

snowdozer



“WHAT WOULD BE THE WEIRDEST PLACE TO CITE mathNEWS AS A LEGITIMATE SOURCE?”

Howdy. This here's the long-storied **mastHEAD**. Feels like we just had one of these, eh? Guess that's what reading week does to you. Terrible stuff—especially if you're the one who has to write this.

This issue's another good one, of course. Just like the one before it, and the one before it, and the one before it, and so on. Here are some of the rewards you can look forward to if you read closely:

- corn;
- numerous follow-ups to the international media response to last issue's article of the issue (including praise from Mr. Linus "Tech Tips" Sebastian);
- complaints about last issue's *unusually tasteful* choice of **blackBOX** placement;
- complaints about the way the international media almost invariably miscapitalised **mathNEWS**;
- complaints about modern society as a whole;
- wow, the writers really like to complain, don't they;
- plenty of **profQUOTES**, as usual; and
- a surprise **gridWORD**-like feature!

Wow, what audacious variety! Now, if I'm lucky, one of those things I listed would've caught your eye enough for you to flip straight past the **mastHEAD** and not actually read the rest of it. If that happens for *everyone*, this whole section will be dead code, which can actually cause undefined behaviour in C++. Anyway, whSegmentation fault (core dumped)

evaluatED
Editor, mathNEWS

ARTICLE OF THE ISSUE

The Divine **mathNEWS** Oracle had a really tough time choosing this one—with that said, It has divined that aphf's *Dark Alleys* gets it this time. Prize in MC 3030 for aphf. *This is his fifth AOTI. Please stop him.*

evaluatED
Editor, mathNEWS

ANDOIHI	Official Racket documentation
YALEVOYLIAN	The C++26 Standard
WINK WONK	mathNEWS
__INIT__	An Imprint article
PLATYPUSGOD	The US president's election speech
FIRSTIE	Tucker Carlson
SEXY_SOFTWARE_BABE	An Antarctic research survey
YUMMYPI	Mom blog that is clearly trying to get you to join their MLM
BEYOND META	On a bikini
ERALOGOS	<i>Discover Canada: The Rights and Responsibilities of Citizenship</i>
BUBERT	MATH 135 midterm
BOLDBLAZER	mms.fandom.com
JEFF	Wikipedia
SKIT	An instruction booklet for an LG Smart Fridge™
0.423	proof on PMATH 945 final
AAQSR	In a CS 246E lecture (this actually happened!!)
TENDSTOFORTYTWO	cookbook
SNOWDOZER	The Bible
WATER	a mathNEWS articles dataset in an AI paper
別	Encyclopædia Britannica
BE'F-UNWELLINGTON	PD 1
CUTLET	CIA documents (classified)
APHF	tattooed on the neck of a man strung to the helm of a ghost ship washing up on the shores of 1850s England
NORMALPARAMETERS	tom scott's newsletter honestly he should
MOLASSES	imprint
YAMNUSKA	Elon Musk on Twitter
TERMINAL	Fox News
LARS NOOTBAAR	BlogTO
WARRIOR1RULES	divorce papers and/or marriage registration
[INSERT PEN NAME HERE]	mathematical proof
NOT A N*RD	Scientology doctrine
WHOLE NUMBER HAVER	Federal Election Debate (goose management will be a hot topic next year)

free(): double free detected in tcache 2

EVAN GIRARDIN, mathNEWS EDITOR FOR WINTER 2024
ALONG WITH OWEN GALLAGHER, DANIEL MATLIN, AWAB QURESHI,
NAMAN SOOD, AND ISABELA SOUZA

mathASKS 154.4

FEATURING PROFESSOR CHRISTIANE LEMIEUX

CULTURED STATISTICS ENJOYER: CAN YOU TELL US ABOUT YOUR RESEARCH?

My research is on quasi-Monte Carlo methods. To explain what they are, it's useful to first talk about Monte Carlo methods, which basically amount to using random sampling to estimate quantities of interest such as integrals, expected values, quantiles, etc. With quasi-Monte Carlo we replace random sampling by a structured sampling typically based on objects called low-discrepancy point sets and sequences. These constructions attempt to fix some of the issues that arise with random sampling, namely the fact that we may oversample some regions and undersample others, in whatever high-dimensional space we're sampling from. Studying these constructions sometimes requires heavy machinery from number theory and other areas of mathematics, but at the same time they can be applied to very practical problems from the fields of finance, physics, computer graphics, etc. I find this duality really nice and enjoy working on various aspects of quasi-Monte Carlo methods, including coming up with new constructions, improving known ones, studying theoretically and empirically how much they can improve compared to Monte Carlo, and then applying them on a variety of practical problems. Lately I've been working on a very cool construction that we call a golden ratio net/sequence, where we construct points by expanding numbers in base golden ratio (instead of, say, base two).

MOLASSES: AS AN ADULT, HOW DO YOU MAKE NEW FRIENDS?

Growing up, almost all my friends were people I met through school, and many of those turned out to be everlasting friendships. Once you're done with school, you tend to become busy with other things, and are no longer immersed in an environment with many people of your age with relatively similar interests and schedule. So to answer the question, I'd say that as an adult you're more likely to make new friends among the colleagues you work with or, if you have kids, by connecting with the parents of your kids' friends. I think people who engage in activities outside of their work or families are also able to make new friends, but that's not something I've been able to find time for myself.

TIME TRAVELER: WHAT ADVICE WOULD YOU GIVE TO YOUR YOUNGER SELF?

I think the younger version of myself was a little bit too focused on perfection and the idea that there is a straight path ahead. So I would try to convince her to think of her goals differently, embrace the imperfection and randomness of life, and aim for internal balance and peace rather than the elusive concept of perfection.

FRENCH LEARNER: WHAT IS YOUR FAVOURITE FRENCH WORD?

Écureuil.

BOLDBLAZER: DO YOU HAVE ANY PECULIAR NON-ACADEMIC INTERESTS?

I'm currently trying to learn how to play the bass guitar.

JEFF: WHAT'S YOUR FAVOURITE BATHROOM ON CAMPUS?

I certainly haven't tried all of them(!) but so far I'd say the one on the 2nd floor of QNC, because of the cool hexagon tiles.

LEAH: WHAT IS THE CRAZIEST THING A STUDENT OR COLLEAGUE HAS EVER SAID TO YOU?

Hmmm... I tend to erase these sort of things from my brain to make room for more useful information. Also... we're Math people, so we don't say crazy things! But to try to answer the question more seriously, the closest thing to "craziness" for me would be people making statements as if they were certain they knew what was in your brain and why you did this or that. And they say this in such an authoritative way that they sound like they actually think they know you better than you do. To me this is crazy.

DICK SMITHERS: IF YOU DIDN'T GO INTO MATHEMATICS/ACADEMIA, WHAT WOULD YOU HAVE DONE?

Going into academia was pretty much a given for me because my father was a professor (of political science, not math) and I always wanted to be like him, i.e., get a PhD and become a professor. But I would say the most likely scenario outside that path would have been to become an actuary since I did my undergrad in actuarial science. Or to become a medical doctor, more precisely a neurologist, because I was convinced that's what I wanted to do for a few years prior to starting university (see answer about best book!).

EVALUATED: WHAT WAS YOUR LEAST FAVOURITE COURSE IN YOUR UNDERGRAD?

Probably some non-math course on social security.

JEFF: HOW DO YOU BALANCE YOUR WORK IN THE DEAN'S OFFICE WITH YOUR WORK AS A RESEARCHER?

This is difficult to do, in that many of my responsibilities in the Dean's Office require my constant attention, and are such that if I delay taking care of them they get harder to deal with. So I often have to prioritize that work over other things. I've been able to maintain some research activities thanks to the fact that I have students and postdocs to work with. They need to output papers for their own progress and career, so this forces me to stay engaged in research. If I have a chance to spend a few hours on a math problem related to research it makes me very happy.

SISYPHUS: WHAT ARE THE BEST AND WORST PARTS OF YOUR JOB?

The best part of my job is I get to work with others who are dedicated to the success of the Faculty, whether they are other faculty in leadership positions, staff, faculty members, or students. One of the less enjoyable parts of my job is for various reasons I ended up playing a key role within Math to ensure we're compliant with Policy 31 on University Expenses. Because of this I jokingly became the "cookie police", because for a while, a strict interpretation of P31 suggested departments should not even have cookies served at their department meetings.

BOOKLOVER: WHAT IS THE BEST BOOK YOU HAVE EVER READ?

Tough question as this kind of opinion or ranking tends to evolve over time. So I will give a two-part answer: I thought "The Man Who Mistook His Wife for a Hat" by Oliver Sacks was fascinating when I read it around the age of 15, so much so that it made me want to become a neurologist. So I'd say this was probably the book that captivated me the most. More recently I really enjoyed "Galileo's Daughter" by Dava Sobel. I loved how the author interlaced describing the life of Galileo and his remarkable dedication to science and knowledge with the beautiful and deep bond his daughter and him had.

☕ : WHERE IS YOUR FAVOURITE PLACE TO BUY COFFEE FROM ON CAMPUS?

Starbucks. But I much prefer the coffee I drink at home in the morning, which is usually enough to get me through the day.

CUTLET: WHAT WAS THE PROCESS TO BECOME ASSOCIATE DEAN, OPERATIONS AND ACADEMIC LIKE? WHAT MADE YOU CHOOSE TO DO IT?

Associate Deans are essentially chosen by the Dean, unlike department chairs and school directors who are elected by their unit. So when I was offered the position I simply accepted it. By then I had already held some heavy admin roles such as being interim chair of my department (Statistics and Actuarial Science) for two years, and Associate Dean, Graduate Studies for two years. So I knew pretty well what these types of roles involve and felt ready for a new challenge. Also, I'm proud to be a part of the Faculty of Mathematics, so I knew I'd be willing to work hard to try to make it a better place.

DISTRACTED: WHAT'S THE MOST UNEXPECTED OR INTERESTING PART OF YOUR ROLE IN THE DEAN'S OFFICE? HAS IT GIVEN YOU MUCH INSIGHT INTO THE FACULTY THAT YOU DIDN'T HAVE PREVIOUSLY?

I think an interesting part of my role is to be sort of a connector. That is, because I'm aware of most of the things that are happening in the different portfolios and units, I can help make connections and make sure people who should be talking to each other do so. And although I think I already had a pretty good insight into the Faculty from my time as

Associate Dean, Graduate Studies, now I'm seeing even better how all the pieces are moving, what the hot button issues are, what needs to be fixed, and what great work my colleagues are doing.

URANUS

It has come to my attention that Uranus is sideways.

After becoming infatuated with astronomy *juust* before the pandemic began, this information has eluded me for years of casual forum-reading, planet-identifying and stargazing with a little app on my phone (that I even splurged and bought the in-depth version of!). So, knowing this now, it is my sole purpose today to pass on this knowledge to you.

First, it is vital to note our lazy superiority to the ancient greats in scientific history. Socrates had no fucking idea about this. Copernicus would shit his pants. Galileo Galilei would simply pass away if he knew that centuries in the future, a pathetic excuse for a student was using a little magic glass and metal slab to look at the night sky and have it identify different celestial bodies, constellations, meteor hotspots, etc. Not to mention that I am a woman, and Galileo couldn't even leave his house. Take that, Renaissance patriarchy!

But! Use this advantage, like me, and look up random planet facts. Ask yourself, "why didn't you question the vertical nature of Uranus's rings?" Ponder, for a moment, what could have possibly caused this anomaly. Obviously, you can look that up too in just a few seconds, thanks to the life's work of some socially isolated astrophysicist. Over time, Uranus had the misfortune of being bombarded by a collection of other celestial miscreants, and now sits eternally in the recovery position. It fell over.

[Article writing is temporarily halted as I watch my cat chase her own shadow for ~3 minutes straight]

Why, you ask, wasn't it just one big object? Well, an astrophysicist has an answer for that, too. If all it took to KO Uranus was one punch, it probably would have obliterated its moons in the process, and a bunch of other stuff, I bet. (But can't explain, as I am not that astrophysicist.) But speaking of moons, that (or its rings) could have yoinked Uranus fully onto its side thanks to gravity. Maybe we don't exactly know why, but some day, a smug brat from the future will have the answer at the tip of their finger.

nike



ON THE COMMODIFICATION OF ATTENTION

Entertainment has always been present in our history. We can find early examples of Entertainment through the arts—Neanderthalic Cave Art depicting themselves, the world around them, and the histories of their interactions. For thousands of years, Entertainment was tribal—it contained pieces of social histories and culture passed down between generations. We still see examples of this in the present age, though their presence is limited. I won't dive extensively into this, as that is not my primary focus; however, feel free to learn more about the cultural practices of the Suyá people of Brazil, the Plains Indigenous Peoples of Canada (Siksika, Piikani, Kainai, Dakota, Stoney Nakoda, Cree, Assiniboine, and Tsuut'ina), and the Māori people of New Zealand (or any pre-colonial culture's history of music, stories, dance, etc.).

Entertainment needs attention to be appreciated, otherwise it loses its significance. One who listens to a song without listening or reads a book without understanding has, in effect, done neither. While they may have heard the rhythm or seen the words, the effect of either is lost on an inattentive participant. This is not a bad thing—it is not a good idea to focus solely on the music and its lyrics while you drive, and it is not a good idea to focus solely on the words in the book while your professor is lecturing. Our ability to be selectively attentive is fundamental in how we process the world. In our present age, we give our attention to sources of Entertainment when we want something that takes us away from our daily lives—or when we want to celebrate something of cultural significance.

As a topical example, we can consider Super Bowl LVIII. Super Bowl LVIII saw nearly two hundred million people tune into the broadcast (through legal, traceable means—the 'real' number is likely higher). For a sense of scale, that is approximately five times the population of Canada. Another interesting, topical example is TikTok—an app boasting an active monthly user count that is approximately the population of the entire western hemisphere—one billion people. Some may claim the dead internet theory is at work here, but I find it more probable that technology and discontent are spreading rampantly.

As these means of Entertainment have become more and more widespread, opportunists have taken notice. Returning to Super Bowl LVIII, a thirty-second advertisement cost (on average) seven million dollars. It would have cost some arbitrary cream company three-and-a-half cents to reach a single viewer for thirty seconds. Given that their products could retail for upwards of ten dollars, this is an incredibly attractive margin—why wouldn't they take advantage of this opportunity? Of course, they would need to spend extensive amounts of time and money to ensure that their commercial was entertaining enough to warrant your attention. Maybe they would do market research on what the best colors, sounds, etc. would be to ensure that they could keep your attention. But what if they outsourced keeping your attention? What if they could hire someone to track how many times you've watched something, whether or not you've interacted

with it in some meaningful way, or if your friends and neighbors seem to take interest in it?

TikTok owes its success to its algorithm—it connects users to an endless deluge of Entertainment that is catered to them. If you're not familiar, their algorithm gains information on your tastes with every piece of content that you consume, quickly learning what you like to see, what you don't like to see, and most of all, what will keep you on the app. After all, the longer you're scrolling, the higher the chances are that you will stumble across an advertisement of some sort. That's the part they care about. It is the visibility of advertisements through tracking and algorithmic profiling that keeps this app alive—notably, advertising is TikTok's primary revenue source. Additionally, we can consider the median salary of a Machine Learning Engineer at ByteDance—their parent company: ~\$200,000 USD. Of course, this is not the largest salary ever—I'm sure someone will scoff at that number, thinking about the half-million salaries of quant firm employees. As a reality check to those individuals, I encourage them to look into salaries outside of the CS/SWE Reddit forums. ByteDance offers a median salary to their Machine Learning Engineers that is over three times the median salary of the US.

The algorithm is their product. It has been designed, tweaked, and revised for several years to both get and *keep* your attention. Of course, do they really have your attention? As a fun exercise, I'd like you to think about every piece of media you've seen today. Most likely, you don't remember most of them—I don't remember most of the ones I've seen either. Everything I've seen today could be shuffled and replayed tomorrow, and I might not even know. When we consider the role that the algorithm and its Engineers play in directing this content towards us, it's necessary that we view it in a combative way.

It is necessary that we consider the Entertainment that we consume through the lens of those providing it to us. It is their motivation to "Entertain" us for as long as possible—to extract as much profit as possible. Through the commodification of attention, we have arrived in a world where predominant forms of Entertainment are fundamentally predatory. Suggestions, like lures, are tossed in front of us as soon as we even consider using an application. Once we bite, it is Their goal to reel us in as quickly as possible, otherwise we may look elsewhere. It is Their goal to learn as much as possible about us as we use their unassuming product, accessing even our physical locations and the activity of those closest to us. It is Their goal to hunt us and our attention, because without it, their enterprises will crumble.

(All claimed figures are freely available online :)) [*Editor's note:* <https://xkcd.com/541/>]

amok-wandering

AN OBSERVATION THAT ONLY KINDA MATTERS TO DUMB DUMB ANIME ARTISTS

So, like, if you were ever a dumb dumb anime artist in middle school like I was, then you looked up dumb art references to learn how to draw basic things. Like:

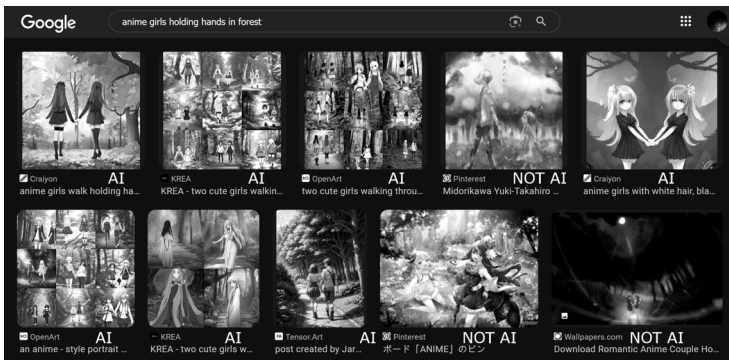
anime girls holding hands in forest

dogs walking through city anime

two people reading same book anime

And before, you'd probably get some pretty decent art from random wallpaper sites, DeviantArt, or the occasional insanely talented person on Pixiv with a username like qfigcq0ye8ixupym1429oqniu.

As Instagram got more popular for artists, I started to use Google less and just doom scrolled telling myself I was looking for art references so it was fine. But recently I've been trying to use Google for references again due to certain very professional articles I'm writing for **mathNEWS** and uh:



ANIME GIRLS HOLDING HANDS IN FOREST



DOGS WALKING THROUGH CITY ANIME



TWO PEOPLE READING SAME BOOK ANIME

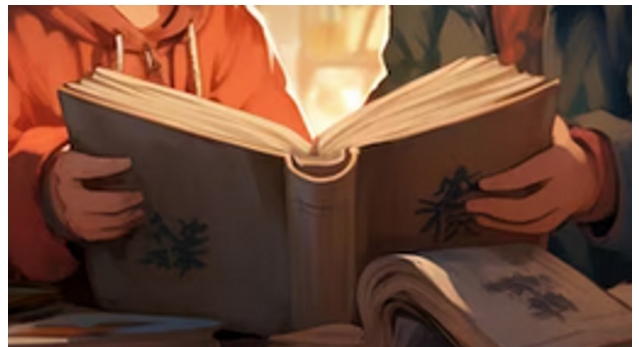
At first I found it vaguely amusing that the way I (and probably other beginner anime artists?) looked up references was pretty much exactly how people entered in AI prompts, which is probably why so many AI sites showed up for me. Something more generic like "cool anime character" has way less (though not none!) AI art showing up for the first few results, while these oddly specific searches yielded what you see above.

But then I began to think about other dumb dumb beginner anime artists who have just discovered how cool anime art is because they're probably in middle school and will try looking up the same prompts that I did. They'll probably get a bunch of unusable garbage like the 9th image in the example at the end of the previous column:



(If you're looking up a reference for people holding a book you'll probably want to be looking at the hands cause that's gonna be the hardest part)

But there were also images that were pretty passable as a reference like the 2nd image:



And it got me thinking: sure, you could go on sites that are specifically made to house references for artists. You could try using real life photos as references instead (generally, for posing, this gets endorsed more). You could accept that, much like AI, beginner artists tend to suck at hands anyway, so do the tried and true 'hide the hands in pockets' method. But the truth is, I bet a lot of dumb dumb anime beginners are going to try exactly what I did and get almost the exact same Google results as I did. Which means there will be a whole slew of

new artists who are probably gonna partly learn to draw from AI images. And maybe this isn't important at all. After all, AI is just aggregating images from the internet, which is what most people do when they look for references anyway.

But it struck me as... strange, I guess? Like, a new wave of people who were interested in the same kind of art and fandoms as me are going to have this completely new tool to learn. Will it make new art look any different? Will self-taught artists begin to have a style heavily inspired by AI? Will they embrace it completely and the art community will begin to be more accepting of blended digital art with AI assisted elements?

I have no helpful answers to these questions; I'm just here to make a kinda interesting observation that might vaguely pique the interest of dumb dumb anime artists.

Not a N*rd

CURVE

Prove that the closed curve below has a distinct inside and outside:



{([])}

A JAPANESE POEM

Japanese poetry is terrible.

The only phonetic restriction sometimes used is syllable count.

Gogyoushi (五行詩) is a type of Japanese poem with 5 lines and a title.

It is otherwise completely unrestricted.

I hate this.

別

HAIKUS FROM FALSETTOS LYRICS

SOMEONE PLEASE TALK TO ME ABOUT THIS MUSICAL I AM UNNECESSARILY OBSESSED

He explains I've he—
patitis too, hepa he—
pa hepatitis

[he lied about having various STDs because he's gay and didn't want to have sex with his wife—you know, as you do]

Nothing is every—
thing to me / Except sex and
money / Good first move

[he and his gay lover are breaking up over a game of chess]

Love him until you
both die! You die on May twen—
ty seventh at eight!

[his ex-wife is getting married to his (ex-)psychiatrist and he just got the wedding invitation (that might make it sound like he's justified but he truly is a bit of a dick in the first act)]

Women with children
Short insomniacs and a
teeny tiny band

[intro to the second act, wish that the opening line (♪ homosexuals... ♪) fit into the haiku pattern]

What I wanted at
a Little League game / My ex—
husband's ex-lover

[honestly self explanatory, her ex-husband's ex-lover shows up to support the kid at a Little League game, who hasn't had that happen?]

I have been revised
It's so swell / Damn it, even
I'm surprised / We laugh

[it's okay he's less of a dick by this point I promise this scene is honestly really sweet highly recommend]

normalparameters

These songs are, in order: Love is Blind, The Chess Game, Marvin Hits Trina, Falsettoland/About Time, The Baseball Game, and What More Can I Say?

I specifically have been listening to the 2016 Broadway revival cast recording so no comments about how it compares to the original but I love it

Also yes I know that some of these are frankly made worse (or at least more confusing punctuation wise) by writing them as haikus but I was having too much fun to not

5

MINGYU

The sky is pink, fading to a pale orange at the tops of the buildings across the street. Thin clouds crawl across. I've never seen it like this, not in Waterloo. Next to me, Xue-Yan lies on the bed in a contorted position, blanket wrapped around her legs. Her nails dig into my shirt. Crying sick. Writhing and screaming and I hope the neighbours don't overhear. I barely make out her words, but I'm not really trying anyway. I wriggle her grip off me.

"Where are you going?" Xue-Yan's voice is all quiet and hoarse now, which I used to find cute the first few times. Now I just think it's awful. At these times everything is awful. I grip onto the glass in my hand. I could smash it. But I don't.

"Just getting water."

"Can I have some?"

We drink slowly while watching out the window. Xue-Yan wants me to comfort her, or at least say anything reassuring. I know that much, at least. But the words don't come to me. All I can think is I have class in a few hours, and I want to go back to sleep, and I don't know how to prevent this from happening again. I've never been good at saying things I don't believe.

"I'm sorry," Xue-Yan finally says.

"It's okay."

The sky is fully orange now, and I wonder if I had just imagined the mystical hot pink. Geese with gentle honks fly in V formation from the left side of our window to the right. I imagine that our hearts beat to the flaps of their wings. Keep Xue-Yan alive, I call out to them. Keep me alive, too.

cy

6

XUE-YAN

I'm pulling myself out of bed, feeling sick as usual, feeling like there's something sharp and sticky in my chest and I'll have to tear myself apart to get it out. As far as I know, I have always been like this. A psychiatrist once said there was nothing wrong with me. After all, I always get out of bed eventually.

Still sleeping in the other bed is Mingyu, who seems to have it even worse than me, who has mostly been in bed for a few days now, ever since our last exam, and I don't pretend that I understand it. I just let Mingyu be.

I'm searching for bread for breakfast but there's none left, there's basically nothing in the fridge. And I think about what we'll have for lunch and dinner and if it were just me I'd just eat nothing, but I won't let Mingyu eat nothing, I'm not even sure if Mingyu could handle it.

I guess I'll go to Waterloo Central Supermarket.

I head out in a mishmash of my clothes, pants and school uniform skirt and a t-shirt, so I guess I'm kind of ugly-cute rather than cute-cute now, *kawaisou* maybe, and I'm hoping that nobody recognizes me, but I don't actually have to worry about that. I don't know anyone from class. It's freeing, in a way. I used to think I could die without bothering anyone, but now there's Mingyu.

In Waterloo Central Supermarket I slowly load up on pineapple breads but then the fluorescent lights start getting to me, so I just rush around the store putting whatever I can think of in my basket so I can get out of here. As I speedwalk

home, the students on Lester Street are jumping and whooping, and I feel like throwing up on the side of the road.

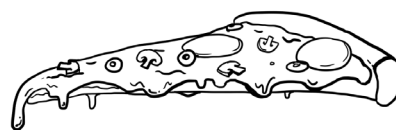
But I make it back to my apartment, and Mingyu is in the kitchen, staring down at the table, so I'm like, "Do you want to have noodles? I got some at the store."

And Mingyu is like "Sure," and I'm like, "You know, you don't have to do co-op if you really don't want to," and Mingyu is like, "That's not what I'm upset about," so I ask what Mingyu is upset about.

But Mingyu just shrugs. So I'm like, "I'll start cooking now," and I walk over to the counter, and Mingyu is like, "Thanks for taking care of me," and I wonder about that, I don't feel like I'm doing anything, or rather it seems like I only ever keep us in stasis, never once moving forward.

I put the cutting board on the table and Mingyu has brought our scratch work here, Mingyu's sketches of characters and level designs, my own handwriting staring back at me, all written on scraps of paper torn from the **mathNEWS** issues we found lying around campus. Mingyu is sitting now, pencil in hand, focused, and I have this urge to hold and caress Mingyu but I'll wait until later, and the sharp and sticky thing in my chest threatens to explode.

cy



A BRIEF RANKING OF THE SONGS IN THE SECOND GLASS BEACH ALBUM (PLASTIC DEATH)

BUT LIKE THEY'RE ALL VERY GOOD IDK THIS IS ONLY VAGUELY IN ORDER OF PREFERENCE

1. *commatose*. This one goes absolutely insane. It's long—9 minutes and 50 seconds—which allows the band to take you on a fucking *journey*. Of the songs on the album, the storylike lyrics are quite clear on this one. Highly recommend.
2. *motions*. A three-and-a-half minute buildup about frustration with the monotony of daily life. I love this song.
3. *the CIA*. I especially love the drums on this one; very punchy. The lyrics personify the CIA as being in love with the narrator (that's why they surveil them).
4. *cul-de-sac*. This is thematically similar to *motions*, but a little more laid back in tone. There's also some discussion of attempts to replicate happy lives depicted in media.
5. *200*. Extraordinary vibes. The drums on this one are awesome too. This might be the most captivating song on the album—I *love* the slow vocal buildups.
6. *guitar song*. Very chill and vibey, extremely slurred vocals—I still have no idea what J is saying in this one, but it goes hard.
7. *rare animal*. Would definitely scream along with this to vent fury. Very energetic explosion from the intro, very abstract lyrics.
8. *slip under the door*. Very sinister atmosphere with progressively darker lyrics. I feel like a demon is in my headphones when I listen to this song (in the best way possible).
9. *whalefall*. The marimba(?) melodies are very bouncy. The lyrics are almost incoherent, but still sound very nice.
10. *coelacanth*. Apparently this fish was a tumblr meme or something. It's pronounced in a very fucked up way. The song is cool though!
11. *abyss angel*. This is the final track on the album. I haven't listened to this one as much as I have the others so don't have much to say about it, but the same was true of the last song on their first album, and it grew on me massively as time went on.
12. *the killer*. Very calm initially. I like the back and forth between J's vocals and the strings at the end.
13. *puppy*. The vocals get a little... intense for me at the end of this one.

*I CANNOT WAIT TO SEE THEM LIVE
ASKJFKWARGINORKGNSLFLKGLEIRGNLF*

nazz

DOES CAMBRIDGE HAVE ONTARIO'S BEST LIBRARY SYSTEM?

Probably not. It's gonna be pretty hard for a small city to compete with Toronto's hundred-branch empire. But that hasn't stopped them from trying.

I've only been to four of their five branches, but they all have really pretty architecture and are open on Sundays (except during the summer), something that most Toronto libraries hadn't managed until recently.

They don't even call themselves the library, but rather the "Idea Exchange". It sounds cheesy, but the non-book material they have is very impressive—so much so that they have an entire branch without any books at all. Instead, the Old Post Office has a working space overlooking the Grand River, a makerspace, a music studio, and more in the rooms I didn't go into. Other branches have large art galleries with collections that change every few months, seeds, and even tools! I used to volunteer at a tool library myself and it's impressive that they have one built into the public library system.

I highly recommend making your way down there and checking it out. You can even get a Cambridge library card with a Waterloo address, as long as you don't mind the hour-and-a-half bus ride each way to return your books.

__init__

N REASONS YOU WATCH SONG OF THE SOUTH (1946)

- good story
- good characters
- surprisingly good acting, including from the children
- not racist, despite what you may have heard
- it'll be mighty satisfactual

別

WHAT DID YOU EXPECT?

I taught you the rules of a stupid game, a game that was not meant to be played, you played a stupid game as I watched, and now you can claim your stupid prizes.

dead poet's math society

profQUOTES

FR 250: NICOLAS HEBBINCKUYS

“ Each time I do this activity, I have to change the celebrities I use because they keep doing controversial things.

CO 463: STEPHEN VAVASIS

“ It seems like I’m saying something complicated but actually I’m saying a triviality.

CO 487: ALFRED MENEZES

“ I can’t tell you because the NSA didn’t tell me. If I did tell you, I’d have to kill you.

“ Suppose Alice is some certain terrorist.

“ If this is ever on the exam, you have the right to shoot me.

CS 341: ARMIN JAMSHIDPEY

“ Think about the children.

“ Do you hear it saying “I AM THE TREE, I AM THE TREE”? You should get into my head; you’ll hear all those weird noises.

“ Do you remember your early days in UWaterloo? You were suffering, you *should* remember it.

“ *[Draws a circular course prerequisites graph]* It means that you’ll be stuck in the university forever. But it’s actually good for us.

“ You’re not talking to each other... you’ll see an NP-complete problem on the exam.

CS 350: BERNARD WONG

“ *[Looking at a photo of a blocked intersection]* If you had a big helicopter, you could airlift some of the cars out of here, and drop them off somewhere else.

“ What’s the protocol for going to a washroom in a dark club?

“ Why are we back in the club? We’re not in the club anymore.

“ Imagine this is the Bernard algorithm, and it’s wrong. And we teach it in all the textbooks. That would be terrible.

“ You’re wasting the CPU of your childhood.

“ Instead of asking, “are we there yet?”, we can have a protocol where you fall asleep in the van and when you arrive, your parents wake you up. “We’re at Disney World!”

“ Can you wake yourself up while you’re sleeping?... People can. But if you’re a thread, you can’t wake yourself up while you’re sleeping.

“ *[Pauses on slide in afternoon class]* Morning class had infinite questions here, afternoon class has no questions here. Either I did a better job or did a much worse job.

“ *[Laughs desperately]* I’m worried because this half of the class is very quiet.

“ I know it’s 2024, but if for some reason you have a co-op where you have to write Java code...

“ I call this the Sleeping Beauty problem. Now, I don’t really know how this story goes, so I’ll make it up. Sleeping Beauty is in her castle. I don’t know if she has a castle. And the castle gate is the lock. So she opens the gate to let Prince Charming in. But before she goes to sleep, she does some other things in the castle. Maybe she gets a snack or goes to the washroom. This is a big castle. But then Prince Charming comes in and sees that Sleeping Beauty isn’t in her bed. So what does he do? He leaves the castle. This is the wrong castle. Then Sleeping Beauty comes back from the kitchen, and she goes to sleep. Remember, it’s a fairytale. So one true love. No one else is going to come and wake her up. So what happens to Sleeping Beauty here? She goes to sleep forever. This is the non-Disney version. My kids have a very warped version of how Sleeping Beauty goes.

CS 444: YIZHOU ZHANG

“ Languages like *[Rust]* are cool.

“ Rust is kind of awkward to write.

CS 479: JEFF ORCHARD

“ What’s a hyperparameter? Is it a parameter that runs around screaming because it had too much sugar?

“ Why does everyone call me during my lectures? [...] I won’t get a phone call for the rest of the day.

“ *[Talking about how friends in undergrad go to different places]* Some of you will end up in important places in society. *[Pauses]* Or jail; some of you will end up in jail.

“ I don’t think democracy is on the line. Unlike in the US.

CS 492: DAN BROWN

“ During the pandemic I forgot that *[Maura Grossman]* was short.

“ If you wanted to make a meth lab at home—please don’t—it’s not the hardest thing to do.

“ A few years ago this class did a test of how beautiful you were, from 0–100, and Maura was more beautiful than me.

CS 492: MAURA GROSSMAN

“ [Student: “You don’t need to drink diet orange crush.”] How do you know??

“ Dan kicked me in the ribs.

“ He was a brutal monster. [Dan Brown turns around and looks offended]

MATH 146: LIAM MCQUAY

“ I think we’ve got the better section. We’ve got better assignments and a better approach to doing things.

“ Some of you are in Shum’s class. Given it is the day of the midterm, are you going to skip Shum’s class? If so, I’m going to continue for a little bit.

MATH 148: HENRY SHUM

“ I pretty much study sperm.

MATH 148: XUEMIAO CHEN

“ [After the midterm] This is a hard exam. Your life is not over; it’s only half over.

MATH 239: SOPHIE SPIRKL

“ I spent my morning running back and forth to my office because emergency assistance put me on hold. Not that I’m bitter about that.

“ I can tell you’re all very excited about this new development and all the horrors we can inflict upon sets.

“ [6 students show up to a class with 73 enrolled] This is exciting. I think we’ve finally reached the threshold where I can remember everyone’s names.

PMATH 332: WILLIAM SLOFSTRA

“ If a person says this is the answer, they have a point, but not a very good point.

“ Democracy is not always right—an important lesson.

PMATH 351: ALEXANDRU NICA

“ How complicated will this get? Well, complicated enough to make your phone possibly run out of storage. [...] Back in my day we did not have such devices; now, you just take your phone, go “click click click”, and then you say “I know real analysis!” But no, actually it’s your phone that knows real analysis.

“ Someone might try to play a prank and throw in the empty set in there. But then you can just throw it out because it doesn’t affect the definition of second-countable.

“ Let’s suppose my marker sent me a message that it was going to run out after writing three more symbols. What should those symbols be?

PMATH 370: BLAKE MADILL

“ Practice midterms are for first years.

STAT 241: MU ZHU

“ I’d like to have a private jet, I’d like to have a boat, but gee, I forgot I can’t afford that... If you don’t follow those constraints you’ll probably end up in jail or something.

“ This is the situation where you have that private jet and the boat or whatever, maybe an island.

“ If you have 20 crashes, you don’t want to tell the insurance company. You’re a bad guy.

“ Even though the room numbers are 17 and 54, it turns out they’re next to each other. I have no idea what math goes into the room planning.

STAT 341: MICHAEL JOHN DAVIS

“ This walk may look like a drunkard’s walk. And you wouldn’t be wrong!

ECE 459: JEFF ZARNETT

“ API design is one of those things where if you give people the option, they might do things wrong.

“ Now listen—when you’re going to Toronto, as one of my friends says, “Every month is bad lane change month.”

“ The great thing about optimizing is that we don’t have to be correct, we just have to be better than not optimizing.

“ One thing I want you to take away from this is: generalizations are always wrong.

“ Why should anything work?

“ Everyone chooses us-east-1 [AWS region] because it’s the default, because of course that’s what we do.

“ If the problem is too hard because this is nonlinear... Well, assume that it is linear and continue.

“ Has anyone done this? [Nobody raises hand] Is this because Java is not in vogue anymore? It’s for the best.

“ Think evilly for a change! It’s fun.

“ Ha! It looks like you’re trying to delete system32. Maybe I should stop that.

PSYCH 232: CHRIS BURRIS

“ [Draws a heart] They’re in a relationship [draws horns on the heart] and they’re very horny for each other.

“ [Finishes illustrating a murder plot] Aren’t you glad you came to university?

“ Presumably we’re talking about emotion that feels really really shitty. That’s the clinical term.

TO GET WHAT YOU WANTED

A SHORT STORY

Sunk deep in his mattress, Connor McQuade watched as his email inbox refreshed, over and over. It was late March, and the acceptance letter his grade twelve mind lusted after was a few minutes overdue.



Stepping onto Ring Road for the first time was a rush. He never thought he’d get here. All the opportunities before him, the smart people, the world-class education, the jobs, it was nearly too much. The clubs, campus resources, and student-led organizations; his eyes widened at the prospect of it all.

An ideal boy, in an ideal world.



In no time, his Notion to-do list was integrated with his Google Calendar and Obsidian in-class notes, and his typing speed was in the three-digit range.

It was true that Connor’s friends would—from time to time—ask him how he was always on top of his assignments. It was a simple answer: “being organized,” he would tell them.

With all his extra time, Connor did what he had been dreaming of all through those lonely high school years. He frequented the Go, archery, poker, and hip hop clubs, and **mathNEWS**. He stayed up late having life chats with new friends, and he woke up early to hit the gym five days a week. Being ahead in school, he had the space to study early for his midterms, and the interview prep was never put off too long.



San Francisco was a beautiful city. Connor could finally add outdoor runs to his lunchtime routine, finishing at Buena Vista for lunch. He always smiled when he ran; he couldn’t think of a reason to frown when he was making a fortune each month at the fintech startup he had the fortune to be hired by.

Well, not exactly fortune. He was more focused, productive, and effective than his buddies back home; it wasn’t luck that brought him here. And with any luck, his determination would bring him so much farther.



His upper-year friends kept telling him 3B was the hardest term of his degree, but so far it really wasn’t so bad.

With a startup and two part-time jobs on top of his five courses, Connor felt more rejuvenated than ever. Everything he chose to do was finally his conscious choice; he had swam upstream for long enough. With all the disposable income from the work, he had gotten himself an Audi R8. Now he wasn’t limited by uncomfortable, slow transit.

Sometimes his friends would plan a night out, and he wouldn’t make it out anymore. He never actually said no, it was just that his schedule was filled up weeks in advance. If the bros really wanted him around, they’d have to start being an appreciable fraction as organized as he was.

Connor loved the freedom of never saying no again. All he had to say was “sorry, I’ve got a business meeting with a client on the West Coast that night.”



With only three business electives on his plate, he could work full-time with Citadel while coasting through the last months of his degree.

His friends knew he was going places. They were sure of it; nearly as sure as he was. No one gets here by chance; you get here through the single-minded drive to accomplish what you always knew you could. Every big step you take, you get a moment to bask in the perfect joy of your doubts slipping away, before you remember you knew you could do it all along. With it all going as planned and any setbacks being opportunities, you’re gripped by the possibility that lies before you.

An ideal boy in an ideal world.



At night, when he couldn’t sleep, he thought of the young, passionate boy who knew what he wanted. Those rosy eyes and the determination underneath that brought him here.

Was it decades ago, or was it just last night?

no pun indented

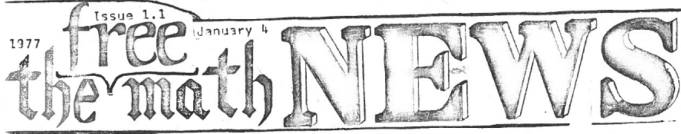
OBJECTS FROM THE mathNEWS OFFICE

VII: THE CHEVRON, THE FREE CHEVRON, AND THE FREE mathNEWS

Deep in the hallowed mathNEWS filing cabinets lies a publication so Free and Democratic that it rivals countries that have those words in their names: *the free mathNEWS*. See it for yourself:

LOCKED DOORS WON'T STOP US

When we approached the offices of the free and democratic mathNEWS we found ourselves locked out. This was probably the work of that hippie fascist Shane Roberts, since after all he is blamed for everything else. Undaunted, however the problem was solved when one of our staff members rushed home and got his key for the office. This is a declaration of intent. We will attack the bloody hippie fascists and the knee-jerk commies with equal vigor. We will not rest until the insidious John Lee Hooker is recalled or resigns as president of the A.S.N. This paper is truly "free" as it is financed totally by donations. It is democratic since Free and Democratic Publications Ltd. owns all the shares and makes all the decisions. We intend to follow the basic precepts of negative journalism, through our personal attacks on all kinds of hacks, negative comments and questionable statements.



Roberts Recalled on Second Try

They couldn't recall Shane Roberts on the first try. But if first you don't succeed...On the second try they did succeed and Roberts was no longer president. The petition submitted by Mark Wills of the now-famous recall committee on December 17th, failed to take effect December 20th due to the fact that there were at most 2116 valid signatures on the petition. The petition never had the 2340 signatures the free chevron claimed it to have. It is reported that the petition only had at most 2199 signatures when presented and 83 of those signatures were ruled invalid. Roberts met with Wills at Roberts' home on December 20th to discuss the inconsistencies in the petition and discuss rules for any resubmission. Realizing the lack of support he apparently had for his position, Roberts offered his resignation effective on January 1st. Normally this would

Despite his offer to leave many apparently wanted him officially recalled in order to prove a point. Apparently the point has been proven. On December 23rd a recall petition, apparently with the requisite number of names was submitted to the Federation office. Shane Roberts

REPORTS
How a so-called fascist like me got linked to one of these free newspapers is strange, but I'll take any column I can get. This week's hack-of-the-week is Peter R. Raynham. Though accused of loafing around, he actually has quite an interest in life, doing quite a bit of work on the Honeywell system. A former worker at the MFCE he now devotes full attention to his studies as an undergrad in the Computer Science department (and also to his girlfriend Sylvia).
Though I'm glad to see another so

did not mount much of a challenge to the petition. Since the weekend holiday legally "stopped the clock", the petition did not take effect until December 28th. On that day the controversial presidency of Shane Roberts came to an end. useless tome to have a person recalled three days before he was to resign. Such action will now probably force an extra election very close to the normal presidential election on February 2nd. Though I don't particularly feel that Vice-President McLellan is a great leader, I do feel that a snap election would not allow sufficient time for debate and thus do a disservice to the students and the democratic process. I did not sign the present recall petition, I might have signed another one with different reasons. For instance perhaps Shane has paid to



It happens to the best of us.

This sort of thing had been circulating for a while in the mid-1970s, the staff of the Chevron had gotten very cliquish, and students had understandably gotten a little sick of it. For an interim period while they figured out what to do, the Federation moved to temporarily shut down the Chevron and lock down their office. In a pretty obviously bad move, though, they let some of the staff in to get their things, only to find that the staff they let in wouldn't leave. They just... stayed there. For months and months. Refusing to leave. In fact, while the Federation tried to wrestle back control of the paper, some staffers took it upon themselves to publish their very own *Free and Democratic People's Labour Unified Struggle* branch of the paper: *the free Chevron*.

The most persistent among their staff continued to espouse how great communism was and how terrible the Federation was, paying for it all out of pocket (well, in practice they were probably being helped out by some of the communist organizations in town).

Anyway, that's enough background, so here's the punchline: some folks in mathNEWS thought this was really funny and decided to print a parody of *the free Chevron* called *the free mathNEWS*. It mostly consisted of John J. Long, a longtime student government guy at Waterloo close to mathNEWS, writing about how stupid the whole thing was. He made six of these between 1977 and 1980, paid for out of pocket, each usually just a page or two with some paragraphs on student government and commentary on the Chevron affair.

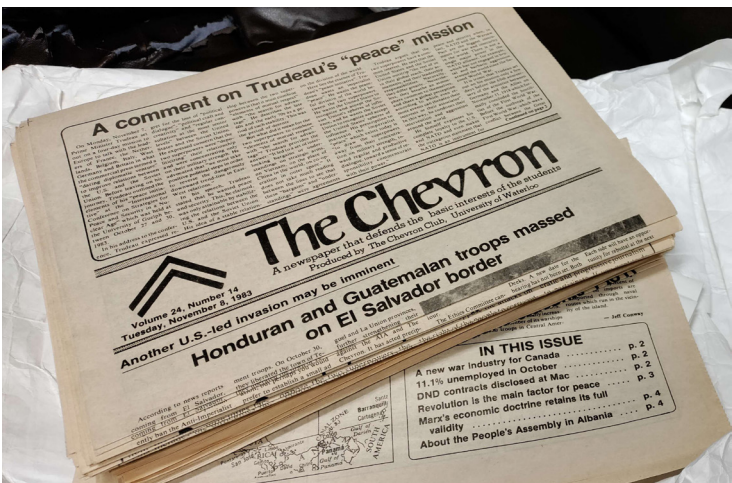
So, like, the actual text of the issues weren't really that funny, but the title was at least a little chuckle-worthy. Sorta. Honestly, they were kind of bad at being funny back then. Man.

jeff

If you want to read more of *the free mathNEWS*, scans are available on the mathNEWS website: <https://mathnews.uwaterloo.ca/i/the-free-mathNEWS>

Please trust me when I say that this is actually a very elaborate bit; we just need to establish some historical context first.

Before Imprint, there was *the Chevron*. The Chevron was the Federation of Students' (read: WUSA's) official student publication from 1966 (previously *the Coryphaeus*, 1960-1966) until some time in the late '70s. What happened? Well, while things were good for a while, the Chevron's staff slowly but surely fell victim to the common mistake of *really falling in love with Albanian communism*.



Like, really hard.

IT WOULD BE BAD TO REPLACE WUSA WITH THE BLOCKCHAIN, ACTUALLY

The most recent issue of Imprint includes a profile on specific members of UW Blockchain, in which they propose a project called GooseDAO, a replacement for a student union such as WUSA which is run entirely on the blockchain, making it (theoretically) more democratic, representative, and equitable.

On the surface, it's an idea that might appeal to people. WUSA is, to put it mildly, pretty unpopular these days. Students seem extremely disengaged from campus culture and student governance at Waterloo. The idea of taking the power centralized in WUSA and distributing it fairly to the people is tantalizing.

I have several critiques.

WHAT IS GOOSEDAO?

First, it's important to get everyone on the same page about what a DAO actually *is*. DAO stands for Decentralized Autonomous Organization. The main idea is that there's no governing body at all, just an automated system that administers rules and allocates capital based on how people vote. All voters and votes are recorded permanently on the blockchain, so the whole process is transparent. Since the voted-on actions are executed instantly, the whole thing is purely democratic. Every action was selected and voted on by a public poll.

The point of GooseDAO is to use a DAO to do the job of a student union. That means that which clubs get funded or which advocacy work is done is decided by the students collectively, instead of a theoretical central leadership.

WHAT'S WRONG WITH THIS IDEA?

If you're like me, you may have noticed some red flags even from that idealistic description. "Transparent voting" means *complete* non-anonymity. It's pitched as a solution for opaqueness within WUSA's leadership team (which is a real problem), but GooseDAO's transparency applies to *everyone*, including non-elected students, massively changing people's behavior. Imagine a queer student who couldn't support the activities of LGBTQ clubs on campus for fear of that public interaction outing them to their relatives. Full transparency creates as many problems as it solves.¹

To be extraordinarily clear, I do not believe that anyone from GooseDAO or the UW Blockchain community is intentionally anti-inclusive here. I believe these consequences are entirely accidental.

Digging a little deeper, they mention that while every student gets a token (Goobi) that allows them to vote, there's an additional token ("HONK"—these names are so stupid²) that gets distributed and does... something. Both the Imprint article and GooseDAO's own website are unclear on what

specifically HONK does, but according to Imprint, holders of more HONK have "more of a voice", and their online pitch deck mentions "weighted voting" on proposals.

After reaching out to the organizers for clarification, it's clear to me that voting will not be a "one person, one vote" system. It's likely that the political power you wield would be tied to the amount of HONK you hold. For people unfamiliar with DAOs, this can seem strange, undemocratic, and easily exploitable. It is all those things, but it's also extremely common in the crypto sphere. For instance, the DAO for the theoretically popular Decentraland weighs voting based on how many specific tokens you own, and the rough prototypes that GooseDAO have already created have the functionality to weight the voting power per user.

The problems with this potential kind of system are obvious. This voting system would give specific individuals an outsized voice in student governance: the exact problem that WUSA has today. In fact, it would be worse than we have today: not only can HONK be bought and sold for money, allowing people to *literally* buy and sell influence, but more importantly, this behavior would be built into the system permanently.

The reason this institutional power lock-in happens in WUSA is because of a complicated series of institutional barriers that, crucially, *can be changed*. It's a difficult task, but it's possible. In the GooseDAO, the lock-in of institutional power would be an intentional outcome of the system's design.

Once that power is granted, it can only be revoked if those well-connected people decide to give it back. They have all the control over how the DAO operates. GooseDAO promises to strip power away from WUSA's current executive class, but they won't give it to the majority—they'd likely just create a new untouchable upper class, same as it ever was.³

WHY IT MATTERS

I'll be honest, I thought hard about whether this was an article worth writing at all. It doesn't take a lot of thinking about GooseDAO to be able to poke holes in the idea. So what's the point?

It almost feels like I'm picking on them. The buzz around crypto has almost completely died out. Most NFTs are worthless. The only time I ever hear about crypto these days is when a project goes belly-up and a million people lose their retirement savings. This project will almost certainly not get off the ground, and I don't want to discourage new ideas, even if they won't work.

The reason I decided to go through with it is because I think people deserve a *serious* breakdown of *why* this won't work. The passive, non-questioning language of the Imprint piece obfuscates what UW Blockchain *actually* intends to do. The

worst thing that could happen is that the lack of detail tricks someone into thinking that GooseDAO is a good idea. I have nothing against the people behind it, I just fundamentally disagree that this would be better for students.⁴

WUSA is a severely flawed organization. It's tempting to simply trash it all and start over. But we must be smart enough not to let those fears trick us into replacing something bad with something worse. The way we'll improve this school isn't by hoping a technical revolution will solve our problems as we just sit back and watch. We need to roll up our sleeves, get our hands dirty, and not stop until the job is done.

I believe that better student governance is possible. In fact, I believe it's inevitable. I just don't think it'll have a name like Goobi.

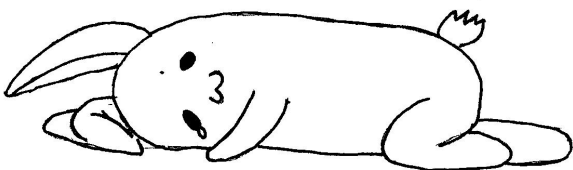
Dick Smithers

1. According to the organizer I spoke to, visibility is tracked between specific crypto wallets, and not directly linked to any one uwaterloo.ca email account.
2. According to the organizer I spoke to, the name "HONK" is already taken so they won't be able to use it, but if I used "the token formerly known as HONK" I'd go way over my word limit.
3. According to the organizer I spoke to, the way they plan to avoid this is through tightly controlling the way HONK is initially distributed (ie: only to clubs) and regularly diluting voting power by introducing more HONK.
4. If you go and be mean to these people because they had a bad idea, you're a dipshit and a bad person and are henceforth banned from reading mathNEWS.

ODE TO THE ANGRY PUMPKIN

Oh no
It is the drill rocket launcher
Take action regarding that individual
Relax I'll handle it
"I am the angry pumpkin"
The architect and the builder,
arrive calmly from their escalator
with a sense of purpose
They are praying at their residence
Their head is soaring
Barret!

PandaPandaPanda!



THE SECRET TO GREAT SKIING SANDWICHES IS OUTSOURCING THE LABOUR TO YOUR FRIENDS

SKI SANDWICH (MY FAVOURITE VARIATION)

Ingredients:

- Rudolph's Bavarian sourdough sandwich bread
- mayo
- baby spinach
- Pillers's German Salami
- Saputo's sliced havarti cheese

Directions:

1. ~~Order your friends to make you a sandwich.~~ Spread mayo on bread and then add the ingredients in your desired quantity.
2. Serve in a plastic sandwich Ziploc bag with a silly nickname written in black Sharpie.

Rant:

Over the reading week, I had the pleasure of being invited to go ski with my friends. Despite having not skied in eight years after a fiasco on in Grade 6 (don't ask), I jumped at the chance. My mom and I went and bought snow pants, ski goggles, and warm waterproof mitts (when I say this, I mean my mom bought me the stuff because she loves pampering me. Don't worry I bought her some frozen yogurt at the mall in thanks. Equivalent exchange :3)

I painstakingly try to plot out each minute detail of the trip because I am a control freak and also like taking on mental load because it makes me feel like I'm contributing something. In my defense, I really popped off with bringing the Ziploc bags and Sharpie for the sandwiches. It's never the big stuff people forget, like the kilo of sliced salami or pants. It's always the small things.

Anyway, the day of the trip approaches, and excitement builds. After 6.5 hours of being passenger princesses (many thanks to Lars Nootbar and yummyPhi), we arrive in our friend's/host's parent's awesome dwelling. The next morning we hit the frosty slopes of [REDACTED] and then we said "IT'S SKIING TIME" and then we [REDACTED] [REDACTED].

Stay tuned until next issue to hear the rest of the story because I need to do the assignment I put off so I could ski ^_^

yummyPi

HONEY WAKE UP

NEW IU JUST DROPPED

—and to great excitement from her enormous fanbase! IU is like the Taylor Swift of K-pop; her name is synonymous with success. Other celebrities lose their mind when meeting her. That said, IU is not very well known in this hemisphere because she has mainly focused on regional audiences over her 15-year career.

But maybe not for long? Along with this EP she has announced her first ever world tour, bringing multiple shows within a day's drive of Waterloo this summer. So let's give it a listen.

SHOPPER

This song is quite catchy thanks to its synthpop instrumentals and upbeat mood. It gives similar vibes to *I Really Like You* by Carly Rae Jepsen, especially at the chorus. The message behind the song is about following your ambitions, but the delivery could have been better. The “shopping = finding your goals” metaphor drags in connotations of consumerism. One particularly sore English lyric is “greed is free”. Overall, I like this song for its triumphant feel but it doesn't rank as highly as my past favourites from IU.

7/10, recommend for Carly Rae Jepsen fans!

HOLSSI

Online, I've seen this song get compared to Lorde's music, probably for its minimalist backing track. *Holssi* is quite different from IU's usual style. This fits well with message of the song—that IU has embraced being free like a dandelion seed and going with the flow. So, she flowed all the way to Los Angeles, singing a genre (hip hop) she doesn't usually do. It's hard to execute it with a softer voice, but the bridge to the chorus is done well, where the *chef's kiss* bass juxtaposes with her characteristic angelic vocals. However, the rest of the song feels *too* minimalist, and the chorus sounds like playground taunting. Both issues stop me from listening on repeat.

5/10, maybe recommend for Lorde fans?

SHH..

This song features two other artists, one a legend of K-pop past, and another a legend in the making. This choice is very fitting for the song's topic: the relationship between mother and daughter. The song transitions during the verses so each vocalist gets a turn at the chorus. I'm not going to pretend to understand the full meaning, other than to say that IU is an exceptionally clever songwriter. For the music itself, the whole song has a mysterious feel throughout that borders on sexy at times. The chorus is extremely powerful, cut off each time by a “shh”. My only concern is that the abrupt contrast leaves the verses a bit empty.

8/10, especially recommend if you can understand Korean.

LOVE WINS ALL

The title track of the album, this song was released in January after a mild controversy over its previous title “Love wins”. Either title summarizes the meaning of the song well. The song is everything that IU is the best at: ballads, emotion, and super high vocal range. Unfortunately the impressively sharp pitch changes in the chorus are the same reason I wouldn't recommend keeping the song on repeat in the background. This should be foreground music! Despite the rave reviews, I would be careful about the music video, however. Its plot does not match the point of the song, so the emotional impact can get twisted if you watch it.

9/10, recommend if you like ballads.

I STAN U

It's pretty funny seeing a foreign artist use English slang like “stan” and make legitimately good wordplay with it. “You're stunning” / “I'm stanning you”—this song is a straightforward pick-me-up for all listeners, even those who don't know Korean. It has that upbeat Carly Rae Jepsen vibe again, too! As the only track in the EP to not get a music video, *I stan U* is probably meant to be a hidden gem to give some love back to IU's many stans. However, I think it actually has better international appeal potential than the rest of the songs, so it's a bit unfortunate how she decided to structure the EP.

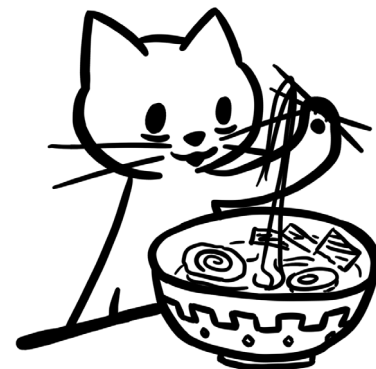
10/10, would play again and again!

OVERALL

The Winning is a mix of many genres and moods, some crafted for IU's domestic fans, others crafted to appeal to popular audiences on this side of the Pacific. Between its 5 songs you'll probably find something interesting—and once you do, I welcome you down the rabbit hole of her past releases (which are even better). It's a long way down...

trust me I've been falling for 2 years

water



THE WORST GIFT YOU CAN GET FOR YOUR CHILD

Are you looking for a gift for a loved one but want it to actually make their life worse while disguising it as something nice and useful? My recommendation to you is to buy them a prepaid Visa card. This discussion of gift ideas is fitting since it's February and Christmas is coming up soon.

Whenever it was gift-giving season and my parents didn't know what to get me or someone else, they insisted on giving a gift card rather than cash. Their reasoning for this was that giving cash too impersonal and not meaningful. Obviously getting someone a real gift is great because you know of something they would at least probably want. Giving cash is low effort but at least the person can get something they want. Giving a gift card is in the middle, a half-assed effort to give a meaningful gift.

To express why prepaid Visa cards are stupid and bad I must first expand on why gift cards are stupid and bad. Gift cards are the worst of both worlds when it comes to gift giving. You're restricted to one store, similar to being restricted to just the thing you got in the case of a regular gift, but gift cards also show the lack of effort like giving cash shows. Another problem with gift cards is that I forget that I have them. I have to make a point of going out and using them because once I've accumulated a few, I forget that I have a gift card for a store and end up paying normally, or I leave the gift card at home because I don't want to carry them all around. Cash doesn't have this problem because it is universal.

Gift cards also make it a pain in the ass to actually use them up. If I get a \$25 gift card to Tim Hortons, for example, I have to try to find a combination of items that totals to exactly \$25 to use it up, or I am left with the choice of having unused funds left on my card, or worse, spending my own real money to get the last of the money off of the card, by going over. This sucks because I don't normally buy stuff at Tim Hortons, so I've really been given the gift of spending my own money. Plus, it's annoying to have to pay one half with the gift card and the other half with my own money just because it's inconvenient to me and the cashier. Once again, not a problem with cash because if I don't have enough cash I just won't buy something with cash.

Prepaid Visa cards are like gift cards but worse. They experience the same problem as gift cards when it comes to getting the money off of them, but it can be even worse to complete a transaction since the card isn't a gift card made by and for that business. Buying stuff online makes this impossible, since you usually can't pay only part of the bill with the prepaid card, so you're guaranteed to have money left over on it. The card will eventually go down to 0 but we'll discuss that later. Also, we have Visa debit now so you can't even claim that these cards allow people without a credit card to shop online because there is an easier way around that now. Prepaid cards also have the exact same lack of effort that cash has, so there's no benefit to giving them to someone.

This is the part where the article takes on a tone more similar to my other articles. These cards have expiry dates for some reason. In the owner's manual or whatever it's called, it says "call us on the phone if your card has expired and we will send you a new one". I called the number on the back of the card, and after some awful phone menu navigation, the robot voice basically told me "the card is past the expiry date, and can't be replaced, so get fucked". Outraged by the apparent lie in the owner's manual, I looked deeper and found a different customer support number, and eventually got put through to a human. I told the guy the conflicting information, and he said "oh yeah we can replace it, but the balance is \$0". *This card had never been used.* It was a \$25 card that I forgot that I owned.

Remember when I said that the card will eventually become empty but it was a discussion for later? Well it's later now and it's time to introduce the true bullshit behind prepaid Visa cards. These things are built on fucking scam fees. After activation, you have 12 months to use it, and then they start charging a 3-dollar fee every month until they have sucked you dry, and in this case, being sucked dry is not a good thing. My \$25 card was drawn down to empty on scam fees alone because it had been active for too long. Literally what could they possibly be charging the fee for aside from just a "fuck you, pay me" charge? These cards are designed to scam people out of their money. They know people are going to forget to use them and that the money will eventually be lost to the void. These things have no benefit over cash, and will be worthless within 2–3 years of ownership even if you don't use them, and of course they only tell you about the scam fees in the fine print.

In conclusion, fuck companies that make and sell prepaid Visa cards, and fuck you for buying them as gifts. They are shit gifts and you are a shit person for getting them for someone. If you don't want to put in the effort, just give cash or even an e-transfer. Otherwise just get the damn person an actual gift. These things are a scam please stop buying them.

Yamnuska

You should write be an editor for mathNEWS.

(I swear it's not as bad as I make it sound.)

A mathNEWS EDITOR WHO WANTS TO GET THE HELL OUT OF THIS MADHOUSE AND RUN DEFINITELY SECURE THE FUTURE OF THE PAPER

INEWS II

N FOLLOWUPS TO THE PAST TWO WEEKS

In **mathNEWS** 154.4, **mathNEWS** accidentally contained **realNEWS** with the article [the M&M's machines are watching you](#). I was hoping it would, at most, provide a new voice to the growing student awareness of the machines' hidden lenses and the implications thereof.

We made it to The Guardian. Ars Technica. The Verge. Multiple CTV News TV stations. Business Insider. The Times of Israel. CBC News. WIRED. *Linus Sebastian of Linus Tech Tips opened mathNEWS on stream*.

Here are some concluding thoughts:

They're in residences too: Once the CTV interview released, I received an email from a concerned **mathNEWS** reader living in UWP. She let me know that not only are the Invenda machines in public spaces around campus, they are also in students' private-access spaces in the CMH cafeteria. For the cameras to not only be in academic sections of campus, but also in our residence common spaces where we reasonably expect to be safe from the panopticon's prying eyes, only furthers the likely invasion of privacy these cameras present.

Public apology to **mathNEWS** international diplomat

Lars Nootbaar: It has been brought to my attention that in **mathNEWS** 154.3, [the M&M's machines are watching you](#), I opened the article by immediately misspelling decorated **mathNEWS** writer and international diplomat Lars Nootbaar's name. I'm so sorry that the one time I misspell Lars Nootbaaar, Linus Tech Tips displays it on stream. My sincerest apologies to **mathNEWS'** top diplomat. I eagerly await Lars Nootbaaaaar's plan for world peace.

The path to change is paved with silly intentions: I

believe **mathNEWS** to primarily be a creative outlet. We don't generally do actual reporting. That's why I thought it would be silly and goofy to include in the article the phrase "Adaria Vending Services declined to comment." Never did I think they would actually respond. Twenty-four hours later, we had a response not just from Adaria, but from Invenda too, completely unprompted. By silly accident, **mathNEWS** had stumbled into real journalism. From there, emailing local news outlets to get the story to the wider KW region was nothing more than a silly moonshot. Try silly ideas. Sometimes they land.

To my fellow writers: To any writers reading this, congratulations. The shitpost journal we have poured so much love into has, for a brief period of time, become an internationally-known publication. Eyes from all over the world are looking at our articles, our writer names, our **profQUOTES**, our bunny-eared anime girls on the front cover. It was true before, and it will ever be true, but let me take this moment to emphasize my heartfelt belief:

We are the coolest people alive.

What comes next?

Through CBC's coverage, we received the following piece of information:

The university says it has asked that all 29 machines, from the Switzerland-based company Invenda, be removed "as soon as possible," and that the software be disabled in the meantime.

"We thank our students for bringing this matter to our attention," said university spokesperson Rebecca Elming.¹

For mathNEWS reader context, Rebecca Elming is the University of Waterloo's Director of Media Relations and Issues Management. Their public relations head.

Before I outline next steps, let me emphasize: this is a win. Our advocacy brought enough international attention onto the university that they have given us the lion share of what we need.

That said, the data could still be out there. We don't know. Until government mechanisms can confirm the data has either been deleted or never existed in the first place, this isn't entirely complete. The Office of the Privacy Commissioner complaint form is in the postscript². I will be asking that, as they did in PIPEDA Findings #2020-004, the Office of the Privacy Commissioner demand that any data collected be deleted. You have the ability to do the same.

We now return to your regularly scheduled shitposting. Sorry for the inconvenience.

molasses

1. <https://www.cbc.ca/news/business/vending-machine-facial-analysis-invenda-waterloo-1.7126196>
2. <https://www.priv.gc.ca/en/report-a-concern/file-a-formal-privacy-complaint/file-a-complaint-about-a-business/>

This reads exactly like a university student paper. [...] It's exactly as irreverent as I would expect it to be.

LINUS "TECH TIPS" SEBASTIAN,
UPON READING **mathNEWS** 154.3

JESUS SHUCKS

THE CORNFIELD DROPOUT

We at war
We at war with wheat, barley
But most of all we at war with ourselves

(Jesus shucks)

Corn show me the way because the Devil's tryna plow me down

(Jesus shucks with me)

You know what the Midwest is? Dry and cornless
Where cornless (n***as) might shuck your necklace
And next these (n***as) might shuck your Lexus
Somebody tell these (n***as) who Cornye West is
I walk through the valley of the farm where death is
Red barn the view alone will leave you breathless
Try to catch it it's kinda hard
Getting blocked by inspectors, yeah, yeah, now check the method

They be testing nutrition, our growing conditions
Sayin' "Can't sell corn without our permission"
Huh? Can't sell kernels of corn? What's the basis?
We ain't growing nowhere but got fields and acres
A trunk full of cobs, rental car from Avis
My mama used to say only Jesus can save us
Well mama I know I act a fool
But I'll be gone 'til November, I got stalks to move, I hope

(Jesus shuck)

Corn show me the way because the Devil's tryna plow me down

(Jesus shuck with me)

The only thing that I pray is that my fields don't fail me now

(Jesus shuck)

And I don't think there's nothin' I can do now to fix my farms

(Jesus shuck with me)

I wanna husk with God but I'm afraid 'cause we ain't shucked in so long

(Jesus shuck)

Corn show me the way because the Devil's tryna plow me down

(Jesus shuck with me)

The only thing that I pray is that my fields don't fail me now

(Jesus shuck)

And I don't think there's nothin' I can do now to fix my farms

(Jesus shuck with me)

I wanna husk with God but I'm afraid 'cause we ain't shucked in so long

So long, so long

(Jesus shuck with me)

To the rustlers, diggers, harvesters, cob dealers, even the pickers

(Jesus shucks for them)

To the cornless at state fairs feel we eating in Hell here, hell yeah

(Jesus shucks for them)

Now, hear ye, hear ye, want to sow Thee more deeply

I know He hear me when my ears grow weakly
'Cause we're the almost nearly extinct
We farmers is role models: we plant, we don't pick
I ain't here to argue about botanical features
I'm here to convert carnivores into some vegans
I'm just tryna say the way fields need reapers
The way chlorophyll needed greenness, that's the way I need Jesus

So here go my tractor, dawg, grocery needs this
They say your crop can be anything except for maizes
That means wheat, oat, rye, barley and grain
But if I harvest my corn my farmers won't get paid, huh?
Well if this take away from my yield
Which'll probably take away from your meals
Then I hope this fertilizes my fields
And bring the day that I'm dreamin' about
Next time I pick a cob, everybody screamin' out

(Jesus shuck)

Corn show me the way because the Devil's tryna plow me down

(Jesus shuck with me)

The only thing that I pray is that my fields don't fail me now

Cornye West

ISSN 0705-0410

UW'S BASTION OF ERUDITE THOUGHT SINCE 1973

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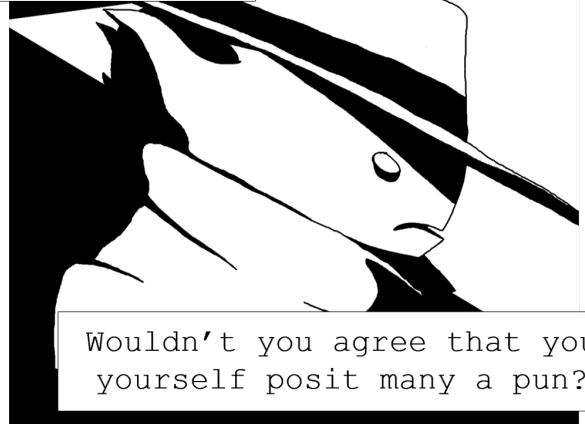
DARK ALLEYS

There is a certain chill that sets in over a crime scene



The room will feel dark and drafty even with the lights on and doors closed

Say, deputy



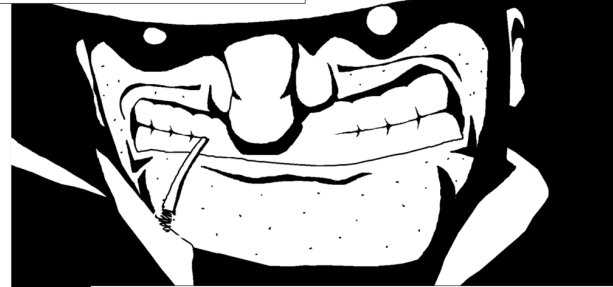
Wouldn't you agree that you yourself posit many a pun?

A death metal musician holding a knife with his spine



Our culprit has an appreciation for puns, it would seem

For such a lil guy



YOU SURE AXOLOTL QUESTIONS

Ghastly business



Some might even call it die-re



HOW VARIOUS NEWS OUTLETS REPORTING ON mathNEWS VENDING MACHINE ARTICLE SHINE A LIGHT UNTO MODERN JOURNALISM

Last issue molasses did a fantastic writeup regarding the surveillance of M&M vending machines. This article gained traction resulting in the university promising to remove the vending machines, and it got reported on across the globe, from The Verge to Ars Technica to The Times of Israel to Business Insider to The Guardian.

Originally I was going to do a detailed write-up evaluating the quality of the various articles and describing the game of telephone that is modern-day journalism. Hypothetically, if molasses' original article is in **mathNEWS** but the writer for The Guardian only reads the CTV article on the story, then the story will become more generic, as the details that weren't included in the CTV article don't get included. Obviously, we have to ding any article that does not capitalize **mathNEWS** correctly. Good job to The Verge for getting it right without being asked.

However, I quickly realized that doing an in-depth review of all the articles would be a lot of work. Fact-checking is hard. If I tried to evaluate the articles for inaccuracies I was acutely aware of the great irony if my own article included more inaccuracies. Good quality journalism is hard and I have some sympathy for the writers forced to churn out content in a rush. I have less sympathy for the companies that encourage these practices.

I do think that taking a story you are familiar with and know all the details to and then reading how various outlets report it is a great exercise in critical thinking: an exercise that I leave to the reader.¹

Here are all the articles I found that reported on the story:

- <https://futurism.com/the-byte/error-message-vending-maching-facial-recognition>
- <https://arstechnica.com/tech-policy/2024/02/vending-machine-error-reveals-secret-face-image-database-of-college-students/>
- <https://www.theverge.com/2024/2/24/24082022/why-do-the-stupid-m-m-machines-have-facial-recognition>
- <https://www.businessinsider.com/vending-machines-facial-recognition-technology-2024-2>
- <https://www.cbc.ca/news/business/vending-machine-facial-analysis-invenda-waterloo-1.7126196>

Beyond Meta

1. What I really should have done was do a media tier list like Hank Green did evaluating the reporting on him disclosing his cancer diagnosis. Tier lists are wonderful in that they are entirely subjective. Unfortunately, I am out of time and I need to get ready for work.

ANKI

Approaching five years ago, I used Anki for the first time. I wanted to learn Korean, and I learned a bit of vocab until the point at which I couldn't keep it up anymore, which coincided with the start of my 1A term. A year or two later, I used it to learn all of the HTTP status codes (I have since stopped reviewing these and have forgotten many, but it was fun) and to practice and learn Russian vocab (I still remember the first word I learned which my older sister, with her much better Russian, didn't already know: «поскольку»).

Last term I took CHINA 101R and JAPAN 101R. This term I'm taking CHINA 102R and JAPAN 102R. My life has become so much Anki. I dread it. I love it. I spent two straight hours one night the other week clicking cards to catch up ahead of a quiz, and afterwards I felt numb, but somehow still satisfied.

Catching up. That's the consequence of not studying at all between last term and this term. I'm still catching up, because instead of adding this term's vocab I've mainly studied last term's vocab. Not being caught up is an invisible weight that I constantly feel. Finally, though, I'm almost free of it.

As hellish as it sounds, there's nothing quite like the feeling of being given a concept and having a word or phrase that once had no meaning just pop into my head in response. The first time it happened in 2019, I was in awe. To be honest, I still am. I have no clue how anyone in my language classes survives without Anki.

Today I studied 170 cards. I haven't studied so few cards since eight days ago. Tomorrow there will be more, and tomorrow will be soon, since my eyes are starting to close on their own.

cutlet

I put this here just so I could fill this column.

A TIRED mathNEWS EDITOR

MY REVIEW OF AVENGERS: ENDGAME

WARNING: SPOILERS AHEAD

To preface, while I do warn of spoilers ahead, it has been 5 years since the movie released, although it's still possible that there exists someone still out there who remains unspoiled of the entire Marvel Cinematic Universe, like I was before October last year. You've been warned. It's better to just stay unspoiled.

I guess this is a continuation of my article in **mathNEWS** 154.1 titled [Watching Marvel Movies](#). Here we go!



After watching *Avengers: Infinity War* with my girlfriend on New Year's Day, I knew I didn't need to wait a year thankfully to watch *Avengers: Endgame*, but we didn't know how long it would actually be until we could watch it together. The next opportunity for us turned out to be for Valentine's Day. Perfect for a 3 hour movie.

During the 6 weeks of waiting, I was thankfully not spoiled at all. My girlfriend put in a lot of effort to prevent that. In one case, she was talking to a friend and the conversation topic shifted over to the Avengers at which point she quickly shushed them and immediately told me to leave the room to avoid spoilers. Whew. Crisis averted.

I was fully onboard the hype train during that time. I would often theory-craft and wonder about how this would all conclude in *Endgame* when in conversation with my girlfriend. Of course, from her perspective it must have been very interesting seeing what I come up with, already having watched it 5 years ago. She kept all her replies vague.



To start off, the movie broke my heart right away. How dare you make me feel that way from the start! Poor Hawkeye...

I also lost my shit when it turned out that 5 whole years went by between the snap and the Avengers finally beginning to work out how to fix it. Five years?! At least, it meant that even *Endgame* would continue to be set in the past for me. One thing my girlfriend did not keep a secret with each movie was what year each of them are set in. No wonder she kept it a secret for this one other than saying it would **start off** right after where *Infinity War* left off. That was technically correct.



There were a couple points throughout that felt a bit too *deus ex machina* for me, such as how they handled Ant-Man. Really? They just put in that one single rat??? I was expecting something better than that over the 6 weeks of waiting. Come on. That part was a let down for me.

I was also worrying a bit when time travel stuff started coming up, because I'm well aware of all the shenanigans movies can

pull off just by waving it off as time travel magic. I gave it a chance and went along with it. There was the part where the Avengers needed to ensure the timelines wouldn't get messed around with, and it was at that moment I knew they would accidentally fuck up the timelines.



They really did Hawkeye dirty with how much emotional damage was inflicted on him (and me) in this movie. Poor Hawkeye...



When the final battle started I had no idea how they would finish off Thanos for good. If there's one thing my girlfriend told me beforehand, it was that Ant Man would not be going up Thanos' asshole. However, I did point out to her that the reverse could technically happen with how big Ant Man got for that battle.

One thing I could have never expected was with Tony Stark. After he performed the final snap, finally defeating Thanos for good, he fell to the ground, and in that moment the only thought I had was "They better fucking not..."

I asked "He doesn't die, right?" My girlfriend stayed silent.

"They can't just kill off Iron Man, right?" Silence.

"They wouldn't." I glanced at her. Nothing.

"He has a kid now. He can't go now!"

When the light from Tony Stark's arc reactor died, I could only say in disbelief, "You motherfucker."

I never could have fathomed Marvel ending the Iron Man character just like that. No wonder Dr. Strange couldn't reveal how that one future out of 14,000,605 would unfold. If Tony Stark knew from the start, it would've changed the outcome.



As with the previous article, I was still super hyped for all the "meme scenes" and there were absolutely plenty sprinkled throughout. However, there was one "meme scene" in particular that will always stand out to me now, mainly because I had already known about the meme beforehand, but did not realize it was from a Marvel movie in the first place.

The meme in question was "No, I Don't Think I Will"¹ and when I realized that the scene I was watching was that meme, I screamed "YOU'RE TELLING ME THAT WAS FROM THE AVENGERS ALL THIS TIME AND I DIDN'T KNOW ABOUT IT?!?!?!?!?!?" I'm not sure which caused me more emotional damage, this realization or Tony Stark.

It was obvious to me years ago which memes originated from *Infinity War* or *Endgame* since they will clearly feature those characters from Marvel. No wonder I didn't realize it back then for this meme. Captain America aged well for sure.



A week later, we finished The Infinity Saga off with *Spider-Man: Far From Home* and now my girlfriend is planning what our next course of action will be. I've been told that the next things to watch are going to be some TV shows instead of movies, since to watch *Deadpool 3* apparently it needs some important context from *Loki*. I really do want to watch it in theatres since I saw the first two *Deadpool* movies in theatres.

Even with the massive backlog yet to watch, my girlfriend has brought up mentions of movies outside of the MCU, such as the other Spider-Man movies. I think it's very probable I eventually write another article. Safe to say, I'm fully invested now alongside her.

boldblazer

1. <https://knowyourmeme.com/memes/no-i-dont-think-i-will>

COMMUNITY SERVICE

IN THE FORM OF FIXING THE MIDPAGE blackBOX ERRONEOUSLY FEATURED ON PAGE 33 OF mathNEWS 154.3

FEBRUARY 16, 2024 mathNEWS 154.3 33

A SHORTER NAME FOR MEXICAN COKE

We all love Mexican Coke; it's objectively better than Canadian and American Coke. We usually default to "Coke" when we are referring to Canadian and American Coke, and specify "Mexican Coke" when we aren't. I think you see the problem: that's too long of a phrase. Think about it, it's a 4-syllable-phrase. Who even has time for that? In this economy?

So, I've been cooking recently, just to think of a better, shorter name for our Lord and Savior, Mexican Coke. I drew inspiration from how the main distinction between regular Coke and Mexican Coke is that the latter is made out of cane sugar instead of corn syrup. Hence, I propose the new name for Mexican Coke: *Coke Cane*™

-TWXT-XT-

HOW TO NO DAMAGE CHEESE DMD/HAH M19 (VERGIL)

1. Have at least 150,000 dollars.
2. Equip DSD and Faust, then spam trickster dash to avoid all his attacks.
3. Wait for him to do a combo B (it's usually the string where he teleports right next to you).
4. Immediately dash away and start charging red hot night (lock on + forward + gun style button).
5. If he does anything other than teleport away and shoot summoned swords, cancel with guard (BG style) and wait for another combo B.
6. When he starts shooting summoned swords, use DT and switch to gun style (the summoned swords will block his).
7. 100-0 him.

warrior1rules

N PIECES OF HUMBLING ARCHITECTURE AROUND CAMPUS

- the mc/dc bridge's water fountain
- chern 2 water fountains
- cracks in bathroom stall doors
- the dc automatically sliding door that opens a second too late after sensing you
- desk outlets that don't work
- Porecellino
- classrooms with the door at the front of the room.

Excuse me walking in five minutes late to (a) squeeze behind the prof with my massive backpack, (b) cast my shadow across the projector screen while I search for a seat and (c) sit down in what just happens to be the squeakiest chair on campus

- the m&tm machines recording my lustful gaze as I pass by
- the dripping brown stain on the lecture hall wall in RCH
- big staircases that expose anemia
- all of P&S
- the entrance to the tunnels I found that's too small for me to fit through

nike

DEAR KARACHI

Dear Karachi,

I have visited four of your gas stations, three of your gardens, two of your mosques and one of your homes.

I have broken a dozen of your gullaks and nearly drowned in your sea. I have sang in your narrow streets and tasted your rain. I have sat in your silent nights, dripping sweat, three dead mosquitoes on my palm. Your cats are safe with me. I will feed your dogs and care for your year-round blossoms. I will nurse your dying birds. I will buy every peach from your street vendors and I will carry your call to prayer with me.

I will love you in the way a child loves their absent mother. You gave birth to me, but I left your arms at seven. I visit during winter break, and for a moment it feels like I never left. In the warmth of your embrace, you are family. You are my home. And yet, when it's time to leave, I tell myself it's for the best. I wish you knew me as much as I know you.

One day, when I'm older and you're dying, I will come back and take your hand into mine. I will recite a short prayer and assure you I have forgiven you.

I will not attend your funeral.

So before that happens,

Please, have me. Call me home.

Moon

I want to defeat you.

PROF. JASON BELL

THE MOST IMPORTANT NEWS ABOUT M4

The Mathematics 4 building is coming soon, and while I could tell you about all sorts of wonderful things about this five-storey building between DC and MC, there is much more important stuff to be said.

It's not all the space for new computer or research labs, staff or faculty offices, or even classrooms, though I'm sure those will be great. Nor is it the innovation or outreach spaces, the environmentally friendly server rooms, or the high-quality spaces for well-being.

I could tell you how the design phase starts in March, with a costing estimate and budget approval. I could also tell you about how construction is meant to start in July and is supposedly scheduled to be completed in 2025, but let's be realistic... the indigenous gathering area by SLC was meant to be finished on February 3rd.

I could even direct you to learn more about what's going on by visiting <https://uwaterloo.ca/math/mathematics-4...> (insert trope about not being able to open the link with your finger on the printed copy)

But no. Rather, I will tell you about how every building on campus, in addition to having a 2 or 3-character code, is assigned a number by Plant Operations. MC is 17. DC is 37. M3 is 56. Importantly, new buildings have been assigned the next natural number following the previous additions. [Do note: the numbering starts at 7 for B1, many numbers are skipped, and some minor buildings are given larger numbers such as 104 for GH] With this in mind, one should observe that some recent addenda to the UW building arsenal are numbers 67 for Engineering 7, and 68 for Claudette Millar Hall; should this pattern continue without any unforeseen circumstances, then M4 will be officially known to Plant Operations as number 69. Nice. [Editor's note: Avril?]

Whole Number Haver

Now you may be calling me immature right now, and you wouldn't be wrong. The university defines mature students as students who have been away from secondary school for some time before applying, and I went straight into university after graduating. Thus I reserve the right to be as immature as I please.



COURSE CATALOG FOR NON MAJORS (1/??)

So we all have friends (haha except you) and not all of them are in math and they feel left out when you are just throwing course codes at them and they have no idea what you're talking about. Well worry not, because this article series is gonna be the perfect explanation of math courses for non-math majors. Let's start with the basics:

- MATH 52, 97—These courses are not real so we skip them.
- MATH 103, 104, 106—Hate math but need electives? These courses are there for you, specially targeted towards Arts and Social Sciences. These aren't really faculty courses so I'll just skip over these. You probably know about it more than me.
- MATH 114—You wanted to avoid math so you took biology but then you realize that you will not be allowed to rest. Not really a hard course. Seems like just an easy version of MATH 136 (look down for an explanation)
- MATH 115, 116, 117, 118, 119—Like MATH 103, 104, 106 but for engineers.
- MATH 124—You know you don't need this course. We know you don't need this course. God knows you don't need this course. But they will not let you rest until your 3rd year so you're gonna have to do some "unnecessary" math. I am sorry for you, honestly.
- MATH 127, 128—This is where the fun begins. You're gonna learn calculus 1 and 2. Not in too much depth because you don't need it. If you did calc in high school you're golden because most of it will just be review. If you didn't and are not really a math person, well, good luck then. Very popular among CS majors who hate math but also want a CS degree which is literally a subset of math faculty. Surely this will not go wrong.
- MATH 135—Biggest course offered by the math faculty. No getting out of it,¹ no easier version. Everyone in math has to take it [*Editor's Note: MathPhys, Sci. side?*], everyone in CS has to take it, and even the SEs have to take it. This course exists solely to get first-years introduced to what uni math actually looks like, mainly focused on proof-writing. The course tends to be very strict, which is fair because proof-writing is supposed to be very precise, at least in an introductory course. Gets annoying at times but seems easy in general (I am very biased).
- MATH 136—A lot of matrices. Continuation of 125/135 but with options now. You're gonna have to do a lot of computation and you'll hate it but your grade would be decent.
- MATH 137/138—Just some calc. More rigorous than MATH 127 and 128. Targeted towards people who would actually like to pursue more math. Most upper year math courses are locked behind MATH 136 and 138 so if you're into math, you're gonna have to get through these.

The spicy stuff begins:

Most of you should be fine with the knowledge provided above. Do not attempt to read the following section unless you are taking these courses, plan on taking these courses or know someone taking them:

- MATH 145—Take MATH 135, add a little masochism, and you will get MATH 145. If you know what to expect and you're still into it, you will get exactly what you want you and will love it. You will learn a new meaning of what Algebra is. It was so awesome and so beautiful and so sexy. You will not see the world in the same way after taking this course. 10/10 would recommend taking it if you feel like it.
- MATH 146—The advanced version of linear algebra. Derives matrices in an abstract sense. Good course but a letdown after 145. You will have to imagine lines in \mathbb{R}^2 and it will be hard.
- MATH 147/148—The advanced version of calc 1 and 2. The difference in difficulty is humungous and, honestly, for me it hasn't been worth it. That being said, I've heard it can be pretty cool and covers many important concepts like how things can be close and far from each other. Give it a shot and see if it tickles your fancy.

That's all I have for today. It turned out to be more of a review than a description but I'll try to do better next time. See you in a couple of weeks.²

0.423

1. Unless you take 145, but trust me if you wanted to escape, 145 is probably not the way to go.
2. There's also MATH 199 but I've never heard of this course so it's not real.

THIS COLD ABYSS

Across this cold abyss
 Out of nowhere, a gentle touch, a kiss
 A dance with grace, a leap of faith
 Falling into your warm embrace
 Our threads intertwine,
 What is yours turns mine
 They tangle, they knot
 A bond which can never be distraught
 My Love, my light
 Falling gently, into that good night

Pizzadonym

BOARD GAME REVIEW: TWILIGHT STRUGGLE

A BRIEF OVERVIEW OF TWILIGHT STRUGGLE

Twilight Struggle is a beginner-friendly board game that simulates the epic history of the Cold War. You can pick it up from the MathSoc Office and play with your friend in the Math CnD for a few hours. On a cozy afternoon, try learning the game with coffee and donuts while listening to some history documentary OSTs. Have fun!

In Twilight Struggle, players act as two superpowers, the USA and USSR, fighting for dominance and control during Cold War. There are ten turns in total in one playthrough, representing the timespan of the war from 1945 to 1989. In each turn, players play event cards from their hand to spread influence, make realignments in enemy-controlled countries, or to take military coup actions. Historical events depicted on the card may also be triggered, turning the tide of war. The event cards are categorized into Early War, Mid War and Late War. At the end of turn 3 and turn 7, Mid War cards and Late Wars cards are added to the draw deck accordingly. The status of the war is tracked by Victory Points (VPs). The first superpower outmatching the other twenty VPs wins the game.

The game board is a map of the world dividing into 6 scoring regions, including Central America, South America, Europe, Africa, Middle East, Asia, and Southeast Asia. As the game progresses, Regional Scoring may happen. Comparing the number of controlled countries in the scoring region, one superpower may outmatch the other, moving the state of war towards its victory. Space Race track, DEFCON Status and Required Military Operations track are also shown on the board. Space Race track indicates the strength of superpowers in science and technology. The further one outmatches the other, the greater benefits one will get. DEFCON Status tracks the tension between the superpowers, ranging from 5 to 1. The consequence of DEFCON 1 is nuclear war, and the player who triggers it loses the game. In a given turn, players need to have enough required military operations, usually acquired by taking coup attempts. Failure to have enough military operations at the end of a turn will result in opponent winning VPs.

REVIEW

Within the circle of board game players, it is a tradition to introduce Twilight Struggle to any beginner who shows some level of interest in this hobby. There are many reasons behind this. It is one of the most easy-to-learn board games. The official rulebook only contains ten pages of actual rules, and it contains lots of examples and illustrations to help players understand how the game works. What's more, the game mechanics are simple and efficient. Players simply take turns to play cards in their hand to change the state of the countries in the world. Most of the time, you can even play the cards in your hand in sequential order for the game to progress, though it might end up in your opponent's favor. It usually takes half an hour for an experienced player to introduce this game and explain the rule to a new player.

The game tells the story of the Cold War in an elegant way. The Cold War is a recent historical event [*Editor's note: hilarious understatement*] that everyone must have heard of, but may not be that familiar with. Cards in this game are unique. Every event card in this game tells a story from history, and the events can interact with or affect each other. For example, NATO can only be played as an event if *Marshall Plan* or *Warsaw Pact* is in effect. *Camp David Accords* makes *Arab-Israeli War* no longer playable. By learning how these events work and by reading Card Histories from the rulebook, players can resonate with history as if seeing it happening on the game board.

Though Twilight Struggle is easy to learn, it is definitely one of those difficult-to-master games. Given a big map of the world and 110 unique cards, the state of the game can be very unstable and difficult to predict. Should I hold onto *Formosan Resolution* until the *China* card is played by the USSR? What if I play *Warsaw Pact* for now? My opponent might have to play NATO to resolve things. Like what actually happened in the Cold War, the players also bear the burden of a ten-turn twilight struggle. There are many competitive games of Twilight Struggle happening around the world, and it is available online to play on Steam as well. For my first and second game, I remembered being awkwardly overwhelmed by my opponent too early. The second one happened in MathSoc Game Night. Zethar did it. To make your first game less awkward, here I present:

N THINGS TO DO TO SURVIVE BEING ELIMINATED TOO EARLY WHEN PLAYING WITH ELITE TS PLAYERS

- Although leaving the event cards as a sweet surprise might be one of the best experiences of this game, I think it's fair to disclose that only *Asia Scoring*, *Middle East Scoring* and *Europe Scoring* are present in the Early Game deck. So, forget about adding influence to America and Africa in the first three turns. They are not important until Mid War.
- Remember to do Coup rolls every turn to meet your Required Military Actions. Coups are effective against small, less stable countries. You can always find an easy target on the map.
- Don't overcommit your influence on battle-ground countries that are isolated from your other controlled countries, as they can be easily aligned (reduce influence) by your opponent. Event cards can also easily affect those countries as well. Do the opposite if you get the chance!
- If you have event cards in your hand that would greatly benefit your opponent, try using them for Space Race. The event cards used in Space Race go to the discard pile without triggering them. Though you can only do this once per turn, it might save your board from a devastating attack.

N USEFUL THINGS THAT WILL MAKE IT OKAY TO PUBLISH THIS ARTICLE

EDITORS PLEASE 🙏

The images in this article are not intended to be erotic or explicit in anyway. It is simply a shirtless photo of myself that has been artfully covered to allow this article's publication. If this offends you, please go die mad.

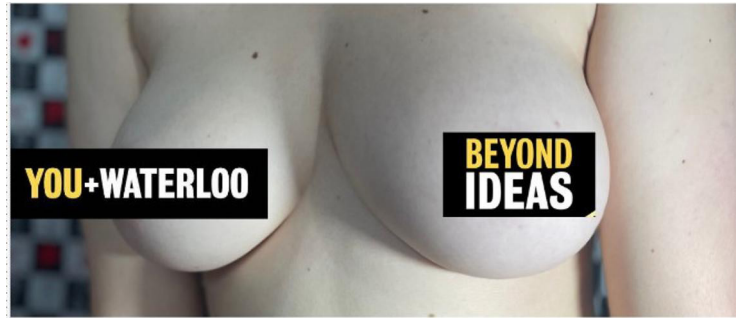
1. SOMEONE ELSE'S NIPPLES

In *mathNEWS* 144.2, a topless photograph of Putin was printed¹ with no issue. If my nipples are not approved, then why are his allowed? I have committed no war crimes. Regardless, I stole the nipples to cover my own.



2. UNIVERSITY OF WATERLOO MARKETING

I miss Beyond Ideas. It meant nothing and it was so good.



3. A VERY CONVENIENT HOUSEPLANT

In the longstanding tradition of edgy comedy movies that aren't edgy enough to show actual tits but still want some nudity.



4. GOOGLY EYES

Imagine if this was a GIF.



5. TRANSPHOBIC POLITICIANS WHO WOULD HATE THIS

Choke on my strap!



6. HANDS



7. M&MS

To be on theme for this issue



8. AND OF COURSE, THE mathNEWS LOGO



rockfacts

1. Considering it was during the pandemic, I think this issue was only posted online.

LAMENTATIONS OF A CUIPIOROMANTIC

(LOOK IT UP YOURSELF)

Cupio cope-io why can't I know-pio
 what is this "romance" that I haven't felt?
 Cupio cope-io looking to know-pio
 why it makes others have hearts that will melt.

Cupio cope-io I still don't know-pio
 why I would want to feel some of it, too.
 Cupio cope-io struggling through-pio
 how it is nevertheless that I do.

Cupio cope-io look where to go-pio
 but deep inside I don't know how to "hunt".
 Cupio cope-io look at the snow-pio
 nothing stands out in the blizzard in front.

Cupio cope-io I will give up-io
 everyone else says that there is still hope.
 Cupio cope-io but they don't know-pio
 how I have felt, so I think that's just cope.

also asexual

REASONS TO UNDERLEVEL AKIHIKO SANADA

1. He looks like deadweight from Devil May Cry (coincidentally both are useless for the first month of the game)
2. The cognitive dissonance between him constantly giving you lines about how hard he's been training and how experienced/effective he is in Tartarus compared with him doing absolutely nothing and getting carried in gameplay is extremely funny.
3. Bro thinks he's on the team
4. He is constantly polishing his boxing gloves in his spare time (we must not be rude and dirty his gloves by having him do anything at all)
5. Honestly I think he's kinda bad (probably not the best person to judge but I think both his theurgies are meh and hard to charge, while his skills are a jack of all trades, master of none type deal)
6. Having him on the team deprives you of 1/3 slots which you could potentially fill up with a dog, DA MAN, a full party heal and incredible support for next to nothing SP every turn, a small child with a polearm, Mitsuru, or even a microwave with blonde hair and funny voice lines.

warrior1rules

A YEAR OR SO WITH THE PEBBLE TIME ROUND

Remember when YouTube tech reviews were really big? Maybe I'm out of touch and they still are, but I doubt it. I haven't heard about one in ages. I just went to Marques Brownlee's channel and he is still reviewing phones; I watched a review of the latest iPhone and it was the most boring thing I'd seen in my life. Not that it was really Marques's fault: there was genuinely nothing to review. There were about 1.5 changes between the iPhone 14 and 15. Honestly, I'm not sure how they still sell these things.

So what even is there to review at this point? Well, there's the new Apple VR thing that nobody can afford, and there's whatever contraption the latest VC-backed startup has managed to shove GPT into even though nobody asked for it. Alternatively, I could just review something from back when tech companies were producing actually interesting gadgets. Fortunately, I bought one of those about a year ago.

The Pebble Time Round was released in 2015, about a year before the Pebble smartwatch company—founded four years earlier by Waterloo alum Eric Migicovsky—shut down and sold its assets to Fitbit. There's still a plentiful supply of Pebble watches floating around on eBay, however, and it wasn't long before I found one in the colour I wanted (white with a silver trim).

UNBOXING EXPERIENCE

The watch arrived in a repurposed cardboard box, wrapped in bubble wrap. I'd bought mine from a seller in Ukraine whose listing said it used to belong to their wife, and that it still worked fine aside from a battery which had expanded and broken the adhesive holding the front glass in place. I'm fairly confident in my repair skills, so I bought the least-sketchy-looking replacement battery on AliExpress and a pack of Sugru, which was the adhesive I'd seen most people recommend to seal the watch back up.

The Sugru ended up failing a few months later, and the glass fell off while I was at a restaurant. I replaced it with B7000 liquid glue and that's held up so far, though it was a little harder to apply. If you also end up repairing one of these, go for the liquid glue.

DESIGN

I primarily bought this thing because I thought it looked cool. It's a smartwatch that's so thin and unobtrusive that it just looks like a normal watch: I got a lot of comments from people who were surprised to find out I was wearing a smartwatch.

How did they accomplish this? Well, taking it apart to change the battery gave me some insight. There's not a whole lot of hardware inside—no heart rate sensor, cellular radio, or NFC—and the motherboard is so small that the battery carves out a little hole in the centre of it, instead of sitting on top. The battery itself is also tiny—a 0.22 Wh pack compared to

the latest Apple Watch's 1.17 Wh. The watch still lasts a day and a half despite this, owing to its low-power components.

I admire this watch's clear intention to not look super techy. Even Apple, known for its attention to detail, designed a rectangular blob that you can't put on without looking like a huge nerd.

HARDWARE

The screen on the Pebble Time Round is interesting. It's perfectly circular, it doesn't give off light (sort of like an LCD on a calculator), yet it can show 64 colours. This makes it perfect for a watch, where readability in sunlight is more important than being able to watch movies in full colour. There's also no touchscreen: you control it with four buttons along the edge, which comes in handy when it's -10 degrees outside and you don't want to take your gloves off.

There are exactly two fitness tracking capabilities: step counting and sleep tracking. This works great for me, as I haven't been to a gym since 2019.

SOFTWARE

I love the Pebble software. It's filled with these wonderful vector animations that bring the watch to life: mute a notification and an ostrich sticks its head in the sand. Run out of calendar events and you're greeted by a sloth hanging from a branch. It's so wonderfully playful that I just had to create an app of my own, and spent several days animating little models of trains and buses for a transit app.

There's still an app store too! A volunteer-run organization called Rebble runs replacements for all of Pebble's cloud services, and it's trivially easy to switch your watch over to use their services.¹

DEVELOPMENT

This isn't usually a component of tech reviews, but I'm writing to a bunch of nerds and CS students. Developing Pebble apps is refreshingly simple, though you do need to have Python 2 installed for the SDK. You write in C with the Pebble UI library, plus bits of JavaScript here and there for phone-side functionality. To deploy an app, you run one command that uploads it to your phone and then pushes it to your watch over Bluetooth. It's all much easier than anything I've done for Android or iOS.

CONCLUSION

I've been wearing this thing for about a year, and I've come to really appreciate that it feels less like a tech product and more like a tool that I get to keep forever. I haven't gotten a single update or had to miss out on any new features. I feel like I'll probably be wearing this until the end of time.

At this point, I'm just wondering why they're still making new phones. If smartwatches from 9 years ago can last forever, then surely the same should be true for phones today, especially since phone revisions are so boring that YouTube reviewers are clearly struggling to find things to review. It's over, you won. Find something more interesting to update every year and let us use our existing phones for 20 years or something.

Also, this thing is fun! Why aren't we getting fun computers anymore. What the hell.

__init__

1. As long as you're using Android. I hear it's more complicated on iOS.

A blackBOX WOULD FIT PERFECTLY IN THIS EXACT LOCATION ON THE PAGE

jeff

ISOMORPHISM THEOREMS FOR SETS

INSPIRED BY PMATH 347

1. Let $f : A \rightarrow B$ be a function. Then f induces a partition of A into equivalence classes. The set of such classes is isomorphic to the image of f .
2. Let A be a set, B be a subset, and P be a partition of A . Let C be the set of equivalence classes of P which contain elements of B , and let Q be the partition of B induced by P . Then C is isomorphic to the set of equivalence classes of Q .
3. Let A be a set, and P and Q be partitions of A , with P coarser than Q . Then P induces a partition of the equivalence classes of Q , and the equivalence classes of *this* partition correspond one-to-one to the equivalence classes of P .

finegeometer

A blackBOX COULD ALSO FIT HERE BUT IT WOULD BE PRETTY BORING, RIGHT?

jeff

N HORRIBLE LOCATIONS TO BE BORN IN

I think my primary article was kind of depressing so let's think about something better! I surveyed the venerable patrons of **mathNEWS** to find out where they would not like to be born.

- MC Comfy
- Bottom of the Mariana Trench
- While skydiving
- The **mathNEWS** office [*Editor's note: why not!?*]
- While your mom is proctoring an exam
- While your dad is proctoring an exam
- While your mom is proctoring an exam that your dad is writing
- While your dad is proctoring an exam your mom is writing
- In Gaza right now
- Antarctica
- ISS
- Bottom of the Atlantic Ocean
- Bottom of Indian Ocean
- 25 feet up
- Underneath the Arctic ice sheet
- To a mother who is not pregnant
- The world's deepest pit in Russia
- Over a pig
- Mississauga
- Brampton
- The Woodlands, Texas
- Quebec
- North Korea
- Outside of the fabric of reality
- Inside the stomach of your twin
- In the mouth of a shark
- Inside a toilet
- South Jersey
- Alert, Nunavut
- Tim Hortons or Post Office or both
- Great Britain
- Central African Republic
- North Sentinel Island
- Power outage (this isn't a location, but the submitter really insisted on it)
- Greedoid

Epic Waterman

blackBOX REPLACER 9000

Please never put one in the middle of a page again. Anyway, I guess this is more of a **whiteBOX**... [*Editor's note: I will never apologise.*]

terminal

LOBLAWS IS OUT OF CONTROL !?

"LOBLAWS IS OUT OF CONTROL!" THEN PROCEEDS TO LOOK AT AN ENTIRELY DIFFERENT CHAIN

We've seen it. Images of packs of chicken breast costing \$30 CAD. The bread price gouging scandal, pictures of chicken breasts costing \$40! There's a clear problem that we all know of. We know it, we see it, and we should say something about it. And it's not just because of inflation. Why don't we compare prices? Using archives of a grocery flyer from February 2013 (February 7–13)¹ and one from February 2024 (February 8–14)², And keep in mind, these are **discount** prices. They're on the flyer for a reason. Here's 12 (matching in brand AND closest amount):

Item	2014 Price	2024 Price	Item	2014 Price	2024 Price
Broccoli Crowns	99 cents each	1.99 each	Sun Maid Raisin Bread	2.99 each	4.49 each
Whole Chicken	\$6.99 each	4.49/lb	Robin Hood All Purpose Flour	9.97 for 10 kg (roughly \$1 per kg)	11.98 for 10 kg (\$1.19 per kg)
Romaine Hearts	1.97	3.98	Simply Orange Juice	3.97 for 2.63 L (\$1.50 per L)	3.99 for 1.54 L (\$2.59 per L)
Avocados	2.97	3.98	Cashmere Toilet Paper	5.88 for 18 pack (0.33 per roll)	6.99 for 12 pack (0.58 per roll)
Boneless Sirloin Tip	4.99/lb	9.99/lb	12 pack Coke	\$3.99	\$6.25
Spices (Literally any Selection brand pack)	99 cents	99 cents	Red Onions	\$1.97	\$3.88

FORMATTING CAN BE SO WEIRD SOME TIMES.

All prices in CAD.

(Brief note re: whole chicken. 2024 was sold as a unit. 2014 is sold by pound. Whole chickens are typically 2.5 to 4 pounds.)

The Canadian dollar buying power increases in volume over time, so its real value—what it can buy—decreases. Things we could buy for \$100 in 2014 would cost \$120 in 2024. The cost of farming, living and supplying have all gone up, makes sense grocers have to up the prices to match, right? But think about it for a second—most of these are increases by two or three dollars. For grocery trips for food that lasts a week or two, bills can go from \$125 to \$200, even, if you have to buy certain products. And you might think to yourself, didn't you just discover inflation? You're right. But food inflation rates went **way** up in 2022, according to Dalhousie's Canada Food Price Report³. The predicted range for 2022 in terms of inflation would be an increase of 5–7%, and that was considered highballing it. Guess how much it actually was?

mathNEWS is the best thing that's ever happened to me.

A \$100% SINCERE mathNEWS EDITOR

Table 1: 2021 Food Price Results: 2022 Forecast vs Observed⁶

CATEGORIES	2022 CANADA'S FOOD PRICE REPORT FORECAST	2022 ACTUAL CHANGE (CPI, SEPT. '21 TO SEPT. '22)
Bakery	5% to 7%	14.8%
Dairy	6% to 8%	9.7%
Fruits	3% to 5%	11.4%
Meat	0% to 2%	7.6%
Other	2% to 4%	12.8%
Restaurants	6% to 8%	7.5%
Seafood	0% to 2%	7.6%
Vegetables	5% to 7%	12.7%
Total Food Categories Forecast	5% to 7%	10.3%

YES, YOU'RE READING THAT RIGHT. Prices obtained from [4].

That's right. The actual change was **double** that of the prediction. You know. The prediction considered 'highballing it'.

Well, maybe it's just a matter of climate change and other current events causing huge supply chain issues. Again, makes sense. Have you *seen* the temperatures lately? We only got one or two major snowfalls this year! We're headed for double digits and February isn't even over! So with the carbon tax, transportation costs and labour costs in the agricultural industry means the cost of farming goes further up, especially with inflation. So grocers have to contend with increased prices from suppliers and employment. Makes sense so far.

Except Loblaws reported a Q4 profit⁵ of 3%, or \$524 million. Metro had \$304 million. So two scenarios here. Either a) grocers are pertaining to the demands of suppliers/employees and yet somehow are still generating a profit or b) they're not paying suppliers enough to account for inflation. And given everything from the bread price fixing and the pay decrease in July 2020...they are NOT beating the allegations 😏. Groceries in Canada are pretty much an oligarchy—Loblaws (Independent, NoFrills), Sobeys (Longos, FreshCo), Metro (Food Basics, Metro), Walmart and Costco make up roughly 80% of the grocery market share. There's also Pattinson (Save On Foods) but those are mainly in Western Canada. Then again, oligarchies are a major problem in Canada (see: 2022 Rogers Blackout) so no news there.

Sooo, what do we do? I honestly have no idea. I just got mad that I had to pay \$182 footing a grocery bill for myself and three roommates and accidentally discovered grocers are scalping us 🤔 and also that there's an online community on Reddit called r/loblawsisoutofcontrol that sheds more light on the situation. Shoutout to them.

Skit

1. <http://foodbasicsflyers.ca/2014/02/>

2. <http://foodbasicsflyers.ca/2024/02/>

3. <https://cdn.dal.ca/content/dam/dalhousie/pdf/sites/agri-food/Canada%27s%20Food%20Price%20Report%202023%20Digital.pdf>
4. <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=181000403&pickMembers%5B%5D=1.26&cubeTimeFrame.startMonth=09&cubeTimeFrame.startYear=2022&referencePeriods=20220901%2C20220901>
5. https://dis-prod.assetful.loblaw.ca/content/dam/loblaw-companies-limited/creative-assets/loblaw-ca/investor-relations-reports/annual/2023/LCL_Q4%202023_NR.pdf
6. <https://corpo.metro.ca/userfiles/file/PDF/Rapport-trimestriel/2024/2024-First-Quarter-Results-v3.pdf>

mathNEWS CAPITALIZATION ALIGNMENT CHART

BROUGHT TO YOU BY THE MEDIA

These are all real ways that the media has referred to us in the past week, except for one which was just Sexy_Software_Babe's dad.

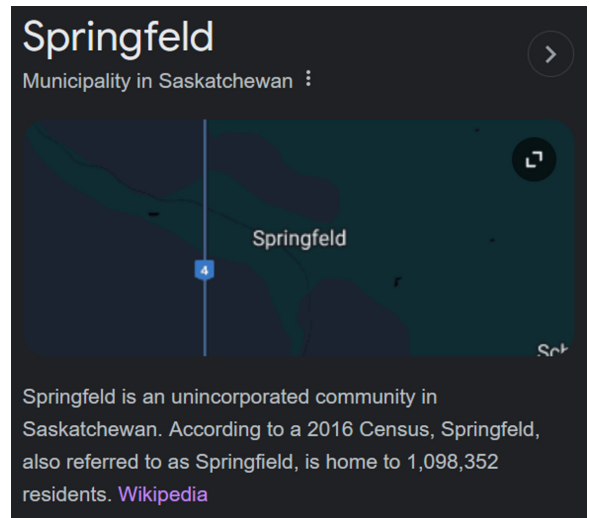
lawful good	neutral good	chaotic good
mathNEWS	MathNEWS	The School Newspaper
lawful neutral	true neutral	chaotic neutral
mathNews	MathNews	MATHNews
lawful evil	neutral evil	chaotic evil
Mathnews	mathNEWS	MathNEWS

__init__

N THINGS THAT SHOULDN'T HAVE WIKIPEDIA ARTICLES WHILE mathNEWS STILL DOES NOT

IN THE NEW LIGHT OF OUR RECENT VIRALITY,
SOME OF THESE ARE SEEMING ESPECIALLY SILLY

- Golden Words,¹ Queen's University's comedy publication, because they seem to do mainly TikTok-style on-the-street interviews and their website has been under construction for months
- Springfield, Saskatchewan,² because something seems off here



- The New York Times³ and the Chicago Tribune,⁴ because one can only wonder why they seemingly refuse to report on the M&M machines or Picard's Peanuts
- The Apollo 11 manned mission to the Moon,⁵ because it isn't mentioned once that it actually occurred on a Hollywood sound stage or that Buzz Aldrin is an iguana
- War and Peace⁶ and Anna Karenina,⁷ because they are way way over the mathNEWS word limit

aphf

1. https://en.wikipedia.org/wiki/Golden_Words
2. <https://en.wikipedia.org/wiki/Springfield>
3. https://en.wikipedia.org/wiki/The_New_York_Times
4. https://en.wikipedia.org/wiki/Chicago_Tribune
5. https://en.wikipedia.org/wiki/Apollo_11
6. https://en.wikipedia.org/wiki/War_and_Peace
7. https://en.wikipedia.org/wiki/Anna_Karenina

THE VOLUME OF SPHERES

What is the volume of an n -dimensional sphere? I recently discovered a beautiful way to solve this.

Consider the volume under the n -dimensional surface $y = e^{-x_1^2 - \dots - x_n^2}$. It's easiest to visualize this when $n = 2$; it looks like a circular hill.

First, let's solve this as a standard multidimensional integral.

The volume is $\int_{-\infty}^{\infty} \dots \int_{-\infty}^{\infty} e^{-x_1^2 - \dots - x_n^2} dx_1 \dots dx_n$.

This looks bad, until you realize it factors as $\left(\int_{-\infty}^{\infty} e^{-x_1^2} dx_1\right) \dots \left(\int_{-\infty}^{\infty} e^{-x_n^2} dx_n\right)$.

So the volume is A^n , where $A = \int_{-\infty}^{\infty} e^{-x^2} dx$.

Alternatively, we can slice the volume horizontally, into a tower of stacked cylinders.

The slice at height y has the shape $\{(x_1, \dots, x_n) | y \leq e^{-x_1^2 - \dots - x_n^2}\}$. Rearranging, it's $\{(x_1, \dots, x_n) | x_1^2 + \dots + x_n^2 \leq -\ln y\}$, a ball of radius $\sqrt{-\ln y}$.

So the cylinder at height y has volume $(\sqrt{-\ln y})^n V_n$, where V_n is the volume of the unit ball. Integrating, the total volume is $V_n \int_0^1 (-\ln y)^{n/2} dy$.

But a simple substitution shows $\int_0^1 (-\ln y)^{n/2} dy = \int_0^{\infty} t^{n/2} e^{-t} dt$. This looks like the definition of the gamma function! (In case you're not familiar, that's the generalization of factorials to real numbers.)

So the total volume is $(\frac{n}{2}!) V_n$.

Putting these two methods together, we've shown $V_n = \frac{A^n}{\frac{n}{2}!}$. Since we know $V_2 = \pi$, A must be $\sqrt{\pi}$.

This yields our final formula:

$$V_n = \frac{\pi^{n/2}}{\frac{n}{2}!}$$

A beautiful formula, with a beautiful proof.

finegeometer

MATH ENDOWMENT FUND NEWS

PROJECT FUNDING PROPOSALS

Need funding for an idea that will benefit undergraduate UW Math students? Apply for MEF Project Funding! This term, we have over \$137,000 available for allocation. Proposals are due by Friday, March 1st (TODAY!) at 11:59 PM. The application form can be found at <https://uwaterloo.ca/mef/funding-grants/project-funding>.

EXECUTIVE DIRECTOR & BOARD OF DIRECTORS APPLICATIONS

Interested in improving the overall student experience for UW Math students? Apply for the position of Executive Director for the Spring 2024 term! The Executive Director is responsible for processing reimbursements of granted funding, organizing Funding Council meetings, communicating with project organizers, and much more! Applications are open until Sunday, March 10th at 11:59 PM. Applications for MEF Board of Directors are also open during this time! The application forms are available at <https://uwaterloo.ca/mef/board-directors>.

Mathematics Endowment Fund (MEF)

CONNECT THE DOTS



Answer posted next issue!

rockfacts

It's very difficult to fit a
good joke on just two lin

A SPACE CONSCIOUS blackBOX

COMMON COCKCHAFER

At a time where the worlds eyes turn towards **mathNEWS** as one of the few remaining bastions of local truth in an environment where media companies are gutted left and right^{1,2,3,4,5}, I come to you with an expose about an injustice that has haunted the Western world for centuries.

Medieval Europe, 1200s. You are a peasant. Your meager harvests are taken by your feudal lord. You are hungry. It comes the Common Cockchafer, a majestic beetle, they are hungry too. They just simply want a nibble of your wheat. They want to spread literature advocating against feudal structure of Europe and plans to establish a collective society in which class and species are abolished.

Did the peasants join the Common Cockchafer in its quest for peace and harmony, and offer a bit of its wheat to the collective society? Would they join them and rise up against their feudal lords? No! Instead they called them “pests” and began to persecute them.

In 1320 Avignon, French Cockchafers were brought into court and sentenced to withdraw within three days onto a specially designated area, otherwise they would be exiled. When the Cockchafers failed to leave the area, they were killed on sight⁶. In 1478 Berne Switzerland, a colony of Cockchafers received a summons to “appear before the bishop in order to tell their story”. When they failed to show up, the Bishop stated that he had heard their “heard the vicious and abominable answer.”⁷ **mathNEWS** stands with the Common Cockchafer in request reparations from the Swiss and French Government for this massive injustice.

Upon the introduction of modern pesticides, Common Cockchafer populations cratered, further subjugating them under the thumb of humanity. However, in recent decades after the banning of dangerous pesticides, the Common Cockchafer has rebounded, destroying 0.001% of Europe’s land each year. As their population continues to rebound, humanity can only hope for forgiveness as the Common Cockchafer lays waste to our land, spurned of its collectivist dreams.

To continue our penance to our incoming Cockchafer overlords hungry for revenge for their century long injustice. I will list more facts about the Common Cockchafer (as well as a photo);

- In Sweden they are known as “Bemärkelse-mask — prognostic worm” as whether their grub larvae are blue or white determines if the winter will be mild or severe.
- They have been a French soup ingredient
- Quote from Wikipedia: “Children since antiquity have played with cockchafers. In ancient Greece, boys caught the insect, tied a linen thread to its feet and set it free, amusing themselves to watch it fly in spirals. English boys in Victorian times played a very similar game by sticking a pin through one of its wings. Nikola Tesla recalls that as a child he

made one of his first “inventions” — an “engine” made by harnessing four cockchafers in this fashion.”

- There have been four Royal Navy ships named *HMS Cockchafer*.⁷



Lars Nootbaar

1. <https://toronto.citynews.ca/2024/02/08/not-a-viable-business-anymore-bell-media-selling-45-radio-stations-amid-layoffs/>
2. <https://variety.com/2024/digital/news/sports-illustrated-layoffs-1235877983/>
3. <https://www.latimes.com/entertainment-arts/business/story/2024-01-23/latimes-layoffs-115-newsroom-soon-shiong>
4. Dick Smithers’ article about Imprint uncritically advertising Crypto-WUSA
5. A million more versions of the same story
6. <https://en.wikipedia.org/wiki/Cockchafer>
7. <https://worldhistory.us/medieval-history/medieval-animal-trials.php>

CS 482 HATE LIMERICK

If you pick CS 482
Consider and really think through
The fact that the course
Brings me only remorse
Et je le déteste beaucoup

peacelovemath

FAREWELL, MY INDEPENDENT GROCER

SO LONG, AND THANKS FOR ALL THE PC OPTIMUM POINTS

The grocery shoppers among us are probably familiar with the grocery stores in proximity of campus. Here are some of them, in order of increasing distance from campus and also decreasing average price of groceries:

1. Farah's Food Mart
2. Waterloo Central
3. Independent: Your Independent Grocer
4. Walmart

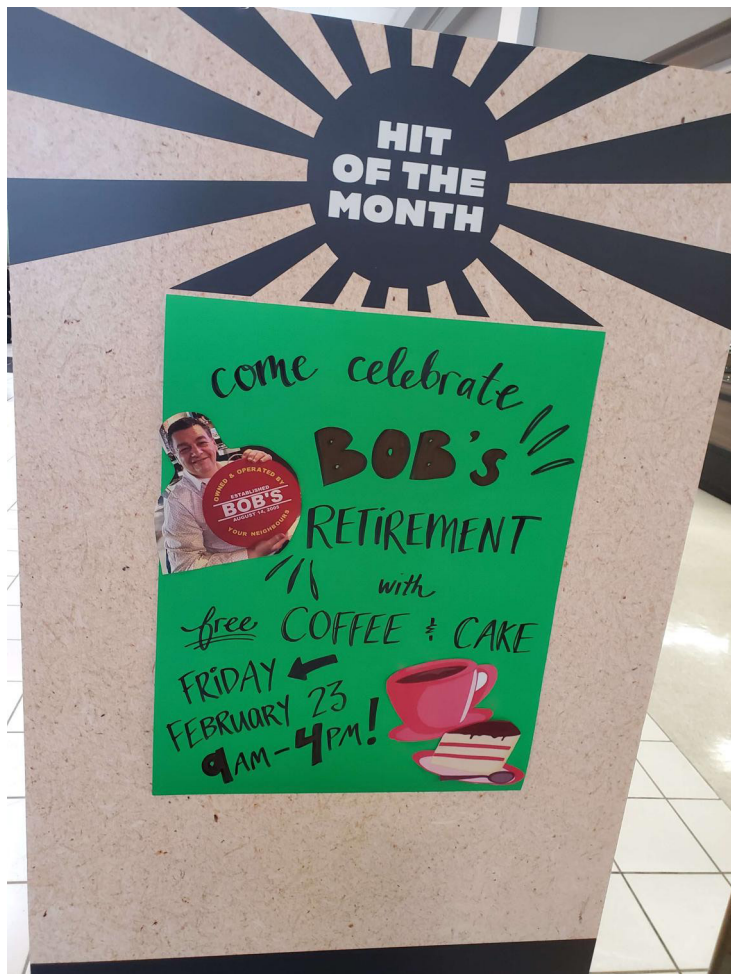
Independent: Your Independent Grocer is a great store. It's two ION stations down, at Willis Way/Waterloo Public Square, so it's relatively easy to reach, and also has a decent variety of foods at a decent price. Farah's and Waterloo Central are walking distance, but much more expensive and lack some of my staple foods. Walmart is cheaper and has more food choice, but many, many stops away on the 12/29, which both come much less frequently than the ION and are much more full than the ION. Independent: Your Independent Grocer is a happy middle ground.

I keep calling it Independent: Your Independent Grocer to hammer in the fact that it is a *stupid* name. It's long, it's hard to say, and it's awkwardly phrased, because it's trying to hammer in the fact that it's independent, *which it isn't, it's owned by fucking Loblaws.*

How did we get here?

In 2002, the Zehrs (Loblaws chain store) in Waterloo Public Square was turned into a Valu-Mart¹ (different Loblaws chain store). It ended up being named after the franchise owner, Bob Stoikos, to Bob's Valu-Mart. In August 2023, they made a Facebook post stating that they were renaming from Bob's Valu-Mart to Bob's Your Independent Grocer² (different Loblaws chain store). For some reason, though, when the branding changed, it all said "Independent" in really big text, followed by "Your Independent Grocer" in really small text. No mention of Bob.

On February 21, 2024, mathNEWS writer molasses posted this image in the mathNEWS Discord server (next column):



I decided to go—I had to go grocery shopping soon anyway, and who turns down free coffee and cake?

When I got there, there was a stall set up outside the store, with self-serve coffee and cake. It was set up directly outside the checkout, so I wasn't sure if this was only available to people buying stuff at the store. Since I wanted to buy stuff anyway, I went ahead and did that. When I came back out, Bob was there.

Bob was standing next to the stall, calling out to passers-by and asking them if they wanted to join him in celebrating his retirement. Eventually, he spotted me, and asked me if I wanted the free stuff. I of course did, but I had to stuff my groceries in my backpack first. As I did that and went back to the table to grab some coffee, Bob handed me a plate of cake that he had prepared himself.

I thanked him profusely, got the coffee, and sat down on the tables nearby to eat and drink. As I did that, Bob was engaging with other people. Folks were stopping and talking to Bob, who was extremely nice and friendly to everyone who stopped to chat. There were old ladies who were going, "Bob! Is it true? Oh, I'm going to miss you." There were younger people in surprise like, "Wow, are you *the* Bob?" There were people

**Give us a bigger office,
and the rag lives.**

**A POSTER ON THE WALL IN
THE mathNEWS OFFICE THAT I
DON'T KNOW THE ORIGIN OF**

just sitting and munching on the free food. Standing and watching, it seemed clear to me that Bob was more than just a brand. Bob was an upstanding, well-liked community figure, and his retirement was not just a photo-op for Loblaw's, but an occasion for Waterloo as a whole.

You may consider Independent: Your Independent Grocer to be just another Loblaw's in a sea of Loblaw's, but I think the touch that Bob, as a person, brought to the store gave it a certain charm that made it different from the rest. If you look at the footnotes, people on the Reddit link remember fondly how working at Bob's was their first union job, how Bob took strong stances against anti-maskers, how Bob worked the till on the front line and how all of his employees were so pleasant to work with. That's not corporate policy, that's a local guy running a local store for his local community. In all the ways that Loblaw's cares about—pricing, store selection, deals—it probably *is* just another Loblaw's. But in ways that exhibit care and concern, ways that matter to the community, this really was our independent grocer.

After I was done with my food, I walked up to Bob, thanked him again, and told him the coffee was great and could he tell me what it was. He proudly pulled out a box of President's Choice The Great Canadian Light To Medium Roast Fine Grind Coffee.

So true, Bob. So true.

tendstofortytwo

1. https://www.reddit.com/r/waterloo/comments/lid42e/september_2002_bobs_valumart_is_born/
2. <https://www.facebook.com/BobsYiq/posts/pfbid07XWTaHth-bdXsff9JyZyo6tdGeKXPtkxsxGbgFMGyFogiJDatEgQEjS726khtG-JQd1>

THE BATTLE ROYALE FOR BATTLE ROYALES 2

ELECTRIC BOOGALOO

Welcome back to another hit episode of Battle Royale Reviews! In our last episode, we covered three free BR games, and in this one, we'll cover some more! Surely they are of higher quality now!

CRAB GAME

Crab Game is a surprisingly popular game with over 150,000 reviews, and many popular streamers have streamed it! It's got a charm in its unfiltered voice chat lobbies screaming slurs at everyone nearby. The gameplay tosses the lobby into a series of minigames, with the victors getting to move on to the next round until there is one winner remaining. It's (unsurprisingly) similar to Squid Game, with several minigames being directly taken from the show.

It also looks like it was made in an hour. We got a victory royale in less than that. The unfiltered voice chat and minigames have their appeal, but since the others didn't really like it that much we left shortly after the W, our ears finally devoid of racial slurs.

Verdict: Hopped on the wrong bus where slurs seemed to be the currency to pay the bus driver, but, like, the seats were okay at least.

SUPER MECHA CHAMPIONS

Mechas are fundamentally cool; it is a universal law. This game is no different: the mechas are very cool. Unfortunately, almost all of the remaining game was utter garbage.

The game looks quite nice and, to be honest, the lobby for this game ranks highly for game lobbies in my opinion. You can invite friends to hang out mid-search, and it's visually appealing as you walk around and look at the high rise apartment. I think there were minigames too, but we found a game pretty quickly.

You get to summon a mech of your choice in game, and the mechs are pretty cool. It's kinda like Titanfall 2, as each mech has their own play style and they can differ vastly. Unfortunately, despite the visually impressive lobby and mechs, the game itself is visually unappealing. There's other flaws too—the controls felt a bit off, and there were a lot more things I couldn't be bothered to reinstall the game to go check for.

And, of course, the worst part is the monetization. There is *so* much monetization. I believe there's a reward for spending around \$14,000 if I'm remembering correctly? You have to unlock mechs, and tons of other stuff that I can't be bothered to recall. And the UI is also incredibly horrible—the screen is cluttered, and I'm fairly certain this is probably a mobile game port based on the main menu and in game UI/monetization. One which takes up 10 GB of your data.

Honestly, the mechas are the only good thing this game has, so if you're a huge Gundam fan maybe you can look past the flaws?

Verdict: You get on a really cool looking battle bus only to realize you're back in *Bombergrounds: Reborn* somehow.

Unfortunately, due to time constraints, I'm only able to cover two BRs this week, so tune in next time for more BRs to torture your friends with!

PlatypusGod

math NEWS

LINUX

IT JUST WORKS

Last issue, esteemed CS graduate student and constants enjoyer water wrote *Linux*, a polemic centred around how that eponymous operating system is undeserving of the high stature afforded to it by its inclusion in almost everything at this university, and how it's okay to criticize and lampoon and hate on Linux, for it's not that good actually.

Like water, I am also a CS grad student in possession of a university-issued laptop. Unlike water, my laptop runs Windows, and I don't have a choice. Yet despite all of the claimed benefits of Windows and the alleged drawbacks of Linux, I still find myself desperately pining for the latter.

I can already hear the protests emanating from water's mouth. "*But emails! But middle-click paste! But actually properly supported graphics drivers that don't cause a kernel panic every five seconds! Surely a fellow grad student must also value a platform that Just Works!*" I sympathize; these are all, indeed, very serious setbacks to The Year Of Linux On The Desktop.¹ And yet, hear me out: I'm not looking for an operating system that lets me do everything a grad student needs to do. I just want something that lets me write software without getting in my way.

And Linux is the only operating system I've found that, for lack of better wording, Just Works.

Let's talk about developing on Windows. For the purposes of this discussion, I will focus on writing in C++ and compiling with MSVC.² Here's how my workflow would look like on Linux:

1. Run CMake.
2. Run `make -j6`.
3. Profit.

Now compare that with what I need to do on Windows.

1. Run CMake.
2. Find and open the generated `sln` file in Visual Studio.
3. Find my target in the solution explorer, right-click to pull up the context menu and press "Build".
4. Watch MSVC fail and spit out error messages that you can't skim quickly because the Microsoft compiler team hasn't discovered the concept of colours yet.
5. Decipher that MSVC is running out of memory, and take heed of its suggestion that it's due to a bunch of syntax errors.
6. Realize that the purported syntax errors are not in your code, but lie in a dependency that definitely should compile with MSVC, because prebuilt Windows binaries exist.
7. Decide MSVC is gaslighting you about syntax errors, and Google the error code — to no avail.
8. Go to sleep.

9. Wake up the next morning and finally figure out that MSVC simply can't handle more than two instances of itself, despite there being 20-something gigs of free RAM.
10. Spend 5 minutes navigating through the Visual Studio settings to find the MSVC settings and lower the concurrent build limit, because for some reason the compiler settings are nested deep within the IDE settings (who thought this was a good idea???!).
11. Rerun the build.
12. Profit.

Yes, I know that `-j6` can make my computer hang for minutes if there isn't enough free memory. But dammit, *let my computer hang instead of throwing a completely unrelated error message*. I'll figure it out eventually. And what's with the complete reliance on an IDE just to build my code? This is a library I'm trying to compile, not an application — *please* just let me use the command prompt! I swear, if I have to watch Visual Studio crash on the splash screen one more time I'm going to burn down Redmond to the ground.

Speaking of crashes, I've found Linux to be much more stable and hardware-agnostic than Windows. Sure, getting *anything* NVIDIA to play well with Linux is a chore — don't get me started on how painful installing CUDA is — but once the setup's done, everything Just Works. Meanwhile, Windows wants to reboot at least once a day. I don't know if it's some asinine IT policy I'm facing or if it's Ye Olde Microsoft Instability,³ but having to restart Jupyter and rerun all of your notebooks every time you open your laptop gets old real fast.

Besides, we haven't even begun our coverage of the myriad ways that Windows manages to make life miserable. Have you ever tried to delete or overwrite a file in Windows? That's right, you can't, because some process got a lock on it and Windows isn't smart enough to tell you who the culprit is. Oh, what's that? The kernel itself owns the lock and won't give it up? Tough luck, guess you'll have to reboot your entire computer. And I heard the file in question is part of your notebook pipeline? Sounds like you're gonna have to start `aaalllllllll` over. Sorry, you said Linux doesn't have any of those problems? That's too bad, I'm sure you'll find something to love about our filesystem that we designed in the 1800s and *still can't handle paths longer than 260 characters*. Why go for "It Just Works" when you can settle for less?

Now, I will admit that Windows is great for all the other aspects of being a grad student — reports, assignments, emails, Slack, Zoom, et cetera. And in that context of being a general-purpose operating system, it is true: Linux is not that good actually. In fact, it's downright horrible to live with. But to quote water, "This machine is a tool, not my wife." Enter the world of programming, and the tables turn drastically. Windows might make a good enough wife, and working with the Linux desktop might feel like being in an abusive relationship, but at the end of the day, when it comes to reliably

writing and compiling my code, there's only one operating system that can make the following claim:

It Just Works.

1. I feel obliged to clarify that middle-click paste is less an issue with Linux the operating system, and more a horrible UI/UX decision that has somehow persisted into every single Linux desktop environment in existence.
2. I can hear people screaming: *Use MinGW! Use WSL!* No, I cannot. You cannot compile CUDA with MinGW and I do not have permissions to install WSL. Also, that would defeat the entire purpose of this rant.
3. I could write a whole other article on the Dell XPS line being horrible time and money sinks, but that's for another day.

N OF MY MULTI-OPTION PREFERENCES

WITHOUT THE CONTEXT TO GO ALONG WITH THEM

1. *Bangel*
2. *Grapefruit*
3. *Chocolate*
4. *Ninth AND Tenth*
5. *Leafcrow*
6. *Glorybringer*
7. *Fighter AND Warlock*
8. *Java*
9. *Chopsticks*
10. *Alexis*
11. *Xayah*
12. *Night*
13. *Dragons*
14. *Georgia*
15. *Current*
16. *TAB*
17. *Italics*
18. *Cubic Zirconia*
19. *Proton*
20. *Salmon*

Sexy_Software_Babe

N THINGS I DID DURING READING WEEK

1. sleep

relatively sane

N MORE HAIKUS

PIZZA

oil

I write for **mathNEWS**
since I like to eat pizza
exclamation mark

EDUROAM

Wifi is broken
Why do I pay tuition
Fix the wifi please

WHY DO I WRITE HAIKUS?

I write bad Haikus
Idk what else to do
I can also rhyme

POET

I'm a poet and
I didn't even know it
however I did

MC

MC is ugly
that is my observation
can't we all agree

[Editor's note: No No No No No / No No No No No No No / No No No No No]

DUMB

You may think these poems are dumb, however you're the one reading them

[insert pen name here]

WHAT IS mathNEWS?

AND WHY I SUCK AT WRITING ARTICLES FOR IT

I do not know who **mathNEWS** is. I do not know what her inner being is.

I do not know who her readers ate. I do not want to join their inner being.

I am scared.

be'f unwellington

INSOMNIA

DECEMBER 19TH, 2023.

I can't sleep. The Russian roulette my neurotransmitters play every night ended in the purging of melatonin from my body, and there I lie, the night before my last exam. My thoughts run amok, as they usually do, much more of a curse than a blessing. I wonder if this is worth it for the possibility of a couple hours of shut-eye, or whether I should go ahead and do more practice problems. Instead, I do something different. Arising from my failed slumber, I don my coat and venture into the great outdoors at King and Columbia. It's a brutal night, at two in the morning. The wind so strong, I can feel it pierce my skull; I see some shorter in stature struggling to even stay standing. Evenly spaced lines of snow from the plows carve my path on the sidewalk to what looks like eternity, and so I follow, until they end. I reach Weber, and then consider going even farther. I've done it before. How far would I get? St. Jacobs? Elmira? Elora? One more step, and I'd be off to the races. But I see someone unsavoury looking ahead and turn back. That's all for the night.

FEBRUARY 17TH, 2024.

I'm in MC on a sunny Saturday, reading the latest **mathNEWS** on the couch adjacent to C&D, still trying to figure out what the hell a greedoid is. There, my mind wanders off again, alpha waves taking ahold of beta. The war in my head I've been fighting for the last month continues. First, the contraction, the big crunch. Time compresses, and I see death imminent; I'm right at its doorstep. For the four hundredth time, I ask myself what I'll experience afterwards. Whether I should be terrified of it. The feeling of dread takes hold. Even the smartest amongst us can't handle it. They comfort themselves, and they lie to themselves, just so their brains can keep working for another few decades, despite the inevitable result. How should I stand a chance? Our lives are a rounding error—no, they're nothing. Anything divided by infinity is nothing. We learn this in MATH 137. I look at the article in front of me. It feels like plastic; everything feels like plastic. The words here are flailings from beings doomed to be forgotten, doomed to be erased through and through, like it never happened. What about Asimov's last question? Can entropy be reversed? This fate is worse—to be doomed to repeat. Poincaré's nightmare. An eternity of these flailings; Sisyphus' rock. Yet nothingness seems just as terrifying. Why can't I just stay right here, outside C&D, forever? Why should that be a logical impossibility? I'm happy here. I could just continue being happy—picking up the weekly **mathNEWS**, talking to people I know, reading about greedoids and rings and compiler optimization and psychology, loving, hating, suffering and the release of suffering, long walks in the night. But I must die, and my death is effectively now. What is this but the most unnecessary cruelty imaginable?

Then, the big bang. Time expands. The plastic sheen melts off everything. I'm right here now, that's what matters. And without a moment's notice, I go from thinking of unimaginable horrors to the movie night this weekend and my possibly

could be future girlfriend (look, she said *MAYBE*, ok? It's not weird.) and regretting I didn't go write something at the last **mathNEWS**. Ten minutes ago me died, just as I feared it would.

JANUARY 1ST, 2024. TORONTO.

My annual walk, from the outskirts of the city to the lake. A good time to ponder things. Man, I love just thinking. Time and space float past me as I walk. Yonge and Sheppard. Leaside. Here's the bridge at Thorncliffe park. I stop at a Pakistani restaurant, the spice purging my body before I make the last leg of the journey. The sky grows darker. Here I am, at the terminus of Leslie, outside Tommy Thompson Park. I could go even farther. I've done it before. But my father calls. I need to be back in an hour.

I do it anyway. I need to reach the lighthouse. I venture through the park, the sun setting as I go, people dwindling. I cross a slippery bridge. A straight road ahead—the final stretch—it goes on forever, just barely lit by the distant city. It's the eternity I've seen in my dreams. It's beautiful. And then there I am; the Gibraltar point lighthouse, pulsing with an occasional red light, towards the open lake. I have no time to think about it. I'm late—oh god, *WAY* too late. I just travelled ten kilometers out of the way. I timidly explain the delay to my father and run, keep running, all the way back, through the pitch black, dreamlike roads.

MAY 11TH, 2654.

I made it further than I ever thought I would. My silicon-interlaced brain is still running, all these years later. I wish my family and friends could have made it. I get it. Experimental technology. Musk had his fingers in it too. It was the only way to keep going, to go further, so I did it anyway. We've overcome the limits of humanity. Live to die, another day.

But tomorrow, I die. It's over. I at least got to do it where I wanted it—outdoors, in nature. I have one more night. Tonight. I can't sleep. I could just force my mind to, but I don't really want to do that, for the sake of old times. I ponder what's next. Probably just nothing. I got over the idea a while ago, to be honest. The fear of all these things is just controlled by your chemicals. But I do wonder if I'll get another shot. Asimov's last question. Things could have gone better. Does it matter? I won't know. Will it even be me? I won't know. I don't really *want* to go further. Maybe that's cope. But I've far outlived my biological purpose. Running away from the horrors of eternity and non existence was a mission orchestrated by my monkey brain, to no meaningful end, and now it's atrophied out. The only thing it has left for me is a bit of love. The stars in the Martian skyline twinkle, and highlight evenly spaced lines in the sand ahead. I sigh. I'm ready. I close my eyes and instruct my brain to begin the slumber. I'm more relaxed than I ever was, for existence is the insomnia of the universe. That's all for the night.

A TALE OF TWO WATERLOO UNIVERSITY PUB SPACES

THE BOMBSHELTER PUB

In the dark halls of SLC, in the dark winter nights, there is a small pub. You might not see it at first, with it off to the side and once sectioned off to a seeming eternity of foreclosure, but as of late the area has reopened, with its dimmed-down lights, lowly barchairs and kitchens.

Its a desolate place—at least, at these hours of night—when all the students with better things to do have gone home, preparing to kill or be killed during midterm season. Only a few loners hang out here now, studying with their laptop silhouetted by the dim lights. And even those people don't stay long—for even the most zealous night owl nests not in an run-down abandoned pub on university grounds.

There has been a migration to this lonely pub, by the lone nomads of **mathNEWS**. A new home they've found in this shelter, out of the grand halls of Mathematics 3, flanked by myraid unoccupied chairs; now they've moved into the slightly smaller pub, flanked yet still by more unsat chairs. For a month and a reading week now they've been here, brooding, serving justice against face scanning M&M vending machines, scrawling fervorous and unfiltered thoughts, and operating the presses like they're the lost kin of Gutenberg.

There is currently, as of 7:06pm on Feb 26, 2024, no WiFi in the Bombshelter Pub.

WILF'S

In the halls of the Wilfrid Laurier University, in the dark winter nights, there is a pub. You would at most always pass by it, right next to the sacred hawk on the floor that one must never step on. The place always has energy, as of late with dim lights, bartenders and kitchen staff.

It's a hearty place—almost akin ro a campfire, the people of Laurier get takeout of the best pastas and spinach dips, hang out outside to celebrate life and all its worth living for, balancing what work they do have with some #shenanigans. And even they too also can take the time to boo at anyone who dares tread on their Hawk, and cheer on as they bless the floor with passionate kisses.

There need not be a migration to this lonely pub, for the people of Laurier keep it company. This has always been their home, almost as synonymous as WLU itself; perhaps save for the Lazaridis building but a road-crossing away. For weeks through reading week Wilf's has seen (presumably heavy) activity, and within its walls there is joy.

There is currently, as of 7:15pm on Feb 26, 2024, WiFi in Wilf's. [citation needed]

It was the best of times, it was the worst of times; what can one conclude but a Waterloo L and a Laurier W?

andoiii

NEWS FROM WATERLOO RUNS ON A FIVE-YEAR CYCLE

...PROBABLY

In my first year, I remember when UW made the rounds in international media because it was announced that Donna Strickland was awarded the Nobel Prize in Physics. Now, five school years later, we've made the rounds again via that blasted M&M machine.

Sure, some would say that recognition of academic research and work over multiple decades is nowhere near the same significance as finding out that a vending machine secretly had a camera with facial recognition software, but it's comparing apples with oranges at this point.

At the very least, this put **mathNEWS**, sometimes with various incorrect capitalization, in articles in all sorts of notable newspapers worldwide, and that's what truly matters, right?

Can't wait to see what happens in school year 2028–29, assuming the five-year thing happens. **mathNEWS** should hopefully have a Wikipedia article by then at the very least that doesn't end up getting deleted.

boldblazer

THIS IS A CRY FOR HELP

the sexy booted m&ms are watching oh god what hath you wrought

firstie



RANDOM WOK

YOU CAN BE GREAT AT MAKING CONVERSATION, TRUST :D

Last week, I read an article written by nazz who was lamenting about their inability to sustain small talk with strangers on a co-op term. As someone who's basically trained themselves to (hopefully successfully!) talk to people, I think it boils down to this: if you have any sort of vague interest in the other person, you will literally be golden.

Why? Well, I believe that people inherently like talking about themselves.

As much as we hate interviews that grill you on behavioral experiences and *tell me about yourself!!!*, a lot of people enjoy sharing stories or telling you about their interests! As long as I ask a stranger a good question about a certain topic, I'm confident I can make them go on and on about some hobby they have. I got to know one of my friends by asking them about a niche video game that they were ranked super high in. Man talked about the game (to someone they have maybe spoken 5 sentences to before this!) for a solid 2 hours!! IT WAS GREAT! How did it start? By talking about games in general, leading to Old Minecraft YouTubers → TFT → Chess → SPEEDRUNNING AND NICHE GAME INTEREST!

If you were to really break it down, it was really just me asking a question, them answering, bantering/relating past experiences to the topic, and then one of us connecting it to another topic, me asking another question or sharing something that I had that somewhat connected to the topic. In this case, it was me dragging in something about YouTube, sharing my Water Later playlist, us talking about Youtubers we enjoyed and used to watch, one of us bringing up the topic of Minecraft YouTubers, me asking about what other games they've played, etc. It's just a massive game of connect-the-dots, creating connections between topics and just leapfrogging from one to the other. It's also asking questions about their thoughts and having genuine interest in their responses, asking follow-up questions—showing that their responses actually have an “impact”.

This is under the assumption that you can connect topics together. I don't actually know how I do it—I've been apparently blessed with this ability my whole life. However, I think the biggest part of it is just shoehorning my experiences to whatever the topic is. Or, just dragging the topic of conversation to something I'm more familiar with so I have more to contribute—e.g. shifting from Smash (I have no idea how to play Smash) → Wii Fit Trainer → Wii Sports, or Smash → “Yea dude, I played Smash once and I SUCKED at it” and moving to “I don't really play games a lot but my friends are addicted to League. I'm so happy you're not a League player, right?? RIGHT??” or moving to “I don't really play games, I spend copious amounts of time on YouTube though...”, or, if I genuinely have no idea what to add, I just say something like “Tell me more about it” or “Top Five X, GO!” because I wanna learn more and keep the conversation going AND THEY TALK MORE! BOOM! CONVERSATION!

This is also under the assumption you care to learn about a topic that you may have very little interest in. After all, a big part of this strategy is either relating it back to yourself, or asking questions about things you may not know much about. I have been granted the ability to just be able to listen and care about things that I have heard nothing about. A random YouTube video essay about a movie I've never heard of? SIGN ME UP! If you do not share this interest, I unfortunately can not help. However, I think it's a good skill to be able to take interest in random things and enjoy listening to other people. I don't know how it started, but I'd encourage you to try it. It's genuinely so fascinating to understand other people and listen to their perspectives and their passions, and it really teaches you a lot. Most of the things I learn are from my friends teaching them to me, because I asked them to tell me more about a topic I knew nothing of.

This is also easier with some people instead of others. I believe that everybody is interesting (my definition of interesting is another topic, but being interesting has a strong correlation with the chance that I will enjoy having a conversation with you), but some people are more interesting than others. I've been lucky enough to find some really cool people where this strategy works, but it can be miserable for others. For example, if the other person doesn't say much, the conversation is kinda doomed because I have. Nothing. To work with (and I inherently have very little to say). However, I've been trying to work on this by getting better at spotting what people are interested in and pushing the conversation in that direction, so they DO have something to talk about. Once again, it goes back to the belief that people *do* like talking, you just gotta find what they like talking about, and once you find that, they become ten times more interesting!

I'm running out of words. I was gonna talk about my opinion on free will thing (and phil! I'm taking PHIL 246 and it's kinda a drag, which is a real shame!). But, I'll end by giving some other questions that I'll be interrogating/have interrogated my friends about:

1. How quickly could you finish a rotisserie chicken in one sitting?
2. Do you think you'd be a compatible couple with your closest friend?

Ice

OLIVE PIZZA

OLIVE PIZZA

olive pizza

olive pizza

HOLOCURE REVIEW

THE BEST SURVIVORS-LIKE GAME

SYNOPSIS

Holocure is a free fan made Hololive game by Kay Yu that is heavily inspired by Vampire Survivors and Magic Survival. In addition to the Survivors-like gameplay, there is also various mini games built within, such as a house designer and a rhythm game.

REVIEW

I will first preface this review by saying that it should be absolutely illegal to receive this game for free with zero micro transactions. I can confidently say that this is one of, if not the, best Survivors-like games in the market. And this is not due to the fact that I am a Hololive fan. Putting that aside, this is an objectively good game.

Now, I have been singing praises for this game, but what's so good about it? For one, there is so much more variety. There are currently 38 playable characters, with more in development. Since the characters are based on Hololive idols, so as long as Hololive keeps pumping out new talents, Kay Yu will never run out of characters to add to the game. Not only that, although other Survivors-like games like Vampire Survivors have over 70 characters, each character uses a weapon that is obtainable anywhere, and each character has a special passive ability, for example extra projectiles, bigger attack radius, etc. On the other hand, in Holocure, each character has their own specific weapon and passive skills that you can acquire and develop along with a special ability. Not only that, there are also extra weapons that a character can acquire in addition to their main weapon. This adds so much variety and replayability to the game, as you can constantly replay the same levels with different characters, and it adds a new experience each time as you have to learn how to synchronise the various equipment you acquire with the weapon and skills that your character has.

There are also a multitude of different enemy types and attacks. Instead of just swarming you, enemies actually have varied attacks, like enemies that will shoot projectiles, jumping on top of an area, and also charging towards you incredibly quickly. The different types of enemies give the game more of a challenge, as it isn't simply a matter of, "Can you outrun the enemy?"

One minor critique that many people might not like is the way you acquire characters. Instead of outright buying a character, you have to pull characters from a gacha, or a lottery system. Thankfully, there are no micro transactions and every character is easy to acquire, as you eventually accumulate tons of the in-game currency, coins, through the main game and various minigames. Each banner, or pool of characters, has no more than 6 characters, which means there's at least an 18% chance to get a character you desire. The dupe system is amazing as well. After you pull a duplicate of a character, it buffs a character a small amount, and this stacks 20 times.

In addition, every dupe of a character gives you "tears", and 7 tears will allow you to buy a new character. This may seem annoying, but after every game you will acquire somewhere between 5 to 10 pulls, which means you can get characters pretty frequently.

Moving onto the gameplay, I feel like it's easier to control characters in this game than in other Survivors-like games. For one, you can aim your main weapon wherever you want with your cursor and the other weapons either fire in a set path or randomly hit targets. The fact that you can move in any direction and have your weapon fire in another direction is a godsend. It makes kiting enemies so much easier and it makes the controls much more intuitive.

The last thing I want to mention is the minigames. There is an area called the "Holo House" where you play various minigames that allows you to spend coins decorating your house or generate coins to pull for more characters and get more upgrades. The main way you can farm coins in the Holo House is through managing fans and fishing. In regards to managing fans, you can recruit NPCs that will automatically generate coins as time goes by. Each NPC has varying stamina and efficiency, which determines how long and how fast they can generate coins. As you level up your NPCs by feeding them various fish and plants, you can level them up, which also boosts your management rank, which means you can hire better NPCs. The next minigame, which is arguably my favorite, is fishing. The fishing minigame is a rhythm game, and as you catch more fish in a row, the minigame gets faster, but you can also catch more fish in one go. Not only that, you can upgrade your fishing rod to get better fish. Lastly, this isn't a mini-game, but in the Holo House, you are also able to buff your character by cooking various foods. These minigames are addicting, since they give you a fast sense of progression while not being overly tedious. The game doesn't make you do these tasks. It's more of an additional thing to do if you get bored or tired of the main game.

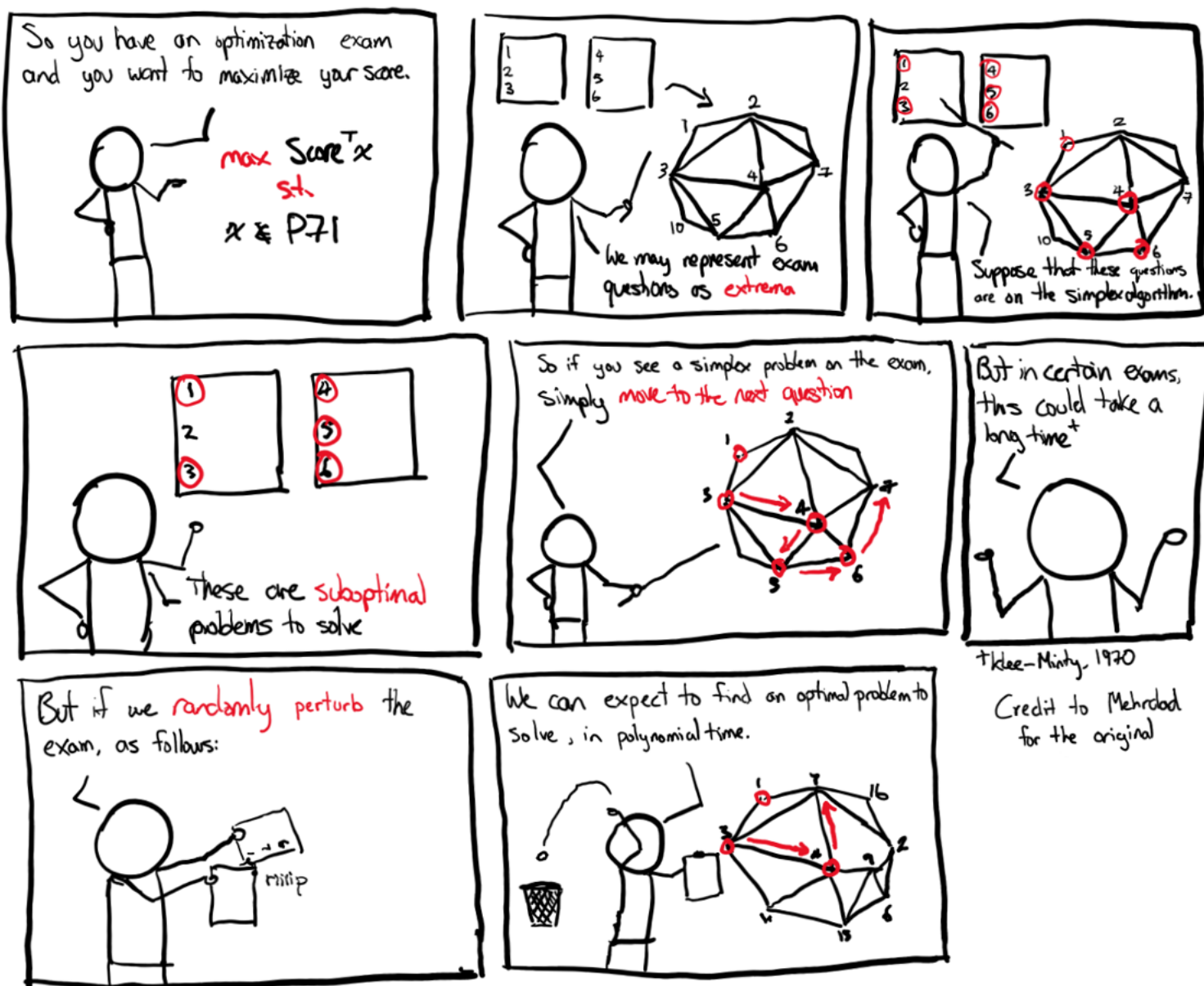
In conclusion, Holocure is an absolutely amazing game due to its wide variety of characters, enemies, and minigames. And the best part is that it is absolutely free. One major downside, which is the reason I docked a point, is that this game is only on Windows. I was able to get it to work on Mac through Wine, but it was a pain. Regardless, I highly recommend this game to any fans of the Survivors-like genre or anyone looking to get into this genre.

VERDICT

9.5/10.

Fried Rice

THE SIMPLEX ALGORITHM



Verisimilitude

N NIGHTMARES

- missing a final exam because i slept through my alarm
- falling off ridiculously tall monkey bars on a kids' playground
- being drowned in a lake by a past classmate
- dying a subway surfers-esque death (smashed by two trains) while chasing my parents' killers
- being choked to death by my hypnotized father
- fighting a tiger with a knife after he tries to attack my mother by a river
- being tormented by a gigantic octopus in the middle of the sea while it kills all of the crew on my ship

leah

wordGRID

Not to be confused with **gridWORD**, which can be found at this back of this issue. **wordGRID** is entirely unrelated, and any similarities in shape, size, and clue content are purely coincidental.

I also can't offer any official prizes for solving it, but if you want to share your solution and/or provide feedback (there's a nonzero probability that I might create **gridWORDS** in the future), feel free to contact me at hhkenned@uwaterloo.ca.

yalevoynian

ACROSS

1. Indonesian soybean staple
7. File transfer command on Linux
10. Movement button on a Nintendo DS
14. Urea derivative
15. Like some beef or video games
16. State noted for its political caucuses
17. _____ closed: Abstract algebra adjective
19. Yeager of Attack on Titan
20. Stan of Marvel Comics fame
21. Center of the circulatory system
22. Director's shout
23. 2014 entry in the Elders Scrolls series, for short
24. Organizational body of the GOP
25. A better place to find a lover than the club
27. "How about yourself", as a text
30. Character arrays in programming, briefly
32. Palindromic name of Hebrew origin
34. Type
35. Declare
38. Q: 2003 Musical parodying Sesame Street
40. Thrown out the window
43. Sacred utterance in Hinduism or Buddhism
44. Red sauce alternative
45. Ltd. alternative
46. Former basketball player and media personality Shaquille
48. Excellent, as a Brit might say it
52. Word often followed by a skull emoji or "I'd win"*
53. Lobster fisher's tool
54. "Summer Girls" Band
57. Ear, in Netherlands
58. Much ___ about Nothing: Shakespeare play
60. Swiper the Fox's lament
62. Collective hallucination (abbr.)
63. A clock might have 3 of them
65. Subsistence
67. Preposition used alongside "slide" and "DMs"
68. In the manner of
69. Made acrimonious
70. Cause of gravitation according to Newton
71. Shoulder and chest muscle, slangily
72. Animus

DOWN

1. Tiles, en Français
2. Khalimov whose face is pictured in the gigachad meme
3. Shooting star
4. Like quiche or tourtière
5. Impressionist artist Degas
6. The Boy and the _____. 2023 fantasy film by Hayao Miyazaki
7. A bad thing to put in a wound
8. _____-Yau manifolds of string theory
9. Compensation
10. God, also en Français
11. Luxury export of Portugal

12. Amazement
13. One of the 12 tribes of Israel
18. Esoteric
22. Modern necktie's predecessor
26. Largest ethnic demographic in the Russian republic of Dagestan
28. "Who invited my man ____"*
29. Seme's counterpart in Yaoi
31. Pillowy
33. Italian scooter brand founded in 1946
36. 2007 single by Mexican duo Sin Bandera
37. Full of sound and fury, signifying nothing
39. The largest boarding school in England
40. Jurist Porter after whom a UW library is named
41. Uses lapis lazuli around a bookshelf in Minecraft
42. "Spill the tea"

43. ___ max
47. Wavy 6-point star in heraldry
49. Japanese prefecture whose name means Blue Forest
50. One with inelegant verses, say
51. Hit the _____*
55. Inaccurate
56. Culinary allium
59. Flood with server requests, maliciously
61. Home temperature regulation system
63. Not her
64. Political commentator and journalist Kasparian
65. 1 of 3 in Mario Kart
66. Sing to oneself

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HELLO (FEAT. SPAGHETTIINHALERS)

gridCOMMENT 154.4

hello again to the gamers,

welcome back to this issues **gridWORD**, this time co-authored by the great spaghettiinhalers who is happy to **greet** you all!!! :0000

last time i asked you: “who is your favourite musical artist?” and you all said:

- aphf & Lars Nootbaar: *The music Travis Kelce makes on the Field*
- MJ: *MCDC*
- FRED: *IU, Drake, Taylor Alison Swizzle, DJ Khaled*
- nike: *the night flight orchestra*
- Coda & Opal: *Green Day and Neru*
- **gridWORD** enjoyer & Asmodeus & Anon: *Too hard to choose, Halsey, pat the bunny*
- jeff & UW Unprint & MzO4 & water: *cornye west, lemon demon, lemon demon, IU*
- denko: *fall out boy*
- `__init__`: *my dad <3*

it’s crazy to see so many people working together on the **gridWORDS** :o it’s very nice to see!! to `__init__`, that is very

sweet and i’m sure your dad is an excellent musician ;0 please pick up your prize to perhaps share with him at the **mathNEWS** office, MC 3030.

as i mentioned, this **gridWORD** was co-authored by the longtime **gridWORD**er spaghettiinhalers!! they said:

- spaghettiinhalers: :3

once my term ends as **gridMASTER**, i will be handing off the torch (literally) at the final production night on march 25th to them to carry on the spirit of **gridWORDS** for centuries to come...

this time, we ask you all, “who let the dogs out? (bark bark bark woof woof bark)” please send **gridQUESTION** answer, along with **gridWORD** solution and pseudonym to mathnews@gmail.com by monday, march 11th at 6pm!!! :0000

see you all next time :p

Wink wonk

ACROSS

1. Like some earrings
6. Lab product in “Breaking Bad”
10. Fresh
14. Not fulfilled
15. Parrot
16. Approaching
17. Kind of pad
18. Scratch
19. Biblical pronoun
20. Hello in Tokyo*
22. Like pie?
23. Bloke
24. Assembly-line workers
26. Pudding fruit
30. ___ and outs
31. Turn pink, perhaps
32. French novelist Pierre
33. Property claim
35. ___ Presley
39. Army copters
41. Immunologist Paul
43. India’s first P.M.
44. Grimace
46. Iris holder
47. Hello in Rio*
49. Modern address
50. Pulp
51. Chatterbox
54. South American balsam
56. Against
57. F = ma
63. Handel opera
64. Smoothie bowl ingredient
65. Sponge
66. Oversupply
67. Bronze age arm band

68. Hello in Honolulu*
69. ___ good example
70. Wraps up
71. Group of 9

DOWN

1. Coat for corn
2. “I’m ___ you!”
3. Harbinger
4. Taylor Swift’s birthplace, abbr.
5. Impassive
6. Piece of machinery
7. Overshadow
8. Take out of the freezer
9. Wolowitz from TBBT
10. Pre-Civil War
11. Hello in Beijing*
12. Cast out
13. Cheese byproducts
21. Long South American country
25. ___ and terminer
26. Scheme

27. Bound
28. Great Salt Lake state
29. Tiny flora and fauna of a region
34. They tend to feel negative emotions
36. ___ la vida
37. Frosts, as a cake
38. Bygone royal
40. Hawaii dance
42. Hello in English*
45. External
48. Paternal relative
51. Bands of bad guys
52. Bless with oil
53. Swagger
55. Emasculate
58. Finance bro’s course
59. Aria, e.g.
60. One dollar figurehead
61. Pain
62. Huh?

They have such weird names.
Firstie? Molasses? Lars Nootbaar?

RANDOM TWITTER USER, UPON READING
mathNEWS FOR THE FIRST TIME

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Drop your gridWORD solutions off at MC 3030. And yes, we do award points for creativity.

LOOKAHEAD

SUN MAR 3

MON MAR 4

TUE MAR 5

WED MAR 6

THU MAR 7

FRI MAR 8

SAT MAR 9

National Mid-Page
blackBOX Mourning Day

International Women's
Day

SUN MAR 10

MON MAR 11

TUE MAR 12

WED MAR 13

THU MAR 14

FRI MAR 15

SAT MAR 16

Daylight saving time
begins (spring forward)

mathNEWS 154.5
Production Night

MEF director applications
due

Pi Day 🥧

mathNEWS 154.5
dispensed
Ides of March 😊

St. Patrick's Eve

Ramadan begins

UW AFSA TAX CLINIC 2024

Tax season is here and AFSA is back with its FREE Tax Clinic 2024! A group of trained volunteers will provide free tax return services for low-income individuals and families. To see if you qualify for our FREE services, please visit <https://www.uwafsa.ca/taxclinic> today! The link also includes information on how to receive our tax-filing service.

UW AFSA

THEY TOLD ME TO
INTEGRATE MYSELF!

$$\int \frac{x}{\sin(x^2)} dx$$

Tax Clinic
Free Income Tax Returns

Date: _____ March 23, 24, 30, 31
Time: _____ 10AM - 8PM
Location: — See Website For Location

Some Conditions Apply
Visit [uwafsa.ca/taxclinic](https://www.uwafsa.ca/taxclinic) for details and changes

LAST ISSUE'S gridSOLUTION

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