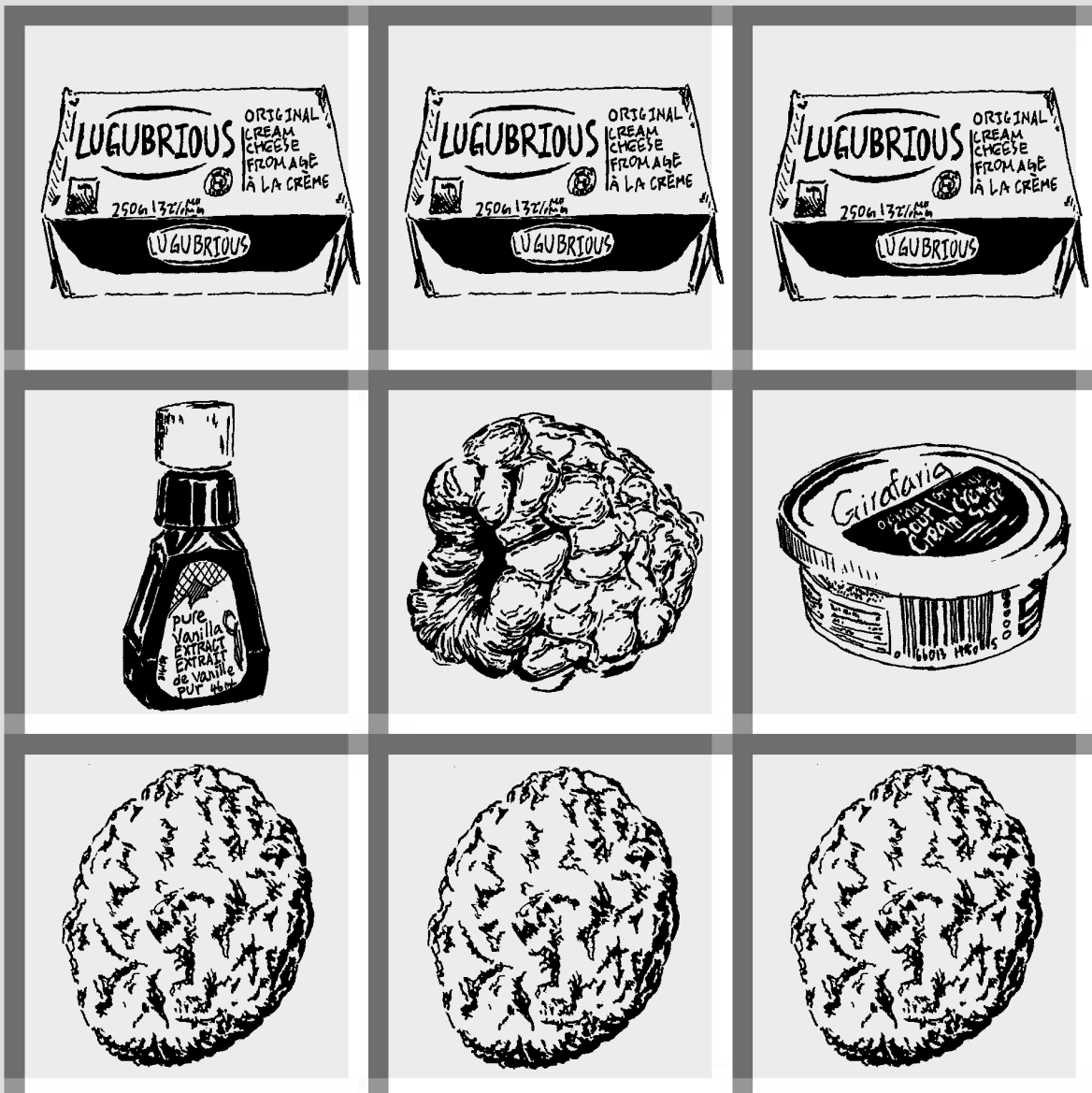


Crafting



“WHAT WILL YOU DO WITH THE EXTRA HOUR FROM TURNING BACK YOUR CLOCK THIS WEEKEND?”

If you weren't aware of the end of Daylight Savings this weekend, well, now you are. So get ready to turn back your clocks—by which I mean your oven and microwave clock and maybe your watch if you still own the kind with hands and a dial.

Some people mix up whether we're supposed to turn our clocks back or forward in November. Not me. Every time this time of year comes around, I think back to a salient memory from my childhood—I had a precise bedtime imposed on me by my parents, a bedtime that was not always enforced without some pleading and bitter complaining from me. This one November Saturday, as bedtime neared, I was in the middle of a particularly engrossing part of a book I was reading. My parents told me to get to bed, but I couldn't. I was in no shape to put the book down, teetering on the edge of a cliffhanger. You know how it is—*just one more chapter, just one more chapter!* In my desperation, I remembered that the day after would be the end of Daylight Savings—so I argued to my parents that, since the clock would be turning back an hour, I should be allowed to stay up another hour. They grumbled about it, but my convincing worked nevertheless, and I spent the extra time finishing up what I had left in my book.

It's not a very consequential or eventful memory, but it's a nice one—I can still remember that feeling of joy of having gotten away with something, of jumping back into whatever enthralling thing I was reading. It's a useful memory too, since it helps me remember that we're supposed to turn the clocks back in November and forward in March.

I wonder how other people remember which direction the clocks are supposed to go. Do you remember that one saying that goes: “clocks *spring* forward” in spring and “*fall* back” in fall? Do you just remember it without knowing how you came to remember it? Or do you look it up on Google twice a year?

Whatever works for you, works for you. If you're stuck wondering what to do with this newfound weekend hour, I suggest looking to your right and reading what our writers have planned. Of course, there's always this issue of **mathNEWS** to while away your time! Happy reading,

clarifED
Editor, mathNEWS

caffeinatED
Editor, mathNEWS

| | |
|-------------------|---|
| JEFF | Wait an hour. |
| SECRETSQUIRREL | STAT 231. HELP ME. |
| X | Lease the minutes to Waterloo students |
| PREDAP | Schedule alarms to go off at a repeated time, see whether it happens on the first time, the second, or both. |
| APHF | The same thing we do every night, Pinky, Try to take over the world. |
| SKIT | Sleep. You guys can suffer with your grind and your STAT231 courses. I'm big brain, I'm in the environment faculty. |
| BEEFBROWN | Transfer into the env faculty. |
| GOLDEN | Sleep |
| PROCAVIA | Invest it—time is money. |
| WHILD | Play on my phone to calm down after watching an additional episode of my scary Netflix show |
| NOT A N*RD | The portal will only be open for the hour, I must come back from whence I came |
| A COOL PEN NAME | BACK TO MANITOBA TIME BABY |
| SOMEBODY | Find someone who doesn't know about Daylight Savings and convince them that time travel is real using the changing clock as evidence. |
| CC | Find out what sort of evil secret shenanigans the editors get up to with their extra hour, then do it myself for tons of profit |
| EVILEVIEVIL | Save it for March 13 next spring. |
| PEACELOVEMATH | plan to do work but end up sleeping through it |
| ETERNALLY PUZZLED | maybe finally get that healthy sleep schedule going |
| ABALD MAN | Stay up an extra hour later than normal |
| TOKYOCATBOY | There's an extra hour? I mean... Write mathNEWS articles and watch anime! Nya! |
| BOLDBLAZER | I never notice these extra hours anyway (or even the counterpart lack of an hour) so it'll go by like any other hour. |
| THE EDITORS | Sleep. |

ARTICLE OF THE ISSUE

Congratulations to Golden! Someone Beautiful really is something beautiful. Collect your \$25 gift card at MC 3030!

mastHEAD answers continued on page 7.

CLARA XI, mathNEWS EDITOR FOR FALL 2021
ALONG WITH NAMAN SOOD, KEVIN TRIEU, AND YANG ZHONG

mathASKS 147.4

FEATURING LECTURER ANTON MOSUNOV

PREDAP: WHAT DO YOU THINK IS MOST IMPORTANT TO CONSIDER AS A LECTURER AS WE MOVE BACK INTO IN-PERSON LEARNING?

Perhaps the pandemic has taught some of us to be more humble and understanding? I hope that, having faced challenges, more instructors will remind students about the importance of mental health and work/life balance.

CC: WHAT IS YOUR FAVOURITE AND LEAST FAVOURITE THING ABOUT TEACHING?

The best thing about teaching is to hear students say: "Ooooooh... I get it!" My least favourite thing is probably preparing for big assessments, since so many things can go wrong! Usually I don't sleep well the night before the midterm or final.

ABALD MAN: ARE THERE ANY DIFFERENCES BETWEEN HOW MATH IS TAUGHT IN RUSSIA COMPARED TO CANADA?

- There are 11 grades in school, not 12.
- During my university years in Russia, all of my finals were oral. You would come to an exam, choose a random *bilet* (ticket), and then answer questions written there.
- I was studying at the department of applied math and informatics, and in retrospect the amount of material that they were trying to put in our heads was... incomprehensible. Only a supernatural being could remember all of it. For example, our second semester of calculus included multivariate calculus, introduction to Fourier analysis, functional analysis, measure theory, and Lebesgue integration.

TLLLOW PRINCESS: WHERE IS YOUR FAVOURITE TOILET ON CAMPUS?

I have no preference, honestly. Speaking of washrooms: I wish we had more gender neutral ones on campus.

TENDSTOFORTYTWO: WHAT DO YOU THINK IS THE MOST IMPORTANT THING FIRST YEARS SHOULD KNOW IN THEIR, WELL, FIRST YEAR?

Every first year student should know about metacognitive learning strategies and the Dunning-Krueger effect (incompetent people overestimate their abilities, while competent people underestimate them). During first year it is important not only to learn the material you are taught, but to develop study habits which allow you to get an objective estimate on the state of your knowledge. With the transition from school to university, it is rather easy to be unaware of your own incompetence, and in 1A students feel it when they get their first midterm results back (provided that it's proctored and closed book).

CLARIFIED: HOW OFTEN DO YOU READ POETRY? HOW OFTEN DO YOU WRITE POETRY? DO YOU EVER READ/WRITE POEMS IN ENGLISH AS WELL AS RUSSIAN?

I wish I wrote and read poetry more often. I have lots of books on Russian poetry, and I wish I could share some of these poems with my students, because they are so beautiful. Interesting fact: Russian is a very flexible language. For example, depending on the context, all six permutations of words in "I love you" can be grammatically correct! I do not write poetry in English, but I should try it one day.

BOLDBLAZER: NOT A QUESTION, BUT PLEASE BE KIND ESPECIALLY TO THE IN-PERSON FIRST-YEARS. PASS THE WORD AROUND.

Thank you for this, I will do my best. Do you have any advice as to the kind of support that we instructors can provide?

COMPANIONSHIP



CIX: WHAT IS THE MEANING OF LIFE?

Everyone has their own, I am yet to figure out mine.

ETERNALLY PUZZLED: ON A SCALE OF ONE TO TEN, HOW PASSIONATE ARE YOU ABOUT CRYPTOGRAPHY AND WHY?

Four years ago I would say 8/10, now it's more like 6/10, since I've not been following recent developments in the field. Though I am curious what schemes will make it to the end of NIST's post-quantum competition.

QUANTUM GOOSE: HOW DID IT FEEL LIKE TO DISCOVER THE GERSHGORIN CIRCLE THEOREM?

I don't remember the statement! I remember that it was a beautiful result about eigenvalues of matrices. There's a video posted in my blog, where Zack Cramer talks about GCT at one of our departmental seminars.

CLARIFIED: WHAT IS YOUR FAVOURITE MEAL TO COOK?

Crepes for breakfast!

WALDO@<3.LE-GASP.CA: WHICH HAS BEEN MORE FUN TO TEACH, FIRST YEAR STUDENTS IN 135 OR PMATH STUDENTS IN 340?

Both are fun, two completely different crowds! I taught PMATH 340 relatively early in my teaching career. Since then I developed an illusion that I got wiser, so nowadays I would teach it differently.

A MIEDIOCRE KITTY: WHAT ARE YOUR OPINIONS ON CONTINUING TO OFFER A READING WEEK IN THE FALL TERM AT UW?

Fall term is the most intense term at UW. Having a reading week in the Fall term certainly helps to maintain one's sanity. So, I am very much in support of that.

NARF DERT: DO YOU HAVE A FAVOURITE PROOF THAT YOU LIKE GOING BACK TO FROM TIME TO TIME?

I really like Klaus Roth's proof from the paper "Rational Approximations to Algebraic Numbers" (1955). The theorem states that for every irrational algebraic number x and every positive number ϵ , there exist only finitely many integers p and q , with q non-zero, such that $|q \cdot x - p| < |q|^{-1-\epsilon}$. It's a monumental result in the field of Diophantine approximation.

ME: HOW WAS LIFE LIVING IN THE SOVIET UNION?

I lived in the Soviet Union for 447 days, from the day of my birth until it collapsed on December 26th, 1991. How was my life living in the Soviet Union? I don't remember!

ROYAL NO.69 MILK TEA: WHO/WHAT INSPIRED YOU TO WRITE POETRY? DO YOU HAVE A FAVOURITE RUSSIAN POET? (ALSO, THANKS FOR A GREAT MATH 235 OFFERING IN S21!)

Glad that you enjoyed MATH 235! To answer your question: When I was writing poetry, I was either inspired by events in my life (falling in love) or by the works of famous Russian poets. I especially love poetry of Joseph Brodsky (Nobel Prize), Boris Pasternak (Nobel Prize), Osip Mandelstam, and Arseniy Tarkovsky (father of the famous director Andrei Tarkovsky).

X: FIND X.**GOD ⚡ PEED: WHAT DO YOU MISS THE MOST ABOUT RUSSIA?**

I am from St. Petersburg, which has magnificent European architecture. It is very exciting to walk in that city, looking at the different historical buildings! I also miss going to concerts of Russian rock bands. If you'd ever want to listen to good Russian music, check out the bands called Аквариум (Aquarium), Пикник (Piknik), Аукцион (Auction), and Кино (Kino). I think you can find them on Spotify. Cool fact: Russian rock was an important symbol of liberty during Gorbrachev's Perestroika!

N THINGS THAT ARE A BIT SUS

- a pegasus
- a mongoose
- pigs (of the genus *Sus*)
- the 25th largest island of Greece
- Jesus
- Sus, France
- the Boomerang Nebula
- amigos
- red
- Asus
- Spongebob Squarepants Season 5 Episode 83c
- Pokemon #591
- sushi
- anyone wearing the official Among Us Crewmate Inflatable Costume

boldblazer

**There is a blackBOX
among us.**

DEFINITELY A REAL ARTICLE

RIP THIS PAGE OUT AND COLLECT THEM ALL FOR YOUR OWN COOKBOOK

Page 7

Snacks & Party Food

Incidentally, I happened to attend a party-ish gathering just one day before the writing of this installment, which is completely a coincidence, I assure you. And I happened to be one of the organizers. Ameny other things, we had to sort out the food situation. People get hungry at parties, but you typically don't want messy, meal-

type food. It's easier to provide snacks, which people can easily graze on. There was a cake at the party, too, and there's also a "cake" recipe here. For one ludicrous moment I'd considered bringing the "cake" to the party - you'll soon see why the thought was so ludicrous. Snacks aren't just for parties, of course. You can also just eat them alone, or with just a friend. But, I feel, if you're just eating snacks 'cause you're a little hungry, you'll settle for some simple junk food like chips and cookies. Whereas the higher-effort kinds of snacks, like these, call for an occasion that's a little more special. Not always a whole party, mind you, but just something a little different, out of the ordinary.

INDIAN PEPCORN by Various Pseudonyms

Ingredients: 1 cup popcorn kernels, 5-6 tbsp vegetable/canola oil, 4-5 tbsp tandoori masala, 1/4 tsp salt, 1/4 tsp MSG (optional).

1. Place all the spices in a spice grinder and blend to a fine powder. Set aside, and keep the lid on to avoid breathing it in.
2. Put the oil and kernels in a wok, and place a lid on the wok. Use aluminium foil to make a lid if you don't have one. Keep the lid slightly ajar or poke holes in the foil to allow steam to escape.
3. Turn heat to max and pop the kernels. Periodically shake or swirl the wok. Remove from heat when there are around 1-2 seconds between pops.
4. Shake around a quarter or third of your powdered spices onto the popcorn. Cover again and shake vigorously, and repeat until you've used all the spices.

"This is inspired by Brian David Gilbert's recipe for Popcorn, but using Indian flavours instead. It's been one of my favorite snacks during quarantine for a couple reasons: it's easy to make in large quantities, has a nice savory and salty flavor, and just spicy enough that you have to eat it in multiple sittings."



I had to make it without a spice grinder, but this was really good. Salty and spicy, what more do you need? And it is spicy, not like "spicy" popcorn you can get in the store. Actually, it was a quarantine snack for me, too. In the evenings, girafavig and his sister and I would make a large pot of popcorn (just with butter and salt, nothing fancy), and we'd eat it while watching random Arthur episodes, or Twitch streams. Those were good times. It's weird to think that I can be nostalgic for a time that was maybe not even a year ago. That's what I mean by special. Even though it was something we did every day at some times, it meant that we wanted to enjoy ourselves. It's something I've had to learn: Experiencing happy moments requires that kind of intention. Even if it's just making popcorn. Side note: The original popcorn recipe uses Lao Gan Ma sauce which is..... interesting?????? I'll have to try it.

RIP THIS PAGE OUT AND COLLECT THEM ALL FOR YOUR VERY OWN mathNEWS COOKBOOK

RIP THIS PAGE OUT AND COLLECT THEM ALL FOR YOUR OWN COOKBOOK

Page 8

THE BEST NON-CAKE YOU'LL EVER TASTE by A cool pen name

Ingredients: ~15 Dad's cookies (or similar but staler is better), 1 cup sour cream, 2 blocks (500g) Philadelphia cream cheese, 1/2 cup brown sugar, 1 tsp vanilla extract, 1 cup berries (can be frozen - I recommend raspberries).

1. Crush the Dad's cookies as finely as you can.
2. Transfer the crumbs into a pan and press them down with a spoon or your hand, so that it's ~1 cm thick.
3. Combine cream cheese, sour cream, sugar, and vanilla with an electric mixer. Make sure to wash the mixer afterwards.
4. Check batter consistency: It should be thick but pourable. Add more cream cheese or sour cream to make it thicker or thinner, respectively.
5. Mix berries into the batter with a spoon.
6. Pour and spread the batter into the pan over the cookie crumbs. Try to keep the cookies from mixing into the batter, so spread carefully.
7. Chill it in the fridge for a few hours.

"If you're anything like me, you like sugary sweet things so cakes and cupcakes and baked goods look incredibly appealing on the outside, but once you start eating you realize that the dry, crumbly dough really only disguises the goodness and deliciousness of the fillings. This is the solution to all your cake problems."

I don't know how I feel about this one. I was dubious the whole time I was making it, but it does taste surprisingly like cheesecake, although I think I shouldn't be surprised, since the ingredients are pretty much the same as those of cheesecake. But then again, cheesecake isn't dry and crumbly, is it?? Should I be comparing it to a regular cake?

The texture is... Well, it's creamy. It's basically cream. I tried to flip it over onto a plate, as you would with a cake, and it went splat. But that's my fault. I just really needed to vacate the pan (read: large pot, which I needed to make the popcorn...) that the cake was occupying so it ended up looking even less cake-like.



Cake is a funny thing, isn't it? A cool pen name is right - too often cakes are dry and crumbly. But the image of a cake - it means something. In high school I had a teacher who would bring cake to class if we all did well on a test. It was horrible Costco cake, but still, I ate it and hated every bite of my slice.

We have cake at parties. We have cake for a reason. It's circular logic, but every now and then someone would bring home a cake, and then it would feel special, even if it wasn't, because a cake is a special thing. I can buy cake whenever I want to, but why would I want to? It doesn't taste that good, and besides, then it wouldn't be special.

RIP THIS PAGE OUT AND COLLECT THEM ALL FOR YOUR VERY OWN COOKBOOK

spaceNEWS — THE DECADES-LATE JWST, STARSHIP'S INAUGURAL ORBITAL FLIGHT, AND MORE!

Welcome to the first article of **spaceNEWS**, where I, your personal catboy, explain to you all the interesting events in the space industry alongside my own commentary, because mainstream media sucks at this stuff. This inaugural article will cover all significant events in spaceflight for the remainder of the year, of which there are quite a few!

On November 6th, SpaceX is scheduled to launch Crew-3, carrying 4 NASA astronauts to the International Space Station. Departing from pad 39A at the Kennedy Space Centre, Falcon 9 serial 1067 will embark on its second flight, carrying Crew Dragon Endurance with NASA astronauts Raja Chari, Thomas Marshburn, Kayla Barron, and ESA (European Space Agency) astronaut Matthias Maurer on board. This will be the second flight for the booster (which previously carried a Cargo Dragon capsule to the ISS for a NASA cargo mission), and the first flight for this particular Crew Dragon vehicle. Interestingly, Endurance shares its name with astronaut Joseph Cooper's ship from the sci-fi movie *Interstellar*.

On November 11th, New Zealand startup Rocket Lab will launch its Electron rocket on a mission named “Love At First Insight” to low earth orbit. Electron is a much smaller and cheaper rocket than SpaceX's Falcon 9, and does not land propulsively. Instead, the booster will deploy parachutes once it has separated from the upper stage, and will for the first time be observed by a helicopter as it splashes down in the Pacific Ocean. If all goes well, it is expected that Rocket Lab's next recovery attempt will consist of the falling booster being caught mid-air by a helicopter, paving the way for Rocket Lab to be the second company (after SpaceX) to reuse an orbital rocket booster.

On November 24th, SpaceX will launch NASA's DART probe, which will test the concept of crashing a probe into an asteroid to shift its orbit. If successful, this technology could be used to protect earth from large asteroid impacts such as the specimen that resulted in the extinction of dinosaurs. Note that the asteroid DART is scheduled to impact is not known to be on a collision course with Earth. This will be the third flight of the given Falcon 9 booster (serial 1056), having previously flown a GPS III satellite for the US Space Force as well as 60 Starlink satellites.

Arguably the most important flight of the year is Arianespace VA256. Lifting off from the Guiana Space Center in Kourou, French Guiana, the Ariane 5 ECA will carry the James Webb Space Telescope to the L2 Lagrange point, an orbit around the Sun that points the telescope away from the heat emitted by the Earth and the Sun. Don't understand what these words mean? Fear not, as I shall explain! The Ariane 5 is an expendable launch vehicle developed by the European Space Agency. The vehicle is propelled by two solid rocket motors, and a centre stage burning liquid hydrogen and liquid nitrogen. After the first stage burns out, it will separate from the rocket, leaving the second stage to perform its job. The

second stage is also propelled by liquid hydrogen and liquid oxygen. The payload, is a large infrared telescope whose launch has been delayed for over a decade at this point. The James Webb Space Telescope, or the JWST for short, is a telescope with a 6.5 meter diameter primary mirror (for reference, Hubble's mirror is only 2.4 meters wide) and is expected to drastically improve astronomer's abilities to study faint, and faraway stars and their respective planets. While we may never be able to send a probe to one of these exoplanets in our lifetimes, it is unlikely that we will discover an “Earth 2.0” somewhere with out ever-improving telescope technology.

Last but not least, Elon Musk has tweeted in October that Starship, SpaceX's upcoming Mars rocket, will be ready for its first orbital test flight in November, pending regulatory approval. However, this is unlikely to happen by the end of the year as regulatory approval from the FAA is expected to push the monumental launch into 2022.

Note that this article is not a comprehensive summary of all the rocket launches scheduled for the remainder of 2021, but rather a selection that I deem to be particularly interesting or noteworthy. Many of these launches are streamed on YouTube. I highly suggest you watch one of these launches if you have the time!

tokyocatboy

N THINGS TO STEAL FROM GEORGE KENNEBUNKPORT

There was recently some debate regarding which of George's possessions make the most sense to steal. So in no particular order, except from least worth it to most worth it, I bring you this list.

[Editor's Note: To prevent the doxxing of one such George Kennebunkport, a handful of items were redacted from this list.]

- His pencil case
- His pencil
- His [REDACTED]
- His water bottle
- His [REDACTED]
- His [REDACTED]
- His [REDACTED]
- His eraser: to erase him so that he can't get mad at you for stealing his stuff

Thank you for reading. If demand exists, strategies for robbery are next to come.

Whild

warSOC XIV — THE BEST LAID PLANS OF GEESE AND WOMEN

Lucy steps away from the bedside. I rush over to Sarah, my heart beating faster than I've remembered it beating. My hands brush aside her hair, cradle her face. She's breathing deeper, slower, and then, an odd noise—she's snoring, this adorable slow purr of a snore. It's calming, and I can't help but imagine curling up with her, and how the sound could lull me to sleep.

Lucy, gives a quiet honk-grumble that could almost be a cough. I stand back up, flushing.

"I know you find her adorable, my dear, but we still have work to do. I know where their compound is, and how to get there."

I pull out my laptop, and navigate to some maps with satellite imagery. Lucy points, and talks, and honks, complaining about how difficult the journey was, and saying "my dear" so much I think the phrase will haunt my dreams. I click, listen to Lucy, drag the map, click again, following the highway northwest.

Eventually, zoomed in over a field of grass, far from any last notable features, Lucy yells: "There, my dear! In the middle of that field. Astounding technology." I zoom in some more; look closer. There's a small patch of land that hasn't loaded on the page, labelled with repeating grey "no data" signs.

"Suspicious." I say. "Thank you for your work, Lucy. I hope your captured geese are safe." I'm trying to decide if I mean it.

Lucy doesn't return the prognostication. "You're welcome, my dear. I suppose we're saddled with each other a little longer, then. Do you know anything about those villains? Why they're here?"

I open Vigil's last automated email; download the video and play it. The audio's on this time, and I hear the explosion that rips open warSOC's clubhouse wall. Stomps of the black-dressed figures, the whip of the Tasers, the yell of one of the Jack Twins as he's hit. My heart clenches.

The dust clears, and a woman in black suit, skirt, and heels steps into the clubhouse. "I am here on behalf of the Standing Coalition for the Counterproliferation of Anti-Mathematics. You and all your associates are under arrest for contravention of the Anti-Mathematics Disarmament Treaty."

"You're called SCAM?" I can't tell if Soren is composed or terrified, but it's probably the former from what I know about him. A taser speaks again, and Soren falls. The intruders carry the bodies of my friends into the plane, fill bags with warSOC equipment, and inspect the room. A black gas-masked face is the last frame of the video, before a "no signal" screen.

Lucy laughs. "SCAM indeed, my dear."

"Scam?"

"All of humanity's a scam for geese. And not just the hunting and eating part. Let's leave Sarah for a bit, and I'll tell you how this whole Anti-Math fight started."



A little later, we're sitting around a table in the hospital's otherwise-empty cafeteria.

"It *absolutely* is a SCAM, my dear. Humans in Theorem-Space, playing with Anti-Math. The truth is, Theorem-Space and Anti-Math were discovered by us geese. A now-famous goose mathematician, in fact, stumbled across Theorem-Space, though entirely by accident. That's a story for later, my dear.

"New land to conquer—of course we explored it. Some of our other animal friends: a few ducks, swans, tried to join us, but the sheer, delicious power of mathematics in Theorem-Space drove them insane. Like your friend Sarah. At least until I healed her sorry self—you *owe* me, Name, and so does Sarah, and so does warSOC. Though who could trust a human to keep a promise! Aaaaah!

"Sorry. Where was I? Theorem-Space. It was fantastic. So much space, beauty, *freedom*. Us geese have a natural talent for it. When we're in Theorem-Space, we learn, get smarter, *evolve*. The mathematics imbues us and makes us better. We would have been happy—well, at least, mostly happy; geese are quite ambitious, my dear—except for the part where you idiotic traitorous humans come in.

"At some point, a human mathematician Rex Sibyllan stumbled across us geese and Theorem-Space. At that point, some of us had evolved to the point where we could communicate in some simple ways. We partnered with Rex's lab, showing them Theorem-Space, and then Anti-Math.

"Theorem-Space—inhabit it, and a goose gets smarter. The faster, much faster way, however, is to take knowledge straight from the minds of those who have it. Anti-Math, an absolutely delicious technique. Of course, we didn't do it back then. Rex's lab made it part of our agreement to not go around Anti-Mathing everyone in sight. And things were good, or so we thought. We helped with their experiments, they fed us and taught us some human knowledge. Glorious inter-species collaboration on a scale never before seen, my dear.

"Then one day a few months in, Rex calls a big presentation, and all the geese involved in the project show up in a room. It's a trap. She speaks for ten minutes, thanking the geese for our collaboration, and then humans who look rather similar to those in the video you showed me storm the room, tranquilizing geese. I barely escape through Theorem-Space—it's quite the tale.

“I learned later that they were killed, after being experimented on. We went into hiding, biding our time. Getting smarter, stronger. The Anti-Math attacks on the UW campus are necessary to accelerate our growth—it's nothing personal, and we try not to harm the humans too much. The *personal* part is with whoever betrayed us, and these SCAM people sure seem to match the profile. And you know that us geese never let it go, my dear. That includes you.”

“My condolences.” I sit there for a long second, running the knowledge through the strategic models in my head. Compassion. Doubt. Unanswered questions. “But why are you pink? Sorry I'm so blunt.”

“I happened to acquire the entire amount of mathematical

knowledge inside the mind of a very great mathematician. One professor Rex Sibyllan.”



Another few hours into the night, and we have a plan. It involves getting a lot closer to SCAM's (presumably) base of operations. Geese don't fly very fast, but we have other options.

I pull out my credit card and dial the number on the airline's website.

To be continued...

CC

ANOTHER YEARLY REMINDER

Here is another¹ yearly reminder for everyone regarding the total solar eclipse on April 8, 2024, where part of the path in Canada will include² Ontario, Quebec, New Brunswick, Nova Scotia, PEI, and Newfoundland.

Why am I reminding everyone when it is still about 2.5 years away? If the last great solar eclipse across the continent in 2017 is any indication, I think it's best if everyone plans far, far ahead of time. I would advise people plan a year ahead of time at the very least. You don't want to be the one who ends up trying to find a hotel room in or near the path of the eclipse amidst a 100%-rooms-booked situation like we saw happen in 2017 across the US. Even if there were rooms available, the prices became astronomical closer to the eclipse day, so to avoid that, you should probably book rooms as much in advance as possible before all these hotels realize the significance of that date.

For out-of-province and international students, assuming this pandemic thing is solved before 2024, maybe you could schedule your terms so that you are in Waterloo, and thus near the path of the eclipse, in the Winter 2024 term. Hopefully final exams won't fall on that day.

boldblazer

1. Last year's reminder was in v144i4.
2. Assuming a map from <https://www.timeanddate.com/eclipse/map/2024-april-8> is accurate enough, it appears as though the path of total eclipse barely misses Toronto and the entire GTA area. In fact, it barely misses London, and Moncton too, but just about manages to include Hamilton, and about half of Montreal. The KW region is completely not in the path of the total eclipse. Any ships in Lakes Ontario and Erie will have amazing views of the eclipse (as long as they are far away enough from the shores of the GTA region). Anyone on the eastern half of PEI will need to go to the western half of PEI to be able to see the total eclipse. Only those in the very northern tip of Nova Scotia will be in the path of total eclipse. It seems the path in Newfoundland completely misses the population centres of St. John's and Corner Brook and instead squeezes in between. Places that lie in the direct middle of the path appear to be Gander, Niagara Falls, Sherbrooke, Miramichi, and Les Îles-de-la-Madeleine. Even if it turns out to barely miss many population centres, I doubt you would need to travel *that* far from those cities to see the total eclipse.

You'll never have to answer a question like this without a calculator. Unless your calculator dies during the exam. Or you have a solar-powered calculator and there is a solar eclipse during the final exam.

PROF. IAN VANDERBURGH

sexNEWS: HOW TO FIND A SUBLET

Welcome back to **sexNEWS**, a biweekly column in which I answer relationship advice questions submitted by you, the readers.

As always, feel free to send your questions to mathnews@gmail.com to be potentially answered in this column. Anonymity is guaranteed¹. You're also welcome to include additional information to give context that you don't want included in the article if you're worried that your situation is specific enough that fully explaining it would expose you. This column is not restricted to just romantic relationships, we discuss personal relationships as well.

What do you do when your significant other is sad and it's making you sad?

JACOB

You should talk to your partner about why they are sad and try to cheer them up. Depending on why they are sad, they might just need some time to themselves, or they might need you to cheer them up.

Here are some ideas:

- Take your partner out on a relaxing date
- Give your partner a massage
- Sing a song for your partner
- Play games with your partner

And as always, 🗨️ COMMUNICATION 🗨️ IS 🗨️ KEY 🗨️!

My friend is seeking a friends-with-benefits situation on a four-month basis. Where can they look for potential suitors?

OOMPH

Well with the current market, the best possible benefit is free housing. So try looking on student housing Facebook groups.

You can also try whatever dating app is popular these days, or ask your one of friends to introduce you to one of their other friends.

How to have gay sex?

GAY

Just have sex that is gay. It's like straight sex but instead of between a man and a woman it's between two people of the same gender.

My boyfriend says Twitch emotes during sex. What should I do?

PERISHING OVER POGGERS

Your boyfriend is trying to engage with you in roleplay. You should talk to each other about your favourite Twitch emotes, which ones turn you on, and which ones turn you off. You will then be able to freely moan and scream **POGGERS** every time you cum.

A person that I have just met believes that I am in a polyamorous relationship with my roommate based on the fact that we existed in the same room. Is this normal?

AN EDGIER NERD

Yes!

Polyamorous relationships, while not common, are perfectly normal as long as everyone involved consents to the relationship.

Senior **mathNEWS** Relationship Correspondent

1. Unless there is a court order or something, but if I foresee that being an issue I probably won't answer the question in the first place. Canada has unfortunately weak laws protecting journalists, and I don't know if this column even counts as journalism.

UWATERLOO AFFIRMATIONS





Finchey

ROAST

Sizzling potatoes

Wrapped in glowing oven heat

Dreaming of gravy

evilevievil

WHAT OTHER PEOPLE ARE DOING WITH THE EXTRA HOUR FROM TURNING BACK THEIR CLOCK THIS WEEKEND

TENDSTOFORTYTWO:

Start to loudly complain about how someone is messing with my clocks and then stop myself, realizing that everything syncs with NTP and all the clocks are 10,000 parallel universes ahead of me.

DERIVING FOR DICK:

Sex.

FINCHEY:

Engage in such relaxing activities as watching paint dry.

S:

- 1:00AM-1:03AM: wake up from ceiling—always be on top of the game
- 1:03AM-1:10 AM: reject n women, where n is a natural number, the natural numbers starting at zero
- 1:10AM-1:20AM: side hustle—sell off useless organs
- 1:20AM-1:32AM: negotiate multiple multi-dollar deals
- 1:32AM-1:40AM: cold shower to match blood in veins
- 1:40AM-1:55AM: multitask—relieve self of all bodily fluids simultaneously. Not blood though—only thing flowing through these arteries is ice
- 1:55AM-2:00AM: begin day on the right foot—both of them

DAYLIGHT SAVINGS (DEROGATIVE):

Break every clock in Albany and Quebec City to protest New York and Quebec chaining us to the archaic shit stain of an idea that is daylight savings.

ME:

Campaign to get Daylight Savings Time removed!

clarified

(It's great to have lots of writers, but *please* write shorter **mastHEAD** answers, people...)

THE REAL sexNEWS 2, WRITTEN BY SOMEONE WHO HAS HAD EVEN MORE SEX SINCE THE LAST ONE OF THOSE ARTICLES

You've done it again, **mathNEWS** readers. In your foolish attempts to come close to my sexual power, you have awakened me from my slumber and forced my hand into writing another one of my famous **sexNEWS** columns. And just like morning wood, when I wake up from a slumber I am hard to ignore, will be here for an uncomfortably long time, and then eventually leave due to lack of interest. Let's get down to business.

HOW DO I FIND THE CLITORIS?

Oh boy, that's a hard one. Without the proper knowledge, your chances of finding the clitoris are about as slim as my chance of finding a winter sublet for less than \$2000/month and my first born child. (Which I would be more than happy to put down as my deposit, DOMUS. Please stop ignoring my emails.) I suggest you give up immediately, because this shit is impossible and the female anatomy has rigged the game against you from the start. Instead, embark on a 12 year journey into medical school to master human physiology. Once you return home victoriously, you will probably find that your partner has long ago left you for someone who doesn't abandon them for a full decade every time they make a minor anatomical mistake. But don't worry! You have accomplished something even greater than finding the clitoris—you finally made your parents proud by becoming a doctor.

WHAT IS SEX?

This question was given to me in person by an editor who shall remain nameless, and will be referred to as god ⚡pissED for anonymity. [Editor's note: We do not have this name in our records.] You see, when 2 math students love each other very much they get very close and eventually... I don't know, get bubble tea or something? But when 2 Laurier students love each other very much, they don't make love. They fuck. Hard. And that's how engineers are born. I hope this answered your anonymous question, Kevin.

WHAT IS GAY SEX?

This is the only time I will ever admit this in my sacred **sexNEWS** article series, but I am not actually qualified to answer this question. This is due to the fact that I am incredibly, unquestionably, and ubiquitously probably straight. And no matter how hard pictures of John Mulaney and Andy Samberg try to tempt my sexual confidence, I don't really think much about gay sex. My best guess would be that it's like straight sex, but with the added benefit of getting to stroke the slick black hair of your favourite comedian while staring deeply into his beautiful eyes and laughing at his jokes. And then having a genuine conversation talking about everything but nothing in particular, exploring each other's true selves while slowly falling in love and deciding to

spend the rest of our time together. Then passionately making love every day and satisfying our deepest and most primal physical cravings... What was I writing about? Oh right, back to the article. Anyways, unfortunately I don't really think about gay sex that often, so I can't really answer the question.



ANDY SAMBERG AND JOHN MULANEY, INFLUENCING MY SEXUAL PREFERENCES IN NO WAY WHATSOEVER

HOW DO I FIND FRIENDS WITH BENEFITS?

Ah, the age-old question of every guy with unrealistic sexual fantasies and fear of commitment. The answer really depends on what kind of benefits you are looking for. But to me, nothing is hotter than a friend who offers you unattached and free-of-strings insurance benefits. So for the hottest FWB, I would check out Geico to save 15% off your car insurance.

I've exhausted my willingness to help all you virgins, so that's all the questions I am going to answer in this article. But don't worry! The spirit of the real **sexNEWS** lives on in the hearts of each one of you. And if you ever want your question to be answered by my endless wisdom, just whisper it in the wind. I obviously won't be able to hear it since I'm not fucking Superman, but you might eventually ask it on Reddit or out loud in prod night, which will prompt me to give you my unwarranted advice. And if that doesn't solve all your sexual problems, nothing ever will.

methNEWS

YOU ARE NOW PARTICIPATING IN THE CULTURAL EVENT OF BLASEBALL

As I'm writing this, Blaseball has finally returned from its approximate two-and-a-half month siesta to once again grace the Internet. Therefore I must proselytize the game once again. So, **mathNEWS** readers... this is why you should become Blaseball fans.

To kick things off, I'll start by talking about what, exactly, Blaseball is. At its most basic, Blaseball is a simulated baseball league between 24 different teams that runs on a website (and soon an app), blaseball.com. Games run every hour, and seasons start every week.

You may be wondering why anybody would care about a simple baseball sim, and the reason is the fan interaction. Fans can bet on the games using in-game currency, and then use that currency to vote for upgrades to help their favourite team in addition to changes on how the game works fundamentally.

In addition, the developers keep on adding new mechanics to make things interesting. Players can be trapped in peanut shells, there can be an additional secret base, or extradimensional sharks can roam the field taking a chomp out of any players with too large of an ego (Chorby Soul, we're looking at you). It makes Blaseball a really dynamic and fun game, making you constantly want to tune in to see what's happening next.

Then, of course, you can't talk about Blaseball without mentioning the community. The Discord server's full of fans, with each of the twenty-four teams each having their own communities ranging from around four hundred to over two thousand fans in size. This wide variety makes it easy for each team to have their own vibe. For example, my team, the Atlantis Georgias, is a small but active community that is known for its star lesbian couple, Niq Nyong'o and Flattery McKinley.

Which leads me to the next thing, the fan lore. All the site really gives us is the names of our players, but every community comes up with their own designs and personalities for their characters, which really helps to bring the game to life in a way that wouldn't otherwise be possible. And because so much of it is designed by the fans, it really feels like you're shaping this massive universe by deciding what a new player with a name like Duck Falconer should be like. Then, once the players have been designed, comes the fan art and fan music.

Seriously, there's a Blaseball-themed band that has released actual vinyls and seems to release new albums every month. It's awesome.

Those are the basics, but I can never really sum up Blaseball in only a few hundred words. It's so much more than a game to me; it really is a cultural event, like it describes itself. If this at all piques your interest, I'd recommend checking out the Blaseball Roundup series on Youtube to get a feel for what the game's like before creating an account on the website and jumping into the Discord. There'll be a ton of people there happy to help you no matter which team you choose.

Just make sure a rogue umpire doesn't incinerate you first.

Predap

THE MATHEMATICIAN'S KAMA SUTRA

Everyone knows that mathematicians don't have sex. Instead of doing sex positions, they pose like letters and numbers. But how easy is it to pose like each letter and number? Well don't fret! We've compiled a handy ranking that can show you how easy it is to relay your one-character message using the shape of your body. That's right, we got up on the desks and posed like letters and numbers in the **mathNEWS** room, all for your entertainment. No you don't get to see it, we don't have that many pages. The pose must use the entire body (head optional because you can stick your head in your shirt), so the M, C, and A from the YMCA dance won't cut it for this.

1. (easy): F I P T X Y 1 4 7 9
2. C D E J K L R 3 8
3. A B S U Z 2 5 6
4. G M N V
5. (hard): H O Q W 0

someBODY

mathNEWS

LO-FI ROTISSERIE CHICKEN IS NIHILIST PROPAGANDA

Last week, I had the opportunity to meet and interact with an undefined set of friends, and as is often the case at parties, a furious debate raged over the kind and quality of music that plays at the event. Many championed for '80s dance music, some endorsed thematic Halloween (and later Christmas) tunes, and others still supported the beautiful voice of Brad Lushman teaching a CS246E lecture.

The ultimate winner, however, was "lofi hip-hop radio—beats to relax/study to." The music was a perfect fit for a lowkey get-together, and the video was pretty good too. Suitably dressed for the occasion, the 'lofi girl' had a Halloween costume on, and the video had a very coherent vibe... a witch, sitting next to a window overlooking a house-roof-covered mountain slope, with her cat familiar... doing homework.

The homework posed a problem. People complained that the lofi music reminded *them* of their own assignments, since it was such a popular thing to tune into whenever someone needed background music while grinding Crowdmark. The girl sitting in her notebook and working just exacerbated the issue. The music could be tolerated, but the video needed to change.

And then, Undefined Friend #1 had the brilliant idea—*change the video!* For a brief moment, we were watching lofi music play in the background as the foreground showed a nondescript aquarium. Then, through the course of natural conversation, Undefined Friend #2 brought up their childhood experiences of watching a very particular television channel. A television channel so simple, and yet so engaging, so enthralling, that at one point they watched it for five hours straight. The channel, of course, was the Swiss Chalet Rotisserie Channel. A 13-week, 24x7 broadcast of chickens rotating on a rotisserie, spit-roasting to perfection. In hindsight, of course it was a smashing hit. Not all of us had experienced this wondrous magic, and wished to see it for ourselves. One hopeful Google search later, there it was... rotisserie chicken roasting while lofi hip-hop played in the background.

It was blissful, for a second, at least. But then I started thinking... I started thinking of the rotisserie chicken, and how I could just watch it spin all day, and life would go on forever. Of course it would go on, why would the world stop for me? The world would keep revolving, and so would this chicken, forever and ever and ever...

I shook my head. What just happened? I tried to focus on the conversation around me. They were talking about mayonnaise or something. I looked around, and my eye caught the rotisserie chicken again, and my hearing focused on the lofi. And once I started thinking, I could not stop... The gentle orange overflow of the heat, the way it didn't touch the chicken but still charred it, like everyone was charred by the experiences that they had in life... What was there in life anyway, but to roast and char and burn? The subtle, off-beat piano caught it perfectly, described my feelings like words never could, and I was a chicken, slowly being cooked in this world, not one thing I could do about it...

I stopped myself again. Unable to keep it in anymore, I leaned into Undefined Friend #3, and told them how I felt. I told them how the rotisserie chicken and the gentle hum of lofi made me feel that life was meaningless, and yet it would go on forever, that we were naught but spectators in our own life.

"So, like, nihilism?"

It clicked. "Yeah, exactly!" I exclaimed, so glad that my mind's indescribable ramblings could be so succinctly, well, described. With not an adjective, but an ideology. An "-ism." And while I never paid attention in language class, my teacher said one thing that I was never able to forget: always be skeptical of "ism"s, because they exist to polarize you. Capitalism, communism, sensationalism, magnetism... you name it, if it names it -ism it almost certainly has cult potential. So... nihilism. Clearly a cult, and someone is trying to recruit me. But who? Or rather, what?

I never subscribed to nihilism before coming here, so it was definitely something at the party. The baked potato was great, but that honestly gave life *more* purpose than *less*. There were some really good Halloween costumes, but seeing my friends look so good was similarly uplifting. I was looking for an influence of lugubriousness, a thoughtful sadness coupled with a repetitive finality... Something that seemed like a mildly depressing forever. But then it hit me like a spinning rod.

Lofi music is not inherently nihilistic. It can bring about a calm, soothing vibe, but something else has to hook me in. Something entrancing, enchanting... Something exactly like rotisserie chicken. But how did these two things, so disconnected in real life, combine so perfectly to form a basis of an ideology with such immense strength? One could claim natural causes, but I suspect sabotage.

I claim that both lofi hip-hop music and rotisserie chicken were invented by the same group. A group that lives in the shadows, and seeks to further the cause of nihilism for their own ideological benefit. I believe that they were intentionally created to be two wildly different things, each innocuously blending into society as we know it without the other. But together, they are an unstoppable force of rejection of meaning of life.

I think Big Nihilism intends to individually promote the popularity of both of these concepts, and once they're together, combine them to take over the world. I wish I could bring this to a larger audience, but it seems that all news publications other than **mathNEWS** have been taken over by them already; they all rejected my article. But that's okay. When the world falls to the nihilists, I hope I will have you, dear reader, to count on to fight off the horde of people who believe there's nothing in life worth fighting for.

“FRIEND”

Surely most of my friendships are purely platonic,
Like my friends from chemistry; bonds that are ionic.
Ironic, iconic friends and friends that call me moronic
will all help me to orchestrate a symphonic friend

theorem, principle, or friendly axiom,
that states 13% of the time, like a tax-ium,
the word ‘friend’ is terminology that ain't lax-ium
with its meaning. Sit back and relax so we don't lose track
now.

There are friends that I turn to when times become dire;
these friendships I find they don't seem to expire.
They're the friends I admire, those with whom I conspire
by the friendly-fire, or breathe a friendlier air than most.

I have a friend over yonder, that I stare at,
And maybe to them I'm not a friend so they glare at
me when I leave the room and friendishly toss my hair at
the friends who don't seem to care about whatever the hell
I'm doing.

I have friends I benefit from,
friends I give benefits to,
friends I share benefits with,
and my friend Ben: I fit into his bed.

Then there's the depressed friends, distressed friends,
the systematically oppressed friends,
some vertically stretched or compressed friends,
and friend who likes their salad dressed with Shawerma Plus
garlic mayonnaise.

I have friends who turn me green with envy,
friends who often leave me on Read,
friends who mark my collarbone purple,
and friends that might as well be dead.

But is the friend who I talk after class with
the same as the friend who's inside my ass with
a more than friendlier mass with
which they shatter my asshole like glass. Alas,

are my dependable friends my expendable friends?
Can any two friends be contend-able friends?
The real, imaginary or pretend-able friends,
all blend-able and tend-able to the same friendly limit.

By now the term “friend” should mean nothing I claim.
There's too many friendships and too few are the same.
So “friend” must then be a terrible name
for a friendly relationship. What a shame it is.

So listen up friend, yes, you I referred to.
The friend who turned colder because I deferred you
back to a friend, the bond I preferred to,
more than a friend, but don't forget what occurred.

On the bench we established what “friend” might just mean.
Scenic night, serene light, we were friends in between.
But keenly I now stand by what I said then.
While we might not be “friend”s, to me you are

Deriving for Dick

BUT I'M NOT ALLOWED TO SMILE

When young, I played a silly game
“I love you, Honey,” was its name.
One in the middle; their aim was to
Swap places with one whose laugh came through.

As player, I knew to hide my grin
Even bit my tongue to let me win.
But as time moved on, as gameplay ceased,
The time I smiled too decreased.

First it was friends. Alien I was,
Companions few and far between;
Yet I would not search; for loneliness
Was already so routine.

“Do they truly care? Of course not.
You are merely free tuition.”
Such “friends” I made! To earn love from them
Was an act of hard attrition.

Then self-care. Imagine that!
Assignments overflow, day after day,
Where lies the time to run or lift
Or meditate and pray?

Breaks always poorly justified,
Unearned. I need more done
Or I cannot rest. If work lies ahead,
How dare I distract myself by having fun!

Lastly hope. Time after time
I hope but misfortune reigns;
Anything, everything, ready to fail
All things doomed, just the same.

Life grew me up. I no longer have
A spirit like a child's,
To all my friends, I love you too;
But I'm not allowed to smile.

Halley Lu

N SONGS TO LISTEN TO FROM VIDEO GAMES BUT DON'T MAKE YOU SOUND LIKE A DWEBB WHEN SOMEONE ASKS YOU WHAT YOU'RE LISTENING TO

Because you're a Math student, there's a high overlap with you and the eBic gamurr, and honestly, there's probably a lot of you who have anime OPs, video game BGMs and whatnot saved to your Spotify/Apple Music/Soundcloud, or whatever. But when someone asks you what you're listening to, you can't just say out loud that you're listening to video game BGMs! That would make you sound like a massive dwebb and loser. So, take it from your local Environment student for a few more tracks to enrich your playlist!

Also: Check out the playlist I made for 147.2 for n songs for that one. specific feeling, and a few songs more here:
<https://spotify.fi/3w6uRiW>

Unfortunately, because a bunch of these songs don't exist on Spotify, you're going to have to use YouTube for most of them. Suffer. The qualifications for songs to be on the list are:

- Lyrical.
- Appears in a video game or affiliated with it.
- If you let an unaware third party listen to it, they might think it's a song not associated with the video game.
- Said unaware third party will not think you're a dwebb if they listen to it with you.

CHVRCHES — “WARNING CALL”

The first entry stems from *Mirror's Edge: Catalyst*—performed by Scottish synthpop band CHVRCHES, “Warning Call” has a hard hitting bass that tickles your serotonin and chilling vocals that mask a dark undertone in the lyrics. Fitting for a song about a parkour-ist in a dystopian city.

THE MAKE BELIEVES — “I WANNA STAY THE SAME”

The “hit single” of the Make Believes discography, this entire band was made up for *We Happy Few*, where three residents make their escape from a town that enforces happiness to cover up atrocities and a dystopian society. Meant to emulate the music of the Beatles and other British musicians of the 60s (the game takes place in the United Kingdom, around the 60s), the Make Believes actually have about 12 songs that serve as BGM and radio music, especially in one segment of the game where you escape a chaotic asylum.

K/DA — “POP/STARS”

This song actually appears in *Just Dance!* While *League of Legends* players are and should be the most oppressed group of people, Riot Games released a K-pop single featuring four of the game's summoners. The result was so iconic it shattered the internet in 2017.

PENTAKILL'S ENTIRE DISCOGRAPHY

Again from *League of Legends*, Pentakill features my crush Mordekaiser and like four others in a death metal group. No, I don't listen to them, but I like looking at them. No, it's totally not because Mordekaiser is shirtless. Anyways. Death metal and video games have slight relation (see: DOOM) but honestly I doubt you'd be listening to it in public.

JAMES LANDINO — “VS. SAYU” (FT. NIKKI SIMMONS/AI YAMAMOTO)

No Straight Roads is an indie game that's just a \$60 dollar album with gameplay. Literally! Made by Malaysian-based studio Metronomik, *No Straight Roads* features an indie rock duo who go against the oppressive EDM government in Vinyl City, a place where music is the rhythm of life—literally! The boss fights are in beat with the music. Would recommend, but only the Encore edition. “vs. Sayu” is the equivalent of fighting Hatsune Miku.

AMEDEO SERA & ROBIN BELL — “DEADLY DANGEROUS LOVE”

Yandere Simulator is surrounded by controversy, we can't deny that! However, you also can't deny that “Deadly Dangerous Love,” the theme of *Yandere Simulator*'s 1980s Mode, not only bops, but emulates the feel of a city pop song you might hear in Japan back when VHS tapes and big hair was still a thing. Everyone loves city pop!

HITRECORD — “GOT YOU RUNNING”

When *Watch Dogs: Legion* was in development, Ubisoft and HitRecord reached out to fans to be featured in the game's in-game radio. The result? About 4 or 5 songs made the cut, including “Got You Running,” and other songs like “United We Conquer,” “I am Your Virus,” and others I'm too lazy to name. It's a perfect bop to listen to when you're in a car chase fleeing the oppressive rule of the private military corporation Albion in a futuristic London!

...huh. There's a lot of dystopian games here.

JONATHAN COULTER FT. ELLEN MCLAIN — “WANT YOU GONE”

The iconic credits song of *Portal 2*, “Want You Gone” is not exactly a song you'd hear on the radio, but it's okay. *Portal 2* is such an iconic masterpiece of a game that it completely outweighs how people feel about you! In fact, it's so iconic people will want to jam along with it if they understand, which they should.

THE NATIONAL — “EXILE VILIFY”

Also from *Portal 2*, American band The National is also behind this masterful, sorrow song. Fun fact— Valve made a contest for fans to make music videos of “Exile Vilify”—the winners were a sock puppet that had nothing to do with the song or *Portal 2*, while the other was an animated re-telling of one of the Portal comics, *Portal: Lab Rat*.

LÚCIO — “WE MOVE TOGETHER AS ONE”

Overwatch and *League of Legends* have their music, when the hell is Apex going to pursue getting a recording artist in the studio? In any case, Lúcio is a DJ musician who fights with global task-force *Overwatch* in a fight against terrorist cell Talon around the world. Lúcio hails from Rio de Janeiro, Brazil, and his abilities rallied around music—two tracks that boosted speed or healed allies. Lúcio had his own cereal that released around 2020, along with the full album featuring 10 tracks! Recommend giving it a listen.

CHVRCHES — “DEATH STRANDING”

Hideo Kojima saw what CHVRCHES did for *Mirror's Edge*, pointed, and said, “I want that.” For the game *Death Stranding* that follows a courier as he braves a dangerous outside to deliver cargo to isolated citizens—wait. Everyone's isolated? Delivery people? Dangerous outside? Hideo Kojima is a future teller confirmed. Jokes about the pandemic aside, CHVRCHES hits its mark again with a beautiful song that echoes welcoming death with open arms. Now to see what their magnum opus is. What a shame they also weren't put into the game like Junji Ito was.

Skit

WE NEED MORE MATH IN mathNEWS

So here's some math from a **mathNEWS** writer that is not me.

The class group of a field extension is basically when you have a field extension of the rational numbers. This has an associated ring of integers which is the intersection of your field extension with the algebraic numbers (e.g., for just the rational numbers it is the regular integers). In this ring of integers, sometimes unique factorization fails. The class group measures (in some sense) the extent to which unique factorization fails. It has exactly one element when unique factorization exists. Otherwise, its structure tells you some things.

Well readers, I hope you learned something new and are now satisfied by the existence of some math in **mathNEWS**.

Whild

ENTER THE mathNEWS

You see a **mathNEWS** issue on the table in front of you. The table is a dark mahogany, with intricate designs of roses and brambles inlaid with silver and copper. The legs arch into an eagle's talons, gripping globes that finally contact the marble flooring. The issue calls to you as a mysterious wind ruffles its pages. What do you do?

“Is there anything else around me? I want to see if I can find any treasure.”

You look up to see a veil of thick mist. Light dissipates evenly around you, leaving everything with no shadow. Consequently, as you look around, you find nothing else besides the table and the issue of **mathNEWS**.

“Alright then, I'll look at the cover of the paper then.”

The cover is a beige photograph of The Editors standing in a circle as a goose stands, possessed in center, babbling pure math jargon around linearity and whether two things can be equally approximated.

“That's... very unsettling. I skim the issue to see what the writers came up with on Prod Night.”

The articles start out with your standard fare: two-word articles posted purely to feel included, multi-page epochs about obscure code conundrums, and a smattering of quotes from various professors that are fully out of context. As you turn the paper onto its back, instead of a trace-maze, you find a single line. “This time you are the puzzle.”

Before you can react, the paper flies out of your hands, a vortex of pulp and ink morphing into a blur around you as you feel your stomach sink, as if on a rollercoaster. In a whisper of rustling pages, the issue reconstitutes in your hand, no different than before; but the same couldn't be said for your surroundings. What once was full of mist is now a dark hallway, bending to the right 15 feet ahead of you.

“Oh my. Have I entered the maze??”

Mathotaur and all. Best of luck!

To be continued...

SecretSquirrel

I read **mathNEWS**
devoutly.

PROF. STEVE FURINO

AN ELECTION SYSTEM PROPOSAL: PART 1

Author's note: this will be a multi-part article for two reasons: (1) it is much too long to be a single article, and (2) I am not done writing it yet. Also, the parts will not necessarily be released regularly.

In Canada and many other parts of the world, the winner of an election is the person with the most votes. This method is severely flawed. To see why, let us assume that you are going to vote in a hypothetical election with five candidates: Cthulhu, the Kraken, the Antichrist, Voldemort, and Sauron. Although you do not like any of the candidates (which is nothing new), you decide to vote anyway. After some thinking, you decide that the Kraken is the best choice: according to the world of D&D, it is quite intelligent, wise, and charismatic, and it does have an interest in preserving the oceans.

So, you should vote for the Kraken, right? Wrong. According to recent polls, the Kraken will only get about 1% of the vote. The race is really between Cthulhu and the Antichrist, both of whom could win. Although you do not want Cthulhu to win, you want the Antichrist in office even less. You should therefore vote for Cthulhu to ensure that the Antichrist does not win, which is what you end up doing.

This example reveals two important problems with the election system. One is that you ended up not voting for the candidate whom you wanted to win, which means that your vote actually decreased the chances of your favourite candidate winning. The other problem is a bit more subtle. Imagine that the final results are this (rounded to the nearest 1% for simplicity):

- The Antichrist: 47%
- Cthulhu: 45%
- Sauron: 5%
- Voldemort: 2%
- The Kraken: 1%

Under our election system, the Antichrist is the winner of this election. But what if all the people who voted for Sauron, Voldemort, and the Kraken prefer Cthulhu to the Antichrist? In this case, the majority of the voters prefer Cthulhu, but the Antichrist wins anyway. These issues can potentially be solved, or at least made better, by using a ranked ballot. This means that instead of only voting for one person, you rank the candidates in the order you prefer them. Therefore, your ballot might look like this:

1. The Kraken
2. Sauron
3. Cthulhu
4. Voldemort
5. The Antichrist

This lets you put your favourite candidate first without worrying that doing so will increase your least favourite candidate's chances. However, there is still one thing left to figure out: how do we determine the winner of an election? It turns out that this is not a trivial matter. One of the most

popular ways, and the way WUSA uses for its Executive Election, is something called instant runoff voting (IRV). It consists of two steps:

1. Find the candidate with the fewest first place votes.
2. Pretend that the candidate found in step 1 was never in the election. If there is only one candidate left, it is the winner. Otherwise, go to step 1.

An example is probably helpful here. For convenience, I will sometimes refer to candidates by only one letter. Suppose that the election results from above are like this using a ranked ballot:

- A, S, C, K, V: 40%
- A, S, C, V, K: 7%
- C, S, K, V, A: 38%
- C, S, A, V, K: 7%
- S, K, V, C, A: 5%
- V, S, A, K, C: 2%
- K, S, C, V, A: 1%
- All 113 other combinations: 0%

Only 1% of voters put the Kraken first. This means that the Kraken is the first eliminated. Since everyone who put the Kraken first put Sauron second, Sauron gets the 1% that went to the Kraken. Voldemort now has the fewest first place votes (2%) and is eliminated. That 2% also goes to Sauron. Now, the Antichrist has 47% of the first place vote, Cthulhu has 45%, and Sauron has the other 8%. Sauron is therefore eliminated. This part is a bit more complicated. The 5% who voted S, K, V, C, A now goes to Cthulhu since everyone above is eliminated. The 2% from V, S, A, K, C goes to the Antichrist, and the 1% from K, S, C, V, A goes to Cthulhu. Doing the math shows that now Cthulhu has 51% of the first place vote and the Antichrist has 49%. The Antichrist is therefore eliminated, leaving Cthulhu as the winner. This seems good, since more people preferred Cthulhu to the Antichrist.

There is something very problematic with the last example. The problem is with Sauron; it is easy to check that 53% of voters prefer Sauron to the Antichrist, 55% prefer Sauron to Cthulhu, 98% prefer Sauron to Voldemort, and 99% prefer Sauron to the Kraken. So why didn't Sauron win? The short explanation is that Sauron got very few first place votes (5%) but a huge amount of second place votes (95%). IRV, as a general rule, does not treat such people kindly. At this point, you might be wondering why we don't just always choose the candidate who, like Sauron in this example, is preferred by a majority to all the others as the winner, and not bother with IRV at all. The answer is that such a candidate does not always exist. In the next part of this article, I will examine why this is the case and a potential method of dealing with it.

$((\lambda(* /)(** /))(\lambda(+ -)(if \text{---} -(+ + \#t)))\#f)$

OUR NEXT PANDEMIC

Covid has gotten boring and old, I think we can all agree on that. We are tired of staying inside, of wearing masks, of the slimy feeling from applying hand sanitizer, of the endless screening questions—the list goes on. It has been too long of the same old same old. For these reasons, I would like to propose a brand spanking new pandemic, *pandementia*—the dementia pandemic.

The mechanics of *pandementia* are very simple. It is transmitted via droplets, much like influenza and the plague. It is highly contagious, like influenza and the plague. Masks slow it down, like influenza and the plague. Washing your hands helps to curb it, touching your face increases chances of infection, etc etc. However, unlike these other diseases, the only symptom of the disease is dementia. It is simply a highly contagious brain degenerative disease.

It would take a while to notice anything was wrong, as people who started having symptoms would go to their doctors, who would promptly forget how to do their jobs. Eventually, somebody in a position of power would notice something was wrong. Maybe it would be the increased amounts of automobile accidents as people forgot the difference between the brake and the accelerator, or maybe it would be the fact that large sections of the population forgot to go to work or school. Either way, this particular person probably wouldn't be the first to discover it. They would follow in a long and entirely unknown tradition of discovering the *pandementia*, proceeding to investigate it, and forgetting all about it.

As soon as the word finally got out, governments would begin to try and issue lockdowns. These, of course, would be entirely ineffectual, as people who contracted *pandementia* would soon forget they were supposed to be locked down and would go out and spread it. Gas prices would spike, stores would run out of toilet paper for some reason, and the various demagogues and nuts would proclaim *pandementia* wasn't real, as they had never met someone who remembered having it. The herds of epidemiologists and doctors who study the disease would have their numbers greatly thinned as vast amounts of them would forget how to do their jobs.

Eventually, hundreds of millions worldwide would lose power, as there would no longer be anyone left who remembered how to keep the grids running. Worldwide supply chains would collapse, as no one would recall how their intricacies worked. It's not like many people would notice these developments or be concerned whatsoever. Besides, those who did would soon enough forget the world before anyways.

Despite millions dying from forgetting how to eat and drink, at least I would never have to get a swab shoved so far up my nose it came out the other nostril again.

aphf

EPISODE 27 AND 28: LOGIC PREPOSITIONS AND BINARY SEARCH TREES

It's a double release from MathSoc Cartoons! Enjoy Episode 27 and 28 of the MathSoc Cartoons series: [Logic Prepositions](#) and [Binary Search Trees](#)!

Additionally: there's an opportunity open next term (Winter 2022) for 1–2 directors for the MathSoc Cartoons project! Are you interested in:

1. Leading a team of writers and artists to create useful academic resources for math students?
2. Developing valuable transferable skills?
3. Being featured on the MathSoc website for your contributions?

Then send your resume to cartoons@mathsoc.uwaterloo.ca now!

Deadline: Saturday, November 20, 11:59 PM EST.



**MATHSOC CARTOONS
DIRECTORS NEEDED!**

- 2 POSITIONS AVAILABLE
- OVERSEE THE PRODUCTION OF EDUCATIONAL CARTOONS
- DEVELOP TRANSFERABLE SKILLS
- BE RECOGNIZED ON THE MATHSOC WEBSITE

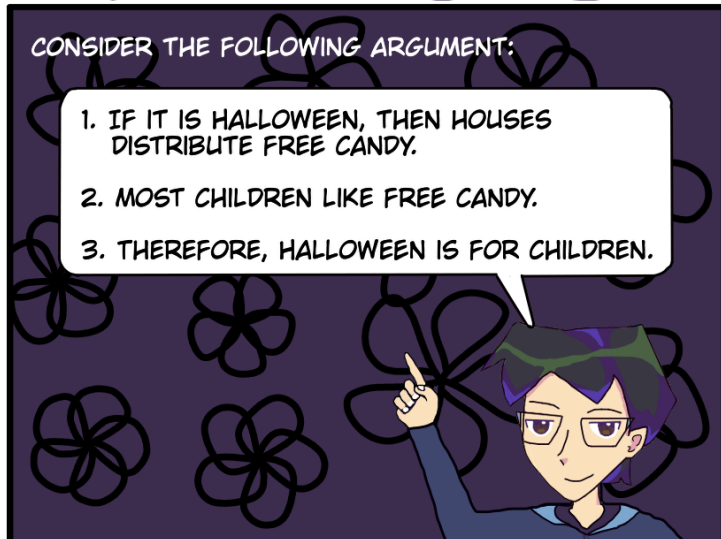
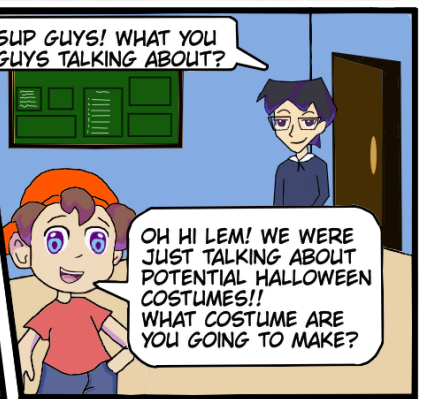
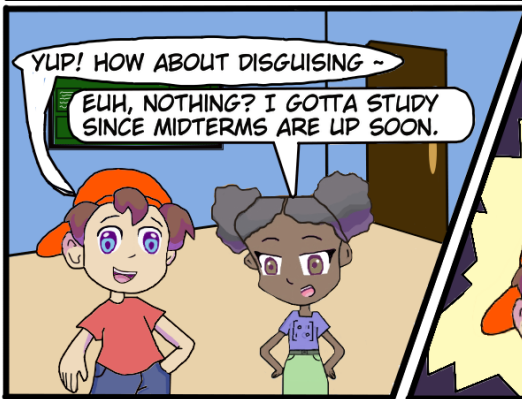
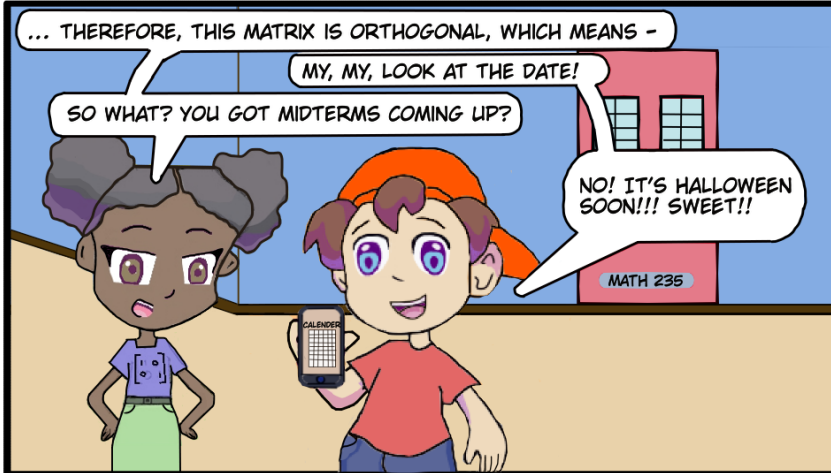
SEND YOUR RESUME TO
cartoons@mathsoc.uwaterloo.ca
BY NOVEMBER 20, 2021 11:59PM EST

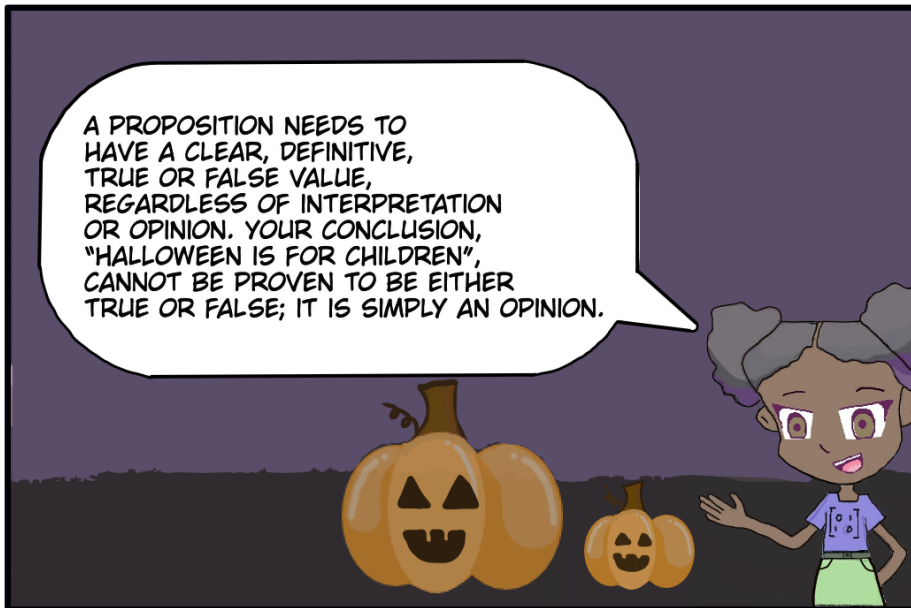
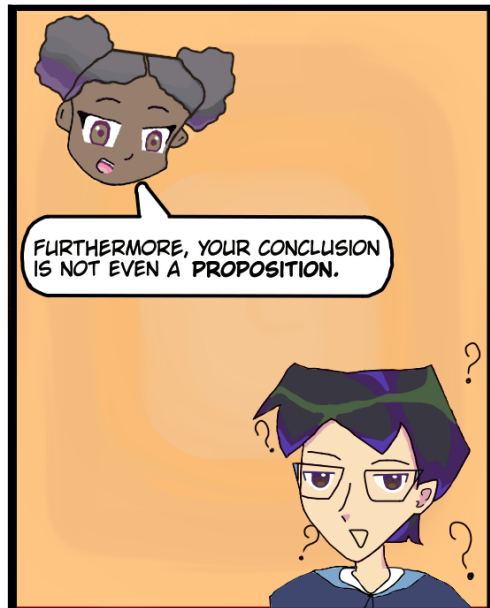
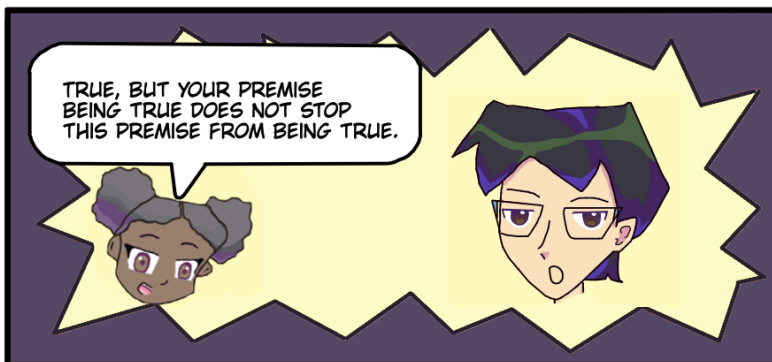
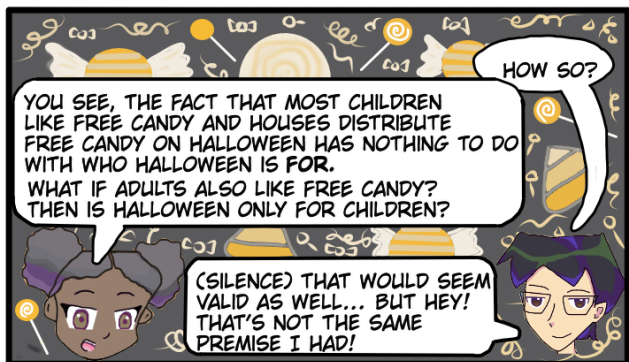
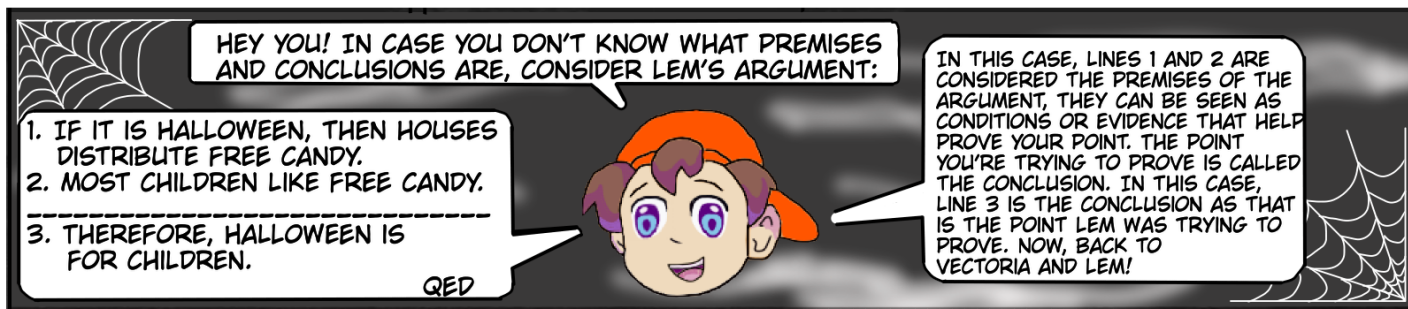
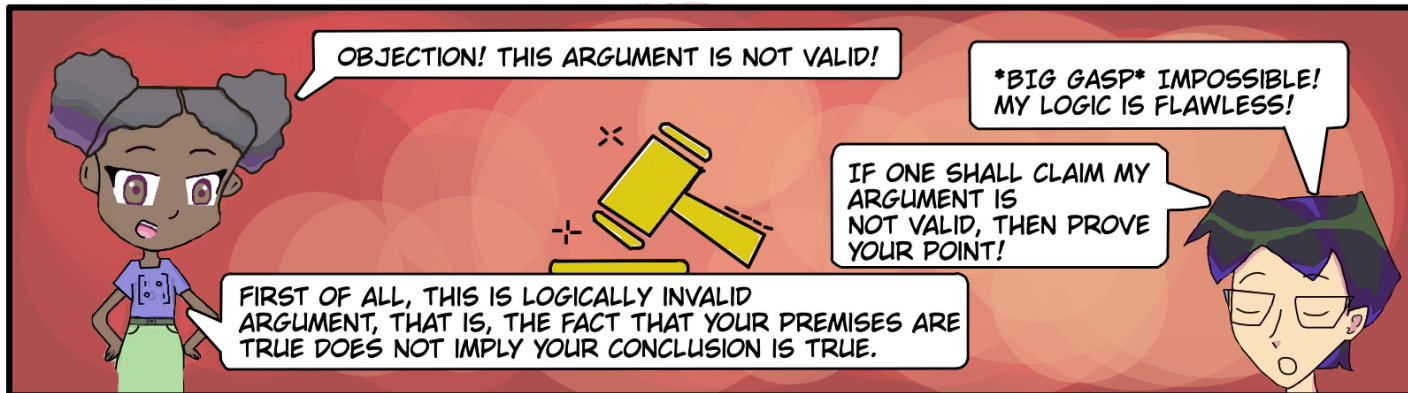
MathSoc Cartoons

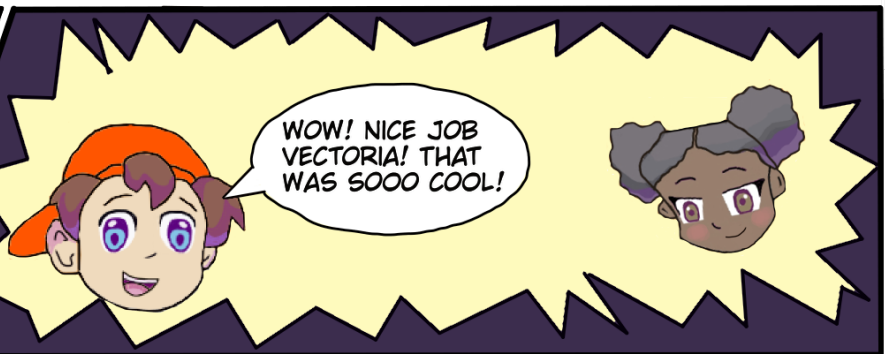
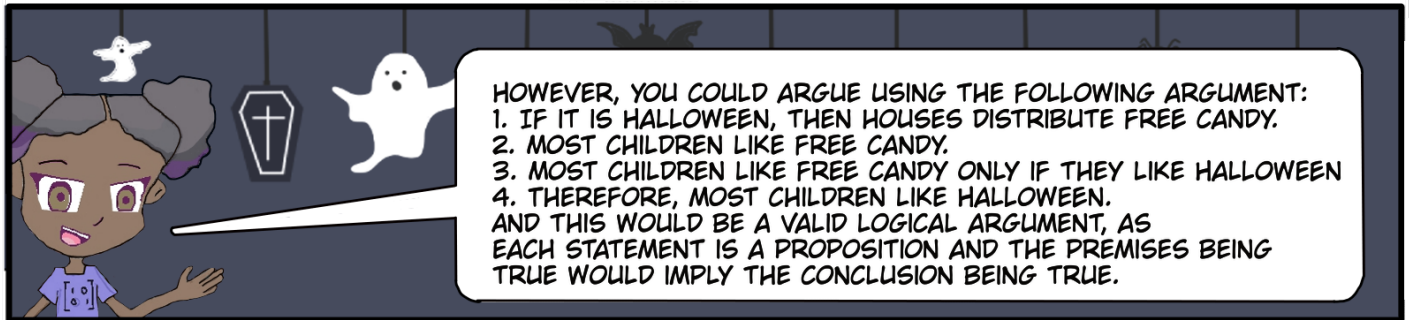
Episode 28 uses graphics from Twemoji (<https://twemoji.twitter.com/>). Copyright 2020 Twitter, Inc and other contributors. Graphics licensed under CC-BY 4.0: <https://creativecommons.org/licenses/by/4.0/>

CS245: LOGIC PROPOSITIONS

STORY BY JIA FENG YU | ART BY NETRA MALI

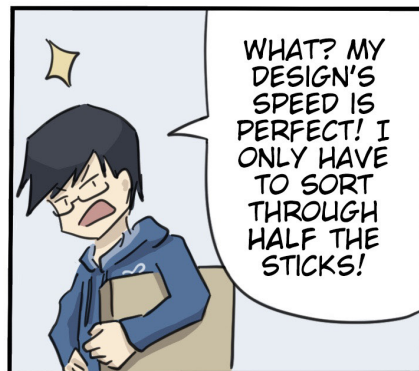
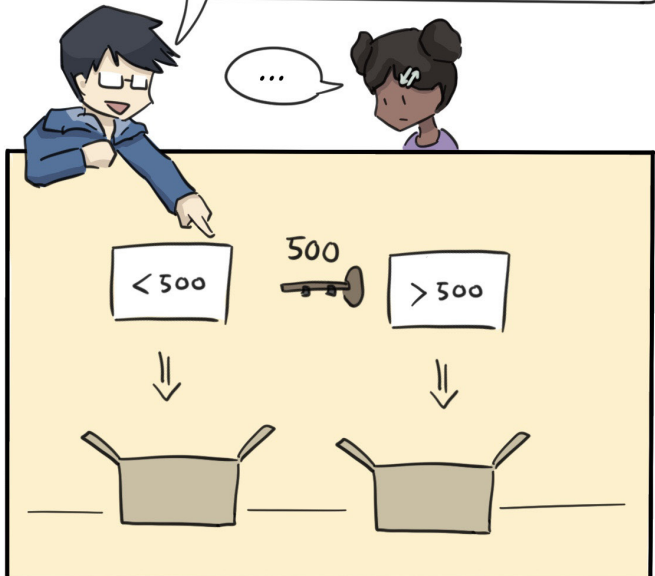
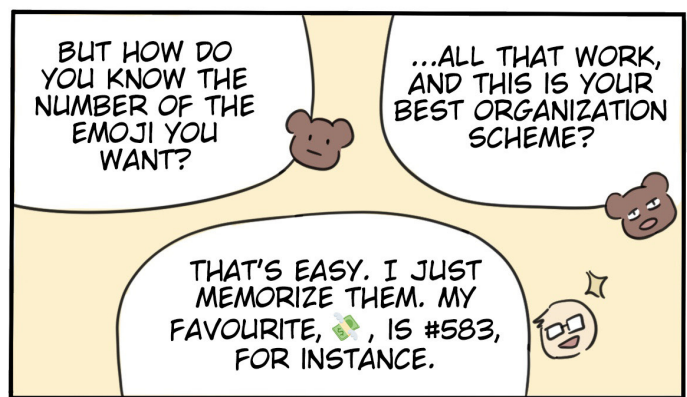
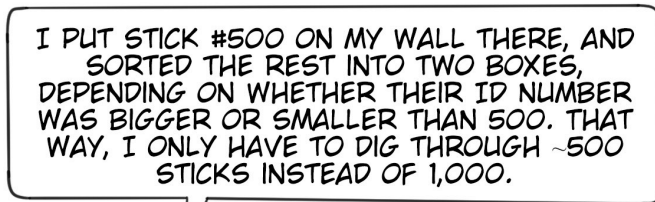
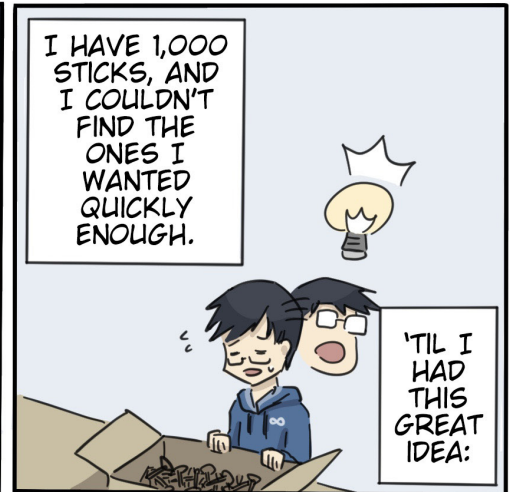
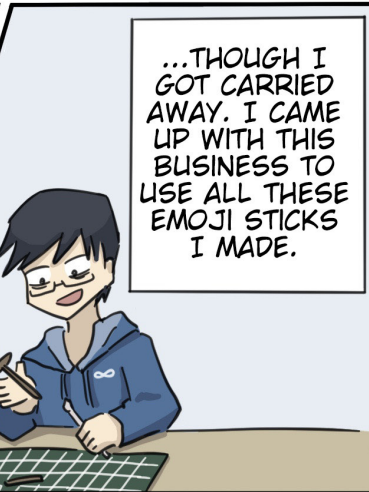
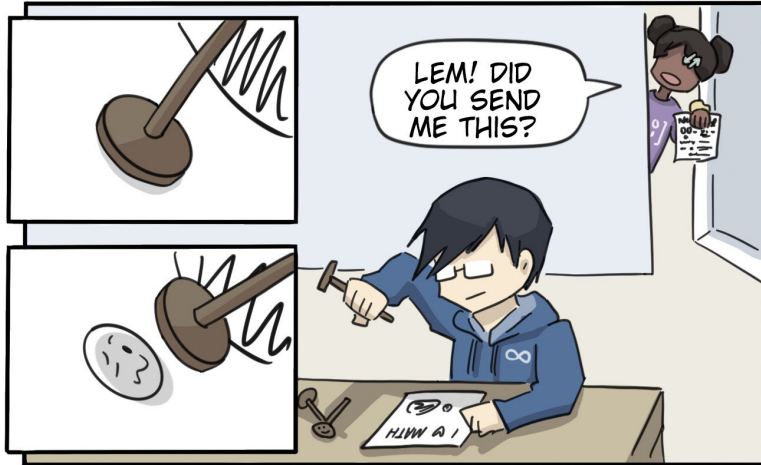


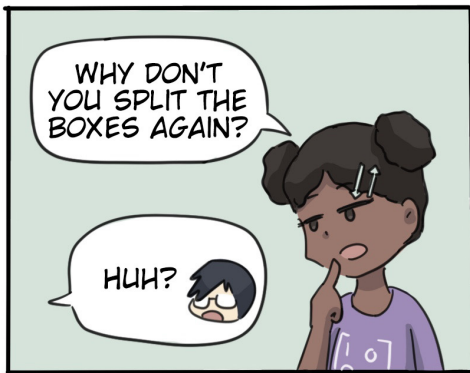




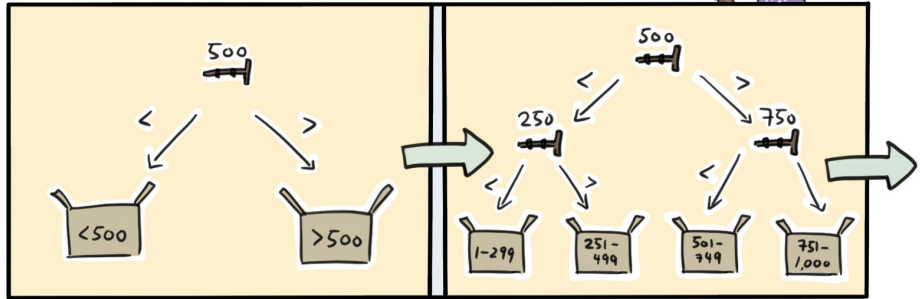
CS136: BINARY SEARCH TREES

STORY BY YANG ZHONG, ART BY LISA WEI



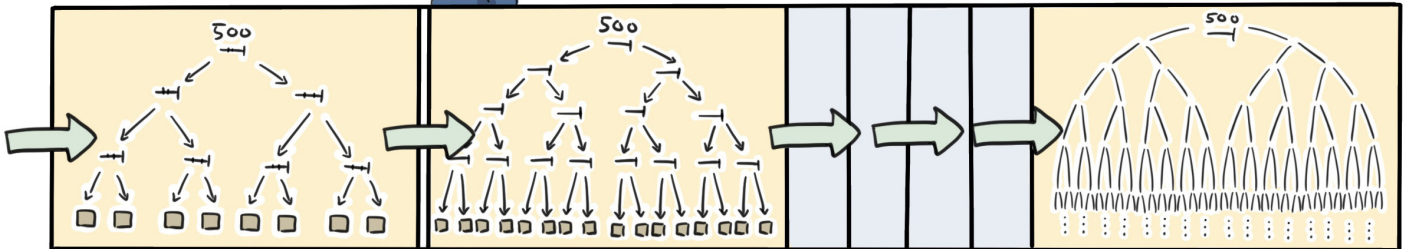


YOU SPLIT THE ORIGINAL BOX IN HALF, BASED ON THE STICK'S ID NUMBER. SO, WHY DON'T YOU SPLIT YOUR NEW BOXES IN HALF AS WELL? NOW YOU ONLY HAVE TO SORT THROUGH A QUARTER OF THE STICKS, AND EVERYTHING IS STILL ORGANIZED.



1 COMPARISON
~500 TO LOOK THROUGH

2 COMPARISONS
~250 TO LOOK THROUGH



3 COMPARISONS
~125 TO LOOK THROUGH

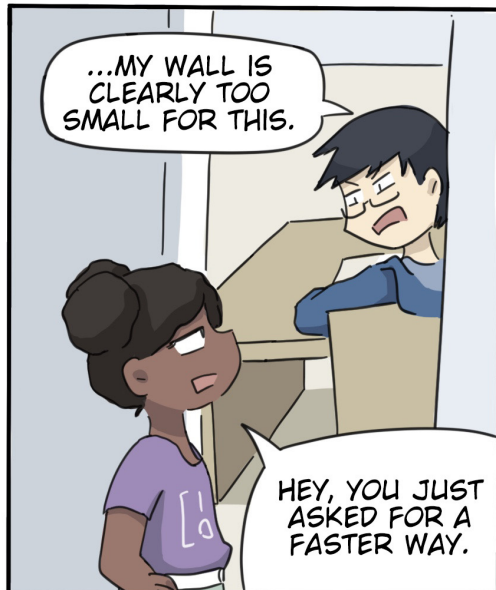
4 COMPARISONS
~65 TO LOOK THROUGH

~10 COMPARISONS ($\log_2(10)$)
~NONE TO LOOK THROUGH

YOU CAN SPLIT THESE NEW BOXES TOO: EVERY TIME, YOU HALVE THE NUMBER OF THINGS YOU NEED TO SORT THROUGH, WHILE ONLY ADDING ONE MORE STICK TO COMPARE NUMBERS WITH.



AFTER YOU SPLIT THEM ENOUGH TIMES, YOU'RE DONE! NOW YOU CAN FIND ANY STICK WITHOUT DOING ANY DIGGING - YOU ONLY HAVE TO COMPARE NUMBERS AROUND TEN TIMES!



CUM OR PISS

We asked the **mathNEWS** production night population on their thoughts on the age old debacle. The results may shock you.

Cum is funnier than piss. (Yes/no).

of pro-cum enthusiasts: 13

of pro-piss enthusiasts: 12

of indecisive/non-voters: 4



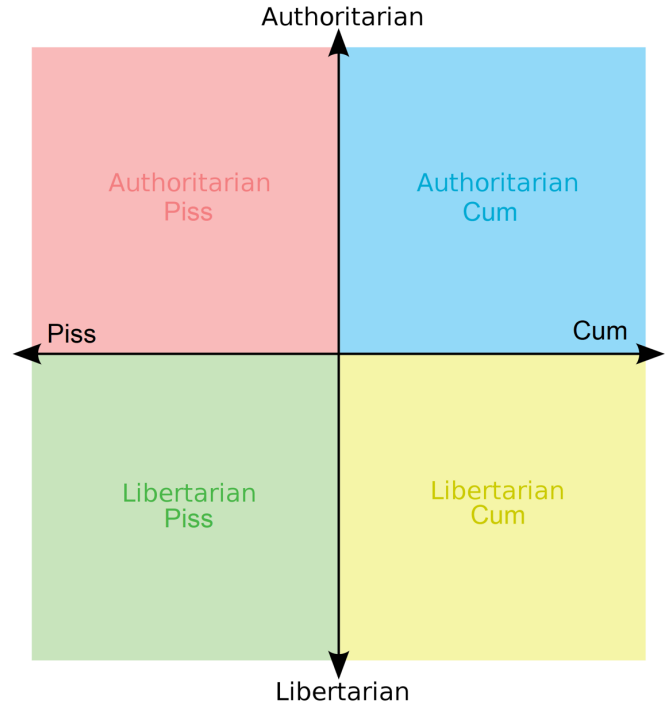
Deriving for Dick

N REASONS WHY PISS IS BETTER THAN CUM

- Piss can have cum in it. Cum cannot have piss in it. Ergo, $\text{cum} \subseteq \text{piss}$.
- Joking about piss doesn't require the thought of "would this be considered sexual harassment?"
- Piss is a nice, strong colour. Or clear. I don't drink enough water so mine is brown, but I hear it can be clear. Have you ever seen cum? That shit looks nasty.
- the -s sound at the end of piss (pɪs) is more phonically pleasing than the -m sound at the end of cum (kəm).
- Piss is more viscous than cum.
- Piss may also be less viscous than cum. I'm not actually sure what viscous means.
- Because I said so.

enthusipiss

POLITICAL CUMPISS



Deriving for Dick

LINUX MOMENT 🙄

Recently, I've been seriously considering switching to Linux and I'm not sure where these unholy thoughts are coming from. Am I frustrated with Windows? Not really. Am I eagerly looking forward to spending countless hours of my life debugging the most inane bugs I have ever seen? Certainly not.

Maybe I'm after the rush I'll get when I tell my nerd friends I'm using Arch and what `pacman -S firefox` feels like.

That's probably it.

futureArchElitist

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

LESLEY ISTEAD

ALBUM REVIEW: J DILLA'S DONUTS (2006)

ON CAPTURING THE SPEED OF HUMAN THOUGHT

Donuts has a myth attached to its creation—not a rumor, but a narrative. You can read about it in more detail online, but I'll try to summarize it here.

In 2005, legendary hip-hop producer J Dilla fought major health complications in Cedars Sinai Medical Center in Los Angeles. From his bed, he worked on two albums, one of which was *Donuts*. Most of *Donuts* was made on an SP-303 (a small hardware sampler with eight pads and four knobs, known for being notoriously difficult to use) and a turntable. As his health deteriorated past the point of being able to comfortably use his equipment, his mother would massage his fingers and flip his vinyl records for him. Dilla insisted on finishing his work.

Donuts was released on February 7, 2006—Dilla's 32nd birthday. He would pass three days later.

It's possible to enjoy the album without knowing about this. All thirty-one beats on *Donuts* are, to say the least, really fucking good. However, I want to analyze this album in this context. What went through Dilla's mind during his final months? Why has this album endured in the hearts of the hip-hop world thus far, and why will it likely endure for longer?

If you ask eleven or twelve different listeners what their favorite thing about this album is, they'll tell you eleven or twelve different things this album does perfectly. However, what amazes me the most about *Donuts* is its structure. The album's most immediate feature is that most of its tracks barely pass the one-minute mark. Additionally, nearly every track leads into the next without a transition or an ending. Dilla doesn't even let most of his tracks finish their sentences; every track starts and ends mid-air. This might make initial listens a bit of a blur, but this is all part of the magic. *Donuts* operates at a dizzying pace.

Even within the framework of individual tracks, Dilla manages to upend every convention of song structure. Most hip-hop beats over the past forty years have been made on machines, whether hardware sampler or MacBooks. Machines let us create loops. A producer might let one loop play a few times, then transition to a contrasting loop for a bit, then return back to the first loop. If they're feeling spicy that day, they might add a beginning or an ending or some transitions, but the main loops remain the backbone of the song's structure.

Donuts destroys all of this. If you pay attention, you'll notice that everything loops, but at irregular intervals. The music also speeds up and slows down and cuts out for fractions of a second and makes way for new sounds before abruptly cutting back in. *Donuts* couldn't have been made by copying and pasting. *Donuts* had to have been made by a person pressing sample pads in real time. It flows at the pace of human thought.

An unfathomable amount of anomalous 5D galaxy-brain mastermind shit takes place on *Donuts*, and I could painstakingly gush about every drop of it. Here is a small, non-comprehensive list of my favorite weird structural details.

- At the end of "Airworks," a fraction of a second of "Lightworks" plays, before cutting back to "Airworks" for two more seconds, before "Lightworks" begins to play for real. Why?
- On tracks like "Waves," "Time: The Donut of the Heart," and "Don't Cry," you can hear small clicks when samples start and stop abruptly. They're easy to remove, even on Dilla's limited hardware. Why leave them in?
- "Mash" and "Glazed" both end with the same ten-second beat that doesn't even appear on the track list. Why?
- "Thunder," which is mixed super widely, abruptly cuts into "Gobstopper," which is mixed almost completely down the center of the stereo field. The two beats have completely different recording qualities but are placed right next to each other. Why?
- "Welcome to the Show" ends with the beat from the first track to suggest that the album is going to loop—just like a donut! But Dilla doesn't give you that satisfaction. He makes sure the end doesn't sync with the beginning. Why?
- "Workinonit" is filled with vocal samples. They are clearly cut up to formulate words, but those words are ambiguous. "Fade me?" "Save me?" "Fake me?" "Buy me?" "Bite me?" "Why me?" Why?

These are all strange details. Why did he bother including any of them? How do any of them enhance the music?

No sane musician would sit down one day and decide that they were going to do any of the things on this list. In fact, Dilla easily could have chosen to exclude them all and *Donuts* still would have been excellent. However, the fact that all of them exist speaks to the singularity of Dilla's vision and the confidence with which he executes it. He constantly reminds the listener: "I left this here intentionally. It is your job to reckon with it. I know you can do it." These details aren't sprinkles; they are the donuts themselves.

So what was Dilla thinking as he worked on this album? It's hard to say, but I'm gonna guess that his mind was racing

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

A SPACE CONSCIOUS blackBOX

really fucking fast. There are flashes of joy and frustration and fear and love and awareness of death and everything in between. To bring *Donuts* into existence, Dilla had to fight against everything—his declining physical condition, the limitations of his equipment, the conventions of hip-hop. In the end, *Donuts* succeeds not only as a musical statement, but also as a testament to the strength of the human will and the inscrutability of the human imagination. I am glad that it is a piece of the hip-hop mythos.

REST IN PEACE J DILLA

χ

profQUOTES

CO 487: DAVID JAO

- “ Hellman was a professor at Stanford. Diffie... was some random guy working with Hellman.
- “ This diagram is not to scale. In fact, it is *very* not to scale.
- “ The “Alice” picture is supposed to be Britney Spears and the “Bob” picture is supposed to be Gustav Mahler.

CS 145: GORDON CORMACK

- “ Looks like this is gonna be a bad Zoom day.
- “ I should be looking at the times on the left, I don't know what I was drawing!
- “ “snoc” is “cons” spelled backwards.
- “ There's no free lunch.
- “ They're Russian so I'm afraid I can't chunk their names.
- “ I had no idea having a hundred some of you here would be different to when I was just talking to myself.
- “ Marmoset will try to mess you up.
- “ Before I share my screen, let me make sure that there's nothing incriminating on it.
- “ I'll go back to Zoom, share the screen and see what disasters occur.
- “ Hard in, easy out.
- “ Stupid sort, also known as bubble sort.
- “ I'd like now to go to my computer which will probably freeze Zoom, but let's live dangerously.

“

- “ There's nothing stopping you from confusing yourself.
- “ I have sufficiently blown your minds today.

CS 360: JEFFREY SHALLIT

- “ I can't draw the equation of a line. I never did very well in art.
- “ If I start talking about PDA, I'm not talking about personal digital assistant, I'm talking about pushdown automata.
- “ I like my [definition] a lot better, but maybe it's because I was raised this way.
- “ There's other flavours of PDA.
- “ There's other flavours of Turing machine.
- “ I wouldn't mind being called a computist.
- “ This is a good place to stop. It's the slide on halting, so we'll halt for today.

CS 458: URS HENGARTNER

- “ So this is a new development, every attack has to have a fancy acronym, so SAD stands for side-channeled... I don't know what the rest stands for, this is the problem with these fancy acronyms.

PHIL 221: MATHIEU DOUCET

- “ Buy fewer avocado toasts, and instead eat lentils.
- “ I was a gymnast, but I'm actually scared of heights.
- “ Student: You don't want child labour.
Prof: Why not?

PMATH 445: JASON BELL

- “ We're pretending our blackboard is a torus.

PMATH 930: ROSS WILLARD

- “ I made profQUOTES! Yay!
- “ Let's call it “k,” for “crap.”
- “ *[Showing how to use a universal algebra calculator]* It's not quite as fun as Minecraft.
- “ *[Frustrated]* Universal algebra should make sense!
- “ I haven't thought at all about how to do this, I hope it's easy!

SOMEONE BEAUTIFUL

“Hey Mom, can I borrow your fabric scissors?”

“Yeah of course! What do you need them for?”

“I bought a top I want to crop. I'm just trying something new!”

What followed that exchange was a 10 minute monologue about how awful crop tops are, which ended with the absolutely wonderful comment “But I thought boys don't wear crop-tops!”

This was... discouraging, to say the least. See, for the past few years, I've *really* hated my stomach. I always thought that crop tops were absolutely adorable, and I really wanted to wear them, but I just couldn't get past the whole “people will see my stomach” thing.

To be honest, I've spent most of my life despising my body. Whenever I saw myself, I honed in on all my flaws. My thighs are too big, my stomach is fat and my waist is small in a way that makes it stand out. My forearms have a lot of awful scars, and there are two huge ones on my left arm from a surgery. They're purple and ugly and so noticeable, they look scary, and beyond that, just alien. My upper body is weirdly shaped, my nose is too big, my jawline isn't right, and my skin would make a dermatologist cry.

Objectively, I know that almost none of that is right, but that doesn't matter because when I look in the mirror I don't get to see an honest or objective reflection. I see a dozen little lies woven by a brain that hates me, which all come together to paint a picture of someone hideous. I see even the tiniest flaw blown into something massive, and my best features are ignored or minimized. It doesn't matter that my smile is cute because my teeth are weird; sure my hair might be pretty but god, have you seen my forehead?? Any attempt at compassion for myself just ends with me feeling worse, because I am an expert at finding things I hate about myself.

Because I couldn't get meaningful internal validation, I spent a lot of high school life looking for external validation. I would compliment myself in ridiculously over the top ways, just to hear other people agree as a joke. I would send revealing photos to almost anyone who asked because there was the slimmest chance I would get a compliment in return. I used Grindr in unhealthy ways because the external validation was the only shred of kindness that my body ever got.

Still, that wasn't enough. At some points, I wouldn't wear shorts because I hated the idea of people seeing my legs. At others, I would always wear a baggy hoodie over my shirt since I didn't like my figure being visible at all. In early university, I wouldn't wear anything short-sleeved because I was so ashamed of my scars. I refused to look in the mirror because the distortions I saw made me hate myself so much more. I have constantly validated my flaws by refusing to show them off, because I am too scared of the potential of judgement.

Crop tops shouldn't have been any different. I hate my stomach, I don't want to show it off, so why on earth would I ever wear one?

It turns out the question wasn't so much “why on earth” as “who on earth.” All it took was for someone who I really cared about to tell me that I would look great in one. That tiniest modicum of support was the push I needed. Maybe I would wear them once and never again, but I was willing to try.

I'm so happy to say I now own three crop tops which I wear regularly, and I *adore* them. I look so cute in them!! All my friends tell me I look great in them. Hell, I was walking home from school wearing my cropped pink sweater, and a stranger stopped and complimented me!

There's something so empowering about taking my biggest insecurity, wearing something that highlights it, and feeling great. Every time I wear one of those tops, I hate my stomach a little less. I feel a little more comfortable in my own skin. I find a little more compassion for my body. And, with those things, I start to see through the little lies my brain has told me. My stomach isn't wrong. My waist isn't weird. My skin isn't perfect, but it's me. I can look in the mirror and see myself as I am.

After so much time spent hating myself, it's the greatest feeling in the world that I can finally say that, when I look in the mirror, someone beautiful is looking back.

Golden

**AAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAA**

AAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAA

AAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAA

AAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAA

AAAAAAA

ADVENTURES OF PROFESSOR M. GOOSE

Robert Langdon M. Goose awoke slowly. A telephone was ringing in the darkness—a tinny, unfamiliar ring. He fumbled for the bedside lamp and turned it on. Squinting at his surroundings, he saw a plush Renaissance lecture hall with an endless row of plastic chairs, concrete walls, and a way too tiny whiteboard. *Where the hell am I?*, he thought. The sign hanging off the door bore the words “M3 1006.” Slowly, the fog began to lift.

Goose picked up the receiver.

“Hello? Monsieur Goose?” a man’s voice said. “I hope I have not awoken you.”

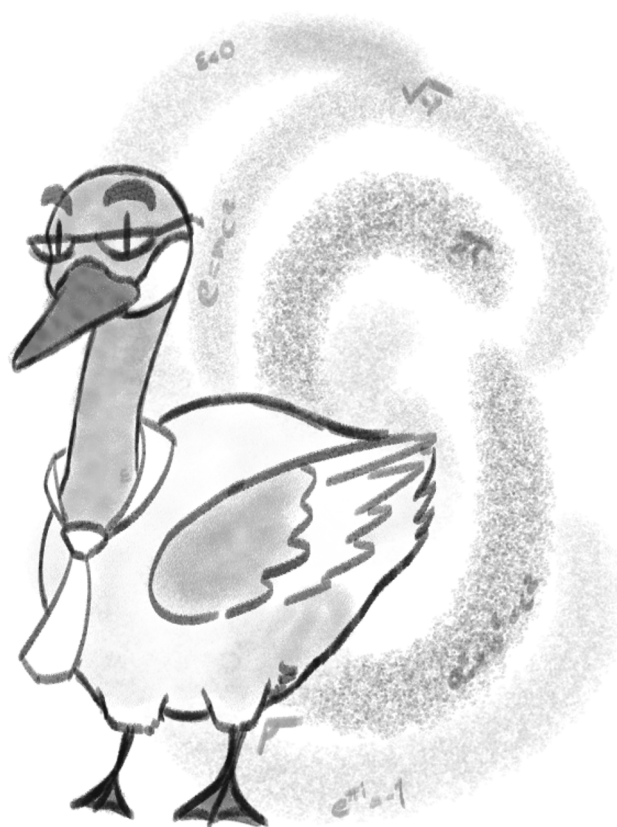
Dazed, Goose looked at the clock. It was 12:32 A.M. He had been asleep only an hour, but he felt dead.

“This is the concierge, monsieur. I apologize for this intrusion, but you have a visitor. He insists it is urgent.” Goose still felt fuzzy. A visitor? His eyes focused now on a crumpled flyer on his desk.

The University of Waterloo proudly presents
An Evening with M. Goose
Professor of Religious Mathematical Symbolology
MIT (of the North) University

Suddenly Goose remembered the horrors he would have to endure. The students banging on his door to ask the billionth thinly-veiled “give-me-the-answer-to-the-assignment” question. Reading shitposts on Piazza telling him to watch *Inside Out*, whatever that meant.

“Fornicate this!” he declared, whipping up a portal using, I dunno, math or something. (I’m just a narrator, not a math expert.) He gazed into the portal for a moment, said a quick prayer to the math gods, and stepped in.



As he left the portal, he left his fate to the whim of the math gods. What do they decide will happen to him?

To be continued...

Not a N*rd

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

Some cliché inspirational saying.

What? I can't think of any inspirational or funny sayings... If you have anything better, submit it to mathNEWS.

VALUE CATEGORIES AND MOVE SEMANTICS IN C++11

**HAHAHA THIS IS THE WORST ONE YET, IT'S THE MOST CATEGORICALLY USELESS THING EVER!!!
HAHAHAHA YOU CAN'T STOP ME!!!!!!!**

Have you taken CS 246? I sure hope you have! This language is quite a beautiful, infernal kind of pain beauty after all; a real keeper of the damned, to be sure. We're going to take a closer look at the “move semantics” nonsense which they briefly brought up in CS 246 and then strategically shut up about, forever.

VALUE CATEGORIES

Definition. An *expression* is a sequence of operators and operands that specifies computation of a value, or that designates an object or a function, or that generates side effects, or that performs a combination thereof. (Note that we're using the classical “C” definition of an object here, which is pretty much just any identifiable region of data storage which might represent a value).

Let's rewind a little and look at C/pre-C++11. Back in the day, it was useful to categorise all expressions by whether or not they represent an object, which resides in some particular identifiable location in memory. In particular, if an expression does do this, we call it an *lvalue*, and otherwise we call it an *rvalue*. Another way of thinking about this is that lvalues are capable of appearing on the left-hand side of an “=” assignment, while rvalues are not. For example, if I defined `int* x = 0xDEADBEEF`, then certainly `x` is an lvalue, since it represents an object pointer living in memory. In fact, I could even give you where it lives by taking its address, `&x` (which is itself an rvalue, since it can't appear on the left-hand side of assignment and doesn't have identity; it's just an address value). Moreover, `*x` would also be an lvalue, since it potentially identifies an `int` living in memory. It can take a few examples to really get it, but a key characteristic is that *lvalues have “identity”*, while rvalues don't. On the contrary, rvalues are fleeting; temporary. They don't live in a particular location (at least, not long enough to make “taking their address” meaningful), and have no meaningful sense of identity or place. They're just literals, mostly.

MOVE SEMANTICS

Enter C++11. We like to move because it's *fast*. Especially with recursive structures like linked lists, we'd do way better to steal another list's “next” pointer than to do a deep traversal and copy of the entire thing. So, we'd prefer to move where possible. But, *where is it possible?* When's it safe to move from something? How does moving actually work? What the fuck is `std::move` really?

Let's get a bit more formal. For the rest of this article, I'm going to start calling the things we used to call *rvalues*, *prvalues* instead, i.e. “pure rvalue”. The reason will be clear soon, but just roll with it for now. More formally, we'll say that a *prvalue* is an expression that, upon evaluation, designates a *temporary object*. Normally, *prvalues* have short lifetimes; they expire when the expression finishes evaluation.

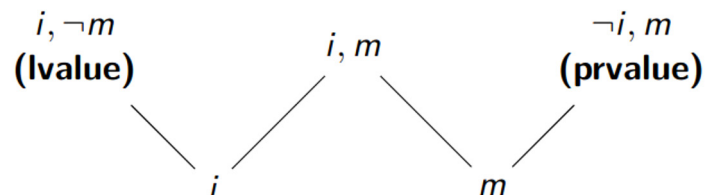
Important aside. By implementation, *prvalues*-designated temporaries *do technically* have addresses—data has to live somewhere—but we can't access them. Since *prvalues* are so short-lived, it's not useful to think of them as having identities. In fact, materialisation of the temporaries will usually be deferred as long as possible, and sometimes optimised out altogether.

So, *prvalues* have a very short lifetime. But, we can extend them in a couple of ways. One of those ways is to bind them to a reference, such as a `const T&` or a `T&&` for a type `T` (we can bind *prvalues* to both `const lvalue` references and *rvalue* references). In these cases, the lifetime of the temporary will be extended to the lifetime of the reference to which it's bound, and we can take the address of it using the `&` operator on the reference variable name, which is an lvalue. Neat!

With this in mind about *prvalues*, we can conclude that moving from *prvalue*-designated temporaries is safe. They're temporaries; it's okay to steal their data. On the other hand, moving from lvalues is *not* safe; they're not temporary, they reside somewhere in memory canonically, and we care about their data. We don't want to try making a copy of an object we care about and then accidentally steal its lunch money. This also gels with the move constructor signature: for a class type `T`, the move constructor looks like `T(T&& obj)`. If we were to run something like `T{T{}}`, then since the inner `T{}` expression is a *prvalue* (with deduced type `T`), it can be bound to the `T&&` in the move constructor for the outer `T{T{}`. Nice. But what if we *do* want to move from an lvalue?

VALUE CATEGORIES AGAIN, BUT IT'S FUCKED UP NOW

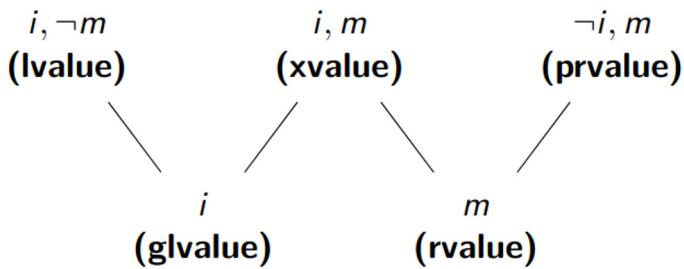
Two key qualities of *prvalues* and lvalues so far are *moveability* and *identity*. In particular, a *prvalue* is moveable and does not have identity, while an lvalue is not moveable and has identity. What we want is an expression value category which denotes “is moveable AND has identity”.



Send more profQUOTES.

THE ENTIRE mathNEWS READERSHIP

Let's talk about `std::move`. What does it do? It sure doesn't move anything, I'll tell you that. You might've heard that it "marks lvalues as safe to move from". What? How? What does that even mean? In fact, `std::move` doesn't do anything of the sort. Here's the honest answer: given an object x of type T , `std::move(x)` just casts x to a $T\&$, i.e., an rvalue reference, so that it can be passed to a move constructor. That's literally it! That's how it "marks" an lvalue as being safe to move from, it just creates an rvalue reference to the object. There are some interesting specifics for the implementation of `std::move`, but I won't talk about them here. But there's something interesting happening here, right? Let's let E be some expression. Clearly, `std::move(E)` is *moveable*. And evidently, `std::move(E)` also *has identity*. To be precise, it identifies E (or, if E is a prvalue, the temporary materialised by E). This is that third value category we were looking for! Let's call it an *xvalue*.



This is the full list of value categories since C++11. It's why I started calling rvalues prvalues, because in C++, xvalues actually count as rvalues, Huh! There are some things other than `std::move(x)` which are xvalues, but it mostly encompasses explicit casts to rvalue reference, and member/array accesses of xvalue-designated objects. Another interesting thing is, while xvalues *do* have identity, and do have a concrete place in memory, you can't actually use the `&` operator to get their address. Some compilers will let you override this rule and do it anyway though, because there's no technical reason why not. The C++ committee mostly made it this way so that xvalues are consistent with the behaviour of rvalues, i.e., we can't take their address. But if your compiler is nice enough, you could do something like `&std::move(3)` and get an address at which the number 3 lives. Huh.

EXPRESSION EVALUATION

That actually explains how most of the value category and move semantics stuff works, but there's one last weird thing worth looking into, and it's expression evaluation. So, let's say we do something like this:

```
T x;
T&& ref = x;
T y{ref};
```

Logically, one might infer that, since `ref` is an rvalue reference, the move constructor will get called when initialising `y`. But this won't happen! Instead, the copy constructor will be called. What?

You might also infer that if you do something like `T x`, then the expression x has type T , right? Somehow, you'd be completely wrong. While x was indeed declared as a T , the type of the expression x is a $T\&$, that is, lvalue reference to T . What?

It turns out that the type of an expression is entirely determined by its value category. This is a small weird thing that's necessary to make things like move semantics really work. More formally, if we have an expression E , then upon evaluating it, the compiler will take the *underlying, non-reference type* T of the expression, and decide how to designate it as follows:

1. If E is a prvalue, then E has type T .
2. If E is an lvalue, then E has type $T\&$.
3. If E is an xvalue, then E has type $T\&&$.

This is probably the most practical part of this article, and if there's anything you take away it should probably be that. It's one of the weirder quirks of expression evaluation and it could actually cause unexpected behaviour in your code if you don't understand it.

Anyway, that's a bit on move semantics. Maybe it makes more sense now. There's also the distinct possibility that it makes *less* sense now. Oh well. There are a few details I left out because this is already way too long and, let's be honest, is anyone even reading this right now? One of the more interesting rabbit-holes that you could go down from here is looking into how `std::move` is actually implemented. It's a bit of template magic that would also send you into figuring out something called the *perfect forwarding problem*. You should do it!

jeff

Now comes the complainer. Someone who is used to programming in languages other than C++. Languages that may or may not begin with J...

BRAD LUSHMAN

AS SEEN ON YOUTUBE — THE JOY OF (CHEAP) PC BUILDING

You've probably seen it, a YouTube video showing off some insanely cheap billion core Intel Xeon or AMD Opteron (if you have any interest in computer hardware). But give the video a watch, and you'll soon realize that there is indeed a catch with these old, retired server CPUs. Being older parts, they tend to consist of slower and less efficient cores that will be both slower and feature a higher power consumption per-core compared to a modern counterpart. Furthermore, the slower per-core performance also means that many common use cases, such as gaming, will not be able to take advantage of the extra cores, which effectively erases the advantage of going the old server processor route. For reference, a 12-core Intel Xeon E5-2651 V2 server part is outperformed by the entry-level, but much more recent, 4-core AMD Ryzen 3 3300X on certain benchmarks.

So naturally, I decided to build a system on the Intel LGA2011 platform, an old server socket hailing from around 2011–2013. For what purpose, you may ask? The fact of the matter is that for a long time, I had no use for a high core count system with rather slow per-core performance. (Neither do most people, which is what makes these old server parts so cheap). However, this all changed after a few discussions with a friend who was also going to be my roommate for the next semester. We had planned to set a server at our Waterloo residence that would handle a number of rather heavy tasks, such as code compilation, as well as a large number of Linux containers to perform various tasks. (In layman's terms, a bunch of tasks that called for lots of CPU cores.) Suddenly, the prospect of a cheap, high core count system built from old server parts sounded like a perfect match. After all, use in a server was what these parts were originally designed and built for (albeit on a much larger scale than what we had planned).

After settling on the platform, it was time to buy the parts and build the system. Very quickly I began to reap the rewards of going with an old server CPU. I ended up with the aforementioned 12-core Intel Xeon E5-2651 V2 at the bargain price of \$20. However, this was only the least interesting part of the build. The motherboard was a Chinese model built using some critical components (the chipset, specifically) scavenged off of old servers. As sketchy as this would sound, the board which I acquired for \$80 ended up working with no issues to my surprise. One major benefit of purchasing a sketchy Chinese motherboard over a used server motherboard is the lack of nonstandard parts, owing to its nature as a non-OEM part, as well as improved consistency in regard to pricing and availability. One of the unique features of old enterprise-grade hardware (and the new stuff too, but that stuff is crazy expensive) not found on consumer grade platforms is its support for buffered ECC memory. ECC, which stands for error correction code, is a technology that allows for greater reliability of the RAM modules. However, buffered ECC is also incompatible with Intel Core and AMD Ryzen consumer CPUs making it completely useless to most individuals. Thanks to my shrewd negotiation with a Kijiji seller, we settled right in

the middle of 64GB of ram for only \$70! All that was now left was a cheap case and a CPU cooler.

Thus, I had done it, completing the build for only \$200 plus some odd parts I already had lying around (namely the storage and power supply). As I assembled the system that night, I christened it "Shinjuku," after the bustling ward in Tokyo and also the setting of a number of animes I had watched. Today, Shinjuku sits on my desk as it awaits deployment next semester in Waterloo, serving as a testament to my bargain-hunting abilities. Looking at it I can only imagine what it would be like when first and second-gen AMD EPYCs (up to 32 and 64 core CPUs respectively) begin to flood the markets cheaply after the day when companies like Google and Facebook finally deem them inadequate. I guess that's when the fun starts! In the meantime, I would definitely recommend anyone looking to build a computer to at least look into old server parts, especially in today's hardware market.

tokyocatboy

MOVIE REVIEW: 12 ANGRY MEN

Last night I finally got around to watching *12 Angry Men*, a 1957 courtroom drama directed by Sidney Lumet. Now, at first glance the movie might seem like an hour and a half of watching 12 middle-aged white guys sitting in a room yelling at each other in black and white. And yeah, that's what it is. But its execution is so fucking *perfect*.

Gradually, over the course of the juror's discussions, you're able to piece together the case the movie is based around. More importantly, you get to know each and every man in that room: where they're coming from, what they care about, and what their outlook on life is. Each one of them is unique and interesting in their own way, each representing a distinct subset of American society. What started as a (nearly) open-and-shut discussion about the case becomes so much more, with some incredibly powerful scenes and messages.

The most masterful part of all this is that you never actually see anything beyond the single room the entire movie takes place in. You never see the murder, the trial, or the lives these men live. All you get are second-hand discussions and hints. It's hard to imagine this making for a fulfilling story, but through the expertly crafted dialogue and interactions between the characters, you're able to build a full picture of it all. Not a single line is out of place, not one argument is wasted. And by the end of the movie, you're as invested in it as any of the men in that room. ★★★★★

Procvia

THE PANTS PROBLEM

When I was in high school, many years ago, back in the Before Times, a friend asked me a question. This question has stuck with me over the years, bouncing around in my head. Today, I want to share this horrible question with you, fine **mathNEWS** reader. The question, disarmingly simple, should not be trusted. Abandon all hope, ye who continue reading.

Tell me, dear reader, *how many holes does a pair of pants have?*

As far as I can tell, there are three common responses. Let us now go through each of them, and you can decide which you identify with the most.

THERE ARE TWO HOLES

This is the answer that I like, so it's correct. Those who give a damn about topology will try to convince you that three is more correct, but I think that two is true. To justify my stance, I will be focusing on the physical manipulation of an imaginary pair of pants. Consider a straw. Fold this straw in half, and trim the top half of the fold. Unfold the straw. Boom, a pair of pants with TWO holes. If this does not have you convinced, consider what happens if you hold a pair of pants vertically, then drop it. Boom, two holes on the ground, and so pants have two holes.

THERE ARE THREE HOLES

This is the most obvious solution, and can be argued for in a number of ways. The first is simply counting the number of apparent holes on a pair of pants, which is three. Occam's razor agrees with this, but I feel like there's some kind of fallacy I can play to call bologna slices (B.S.). I asked other **mathNEWS** writers about their opinions on this subject, and they all became quite vindictive, asking me "if I was really going to die on this hill," "if I knew just how wrong I was," and "if I had any understanding of topology whatsoever." I do not,

and honestly I don't give a fuck. Three holes is wrong. If you would like to argue with me, feel free to email me at pants.have.two.holes@gmail.com. Yes, this is an actual email address I have set up. I await your responses, despite how wrong you are.

IT'S A STUPID QUESTION

I asked a prof this question. He thought about it for a few moments, then decided it was a stupid question. Based on the response of other **mathNEWS** writers, I am thinking that this may be the correct answer. Additionally, I feel that this may be a fitting demise to such a philosophical question. This question pushes the boundary between math and philosophy, and hearkens back to the days of natural philosophy, when math was but a flower in Euler's eye.

I then feel that it would be unbecoming of me to offer an objective answer to The Pants Problem, as it is worth more to think about than to actually solve. This is definitely not a cop-out on my part, where I am withdrawing my question after being told I am wrong. I would never do that. If you would like to discuss the question further or to share your thoughts on the problem, I encourage you to email me at pants.have.two.holes@gmail.com.

pants have two holes

FUCK SPCOM

Fuck SPCOM

Fuck SPCOM

ISSN 0705-0410

UW'S BASTION OF ERUDITE THOUGHT SINCE 1973

mathNEWS is a normally fortnightly publication, funded by and responsible to the undergraduate math students of the University of Waterloo, as represented by the Mathematics Society of the University of Waterloo, hereafter referred to as MathSoc. **mathNEWS** is editorially independent of MathSoc. Content is the responsibility of the **mathNEWS** editors; however, any opinions expressed herein are those of the authors and not necessarily those of MathSoc or **mathNEWS**. Current and back issues of **mathNEWS** are available electronically via the World Wide Web at <https://mathnews.uwaterloo.ca>. Send your correspondence to: **mathNEWS**, MC3030, University of Waterloo, 200 University Ave. W., Waterloo, Ontario, Canada, N2L 3G1, or to userid mathnews@gmail.com on the Internet.

mathNEWS is overseen by the Board of Publications, an autonomous board of the Federation of Students, University of Waterloo, hereafter referred to as Feds. **mathNEWS** is editorially independent of Feds and the Board of Publications. **mathNEWS** has never been requested to withhold Improper Content as defined under Feds Policy 71.

This work is licensed under the Creative Commons Attribution-Noncommercial-No Derivative Works 2.5 Canada License. To view a copy of this license, visit <https://creativecommons.org/licenses/by-nc-nd/2.5/ca/> or send a letter to Creative Commons, 559 Nathan Abbott Way, Stanford, California 94305, USA. Terms may be renegotiated by contacting the **mathNEWS** Editorial Team.

ALL I WANT FOR CHRISTMAS IS mathNEWS

You know the tune.

[Intro]

I don't want a lot for Christmas
There is just one thing I need
I don't care about assignments
Worth half my grade due at 3
I don't want to write at home (Ooh)
More than you could ever know (Ooh)
Make my wish come true
All I want for Christmas is **mathNEWS**, yeah

[Verse 1]

I don't want a lot for Christmas
There is just one thing I need (And I)
Don't care about the runtime
of my short decision tree
I don't need to write QED
After the inductive case
Marmoset won't make me happy
with a 'pass' on Christmas Day

[Chorus]

I don't want to write at home (Ooh)
More than you could ever know (Ooh)
Make my wish come true
All I want for Christmas is **mathNEWS**
mathNEWS, baby

[Verse 2]

Oh, I won't ask for much this Christmas
I won't even wish for jobs (And I)
I'm just gonna keep on waiting
For the Safety Office's calls
I won't make a list and send it
To the continuous round
I won't even stay awake to
check for interviews inbound

[Chorus]

'Cause I just want **mathNEWS** tonight (Ooh)
Hanging out as we all write (Ooh)
What more can I do?
Oh baby, all I want for Christmas is **mathNEWS**
mathNEWS, baby

[Bridge]

Oh, all the geese are honking
So loudly everywhere (So loudly, baby)
And the sound of ION's
Rolling fills the air (Oh, oh yeah)
Computer labs are booking (Oh yeah)

I smell those pizzas cooking (Oh)
COVID, won't you give me the one I really need? (Yeah, oh,
oh)
Won't you please give my Prod Night to me?

[Verse 3]

Oh, I don't want a lot for Christmas
This is all I'm asking for (Ah)
I just wanna see my writers
Standing by the MathSoc door

[Chorus]

I don't want to write at home (Ooh)
More than you could ever know (Ooh)
Make my wish come true
Oh baby, all I want for Christmas is **mathNEWS**

[Outro]

mathNEWS, baby

All I want for Christmas is **mathNEWS**, baby (**mathNEWS**)
All I want for Christmas is **mathNEWS**, baby (Ah, oh, ah, oh)
All I want for Christmas is **mathNEWS**, baby (**mathNEWS**)
All I want for Christmas is **mathNEWS**, baby (All I really want,
baby, ooh)
All I want for Christmas is **mathNEWS**, baby (All I want, all I
really want is **mathNEWS**)

girafarig

A CHRISTMASSY, CONSUMERIST AD BREAK

Dashing through my feed
On a 30 sec ad break

Sickly sweet cheer shows
It seems so clearly fake

Brands and adverts trill
Making pleasant smiles

Oh what fun it is to
Go shop and earn Air Miles

Jingle coins, jingle coins
Jingle to the store
I know you have bought some gifts
Why not buy some more?

tendstofortytwo

PROUD MAMA :')

gridCOMMENT 147.4

So I'm just sitting here, barbecue sauce on my [redacted], when I receive an email with not one, not two, not three, but **FOUR gridWORD** solutions in my inbox!! Big improvement from last time, ladies and gentlemen. Hoping to get to a power of 10 next time...

Chicken dinner we have a winner, congratulations to The Bear Pun for your 100% correct submission, and tie-breaker winning **gridQUESTION** answer. Your prize? Knowing that I am proud of you :'). Honorary mention to a third **gridSOLVER** that just needed to spell Olsen correctly—you'll get 'em next time, tiger.

Some **gridQUESTION** answers from last issue, which was "Which cheesy couple's costume would you be willing to wear?":

- Marauder: "π & τ"
- K9_delta and churned milk: "Soldier bf and medic gf (from TF2)"

- The Bear Pun: "Male/female electrical plugs"
- C team: "George Bush and the shoe that was thrown at him"

Seems like my **gridWORDS** are not as puzzling (*ba dum tss*) as I would like... This week y'all are off the hook but be PREPARED for some more difficult, and maybe a bit nonsensical, gridWORDS to come. You have been warned.

This **gridWORD's** theme is "What Show is it Anyway?". The **gridQUESTION** for this issue is "Which TV villain isn't really a villain?".

Please email your **gridWORD** solution attempt to mathnews@gmail.com by 6:30 PM on Monday Nov. 15 with your name or a moniker, and your answer to this issue's **gridQUESTION**.

eternally puzzled

ACROSS

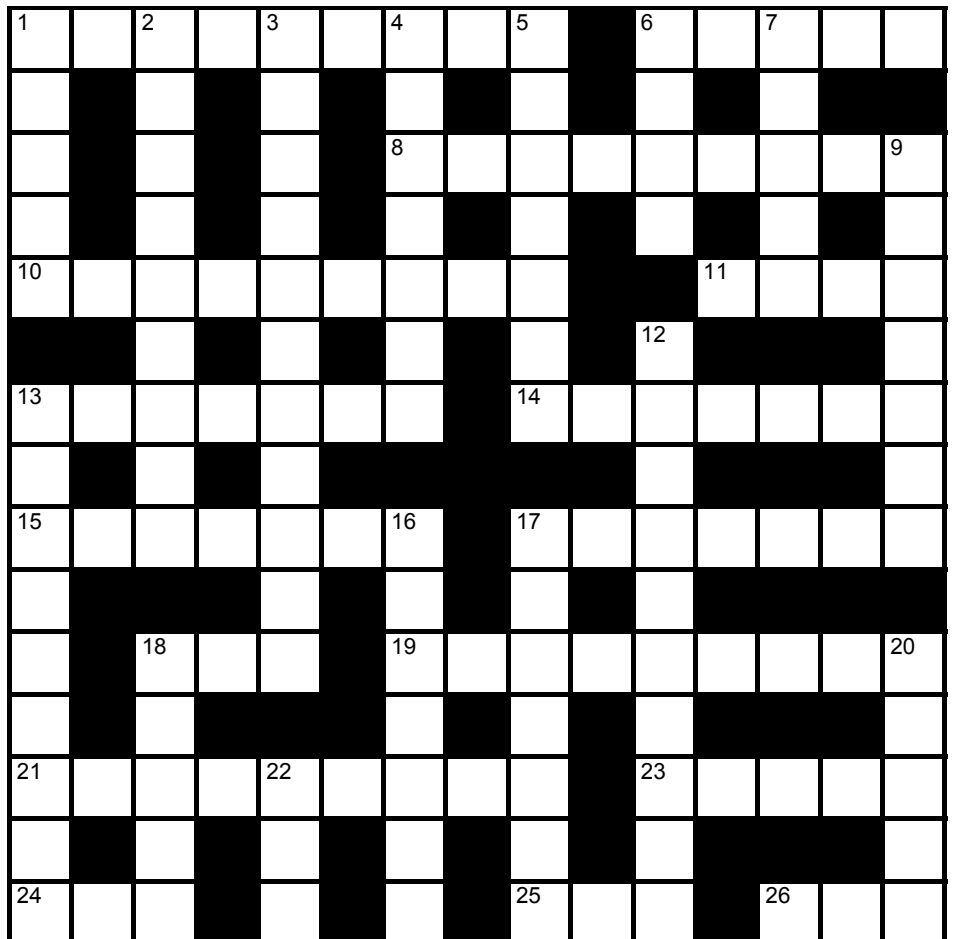
- TV sitcom with a tight-knit study group. (9)
- Zoey's cousin in How I Met Your Mother. (5)
- Longest in Africa. (4,5)
- Flashy people, or a song by Lady Gaga. (9)
- Doctor that cheats with Spencer in Pretty Little Liars. (4)
- Freud. (7)
- Mother-daughter comfort show, with [Down 18.] (7)
- You say this when you (politely) want to contribute to the conversation. (3,1,3)
- Captain America is one. (7)
- Garden Of Eden. (3)
- What the Pogues are doing [for] the cross in OBX2 (9)
- You say this when giving someone something (4,3,2)
- What a group of [Across 17.] do. (5)
- Transactions Per Second. (3)
- Contrary to no. (3)
- United-Statesian Creepy Tale, properly, abbreviated.(3)

- See [Across 14.] (5)
- With [Down 17.], arguably the best ongoing medical drama (5)

- Me, and appears twice in the puzzle section this answer is in. (3)

DOWN

- What Joe Goldberg does around town. (5)
- Sesame Street's sassy queen. (4,5)
- It's a series of these types of events. (11)
- Acquired a negative/positive charge. (7)
- Village in England where there's a lot of shouting, probably. (7)
- Protagonist of a show, in other words. (4)
- ____ Have I Ever, ft. a Canadian teen actress (5)
- Surgical instrument used to gouge out bone. (7)
- Beloved childhood show, whose host left suddenly in 2001. (5,5)
- Victorious spin-off, if a cat was a hat. (3,3,3)
- A cat was in a hat, according to this author. (2,5)
- See [Down 20.] (7)



lookAHEAD

SUN NOV 7

Daylight Savings Time changes — remember to set your non-online clocks!

MON NOV 8

Waterloo Works continuous round (Cycles 3-6) begins

TUE NOV 9

WED NOV 10

THU NOV 11

Remembrance Day

FRI NOV 12

SAT NOV 13

World Kindness Day

SUN NOV 14

mathNEWS 147.5 Production Night

MON NOV 15

Day of Declaration of Sovereignty in Estonia

TUE NOV 16

WED NOV 17

THU NOV 18

Course selection results for Winter 2022 released

FRI NOV 19

mathNEWS 147.5 released

SAT NOV 20

LAST ISSUE'S gridSOLUTION

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B | A | C | O | N | T | H | U | R | S | D | A | Y | S |
| E | O | A | | | A | H | | | | S | | | A |
| P | U | M | P | K | I | N | S | H | I | V | E | R | S |
| A | B | I | C | K | G | H | O | S | T | F | R | | S |
| I | N | | | | | | L | | | | | J | |
| E | Y | E | O | V | A | L | S | Y | I | E | L | D | |
| N | | | | | C | D | E | A | | | | | |
| T | H | A | N | K | I | O | N | I | C | H | B | O | O |
| S | E | A | N | | E | | | | | H | R | | |
| L | N | | | | T | H | U | M | B | I | | | |
| A | L | G | E | B | R | A | D | E | C | A | D | E | S |
| S | E | | O | | | | E | A | | | E | | T |
| H | A | L | L | O | W | E | E | N | | | T | H | R |
| | | | | | | | | | | | | | E |

HOW DO YOU DO, FELLOW READERS? AN EDITOR'S ATTEMPT TO BE RELATABLE

Man, this **mathNEWS** issue really was something, huh? Bunch of great articles, some awesome artwork, discussion on various body fluids... there really is something for everyone at **mathNEWS**.

Now, some of you might try to one-up me and say, "Well, I read the entire issue and found *nothing* that was up my alley!" For anyone who did say that... congratulations, you walked right into my trap!

You see, this entire thing was a setup. Now that I know that you have content in your mind that we don't, I can tell you to come write for us!

Come write for us! We'd love to extract all the juicy content from your brains, and apply it all over the next issue!

Wait, crap. Too creepy. Revert to human language.

Anyway, yeah! We'd love to have you come write for us. According to the **lookAHEAD** directly above me, the next production night should be on November 15. If you'd like to join us in-person, we meet at the MathSoc office on the third floor of MC at 6:30PM, and then occupy a classroom. (Don't worry, we ask for permission so it's okay.)

If you can't make it, that's totally cool! If you go to our website's mailing list section here: https://mathnews.uwaterloo.ca/?page_id=21214, you can sign up to be informed on when the next production night is (I know you already know, but bear with me here). If you indicate your interest, we'll send you a link to the **mathNEWS** Discord server. Once you're there, grab an editor (our names end in -ED) and get them to make you a WordPress account. Once you have one of those, you can write articles!

One paragraph of instructions. It's that simple. Write for **mathNEWS**!