought their message across
They want every person to donate their share
So as a false prophet who only sought profit
This is a warning for students to come
My time is diminished and break almost finished
And my study term hasn't even begun
Dear academic advisor, I promise I'm wiser
So I hope you believe me and get it
This is my story, it's not allegory
Does cult leading count for a breadth and depth credit?

*meth*NEWS

A COMPREHENSIVE LIST OF EVERYTHING I LEARNED WHILE ACTING AS A MODERATOR FOR PSEUDOLEGAL DEBATES ON A MINECRAFT SERVER EXCLUSIVELY POPULATED BY mathNEWS WRITERS AND EDITORS

aphf

mathDATES
HOW TO ATTRACT YOUR CRUSH, GET LAID, AND MORE!

Welcome to **mathDATES**, a biweekly column where I, Finchey, discuss and dissect everything relationships and sex for FREE from the **goodness** and **virtue** of my own heart. (The Catholics can't canonize me fast enough.) You don't need to be worried about quack advice from me, since I have tons of first-hand relationship and sex experience from years of working in the field. You see, I have had sex with 739 unique individuals, been in 68 long-term relationships, had 5 divorces, and am currently in a committed but open long-distance common-law partnership of 14 days. (How'd I end up with no children? The secret is being born sterile, like a mule.) I know how to fuck. I know how to seduce. I AM WHAT TOO MUCH DICK, PUSSY, AND ASS DOES TO A MOTHERFUCKER. Because of my prominent qualifications, I became overwhelmed with questions before I even got the idea to start writing this column. I have a massive backlog of over one thousand questions to get through, so I will NOT, I repeat, NOT, be taking in any more. No rain checks, no refunds! Thanks for your gracious understanding.

> *I've been friends with this girl for a little over a year now. We met in Winter 2020, before COVID happened. We talk nearly every day and I think I've fallen in love with her. I catch myself fantasizing about what we'll do when all this is over and we can finally see each other again. What should I do?*
>
> **Love-struck Idiot**

Okay. Think about it. Do you really love her? Seriously think about it, man — do you *really* love her? Or do you just like the fantasy of her? The idea of her? Her pretty face? The intangible construct of a woman in your head shares nothing with this real, flesh-and-blood, living, breathing girl other than her looks and voice; you haven't seen her in person for nearly a whole year! You cannot truly love someone. To love is to know. But you don't *know* this girl, even if you think you do just because you're friends; in fact, *you don't know* **anyone at all.** BECAUSE PEOPLE ARE INFINITELY UNKNOWABLE AND THE ENLIGHTENMENT HAD IT WRONG. Science and reason is a sham. As long as the mind is intertwined with the earthly body, we will never be able to truly, fully, completely grasp it. Maybe super-intelligent A.I.s or alien beings of pure energy could comprehend it, and therefore us, in its entirety — but neither of *those* are we, are *any* of us, and most certainly *not* you. Let not hubris be your downfall. Know this: you cannot "love" this girl. You cannot even love your family, or yourself, you doomed child of Man. Wither away in your own irrelevance and futility, and let your ego dissolve like dust in the wind.

Next question!

> *What's a good first date idea?*
>
> **First Time For Everything**

The following advice isn't COVID-safe, but it's not like you have many (or any) options for a first date right now, since all the usual avenues got locked up. Nevertheless, please read *Your Definitive Guide to Getting a Date this Valentine's Season* from Volume 139 Issue 2 of **mathNEWS**, authored by me. Remember the **ETL** pipeline:

- **E**conomy Lube
- **T**he Metamorphosis by Franz Kafka
- **L**eonardo, leader of the Teenage Mutant Ninja Turtles

Next question!

> *Lately, whenever I go out into town for a walk or to do errands, I get the sense that I'm being followed. I look behind me and find no one there, but I can't shake the feeling. Sometimes it looks like the shadows on the streets are moving, shifting, somehow, but I think that's just light reflecting off of black ice. Yesterday, however, as I was in bed, about to fall asleep, I heard a thump in the kitchen, so I went to check it out. I think I only saw it for a second in the dark, but there was this tall, skeletal figure with tiny glowing red eyes all over its body, which was dripping this black goo. It broke my window and jumped out of it when it saw me. Do you know a company that can repair my window for me?*
>
> **Drafty David**

I'm not versed in window repair services, but I can give you some guiding advice to avoid happenstances like this from occurring in the future. It looks like you've got a person who likes you but won't take no for an answer! Annoying! Remember the similarly-named-but-different-in-all-other-aspects **ETL** pipeline. The general idea is to put off your courtier as much as you can by:

- **E**ating: a lot of horse tartare. Being seen eating raw red meat will make you appear brutish and animalistic, which are not qualities most people like in potential partners. Furthermore, tartare is usually expensive, so eating a lot of it will further the perception that you spend money frivolously. Finally, eating horse meat is not common in Ontario and will likely be seen as disgusting to most people who were raised here (I am not sure about other geographical regions); if you are preparing your own tartare you can acquire horse meat from specialty butchers in Toronto *or* in nearby Quebec, where it is plentiful.
- **T**oxoplasma gondii: hopefully you become infected by this bacterial parasite which can be found in inadequately cooked or cured meat. (Quick tip: skip the stove and eat your ground meat cold out of the package.)
- **L**owered IQ: associated with latent toxoplasmosis in adults in a study by Flegr et al. (2013). A final kick in the metaphorical nuts of all sapiosexuals — ugh!

Next question!

> *My friend likes to say he fucked my mom a lot. At first, I wrote it off as just a joke, but he kept saying it over and over. When I confront him about it, he insists he's telling the truth. It's not funny anymore. What do I do to get him to stop?*
>
> <div align="right">U<small>NFUCK</small> M<small>Y</small> M<small>OTHER</small></div>

I know you don't want to hear this, but your friend is me. I fucked your mom.

<div align="right">*Finchey*</div>

THE CHICKEN FRIED RICE THAT MADE MY CHRISTMAS

Yes, you read that title and inferred a conclusion from it correctly! I am back with another amateurish recipe I used to great success. After the resounding success of my last one (I believe some people on Reddit criticized me for vague instructions, hopefully I can do worse!), I have decided to bring forth to you, the chicken fried rice that I had on Christmas Eve. The title is a *bit* clickbait in that I didn't actually have them on Christmas Day, but that's just because there were no leftovers—goes to show how amazing they are.

APPARATUS REQUIRED

- One pan
- One spatula
- Uh… that's kinda it actually.

MATERIALS REQUIRED (SERVES ONE)

- Half a cup of rice, cooked and ideally left in the fridge for a day
- Half a cup of diced onions/spring onions/carrots/peas/other vegetables you like (really recommend putting in *at least* onions and/or spring onions, rest is up to you)
- Two chicken breasts or approximately 250g of diced chicken
- 1–2 tbsp olive oil
- 2 tbsp soy sauce (seems like a lot but trust me)
- Ginger and garlic (½ tablespoons each, pastes or finely chopped)
- Salt and pepper to taste (I used ½ tablespoon each)
- MSG (½ tablespoon, optional but recommended)
- 3–4 tbsp sriracha sauce (optional, can skip if you're not into spicy)

PROCEDURE

1. Dice your chicken into small cubes if it isn't diced already, then throw it into the pan with the oil, cover it well with the oil, and cook until the pink color all turns to white.
2. Add the vegetables, salt, pepper, MSG, ginger and garlic, and cook for 3–5 minutes further, mixing continuously.
3. Add in the cooked rice, ideally straight from the fridge, mix everything up, then add soy sauce and sriracha, then mix everything up again. Cook for

5–7 minutes, mixing continuously again. After that, you're done!

OBSERVATIONS

This was easy to make. Ridiculously easy. It took me thirty minutes to cook, wash up, eat, and start writing this article. And for that, it tasted *amazing.* I don't know how authentic fried rice are supposed to taste, but when my mom made it at home, it tasted *exactly* like this. I love these, it's an amazing comfort meal—easy to make, delicious, and brings back homely memories.

CONCLUSIONS

And that's it! This recipe is much shorter than usual because it's such a quick and painless process. I daresay it's easier than **My First Co-op Pasta** from all the way back in v143i3. I guess I've become a better chef since then. On a completely unrelated note, do they have a MasterChef Canada?

As always, remember to leave a like on my article, send comments to spam@tendstofortytwo.tk, and subscribe to **mathNEWS** for more articles like this!

<div align="right">*tendstofortytwo*</div>

$8 \to \infty$

it was meant to be eight
no sooner, no late
the months we were spending apart
yet much more did I wait
been a year now in date
evermore will I long for your heart

<div align="right">*M-A-T-H*</div>

13 doesn't exist.

<div align="right">ROB HACKMAN</div>

ON ELECTORAL REFORM, PART 2

profTHOUGHTS *CONTINUED*

The key thing to know about Canada's current electoral system is that the federal election is really 338 local elections, each one electing one MP to Parliament. The party that wins the most local elections ("seats") usually gets to form the government.

The second brain teaser (how could the Liberals win all 338 seats?) is the easiest one to explain. For example, consider the 2015 election. If the support for each party is evenly distributed across the country, then in each local election the Liberals will have 40% of the vote, the Conservatives 32%, the NDP 20%, and other parties will have the rest. In each local election the Liberals have the most votes and they win them all.

How could the Liberals have lost every seat, in spite of having more votes than each of the other parties? Again, it depends on the distribution of votes. Assume the Liberal voters are evenly distributed at 40% in each local election but that the other parties are not evenly distributed. In a bunch of local elections the Conservatives make up 41% of the voters (enough to win that local election). In other local elections the NDP have 41% of the voters. If the Greens are concentrated into just a couple of ridings, even they could win.

What happens most of the time is that support for each party is not distributed uniformly and each party wins some of the local elections. The results are almost always skewed. Not as badly as the brainteasers (well, there was the 1987 New Brunswick election where the Liberals won every seat in spite of 40% voting against them…), but badly enough.

For example, in 2019 the Conservatives earned 34.4% of the votes and won 35.8% of the local elections. Meanwhile, the Liberals earned only 33.1% of the votes but won 46.4% of the local elections ("seats").

What?!? The Liberals got fewer votes but more MPs in Parliament? Yup, the other parties got screwed by the distribution. The Conservatives came out pretty good, but the NDP got less than half the seats that they should have had and the Greens should have had 7 times as many seats as they actually got.

The brainteaser I do not have an answer for is the last one: How can our citizens think such a volatile electoral system is OK?

Actually, polls show that up to 80% do not think it's OK.

There are alternatives. If you look at the top 50 or so countries on the United Nations Human Development Index (basically the democratic countries you would want to live in), only four use the same electoral system that we do. The vast majority of those countries use an electoral system in which the number of seats each party wins (and political power they enjoy) is closely proportional to the number of votes the party earns.

40% of the votes wins you 40% of the seats and 40% of the power. What could be more fair?

If most people think our current system stinks and there are viable alternatives, what's the holdup? Canadians have tried to change their electoral system a number of times, but so far the efforts have always failed. Often times it's been because of meddling by politicians (the same ones who got a majority with only a minority of the votes). Other times we've put a complex question (what should our electoral system be like) to a referendum vote — which is easily misled by all sorts of fear-mongering and distortions.

I think there are two viable alternatives for changing our electoral system to something that's fair. One is to convince the courts to rule that our current system is unconstitutional. As noted in my introduction, I'm involved in one such effort. The other is to summon the political will for a "Citizen's Assembly" — an assembly of randomly chosen citizens who are willing to take the time to educate themselves about electoral systems and make a binding recommendation. Such assemblies have been used successfully in other countries and were even leading to real electoral system change in Canada — before the politicians got involved.

Want to know more? Take a look at `fairvote.ca` or `charter-challenge.ca` — or get in touch with me.

Byron Weber Becker

AMERICA REJECTS HATE, DIVISION FOR AT LEAST FOUR YEARS

UW Unprint

N FLAGS SEEN AT THE CAPITOL ON JANUARY 6

Thanks to this website[1] I ended up down the rabbit hole for a good couple hours, seeing all these videos taken at the US Capitol building. During my time spent scrolling through the various videos, I couldn't help but keep track of the various flags seen everywhere.

PRIDE FLAG

Out of all the possible flags out there in the world, the Pride Flag was one of the ones I had least expected to see understandably. It also became the reason why I decided to document the various flags in the first place.

USA AND SOUTH VIETNAM

I saw these two on the same flagpole so… I guess that particular person just wanted to represent both countries on the losing end of the Vietnam War.

KAZAKHSTAN

I guess Borat did manage to infiltrate another Trump group.

PALAU

I can't come up with a plausible reason as to why someone flew this flag, other than perhaps that person was Palauan? Out of all the countries in the world, the country whose population is around 20,000 people is the one whose flag is present? Its presence ended up making the Ambassador of Palau to the US denounce the use of this flag afterwards.

TEXAS

I'm not really surprised of this flag's presence, considering the population of Texas.

FLORIDA

Again, considering its population, I'm not really surprised of Florida either.

ARIZONA

I'm not really shocked either at this one, also considering it was one of the swing states this election.

VARIOUS "STATE SEAL ON BLUE BACKGROUND" FLAGS

I have no idea what state(s) these flags were representing. If there's one tiny thing to take away from this event, it's that it really shows the importance of good flag design including being able to recognize the flag from a distance.

GEORGIA (COUNTRY)

Hmmm… Now this makes me wonder if the people that flew the previous state flags were actually from that state or not since it seems highly likely that the person confused Georgia (country) with Georgia (US state).

EAST TURKESTAN

So it seems as we're going into unrecognized territory with this flag. Don't let China find out.

VARIOUS US FLAGS THROUGHOUT HISTORY

Alongside the current version, there was the Betsy Ross version too, as well as everything in between. If you wanted to see a some US flag with a certain number of stars, it was likely that there would be at least one somewhere, it seems. This leads me to the following.

BOTH THE FORMER AND CURRENT US NAVAL JACKS

Considering that the naval jack is only used for ships, it's a bit odd that people decided to fly these. Maybe it was the "don't tread on me" written on one of them that led them to decide on it. Speaking of that phrase…

MULTIPLE VARIANTS OF THE GADSDEN FLAG

I don't think I have ever seen so many different kinds of the Gadsden flag. There were ones with a yellow background or red, blue, white, etc. There were snakes in all sorts of positions and coils. Where they get all these variants, I have no idea.

FLAG OF TAUNTON, MASSACHUSETTS

This was a flag I had never seen before. From the video, I could only get a partial description of the flag so it took a bit of digging around before I found out exactly what it was. Reading a bit about the history of the flag, I find it a bit ironic that someone chose to fly this flag that day.

THE MOULTRIE FLAG

Also known as the Liberty Flag, I had originally thought the flag was the flag of South Carolina before I noticed the lack of a palm tree and the word "Liberty" inscribed in the crescent moon. Again, reading about its historical context makes its presence at the capitol that day quite ironic.

FLAG OF MISSOURI

This was another flag where I only had a partial description. I got the horizontal stripes of red, white, and blue but I couldn't get exactly what the seal in the centre of the flag was. Though, I'm quite confident of my guess of this being the flag of Missouri, but I might still be wrong.

UNIDENTIFIED FLAG

Unfortunately, this last flag is one that I doubt I'll ever be able to properly identify. What I know for sure is that the flag had horizontal stripes of green, white, and red, with some symbol in the centre, but it is insufficient in detail for me to figure out what it is. I can say exactly which flags this flag is not, but that's about it.

boldblazer

1. The site is https://projects.propublica.org/parler-capitol-videos/

PROVING THAT THE CALGARY FLAMES SUCK

Theorem: The Calgary Flames suck.

Proof: We first introduce the following definition:

A player sucks if they possess the capability to make fans in the majority of teams, including their own, hate them.

We now introduce the following axiom:

A team sucks if its active roster or play is dominated by sucky players.

Matthew Tkachuk plays for the Calgary Flames. Matthew Tkachuk has a history of intentionally trying to injure players, which makes him suck. Neither the Calgary Flames organization nor Matthew Tkachuk have tried to reprimand Matthew Tkachuk for his behaviour, which has led to games with the Flames being dominated by Tkachuk's dirty, dirty plays. By the given axiom, we have thus shown that the Calgary Flames suck. *Q.E.D.*

The rest of the Canadian division

> For the record, although I did once say "there is beauty in mathematics", I did not then add "and it is me".
>
> **STEPHEN NEW**

WHICH PLANET SHOULD WE COLONIZE AFTER ELON MUSK COLONIZES MARS?

Elon Musk aims to send a million people to Mars by 2050, sparking a new age of colonizing planets rather than countries. Which begs the question, which planet should we colonize after Mars? Here is a definitive ranking of the best to worst planets to pick.

1. Mercury: This is the closest planet to the sun, making for some excellent tanning conditions; your skin will be graced with those UV rays like never before. Its proximity to the sun also results in longer and brighter days all year round. Goodbye seasonal depression!
2. Jupiter: Known by NASA as the grandest planet, Jupiter might actually have a solid inner core about the size of Earth. If we arrive and this core does not exist, no problem! Jupiter has over 75 moons, some of which may have oceans beyond their crust that are ready to support life. Its status as a gas giant gives rise to a whole new sport: gas floating. Basically flying, but not.
3. Saturn: Saturn may seem like a smaller, less habitable Jupiter. And it is. That's why it comes after Jupiter. There is logic behind this ranking. However, it gains the title of third for its beautiful rings, leading to some beautiful skygazing all year round.
4. Uranus: Neptune and Uranus are basically the same, but we like to say Uranus and then laugh, so it gets points for that. If you love winter, you'll love Uranus! The planet is known as an ice giant, leading to some excellent conditions for skiing, snowboarding, and snowpeople building.
5. Neptune: Like Uranus, but farther from Earth. Maybe you like that. We don't.
6. Venus: Venus is objectively the worst planet to colonize. To begin, global warming there is even worse than it is here on Earth. The planet is covered by thick, toxic, yellow clouds that trap heat and cause the most aggressive greenhouse effect, leading to temperatures hot enough to melt lead. We are trying to get away from the global warming on Earth, not run towards it. It used to have water but it killed that, just like it will kill us. This is not a welcoming planet.

There ya have it folks. Good luck on your future interplanetary travels!

Whild

GRIDWORD

YET ANOTHER gridWORD

gridCOMMENT *145.1*

Happy New Year! I'm back for a second time as **gridMASTER**, and for another term. Hopefully everyone is enjoying their classes for the new term, and isn't too swamped with work yet.

This week I bring you "The Weather Outside is Frightful", a themed cryptic crossword to match the season. The **gridQUESTION** for this issue is:

"What is the best way to welcome the New Year?"

Remember to email your **gridWORD** solution attempts to mathnews@gmail.com with your name or a moniker, and your answer to this issue's **gridQUESTION**.

Cloak and Vorpal Dagger

ACROSS

4. Play back voiceover for sprout (3)
7. Arctic animal destroys a pearl orb (5,4)
9. Midday's lull; I act even as perfection (7)
10. Day off due to hazardous acid sky (4,3)
12. Acquiesce nicely: fragments are picturesque (6)
14. Device for tea uses nettle with key lime rather than nectarine (6)
15. Crystal of snow shatters, fleas know (9)
18. Rapidly falling snow suddenly comes in overwhelming quantities (9)
21. Declared to be a king when making cookies (6)
22. Taxicab instructed partway to small chalets (6)
24. Tunnels into burrs; ow (7)
25. Skating location written in Spooner's rice ink (3,4)
27. Winter sport involves rushed key choice (3,6)
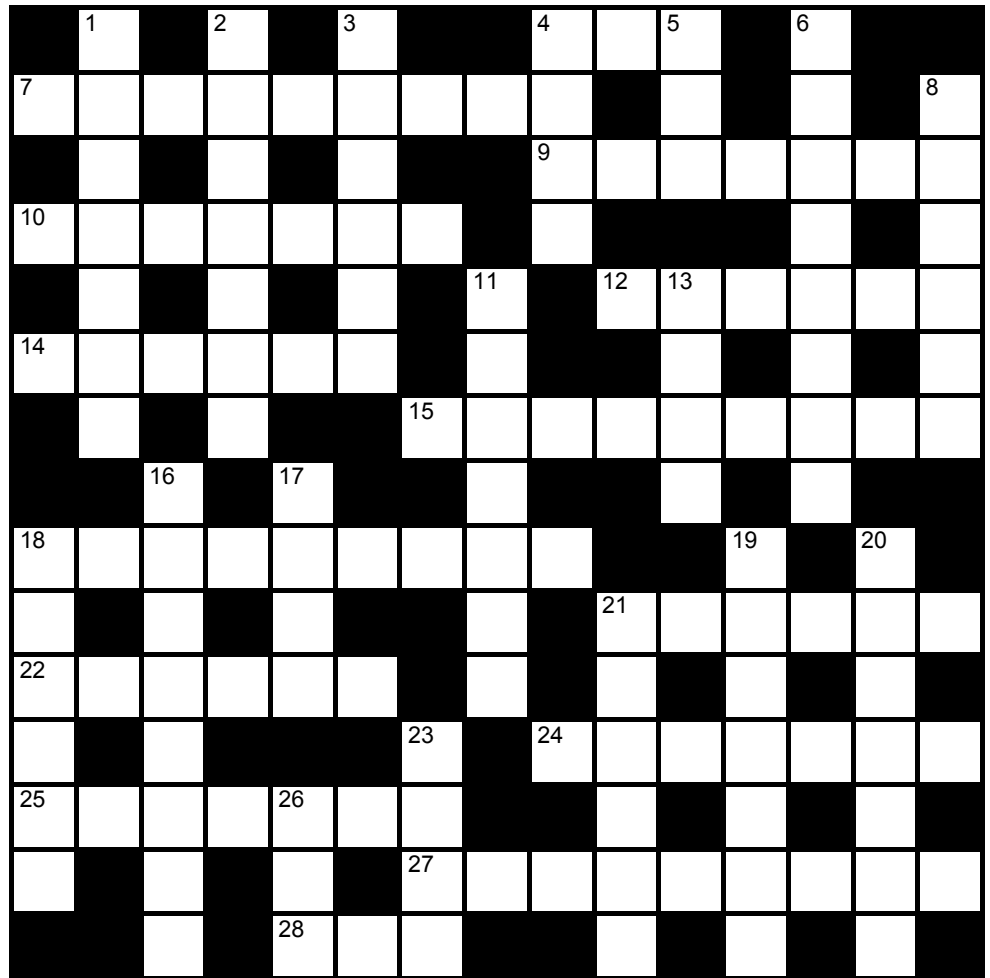28. Den confusion leads to conclusion (3)

DOWN

1. Tree with cones nice for mess (7)
2. Coats extraterrestrial in cards (7)
3. Having the power to surround letters in flames (6)
4. Edge of a bowl is filled to the point of overflowing (4)
5. One rotation of a planet central to yoda youth (3)
6. Schedule a loan in car (8)
8. I hear cycle of frozen drips (6)
11. Birds make first flight measurement (7)
13. Decaf espresso essential to coffee bar (4)
16. Songbirds are versatile brawlers (7)
17. Yawn, replacing yearning with dancing at daybreak (4)
18. Polar cacti is fake, about right (6)
19. Strange cake, sir, for an alpine competition (3,4)
20. Winter creations began solid, now men (7)

21. Branches bow audibly before gusts in the end (6)
23. Raving kids cause car slide (4)
26. Frozen water forms circle evenly (3)

lookAHEAD

SUN JAN 31	MON FEB 1	TUE FEB 2	WED FEB 3	THU FEB 4	FRI FEB 5	SAT FEB 6
WUSA candidates Reddit AMA on r/uwaterloo		Groundhog day Voting period begins for WUSA Elections (until Feb. 4)	Last day to set up fee arrangement and Promissory Note in Quest		Final examination schedules released	

SUN FEB 7	MON FEB 8	TUE FEB 9	WED FEB 10	THU FEB 11	FRI FEB 12	SAT FEB 13
	mathNEWS 145.2 production night			Cycle 1 Employer rankings available on WaterlooWorks @ 2 PM	**mathNEWS** 145.2 released Lunar New Year Cycle 1 Student rankings due on WaterlooWorks @ 2PM	Reading Week begins

OBLIGATORY "VOTE IN YOUR STUDENT ELECTIONS" ARTICLE

Hello all, and congratulations for making it to the end of a hefty issue of **mathNEWS**. I'm here on the **lookAHEAD** today to remind you to vote in the WUSA elections on Feb. 2-4 at vote.wusa.ca. Make sure you tune into the Reddit AMA on Jan. 31 and read up on what your candidates' platforms are.

That's all I have to say. Usually we have a random writer passionate about student governance write these types of articles whenever an election is coming, but no one stepped up to it this time around. I was thinking about how to fill this space on the **lookAHEAD** when I realized that WUSA elections were next week and we didn't have an article about it yet. So here I am. I don't know how to end this, so thanks for coming to my TED Talk, I guess.

clarifiED

otherNEWS is made technically possible by club executives of the Math Faculty.

I say "technically" because if they had sent us more news this week, this box wouldn't be here.

THE mathNEWS EDITOR WHO PUTS THE "NEWS" IN mathNEWS