"IF YOU COULD HAVE ANY SUPERPOWER, WHAT WOULD IT BE?"

Happy February, my dearest **mathNEWS** reader!

This time last year, in **mathNEWS** 145.2, I wrote about how the month of January went by surprisingly quickly. Well, this year, I'm happy to report that January seems to have returned to its normal pacing to have taken a very ordinary time to finish. The job search is still going on, reading week is still in the realm of Someday™, and I am still on top of my assignments for the term. We all know none of this is going to last, so let's enjoy it while we can.

Speaking of things that are not going to last, online school! In a shockingly controversial move, the university has decided to stick to its word and keep moving forward with its reopening date of February 7. I'm sure there are plenty of legitimate reasons and plenty of spicy drama behind the decision, all of which I assume is being hotly debated by the intellectuals over at the r/uwaterloo subreddit. All I can say is that this is going to be the first time in nearly two years that I step into a classroom with the goal of learning, and I can't decide if I'm excited or nervous. Honestly, probably a bit of both.

Another thing I'm excited for is this issue's **mathASKS**! The famous new editor, enamourED, has been interviewed by the **mathNEWS** readership, and I can't wait to see what she has to say about amogus, numbers, blockchain, and more! Wait, crap, are those spoilers? Eh... I'd say they're teasers. Don't you feel teased? Go check it out! It's right there. →

And the issue doesn't stop being great there. We got multiple articles from Linux users,[1] math orientation adverts,[2] reminiscing about video game exploits,[3] conspiracy theories about our President and Vice-Chancellor,[4] and much more.

Need I say more? Start reading today!

caffeinatED
Editor, **mathNEWS**

1. Year of the Linux desktop, anyone?
2. Go apply, we'll be Tie-Guard together!
3. Honestly, so relatable.
4. Please note that the views and opinions expressed in **mathNEWS** articles are those of their authors, and do not necessarily reflect the views of **mathNEWS**.

Predap	The question's not very well-defined, as I could just say the power to do whatever I need to do in any given situation. However, for an existing superpower, it's hard to beat being able to always win like Isca the Unbeaten.
girafarig	Invisibility, but only on the internet
Deriving for Dick	Having a fat ass
boldblazer	Relaxation and comfort. Unfortunately, that's not something you'd see get made into a movie though.
evilevievil	Time travel.
X	Forget the accident (it was ten years ago, it wasn't my fault)
tendstofortytwo	Ability to stick to a schedule would be pretty nice.
Skit	I could say manipulating probability but i remember two of my friends had a massive argument about it when i brought it up in high school so i'm just gonna go with shapeshifting and commit identity fraud
jeff	Adding any one, singular feature to the next C++ standard
A cool pen name	The courage to drop stats
Vincent	The ability to unilaterally change any University of Waterloo Policies at will.
Finchey	Laser eyes, except instead of lasers I shoot out lines of Lazeez hot sauce.
CC	Shapeshifting
mouse	The confidence of a Canada Goose
Lemman	The ability to own lemons
sqrt(cause)	The real superpower is the friends we made along the way.
bipED	The power to sort anything
clarifiED	Flight!
caffeinatED	Coffee whenever/wherever/however I want.
GOD ⚡ peED	Magneto's powers would be cool, but I also want the helmet (for fashion reasons).

ARTICLE OF THE ISSUE

Rubinstein. A cool pen name. Prize MC 3030. Help I'm out of sp

terrifiED
Editor, **mathNEWS**

I can't believe Dot Dot Dot by axman13 is 12 years old…

NAMAN SOOD, math**NEWS** EDITOR FOR WINTER 2022
ALONG WITH CHEN CHAI, TERRY CHEN, CLARA XI, AND YANG ZHONG

math**ASKS** 148.2
FEATURING math**NEWS** *EDITOR ENAMOURED*

PREDAP: YOU ARE TRAPPED AT THE SIZE OF A PILLBUG. HOW DOES YOUR LIFE SUBSTANTIALLY CHANGE, AND HOW (IF AT ALL) DO YOU ATTEMPT TO COMMUNICATE WITH PEOPLE YOU KNOW?

Hiya Predap! That's a fun question!! I've always wanted to be small like a pillbug and I think it would be super duper cute! I'd start my day by eating my pillbug-sized breakfast, cooking little eggs in my pillbug-sized stove with pillbug-sized toast, then go out for a day of sightseeing. Life is soooo exciting and fantastic! I'd call my parents and friends on the phone every day.

Lemme get a bit more ✿ serious ✿ than usual — I think that one of the most important skills I've ever learned is how to let go~ Life will never be the same, and the way I know everyone else will be different too. Sometimes you have to let go of who you *think* you are, and embrace who you *really* are, even if it isn't your choice.

SKIT: WHY ARE YOU NOT SUS? EXPLAIN IN ONE PARAGRAPH OR LESS. SHOW YOUR WORK.

Pleased to meet you, Skit!! I'll let ✿ Lady Gaga ✿ defend my unsusness:

> *I'm beautiful in my way*
> *'Cause God makes no mistakes*
> *I'm on the right track, baby*
> *I was born this way*

AMOGUS: AMOGUS

I *adore* Among Us!! It's SO FUN!! When I play with my friends, we don't have any impostors because they're not fun and they're so 🐱 *mean* 🐱. We just play on the maps and complete tasks until everybody wins!! It reminds me of playing house back in the day. 😊

BOLDBLAZER: YOUR NAME HAPPENS TO BE REALLY SIMILAR TO A NEW POKEMON INTRODUCED IN THE HISUI REGION FOR THE NEW POKÉMON LEGENDS ARCEUS GAME. DO YOU HAVE ANY COMMENTS ON THAT SIMILARITY? DO YOU FEAR THE MIGHTY HAMMER OF THE LEGAL TEAM OF GAME FREAK/ NINTENDO/THE POKÉMON COMPANY?

Heya boldblazer! Your question reminded me I haven't talked to my Pokémon friends recently!! I visited and said hello, and just like you mentioned, 😺 Enamorus 😺 was there with them!! 😺 Enamorus 😺 seems very kind and cute and nice (at least when I talked to them), but some of our mutual friends say that sometimes 😺 Enamorus 😺 is more like 🐱 Enamorus 🐱.

I was named out of love, and it sounds like Enamorus was too! I hope the Pokémon people won't get angry with me just for talking with their Pokémon… 👉👈

BOLDBLAZER: DO YOU HAVE AN AMERICAN COUNTERPART CALLED ENAMORED?

Oh, enamorED? She's my sister down in Silicon Valley right now making ✿ SaaS keyboard platforms ✿ or something! I adore her, and think she's wonderful! She works very, very hard in everything she does. Once, I tried to take her on a vacation to the Rocky Mountains, but she was caught up with working remotely the entire time we were there, even in the canoe. 😩

DERIVING FOR DICK: WHAT IS YOUR NATURAL HAIR COLOUR?

Hiya Deriving~ It's ⚡ Electric ⚡ Blue 😨, but changes depending on how I feel! I've gone blonde a few times, and jet black is always so goth and edgy and cool!!

MOUSE: WHAT IS THE LEAST NATURAL HAIR COLOUR YOU'VE WORN?

Hey mouse!! I *adore* your name!! I think black must be the least natural hair colour I've worn since my natural hair colour is ⚡ Electric ⚡ Blue 😨. Black is just so still and formal compared to that!

DERIVING FOR DICK: DO IT BE SQUIRTING?

Water gun fights are so fun~ I did them *all* the time back in high school! 🔫

χ: ENAMOURED? ENAMOURED WITH WHAT???

Hi χ! The answer is enamourED with *everything* 😌. What isn't there to be enamourED with?! My favourite thing is listening to people, though. Everyone has soooooo many unique 😄 and quirky ✿ things that are so fun to learn about~

ME: WHAT IS THE LARGEST FINITE NUMBER YOU CAN WRITE DOWN WITHIN THE SIZE OF THE TOPICAL mathASK** ANSWER? YOU CAN'T USE OTHER PEOPLE'S NUMBERS SUCH AS TREE(3) NOR CAN YOU SAY "THIS NUMBER IS SO HUGE IT CAN'T BE DEFINED" YOU HAVE TO COME UP WITH THE NUMBER YOURSELF AND THE NUMBER MUST EXIST. EITHER WITH CODE OR MATHS NOTATIONS. BE CREATIVE.**

Hi me! Awww~ it's a firm belief of mine that largeness isn't about size, it's about *character*! 😊 And when it comes to character, there's no number with a bigger heart than my friend tendstofortytwo. 😺

APHF: WHAT'S THE BEST QUESTION I COULD ASK HERE?

aphf!! Hi!! If you ask me, the best question you can ask *anyone* is a nice "what's your favourite thing to do?" It often brings out an awesome side of people you might never hear about otherwise!

CY: WHAT'S YOUR CURRENT OBSESSION?

Hi cy! (Hey, that rhymes!) Oooh, lemme tell you about 🔫🉐 l33tcode dojo 🉐⚔!! It's this little club thing that some of the **mathNEWS** authors have been talking about lately and I think it's really really lovely. A lot of the time, we're too caught up in alllllll the hustle and bustle of life, and the ⚔ work ⚔ we've got to do, and ahead we've got to get, that we forget about *love*.

I'm not just your glitzy glam girl (though I am that too ✨)—I know a little bit about coding and stuff and I know how much people hate leetcoding because it's part of the grind for interviews! They say 🔫🉐 l33tcode dojo 🉐⚔ is about leetcoding for the *love* of the art instead of other reasons like interview prep, and I can get behind that. I know that not everyone loves everything, but if you can remember to remind yourself of what you *do* love, and take some time to enjoy that, that can be all you need. 🙂

(I'll admit I'm a little intimidated 😖 by them since I'm slow at leetcode—it takes me about five minutes for an average medium and ten for a hard 😖)

CUTLET: ASIDE FROM "✨", WHAT'S YOUR FAVOURITE EMOJI?

How're you doin', cutlet? Allow me to introduce you to enamourED's ✨ Brand Guidelines ✨

💝 💗 😍 🥰
✨ 😁 ❇ 🙊
🙂 😄 😊 🙌
😨 😺 😖 🗃
👉 👈 👎 🤚

I like 🏙 "Night with Stars." It reminds me of Van Gogh's *The Starry Night*, and how we're all our own little stars, swirling together in this beautiful, beautiful world~

ABALD MAN: WHAT'S YOUR MAJOR?

Hi Abald Man! I'm a 💗📄 Software Engineering ◉💝 gal!

DERIVING FOR DICK: WHAT ARE YOUR GOALS?

You have such *fun* questions, Deriving!! I just wanna make people happy 🙂. And dance! People sometimes call me naive, but *I* think it's important to stayyyyy positive!

ABALD MAN: ARE YOU SINGLE? IF SO, ARE YOU READY TO MINGLE? 😉

😳….. 🤗…. 👉 👈 ….. 👍

LEMMAN: ARE YOU PRO OR AMICABLE TO LEMONS?

Heya Lemman! When I was younger, at swim meets, there'd always be lemonade for sale at the concession. Lemonade reminds me of the past, and through that, so do lemons 😊. Lemons are great!

NOT GIRAFARIG: WHICH CY & GIRAFARIG GAME DID YOU LIKE THE MOST? WHICH DID YOU DISLIKE THE MOST?

Hello, uhh, not… girafarig? I'm glad to say I've played all six of them and *Super Little Bug* is my favourite!! Bug is sooooo cute 😍😍 and adorbs and I just love hopping around my little pillbug-sized world. Not a care in the world except for that big, juicy, delicious red strawberry 💝. It reminds me of a younger me~

leaving home makes me a little sad each time I play it, though. It's a mix of nostalgia, from the thought of all we pass through and all we leave behind, and it's mostly grey with just a few colours (I like colours!). I'm not too good at video games though a play quite a few, and trying to get all the blocks to fit was pretty frustrating 😖 at times! Mixing together nostalgia and frustration is just such a weird feeling to me… It's still a fantastic game!! 💝

CIX: HOW DID YOU PICK YOUR EDITOR NAME?

Hey Cix! So my *real* name's Enamour, so ✨ enamourED ✨ was the obvious choice~ If you're asking about where that name came from, the person who gave me it did it out of love.

BIPED: HOW DO YOU FEEL ABOUT THE mathNEWS OFFICE COMPUTER?

Hiya bipED! Yaaayy!!! My good ol' friend 🖥. Six cores, twelve threads, starry eyes, brilliant head~ 5820k thinks wayyy faster than me, and we work great together. 🙂

I think computers all have a soul! **mathNEWS** office computer is our wisened, experienced friend who always knows how to comfort me when I'm sad and is reliable and trustworthy. That friend you can confide in, and cry on their shoulder, and all that!

CLARIFIED: WHO'S YOUR FAVOURITE EDITOR AND WHY?

Hi there, clarifiED!! Since you asked, my favourite editor is you!! You keep the rest of us (or at least me) on the right track when the crazy ideas start sprouting~

CLARIFIED: WHAT IS LOVE?

Love! You're asking me about love!! Love is the most beautiful and pure part of all of us 💝. It's the part of us that does crazy and irrational things for no reason other than *we want to*. It's the act of giving yourself to someone or some act in complete, utter, selflessness.

It's why I'm here~ 🙂

TENDSTOFORTYTWO: I HAVE AN INTERVIEW IN SIX MINUTES, ANY ADVICE?

Hi there tendstofortytwo! Just be yourself, relax, and try to have fun!

SQRT(CAUSE): WHAT'S BEEN YOUR FAVOURITE ARTICLE TO EDIT SO FAR?

Hi sqrt(cause)! I don't usually do too much editing in the traditional feel, but I gotta say None Book With $10+ Shipping is my favourite 😎! It's sooooo cool that boldblazer just noticed that book and then actually decided to order it just to see what would happen! It's curious and quirky and fun and explorative, and something not everyone would have tried. It's really like that quote written on a placard between RCH and DWE, you know?

CAFFEINATED: WHAT IS YOUR 5-YEAR EDITORIAL PLAN AND WHAT ARE THE IMPORTANT STRATEGIES WITH RESPECT TO PRINTING, FUTURE STEWARDSHIP, AND BLOCKCHAIN?

Hey caffeinatED!! I'm a bit new here, so my big 5-year strat plan is still in the oven, but here it is!

I think the most important part of **mathNEWS** is having writers and editors who do **mathNEWS** for the love of it 💗! I hear most big fancy strategic plans have metrics and growth targets, but mine doesn't. Mine just says "keep the *love* in **mathNEWS**!" and I believe the best way of doing that is by having an open, happy, friendly air around **mathNEWS**. ❄

Printing!!! Some day I want a cover with *two* paper colours instead of one!! Think about how glam it would be with two colours!! Also a **mathNEWS** stand in the president's office would be fun. ☺

Future stewardship!! If you're reading this and love **mathNEWS**, apply to be a ❄ **mathNEWS** editor ❄ today!!!

Blockchain?!! Umm… Blockchain!!!! ❄ ❄

CUTLET: HOW LONG DID IT TAKE YOU TO ANSWER ALL OF THE QUESTIONS IN THIS mathASKS?

Three and a half hours 😩. But it's absolutely worth it!!! All these thoughtful, *delightful* questions! Thanks, everyone, and hope you had fun! enamourED, signing off~ ☺

WHAT YOUR MATHSOC VPA IS DOING: PART 2

Hello! My name is Vincent, and this term I am your MathSoc Vice President, Academic.

I plan to update students in **mathNEWS** every issue about what I've been doing at MathSoc to improve the undergraduate experience in the Faculty.

So here's the highlights since last issue.

PROCTORU

MathSoc has been having internal discussions about how to handle courses that are using ProctorU for their midterm (i.e., the online sections of STAT 230 and STAT 231).

RÉSUMÉ CRITIQUES AND MOCK INTERVIEWS

MathSoc held our Mock Interview event on our Discord server on the 23rd, which went well thanks again to my amazing Career Events Director. Any student can join the MathSoc Discord server through the Discord UW Student Hub (the MathSoc server can be found in the "Miscellaneous" tab).

DEAN MEETING

The MathSoc executives met with the Dean and a few other Faculty administrators and discussed our reopening plan and more. Of note to students is that instructors are required to accept a self-declaration of illness if you have COVID-19 symptoms. For more information, see https://uwaterloo.ca/quest/help/students/how-do-i/self-declare-my-illness.

GOING FORWARD

We are looking forward to welcoming you all back on the 7th, and we'll be increasing our in-person offerings over the course of the term as restrictions lift. Currently Ontario is planning to lift most restrictions on March 14th, which is Pi Day!

Vincent Macri
Winter 2022 MathSoc Vice President, Academic

WHAT MATH ORIENTATION ROLE SHOULD YOU APPLY FOR #AD

Quick! Pick a number between 1 and 9…

Okay, now go find the role that best suits you and fill out the application!

☙

If you picked One (1): Teamster

- You're the parental figure of your friend group but not by choice. Everyone else is just immature and takes no accountability and so you are left with the responsibilities that none of them covet. 'Tis a shame, because you have a rather daredevilish smirk.
- You got a need for speed that puts a meth-addict to shame. Water is your beverage of choice because it won't eat away at your stomach lining. Can jaywalkers exist if there are no roads?

If you picked Two (2): Tie Guard

- You've never been to a slumber party because you were prone to wetting the bed. Shitting your pants that one time has traumatized you to the point of optimizing your organic toilet pathfinding. You never make the same mistake twice; wetting the bed is an exception.
- Stay up all night except do it outside, surrounded by the intersection of brutalism and modernity. Watch all of those movies your bestie told you to watch but put off until now. Besides, you're up 'til 4 AM anyway.

If you picked Three (3): Food/Sustainability Director

- What brings you joy in life are bong hits and vaccination mandates. There is no one who can change your political stance on marriage fraud because the objective truth courses through your veins.
- Push the vegan agenda you can't convince enough people to follow. Create as much chaos as you need to ensure that you are the last one standing on a luscious green Earth. Eat your heart out Guy Fieri!

If you picked Four (4): Devisor

- Mountain Dew is an alias for the blood that drips out of your fresh knee wound caused by a rogue arrow. Dexterity is maxed out. What can you do but roll those dice.
- Chess is a game and a lifestyle. But you strive for games that surpass the capabilities of Magnus Carlsen. We are merely your pawns, but you won't hesitate to sacrifice us all.

If you picked Five (5): Media Design

- Balance and moderation. You know exactly who you are and what you enjoy down to the exact number of rice grains that you can stomach in one sitting. Everything must be perfect, and you will stop at nothing until perfection has been achieved.
- You constantly critique and belittle other clubs and societies for their amateurish attempts at graphic design. Only you know the secrets of colour theory like the back of your hand. Rise from your slumber and set the bar high.

If you picked Six (6): Choreographer

- Deep down you long for eternal fame and legacy. You desire and crave the attention and admiration of your friends, strangers, and **mathNEWS** readers alike.
- Take charge of your destiny and do a little dancey-dance in front of 1000 people. Win over the hearts of prospective students from Senegal and some goose who will never know your name. Your voice and vision will be remembered for centuries to come.

If you picked Seven (7): (Head) Pink Tie

- Your sense of humour is manufactured from a pocket of Internet subcultures that fades into obscurity and is lost on others. You have friends that finally understand you but you can still do better than that. You'll probably have kids but because you think you can do better than your parents at understanding your child.
- Books give you comfort and it's time to give back. People admire your persistent strength and limitless quotation generation. You never chase; you only attract.

If you picked Eight (8): Finance Director

- You always opted for Prezi instead of PowerPoint. You want things done quickly and efficiently. Approximation is actually okay, it just gets a bad reputation because of the engineers.
- Exactly two things are true. You are proficient in Microsoft Excel and stocks only go up. Only a second coming of Christ could cause your fall from budgeting grace.

If you picked Nine (9): Photographer/Videographer

- Adam Sandler holds a special place in your left femur. There's no such thing as enough action in

your high-risk, high-energy lifestyle. People excite you but only if they are at a nonzero risk of death.

- Macro means exactly what you know it means, and that isn't taught in ECON 102. Blur the lines of reality but keep your focus laser sharp. You actually do see 102% of the visible colour spectrum.

If you disagree then pick another number.

Applications for Math Orientation Directors and Head Pink Tie Leaders will open on February 7 and remain open until the 27th. Apply here: https://linktr.ee/mathorientation

<div align="right">Mary Shilly</div>

WHY YOU CAN BE AN ORIENTATION LEADER #AD

"I HAVEN'T EVEN HAD MY OWN ORIENTATION WEEK. I CAN'T BE A LEADER."

Consider the training and leader retreats to be your orientation experience. By the time that actual first-year orientation happens, you will have made plenty of friends and will have familiarized yourself with the campus. All we're looking for in leaders is a willingness to participate and those positive vibes.

"I'M ON CO-OP IN THE FALL TERM SO I DON'T KNOW IF I'LL BE ABLE TO COME."

Apply anyway! If you're in or near Waterloo in the Spring term then you'll still be able to participate in training/Spring Leader Retreat. You'll be able to get a meal and other perks of being a leader even if you can't follow through. Who knows? Maybe you'll co-op in Waterloo or better yet for the university. You don't necessarily have to be present for all of O-week, as much as you can is enough.

"I HATED ORIENTATION WEEK, WHY BOTHER?" / "O-WEEK IS LAME AND SO ARE ALL THE LEADERS."

That's a valid opinion! You can change that and plan your own event that you would actually appreciate. Your voice and perspective is particularly important to us because there are bound to be first-years just like you who might not have connected with our programming of the past.

<div align="center">℩</div>

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<div align="right">Mary Shilly</div>

CALLING ALL DIRECTORS, ACTORS, WRITERS AND STAGE MANAGERS!

When I look back on my university experience, the things that stand out aren't the academics but the extracurriculars — all the opportunities to get involved. For all of you who have spent the majority of your time at university virtually, I am so sorry. That sucks. Though, knock on wood, there are some neat opportunities coming up soon for the theatrically inclined.

Kitchener Waterloo Little Theater (KWLT) is once again hosting their annual theater competition this March. The idea of the event is that you have several different teams, all given the same script, with one week to rehearse a show before having to perform it. I participated in this event on a whim in 2015 and I have been obsessed ever since. It is an amazingly fun way to connect with the local theater community.

We are aware that the pandemic is not over and we have put in place the following policies to minimize risks to participants:

- No live audience. The show will be streamed on KWLT's YouTube channel on Saturday March 5th.
- All participants must be double vaxxed.
- The script this year will ask for 2–3 actors.

All good events need participants and those participants could be you! **If you are interested in trying your hand at directing or stage managing a play please contact** pastprez@kwlt.org **by Sunday February 20th.**

If you would rather act, auditions will be held over Zoom on Saturday February 26th.

We are also looking for a short 10 minute script for this competition, with an \$80 honorarium for the writer. The due date for this script is unfortunately February 4th, the publication date for this issue of **mathNEWS** 😐. But you are university students; I am sure you have all mastered the art of winging an assignment at the last minute. If you are up for the challenge, more info about the script can be found below, outlining our specific requirements and how to apply: https://buff.ly/339Lkso.

I will even be so gracious as to give you an automatic extension 😉. The committee is meeting at 4 PM this Saturday to discuss the scripts, so as long as you can get in before then we will consider your submission.

More info for everything can be found at kwlt.org**.**

I long for the day where we can gather in theaters without caveats, but hopefully these baby steps will help pave the way.

<div align="right">Beyond Meta</div>

prof**QUOTES**

CLAS 104: DANIEL HUTTER

❝ I shudder to say that in 2017, we had the *Wonder Woman* movie… and I think I need to apologize to anybody who likes mythology for that film.

❝ And of course, who has not used the line "RELEASE THE KRAKEN" when you've cracked open a bottle? Everybody's done it, admit it.

❝ Trojan condoms! Not going there, but the idea is, condoms as strong as the walls of Troy. I'm sure there's other comments we could make, but we're gonna walk away from that one.

CS 146: BRAD LUSHMAN

❝ I'm not sure if a cufflink is the most popular Link I have, but it's a link.

❝ C tells a lot fewer lies than Racket does.

❝ What are the advantages of doing this? Almost none.

❝ Yes you could do cute things like this. I can't live without cute things like this.

❝ One of the great benefits of going back in person is there'll be a lot less lag.

❝ Isn't the original designer of C cute? No.

❝ They tried to be cute, but they cost generations of C coders additional keystrokes. Shame on them.

CS 341: ARNE STORJOHANN

❝ (Referring to Piazza) We're gonna be using the pizza site…

❝ I'm using an iPad to prepare the lectures, and if you saw my writing on the iPad… you would not want to see it any more.

CS 350: EMIL TSALAPATIS

❝ You are not dividing by zero millions of times a second.

❝ You *could* call system calls in assembly, but do you *want* to?

CS 442: GREGORY RICHARDS

❝ Smalltalk is very unhappy with me.

❝ Just don't do infinite loops. Smalltalk doesn't like it.

❝ (In voice of Kermit the Frog) I always thought it would be funny to do an entire course in the voice of Kermit the Frog, but somehow I just can't bring myself to do it.

❝ OCaml still makes it pretty gross to write imperative code, so at least that's something?

❝ Mappings between categories like this are called functors, but they're really just morphisms given a funny name because mathematicians aren't as accustomed to this kind of abstraction as we are.

❝ I've never had an experience with Pandoc that wasn't a disappointment.

❝ No formal system can model "a disgruntled employee took a pickaxe to my server."

❝ To keep this video from being infinitely long, I won't go into quite as much detail for the rest of the steps.

❝ Our grammar is actually ambiguous. (…) We'll just sidestep this problem by only writing code that's unambiguous.

❝ We describe this phenomenon as, "getting stuck."

ECON 371: PREDRAG RAJSIC

❝ Without love it's easier to calculate things.

❝ Okay, your uncle doesn't love you.

MATH 249: KEVIN PURBHOO

❝ There is a very good chance that I will disconnect, probably by the time I finish this sentence…

❝ It's not that it's wrong, it's just that you're going to regret it.

❝ After you've done this 100 000 times, or maybe 5 times, you can skip this step.

PHIL 121: MATHIEU DOUCET

❝ It's not that we're greedy; it's just that we don't want to be played for suckers.

PHIL 145: VANESSA CORREIA

❝ (Referring to a flat earth theory) I believe someone called it "super sus"…

❝ Tonight, when you go to social media, find me bullshit.

❝ Any kind of bullshit, send it my way.

❝ I am incredibly susceptible to the cuteness bias.

❝ The White House has adopted a new cat.

PMATH 351: BLAKE MADILL

66 I'm still waiting for something stupid to happen, like the nabla variant.

66 I'm one of the few Jedi left.

PMATH 370: STEPHEN NEW

66 What's the point of the first part? Well there isn't one. I did it because I could.

STAT 241: MICHAEL WALLACE

66 At this point I moved to Canada and immediately the Canadian dollar weakened. It is up to you to determine the causation and/or correlation there.

66 I speak as someone with a very high IQ and is not particularly proud of it.

66 I'm reliably informed by people with better eyesight than me that they can't see the puck either.

66 They are tempting, but pie charts are very, very bad.

66 If I say I like football I might not only be at risk of being interpreted as liking American football, but Canadian football.

66 Excellent, some clicking is happening.

66 I need one of those things on Twitch, to remind me to stay hydrated

66 So last Thursday, before the snowpocalypse…

66 This was about pandemics before they were cool!

66 I'm not advising you to drink alcohol, I'm not that kind of doctor.

66 I'm gonna sip my tea before I answer this question.

66 You shouldn't be doing math at 11:55 PM.

66 This is another function that will come back with a vengeance in Chapter 4.

66 You should be very critical of this… as in, critique it, not just throw insults at it.

66 If we ever have a blank slide, we just give it a lil smiley face and move on

66 (About an outlier) There's this little chap down here who's ruining everyone's day

66 Those gamers, they go to bed late.

66 My page count is blocking my amazing meme work.

66 You need a little stats hat on top of your algebra solving hat.

THE IMPOSTER'S GUIDE TO ACING YOUR CO-OP TERM

Hello readers, and welcome to my advice column where I solve all your life problems and get absolutely no recognition or thanks for it. This issue, I'm going to tackle the only question that should matter to a Waterloo student: how do you get an ✪ outstanding ✪ co-op evaluation, despite the fact that you're severely under-qualified for your position? Well, many self-help guides make the foolish mistake of assuming you actually do belong in your current job, and that any feeling that goes against this notion is so called "imposter syndrome". But if you're reading this article, you know being an imposter isn't a syndrome — it's a lifestyle. And with my help, you can master this lifestyle to be the most effective imposter that CECA has ever laid their tyrannical and over-funded eyes on.

If you are aware of a current popular game that involves playing as an imposter (which for legal reasons I must refer to as "within our presence"), you know being an imposter involves 3 tasks:

1. Blending into your environment
2. Convincing those around you that you belong there

And the last task, which coincidentally is also what people say I'm doing to my future by writing for **mathNEWS** instead of working on my assignments:

3. Sabotage

HOW TO BLEND INTO YOUR COMPANY

Modern tech companies have basically become full-blown cults, where a successful product launch hopefully replaces the inevitable mass suicide event. But until you're sure that's going to happen, you better get started chugging all that Kool-Aid! Remember: there is no such thing as being too into your company culture. Use their slogan as your personal mantra, come to work every day dressed as the company mascot, and live by the company's code of values that the sales team forced you to memorize during onboarding. As the ultimate display of allegiance, declare to everyone on your team that your singular goal in life is to crush the company's competitors, see them driven before you, and hear the lamentation of their HR staff. In no time, everybody will be so fixated on your undying

loyalty to your company that they won't ever question if you've ever accomplished a single task to help it.

The next step for impostering your way into a 7-figure, Silicon Valley, avocado-toast-affording salary is convincing everyone on your team that you belong with them. And to do that, you'll have to figure out how to hide the fact that you just came out of a 3-hour meeting somehow knowing even less about your project than you did before coming in. Therefore, you have to learn the art of:

OVERPROMISING AND OVERDELIVERING (EVEN MORE PROMISES)

When trying to impress people at a new job, it's always risky to set the bar too high for yourself, just to have reality hit you out of nowhere and destroy your facade. That's why you have to keep expectations moving upwards at all times, so reality never has the chance to catch up and hit you down again. A co-worker is asking when you'll be done your simple task? Tell them you found a great way to automate the whole project and you'll be done by tomorrow. Your manager is asking when you're going to have your new feature ready to demo? Tell them you're reworking their entire CI/CD pipeline and you just need the rest of the weekend to tune it up. By the time they finish googling the 47th buzzword term you've thrown at them to get another week to tidy up your monstrous 154 file PR, you will have already manipulated your way into an outstanding evaluation, and without even needing to unbox your work laptop. So it doesn't matter if it's a programming language that has been deprecated by Grace Hopper herself, or the Pre-Alpha release of Python 5.0 that's currently only being tested in Area-51. if someone is asking if you are comfortable with a language, you need to answer that it's your favourite one, and that you've been coding with it since high school.

Lastly, in your co-op term you're probably going to meet incredible, capable, and friendly interns that will spend the next 4 months of their life dedicating their time to working with you. And here's how you should show you truly recognize them for their talents:

SABOTAGE

Despite my numerous requests to Zoom and the Google Meets team, most video conferencing solutions have yet to implement a "Stab in the Back" functionality just yet (although I've heard Microsoft Teams are already testing this feature). However, what kind of an imposter would you be if you just gave up and let all the other co-ops accomplish fulfilling work that makes them look good in comparison to you? Instead, you will have to come up with your own creative way to undermine and subvert any other student on your team. The oldest trick in the book is to slowly inject a trojan virus to their computer every time you help them with their code. In 12 short weeks, you'll be able to gain control of their laptop and push their system clock back by 2 minutes. This ingenious plot will ensure that they will be casually late into every single

> ## To misquote Bertrand Russell "I would advise you not to follow this advice."
>
> PROF. KEVIN HARE

meeting with your manager, while you get just enough time to plan your next devious scheme and find a way to justify discarding your 7th backlogged JIRA ticket.

Well folks, now that you're finished with this article, you should have become the best display of espionage and subterfuge the world has seen since the 8 latest James Bond movies. And remember: I am the world leading expert on impostering a tech job. So if my guide didn't help you, it is only because you couldn't keep up with my perfect plan. Unless…I was lying about knowing anything, and this whole

article was written with 0 expertise? And the guide is my attempt to sabotage you in case you end up at my next co-op job? And we're all merely pawns in the hands of the CECA ruling class, waiting to be used as cogs in the machine of our capitalist overlords?

I guess you'll never know, or at least not until I write my next article: "How to lead an intern revolution at your company— the Bolshevik's guide to becoming your own manager."

*meth*NEWS

WHAT YOUR SLACK PROFILE PICTURE SAYS ABOUT YOU

Oh, Slack, that charming little rascal of a messaging app that we love to be terrorized by. Nearly all of us have had to deal with it, especially those who've done time in corporate ecosystems to which Slack is so endemic. Thus, we've all had to deal with the burden of picking a suitable profile picture to represent ourselves to our peers. Admittedly, some may agonize over this decision more than others, but the end result, I find, is always quite telling. (And before you ask, yes, I *am* indeed an expert in the art of psychoanalytical divination—only check my family tree and you'll find I'm an indirect relative of *the* Sigmund Freud himself. Just *witness* all the personality quizzes I've written over the years!)

IF YOUR PROFILE PICTURE IS…

THE DEFAULT SLACK PROFILE PICTURE

What happened here? Apathetic indifference? Or defeating indecision? Whatever it is, you're not alone: it's a toss up between this one and the next option that you'll see the majority of people going with. But unlike the next option, if you stick with the default Slack profile picture, know that you appear as a faceless entity among many. You must not like drawing attention to yourself, or perhaps you wish to be as inoffensive as possible. But is it really worth it to be so bland and forgettable?

A PICTURE OF YOUR FACE

This is what the overlord executives at Slack intended profile pictures be used for, so congratulations for falling into line and getting the memo. You probably use this same picture on your Twitter, or—heaven forbid—your personal blog or website, as part of your Unified Online ~~Brand~~ Presence. If you were lucky, you got a friend or even a professional photographer to shoot this picture for you, against a pretty backdrop that may or may not have been where you spent your last vacation. Life is simple and good to you. You probably don't even have any issues with the way you look, considering you're looking at this picture of yourself *every single day*. Do you like looking at yourself or something?

A PICTURE OF YOUR PET

Aww, little Mittens and Rufus, who could possibly resist? As the animal-lover you are, you're probably quite the softie. At least, that's what you want other people to think. Whether you admit it or not, you *are* hiding yourself behind the image of your lovable, purrfectly fluffy pet. You probably spoil your pet to death; whenever you hop on a video call, piercing yowls or flashes of a furry tail are basically guaranteed. But I suppose I can't blame you for being so doting if it makes you happy.

A FUNNY PICTURE YOU FOUND ONLINE

To start: you are under 40 years old. Now, there are two kinds of funny image, both with distinct implications. The first is the generalized kind—like mainstream memes, you know, things that most Internet denizens your age would instantly get. The second is the niche kind—possibly jargon-filled, definitely geeky (think xkcd comic panel). If you have the first kind, you're the archetypal class clown, although more toned down and smoothed out, since you *are* a user on Slack and everything. (Oh yeah—you're terrified of aging.) By contrast, if you have the latter kind, you're the archetypal nerd: dutiful, knowledgeable, and quiet. Both kinds are each other's foil in that they are both somewhat resistant to change, keeping around their profile pics months after the joke has been run into the ground. (I would apologize, but you know it's true.)

A DRAWING OF YOUR FACE / FROM AN AVATAR MAKER

You probably think you're an artsy type. But unfortunately, that I cannot judge. All I can say is what I said about the people who put real photographs of their face as their profile picture, except for the part where I discuss them taking the actual photographs. To take a picture of your face is one thing, to deliberately construct an effigy with passing semblance to yourself is another. Also, if you got your picture from that pie-crew website, one arrives at the conclusion that you like anime. By putting it as your Slack profile picture of all things, one further concludes that you like anime perhaps a bit too much—a statement with many worrying implications on its own.

Finchey

FEDORA 35 REVIEW: BROADLY ALRIGHT

I think I've come a long way in using Linux as my main operating system since 141.3's *apt-regret: My experience with using a "real" operating system*. I was a Windows user back then, and Linux missed a lot of things that I thought I needed from an operating system. It turns out, most of those things I either actually don't need or could find suitable replacements for. I'm pretty comfortable calling myself a Linux user now, and 2 out of the 3 devices I use regularly run some variant of Linux (and the third is a gaming computer).

When I started using Linux full-time, I was initially using Manjaro Linux with the Xfce desktop environment. Sadly, I was not a fan of Arch/Manjaro's `pacman` package management system and some of their design decisions. In late 2020 I switched to Ubuntu with GNOME, and have been a happy camper ever since. It worked well, did what I needed it to do, and was super reliable.

But the bug of experimenting with my primary operating system bit me again recently, so I got around to searching. I am now fully committed to using Linux, so it was inevitably going to be a Linux distribution, but I still wanted to have *some* new experiences. As of writing, I already ran Ubuntu on my main laptop and Arch on my 2-in-1 tablet (yes, despite `pacman`), so I wanted something substantially different from those two. At the same time, I didn't want to stray *too* much off the beaten path, because at the end of the day I did need a working computer to turn in my assignments and such.

I decided on Fedora—built on the same base as (allegedly) everyone's favourite enterprise distro, Red Hat Enterprise Linux. rpm is a common enough package format that I didn't expect to have any problems finding and installing software, Fedora was generally well-recommended in terms of reliability and delivering a faithful GNOME experience (which I am mostly a fan of), and I had picked up a few tricks since my old article which would solve the issues I had been previously having. The boxes were looking pretty checked, so I decided to give it a try.

INSTALLATION

Installing Fedora was just like getting a vaccine—it sounds like it'll hurt but it's actually reasonably painless and you get over with it so quickly that you'll be kinda confused that this was all that the fuss was about.

The installer took all of *ten minutes* and from what I can tell it straight up partitioned my drive and dumped a working copy of Fedora right onto disk, `dd` style. No dpkg-reconfiguring everything for an hour like Ubuntu and no "We'we awwmost done setting up youw cowomputew uwu x3" while your screen flashes fifty shades of blue like Windows. I am honestly impressed.

After you reboot, the initial setup wizard runs and makes your user and such. Very seamless experience, felt almost macOS-like in how magical it was. It dropped me onto a familiar GNOME desktop in minutes.

USAGE

Using Fedora was just like getting a vaccine—the next couple of days after you get it are full of annoying side effects that you have to deal with before you can start being productive again.

Fedora does not, by default, have any proprietary software in its repositories. This is ideologically great and such, but kinda sucks if you're like me and made the mistake of buying a laptop with an NVIDIA graphics card (do *not* buy NVIDIA if you hope to run Linux on your laptop, just don't). Thankfully, I already know that there's a solution—it's called RPM Fusion. If you're a Debian user, this is very similar to having a "non-free" repository—it's where all the not-open-source software is shoved, including NVIDIA drivers.

After installing RPM Fusion and the NVIDIA drivers, the laptop became a lot more usable, though battery life is much worse than Windows or even Ubuntu. This is mostly because the NVIDIA drivers do "the official thing" and keep both the NVIDIA and Intel GPUs powered on just so the NVIDIA one can be switched to on the fly. In Ubuntu you can shut off the NVIDIA GPU entirely (and switch between Intel and NVIDIA with a restart), and on Windows it's the same as Fedora but power management isn't broken so the battery doesn't completely die.

I will try not to mention NVIDIA again.

Most of the software you'll want exists the same way for Fedora as it does for Ubuntu or Arch or any other Linux distro. I was able to install GNOME Tweaks to enable the glorious maximize/minimize buttons, extensions to get it otherwise working exactly the way I like. All the hardware other than the unmentionable caveat above works great, including even my home printer (!!!). It's beautiful.

Until, of course, something doesn't work.

This is common in a lot of open source projects—they'll have setup scripts for Ubuntu always, often Arch, and sometimes Fedora. Sometimes all the instructions are installing certain packages (which you can find alternatives for), and then the rest of the thing is generic, but other times the process just isn't possible on Fedora.

Case in point, my CS350 OS/161 setup. I was trying to set it up locally, and a friend of mine was able to do that by finding an old deb of gcc 4, and using that to compile the things he needed. But debs are an Ubuntu thing, and Fedora's equivalent are rpms. After much searching I did find an rpm from an old version of CentOS, but it had unmatchable dependencies. I think realistically nearly any OS would have run into this issue given enough time, but the thing with Fedora is how quickly it iterates compared to say, Ubuntu LTS. This makes such an old

package hard or impossible to find. Meanwhile, Arch has an *up-to-date* AUR package for exactly what I need, if only I could use it.

There's also the fact that Fedora uses bone-stock GNOME, with no customization whatsoever. Usually, this is a good thing — Ubuntu's changes to GNOME sometimes break compatibility with random tweaks and such, and Fedora has been refreshingly great in a lot more GNOME-specific things "just working". But this also has downsides — for example, the GNOME team has decided to secure the screenshot pipeline by making any 3rd party app request permissions *every time* they need it. This is great for privacy and all, but sometimes I just want an app to be able to take a screenshot whenever I want — for example, a *screenshot app*. The GNOME team's official answer is to either use the default screenshot app (which is not great), or turn off the security feature entirely. This is technically more a gripe with GNOME than Fedora, but it is what it is.

Overall though, these are minor quibbles, in the grand scheme of things. Most of the time when I have something Ubuntu-specific or Arch-specific, I can do it in a Docker container and be fine 99% of the time. And other than these, my experience with Fedora has been mostly positive. Most of the time, I don't even have to think about which Linux distribution I'm using, it just all works. After the initial hiccups installing software and getting set up were over, it's been smooth sailing.

In fact, there's a few things that I quite enjoy — Fedora packages tend to not hang as far back as Ubuntu's do. Because of this, I have fewer instances of having a bug, going to the package's issues page, and realizing it was fixed three versions ago — which is four versions in the future from whatever is in the repositories. Fedora stays up to date so doesn't have these problems. On the other hand, it doesn't need you to update your entire system whenever you install a package like Arch. I understand that technically I can do `pacman -Sy thing` and be fine, but it's not a supported configuration and I don't want to be running an unsupported configuration when I go crying on the Arch forums asking for help.

CONCLUSION

There are definitely minor annoyances with Fedora not being on one of the two big distributions every now and then, but it could definitely be worse. The Fedora experience in itself is quite positive, and I imagine that if it had the level of support Ubuntu does with respect to packages and programs, it would overall be a lot better than Ubuntu is today.

But that universe is lugubriously not the one that we live in today. And today, I can only recommend Fedora to the person who is in roughly the same situation as me. You know enough Linux to dig yourself out of a hole when you need to, you've used Ubuntu forever and want a little spice in your life, but you also want something that Just Works™ most of the time, because Arch and Gentoo have left you too traumatized. If I'm describing you right now, maybe Fedora is something you would enjoy.

I'm definitely enjoying it right now, though I'll be honest, it isn't different enough to scratch my itch. If my laptop magically had Ubuntu tomorrow, I wouldn't *want* to install Fedora over it, but conversely I don't particularly want to install Ubuntu right now either. It's just more of the same. That might not sound too appealing, but remember, "more of the same" is what Joe Biden got elected on. Maybe Fedora will have its day someday too?

tendstofortytwo

N THINGS YOU NEED TO DO BEFORE YOU GRADUATE

- Wonder how "N things" articles got so popular
- Cry in the DP library
- Wake up excited on Monday because it's Mac and Cheese day in the C&D
- Cry in the DC library
- Join a random club that you know nothing about and meet some of your closest friends there
- Cry in the MC Golf Research Facility
- Write a really bad exam and punish your kidneys with Lazeez in retaliation
- Realize the sanctity of human life and go to Shawarma Plus instead
- Work on a cool project with your friends
- Learn the true meaning of the word hatred when you depend on any of them for real deadlines
- Day drink on your co-op job
- Have an intervention organized for you by your CECA academic advisor
- Notice that you are graduating soon and wonder how the years have passed so quickly
- Come to terms with the fact that no matter how difficult it was, your time in Waterloo was still a positive experience and you used it to the best of your abilities. Forgive yourself for your regrets, and become grateful for the good times you did have
- Cry with a goose
- Write your own "N things" article

*meth*NEWS

> You shouldn't anthropomorphize computers, they hate that.
>
> PROF. IAN GOLDBERG

ARCH LINUX IS COOL, BUT ALSO TEAR-YOUR-HAIR-OUT STUPID

For the record, I like Arch Linux. It's very nice; it's my primary choice of Linux distribution. I like the control it gives and how I can keep it minimal to make things simple and speedy. It's overwhelmingly transparent. With that said, *holy fucking shit, Arch Linux is such an immense pain in the ass to do anything with.* Christ. I don't know why there's such an aversion to making things obvious and accessible.

I love Openbox; it's very minimal and simple. It's fast. But I'm very keen to know the sadist psychopath(s) behind it who figured it was a good idea to make people edit XML files to customize anything with it. Plainly deranged, right? It's a simple menu. If this were a complex task and a fine level of precision demanded something like this, then fine. However, the menu in Openbox is quite simple; it only does a few things. It's a menu and submenus, with buttons designated to execute certain things. You *cannot* convince me that there is any reason that this couldn't (or shouldn't) be done with a basic GUI. I don't care how much of a gamer/boomer/sysadmin/poweruser you are, there is no god damned way in hell that you are doing things faster or easier by editing an XML file. And even regardless, *why do you need it to be a faster process?* This configuration is something you're probably doing once or twice and then forgetting about. It should be intuitive and no-nonsense. Shortcuts are not needed here. In any case, a GUI should be an option for the sane of us. I shouldn't have to resort to some random user binary on some GitHub repo for a graphical interface to perform a task otherwise tedious and frustrating, but made dead-simple by such an interface. It's an inherently visual task. Openbox is an actively maintained project. It's been around for ages. I don't get it.

The control granted by Arch is one of its foremost strengths, no doubt. It's why people like it, myself included. But I think it very consistently gets taken too far. I like being *allowed* control wherever possible. Note, however, that this does *not* imply that I like to *directly assume* total control wherever possible. For example, I do not want to spend time populating a list of applications myself, playing a game of pick-and-choose. While some people might want to do this, I would like the computer to figure out a reasonable way to populate and categorize such a list, if I should so choose (looking at Openbox). Similarly, I do not want to set up and explicitly provide formatting in some pseudo-HTML for every widget, applet and icon in my panel (looking at DockbarX). I would like the developer to provide some (optional) packages/modules so that I can throw in some decent-looking, standard, common panel items, and get going. Let me be clear: the control is good. Granting freedom to modify things finely and precisely is good, but I just don't want to exercise that freedom for every single little thing. There are some things where I just want the computer to figure out a reasonable solution, or even offer a selection of reasonable solutions. Just give me some acceptable basic functionality; I don't want to hold every program's hand through every task. I'd like to be able to trust some programs to just figure some things out on their own.

That's the thing that bugs me with Arch's philosophy, is that many developers seem content to offload complete and total, meticulous control onto the user at all times, and not give too much thought to the overall user experience. I used a small set of examples here, but I think this philosophy permeates deep throughout Arch software. Plenty of people looking for a half-decent user experience get mocked for inexperience or laziness, or an unwillingness to learn. I broadly like Arch a lot; if I didn't, then I wouldn't be using it. I agree with most other parts of Arch's philosophy. But god, there are a lot of things I just don't have the time of day to micromanage on my computer.

jeff

A BOX OF CHOCOLATES

It's almost Valentine's Day.

I feel so lucky,
to have a received a box of chocolates,
from someone I love,
who also loves me dearly.

My favourite pralines,
lined up pristinely.
And a handwritten note,
oh so lovely.

'Remember to eat the chocolates
They are expiring in March

Love
Mom'

I knew it.
It's the one she got
from Boxing Day sale.

(love you too mom)

evilevievil

> # Nothing makes me happier than a 4-litre jug of chocolate milk.
>
> **BLAKE MADILL**

SOME ANNOYING ARCH LINUX PROBLEMS I HAD TO SOLVE LAST WEEK

Anyways, in bringing a new Arch install to campus now and again over the past week, I've inevitably run into the usual growing pains of getting things stable. Here are a few of the highlights that were really annoying, so that you and I can refer to the solutions upon inevitably encountering the problems again:

HELP, I NEED TO CONNECT TO EDUROAM AND I FORGOT TO GET A NETWORKMANAGER GUI

1. Enter this into a terminal, replacing **userid** with your userid:

   ```
   $ nmcli connection add type wifi con-name "eduroam"
   ifname wlp1s0 ssid "eduroam" -- wifi-sec.key-mgmt
   802-1x.eap peap 802-1x.phase2-auth mschapv2 802-1x.
   identity "userid@uwaterloo.ca"

   $ nmcli connection up eduroam --ask
   ```

2. Get **network-manager-applet**, you shortsighted fool
3. Things should just work(tm)

HELP, EVERYTHING BROKE, INCLUDING THE INTERNET, X11, AND BASICALLY EVERYTHING ELSE

1. From a terminal, run **uname -r** and **ls /lib/ modules**
2. If the output is different, your kernel is somehow a different version than your modules (???) and that's breaking everything. Continue to step 4.
3. If the output is the same, God help you.
4. Get a USB with an Arch install image
5. You don't have one on you, so beg your friends for a USB drive, go to a nearby computer, download the latest Arch image and flash it to the USB.
6. Boot from the USB
7. Mount your main partition to /mnt (for me this was **mount /dev/nvme0n1p3 /mnt**)
8. Mount your EFI partition to /mnt/boot (for me this was **mount /dev/nvme0n1p1 /mnt/boot**)
9. Temporarily change your root to /mnt: **arch-chroot /mnt**
10. Reinstall the kernel: **pacman -Syu linux**
11. Things should just work(tm)

HELP, MY AUDIO WON'T WORK

1. Get rid of **alsa-utils**
2. Get **pulseaudio**
3. Run **pavucontrol** and adjust input/output levels
4. Get something like **volctl** for a nice panel volume control applet
5. Things should just work(tm)

HELP, WHENEVER I PLUG IN MY HEADPHONES IT SWITCHES TO THE SHITTY BROKEN MIC THAT COMES WITH THEM, AND DOESN'T LET ME USE THE INTERNAL MIC

1. Get **alsa-tools**
2. Run **hdajackretask**
3. Switch to the audio codec (for me it was Realtek ALC257)
4. Change the external mic from "Microphone" to "Not connected"
5. Click "Install boot override"
6. I needed to briefly install GNOME and do all this from there instead since I don't have a DE and got funny permission errors when it asked for my password when I tried just running it out of the terminal with Openbox. You might need to do this if you're not using a DE. I don't know, this is weird.
7. Restart your computer
8. Things should just work(tm)

Thanks to a few **mathNEWS** writers who helped me figure out some of this stuff last week.

jeff

[Editor's Note: jeff has since moved to using vanilla Ubuntu.]

N THINGS TO DO BEFORE YOU GO BACK IN PERSON

- Leave your bed.
- Find your backpack.
- Refill your water bottle.
- Say goodbye to your pets.
- Shave your beard if you need it.
- Find some clothes that still look decent.
- Clean the ancient garbages out of your backpack.
- Have a good night sleep before your first day of class.
- And set up multiple wake up alarms, spanning for at least an hour.

loloolol

Fear my meek coding skills.

JEFF AVERY

\TW@

Let's talk about (La)TeX. Nothing comprehensive, nothing fancy: just a nifty little pouch of nifty little tricks. Nothing useful either, mind you, but maybe we'll build up to something. Let's talk about it.

Let's talk about tokens. A token is either a single character or a control sequence. { is a token. a is a token. \hbox is a token. Actual TeX compilation is best illustrated with an example. Consider a\hbox{b}: TeX first sees a, which is itself a complete token. This is passed to the expansion engine, but a doesn't expand. So, it moves on to \, denoting the start of a control sequence token. Proceeding by consuming characters, it acquires \hbox, which is passed again to the expansion engine. As TeX knows \hbox requires one argument, it goes back to grab either a token or a group. The { token indicates that the next few tokens until the } will be part of a group, so it grabs them all and returns to \hbox for expansion. But, \hbox doesn't expand: it is *primitive*, which is to say it was built into TeX. There is nothing \hbox is defined by. Then, the processed input stream is passed onto the process that actually renders a PDF — a process I make no claim towards even remotely understanding — and we are done.

Let's talk about catcodes. How did TeX know that \ meant the start of a control sequence, or that { was the start of a group? Every ASCII character is labeled with an integer from 0 to 15, a category code, that describes its functionality. Category 0 denotes an escape character, like \. Category 1, begin grouping. And why was it that \hbox was the control sequence, and not \hbox{? Because only category 11 characters, [a-zA-Z], can be used in control sequence names. Or so they insist: I like to think of catcodes as suggestions. One \catcode65=0 later, and now Ahbox is a control sequence. What fun.

If the reader is so interested, I would suggest fiddling around with catcode 13. In the meanwhile, catcode 12 is the category for "everything else." In particular, it contains the @. Now, there are many, many internal control sequences with an @ in their name. To protect the user from themselves, these control sequences are rendered inaccessible by the @'s catcode. To meddle with them, it suffices to set @ to catcode 11 (almost like a ritual: the user at least knows the bare minimum of what they're doing).

Let's talk about names. Suppose I defined some control sequence \def\abc{1}. Then, compiling \abc will give a 1. But \abc is shy. I might not want to call it by its full control sequence directly. No matter, \csname abc\endcsname will also give a 1, using only the tokens a, b, c. But \abc is cripplingly timid. I might not want to call it by a direct token stream at all. No matter, \def\ijk{abc}, followed by \csname\ijk\endcsname should do the trick. Right? But of course.

Let's talk about expansion. Suppose now I wanted to define a control sequence *using* \csname. This does have legitimate benefits: tokens that aren't strictly catcode 11 can, through \csname, be part of a control sequence's name. Take the expression \def\csname abc\endcsname{1}. What it is meant

to do seems self-evident, and so a single question remains: why doesn't it work? In the left-to-right expansion model, \def sees the control sequence \csname and assumes that is what we are trying to (re)define. To fix this, we must modify the expansion flow. Consider instead \expandafter\def\csname abc\endcsname{1}: as \expandafter "jumps" over one control sequence, it will finish what \csname is trying to construct (that is, \abc) before returning to the \def. And now the code works. (Bonus: using the fact that \expandafters can be chained (i.e. a jump after a jump after a jump…), how many does it take to expand each control sequence of \ii\jj\kk in reverse order?)

With all of that work behind us, what exactly have we unlocked? Take a look at control sequences such as \12a or \jk43. Before, they were inaccessible without catcode trickery; now, they are readily available. We can imagine, for example, dynamically constructing a family of control sequences \c1, \c2, \c3, and so on at runtime, almost l-li-like an array o-of memory cel- oh dear god here we go again no no no n

LEMMA 2.1. LATEX IS A LEGITIMATE PROGRAMMING LANGUAGE.

With *Fact 2.2. LaTeX has if statements* and *Fact 2.3. LaTeX has for loops*, an actual implementation is fairly routine: quite fun to try (which I highly encourage you do), but rather dry to write about in full. There is, however, one little detail that proves to be of interest.

Over in Desmos, we used a stack to keep track of Brainfuck's [s and]s. Implementing data structures in LaTeX is an exercise best left for the likes of Jesus Christ or David Carlisle, and so we look for alternatives. Recall back during our discussion of converting the input stream to tokens that when finding groups, LaTeX must have for every { a }. For every catcode 1 a catcode 2. Intuitively, then, if we modified [and] from catcode 12 to catcodes 1 and 2, we could get the compilation process itself to work for us.

The variant of the loop we're using, \@tfor, treats tokens individually and groups as one. That is, given a\abc{a\abc} to loop over, it will see three distinct items: a, \abc, and a\abc. This means that if we had some Brainfuck evaluation control sequence \bf, we could have it call itself whenever it sees a group. In essence, we want \bf{-[----->+<]>--•} to "become" \bf{-\bf[----->+<]>--•}.

But wait a minute: turning [] into {} with catcode doesn't do the trick: the \@tfor, while it was able to respect groups, also stripped the outer bracing away! Instead, we need [] to become {{}} then: that is, [into {{, and] into }}. Seems easy enough, right? \def[{{{ for the left side, \def]{}}} for the right side, and we go on our merry way? If only.

Moments ago, the reader was suggested to mess around for a little bit with catcode 13. See, characters of catcode 13 are special: they can be single-character control sequences,

without the need for a \. That's what we need [and] to be. But this still doesn't work: we don't want them to be catcode 13 all of the time, only when we need them to be. When they're sitting in the Brainfuck string, we need them to be like all of the other characters: catcode 12.

As it so happens, catcode assignments respect scope. So, we open a local scope, change the catcode to 13, do a *global* definition, and close the scope.

```
\begingroup
\catcode`[=13
\catcode`]=13
\gdef[{{{}
\gdef]{}}}
\endgroup
```

And are we done? Not quite. A catcode 1 always, always, *always* needs a catcode 2. The hell is {{{}? We need one last piece of fuckery.

LaTeX conditionals look something like \ifnum\value{counter}>n A\else B\fi. The type of conditional is determined by the first control sequence: here, \ifnum denotes a numerical one. Of these, we happen to be looking for \iftrue and \iffalse. Their quirk? They're not conditionals in the intuitive sense. The former is always true, and the latter never. So, in \iffalse\abc\fi, \abc will never be expanded. It will be seen in the tokenization process, and that's it. It then suffices to \gdef[{{{\iffalse}\fi\iffalse}\fi} and \gdef]{\iffalse{\fi\iffalse{\fi}}}, and the braces are balanced.

And that's all it takes! We're done! Recursive Brainfuck interpretation. What a world, hmm?

Let's talk again next time.

Ⱶⴜ

WALLY HELP IM

Skit

A QUICK REMINDER

Life is weird and happiness is fleeting.

I don't think that's news to most people. But it's sometimes informative to look back at life and just realize all that's happened. The stuff you've made it through, and all that you've accomplished despite it.

If you're reading this, you're probably a UW student. Remember how hard you had to work in high school to get accepted, how impossible it seemed at times? But you made it.

We've even all made it this far despite a pandemic interrupting our lives, one that is admittedly not over but has required a great deal of resilience and self-sacrifice from everybody. Sure, it's dragged on longer than anybody would like or hope, but we're still here, we've made it.

And I think that we should try and be satisfied with all that we've done, because life's too short to not at least try and be happy with how things are. I see so much doom and pessimism across the Internet and well, yes, there are a lot of things wrong in the world that are worth trying to fix. That doesn't change the fact that it's important to savour the small victories in life, and the large ones too, when they exist.

There are a lot of people who are constantly focused on their next objective in life, who tell themselves that they can only be happy once they accomplish their goals. But there are always more goals in the future, and a lot of the time this mentality can make it hard to just let yourself truly relax and be grateful for what you do have.

I just really think that if you can't let yourself be happy at any point in your life then you're never going to let yourself be happy. We've all made it so far, that sometimes you deserve to pat yourself on the back, stop the constant self-judgment, and just let yourself be for a while. You deserve it! Beating yourself up very rarely helps as much as it hurts you in the long term, and looking after your mental health is very important to avoid burnout.

Obviously this isn't anything groundbreaking, it's advice that applies to pretty much anyone and like most of that advice it's been repeated ad nauseum. But I think it bears reinforcing every so often, since sometimes people forget it, and I find that's especially true for the type of overachiever that's so common in UWaterloo Math.

So let this be your reminder for the term that, before midterms get the best of you, take some time to refocus yourself and try to be happy in your current circumstances, whatever those might be. I wish you the best of luck in midterms, by the way, you're going to crush it!

Predap

AN ELECTION SYSTEM PROPOSAL: PART 5

Author's note: the first part of this article was published in 147.4.

In the third part of this article, I introduced a change to what was then step two of my election system in order to handle super^n-cycles properly. This had the nice side effect of making step one of the old system unnecessary: an equivalent effect was achieved in step two. Therefore, the old step one could be removed from the system. However, this raises an important question. If our method of calculating a candidate's Victory Index (VI) is ideal, should it not take care of losing super^n-cycles itself? (By a losing super^n-cycle, I mean a group of candidates who all lose to every candidate not in the group and such that there is at least one candidate not in the group.) Another way of phrasing this is asking whether or not the same candidate will be chosen to be the winner whether or not we do step one of the new system (which is a better version of step two from the old system).

As it turns out, the answer to that question is no using the current method of calculating VI. A simple illustration of this is the following results of voting:

- A vs C: 51% to A
- A vs S: 51% to A
- A vs V: 51% to A
- C vs S: 100% to C
- C vs V: 51% to V
- V vs S: 72% to S

It is clear that the Antichrist beats everyone else here. Therefore, step one would eliminate the cycle consisting of Cthulhu, Voldemort, and Sauron, which means that the Antichrist would win. However, if we skip step one and go straight to calculating VI, we get these results:

- A: 153%
- C: 198%
- V: 128%
- S: 121%

Which would mean that Cthulhu would win. This is not ideal. I think that the best way of calculating VI would be one that makes step one pointless: the result should be the same whether or not step one is done. I can also think of several other properties that an ideal method of calculating VI should have. However, since this is **mathNEWS** and I might very well have to prove that a method has these properties, I decided that I will be very mathematical about this now. So, say hello to a bunch of definitions:

Definition 1: an election E is an ordered pair (S, f), where S is a finite set of objects and $f : S \times S \to [0, 1]$ is a function such that $f(a, b) + f(b, a) = 1 \forall a, b \in S$. We call the elements of S the candidates and we call $f(a, b)$ the proportion of voters who prefer a to b.

Definition 2: let $E = (S, f)$ be an election. Let $a, b \in S$. We say that a beats b when $f(a, b) > \frac{1}{2}$.

Definition 3: let $E = (S, f)$ be an election. Let $a \in S$. We call a a clear winner if, for all $b \in S$ such that $a \neq b$, a beats b.

Definition 4: let $E = (S, f)$ be an election. Let T be a non-empty subset of S. We call T a losing set if $S \setminus T$ is non-empty and, for all $t \in T$ and $q \in S \setminus T$, q beats t.

Definition 5: a victory index algorithm F is a function whose domain is the set of all elections and which satisfies the following condition. Let $E = (S, f)$ be an election. Then, $F(E)$ must be a function from S to $\mathbb{R}$. For $s \in S$, $(F(E))(s)$ is called the victory index, or VI, of candidate s according to F.

Definition 6: let F be a victory index algorithm and let $E = (S, f)$ be an election. $a \in S$ is called the winner of E according to F if $(F(E))(a) > (F(E))(b)$ for all $b \in S$ such that $a \neq b$.

Note: given an election E and a victory index algorithm F, it is not always the case that there is a winner of E according to F.

Definition 7: an acceptable victory index algorithm F is a victory index algorithm which satisfies the following conditions:

1. Let $E = (S, f)$ be an election. If $a \in S$ is a clear winner, then a is the winner of E according to F.
2. Let $E = (S, f)$ be an election. Let T be a losing set of E. If $a \in T$, then a is not the winner of E according to F.
3. Let $E = (S, f)$ be an election. Let T be a losing set of E. Let $Q = S \setminus T$. Let g be the restriction of f on $Q \times Q$. Let $W = (Q, g)$. Then, for all $a \in Q$, $(F(E))(a) = (F(W))(a)$.

Note: the example I gave above shows that our current victory index algorithm is not acceptable, because it does not satisfy the first condition.

Definition 8: a good victory index algorithm F is an acceptable victory index algorithm which satisfies the following conditions:

1. Let $E = (S, f)$ be an election such that $a \in S$ is the winner of E according to F. Let $g : S \times S \to [0, 1]$ be a function with properties that make (S, g) an election. If $g(b, c) = f(b, c) \forall b, c \in S, a \neq b, a \neq c$ and $g(a, b) \geq f(a, b) \forall b \in S$, then a is the winner of (S, g) according to F.
2. Let $E = (S, f)$ be an election such that $a \in S$ is not the winner of E according to F. Let $g : S \times S \to [0, 1]$ be a function with properties that make (S, g) an election. If $g(b, c) = f(b, c) \forall b, c \in S, a \neq b, a \neq c$ and $g(a, b) \leq f(a, b) \forall b \in S$, then a is not the winner of (S, g) according to F.

In the next part of this article, I will continue this mathematical exploration. Hopefully, I will be able to find a victory index algorithm which is at least acceptable and prove it to be so.

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ALBUM REVIEW: JAMES BLAKE — JAMES BLAKE (2011)

ON BEING NAKED

It is currently 2:13 AM on prod night. I've been trying to put into words how I feel about this album. I wanted to find something grand to weave it all together, maybe even relate it back to something personal. But I'm kind of freaking out because a) I'm running out of time and energy, and b) I can't bear to submit something that I don't believe in. So I've decided to scrap everything and elaborate on my initial notes. I will do so with minimal pretense. Fittingly, this is what I think this album does so beautifully.

Such a weird album

This is a really weird album. I first heard it in 2015 — I was twelve, only just venturing beyond the music on the radio — and I don't think I fully understood how weird this album is. I still don't think I fully understand.

Why do people make weird music? Isn't the purpose of music to reach out to others? To communicate something that can be understood? To throw a ball and to know that someone will catch it? What does it feel like going against that? What does it feel like having a truly original idea? Would it matter to you if others didn't understand it the way you understood it?

There is something fundamentally different about this album

This one is hard to explain. A lot of weird electronic music is out there, but to me, this album is unlike all of them. I think we usually associate "weird" with "loud" and "obvious," and I think that people who make weird music are aware of their weirdness and lean into it. "Look at me!" such music might say.

But despite the backbone of most of these songs being arhythmic piano motifs, despite there being large passages of dissonance and stillness, and despite the overwhelming presence of beautiful singing on a record marketed as "dubstep," I never feel like I'm being told to pay attention. But somehow, I pay attention anyways. It's entirely unpretentious.

I feel naked listening to this album. I feel naked as the bass hits on "Limit to Your Love" and as the vocoded voice sings on "Lindisfarne" and as the mix ducks back with the boom of an 808 every bar on "To Care (Like You)" and as the piano-and-voice demo abruptly gets chopped up on "Why Don't You Call Me." Much of the time, this album reduces itself down to bass and voice. That's almost nothing to work with. But I guess that if someone were to trace a cold finger down your spine, you would feel a lot more than "almost nothing."

This is a frustrating album

There are moments that took a long time to grow on me. I always found the vocal manipulations on "To Care (Like You)" and "I Mind" pitchy and off-putting. But for some reason, I would return to this album once or twice a year without fail, curious to see if anything about it had changed. Sometimes, pieces would click into place. Sometimes, it's the frustrating ideas that endure. Maybe this is why weird music is made.

There is something that this album accomplishes that a fully acoustic album could never

I don't think that acoustic instruments could evoke the same emotions as these electronics. Every sound is so pure and so free of blemishes. Usually, this would turn me off because I like my music smeared in dirt and fed through a hundred tape machines. But to me, the simple and perfect sound of this album signals intimacy. No tricks were played in creating these sounds. I can let my head rest.

Between two things, a third thing emerges

I deleted a long passage that I can sum up by saying that James Blake started out by making dance music. I deleted another long passage that I can sum up by saying that James Blake cited Joni Mitchell as a primary influence for this album. I find this interesting because Joni Mitchell does not make dance music.

But *James Blake* consists neither of dance music nor of Joni Mitchell music. I think it hits upon something that exists between the two but is neither. I think that it's inherently linked to the uncanniness of electronic music. In the late 60s and early 70s, before we had mastered synthesizers for usage in pop music, we only knew how to create odd, inhuman soundscapes that were thin imitations of more familiar forms of music (think: the original Dr. Who soundtrack). And since then, I think that despite our best efforts, we've failed to recapture that innocent sense of exploration. Electronic music can sometimes feel overly "put-together" these days.

But that feeling returns when I turn on this album. There was a jankiness that was lost that James Blake managed to find. And I think that in the twenty years preceding this album's release and the ten years since it, nobody has made music more naked than it.

Why do people make weird music? Because there's no other way to make someone feel naked.

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THE BEST POKEMON GO EXPLOIT

This is a recount of my experiences with one of the best Pokemon Go exploits ever found. It sadly does not work anymore, but before it was patched, it really made things easier. The exploit allowed a lot of "once a day" events to be repeated for the day, which took advantage of your phone's time zone settings. According to a quick search, it was around 2019 January 7 when Niantic, the developers of Pokemon Go, patched that exploit. Since then, time zone shenanigans don't do anything anymore.

I did not discover this exploit first nor did I discover it independently at any point nor did I find it out for myself. It was a fellow Pokemon Go player at school who told me about it one day.

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There are many game elements in Pokemon Go where time zones are required for proper functionality. For example, Community Days each month take place in a 3 or 6 hour period, and the start and end times for those are linked to your local time zone. Other examples include those that are "once a day" that reset at midnight, which I will refer to as daily tasks. These daily tasks can include the 7-day streaks for catching pokemon or spinning pokestops, each day's research stamp, or the free daily raid pass, and more.

Once you do one of those daily tasks for the day, if you want to do another, you would have to wait until midnight according to your local time zone, but that could be manipulated by manually changing time zones in your phone's settings. If you set your phone's time zone manually, then you can change your phone's time zone to whichever one you want. This is where the exploit comes in.

After closing the Pokemon Go app, you would change your phone's time zone to a time zone that is already in tomorrow. Typically the time zone of choice for people in the Americas would need to be somewhere in Eastern Asia, Australia, New Zealand, or one of the Pacific islands. For practically all cases, choosing a time zone like Guam would work.[1] Then, re-open the app. Because the phone was now manually changed to be one already in tomorrow, the game also thinks it is tomorrow, hence midnight has passed.

You can see that there is a limitation though, in that when you do this exploit, at least one time zone on your phone needs to be in tomorrow. So, it doesn't work as well for those in the earlier parts of the world as the exploit would only work for fewer hours of the day compared to in the Americas where it works for most of the day.

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So, now that you have changed the time zone, what can you do? To start, you can do those daily tasks again. You can do another of your daily catch and pokestop streaks. You can get a second research stamp that displays the same date as it still

thinks the current date is the same, even though the game thinks it is tomorrow.[2] You can get another daily raid pass assuming you have none remaining in your inventory.

Certain time zone dependent events don't get affected by this exploit. For example, certain time zone dependent things such as the start/end times for events, are based on your physical location. I assume that they use your GPS data to locate your location and apply your time zone based on that.[3] Events not being affected by this exploit is the most important factor, as I will explain in a later part.

However, I have yet to mention one caveat with this exploit. You don't get to repeat those daily tasks for free. There is an exchange happening. You are essentially borrowing from the future. If you do a second daily task in one day, that second one is "borrowed" from tomorrow, so when it becomes your actual tomorrow, you can't do that day's daily task as they were done the day before. For example, if you get a second daily raid pass, you won't get one the next day. The good thing was that if you do 2 of the streaks in one day, even though you need to wait an entire day due to the borrowing to do the next step in the streak, the streak doesn't break.

After you repeat all your second daily tasks, you can close the game, revert to your normal time zone, start the game again, and everything will continue as normal. The only way you would be able to tell that the exploit was done is either from the repeated date on the research stamp, or from the journal. The journal only has entries of your most recent game activities, so as you play the game, the evidence disappears. So the only other thing that lasts is the research stamp, but once you have 7 stamps collected, that evidence goes away as well.

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Now, this is where we get into events as mentioned before. The big uses for the time zone exploit came from in-game special events. For example, there was an event scheduled for a particular Saturday back then, where a bunch of legendary raids spawned for a set time period of 3 hours, and because it was a special event, the game gave you 5 daily raid passes instead of the usual 1 for that day during the event period. You can see how useful this exploit was. You could use it to get a maximum of 11 daily raid passes to use in the event instead of the expected maximum of 6 daily raid passes: 1 daily raid pass kept in the inventory from the day before, 5 daily raid passes during the event, and 5 more daily raid passes using the time zone exploit to borrow tomorrow's 1 daily raid pass but with the event's special effect applied (whose time zone was based on your GPS location instead) to get 5 instead of just 1.

Considering that it takes 100 pokecoins to buy an additional raid pass, and it costs $1 to buy 100 pokecoins, the 5 additional free daily raid passes during the event saved everyone who used the exploit $5. This was particularly useful for us high school students back then. You can only imagine the collective

money saved once everyone who played Pokemon Go at school found out about the exploit through word-of-mouth.

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Unfortunately for us (or fortunately for Niantic), that exploit got patched and now no one can borrow from the future and exploit event effects for more items. Now the only exploits left are those that save you time or those that save you literally a couple cents worth of money. Long gone are the days where you can save many dollars. Hopefully, those remaining don't ever get patched, though I doubt that Niantic cares since there isn't really any loss on their part from what remaining exploits are left. There are actual problems like bugs, glitches, and events not working properly in the game they probably worry more about.

boldblazer

P.S. Whenever there are problems in-game, because New Zealand is the first to start an event due to them being the first major population based on time zones, they are usually the ones who discover those problems first and also get affected the most by them. They basically are like guinea pigs where Niantic finds out from them if there are any problems occurring or not. Typically any problems in events get ironed out by the time the event starts in the Americas, which is around when the events have already ended for New Zealand. So massive respects to players in New Zealand for dealing with any of the game's BS and getting Niantic's attention on those issues. o7

1. Guam takes the fewest letters in the search bar which is why my friend used that time zone often.
2. This used to be one way of displaying the same date twice in a row. The only way remaining to display multiple research stamps in a row with the same date is to wait one year. The stamps show the month and day but not the year.
3. I don't know what happens in geographic time zone edge cases though.

SOLUTION: YOUR MOM

hahahahahaha you thought there was a solution? epic fail, gottem.

tendstofortytwo

N (SUSPICIOUSLY SPECIFIC) SIGNS YOU'RE INTERVIEWING FOR A CULT

- **Deceiving potential members about what they're signing up for:** They call themselves 'mission-driven' but talk more about global expansion than the efficacy of their 'solution', and share no public numbers — only anecdotes
- **Teaching that the supposedly exalted ends justify the means:** They claim collecting lots of personal health data is good because it will help save humanity
- **Strong control from leader:** The CEO insists on interviewing every new hire (at 400+ employees!) even though he should really be too busy for that
- **Creating an 'us vs. them' mentality:**
  - They claim they are the only morally correct players in the industry
  - The most recent news article about the company is how the CEO lost his temper during an industry panel
  - They press you to name the other places you're interviewing for, and then insult them
- **Leader as saviour:** CEO's conference talk reeks of techno-solutionism
- **Differing ideas are discouraged:** Entire leadership interview is the CEO asking a question (e.g., about the mission, desired work environment, etc.) and then telling you your answer is wrong, repeatedly
- **I don't know what category this is but HUGE red flag:** CEO had a public LinkedIn conversation with a director from his old company (who he claims is a "friend"). The "friend" had commented, "I legitimately worry that you do bad things. I'd hoped you'd share any learnings about how you're doing better. Sorry."
- **Members expected to devote extreme amounts of time to the group:** Oh wait… that's a lot of start-ups
- **Group's main purpose is recruiting new members and fundraising:** Actually, this is like every VC-backed start-up ever

To jobseekers looking for 'mission-driven' companies: I get it. But remember that 'mission-driven' doesn't necessarily mean 'non-toxic' or a match for your values. Be careful and know the signs… lest you join a cult.

On the other hand, if someone invited me to their commune, I wouldn't turn down free housing… 🤷

mouse

AWESOME POINTS

"For the winter term, we'd like to allocate four hundred dollars towards community building expenses in the form of Awesome Points. Awesome Points will a new currency earned for participation in Gaming Club's online chat. Members will earn points for helpful interactions with other members, like answering questions or posting game walkthroughs, or even just chatting. Awesome Points can then be redeemed for rewards like gift cards. This will increase Gaming Club's online engagement, which has been challenging to maintain in the pandemic.

And that's why we want to bring Awesome Points to everyone in the community. Thank you for hearing Gaming Club's MathSoc budget proposal."

Josephine dipped her head slightly and smiled—a surrogate bow—as the video conference erupted in virtual raised hands and requests to speak.

❧

"You know, Name, I think we shoulda passed it." Blas mumbled around a bite of chicken pita wrap. The two were sat across from each other at a table by the window, in SLC's designated dining area.

They were quite the odd pair: Name, tall, fashionable, and formal, wore a white dress shirt, pants, and purple bow tie; hints of makeup sharpening her smooth dark skin and hawkish eyes. She was working through a salad bowl with a refined care beyond her years. Blas, on the other hand, was a good two years Name's junior, speaking with wide eyes filled with enthusiasm, the top of his pale, freckled face and ruffled brown hair half a foot below Name's eyes. Blas' always wore his blue Science faculty hoodie, even to MathSoc council meetings (which Name had no idea how he'd managed to weasel himself into, though she was glad for his company).

"I'm sorry, Blas, but it's one of the silliest ideas I've heard!" Name exclaimed. "Gaming Club has always brought very… *unique*… ideas. Giving students money for chatting online? It doesn't provide real value to our students, and I can think of a dozen better things to spend MathSoc money on. These Awesome Points are just a convoluted scheme for giving money away."

"You're so smart, Name, and you're right! But it gets engagement going!"

"Gaming Club is trying to solve their engagement problem in all the wrong ways—you get engagement through high-quality events and interesting club direction, not through *paying* people to chat."

"That's why it's *so good!*" Blas cooed. "Hear me out." Name took another bite of salad, then nodded and sat back, unable to resist a slight smirk as Blas continued. "Imagine what could have happened if Awesome Points were funded."

"Gaming Club would have had a bunch of people posting inauthentic nonsense to get points, and we'd be out four hundred dollars?"

"Yup! It probably would have been a disaster. People would exploit it, Awesome Points would get posted to all sorts of social media and memed to High Heaven—sorry Name, I can't help but laugh—give me a moment—okay. Maybe it would have made the news! All the other student societies would hear about it, and everyone would be asking how we ever let this get approved in the budget."

"And this is good for us… how?"

"The publicity! Gaming Club would be infamous, MathSoc would be infamous, engagement through all sorts of platforms would skyrocket. No-one gets even gets hurt! Four hundred dollars isn't even that much; it's like two pizza events."

"You know, Blas, as councillors, we *do* need to be responsible and professional to the student body—"

"They'd love it!"

"—and, to the faculty. MathSoc council needs to be taken seriously, and that means we need to show that we can make serious, responsible decisions. And funding Awesome Points is irresponsible—you said it yourself, it's probably going to fail."

"Yeah, we'd lose some cred with the faculty, but I think they'd secretly enjoy hearing about it too. I haven't even gotten to my pièce de résistance yet! This will create a story. A culture! A *legend*!"

Blas stood sharply as he continued to speak.

"Awesome Points is going to go down in MathSoc history as blunder or brilliance, but it *will* go down! It'll be professors, telling their kids, 'I have a great story from work today.' It'll be councillors, telling potential new candidates, 'wanna join the council? We do awesome stuff like those Awesome Points from last term.'

It'll be ten years from now when you and I are old and grey and reminiscing about our old MathSoc days, and I'll say, 'Hey, Name, remember the Awesome Points fiasco back in undergrad? Those were some *good* times.' And we'll nod and laugh and cry together, because it was just. So. Legendary! And we could have had that!" Blas finished with a flourish of his wrap.

Name started laughing, and so did Blas, and they laughed together for a long while. She wiped a tear from her eye as she finally worked through her last chuckles to answer, "oh, Blas. It's a charming argument, but Gaming Club's Awesome Points just aren't it."

"Ten years from now, Name. Ten years." Blas wagged his finger with a sparkle in his eye.

<center>⁓</center>

#GAMING-CLUB-EXECS

Josephine (VP Finance) 10:21 PM
so we have a partial-success from the budget meeting
everything got funded except for the AP
sucks after arty put so much work into the ap infra

Arthur (VP Gaming) 10:21 PM
Thanks for trying anyways. and it's not like the AP system is just gone without real funding. The points still work and stuff. It's running right now in the exec chat for testing actually

Josephine (VP Finance) 10:22 PM
still 😞

Josephine (VP Finance) 10:25 PM
wait I just got an email from a corporate sponsor!!
they're saying they'll fund awesome points as long as we put their name on it somewhere and send over our resume bank?

lightSoul (President) 10:25 PM
AP lives ❉

Arthur (VP Gaming) 10:25 PM
Awesome work!!!
lemme see if I can get this going
ap tip **@Josephine (VP Finance)**

Awesome Bot [BOT ✔] 10:26 PM
@Josephine (VP Finance) has been tipped 50 Awesome Points! Keep up the Awesome!

<div align="right">CC</div>

#SAVEWATCHDOGSLEGION: HOW I IDENTIFIED 20 VOICE ACTORS FROM A SEA

If you're familiar with the *Watch Dogs* franchise, you probably heard of *Watch Dogs: Legion*—supposedly an innovation in that you can literally play as everyone. Each citizen has their own metadata and schedule in the city of London, their own identity and web of connections. You can recruit any one of them to play in the campaign and online mode—which is also the problem. There's only 20 unique voices, and a lack of identity means there isn't a true protagonist, other than Bagley, the equivalent of Siri becoming sentient on your phone and getting to swear as much as possible.

One of the criticisms of *Watch Dogs: Legion* was that the voices didn't even sound like they were British. With only 20 voice options plastered onto a population of 7 million, things get repetitive—and annoying. One notable voice can be heard saying "it's in the kitchen on the right hand side"—once you hear it, you can't stop. But I thought—who are the voices behind the characters I keep hearing in London? I identified all 20 voice types and the personality that came with—each voice had their own "identity" attached to it. The female voice with an Indian accent appears to be a daredevil, the female voice with an Irish accent is a misanthropic genius, the Jamaican male voice will always be the "determined negotiator". I could go into how each of the 20 voices should have been a set character with their own arcs, but I'll touch on the gameplay criticisms of *Watch Dogs: Legion* in another article.

Thus began a gruelling list of searching through an entire list of voice actors—some of them not even having *Watch Dogs: Legion* listed as a work they appear in—to see who is who. I only found three—two were already identified and one I found by chance. After about 3 hours of searching through the entire voiceover credit scene, I realized I could just look through the credits of the DLC set in the same game, and voila—all 20 voices of London are listed. I went through 3 hours of essentially listening to people's Spotlight voice samples for nothing.

Except now, the criticism that the voices don't sound authentically British became invalid. All of the voice actors were British/Irish, in two cases. And most of the voices were genuinely the way they spoke, or at least the voice they used could be found in other media as such. Fair. I wanted to put together a video to sort of recognize the voice talent, except I ran into a few roadblocks: one voice actor had no recorded media works, just stage plays and short films that are gone. Another did have a media presence, but the accent she put on is no discernible—leading me to wonder if she even is the voice actor at all.

Still, I'd like to at least recognize the voices of *Watch Dogs: Legion* who put together 20 people that kept me sane during this pandemic while I was trapped living with my parents. You gave your voice into DedSec itself. Hatty Preston, Michael Onslow, Tina Gray, David Peyton Bruhl, Armin Karima, Lowenna Melrose, Joyce Greenaway, Shane Quigley Murphy, Courtney Winston, Scarlette Douglas, Bernadett Ostorhazi, Tomi May, Colin Hubbard, Diana Croft, Bhavini Sheth, Kush Khanna, Dominic Creasey, Charlotte Reynolds, Selva Rasingalam and Abbie Andrews—thank you for bringing life to London.

Watch Dogs: Legion ended up being a disappointment gameplay-wise mainly because Online Mode didn't live up to what we expected to (plus Ubisoft pulled support early literally a year after release), but I still hold out hope we'll get something.

#SaveWatchDogsLegion

<div align="right">Skit</div>

PEER REVIEW AND THE FOURTH ESTATE—CHAOS IN KAZAKHSTAN

PART (1 OF N)

News can be unscrupulous.

With a maelstrom of activity feeding the 24-hour news cycle on the daily, the influx of information is overwhelming. Watch a reputable broadcast long enough and you are bound to see the briefest of text flashes highlighting corrections for the past day, or week. Blunders are no surprise. Any field dealing with information should be wary of the adage that "garbage in makes garbage out," that your reporting can only be as good as the information received. We may all know the comical report of Dewy v. Truman, and the egg-on-face that resulted, but incidents like these work themselves out in no time flat. My concern, then, is much more with when it permanently stains the zeitgeist, and irreparably changes human life.

This was reinforced to me, as of late, during the recent protests in Almaty, and Astana (now known as Nur Sultan). The Kazakh whiplash at the start of January impacted people I knew on the ground, and foreign reporting was sparse to say the least. There are few feelings worse than uncertainty in the face of crisis. While I was personally lucky, there are many who yet grieve those events.

Looking back, the distress of not knowing what was happening spread panic on the ground. While revelations continue to come to light about the event, numbers remain terribly hazy. How can we trust the local police to present accurate information when their incentive is to inflate numbers and legitimize their authority? How can the Russian reporters feed us the facts when Spetznav rain from the sky over Almaty?

The story is deeply muddled, and the flow of information being such a thin trickle leads to poor decision making. One of the greatest discrepancies in the escalation of violence, is the comparison between information on the ground in Astana and Almaty. In the former, foreign journalists were active from day zero, reporting and reviewing each other's work. The rigour in Astana stands heavily in contrast to the chaos in Almaty. The decision to cut internet communications may have dulled the collective efforts of the citizenry, but one could argue that it also led to a collapse in the social order. Without indication of popular support, individuals became confined in their knowledge of what they saw on the street, and what could be gathered via back channels like Telegram. Propaganda from the Kazakhstan state, separatist movements, foreigners with a beef, and more flooded the airwaves and led to panic and raids on the stores.

I view the disparity in human impact in part as directly the fault of holes in communication and the absence of self-policed reporting. We often limit the scope of our peer review to the sciences, and neglect the humanities. It is equally vital however, as the prevalence of Journals of all stripes attests.

Propaganda is so insidious that it can propagate of its own volition. Effective works are self reinforcing, and as the narrative lacks inherent questionability an incautious journalist can parrot it quickly without considering the consequences. On the next edition of *Peer Review and the Fourth Estate,* we will examine a prime example of the rapid dissemination of falsehoods by exploring reports on the 2021 Cuban Protests.

Restricting access to information is tantamount to deceit, and the loss of life in Almaty is but one example to mourn.

sqrt(cause)

SILENCE IS A FRAGILE THING

At the time that I am writing, the biggest story right now is the protestors in Ottawa. The thing that stands out to most to me regarding the coverage of this story is the undue amount of attention given to a fringe minority. The best estimate I have heard for the number of protestors is at most ten thousand participants. When you consider all of Canada, 10K isn't a lot. It's 0.02% of the population. In comparison, a climate march in Montreal had an estimated one hundred thousand participants.

There also very few trucks. There are some, and yeah you can see those neat pictures on the news of them, but the thing about trucks is that they are very big and you don't really need many to take up space.

We do need to take their anger seriously; it is concerning that a fringe minority feels so emboldened to be absolute assholes. But they are a very small group. They are just very loud and annoying. Trust me, I know, I live in Ottawa. Thankfully not downtown, but I do live close. So I have first-hand experience of how annoying they are.

The big problem here is that it doesn't take a lot to disrupt peace. You just need one idiot honking down your street to interrupt what was previously tranquil. Perhaps there is insight to be had here for how to mobilize for a better cause. Though for now, I wish we would stop giving them so much attention so they can get discouraged and finally shut up. If I wanted constant honking and angry creatures shitting everywhere I would just go back to Waterloo.

Beyond Meta

VIVEK GOEL REVEALED TO BE THREE OMICRONS IN A TRENCH COAT

WATERLOO, ON — Researchers at the University of Waterloo have discovered that the university's president, Dr. Vivek Goel, is not the human he was made out to be, instead consisting of three stacked Omicron coronaviruses named Bob, Rob, and Hob.

According to the study, which was published in the *New England Journal of Medicine*, suspicions arose after the university mandated a return to in-person activities despite significant dissent from students and faculty. Further investigation revealed the internal structure of Dr. Goel, with Bob taking the place of the head, Rob the upper torso, and Hob the lower torso.

"We believe that our research explains some of the strange announcements that have been coming out of the Office of the President recently," said Dr. Charles LaFontaine, a professor of public health and one of the authors of the study. "In particular, the stance that N95 masks are overkill, the twiddling on mandating a third dose, and the insistence that self-isolation is unnecessary are all examples of behaviours that might be caused by a viral desire to infect as many people as possible, as quickly as possible."

Dr. Goel denounced the findings and subsequent press coverage in an emergency press conference on Wednesday. "The conclusions of this research are baseless and I strongly condemn all accusations that I am not a human being," he said as a poorly-disguised spike protein from Bob doubled in length. "I think all of you will agree that it would be inconceivable for a virus, which isn't even sentient, to take the helm of a multi-million dollar organization," he added as the spike protein broke through his mask and laid itself on the shoulder of a horrified front-row reporter.

After fifteen minutes of continuous grilling, including five minutes of a CBC reporter chasing Dr. Goel around the room with a UV flashlight, he finally admitted his true form and abruptly left, not even stopping to use the hand sanitizer by the door.

In a prepared statement released yesterday, the Board of Directors announced that they intended to keep Dr. Goel as President, noting that his newly uncovered experience with managing hospital capacities and infectious diseases would greatly aid the establishment of a medical school at the university.

As of press time, research is underway to determine if Premier Doug Ford is actually five Ebolaviruses in a fat suit.

quantum goose

UNACCOUNTABLE MELANCHOLY

I walk home after a night at his house, boots crunching in the morning snow.

The plane takes off, starting me back after long long time afar.

Yellow post-party taxi door slams shut; frigid fingers fumble keys.

Friends wave as the ION glides away.

Home at last, I sigh and sit down,

By myself in my quiet, peaceful room,
Comfortable, beautiful,
I plaster the memory onto my wall
and ache for another
and wonder where
This insatiable craving came from;
This unaccountable melancholy.

CC

THE GÄVLE GOAT

Looking kinda cute this year, what a piece of ash.

Since the last math**NEWS** edition (+1), an important news item landed across my desk: the festive immolation of the yule goat.

What a joyous time to be had! After four years of saddening survival, the time has come to see him go up in flames again.

The tradition of goat burning dates back to the late sixties, and since that time a goat has little more than a 50% survival rate. Many means have been employed to protect the massive wood, straw and fabric goat statue over the years, from dousing the flammables in water to form ice, to adding fences, guards, and $^{24}/_7$ surveillance. Little has stemmed the tide, with festive arsonists bringing their own tricks to the scene, including a volley out of flaming arrows in 2005.

While math**NEWS** does not condone arson, we all have the primal urge to watch big goat fire haha goat burn.

…Especially when the stakes are so low. Make the yuletide gay, and if you plan on doing crimes, at least have them be festive.

sqrt(cause)

Who does not support arson.

*[Editor's Note: This article was originally submitted for 148.1, but slipped through our cracks. Apologies to the author! Also, the math**NEWS** editors do not condone arson.]*

RUBINSTEIN

Igor Rubinstein — affectionately called Rubinstein by his many friends — was a scrawny chemistry student. Looking past through laminated photos stashed away in my parents' cabinet, his cheery face smiles back at me in almost every one. He was your classical nerd: scrawny, with shaggy, curly hair, big round glasses, and an intelligent look behind a pleasant demeanour. I would have liked to be friends with Rubinstein.

Rubinstein's best friend was his polar opposite. Oleg was charming, smooth — or at least, he seemed to think so. He was the quote unquote bad boy of the unlikely gang of nerds, and he had the (rather entertaining) habit of flirting with anything that moved. There's a photo of him dancing with practically every single lady at my parents' wedding; the fella had his hands on the waists of all of my dad's sisters, my mom's friends, and every other miscellaneous woman who happened to be invited. He was rejected by every one of them.

Rubinstein and Oleg were an unlikely pair. They were the clowns of the group — their laughter is frozen permanently in every photo. My parents loved them both very much.

On the night of the big wedding, the two were tasked with driving my dad's humble grey automobile back home. The back was draped in cheap party streamers and lavishly painted in bright red: "JUST MARRIED." It was painted by my dad's ex-lover. My mom still laughs.

So Oleg and Rubinstein, drunk off their rockers, turned the radio up, rolled the windows down, and drove through the city singing "My Heart Will Go On" in their horribly off-key Russian accents — Oleg behind the wheel and Rubinstein happily shaking a bottle of beer at the passersby outside.

On the last stretch home, Oleg was meant to turn left at the intersection, but the poor guy was too drunk to realize it before it was too late. Well never mind that; he spun the wheel round and round and made a solid u-turn to try again.

Missed the turn once more. Rubinstein was crying laughing, teasing his buddy while shamelessly doing nothing to help. Another u-turn… another miss. The unfortunate duo were on their fourth attempt by now. Seeing the commotion and realizing that his two best friends were in dire need of assistance, my dad rallied the wedding guests to come to Oleg and Rubinstein's rescue. So, fifteen people dressed in their fanciest clothes — including my mother in her long white wedding dress — stood hand-in-hand that night in Jerusalem in a blockade so that two drunks could manage a left turn in an embarrassingly lurid wedding car.

A cop with a mild sense of humour was watching the action unfold from the intersection. Nearly twenty-five years later, I hope he still chuckles at the part where Rubinstein yelled "Cheers!" and tried to offer him a six pack of beer through the window at 30 kilometers per hour.

Of all the stories my parents have shared about their youth, this is by far my favourite. Of all the characters that passed through their stories and were left behind as careers and families and lives grew, Rubinstein will remain the scrawny 20 something year old I wish existed in my generation. Those people existed! They laughed and they were young together, like we are now. I think my kids will enjoy hearing about my adventures in math**NEWS**, in PMC, in Waterloo.

There's another thing too — these photos of my parents and their friends as young adults show adults, just as adults are supposed to be. They've told me that the core "you" that's inside of a person doesn't change from that point forward. So I like to hear these stories, not because they are tales of warning about the dangers of making mistakes that is so often the undoing of a parent trying to share their past (like getting too drunk or trying to smoke to look cool or having unprotected sex) but because they were stupid and fun and *funny*. I love to know that my parents had fun lives. Everyone deserves to know a Rubinstein.

A cool pen name

PHILOSOPHY: IS IT STUPID?
TODAY'S TOPIC: HEGELIAN IDEALISM

Hegelian ideals have three main ideas:

- The everyday world is shaped by our mind & its interpretation of it
- The best reflection of the world is that found in our mind
- To think is to relate the minute to the infinite, from which everything is derived

Not gonna lie, I'm not really sure what this means. I'm honestly not convinced that whoever wrote this entry in the Encyclopedia Brittanica knew either. I think Hegel took the idea of beauty being in the eye of the beholder and totally ran with it. This is a philosophy for philosophy majors, and hot take, it's stupid. No I won't be taking criticism or defending my opinion. Please consider the following lemma:

Lemma 148.2:

"*Hegelian/absolute idealism is fucking stupid.*"

This lemma can then be used to construct a proof that philosophy as a whole is stupid. QED.

Lemman

THINGS TO LEARN IN THERAPY: GOALS ARE VECTORS

In lieu of the New Year, we as a society decide that January is when we make resolutions. Except most resolutions typically don't last the whole year and are also usually vague (e.g., exercise *more*, eat *more* healthily, do a *good* job in my occupational tasks). There is little weight and commitment to these resolutions which is why I didn't set a proper set of goals at the strike of midnight, instead copping out to "set better goals" as my 2022 resolution.

Fast-forward two weeks and I book a counselling appointment because I am what? Depressed. Also I wanted some guidance in setting my goals. Without getting too personal, my main takeaway and what concept I found to be most helpful is to think of goals less as tasks to complete, but rather as vectors.

Goals can serve as a general direction of how we can approach life. Without viewing them as definitive points and binding ourselves to a meaningless creed, we are instead left with guiding principles and a vague idea of what we want accomplished. This leaves a lot open to interpretation and additional leeway if things don't end up as perfectly as we plan.

You can ballpark the duration/magnitude of your vector goals too, so that we have a rough timeline rather than a deadline. Less pressure this way while maintaining a sense of accomplishment when we eventually reach the end.

Maybe you are like me too, less result-oriented but still want to set goals for yourself. Try finding those deep-set principles that you can refer to if you feel like you're going off-track. Let whatever sum of vectors you like guide you to an eventual destination.

Deriving for Dick

N NUMBERS THAT ARE LUCKY, PROVED BY EULER HIMSELF

- 1
- 2
- 3
- 5
- 11
- 17
- 41

loloolol

elseWHEN: HOW TO CONTACT mathNEWS EDITORS IN 1974

DEMONSTRATING THE CURRENT EDITORS' EFFORTS AT LARGE-SCALE DIGITIZATION OF OLD math**NEWS** *ARCHIVES*


```
                    YAFI

        Once again, it is "How To Send Us A
Message" time (written so even YOU can
understand it).

1)goto M&C 3013
2)find a terminal
3)turn power "on" (switch on right hand side
4)sign on (instructions are on the blackboard)
5)type "mail mathnoos" in reply to "SYSTEM? "
6)enter your message
7)enter a blank line to end and send the message
8)reply "logo" to "SYSTEM? "
9)turn power "off"
10)clean up your mess

     Here's an example:

(carriage return)
114101
WATERLOO 6050 01/15/74 20:22  3370, 23 USERS
USER ID --jqpublic
PASSWORD--▓▓▓▓▓▓▓▓▓▓▓
(current news prints out)
SYSTEM? mail mathnoos
.I think you people are crazy, and
.I'll never read your rag again!
.
message sent
002 mathnoos 20.527 01/15/74
SYSTEM? logo

     See how easy it is! With just a bit of
practice  you'll be sending messages like a
pro. And remember: we ENJOY  hearing  from
you...
```

NOTES

- Our scans are typically much better than this one.
- We still enjoy hearing from you: email us!
- No, I don't know what "YAFI" means.

bipED

N THINGS TO DO ON LUNAR NEW YEAR'S EVE

- Attend **mathNEWS** production night at 7pm
- Attend **mathNEWS** production night at 8 pm
- Attend **mathNEWS** production night at 9 pm
- Attend **mathNEWS** production night at 10pm
- Attend **mathNEWS** production night at 11pm
- Attend **mathNEWS** production night at 12pm
- Happy New Year!

loloolol

FIFTY YEARS

It's interesting how thinking about something in a different way can totally change your perception of it. For example:

Did you know that **mathNEWS** is turning 50 years old in about one year from now?

Not so shocking, maybe. We've been around for a while. It's not really even that much time in the grand scheme of things, right? For several years I had known about this, since my graduation pretty much coincides with this anniversary, but haven't really paid much thought to it, in emotional terms. Alright, here's another perspective.

Did you know that the first **mathNEWS** writers and editors are now around 70 years old?

I don't know about you, but that elementary arithmetical deduction (20-year-old university student + 50 years of **mathNEWS**) just about blew my shirt off when it first occurred to me. And thinking about it now, I can see how it changes your perspective: institutions and organizations last a long time, but human lives really don't. When you take 'one human lifetime' as a unit, the whole situation re-orients itself on a human's scale. And on a human's scale, 50 years is a long time.

Actually, it doesn't even take 50 years for a long time to pass. You can read through some older issues of **mathNEWS** on our website, they go back around fifteen years, and what you'll find is certainly **mathNEWS** in that it looks like **mathNEWS** and structured like how **mathNEWS** is structured now. But the feeling is completely different. At least, to me it is. And it's not like this is some crazy revelation either! Nobody from fifteen years ago is still here now. Three generations of UWaterloo students have made their way through here in fifteen years, all with their own ideas of what **mathNEWS** is supposed to be like. Of course, there is a central spirit to this publication that holds fast throughout the past and present, ingrained like DNA through every issue and article and **blackBOX**, but ultimately **mathNEWS** is written by the people who write for **mathNEWS**. And people come and go very quickly, bringing their own basket of ideas and shaping **mathNEWS** in their own way, before leaving and letting someone else take a shot.

Try it, read some old issues. The same 'things' are still there, but at the same time the whole atmosphere feels alien and unknowable. The issues are snapshots from a culture that left very little else behind. All those people wrote articles in a certain context; the context of being a Math student, and a member of the student publication **mathNEWS**, at UWaterloo in the early 2000s. Think about it symmetrically: in fifteen years nobody will know, say, why that article in the last issue was by someone named lugubrious. You probably don't even know now.

The upshot of all this is that it feels ridiculous to even celebrate a 50th anniversary for **mathNEWS**. I can confidently say that the past four years have been worth celebrating, but everything behind that is this impenetrable murk, like I'm on a ship and need to figure out what the crashing waves looked like to the captain before me.

Well, we're celebrating anyway. Everything's still in early stages, but we've got a lot of ideas and even more money. Now is a really good time to **become a mathNEWS editor**, too; there's a lot of stuff to do.

Maybe you're one of the 70-year-olds (or younger, that's cool too) whom I was referring to earlier. In that case, please email us! We're really interested in talking to you. If you don't want to talk, writing an article works too. You'll have to email it to us, or use the WordPress if you're young enough to have an account. In either way it would be extremely cool to hear from you and I hope I didn't turn you off with the 'alien and unknowable' thing.

Maybe you're reading this 51 years from now. It's not out of the question, we've been upgrading our systems recently. How's **mathNEWS**? Well, I'm nearly out of space now on this extra page now, so:

Look forward to the 50th Anniversary of mathNEWS!

bipED

EPISODE 32: BIG O AND SORTING ALGORITHMS

Enjoy Episode 32 of the MathSoc Cartoons series: *Big O and Sorting Algorithms*!

Want to see the next comic BEFORE it's released and provide feedback to help us out? Sign up to be a reviewer at `https://bit.ly/cartoons-reviewer-join`!

Want to see the next comic when it's released? Follow @mathsoccartoons on Facebook and Instagram! As always, feedback, suggestions, and fan art can be left on the MathSoc Cartoons Discord channel in the MathSoc server.
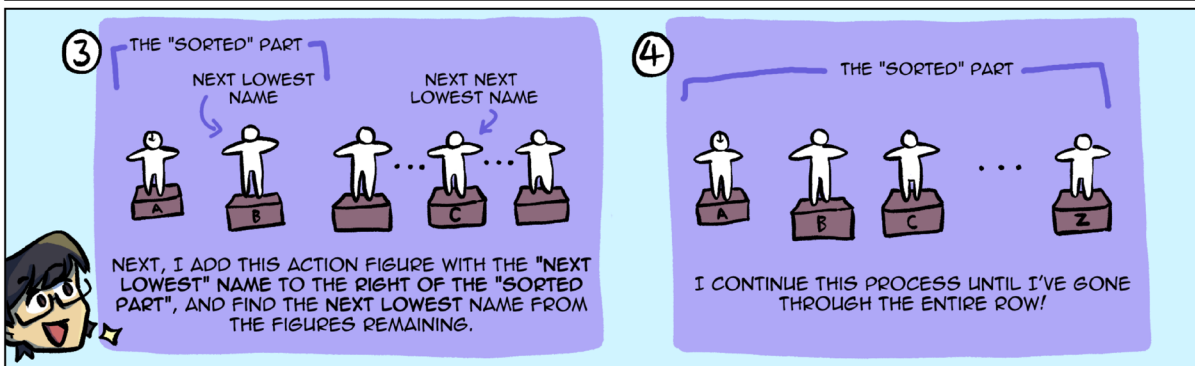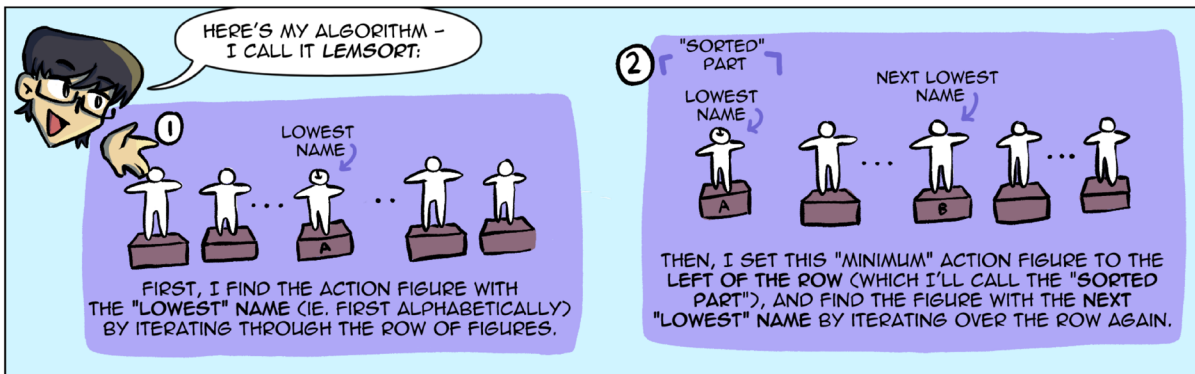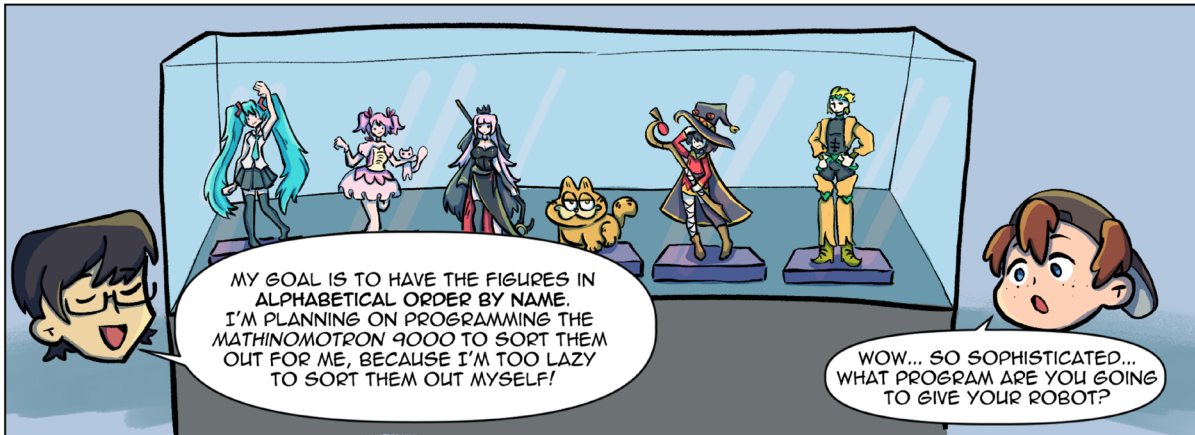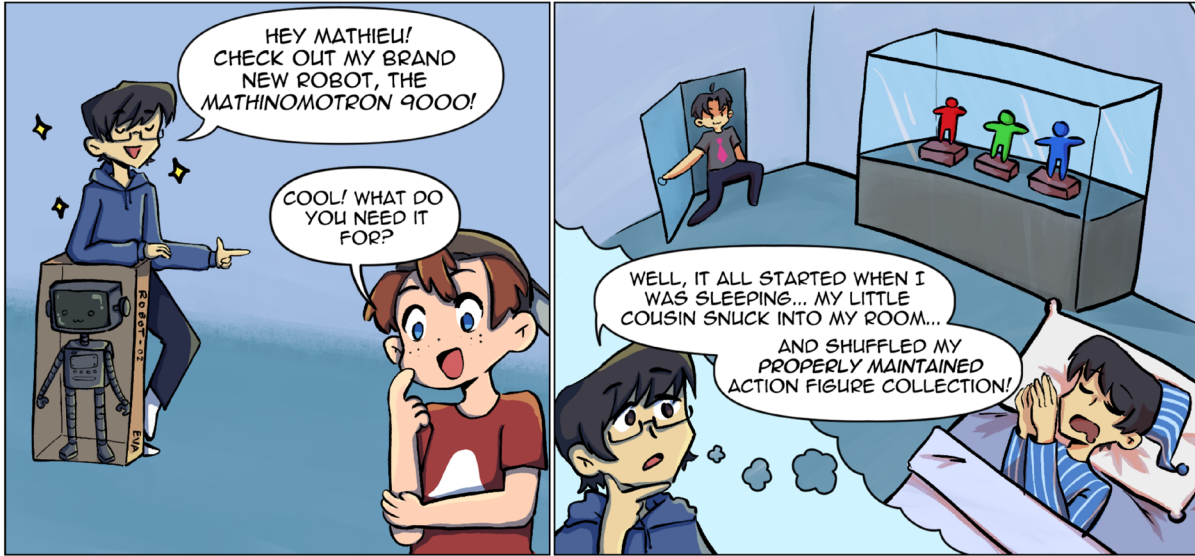
MathSoc Cartoons

A blackBOX a day keeps whitespace away.

A HEALTHY math**NEWS** EDITOR

CS 136: BIG O AND SORTING ALGORITHMS
STORY BY MARCUS CHAN | ART BY ALYSSA BAKSH & GRACE FENG

CS 136: BIG O AND SORTING ALGORITHMS
STORY BY MARCUS CHAN | ART BY ALYSSA BAKSH & GRACE FENG

MEF — Mathematics Endowment Fund   MATHSOC

WELL, FIRSTLY, THE SORTING ALGORITHM YOU OUTLINED ISN'T NEW— IT'S COMMONLY KNOWN AS "SELECTION SORT".

MORE IMPORTANTLY, THOUGH, THIS ALGORITHM ISN'T THE BEST TO USE BECAUSE IT'S PRETTY INEFFICIENT!

OH — WHAT DO YOU MEAN?

DID I JUST REINVENT SOMETHING AGAIN— WHY DOES THIS ALWAYS HAPPEN TO ME?

WELL, IF WE LET 'N' BE THE NUMBER OF ACTION FIGURES YOU'RE SORTING, EACH PASS THROUGH THE LIST AND THE NUMBER OF TIMES YOU NEED TO PASS THROUGH THE LIST INCREASES LINEARLY AS 'N' INCREASES.

IN OTHER WORDS, THE TIME IT TAKES FOR YOUR ALGORITHM TO RUN INCREASES QUADRATICALLY AS 'N' INCREASES.

WHY DOES THIS MAKE THE ALGORITHM INEFFICIENT THEN? IT DOESN'T SEEM THAT THE GRAPH INCREASES THAT QUICKLY...

TIME

N

IMAGINE IF, AFTER YOU EXPANDED YOUR COLLECTION TENFOLD, THE CULPRIT DECIDES TO STRIKE AGAIN. SINCE THE NUMBER OF STEPS SELECTION SORT NEEDS INCREASES WITH 'N', THE TIME YOUR ROBOT WOULD NEED INCREASES BY A FACTOR OF $10^2 = 100$!

TIME

$100T_0$

T_0

N_0 $10N_0$ N

RIGHT NOW, I HAVE 15 ACTION FIGURES AND IT TAKES ME ~20 MINUTES TO SORT MY COLLECTION.

IF I HAD 150 ACTION FIGURES, USING THIS LOGIC TO SORT MY COLLECTION WOULD TAKE UP TO 20*100 = 2000 MINUTES, WHICH IS NEARLY ONE AND A HALF DAYS!

IN COMPUTER SCIENCE, WE WOULD SAY THAT THE TIME COMPLEXITY OF SELECTION SORT IS ON THE ORDER OF N^2, OR JUST $O(N^2)$ FOR SHORT.

$O(n^2)$

HMM... IS THERE A BETTER ALGORITHM WE CAN USE THEN?

THERE ARE MANY, BUT ONE OF THE MOST POPULAR ONES IS KNOWN AS "QUICKSORT".

HOW DID YOU EVEN GET A PLANE???

① FIRST, PICK ANY ACTION FIGURE IN THE ROW, AND LABEL IT THE "PARTITION".

② BEFORE   AFTER   NEXT, PLACE THE FIGURES WHOSE NAME COMES BEFORE P TO THE LEFT OF P, AND THOSE WHOSE NAME COMES AFTER P TO THE RIGHT.

BY DOING THIS, WE DON'T HAVE TO COMPARE ANY OF THE FIGURES TO THE LEFT OF P TO ANY FIGURES TO ITS RIGHT, SAVING US A LOT OF TIME!
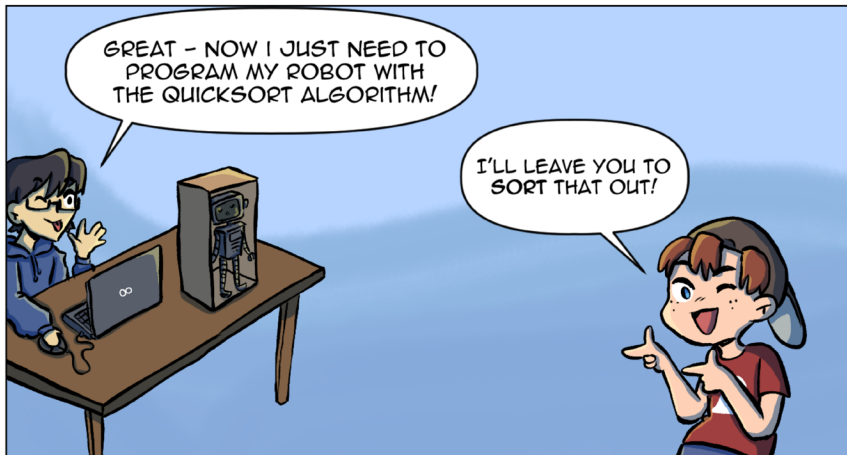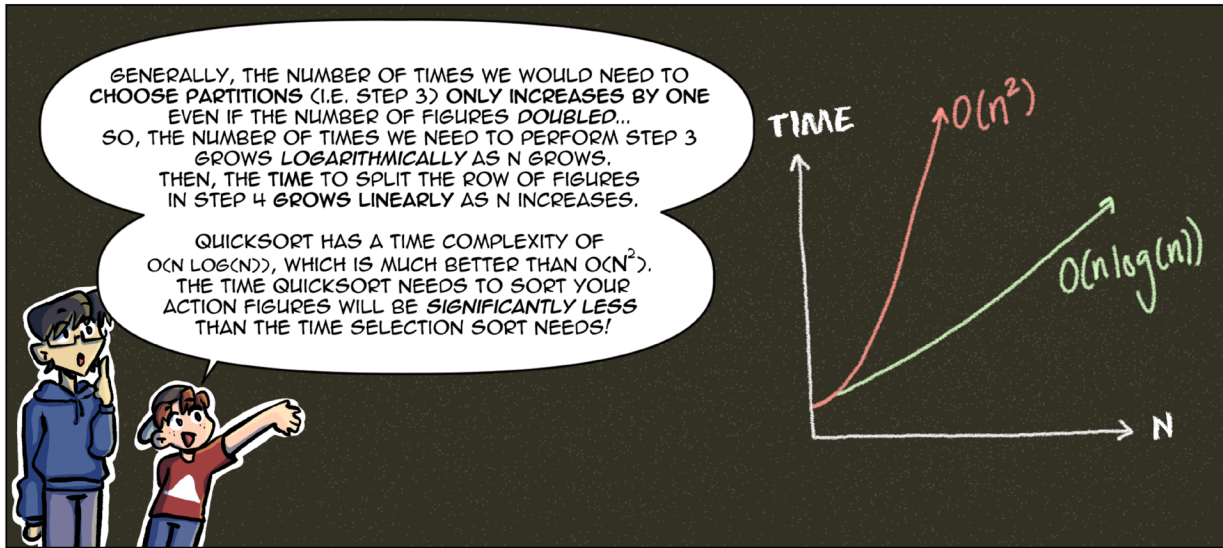
③ THEN, REPEAT STEPS 1 AND 2 ON THE NEW "BLOCKS" OF ACTION FIGURES; IN OTHER WORDS, PICK PARTITIONS IN EACH BLOCK...

④ ... AND THEN, SPLIT THE FIGURES IN EACH BLOCK UP INTO SMALLER "SUB-BLOCKS".

⑤ FINALLY, WE REPEAT THE SAME PROCESS ON THESE "SMALLER BLOCKS", AND WE CONTINUE THIS RECURSIVELY UNTIL THE SUB-BLOCKS JUST CONSIST OF ONE FIGURE.

⑥ ONCE WE REACH THIS POINT, WE CAN BE ASSURED ALL THE BLOCKS ARE SORTED, AND SO WE'RE DONE!

CS 136: BIG O AND SORTING ALGORITHMS
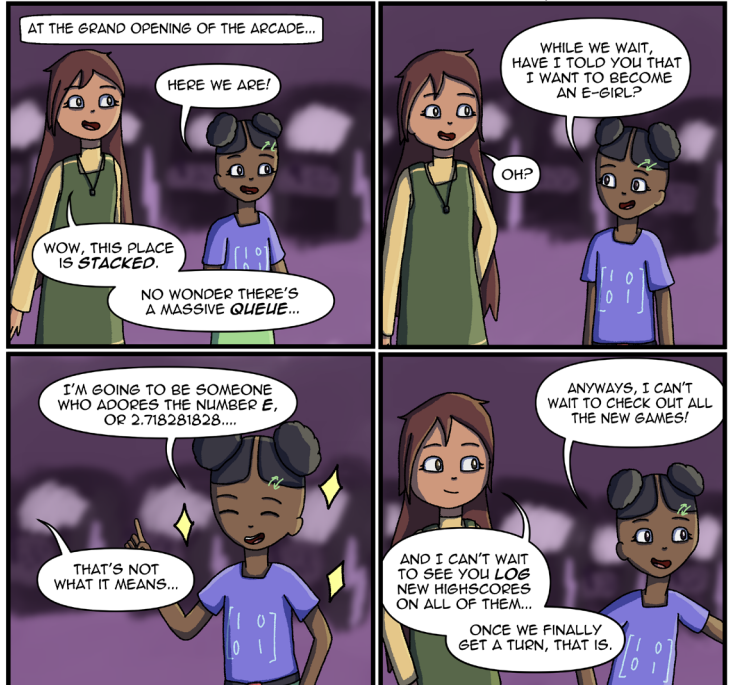STORY BY MARCUS CHAN | ART BY ALYSSA BAKSH & GRACE FENG

DIRECTORS' DOODLES #1: E-GIRL

What's this, another MathSoc Cartoons submission? Well, not exactly. We're Marcus and Grace, the MathSoc Cartoons Directors for Winter 2022, and we wanted to make some bonus content for fun and for your enjoyment. So… we present to you a short comic for e day, written as a continuation of sorts to Cartoon 26: _Stacks and Queues_. More bonus content can be found on the MathSoc discord and on the MathSoc Cartoons socials.

MathSoc Cartoons Directors

DIRECTORS' DOODLES #1: E-GIRL　　STORY BY MARCUS CHAN, ART BY GRACE FENG

SUN FEB 6	MON FEB 7	TUE FEB 8	WED FEB 9	THU FEB 10	FRI FEB 11	SAT FEB 12
	Return of in-person instruction	Course selection period ends		Cycle #1 employer rankings available @ 2PM	Cycle #1 student rankings due @ 2 PM	

SUN FEB 13	MON FEB 14	TUE FEB 15	WED FEB 16	THU FEB 17	FRI FEB 18	SAT FEB 19
	mathNEWS 148.3 production night Cycle #2 job postings open Valentine's Day ♡		Requests for accommodations on religious grounds due	Random act of kindness day 😬	mathNEWS 148.3 released Cycle #2 applications due Tuition and fee refund deadline — 50%	Reading week begins 📖

LAST ISSUE'S gridSOLUTION

LAST ISSUE'S gridSOLUTION (CONT.)

1. RING ROAD
   (where you are)

2. PAC, E5, PAS, TC, MC, COM, PHY
   paces past MC Comfy
   (what you need to take)

3. J C M V T M N T   from every 5th clue
   + R I N G R O A D
   _____
   B L A C K B O X
   (what you're looking for)

mathNEWS