

“WHAT WAS THE BEST THING THAT HAPPENED TO YOU THIS TERM?”

Next term, I'll be taking a break from **mathNEWS** and won't be editor for what feels like the first time in forever. So, I'm going to keep the promise I made in the secret editor chat and “maybe get sentimental idk”.

When I started preparing to come back to campus this term, I was excited to go back to normal. But, I was also worried that being back would be disappointing, that maybe campus life would just be my pandemic life with slightly more sun.

It turns out I shouldn't have worried. This term was as amazing as I hoped it would be, and I owe a lot of that to **mathNEWS**. You haven't lived until you've had to wrangle hordes of hungry writers into one coherent pizza order, and to the new friends I've made here, my only regret is that I didn't get to know you earlier.

Reading that back, it sounds like I'm about to die, so I want to clarify that I'm not going to, and will be back in two terms.

But, even if I was going to die, I'd be confident that **mathNEWS** has a bright future. 44 pages of content? Scores of new writers (whose articles you should read right after this)? Clearly, **mathNEWS** will outlive all of us.

Not that I plan to confirm that any time soon.

god ⚡ peED
Editor, **mathNEWS**

ARTICLE OF THE ISSUE

We're giving out another lifetime achievement award for cy's **mathNEWS** cookbook. I'm sure you've seen those hand-drawn illustrations gracing the pages of this volume, and if you haven't read the recipes or the writing that accompanies them, you're missing out.

cy, come pick up your gift card at MC 3030. And maybe also cater a production night sometime?

god ⚡ peED
Editor, **mathNEWS**

- PREDAP** | Actually getting to interact with more than a handful of the same people for the first time in a while
- VINCENT** | Got elected as MathSoc VPA for Winter 2022.
- 別** | Joining **mathNEWS**
- SOMEBODY** | The curse remains.
- JEFF** | The worst thing that happened to me this term.
- APHF** | Avenged my father
- SECRETSQUIRREL** | Changed my major
- TLC** | Grew a third eye
- BOLDBLAZER** | Nothing. In fact, it was quite the opposite situation.
- A COOL PEN NAME** | Got on a plane (and escaped Manitoba)
- DERIVING FOR DICK** | Creating a bodily fluid schism
- CC** | Discovering myself
- WALDO@<3.LE-GASP.CA** | Marrying Soviet Canadian, and having an impromptu **mathNEWS** reunion with BeyondMeta, Zethar, and IceNine in celebration <3
- hu** | Met many new people I would consider friends. Whether or not they consider me friends is of separate concern entirely.
- SQRT(CAUSE)** | Bombing FYDP.
- AVERAGE ANIME ENJOYER** | anime
- X** | Was avenged by some dumbass that thought he was my son
- LEMMAN** | Getting in person and actually meeting people
- SKIT** | My birthday being on prod night
- ETERNALLY PUZZLED** | seeing people solving my gridWORDS
- ME** | Congrats to Waldo *Proceed to crouch so my name is hidden*
- EVILEVIEVIL** | Everything and Nothing.
- SOPHERICAL** | Watched Soul with a friend :)
- TENDSTOFORTYTWO** | Built a decently priced gaming PC (yes, including GPU!)
- FINCHEY** | Ate an AUTHENTIC Philly cheesesteak sandwich.
- MATHEW** | found four FREE cornstalks for free
- BIPED** | Recalled the names of many people
- CLARIFIED** | Saw some friends after a long time.
- GOD ⚡ PEED** | Got some free cookies.

See you next term! Don't get killed by finals!

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

mathASKS 147.6

FEATURING PROFESSOR CHARLIE CLARKE

CLARIFIED: WHAT WAS THE RATIONALE BEHIND THE CREATION OF CS 497? WHAT DO YOU HOPE STUDENTS WILL TAKE FROM THE COURSE?

CS 497 lets us pilot new ideas for CS courses. In the winter there are two offerings (<http://csatuwaterloo.blogspot.com/2021/10/new-winter-2022-cs-courses.html>). Professors Grossman and Brown will offer a course on “Computing and Discrimination.” They are both brilliant researchers and fantastic teachers. I highly recommend the course.

I am also teaching an offering of CS 497, which has the much less exciting name of “Design Project,” which is perhaps the course you're actually asking about. While Engineering students undertake a final-year capstone design project, very few Math students do. Maybe that's because the current offering (CS 492 / 493) consumes two electives that could otherwise be used to take courses like “Computing and Discrimination.”

My offering of CS 497 will pilot a single-term version of a capstone design project. Students form teams that work together on a project of their choosing. The course gives students the opportunity to work in teams on open-ended, large-scale computer science projects. The course will be structured so that students participating in our (non-credit, non-academic) e-Capstone (<https://uwaterloo.ca/math/entrepreneurship-and-innovation/cs-e-capstone>) will be able to obtain academic credit for the e-Capstone activities. The course itself will contain additional content beyond the e-Capstone and can be taken independently of the e-Capstone. A student can take one or the other, or both.

CC: IS IT EASY TO TEAM UP WITH CS STUDENTS FOR CS 497 IF YOU'RE AN ENGINEERING STUDENT?

Engineering students can't take my version of CS 497 since they have their own capstone design courses. However, I would be open to proposals that have CS students working on a common project with Engineering students who are taking an Engineering design course. We would need the permission of the instructor offering the Engineering course. Talk to me.

GOD ♯ PEED: IS IT CHEATING IF I WORK ON THE mathNEWS WEBSITE AS A POTENTIAL CAPSTONE PROJECT?

If you are proposing an “open-ended, large-scale computer science project” related to the **mathNEWS** website, talk to me. Otherwise, no, it's not going to be a thing.

BOLDBLAZER: WHEN IT SAYS “CAPSTONE” IS IT SIMILAR IN ANY WAY TO AP CAPSTONE STUFF?

I had to google “AP Capstone.” They both use the word “capstone” as a metaphor and neither teaches actual masonry, so I suppose there is some similarity.

QUANTUM GOOSE: HOW WAS LIFE IN NEWFOUNDLAND LIKE BEFORE, DURING, AND AFTER THE COLLAPSE OF THE COD FISHERIES? WHAT IS THE BIGGEST IMPACT, SOCIETAL OR OTHERWISE, OF THE MORATORIUMS THAT NO ONE TALKS ABOUT?

I'm actually not quite old enough to really remember life before the collapse of the cod fisheries. All of my grandparents fished for a living, but many of their descendants (who did not run off to be professors or doctors) suffered from the loss of their livelihoods. Few people ever got rich fishing off the coast of Newfoundland, but while there was always poverty, people could more-or-less support themselves. Within my memory there were many people with no toilet or running water, and only a wood stove for heat in winter, but at least they had fishing as a source of food and income.

Even that changed when the cod stocks collapsed. People whose families had lived independently in tiny villages for hundreds of years now found that they had only two choices: depend on government support or leave for elsewhere. In the 1980's and 1990's the unemployment rate in Newfoundland was often above 20%, and I chose to leave for elsewhere. The oil boom changed everything again, and for the last 25 years things have not been so bad, I think. Unfortunately, we can't keep digging up oil and burning it without destroying the planet. So with no cod and no oil, I'm not sure what the future will bring. I've haven't lived there for many years, so I really have no idea.

CLARIFIED: WHAT WAS IT LIKE TO BE A PROGRAMMER IN THE 80'S? HOW WAS SOFTWARE DEVELOPMENT DIFFERENT THEN?

For me personally, the three biggest technical advances since the 80s have been smart pointers, “pip install,” and mosh/tmux. Also, neural nets work now. Otherwise, things are surprisingly similar. Probably the biggest non-technical change is that “programmer” is an established job that lots of people do. In the 1980's (in Newfoundland anyway) being a programmer was not considered a good job (or even a job at all) and most of my family were confused about why I was not going into medicine. I probably agreed with my family, but I got addicted to programming and math, and I couldn't stop myself from doing them. So, here I am, instead of wherever I would have been if I had just listened to my mom.

SKIT: WHAT'S YOUR EXPERIENCE WITH THE REST OF THE FACULTIES?

I used to be the Director of Software Engineering, and I regularly collaborate with people in Management Sciences, giving me a very positive impression of Engineering. I don't know much about the other faculties at the moment. As an Associate Dean, I imagine I will get to experience more about them. I recently got to fly the flight simulator over in the Environment Faculty, so I'm feeling very positive about them as well.

ANONYMOUS: WHY DID YOU DECIDE TO GO INTO RESEARCH?

I started doing research with a few professors during my undergrad. Continuing research as a graduate student at Waterloo gave me my way to leave for elsewhere. After grad school I likely would have gone to the Bay Area, but I received a tenure-track faculty offer from Toronto, which was too good a thing for me to decline. After a few years, I moved back to Waterloo, and here I am. Teaching and research is incredibly fun, but I would have been just as happy to be a programmer. They are both great jobs, with different kinds of impact.

WALDO@<3.LE-GASP.CA: WHAT EXCITES YOU MOST ABOUT DATA AND INFORMATION USE RESEARCH? HOW DO YOU FEEL THINGS WILL PROGRESS IN THE FUTURE?

This is truly the greatest time to be in Computer Science and Math since well before my time. Every day brings a new thing. Also, neural nets work now. Things will be crazy and wonderful in the next ten years, unless we destroy the planet. I guess we'll see.

STONER: DO YOU HAVE ANY PARTICULAR INTEREST IN ROCKS? HAVE YOU EVER SEEN A ROCK THAT EARNED A PLACE IN YOUR MEMORY?

I've been to Uluru, which is certainly an impressively large and memorable rock.

BOLDBLAZER: DO YOU THINK THINGS WOULD HAVE TURNED OUT DIFFERENTLY IF YOUR LAST NAME STARTED WITH THE LETTER S?

I guess I would have to say, "That's Scarle with a silent S," much more often than I do now.

PREDAP: HAVE YOU THOUGHT ABOUT UPDATING YOUR WEBSITE RECENTLY? IT WAS LAST TOUCHED IN 2017, AND IT'S STILL PRETTY BAREBONES. YOU GOTTA MARKET YOURSELF, YOU KNOW?

Thank you for your advice. Feedback is a gift. A long time ago my site¹ had lots of stuff on it, but now sites like LinkedIn², Google Scholar³, DBLP⁴, and github⁵ do a much better job of maintaining information about my professional interests. If you are my "friend," various social media sites do a much better job of maintaining information about my personal interests. Since I created that site long ago (by directly writing html with vi) I've been steadily removing stuff and replacing it with links. Thank you for reminding me to update it again by removing some more stuff and replacing it with some more links.

1. <https://plg.uwaterloo.ca/~claclark/>

2. <https://www.linkedin.com/in/charlie-clarke-7714a82>

3. <https://scholar.google.com/citations?user=TkV1eDIAAAAJ>

4. <https://dblp.org/pid/96/3666.html>

5. <https://github.com/claclark>

CIX: HAVE YOU DECIDED ON A NEW YEAR'S RESOLUTION YET? IF SO, WHAT IS IT?

I'm working on it, but no decisions yet. If you have any suggestions, talk to me.

QUANTUM GOOSE: HOW DO I GROW LUSH FACIAL HAIR SUCH AS YOURS?

I dunno, it just shows up. Maybe if you wait a little longer?

TOLLOW PRINCESS: WHERE IS YOUR FAVORITE TOILET ON CAMPUS?

The one on the third floor of the Chemistry building is usually nice and quiet, unless I've ruined it now.

profQUOTES

PMATH 340: TOMÁŠ VÁVRA:

- “ It's better, but in a sense, it's worse.
- “ This set lies on a circle, which is a compact space—so if you add some topology, you should be excited, like “Oh!! An infinite sequence on a compact set!”
- “ For some physicists, 3 would be a pretty good approximation for pi, I heard.

PMATH 930: ROSS WILLARD

- “ Pretend that you're attending a good lecture, okay?
- “ *[Yelling excitedly]* THEOREM TEN POINT THREE!!!
- “ As was noted in mathNEWS...

MATH 247: BLAKE MADILL

- “ Triple majors just means bragging rights until you graduate.
- “ The analysts keep retiring!
- “ It's all computational, you don't need any help.
- “ Give me any theorem in algebra or group theory and I'll be able to state it... probably.
- “ Oh no! You're gonna make me do math??
- “ I'm gonna wear 8 masks.

'ΕΤΥΜΟΛΟΓΙΑ

Etymology. Checking the Wiktionary, we see it was derived from Middle English's ethymologie, which itself was derived from Old French's ethimologie, which was derived from Latin's etymologie, which was derived from Ancient Greek's ἔτυμολογία, from the adjoining of ἔτυμον (the true sense) and λογία (the study of).

But it doesn't end there, does it? ἔτυμον is the conjugated form of ἔτυμος, a word derived from ἔτεός (that which is true or real), from the Proto-Indo-European *set- (that which is stable or true). And as a general rule of thumb, all that is pre-Proto- is unknown. Hell, even Proto- is a mystery.

I bring this up not to make any sort of deep point, mind you: the amount of linguistics I know can be succinctly described by ∅. Over the past few months, however, I have been snailing my way towards some understanding of the Chinese language, a process in which etymology has been immensely helpful.

Chinese characters originate from a variety of formation methods. One such method, for example, is the one many non-speakers (wrongfully, through no fault of their own) think comprise the majority of characters: pictographic. Here, in essence, we have primitive Bronze Age images, carved in stone and bone, that over the millennia evolved into their final form. 日 for sun, or 羊 for sheep. That doesn't look much like the sun, nor a sheep, you may wonder. And I too wonder: where along on this long road we call life did your imagination crawl off to die? When in the slow encroaching of civilization, as empires toppled and rose up again; when on this ever-turning wheel of birth and rebirth did we lose that simplistic sense of creativity and joy our ancients once held, engraving meaning into stone and sun onto bone?

But I must reiterate: no deep points here. Back to the characters.

Next we have the characters formed by associative compounding. Sounds deceptively complex, but they boil down to multiple pictographics together—an almost rebus-esque construction. 果 for fruit is just a picture of orbs 田 atop a tree 木. 茶 for tea is a person 人 harvesting leaves 艹 from a plant 木. Here again the history is rich: in 家 for family or home we have a pig 豕 under a roof 宀. Did this represent the pigs literally under a home, on account of them being built on stilts? Or rather that pigs were allowed free entry into homes? Or maybe home was where one cooked pigs?

Indicative formation is easy enough: 一 means one, 二 means two, 三 means three (as a side note, 口 is mouth: if you're looking for zero, enjoy 零), 上 is above and 下 is below. Just point to exactly what you mean. 本 is the root of a tree: the line tells you where to look.

And last that we'll be covering, but by no means least, we have the bulk of character formation: the pictophonetic. Each of these symbols consists of two components: one meaning and one sound. For example, 苹 (píng) for apple: the grass 艹

component suggests something botanic, while the 平 (píng) details how the character is to be pronounced. What does 平 mean? Flat, level, average. Not at all anything to do with apple, but that's not the role it was meant to serve. After all, 草 (cǎo) sounds nothing like apple, but that's not the role it was meant to serve either. We all play our part in the greater picture. Not that we're getting deep or anything.

Do the sound components have to match perfectly? Not really. Take 忙 (máng), to be busy. The heart 忄 suggests the meaning while 亡 (wáng) suggests the sound. Perfection is overrated.

Do the sound components have to match at all? Not really. Take 眼 (yǎn), the eye. An eyeball 目 suggests the meaning while 艮 (gě'n) supposedly suggests the sound. And even this does not begin to account for the character simplification process, imposed by the government in the fifties and sixties in an effort to raise overall literacy. The medicinal 醫 (yī) had a wine jug 酉 suggesting the meaning while 毘 (pí) suggested the sound. Can that be read from its modern form 医 today? Some of the simplifications are not without criticism: how poetic is it, that to make 爱, they took the heart 心 out of love 愛? Language moves with history. Nothing wears the test of time.

But the remnants of the past cling still, unwilling to be forgotten. Through the characters of the present, we return to the lifetimes of the past, stories painting a tapestry of ages we'll never see. For what is more good 好 than a woman 女 with her son 子? And what abandonment is greater than to, with two hands 卅, discard one's own child? To pray for the happiness of another 祝 one 兄 stands before an altar 礻. To do obeisance 拜 one extends the hand 扌 and offers crops 丰.

But the past does not care for the morals of the present. History is history. A wife 妻 is a hand 卩 pulling a woman 女 by the hair 十. An ethnic group 民 depicts an eye pierced with a sharp instrument: to enslave by blinding.

Again and again, there is no depth to be found here. Dig through any language and you'll find such shadows, skeletons in the back of the linguistic closet. History is history. And my, is it so wonderfully intriguing, no?

Formations and etymologies fetched from YellowBridge dictionary.

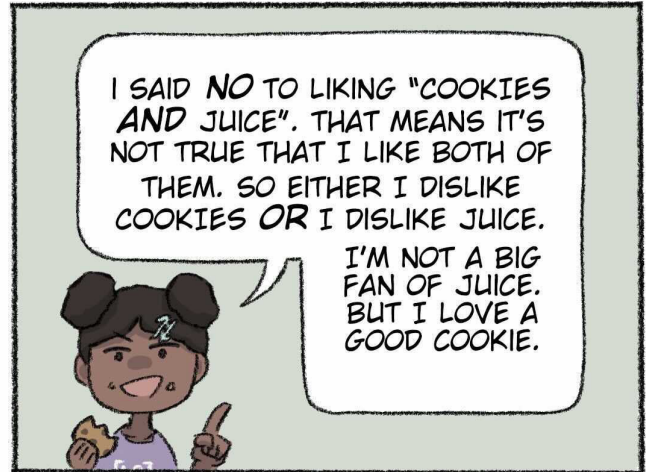
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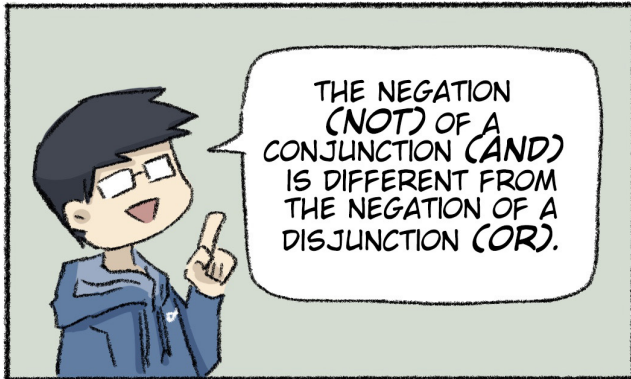
EPISODE 30: DEMORGAN'S LAWS

It's the final MathSoc Cartoons episode for this term! Enjoy Episode 30 of the MathSoc Cartoons series: *DeMorgan's Laws!*

MATH 135: DEMORGAN'S LAWS

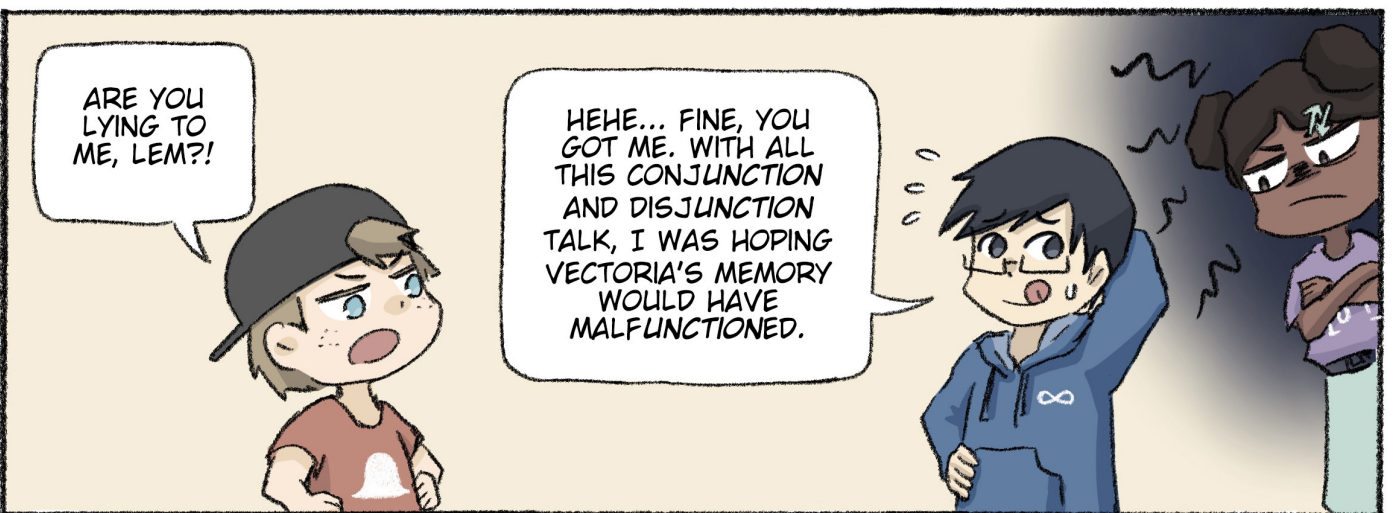
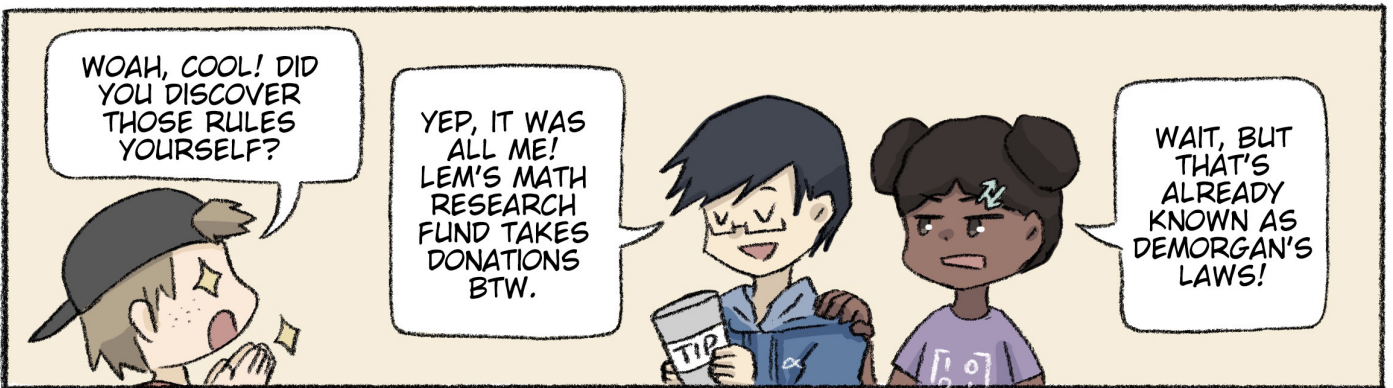
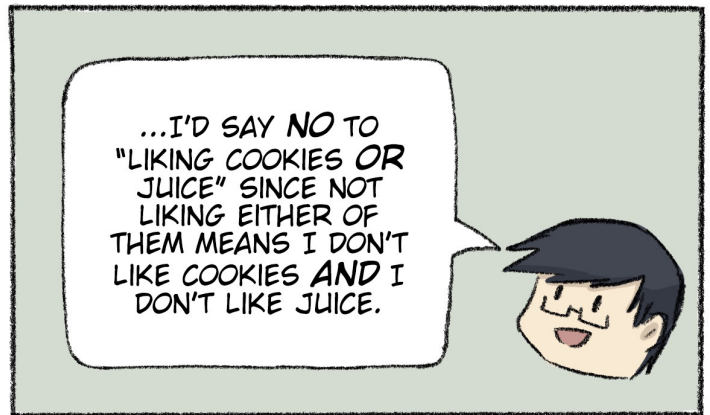
STORY BY: CAITLIN KWAN, ART BY: LISA WEI





A	B	$A \cap B$	$A \cup B$	$\neg(A \cap B)$	$\neg(A \cup B)$
✓	✓	✓	✓	X	X
✓	X	X	✓	✓	X
X	✓	X	✓	✓	X
X	X	X	X	✓	✓

\cap : "and" \cup : "or" \neg : "not"



THE CONFRONTATION

I was deep in DC tryna' get work done
 Staring right at my screen contemplating the fun
 I'd be having if I spent more time in the sun
 Maybe once in a while I would go on a run
 Then out of my Mac suddenly came a person
 He looked just like me but years younger for certain
 I had no idea what had left my computer
 But then he said "methNEWS, you're me from the future"
 I had to believe him despite the surprise
 I could tell he was me by the look on his eyes
 So I made myself look more mature and more wise
 Ready to talk to young me and advise



PAST ME:

I came over here from years back in the past
 I just started uni and I want to ask
 How is your life now that you're almost done
 Studying in Waterloo, was it any fun?

PRESENT ME:

It was pretty good, I'm glad I am here
 For some time it was hard to maintain my cheer
 But I pressed through the dark storms until it got clear
 Now I am better than ever, this is my best year

PAST ME:

Does that mean you have a job in the bay?
 With grades in the 80s that are here to stay?
 And a girlfriend who makes us happy every day?
 Is the life that I've wanted soon coming my way?

PRESENT ME:

I did just receive a good job in Cali
 It's no Google or Facebook but it is worth a tally
 My grades aren't perfect but they're good enough
 I made it through courses that were pretty tough
 Then joined awesome clubs and found out some talents
 I had all this time but for years I kept silent
 And made many great friends, but I have to point
 That I am single now, if I must disappoint

PAST ME:

Are you telling me you are now twenty two
 And so far no partners ever been with you
 The 40-Year-Old Virgin is all coming true
 Is this worth the hell I had put myself through?
 I did this so one day our fun will not stop
 I worked hard to get us to be at the top
 I thought you would reap from the path we have walked
 So how come you achieve only half we have sought?

PRESENT ME:

Listen here methNEWS, you should just relax
 Forget what you aimed for and hear out the facts
 I took us off from the tail of the class
 And put us in a place where we're happy at last
 You're right that I didn't achieve all our goals
 But that isn't worth the torment of our soul
 There's one thing I learned from the years growing old
 Hard work should be our pride and not our toll

PAST ME:

You sound like you lost your competitive edge
 From all future bets I could ever hedge
 I'd never guess you'd lose the skills that I fledged
 Those skills that I worked to get us off the ledge
 The ones that are left are so few and meager
 Cause you gave them up for your life to get cleaner
 Then you act calm with a gentle demeanor
 And wonder why I'm getting meaner and meaner?

PRESENT ME:

You're talking 'bout all the fun you desire
 But wouldn't leave your room if it was on fire
 Your needling complaints are just turning me tired
 I got our mind the quiet it required
 Is it too much to ask for a pat on the back
 From the me that was me back when my life was fucked
 But instead you come here with your mindless attacks
 Makes me feel like I'm being hanged
 So cut me some slack
 And think back on the life I had in your time
 I rarely could feel a brief moment of shine
 Lucky for you I took manners into my hands
 But you haven't yet so how could you understand
 Now leave me alone
 You wanted your future? Well, you got it shown
 Or you can stay here to complain and to groan
 Either way you can consider me gone

PAST ME:

Alright I admit it I made some mistakes
 But please hear me out for both of our sakes
 I promised this wasn't a plan I devised
 I wanted to know what in our future lies
 I hoped this knowledge would make my mood rise
 But it turned our brain to the Lord of the Flies
 And now that I know that all that I want
 Still doesn't lie in the near future's front
 How can you ever make this thing bearable
 What can I learn from this rap battle parable

PRESENT ME:

You are the problem that you have to solve
 Until you can do it you cannot evolve
 There is no outsider people to blame
 Young me or old me it's all of the same
 So when you took all of your anger on me
 It is because in your heart you can see
 We are the source of our own misery
 But we're also the source of our glee
 And now you can take your trip back to the past
 Knowing how to improve our life at last
 I still haven't mastered it myself at all
 But knowing is the first step at the battle

PAST ME:

Thanks to your help I can now go away
 But the doubts that I shout at myself will still stay
 Life will still be a challenge, be that as it may
 I can now see that better things are on the way



There once was a time I would go through my issues
 Find me some guidance and use up some tissues
 But why waste so much time healing old scar tissues
 If instead I can use them for **mathNEWS** issues
 Talking to therapists can be expensive
 Writing a huge poem is sure more intensive
 You might want to try it next time that you feel
 Your Waterloo life is getting too real
 If you pour your heart to it with great devotion
 It will help explain your most complex emotions
 And you'll end up with a song that really kicks ass
 And only three weeks behind in every class

mathNEWS

A PARODY AND A PUN

"Twas the morn of the new year when all through the house,
 Not a creature was stirring, not even a mouse.
 I slept by the shelf where my effects would rest:
 A notebook and pen for myself to express.
 When up from my slumber I suddenly rose,
 Called to create, to pen, to compose!
 I grabbed for my tools (just barely awake),
 And to work I went before even daybreak.
 A mere moment it took once I'd gathered my thoughts,
 To write down the discourse that slumber had wrought.
 Future me—I felt sure—would decipher the clues,
 The figures I scribbled at a quarter past 2.
 The goal now accomplished and with high self-regard,
 To my cot I returned with many thanks to The Bard.
 Content once again, I fell soundly asleep,
 Knowing dawn would arrive with a humorous treat.
 In stitches was I when I told the joke,
 But laughter took time from my friends to provoke.
 With the following wish for the pun that I write,
 Good laughter to all, and to all much delight!

(clears throat)

"Are you aware that you are super, Human?" Asked the Wolf.
 "I am aware, Wolf," said the Human.

Tad Cooper

ISSN 0705-0410**UW'S BASTION OF ERUDITE THOUGHT SINCE 1973**

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WHERE'D OSAP ABOUT TO HAVE BEEN GONE, BUT LIKE NOT NOW, LATER, ALSO ALREADY HAPPENED, AND WOULD HAVE BEEN BAD TO HAVE HAPPEN AGAIN AND STILL WOULD?

OUSA (OR AS IT'S ALSO KNOWN, BIG WUSA) HAS SOME THOUGHTS, I'M HERE TO SYNTHESIZE THEM INTO SOMETHING LESS COHERENT.

(Note to reader: hahah this is a joke, jk... unless? The opinions of this article are not necessarily those of **mathNEWS**, all that jazz.)

Ah, the joys of looking through governmental budgets. The euphoria of reading transcripts of committee meetings attended by those geezers in Ottawa and Toronto that phone you every two or four years. To the *very* well informed among you, I suspect the news about losing nearly nine hundred and seven dollars a person is less than wholly surprising, and the *impossibly* well informed may even realise that, as students we actually only lost the *possibility* of those checks with an extra grand. Let's catch those first two groups up to speed and politely inform the third why alarm is justified.

Some background: OSAP is that thing that gives you money for school. OSAP gives you money and you say "Oh wow! A new coat!" and proceed to waste that money on things like textbooks that you could've stolen for free. Controversially, students like to have that money, just in case they want to make it through the term on more than day-old C&D bagels from E7 (everyday at 5:30).

You know *who* continually insists on my toroidal carbohydrate habit? Why our S.C.I. touting, green belt paving, research defunding, provincial government.

Despite our protestations, tuition rises annually...

(Take this time to grumble audibly that the administration is up to their shenanigans, while I nod consolingly.)

...which means that OSAP needs to match pace to ensure the Ontario populace of snot-nosed teens can become debatably informed adults. Let's take it as a given that this is a good thing. It's also not up for debate that most students, without their parents' support, benefit from social assistance in education. This comes with a begrudging acknowledgement that until we escape to Cali we'll be paying it forward via taxation. At the end of the day most of us recognize the value in social support for education, if not because taxes are fun to compute, then at least because of our distaste for schools whose names are exclusively in Latin. Luckily enough the federal government (for now) concurs, and this year increased the national budget reflects the ever growing need, doubling the Canada wide student grant.

I mean, it's not free education, but it could easily be worse. For this year we can nearly pretend that's the case. In effect \$400,000,000 (0.4B) of that increase was shipped to Ontario

Students. Distributed amongst the annual recipient pool of undergraduate and graduate students numbering about 441,000, this amounts to that \$907 number from earlier.

Where we, as students, might see the possibility of greater financial freedom, or an extra month's rent, the Ontario government instead realised they could have their cake and eat it too. How can you balance your budget of subsidizing polluters and pestering Toronto City Hall? Well, by taking advantage of the opportunity to redirect the now "available" \$400,000,000 (0.4B)! Putting it towards bulldozing another endangered species' habitat, evicting yet more homeless camps, or burning through it on highways across the Georgian Bay, who cares? Not like students vote or anything. Seeing the expansion of federal funding the provincial government resumed its crusade against student interests, withdrawing that same value from OSAP. If you, for instance, don't even use federal assistance, this is, in effect, a thousand dollar loss, and is a sharp warning for those of us who do not have support at home.

This was not a coordinated effort to move funding to the national level. Other provinces like British Colombia have seen to expand student supports both provincially and nationally, providing assistance to education in alignment with Canadian values...

...and yet *our* provincial government shows no sign of slowing down clawbacks on education spending through 2022. For now they hide behind the claim that the funds were simply "shifted to address COVID-19," setting up for next year seeing all those dollars disappear into the bureaucratic ether. Research funding is piss-poor, and OSAP is cannibalised for their own nefarious works.

This isn't even the first time in the past two years they've gone and pulled this crap. If we set our time machines for the before times we can locate the mystical year of 2019 where not only was tuition mercilessly cut by 10%, burdening our international friends with the difference, they simultaneously went and slashed \$700,000,000 (0.7 B) making upcoming institutional budgets unnecessarily tight.

While at the end of the day we as students didn't strictly lose anything out of pocket, the clawbacks undo the needed support, and prime future students to be royally screwed. While organizations like WUSA, and OUSA the GSA, and even the fledgling organizeUW are trying their best, infighting and a lack of unity among the student body are making life difficult.

While I could get into impacts of policy on campus, like those of policies 9, 11, 16, 18, 30, 33, 46, 62, and 73, the WUSA governance structure, the Ontario Universities Act, Ontario Regulation 941, and how they form an unholy slurry, resulting in an adversarial relationship between students, staff and professionals, sowing discord between undergraduates and our TAs. In general our interests are aligned: providing a quality education at the University of Waterloo. The time has come to acknowledge the real silent antagonist on campus:

The best selling vehicle in Canada.

$\sqrt{\text{cause}}$

Student issues don't often get the same media attention that they deserve, but so you're given plenty of time to clear your schedule, the next provincial election is slated for June 2nd, 2022.

Further reading:

1. https://www.ousa.ca/newsroom_osap_clawbacks
2. <https://toronto.ctvnews.ca/ontario-government-main-tains-overall-education-spending-has-increased-through-the-pandemic-but-is-allocated-differently-1.5654353>
3. https://www.bcbudget.gov.bc.ca/2021/pdf/2021_Budget%20and%20Fiscal%20Plan.pdf
4. <https://uwaterloo.ca/secretariat/policies-procedures-guidelines>

N REASONS TO AVOID TELLING YOUR TAs ABOUT ORGANIZEUW

OrganizeUW is a labour union of graduate TAs, RAs, and Sectionals in the process of syndicalising. That's nice an all, but what would push a math student over the edge and fail to inform their lovely TAs of the benefits of singing up with CUPE?

- Failing to realise the term you wrote is synonymous with the marking sheet
- Using non-spherical surfaces in the Derjugin Approximation
- Not accepting the assumption that gravity is negligible
- Ignoring the simple fact that dividing by zero means you can write the next line of your proof as anything you want it to be
- Misunderstanding the number of holes in a pair of pants
- Considering MC a building of inherent architectural beauty
- Purchasing food outside of the plaza and the C&D
- Mentioning what they had as their coop in your current term

$\sqrt{\text{cause}}$

methNEWS REVIEWS: GETTING A MASSAGE

The following is a true story that happened to me a few months ago. It was a very traumatic experience that I can only write about now that my emotional wounds have healed (or more accurately, have been overshadowed by larger emotional wounds from exam season).

A while ago my parents convinced me to try going to a masseuse. I initially objected, since I saw no reason to need a massage when all I do is sit around on a computer desk curled up in a shrimp position. But they told me my insurance plan covers massages for some reason, so I decided to go out of spite for capitalism. The first thing I noticed was the astronomical number of salt lamps. Like, waaaaay more salt lamps than any sensible person should legally be able to buy and keep in one place. Also, the music they played was this fusion between a catholic monk choir and 1980s trance music. The vibe of discomfort and awkwardness they achieved in that room transcended time, religion, and culture. It was beautiful.

I'm a guy, but I wasn't really comfortable with asking for a male masseuse because it's 2021 and it's time for some god damn change in this society. Well, that didn't matter at all since they only had one staff member there and it was an old Russian woman. I'm fully Russian, so I want to clarify I have nothing against the people themselves. But it's important to note that Soviet people just don't give a shit about your feelings. If you lived to see the Berlin Wall rise and fall, you probably don't care about the personal boundaries of a 20 year old kid with anxiety. So I was quickly told to lay down on a bed next to salt lamp #37, and the massage began.

The **second** the masseuse touched me she told me I was the most tense person she has ever seen. I wasn't sure if she meant physically or emotionally, but I agreed either way. I was very uncomfortable, so I tried to deal with the situation the same way I dealt with my MATH 136 exam: close my eyes, breathe deeply, and just wait for it to be over. I don't think that helped, since she kept periodically berating me for not being relaxed enough. I don't know about you fellow **mathNEWS** readers, but an old Russian woman yelling at me to be relaxed and asking me if I'm scared isn't exactly my idea of a chill time. She then gave me the helpful tip to pretend I'm asleep to relax my body, which was hard to do because I don't usually sleep while someone gropes my arms with oil-covered hands. At one point, I think the psychedelic radio station they were using somehow malfunctioned because Beyonce's "Crazy in Love" started playing. At that rate, I realized that soon I'd be able to relax my body to the calming sound of "Straight Outta Compton," which made me feel a lot better about the whole experience.

Overall score: $\frac{3}{5}$ salt lamps.

SPEEDRUNNING UW

I believe that there is a speedrun available on the UW campus. I shall refer to it as UW Bridge% which is self-explanatory. Basically, the goal is to cross every bridge on the main UW campus. There are plenty of bridges on campus all over the place, that for years I've thought that there ought to be a speedrun for it. Also, it fulfills all the stuff that makes a speedrun great:

- There are enough bridges to make it challenging enough.
- The bridges are in all sorts of places, making optimizing the route itself a challenge, and it will require you to be in all parts of campus.
- Because of the number of bridges and a complicated route involved, the memorization of the route will also be part of the challenge.
- Because some bridges close after a certain point in the day, the timing of the speedrun will also be an important factor. Thus, the speedrun will need to be done during hours where there is likely to be other people present in the route, adding a random element in the speedrun.
- The same also applies to non-human obstructions, such as stairs and doors, as not all bridges are on the same level.
- Doubtless, there will be some exploits found (somehow), which will be incredibly interesting.

Of course, there will need to be some criteria, definitions, and rules in place. The following are just the ones I came up with, and some will probably change slightly as it becomes more developed.

1. Crossing a bridge means that a person must enter through one portal and exit through another. This one seems obvious. I only use the word portal to mean the entrance and exit to unify all possible things that may be placed at the entrances of these bridges under one word.
2. If a bridge covers two levels (such as the one between MC and DC) then you only need to cross one of the levels to count it as crossing the bridge. I think it is a bit much in needing to cross the same bridge twice just because there are two levels.
3. You can start anywhere on campus, but you cannot start within a bridge. I think this will make defining a discrete start and end easier. You can start and end the timer wherever you want on campus as long as it isn't within a bridge. I think this basically makes it so that the speedrun will always start at a portal of a bridge.
4. You must stay within bounds. For example, if there are stairs involved in a route, don't jump off the railings to go down a set of stairs faster. Just stick to going down the stairs the usual way. I think for the purposes of safety, this rule must be in place.

5. The attempt must have some video proof. Is it going to get to the point where people are called out for splicing? I hope not. It better not.
 6. Just so everyone is clear on this, the bridges I'm referring to are the ones within Ring Road, and that one bridge that crosses over Ring Road to E5.
- N. It may be that more rules are needed as this speedrun is developed.

I think the only parts that are debatable is what exactly counts as a bridge. Do the connectors between buildings that are underground count as a "bridge"? I think it should be included, as it still is a connector between buildings, even though it isn't a pure bridge in an architectural sense. This leads to the other debatable part which are those buildings that have distinct names but are conjoined (such as the STC-B1-B2 conjoined building). For these, I don't think going through one set of doors between the STC part and the B2 part, as an example, should count as a bridge.

Now what is remaining is to find out exactly how many bridges there are, and to scout out what a possible route may be, but I can't do that until at least the spring term next year. So, if someone is actually willing to do all that before I go back to UW, then by all means, feel free to do so.



Alongside UW Bridge%, I also propose UW Building% where instead of crossing every bridge once, you need to go in every UW building at least once.¹ It seems similar enough to Bridge% that you pretty much just need to modify the same rules slightly for it to work.

boldblazer

P.S. If it turns out that such a speedrun already exists and I was never informed of it for over 3 years at UW so far, then this article was a waste.

P.S.S. For those who originally thought this article was about speedrunning graduating from UW by doing the 8 terms (or less with 5+ courses per term) in less than 3 years, I hope you weren't too disappointed with this.

1. In this case, I think the STC-B1-B2 conjoined building would count separately as 3 buildings because of each part having a distinct name.

**I have sufficiently blown
your minds today.**

PROF. GORDON CORMACK

LES PISSÉRABLES TRACKLIST

1. Prologue: Piss Song
2. Prologue: On Piss
3. Prologue: Valpiss Arrested, Valpiss Forgiven
4. Prologue: What Have I Piss?
5. At the End of the Piss
6. I Pissed a Piss
7. Pissy Ladies
8. Fantine's Piss
9. The Runaway Piss
10. Who Am I? (Piss)
11. Piss to Me
12. The Urination
13. Pissing on a Butt
14. Master of the Piss
15. The Piss Scene
16. The Piss / The Thénardier Waltz of Piss
17. Piss Down
18. The Pissery
19. Japiss' Intervention
20. Pisses
21. Épissnine's Errand
22. The PPP Café / Yellow and Yellow
23. Do You Hear the People Piss
24. In My Piss
25. A Heart Full of Piss
26. The Piss on Rue Plumet
27. One Piss More
28. Building the Urinal
29. (Pissing) On My Own
30. At the Urinal
31. Japiss's Arrival
32. Little Piss
33. A Little Fall of Piss
34. Night of Piss
35. The First Piss
36. Piss with Me
37. Bring Piss Home
38. Dawn of Piss
39. The Second Piss (Death of Pissroche)
40. The Final Piss
41. The Sewers / Piss Drinks Piss
42. Japiss' Soliloquy
43. Pissing
44. Empty Bowls at Empty Toilets
45. Every Day / A Heart Full of Piss (Reprise)
46. Valpiss's Confession
47. Wedding Chorale / Pissers at the Feast
48. Epilogue: Valpiss' Death
49. Finale: Do You Hear the People Piss? (Reprise)

Deriving for Dick

N REASONS WHY CUM IS BETTER THAN PISS

- Cumming is done less often than pissing, meaning it is funnier when it happens.
- The word cum sneaks into normal conversations in the form of the word "come." This is especially funny when done unintentionally, and us comedically-educated folks can just give each other that look that's like, "Heh. They said cum."
- Cum won the poll two issues ago.
- The hard "C" sound at the beginning of cum is more phonetically pleasing than the "P" at the beginning of piss.
- Cum is more delicious.
- Cum is more nutritious.
- Cum is more suspicious (which is funny because of hit indie game amogus).
- Cum is more Fergalicious.
- Cum is more diverse. There are two types of cumming but only one type of pissing.
- Cum has anti-aging properties. In fact, your biological clock only ticks forward when you are not cumming.
- Cum is in our university slogan.
- Because I said so.

Cumthusiast

A RESPONSE TO "N REASONS WHY CUM IS BETTER THAN PISS"

The article named in the title is a blatant ripoff of the article [n reasons why piss is better than cum](#) that was published in 147.4. This plagiarism will not stand, and shows that the cum camp (the "cump") are so unoriginal that they must stoop to simple plagiarism to accomplish their goals.

Long live big piss.

Enthusipiss

N INTEGERS $\in (3,3)$

- \emptyset

Lemman

AN ELECTION SYSTEM PROPOSAL: PART 3

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

In the last part of this article, I presented a three-step method of choosing the winner of an election with a ranked ballot. However, there is a flaw in step 2 of this system. Let's say that, in addition to our five candidates, Trump is running for election. Suppose that the results are this:

- A vs. C: 53% to A
- A vs. S: 71% to S
- A vs. K: 64% to A
- A vs. V: 72% to A
- A vs. T: 99% to A
- C vs. S: 65% to C
- C vs. K: 79% to C
- C vs. V: 62% to C
- C vs. T: 99% to C
- S vs. K: 51% to S
- S vs. V: 67% to S
- S vs. T: 99% to S
- K vs. V: 58% to K
- K vs. T: 51% to T
- V vs. T: 99% to V

No one here is a clear winner or clear loser. Therefore, step 1 and 2 both do nothing and we move on to step 3. But, if you really study the results, you'll notice that there are two cycles in play. Cycle one is that A beats C, C beats S, and S beats A. Cycle two is that K beats V, V beats T, and T beats K. You'll also notice that every candidate is in exactly one of these cycles, and that, if you pick any candidate from cycle one and any candidate from cycle two, the candidate from cycle one beats the one from cycle two. One way of thinking about this is that cycle one itself beats cycle two. Therefore, no candidate in cycle two deserves to win, so the entire cycle can be eliminated.

You may think that we should add this provision about cycles beating other cycles to the election system as step 2.5 (or maybe step e, if you are feeling irrational). However, things can get even more complicated than this. For example, if there are nine candidates, there can be three cycles of three; call them C1, C2, and C3. It is then certainly possible that C1 beats C2, C2 beats C3, and (you guessed it) C3 beats C1. Let's call this a supercycle. If there are at least 18 candidates, you can have two supercycles, one of which beats the other. And of course you can have three or more supercycles forming a supersuper-cycle. And there is nothing stopping us there. It is also possible to have a supercycle which is beaten by a cycle, and other things like that. Clearly, it would be impossible to add provisions for all of these cases as new steps in the voting system. What is needed is an algorithm to handle all such cases without even needing to think about how many superⁿ-cycles are in play.

To find such an algorithm, it helps to explicitly write out a principle which guides steps 1 and 2 of the system: if a majority prefers candidate X to Y and X does not win, neither

should Y. Of course, it is impossible to maintain this principle in the case where there are cycles, which is why we have step 3. But this principle is maintained in steps 1 and 2, and is, in fact, much of the reason those steps do what they do. One can also write this principle in a different way: if a majority prefers candidate X to Y and you eliminate X, you must eliminate Y. This will form the core of the algorithm behind the new and improved step 2:

1. Mark the first candidate as the current candidate.
2. Eliminate the current candidate. Also eliminate any candidate beaten by any candidate you eliminated in this step.
3. If there are no remaining candidates, undo the last step.
4. If the current candidate is the last candidate, stop. Otherwise, mark the next candidate as the current candidate.
5. Go to step 2

I am about 99% sure that this algorithm eliminates every possible superⁿ-cycle that deserves to be eliminated ($n \geq 0$) and every candidate not part of a cycle that deserves to be eliminated, without eliminating anyone who does not yet deserve to be. Assuming it does what it is supposed to do, we can now make this step two and not have to worry about trying to figure out just how super our cycles are.

As an added bonus, we no longer need step 1. If one candidate is a clear winner, this candidate will be the only one left after the algorithm runs. This candidate's VI will be calculated and will clearly be the highest VI. Therefore, even without step 1, such a candidate is guaranteed to win. You may claim that we never needed step 1 in the first place. To that, let me say this: what if we had four candidates, where three were in a cycle and the fourth beat everyone in that cycle? Since we no longer need step 1, we can now reduce the system down to these two steps:

1. Eliminate candidates based on the algorithm mentioned earlier.
2. Of the remaining candidates, the one with the highest victory index wins.

So far, I have assumed that this hypothetical election will use a ranked ballot. But is this really the best kind of ballot? I will explore this question in the next part of this article.

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

LET $\epsilon < 0$

N THINGS TO DO ON CAMPUS AND WHAT YOUR FAVOURITE SAYS ABOUT YOU

PLAY VIDEOGAMES AT V1

If you like to spend your time at the eSports lounge playing Valorant, Rocket League, Fortnite, Apex Legends or something of that sort, then you're either a nerd who has their own ergo split keyboard and a god complex about owning a laptop that is not a Mac (and you make sure you remind your Mac-using peers that you have a dedicated graphics card or some nerd computer stuff, I don't know how they work) or you're friends with a person exactly like this. Also, if you're a Kirby main in Smash Bros and all you use is down B to turn into a 100-ton weight; you are the worst kind of person. You are also exactly like me.

PLAY POOL

You don't know how to play pool. I've been here three months and never once have I seen a person playing pool actually know how to play pool.

STUDY WITH YOUR FRIENDS

Let's be honest, there are two types of university students. One type are the ones who haven't bathed since the last time I finished a CS assignment on time (Hint: It's been a long, long time). They can usually be identified by their sweatpants, slippers, and an old t-shirt that has looked death in the eye just to come back for an ungrateful, self-loathing university kid. Or, you're the person who dresses up and goes to DC or SLC with your friends and iced coffee to get 2 hours' worth of work get done in 7 hours (or maybe it's just me and you're super productive). Tip: if you see someone from the latter category wearing a pair of Carhartt pants with some Nike Dunks and a tote bag, RUN.

GO FOR COFFEE WITH YOUR FRIENDS

If I'm being honest, in my brief three months here at Waterloo, some of my favourite memories have been walking to Tim's (or Starbucks cause for some reason, Tim's doesn't have Hazelnut flavouring???) I think as a university student, walking to get coffee is a great way to find some common ground. Lattes or cappuccinos? Simple glazed donuts or diabetes? Hating on your CS course or hating on your math course? Small talk that will result in nothing or sharing your personal favourite childhood trauma? The possibilities are endless.

peanut

REVIEW OF RESTAURANTS NEAR CAMPUS

Pita Pit: They stole my girlfriend's steak, and it's not campus pizza. 1/10

Mel's: Delicious beautiful amazing. Plus you get free jelly :) It's not campus pizza though. 8/10

SLC tim's: Inferior sidekick of inews. Also inferior to DC tim's. And it's not campus pizza. 5/10

DC tim's: I've always liked the DC tim's vibe. But I mean it's still tim's, plus it's not campus pizza. 6/10

inews: It's open all the time which is really great. Otherwise inferior to the nearby SLC tim's in most ways, except for coffee. But also it's not campus pizza. 4/10

Math CnD: Rest in peace. But it's not campus pizza. ∞/10

Campus pizza: They have rats in here :) 10/10

rat looking rat

PROPOSED COURSE:

It has come to my attention that the University has no course dedicated wholly to the study of piss (also known as pee, peepee, and a variety of other euphemisms). I am then proposing a course, part of the Health faculty, that would be mandatory for all undergrad students to take to graduate.

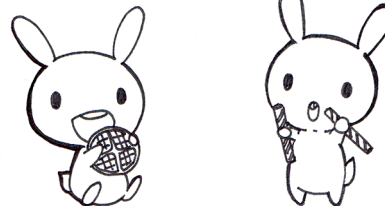
AHS 111: *Piss in popular culture*

This course will focus on the social, health, and political factors that influence piss quality, piss production, and the comedic value of piss compared to cum. Special interest will be placed on the mental depravity commonly found among those who prefer cum to piss. Mandatory for students to graduate with BMath, BArts, BEng, BBA, or BEnv programs.

Possible profs: Enthusipiss

If after reading the preceding course description you think that you would like to take this course, I encourage you to contact your local MathSoc representatives and tell them you desire such a course.

Enthusipiss



CULTURE SHOCK

I've been thinking a lot about the Pure Math Club this term (I spend most of my time there, how could I not). Specifically, I think that something really significant was lost over the course of the pandemic. Organizational knowledge; practices; culture. At the start of the term, we had a team of elected executives who had never once set foot in the PMC office, myself included. Walking in for the first time was strange, and it still is a little strange: a bunch of weird posters from the 90's and mid-2000's line the walls; old photos of people none of us know are pinned and taped up; inside jokes and names of people since graduated are scrawled all over the boards. It's so weird, you know? There's a whole culture and set of attitudes in there—a soul—that just vanished.

There's something really surreal about it. There's so much stuff in the office, and I barely know what half of it is or came from, or why we still have it around. I spent a solid few hours digging through things and mentally cataloguing everything that exists in there, and even today I'm still finding random stuff lying around, in varying conditions and of varying ages. There are several old computers in there with files dating back to at least 2010. There are quote books dating back to the 1990s. For god's sake, the book for keeping track of book-borrowing—last written to in Winter 2020—is the same one they were using in the 1990s. It's bound together by layers of tape, the pages are yellowed, and the front few are falling out. There are smiley-face stickers on some of the books and they're supposedly important, but nobody really knows why.

The best way I can describe it is like a discontinuity. The culture is uniformly mixed and distributed throughout, and club members of years prior added their physical fixtures to the room, building on top of the culture already there. If you made a graph of all the past executives with edges representing them knowing each other, the graph would probably be connected. And then suddenly, over a year later, you have me and the other executives who hardly know anyone who used to be actively involved with the club. It's weird! What values do we uphold? What historical traditions should we continue, and how do we learn of them? What items in the office are worth preserving? What precedent does it set if we don't adequately value our history? Is it okay to change? How much? What was the baseline? Is the “new” culture better? How the hell do we order t-shirts?

These questions make it difficult to selectively abandon parts of the club office. There are a lot of things in that place of which I have no idea regarding their significance or value, sentimentally and sometimes monetarily. “Hey, here are some dirty MEF sticky notes from the 90's! Are these worth keeping around? Did others value them? Should we?” Alright, that particular example might be a bit easy to answer. But what about old photos? Books? A computer filled with past students' assignments, games and in-jokes? Sure, we could keep them, but will it ever matter? Will anyone ever look at those photos again and recognize the people in them? Is it actually important whether anyone recognizes them, or is it more about the principle of knowing our history and respecting

those whose efforts were put in before ours? I don't know the answer to any of these questions, but I wish I did.

I'm sure that the Pure Math Club isn't the only group that struggles with this. I mean, I'm sure even the **mathNEWS** editors struggle with similar things! It's not a particularly unique issue, but the discontinuity in executives definitely makes it a lot harder, since there's nobody around who can help answer these questions for me. I've never been one to place much significance or respect on tradition, but for some reason this club office just brings out a part of me that impulsively cares about it. Maybe it's the “micro” scale of it; or maybe it's the fact that I'm so intimately involved with it, and part of me thinks about how others in five or ten years might perceive and value the things that my friends and I contribute—and whether or not any of it will outlast me.

Evaluator

PMC NOW HAS A SPORTS CHANNEL, AND APPARENTLY I'M VP SPORTS

PMC, seldom known as PMAMCOC, is a club full of nerds who spend most of their time not doing sports, and somehow I was one of the “sportiest” people on the club because I would spam the meeting-plans channel inviting people to join me for soccer or volleyball.

So the Empress of PMC has declared me VP Sports and created a channel for sports activities for PMC members, wahoo! I am very flattered to be called sporty, and to be someone who encourages the nerds to engage in something physical. Come to PMC if you a real one ;3

PMC VP Sports

For the record, although I did once say “there is beauty in mathematics”, I did not then add “and it is me”.

STEPHEN NEW

BE POETIC

THE STORY OF THE MYTHIC QUOTATION BOOK

Once upon a time, when TikTok didn't exist and people used pen and paper to write, lived a wise man. For the sake of simplicity, we shall call him Walsh. Walsh was a genius, fierce scholar of the doctrines of Euclid and Erdős and worked with passion on all that crazy math stuff in a place that is now known as the University of Waterloo.

On a snowy winter day, while waiting desperately for the hot drink he had ordered at Tim's, the idea of his life struck him. The wisdom of his time, the virtues of the people around him, all the poetry and prosaic eloquence should be passed on to the future. So Walsh went to work and started collecting all the wisdoms he encountered in his everyday life and writing them down in a mythic book: The Pure Math Club Quotation Book. The amount of entries in the book grew rapidly and after a couple years it was known around the globe for all the treasures it contained.

Everything went well for a couple years and Walsh became confident about the success of his project. But as nobody expected it, COVID hit and people were forced to stay away from each other. New wisdom could not be shared anymore and the Book of Quotations slowly got forgotten.

Today, we are allowed to exchange on campus together again, debate, laugh and celebrate. But the Book remains unknown. I bet you had never heard of it. And still, there are rumours that the PMC recovered this legendary book and assigned it a new keeper. I can assure you, it has been found. And now you know about it. So share your wisdom, be poetic and make your quotes become known. Maybe, you'll have a chance to end up in the records of the Quotation Book, next to wisdoms of the last millennium.

The Lion Hunter

PS: If you happen to be this Walsh, or to know him, please get in contact with me!

N REASONS WHY EIT IS AN ANOMALY

- dinosaurs and rocks
- literally an entire t-rex
- liminal space hallways. 4 left turns = different floor
- full-size 20th century-era coal mine style mineshaft, dynamite included (behind the movie theatre)
- the 6th floor
- the 7th floor
- free mass spectrometer for daring challengers
- working water fountains

mathEW + ddonck

SIX DEGREES OF REGULAR BACON

We all know the six degrees of Kevin Bacon. Actors do movies with other actors, and if two actors have done a movie together then they have one degree of separation between each other. It is a well-established fact that any actor is at most six degrees away from any other actor, often through Kevin Bacon. This in and of itself is a play on the six degrees of separation, which posits that any person is no more than six degrees of separation from any other person through acquaintance links.

Now, let me tell you about the burger I ate last week. It's called the Hella Nutella Burger, and it consists of a bun (top and bottom), a beef patty, bacon, and, you guessed it, onion rings. Oh, and also Nutella. And if you're reading this and saying, "That sounds gross!", then I'm sorry to tell you that you are a coward with horrible taste. But fine, maybe it's somewhat contentious to say that a burger goes with Nutella. Some pairs of foods go together nigh indisputably, while others may go with foods that go with foods that go with another food. See where I'm going? Through these links, any food can clearly be linked to any other food. Let me give an example. Burgers go with bacon. Bacon goes with pancakes. Pancakes go with Nutella. Each of these claims will almost certainly be upheld by anyone who has tried each of the foods themselves, and together they put burgers and Nutella three degrees of separation apart.

The number of foods that are N degrees of separation from any given food will grow exponentially with respect to N, similarly to the way that the degrees of separation or degrees of Kevin Bacon do. Due to this, I am officially putting forth the idea of the six degrees of regular bacon, which posits that no two foods are more than six degrees apart in this way (It's possible that the six could be decreased to a smaller number, but I'm going to play it safe). On that note, I'm hungry. Time for me to go eat some eggs with Nutella.

someBODY

Growing up I always assumed that Rice was a University founded by my great Rice ancestors, but sadly it is not the case.

PROF. GREGORY RICE

THE ADVENTURES OF PROFESSOR M. GOOSE CHAPTER 3

Suddenly, a dark shadow figure appeared at the doorway. The math student readied their baseball bat, ready to charge.

“Wait, it's illegal to hit old people!” The figure cried out in the stereotypical crotchety old man voice (I can't explain it but I can hear it perfectly in my head). The math student paused for a second.

“Is it?”

Professor Goose shook his head. This was easily googleable information, but of course the student wouldn't bother to check.

The old man, perhaps aware of his precarious position, spoke again. “I come bearing brib- I mean gifts.”



He handed the math student a battered old book with a strange symbol on it. Professor Goose's eyes lit up. He'd recognize that symbol anywhere, as a professor of religious mathematical symbology (Chapter 1). He quickly snatched it.

“This is the symbol of the math god, A. Gaoldenhart. It's far too valuable to give to students!” The student clearly recognized the name, as they made a desperate grab for it, but the professor snapped at her hands with his beak.

Foolish student, you won't suffer enough in the courses if you have access to

“The course notes of A. Gaoldenhart. You'll need this for the trials ahead,” the old man said gravely. “You'll never make it out of this basement alive without it.”

The math student, with their ever-short attention span, had already begun to waltz out of the room.

“Hey, listen!” The old man cried out. “You'll perish if you leave this place. Great danger lies outside this room. You are in the lair of a corrupted math student, one that is too far gone.” A dark look came over the old man's eyes. “He is beyond saving. You must slay him to leave this place.”

The professor grabbed the student. Anything that warranted bringing out the fabled course notes had to be quite serious.

“Why would the portal lead me here? My calculations were perfect, I should be on a beach right now while students watch some old videos.”

“There's been strange happenings in the Theorem-space lately...” the old man started to mutter, but suddenly a large roar was heard above. “Quick, you two take the book and get up there!” The professor and the student looked towards the doorway, and when they looked back, the old man had disappeared.

The student and professor shrugged, then heading towards the door. Right before leaving, the student raised their bat and smashed a jar. The professor gave the student a quizzical look.



“It just felt right.” And they both exited the room.

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

HOW TO MAKE A PEANUT BUTTER BURGER

Peanut Butter.

Patty.

Bacon.

Monterey Jack.

The Peanut Butter Burger is a modern masterpiece in capitalism charging an exorbitant premium for something that any reasonable home cook could make in less time for less money. The Works, in Uptown, has the audacity to charge \$18 for what sums up to maybe five dollars of ingredients. The only acceptable reasoning for this price is the price of innovation. Nobody in their right mind would put onions, peanut butter, and cheese in the same place, but they thought, "What the hell, we already have a burger with Nutella on it, how much weirder can we make a burger?"

All said and done, the burger is, hypothetically, delicious. The unnamed source that ate the burger would "eat it again." I didn't get that burger on my visit, as I prefer to only eat out for food that I wouldn't otherwise make, but with a sample size of one, the odds are promising. Bacon, cheese, and peanut butter are a fatty, salty, crunchy mess that are delicious individually. Together, the sky is the limit.

Ingredients:

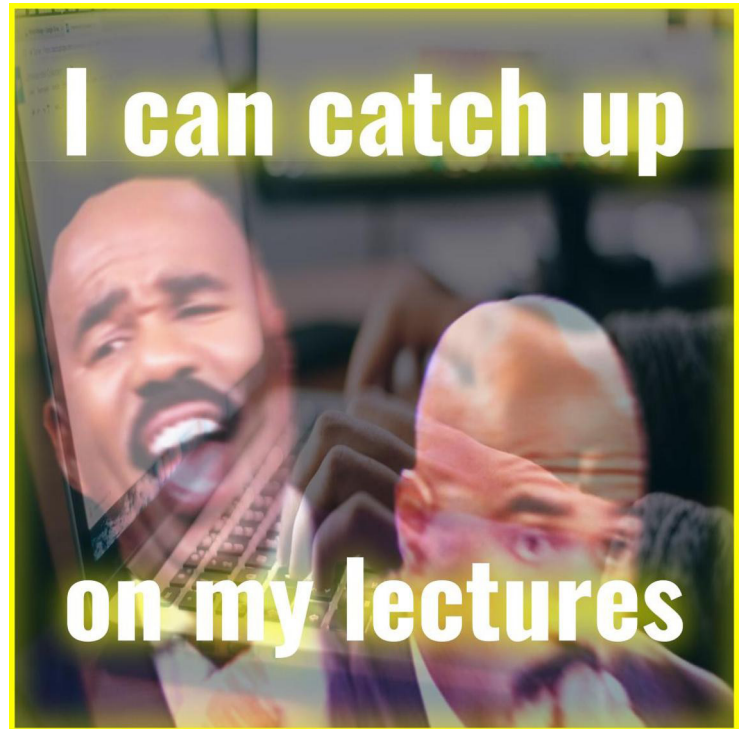
- ¼ lbs ground beef
- 1 slice Monterey Jack
- 3 strips thick-cut bacon
- 2 tablespoons peanut butter
- 1 plain burger bun, toasted

Instructions:

1. Cook bacon in a frying pan until done to your liking. (DO NOT remove the bacon grease from the pan)
2. Form ground beef into a patty and press into frying pan.
3. When the patty is about half cooked, flip it over and place the slice of cheese on top.
4. Cover with a lid and cook until the patty is no longer raw.
5. Remove the burger patty into a plate and use the remaining oil to toast the burger bun.
6. Assemble the burger with peanut butter on both buns and the patty/cheese below the bacon slices.
7. Enjoy your significantly cheaper (and faster) burger.

SecretSquirrel

END-OF-TERM AFFIRMATIONS



Finchey

Send more profQUOTES.

THE ENTIRE mathNEWS READERSHIP

sasmsQUOTES

Last week, **mathNEWS** correspondents attended some Short Attention Span Math Seminars (SASMS) organized by our lovely neighborhood Pure Math, Applied Math, Combinatorics & Optimization Club (PMAMCOC). Even though as a CS major our reporter had very little background on most of the topics covered, they were still able to mostly follow along and had a ton of fun listening to all the speakers. Below are a collection of funny quotes they collected from each talk. Enjoy!

JOSUÉ KURKE — AN INTRODUCTION TO VINOGRADOV'S MEAN VALUE THEOREM

- “You can just take my word for this.”
- “Because we're number theorists, we're only going to be working with really large arbitrary values of X .”
- “Goodbye, orthogonality lemma! I hope you all treasured it.”
- “It's almost like I planned this whole thing.”
- “There are ties to this with the Riemann hypothesis. Ooh! Everyone's favorite mathematical buzzword!”

LÉON BURKHARDT — INTRODUCTION TO MATHEMATICAL LION HUNTING AND A TOPOLOGICAL APPLICATION

- “If you do a lot of math, you might become crazy sometime.”
- “Is it useful? (*shrugs*) Not sure...”
- “Lazy... as all mathematicians are.”
- “I'm gonna do a proof by picture.”
- “Remember boxes?”
- “Let me tell you a joke about statisticians.”
- “This might be a bit... disturbing.”
- “I think we're finally ready to chase the lion. Are you ready?”
- “It's gonna be okay. Stand strong.”

GAVIN OROK — ABSTRACT APPLICATIONS OF THE WEINGARTEN FUNCTION TO FINITE FREE PROBABILITY

- “Why did the topologist's marriage fail? They thought arbitrary unions were open.”
- “If I were to guess, I would say that you can do this.”

LEON YAO — INTRODUCTION TO ALGEBRAIC TOPOLOGY

- “I don't know how to do that either, don't worry.”
- “If you ever played Pac-Man, it's like when you go into one end and come out the other.”
- “Trying to get a mathematical definition of ‘just touching’ is kinda hard.”

PARSA SALIMI — GENERATING COMBINATORIAL CONSTRUCTIONS WITH REINFORCEMENT LEARNING

- “I'm gonna talk about how to use AI and machine learning and stuff to... solve math problems.”

- “Now, graphs are cool, I guess.”
- “This takes a lot of explaining so I'm gonna skip it.”
- “Oops... I removed the definition.”
- “I'm gonna do the most naive thing possible, and hope that it works.”
- “4 vertices. Did I say 4 vertices? I meant 3 vertices.”
- “So I'm just gonna go on Skype and write this from there.”
- “I don't know how to prove it right now but it's not very hard.”

KAVIN SATHEESKUMAR — HOW TO MULTIPLY

- “I'm just a lowly CS major, I can't PMATH as well as you.”
- “You've taken CS 135, and you've noticed programming uses numbers. Shocking, right?”
- “Computer scientists, at least when they were starting out, were not very creative.”
- “When you're trying to perform an algorithm on a data structure and it's not going so well, maybe you're using the wrong data structure.”
- “We went from all the real numbers to 3.”
- “What you get is the system of linear equations your nightmares are made out of.”
- “That doesn't matter. Words are for nerds.”
- “There's an old saying that if something looks like a cow and smells like a cow, it's a cow. So if it adds like a vector and scales like a vector...”
- “It's a cool function matrix and you should probably Google it at some point.”
- “I'm gonna handwave the hacking away of a Fourier transform. But before my magical handwaving, I'm gonna abuse notation a bit.”
- “You don't need to know about any of it, cause I'm not going to explain it, cause frankly I don't understand.”
- “This is known as a discrete Fourier transform because it's discrete and it kinda looks like a Fourier transform.”
- “I initially had all the algebra in the talk, but... (*shakes head*) Guys, you're welcome.”
- “Before I address these concerns, I want to point out a cool fact.”
- “Unfortunately this looks very ugly. Before we make it look nicer, we have some notes.”
- “‘Constants don't matter,’ is a lie spread by evil academics.”
- “Complex numbers are not very original, they stole most of their ideas from other places.”
- “64 isn't even a concept that exists in the integers mod 17.”
- “The real solution is the true computer science solution: Google it!”
- “To my massive astonishment, this whole thing actually works.”

EVAN GIRARDIN, ORGANIZER

- “Fellas, sit the fuck down!”

SHANNON JEFFRIES — DRAWING RANDOM LINES IS MATH, RIGHT?

- “I’m clearly excellent at drawing lines.”
- “I have my lines... I have my outline on my phone.”
- “Here, here, here... I’m not gonna say ‘here’ every time cause that would get annoying.”
- “This is going to take a nonzero amount of time.”
- “If you haven’t done a course where you talk about directed graphs, you may be confused why our edges have arrows. That’s because this is a directed graph.”
- “Normally we don’t draw so many edges, but this is for the aesthetic.”
- “Not scalar multiplication, but, like, true multiplication.”
- “In algebra class we don’t get to see fun pictures very often... that’s why I’m in C&O.”
- “Describe what you mean in non-mathematical words.”
- “What does addition look like? This is both the easiest and the hardest.”
- “We raise our hands in this classroom.”
- “This is addition. It means nothing on the graph.”
- “Need another Greek letter... someone give me a Greek letter.”
- “Cool! At least I hope you think it is.”
- “I told you I was a C&O major. This is where the O comes in.”
- “Basically we’re looking for a basis but I don’t want to explain what linear independence means in this context.”

NICHOLAS PRIEBE — HOW NOT TO PROVE FERMAT’S LAST THEOREM

- “While I get my slides set up, grab a drink of water and emotionally prepare yourselves.”
- “So those of you who haven’t heard the story behind Fermat’s Last Theorem, oh God...”
- “This is the core idea I want you to take away: addition is really fucking hard. Multiplication is easy.”
- “The very first thing you should do when you change a problem is do a bunch of examples. I do three for time purposes.”
- “The first thing you do when you see a pattern is you try to prove it. No... the first thing you do when you see a pattern is you see if it’s useful.”
- “Yay! We’re done! Except no, I’m lying to you, I’ve omitted *so* many details.”
- “When I say exercise [to the reader], I mean it literally.”
- “You do things with addition and divisibility, but that’s gross and takes three pages.”

- “If $p = 23$, there is a trivial counterexample. (*shows slide with two long lines of math*) Anyone could think of that.”
- “There’s a definition there, you can read it, have fun with it.”
- “We can always, always do this.”
- “If you’re doing math and you can turn a gigantic infinite thing into an easily understandable finite thing, you’re gonna have a good time.”
- “Given how much work this was to prove, Fermat was a time traveler. I will not elaborate.”

R. E. Porter

4 FRIENDS AND A BRIDGE



After defeating the naughty Ayam and collecting the 147.6 gem, our group of four friends (made of Sadah Elocin, Vez, Tencinv) have to go back to M3 1006 to restore the peace on Mathworld.

Outside of the ruined dungeon, it is night and the storm is raging. The blizzard makes walking difficult, but they have to continue, for peace, for Mathworld, and also because the power of the bad Ayam is still in place and will delete all the math articles soon.

Our group of adventurers arrive next to a very old bridge.

This bridge can only hold two people at a time. They have one torch, and since it’s night, the torch has to be used when crossing the bridge. Sadah can cross the bridge in 1 minute, Elocin in 2 minutes, Tencinv in 5 minutes, and Vez (who is slow because of he always tries to find N other reasons to add to his article) in 8 minutes. When two people cross the bridge together, they must move at the slower person’s pace. The question is, can they all get across the bridge if the torch lasts only 15 minutes?

“Help us save the world. Please.”

Tencinv

(Solution: Google “Bridge and torch problem—Wikipedia.” However, you don’t have normally access to internet in a blizzard!)

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Page 11

I used to hate holidays, and this was born from a series of disappointments. Year after year, even though my teachers and classmates hyped it up so much, I always woke up feeling sad and tired and went to bed feeling sad and tired on every holiday. But I kept it a secret, because I felt like holidays were supposed to be fun, that there was something wrong with me for not enjoying them when everyone else seemed to.

At some point in school we were tasked with making yet another one of those paper snowflake things that take 6 sheets of paper and a stapler to make. We did this every year and we'd decorate the classroom with them, hanging them from the ceiling or something. But that year, I could not bring myself to do it. I think it's the first school assignment I did not complete.

In general I was pretty cynical and always had to hold the negative or contrarian opinion on everything. After years of always feeling a bit odd around my peers, I met

a person by the name of girafarig who was also like that and we instantly became friends because we liked to make fun of the same things. Except... for some reason, he was a really big fan of holidays. All of them, but in particular Christmas, which I hated the most (or maybe on par with my birthday). Huh??????



ORANGE CHOCOLATE MILK by girafarig

Ingredients: Milk, hot chocolate mix or cocoa powder or chocolate "dessert topping", orange juice.

1. Fill a cup with milk. Mix in chocolate flavoring of choice until it tastes good.
2. Add a little bit of orange juice, to taste.

"As a child, I once went to a distant family friend's Christmas party. I did not enjoy it, and cried on the way home, but I did eat an entire chocolate orange there. The impact of this gave me a singular obsession with the holidays; I got a wonderfully complicated and nostalgic mix of feelings during all of December. This concoction gives me a blast of that Christmas feeling."

As I got older it became easier to hate holidays; it even became the norm. I learned about something called consumerism which is when companies try to make people want or need to regularly buy stuff. Holidays are rampant with it: decorations, presents, sales, rituals. If you look on the internet you will find all sorts of people making fun of that sort of thing. So I stopped feeling weird about hating holidays.

Actually, girafarig told me that he also feels sad on holidays. Maybe even a majority of people do. We're people who tend to feel sad a lot in general, so being happy doesn't come easy, and of course it's not going to come by default on a holiday.

I really did not understand how girafarig could like something that makes him sad. But at the same time, I always wanted holidays to be good, and special. Goddamn it, if they weren't going to be, then we would make them that way.

Holidays still make me sad, and that's probably never going to change, but I like them now. As more years passed I understood that nothing in our lives is truly special at all. Day after day, it's the same thing. The only way to experience something interesting is to make it happen yourself, even if that takes away some of the mystique. So now I just try to enjoy getting ready for holidays, and looking forward to it, and eating the good holiday food. After it's over, I anticipate the next one.

RIP THIS PAGE OUT AND COLLECT THEM ALL TO MAKE YOUR OWN COOKBOOK

RIP THIS PAGE OUT FOR YOUR VERY OWN mathNEWS COOKBOOK Page 12

I think one of the biggest challenges that people have when it comes to the holidays is loneliness. It's ironic because holidays, especially in winter, emphasize getting together with our friends and family. But I guess it's that thing - that it's actually easier to feel lonely when surrounded by people. Especially here at Waterloo, if you are always surrounded by other students whom you could be friends with but you aren't.



"Mozzarella in Marinara" is seriously delicious, and something I'm going to make again during the break, for sure. It's fun to eat but really messy. That adds to the enjoyment of it, though. The food that you eat at holidays tends to be this sort of food that's annoying to clean up, which is okay because it's a special-occasion thing that you only eat once or twice a year. Even if it's by yourself, the novelty (and deliciousness) is worth it.

I wonder how mathNEWS writers will be spending the holidays. Maybe doing nothing, maybe eating some "Mozzarella in Marinara" like evilievil and I will be. I realize that I barely know anything about most people, even those at mathNEWS. That's what's inherently lonely about our existences, I suppose. But through sharing recipes, sharing our experiences, I guess we know one another a little better now. So, thanks for reading, and contributing, to the

MOZZARELLA IN MARINARA

by evilievil

Ingredients: Smoked mozzarella (or any semi-firm cheese), marinara sauce, crusty bread, fresh basil (optional).

1. Reduce marinara sauce to your desired consistency in a saucepan on low-medium heat. Stir occasionally.
2. Cut or tear cheese into slices that are thin enough to not completely sink into sauce but thick enough to be luxurious.
3. Turn heat to low. Gently distribute cheese slices evenly across surface of sauce. Cover with lid to melt cheese.
4. When cheese is melty and gooey, turn off the heat.
5. Serve in pan or scoop sauce out carefully. Make sure to avoid disturbing the beautiful cheese puddles. Garnish with basil and enjoy with bread.

"Five years ago, my wonderful godmother came to visit and shared the recipe for 'Scamorza in Marinara' with us. The original recipe calls for smoked scamorza, but any melty cheese will work. This is the only cheese dish permitted at my family's holiday dinner table because even my dad, a cheese-hater, loves it! It also makes a satisfying single-serving holiday dish for someone who is away from family and friends and stuck in Waterloo like me."

mathNEWS Cookbook

by cy, with recipes provided by various mathNEWS writers, and illustrations provided by girafaring

RIP THIS PAGE OUT AND COLLECT THEM ALL FOR A mathNEWS COOKBOOK

BINARY 敬語 (KEIGO): QUANTIFYING A LANGUAGE LEARNER'S CONFUSION

I have been learning Japanese. There is a certain aspect called 敬語 or “keigo” which can be applied to verbs in certain contexts. However, what if there is more than one verb? Auxiliary verbs are a concept even English speakers are probably quite familiar with. So in an auxiliary construction there are two verb: the lexical (or main) verb, and the auxiliary verb. Now which verb gets keigo?

So each verb has the possibility of having or not having keigo. Calling the inflected form of the verb 1 and the uninflected form 0, we can see 4 possibilities (examples coming later). 00, 01, 10, and 11. Hey, wait! This corresponds to two digit binary numbers. I have now fulfilled the title's claim.

But there's more. A bare verb will have two possibilities, for example, 会います and お会いします. A verb with an auxiliary has four possibilities: 会っています, 会っております, お会いしています, and お会いしております. What if we have another level. If we have a verb, another potential inflection, and an auxiliary, we have $2^3 = 8$ possibilities. Such a combination does exist, and you bet it annoyed me.

- 000 会おうとします
- 001 会おうと致します
- 010 会いましょうとします
- 011 会いましょうと致します
- 100 お会いしようとします
- 101 お会いしようと致します
- 110 お会いしましょうとします
- 111 お会いしましょうと致します

Wow. That's a lot to parse, and I'm pretty sure only two of them are correct. And you would think it would stop there. But no.

- 1010 お会いしようと致しています
- 0111 会いましょうと致しております
- 0100 会いましょうとしています (just for example)

So math can help you quantify your confusion when learning a new language, so you can see just how many possibilities you need to see are valid or not. But wait! We can go deeper.

Each of possibility can either be grammatically valid or invalid. This means that for each possibility, we can assign it the number 1 for valid and 0 for invalid. With this, the number of possibilities goes up to 2^{2^n} if n is the number of verbs. So my confusion about which combinations are valid grows even worse than exponentially with each new addition. So the sentence with 4 verbs will have a whopping 65536 states of validity!

(For those curious, from n = 0 to 4, I'm pretty sure the actual validity states are 1, 11, 1001, 10001000, 1000000001000000 but I'm not exactly sure. There are kind of a lot of possibilities here.)

(Second note, the example sentences are a bit wrong. They are about as correct as saying “The violent clarinets fly colourfully”).

別

THE BEST THINGS THAT HAPPENED TO OTHER PEOPLE THIS TERM

TAD COOPER

Rediscovered a bunch of childhood musicals

NOT A N*RD

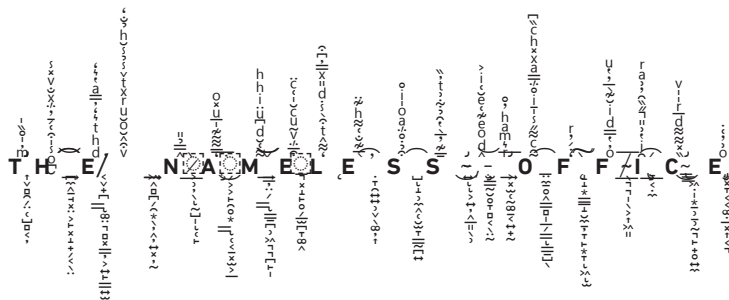
Started fostering cats! Please ask me about them

GIRAFARIG

Had a religious experience under the gaze of the Among Us Staircase

PEACELOVEMATH

Moving into a nice apartment with cool people



Added to this already extremely long **mastHEAD** by contributing absolutely nothing of value. I smile as the air in MC 3030 fills with weeping and the gnashing of teeth. I grin as Indesign crashes over and over again, stuck in a startup loop for all eternity. I laugh at the editors' fruitless attempts to cull this issue's length as I fill **mathNEWS** with LaTeX and cuneiform and empty words and repeated letters. I dare you to stop me now, editors. I'll eat you like I ate everyone else back in 140.2. [Editor's Note: bruh.]

enamoured

My training issue <3

I'm not weeping and gnashing I'm not weeping and gnashing I'm not

PLACEHOLDER ORIGINAL TITLE

Originality is a strange concept in fiction. It might seem simple: being unique will get you more people interested in your story, since it's different from everything else, right?

The issue with this is that humans like habits. The things that we like, we tend to like more of. Hence why so many imitators are spawned from any mildly successful entertainment property. This has been happening for decades, centuries even, and probably for as long as stories have been told.

In fact, many of the original folk and fairy tales were not written down for centuries. There was simply an oral tradition of people taking these tales, adding their own twist on them, and passing them down. So, really, originality is the only reason we got the childrens' stories of today, finely tuned to appeal to childrens' imagination across the centuries.

But alas, things got significantly more complicated once writing was invented and people had a way to make money off of these stories in a significant way, by the introduction of copyright laws. Copyright is a tough balance to strike, as it has to be balanced in such a way that people can profit off of their original ideas while still allowing people to build off of what is there. Whether you think they get it right or wrong, there's a really interesting dilemma that occurs in creating these statutes.

Of course, many countries will simply borrow the laws of other, similar countries to make things a bit easier, only changing a few facets.

Make of that what you will.

It's clearly important for storytelling traditions to thrive that others can develop past ideas. Take the superhero, for example; many of the ideas that would later be grafted onto the Superman mythos were in fact developed by Otto Binder, working on the Superman-inspired character Captain Marvel, who would then bring the ideas back over to Superman when he started writing for Big Blue himself.

It's almost like biological evolution, actually. Taking a basic idea, making a small change, testing if things work, keeping that which does, and discarding that which does not.

Of course, this definition has a word when applied to cultural concepts: memetic. And memes really are the modern evolution of the traditional folk story. Simple ideas produced for the masses that go through dozens of iterations as they change over time. The main difference is the much faster replication time. A meme can go through dozens of iterations in a day, while a folk story is lucky if it changes significantly year-to-year.

This makes one wonder: are memes stories? I would argue that they are, even if a simple one: most have characters, a setting, and attempt to communicate ideas. However, their simplistic form greatly inhibits the potential of a meme editor to really

impact what the meme is saying beyond changing the basic nouns that it refers to.

Once people start editing the more complex stories that permeate the culture, we end up with fanfiction and other fanworks.

Again, this is a memetic process. Those who create a lot of fanwork also usually appreciate other fanwork, and so take their previous knowledge of what has been successful in those works and use them to create their own. Like memes, fanfiction can lose its connection to the source over time as it becomes more abstract, picking up its own ideas and tropes, and generally causing the fandom collective consciousness of a work to drift from the author's original concept.

I find this process very interesting, because it is really a community gaining control over an idea, telling a meta-story to its members through the stories its members tell. This is probably the main reason fan communities and fan culture interest me so much; stories evolving on two levels over time.

Then, of course, there's official fanfiction. Sequels and other stories that build upon previous work, approved by the copyright holder but not necessarily by them or the original creator. While this is much more widely accepted than the unofficial kind of fanfic, it's also a bit strange to consider because even if it has a larger budget and is more subject to profit-seeking goals, it is a derivative work and should be treated as such.

People creating only semi-original work because people already care about the trappings of the story and would be interested in the familiar aspects of the work.

Once corporations realized that they could weaponize this, there was no stopping them. In recent years, they've taken the idea of the crossover, long a hallmark of fanworks, and made them into the corporate crossover, solely aimed towards the generation of capital. I'm talking stuff like *Space Jam: A New Legacy*, *Spider-Man: No Way Home*, and *Playstation All-Stars Battle Royale*, that combine properties owned by the Corporation in a bid to gain our money by appealing to that which is familiar.

Note that this is distinct from the crossovers that do use these other properties to add to their art. Like *Super Smash Bros*, a really great fighting game that uses its characters' attributes as a unique part of its appeal, or *The LEGO Batman Movie*, which uses a bunch of fictional villains to help the Joker question exactly what it means for him to be an antagonist to Batman.

Most of the time, however, crossovers this big just feel wrong, and while a lot of us can bury this feeling under heaps of excitement, it's hard to completely do away with that initial distaste. This is because most of the time these ideas aren't really used to any narrative potential, instead just used to try and attract eyes.

They're unoriginal, and in the worst sense of the word.

I think this is really the key to the difference between using previously existing works for good, and using them for evil. Coming to the works with pure intent and using them to build, to tell a story that isn't there and progress the cultural understanding of the idea? That's usually good; after all, the original creators can't address all the possible permutations of their initial idea.

But if that isn't your purpose, if you just want to use the ideas to sell with fancy iconography and nostalgic symbols?

Well, that's why copyright law exists in the first place. To stop people from profiting off of the basic ideas of others without doing any work of their own. And I really do think this is one of the worst sins a storyteller can commit.

So basically, that's why I'm morally against the MCU.

Predap

WHAT YOUR MATHSOC VPA IS DOING: PART 0

Hello! My name is Vincent, and I'm going to be your MathSoc Vice President, Academic, next term.

I plan to update students in **mathNEWS** every two weeks about what MathSoc has been doing to improve their lives.

As VPA next term, I plan to:

- Fix PD and work term reports
- Make sure student voices are heard
- Work with Faculty to modernize communication courses
- Work with the University and WUSA on a safe reopening
- Improve our clubs

MathSoc has already seen great progress made on PD and work term reports, and I can't wait to see the changes implemented.

Vincent Macri

ADD AN TITLE

This is a sample **mathNEWS** article designed to show a new person how to write a **mathNEWS** article. Pay no attention to it!

guy who really likes titles

IN PERSON ADVICE

Next term will be the first in-person term in 2 years. I will drop in some small protips for math.

- MathSoc lockers come in very handy for you to hide ~~weed~~ things you don't want to bring into your residences. However, it's in high demand and it's first come first serve. Please get hold of their booking date and with the f5 button ready.
- There is a small publication located in MC called **mathNEWS**, they offer free pizza and snacks biweekly as long you are willing to pretend to write a good article. You might also have a chance to meet famous personalities there, just a side note.
- Try to not have classes that are back to back if you have never been in person before. The campus is large and you probably overestimate your walking speed.
- In-person courses tend to be more unforgiving, so be sure to make that adjustment.
- And try to go to your exam 10 or even 20 minutes early, just in case of some misfortune happening on your travel to the exam location. Make sure you visit the location beforehand to familiarize the route.
- There are many bathrooms around the offices in DC upstairs, and in some other buildings, that are low traffic with way better hygiene. Find a couple of them that are convenient for you, then make a mental or physical map around campus for you to use.
- Taking pictures of the blackboard is much less work than writing it down and spending time guessing your own handwriting.
- If you want to ruin your health by buying soft drinks and snacks, CSC and PMC offer below-market prices in their fridge. #notsponsored

me

THOUGHTS

Went out with a friend last week. Barhopped some. Drank the worst Guinness of my life. Friend was having a bad week. Shared our thoughts on some things. Had a candid conversation or two, expressed some dissatisfactions. Wanted to share one of my thoughts with **mathNEWS**.

As we get into finals season and the break, remember to check in on those you care for. Something more than "I'm here if you need to talk." That rings hollow when you convince yourself they don't care. Ask how they are. Really.

Somebody

N UNUSUAL CANADIAN MUST-DO EXPERIENCES

The first time that I heard about **mathNEWS**, I was meeting with some friends to grab a burger. Believe it or not, the place where we were proposed quite a few toppings to add to the burger, including some random stuff like mac & cheese. In the burger. IN. THE. BURGER.

Okay, I may be overreacting. I am not Canadian. To me, this is rather unusual. Then I started thinking. As an exchange student, I've obviously been to some touristic places, plus in natural parks for some hikes. But, what if instead of proposing a list of stuff that would be awesome to do, I proposed a list of some experiences that are objectively not nice but are so typical of Canada and sort of fun in a weird way that it could actually be on a to-do list?

I've given it some thought, asked around, made some research, and I am very proud to present you the result of my investigations. Just be aware that the order is irrelevant and that the following points are very bad advice.

- I don't know if you guys are just used to it or if you just take the car for everything, but public transports here is really bad. Like, ever heard of the train? You know, that fast and ecologic way to go from point A to point B? Well, I dare you to buy a \$10 day pass bus ticket and go from Waterloo to Toronto and back, twice in the same day. And pray for someone to build rails between these two places.
- Since we're talking about transports, a funny thing happened to some friends and I. We were hiking, and on the way back, a Sunday, around midnight, they only had 40 km left of gas and the closest place to refuel was 80 km away. So there you go: being lost in the middle of nowhere because the gas tank is empty is definitely a must-do.
- Okay, I've been complaining about transports. But to be fair, it's really necessary in a country as big as Canada. Therefore, the next item on my list is to cross an entire town, random houses very far away included, by foot. There you go. Good luck. Prepare a lunch and good shoes.
- Let's talk about food. I started this article on this subject, after all. My standards for food are pretty high, especially about cheese. I am French and proud of it. So the \$5 cheddar bars are not cheese. However, just for fun, try it. And hope that you won't die from a cancer 5 years from now.

- One of the things that surprised me most is the fact that carrying alcohol is not allowed. Back home, hanging out in the park with some beers or other diverse alcohol was permitted and very common. It makes me want to go outside and throw a party by the lake. And pretend to be German to escape the fine (yes, I'm French, but German is so much fun).
- I am actually surprised that I went all the way here without mentioning the cold. So far, it's still manageable, but I expect it to be much worse. I don't know if you have ever done it, but as a kid, every time we went to the beach, I used to bury myself in the sand (or my siblings, to be honest). Why not do the same, but in the snow? In a swimsuit, obviously.
- And, since you're at it, go take a bath in a frozen river. Break the ice to dive in, it'll be better.
- Last, but not least, I've been reviewing the worst rated museums in Canada. The winner (or loser, depending on how you look at it) is the Prince Edward Island Shellfish Museum. To elevate your mind, allow me to copy-paste the information that I found on Google: "The museum's purpose is to preserve the history and heighten the awareness of the public regarding the value of the shellfish industry in the local area. Displays include artifacts relating to species identification, the history of oyster cultivation, and the growth and culture of shellfish." Looks awesome, doesn't it? I also selected for you some of the best reviews I found. Definitely worth the trip, if you want my opinion.
 - a. "This museum was a bit boring. But the girl who worked there was so helpful."
 - b. "The aquariums were empty. Disappointing visit, we probably could have saved the admission price, bought a book about shellfish and learned just as much if not more."
 - c. "Found the house on the pictures. No signs of the museum, door closed, tried calling the given number and it went on the answering machine. Yet there were blue signs indicating the way. If this has closed they should remove the signs."

So that's it for now, I'll stop criticizing Canada! Don't get me wrong, I love it here, I am just too sarcastic for my own good.

aFrenchieLostInCanada

So you wake up on Friday afternoon and you see a pink elephant walking down the street getting a drink...

SURYA BANERJEE

RE: RE: mathNEWS 147.3: PENETRATIVE SEX REALLY HURTS. WHAT CAN I DO?

Dear A. Spinster,

I bear good news today from the medical community. Shortly after reading (and rereading again and again) your response to my question, I saw a doctor. A real one! And I asked her how to fix this problem (you and) I've been having. And the remarkable thing is: it is *fixable*. Apparently, the vagina sometimes involuntarily contracts whenever there's pain at its entrance. I didn't know that! In my joy of discovering this marvelous truth about why sex has been so absolutely *wrong* to me for three and a half years, I've decided to write this article. Maybe this will help you too, and give a satisfying conclusion to this intimate, anonymous back and forth you and I've been having.

Now you, dear reader, I'd like to share with you what I've learned—the first being that many many women (and other genders) struggle with this issue in silence. It is annoying, frustrating, and uncomfortable. I've been there. I can't speak for you if you don't do penetration, or if you do it but don't really like it and think it's not for you. That's totally fine. You can talk to that **sexNEWS** guy about it. But to those out there who *want* to do it but can't, here's my advice:

TALK TO YOUR PARTNER FIRST.

This one's been said a million times, and if you've been trying long enough you've probably already gotten used to explaining this to each new partner and checked this box off. Cool.

REFLECT ON YOUR EQUIPMENT.

Equipment here meaning: lube and condoms. Good lube does wonders, and a bad condom does horrors, so try different brands and types.

TALK TO A DOCTOR.

'Loo has a sex health clinic. Call them (519-888-4096). They can do a physical, if you're okay with it, and tell you what's actually going on. There is a certain relief to hearing the problem from a professional. They might recommend pelvic floor physiotherapy. Who knew that's a thing?? But OH-EM-GEE holy crap! There's physiotherapy for doing sex things! Isn't that awesome? They can help you fix a problem just like putting a cast on your leg or giving you antibiotics—your suffering is not inherent to sex!

KEEP TRYING!

I promise you, if this is something you want to do, you can do it. It is not supposed to hurt that much, and you know it, but you can absolutely figure it out. Give it time, take breaks, reward yourself every time you reach a new milestone, and

know that if something isn't feeling right—it can be fixed. And then it will feel *really fucking good*.

mathNEWS Sex Correspondent In-Training

THE IRONY OF FATE/ENJOY YOUR BATH! MEETS WATERLOO

As New Year's approaches, everyone should be made aware of the famous Soviet 1976 rom-com “The Irony of Fate,” also known as “Enjoy Your Bath!”, whose plot centers around a drunken New Year's eve. I don't want to spoil the movie, but the main plot point is that the main character stumbles into the wrong apartment because late USSR architecture was very uniform, and chaos ensues.

Now, how does this relate to Waterloo? Well, recently I had my own “Irony of Fate” moment in which I went up the wrong wing of Icon. I was visiting my friend in the north wing, or so I thought. I made it all the way up the 23rd floor, I knock on what I assumed to be her door, when a stranger appears from behind it. I have never been so confused in my life. He is not my friend Claire, I'm almost certain.

I look at him. He looks at me. Internally I'm freaking out. I look at the apartment number. “I should be in the right place”, I think to myself. The longest possible silence passes by as we both try to process the situation. I don't think that time has ever gone by so slowly.

Finally, he says, “You might be in the wrong wing.”

While this experience was mildly embarrassing, at least I paid homage to a classic New Year's movie (that everyone should watch!), even though, sadly, we didn't fall in love and celebrate New Year's together, like in “The Irony of Fate.” Anyways, if you want to recreate a great Russian film, Icon's the place to be.

peacelovemath

celibateNEWS

wait thats just mathNEWS lol.

mathnews Senior Celibacy Correspondent

ON LOVE

There's a boy with golden hair who will disappear.



When I wake up in the morning, I make myself a very special promise. I promise myself to take this day one-day-at-a-time. See, I'd gotten used to living in the "two weeks from now"; getting ready to start the next assignment or studying for the next exam. I'd spent my time practicing, preparing, for when LIFE starts.

I'm okay I'm okay, just need to get through this day. Get through this one, and then after Tuesday it'll be okay. Then it's just until Friday and it'll be done. Then



Tonight
We are young
So let's set the world on fire
We can burn brighter than the sun

Will music sound so *intense* when I'm 50?



I can't find the words to say how good it is to be young.



Everything is okay now though, isn't it? My parents are still alive—they're not going to be someday. I don't know what it's like to live after someone dies. How can a person just, **end**? There's too much homework, gossip; too many appointments, SMART goals, things to say. If you keep a secret until your death, no one will ever fucking know.

Time makes history permanent. A moment passes, and that's permanent. You've written that thought into your life, and there's no unwriting it. Do you ever feel tired of living? That's in your life now. I am so tired of my memories.



We'll start this day with the intention of living it. Promise: I get to pick and choose the moments I want to include in my life. This is a quilt of memories that only I get to see, and that will be gone when I'm gone. So I'm making it a work of art.



The golden-haired boy will disappear. I am eighteen years old. I've never felt so eighteen. I won't be tomorrow. I want to remember this. I'm sorry to the woman remembering this, I'm sorry she can only remember the taste of his lips.

My roommate had her first kiss last night. First kiss! I can't believe I'm going to have a last kiss. What's it like to never feel warm lips against yours, for all eternity?



I don't mean to be depressing. This is *not* a sad article. Sadness is not inherent to things ending. Sadness is inherent to not understanding that things will end. You might get into a car crash and forever lose feeling in your right foot. Your house might flood. Your brother might get terminally ill from a disease that hit the world out of nowhere. Your dad might have a heart attack. Your soulmate will decide that you aren't theirs.

And YET you cannot *comprehend* the luck that brought you into existence. The single sperm cell out of *billions* that connected with an ovum. THOUSANDS OF TIMES, FOR EACH GREAT GREAT GREAT ANCESTOR who escaped this war or that war, famine, disease, death. You have more luck than the whole universe combined. How are you here??

Life is so *ridiculously, inexplicably* good right now. For God's sake, can't you hear the blood rushing through your organs? Can't you feel your heart beating? Shit could go wrong that I can't even imagine. Every day is a disaster nearly missed and barely escaped, disasters that would absolutely break me.



I should be scared. So I'm enjoying this song while it lasts.

Absolutely smitten

N REASONS MATH STUDENTS MAKE THE BEST ROOMMATES

- Their crying can act as white noise to help you sleep
- They are never around to annoy you
- You know you are always the most sane person in the room
- You can water your plants with their tears
- If you talk to them about their problems, you're guaranteed to feel better about your own life
- They never shower so you'll save a lot of money on your water bill

anonymous penguin

IF YOU THINK “TRAVELLING” IS A HOBBY, FUCK YOU

BECAUSE TO EVERYONE'S DISMAY, PEOPLE STILL BELIEVE THIS, SOMEHOW

I thought society would've tread this ground eons ago, but apparently that's not the case. How incredibly sad! So allow me to lay it down for you, right here, right now. If you honest-to-God believe that “travelling” is a “hobby,” and furthermore, *self-identify* as such a “traveller,” then you are utterly, hopelessly *brainless* and I *despise* you.

Travelling is NOT a hobby, people! Drill that into your numbskulls! Christ, every time I see someone volunteer it as one of their hobbies, bile swells into my throat with such velocity that my lips have to keep it together with the might of the Hoover Dam to prevent an all-out projectile puke calamity. It's maddening! It's sickening! It's a fucking *outrage* is what it is!

Here's the crux: when people say they like to go “travelling,” 99.9999999999% of the time, they mean that they like to go on vacations. That's it. Whoop whoop, I like to go on vacations too. Every human on Earth likes to go on vacations, dimwit! Fuck you! And you know, I wouldn't nearly be so irate if they just said that outright, or if they used the word “sightseeing.” I wouldn't be irate at all. In fact, I'd be such a happy little clam, swimming my swimmingly way through the ocean, completely at peace. Because there's no obfuscation at play; that's what these people are actually doing. You see, there's nothing cultured about going *sightseeing*—that's what stupid, swinish *tourists* do. These “travellers,” in their delusions, think they're above that title. “Travelling” is supposed to make you

sophisticated, cosmopolitan, adventurous, experienced. Yucky *tourists* are none of those things.

Don't even get me started on “travel” “influencers” or I'm going to be thrown into such a rage that... well, let's leave some things to the imagination, eh?

I reserve the 0.00000000001% for people who are just confused. There are probably some people out there who genuinely find trip planning or train riding to be fun, pursuable hobbies, I guess. Power to them, but “travelling” is supposed to have a wider scope. Also, a very important thing I want to note: moving house or going on business trips may be “travelling” in a sense, but they definitely do not constitute “travelling” as a hobby. If I have to explain why to you, it's a lost cause.

What do these fuckers think they instill in other people when they say that they “travel”? Envy, since they go on vacations more often than you? Boredom at such a tired cliché? Annoyance so extreme that your eyes roll back 360° in your sockets? Disgust? Violent, red-hot fury?

In conclusion, if you still think “travelling” is one of your hobbies, I hate you and will maul you on sight.

Finchey

YOU DON'T UNDERSTAND MUSIC THEORY

So, you probably don't know much music theory. That's just an assumption. Who knows. You might be like me and in way over your head. But statistically, you don't know much about music theory.

This leads to a problem. What do you think music theory is? You probably think it's a bunch of rules and then you get a value for how good the music is. Well I'm here to tell you that you're wrong, and that to understand music theory we must go to math. (What? This is **mathNEWS**. You think it wouldn't go back to math?)

You, as the cultured **mathNEWS** reader you are, probably know that math is the beautiful exploration of what is true. You try to prove things, but proofs have to reflect reality. Otherwise they are wrong (read: “bad”). So math is about explaining what is true in a way in which we can generalise.

But this, as you know, is not the normal conception of math. Most people think that math is a set of rules and then they tell you the single right answer. Does this sound familiar?

So is music theory like math? How does that work? Well, music theory is about explaining why music has a certain effect. If it doesn't explain how you feel, the theory is bad. This is the essence of theory. You can tell because it's called a “theory,” because it's what explains the “practical.”

So music theory is about explaining why music has a certain effect. And it must change based on the situation, because trying to understand a punk song from a jazz angle is probably not the most helpful. Some models can be used in multiple situations but with different sets of goals. Some are laser focused for only a specific genre, or even a single song. But it's all about explanation, not value judgement.

So now that you are enlightened, what will you do with this information? Probably nothing. But thank you for reading this rant I had about people not getting why music theory is.

読んでくれてありがとうございました。

別

ALBUM REVIEW: DUSTER'S STRATOSPHERE (1998)

ON SPACE AND THE PEOPLE THAT TRAVEL IT

Close your eyes. Imagine you are in space. How do you feel?

A quick Google search says that on average, space is 2.7 Kelvin. There is an average pressure of 13 picopascals. Contained in the average cubic centimeter of space is a single atom of neutral hydrogen.

Let's set Google aside for a bit. Space is empty. There are stars and planets and other strange rocks floating around. It is cold and it is silent. It is black and it is dark. Pins of light surround you. You float freely.

Bear with me here.

Let's set realism aside for a bit and direct our attention to the stories we tell about space. How many can you think of? I can only name a handful. *Interstellar*. *The Martian*. *2001: A Space Odyssey*. "Space Oddity." *Rick and Morty*. *Steven Universe*. *Star Wars*. *Dune*. *A Hitchhiker's Guide*. Levels from old Kirby games on the Nintendo DS.

Not all of these have scientifically accurate depictions of space—in fact, I'm pretty sure none of them do. However, when each of them portrays space, I am convinced that it is in fact *space* being shown and not something else. It's not that I believe that space is like an episode of *Rick and Morty*. It's that, as someone that has never been to space, I catch glimpses of each of these fictions every time I close my eyes and imagine space.

Now close your eyes and imagine you are in space again. How do you *feel*? What emotional connotations does your conception of space carry?

I think space is exciting. I think space is inhuman. I think space is cold and uncaring. I think space is intense. I hear the low hum of a distant Vagon spacecraft. I hear the muffled transmissions of Major Tom.

I hear *Stratosphere* by Duster.

On the surface, *Stratosphere* may seem like standard late 90s/early 2000s indie rock: fuzzy, scuzzy, lo-fi, sloppy, and boyish. The same compositional strategies are used repeatedly, resulting in songs that bleed into each other. There is simple music and there is complicated music. This is simple music. This is magical music.

But this is also music about space travel. The name of the album is *Stratosphere*. Track titles include "Moon Age," "Docking the Pod," "Constellations," and "Earth Moon Transit." I get the most out of this album when I close my eyes and try to envision the fiction of space that it conveys.

To Duster, space travel sounds like the muted jet-engine bass tones on "Docking the Pod" and "Echo, Bravo." Space travel feels like the rigid and winding guitar lines of "Heading

for the Door" and "The Queen of Hearts." Space travellers communicate through radio waves with the audio quality of cassettes; sound flickers in and out in the left and right channels like it does on "The Twins / Romantica."

To Duster, space travel is slow. Space travel is monotonous. Space travel is at once serene and intense and oddly beautiful.

But space travel is also full of angst and longing. Space travel is also full of exhaustion, of subdued two-note vocal melodies. Space travellers spend their days reminiscing about Earth.

Space travellers write songs like "Inside Out":

Will I be able to speak after a stiff drink?
Would it break my panic?
Would the sweat stop pouring out?
Slow and deliberate with her words,
She'll walk through my heart.
Those eyes light a fire in the stomach.
Fall apart from the inside out.

Space travellers travel through space—the final frontier, the large golden egg in the sky that two large political powers scrambled to colonize many years ago, the inscrutable and all-encompassing entity that symbolizes the arbitrariness of human existence and the majesty of all that we cannot understand—yet they write songs about falling in love. Space travellers embark on million-year space missions to engage with beings of functionally infinite power and intelligence, yet they cannot help but fixate on the humans they left behind.

Every story that a human tells, space-related or not, is about other humans. It is so impossibly self-centered. It is so impossibly arrogant. Yet it is so impossibly endearing and so impossibly romantic. We can't get over stories about each other. We can't get over each other.

When space travellers close their eyes, they cannot imagine being in space. They can only imagine their loved ones.

χ

MORE profQUOTES

AMATH 250: JOE WEST

“ If I were to teach first-year calculus, it would probably just be juggling..

PMATH 950: MATTHEW KENNEDY

“ I have been a mathematician for about 10 years, I am going to be honest here, I had no idea omicron is a Greek letter.

BOREDOM — TYLER, THE CREATOR; REVIEW

Boredom is a luxury and privilege that a very small demographic of the world experiences. To be bored is to be a part of the most fortunate subset of people to have ever lived. And so it follows that complaining about boredom may be perceived as complaining about not having to worry about basic needs and may be labeled as a sign of entitlement and ungratefulness. Yet boredom, while a menace to begin with, can foreshadow a creeping sense of problems far more sinister: existential dread, anxiety, loneliness, longing, and depression. The same creeping sense that has been wonderfully explored and encapsulated in Tyler, The Creator's track "Boredom" off his critically acclaimed album *Flower Boy*.

The genius of Tyler's track is that he takes a topic that can so easily evoke dismissiveness, but somehow instead evokes empathy and introspection. It paints a picture that is simultaneously compelling, heartbreaking, and endearing. The vocal inflections, expansive production, and lush soundscape of the track make it feel like you're immersed in a colourful meadow, yet it's one where you're left to explore without a map or companion. It's an apt analogy for those blessed to have an ocean of possibilities awaiting them, but are left uncertain of which direction to swim in.

The mantra of the track, "find some time/ find some time to do something," layers the entire track with a cloud of melancholy and confusion. The inability to overcome boredom signals a sense of paralysis in life, one where you're no longer moving towards a goal. Your existence appears to be purposeless, directionless, and devoid of significance. Enough of these cumulative moments, and "boredom has a new best friend."

The wheels of change come for us all and with every spin, we grow distant from the ones we considered closest to us. It's natural to have these phases where we feel a disconnect especially as we enter the shores of real adulthood and go on our distinct life paths. Tyler puts his fears, vulnerabilities, and insecurities on full display as he expresses feelings of going through the same phase with Odd Future, a once-close group of friends and musicians that disbanded in recent years. In these periods of change, boredom can breed existential dread, isolation, loneliness and a drifting set of friendships, which in turn only breeds more boredom. The cycle of boredom is a seemingly innocuous, yet vicious cycle.

Tyler was in his mid 20s when he wrote and recorded the album. The age points to a larger trend in Millennials and Generation Z experiencing the "quarter-life crisis," growing more uncertain about where to direct their life. With infinite options available, so many comparisons ready to be made, and the information of the world on our fingertips, it's easy to feel overwhelmed and disillusioned with it all.

Tyler expresses what it is to be human on this track. It's in human nature to hate the feeling of boredom. We crave instantaneous stimulation in some way, anyway possible, even if it may be short lived. We're also prone to try and short circuit

this boredom, feeding the void with social media, television, music, materialistic objects but if we really look back and see these things, they're nothing but temporary fixes to an everlasting problem, one that is constantly growing. But boredom can also be embraced; the concept in it of itself is not evil but rather, a symbol of dissatisfaction with our lives. It tells us that our life isn't what we want it to be, we aren't where we are meant to be and something needs to change.

Boredom can be the spark we need to find some semblance of meaning and reality in our changing lives, it can be the last privilege of a free mind. It can motivate us to reach where we would want to be. If necessity is the mother of invention, boredom is the father.

While this song lets us wallow in our existentialism and grasps the concept of our existence, it also provides a certain unforeseen sense of hope. Despite the melancholic strings and Rex Orange County's harrowing vocals that bloom throughout the track, the climax of the song sees a tonal shift and a new variation of the mantra: "find some time/ gotta find some time." This time, it feels less undirected, the vocals less hollow and spacey. Instead, the vocals grow and blossom, intentionally growing a tad more enthusiastic and cheerful.

The closing outro reminds us that to move forward, you need to do something and grasp your time rather than letting it flow. Purpose doesn't come from being done, it comes from the act of doing. Meaning doesn't come from figuring out your amazing life goal, it comes from the simple act of trying to pursue it, little by little, step by step.

Like the loneliness of "911/ Mr. Lonely," struggles with identity on "Garden Shed," seeking romance on "See You Again," and the nostalgia of "November," "Boredom" highlights the theme of *Flower Boy*: the journey of being human and exploring within. As our childhoods come close to an end, we can feel incomplete. When everything in our lives should make us feel whole, we can still feel lost. Confused. Purposeless. **Bored.**

But it's okay to not have everything figured out. In fact, it's what it means to be human. The thrill of not knowing, of wanting to find out and wanting to belong. There's no race to get wherever you are supposed to be. Look around, the wheels of change may have you illusioned about the lack of time. But there is time, we just need to find some of it.

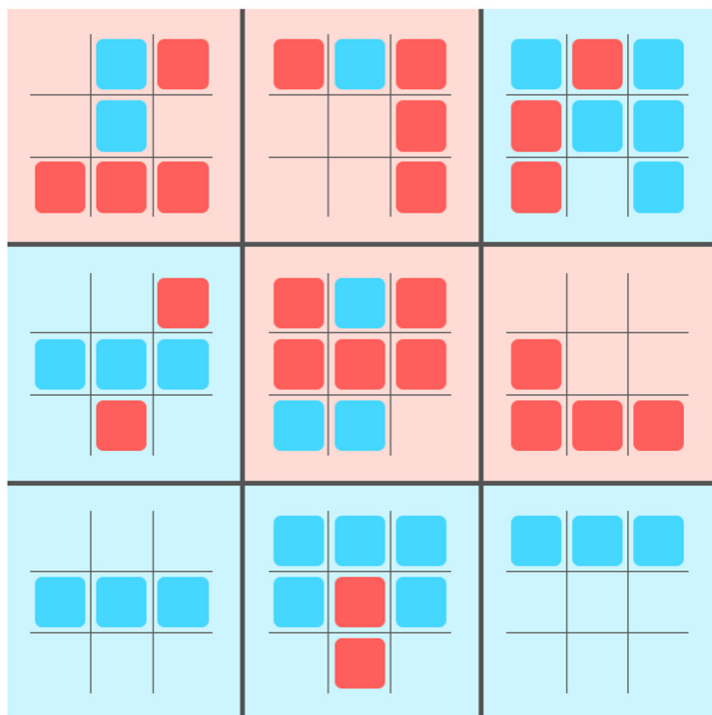
peanut

Often the details are boring.

PROF. JEFFREY SHALLIT

BEGINNER MODERN ULTIMATE TIC-TAC-TOE OPENING THEORY

For those who do not know, Ultimate tic-tac-toe is a variant of regular tic-tac-toe where each square of the regular 3x3 board is filled with another smaller 3x3 board to make one big 9x9 board. A finished game looks something like this:



Here, blue won by winning 3 grids in a row on the big board, and blue got those three 3x3 grids by winning tic-tac-toe on each of them. The other rules are that each place you go on a small grid corresponds to where your opponent will have to go on the big grid. For example, if you put your marking in one of b2, e2, h2, b5, e5, h5, b8, e8, or h8, then your opponent must place their marking in the central grid, which is from d4 to f6. The game continues in this way until someone has won. If your opponent makes a marking that would force you to go in a 3x3 grid that had already been won, then you can go anywhere on the board.

The gut instinct of many beginners is to try to control the central 3x3 grid. In regular tic-tac-toe, playing 1b2 is the most natural move, as b2 is very flexible, allowing for four different win conditions. This instinct is entirely incorrect in ultimate tic-tac-toe. When you focus entirely on preventing your opponent from being able to make markings in the central 3x3 grid, you play extremely passively, and it becomes very hard to win on any of the 3x3 grids around the perimeter without marking off the center of any of them. It also completely ignores the fact that all the tactics of the game involve controlling where your opponent can go, and you lose a lot of your options if every line you consider will not allow for your opponent to go in the center.

The actual key thing to keep in mind when playing Ultimate tic-tac-toe is very simple, you have to be more efficient with your markings than your opponent. In the game seen above, blue has two 3x3 grids that they won with only three markings in each, which is the bare minimum required. Red also often has placed many markings in squares blue ended up winning, and in the end, those markings accomplish nothing for red. If you can force your opponent to place as many of their markings as possible in suboptimal 3x3 grids, like the non-corner and non-central grids, which have less strategic importance on the overall grid, then you will be happy. You will also be happy if you can get your opponent to make many markings in squares you end up winning, or more markings than necessary in squares they will end up winning. At the end of the day, both you and your opponent will have placed the same number of markings, but only one of you will have won.

The final thing to keep in mind is that already by the beginning of the latter half of the game will be almost entirely decided already, outside of catastrophic blunders or miscalculations. The game becomes very deterministic, as there will only be one or two moves that do not instantly lose advantage for each player to consider when more and more squares in the 3x3 grids are filled up, making calculating deeper lines easier. It is critical that you have an advantageous position out of the opening, as the game will almost certainly be decided before either player realizes it.

aphf

STUDENT CAN'T WAIT UNTIL SCHOOL OVER SO HE CAN MISS SCHOOL AGAIN



I CAN'T STOP PLAYING NO STRAIGHT ROADS

Help. Help. Help. Help-

Today on, “Skit has horrible time management,” it's No Straight Roads! In Vinyl City, music is everything—literally. There's a massive generator that converts music into electricity, with a council of EDM musicians, named NSR, overseeing the city. Mayday and Zuke are a pair of rockers who audition to be a part of NSR, only to be kicked out despite outperforming everyone else, and to add insult to injury? Rock is now banned from Vinyl City thanks to Tatiana, the authoritarian CEO and charter of the city. So what do they do? Hijack the concerts that NSR hosts and take down their members, one by one! You know, hero stuff.

I'll spare you the details of the plot, because at its core, No Straight Roads is a \$60 album with gameplay attached. There's a bit of a balancing act that Metronomik, the Malaysia-based game studio behind No Straight Roads, has to manage between gameplay, but it seems the game leans heavily on its gimmick of attacks on the beat. In the original game, there were many flaws—an inaccessible UI; complicated boss fights; at one point in the game, one of the boss fights was literally missing a key component that made the difference between a confusing time and a fun time. Thankfully, the latter part was fixed immediately, but Metronomik answered our prayers in *No Straight Roads: Encore Edition!* Thank you, Wan Hazmer, lead designer of Final Fantasy XV.

Encore Edition answered pretty much every problem I had with No Straight Roads—the UI is a bit more accessible (and yet still a bit of a bitch to navigate), we finally get hints as to what to do/attack in the boss fights, and more! In fact, Metronomik reached out to the fanbase to provide art for the game in the form of cosmetics for a guitar case—over 500 artists have been highlighted!

Let's get to the music. There are 5 charters you fight against: a space DJ who represents club music, a virtual idol who represents the whole Vocaloid/cutecore genre, a child pianist who goes into neoclassical, a robotic boyband who represents techno, and an eccentric diva who represents psydub (or synthwave). With a side mission rap battle against Zuke's older brother, and the final fight against Tatiana, that's 7 tracks.

Each charter has their own approach (save DJ Subatomic Supernova, although the tracks still exist), each boss fight has its own base track. And with each base track, there's a rock and EDM track, as if the base couldn't be EDM enough. And added with the Encore Edition are five new remixes that go into other genres, too. Not to mention, each boss fight can have the music transition from EDM, to base, to rock for the melody, drum, and vocals in the case of the virtual idol Sayu. With melody and beat for rock, base AND EDM, that's multiplying 6 EDM tracks by 6. 36 tracks, plus 3 for the rap boss battle, and additional tracks for the background of Vinyl City, that gives us a little less than 50 in the entire soundtrack. Wanna know why the music is so banging? Many composers of the soundtrack include prolific EDM artist James Landino,

Falk Au Yeong, Funk Fiction, and Andy Tunstall—recognize them? That's right, they're also contributors to Sonic: After the Sequel, and Spark the Electric Jester!

Would I recommend No Straight Roads? Only the Encore Edition. Again, its cues are easier to understand. I only got into it because I heard there were people in its fandom that not only slid into James Landino's DMs to tell him about their OC despite his clear disinterest, but also apparently a kid sent Wan Hazmer a video on basic game design in an attempt to “help.” So, not exactly the best introduction, but the music had me hooked, line, and sinkurr. But the music is especially great for helping you study, too, so that's a bonus. Moderate gameplay, killer music, expressive and true voice acting, I rate it 7.5/10!

Skit

TODAY IS MY BIRTHDAY!

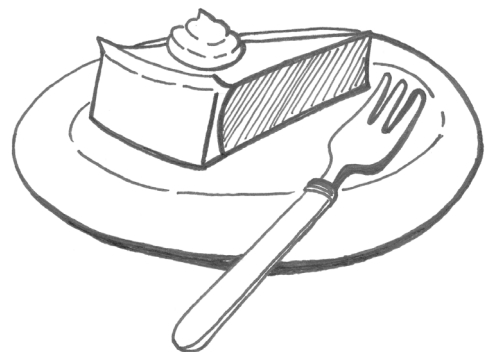
Or at least, November 29th was. That's production night for **mathNEWS** 147.6! I am now 20 years old, no longer a teen, now an adult! I feel like nothing has changed, and yet I'm a completely different person compared to when I was 19. (Or was I? Maybe it's the pandemic-induced asocial tendencies.)

Anyways, when I turned 18 in first year, I took an Instagram photo on the ledge of the window at St. Paul's University College's window, posted the lyrics to “Everybody Wants to Rule the World” and made some weird ass log about how mature I've gotten, but now I know my audience. Now my captions are the epitome of the statement “less is more.” I'd rather be true and put not a lot of effort for the only post my friends comment on, anyways!

(Let's not mention my 19th birthday. I took a picture when my sideburns were unshaved, trying to look thoughtful and inquisitive. Ew.)

Here's to another year of nearly tearing my hair out over assignments, struggling to get motivation to complete even a sentence on Google Docs, and crying over my marks!

Skit



RABBIT IN A JAR

Winter is a good season to sit by the fireplace with a bunch of friends and talk about random stuff. Coincidentally, I have a dream I've been dying to decipher.

"Yo, you wanna hear about a dream and give me some interpretations afterwards."

"I'm no psychic but sure. Why not."

So I took a sip of my hot chocolate and started talking.

I'm a globetrotter who recently got obsessed with fishing. Not all kinds of fish, just rainbow Dorado. So I started my journey in my weird ship. A ship that looks like choo-choo train where a boxcar that floats is hooked to a steam powered sailboat. The steam powered sailboat has a giant deck with an engine room at the back, close to the boxcar. The train car has no window and there is only one bulb strapped to the ceiling.

I put the ship on auto-cruise mode and hopped onto the hook between the engine room and the boxcar. It felt better than surfing. The sun, the wind, the wave, and the smell of the sea banished my morning fatigue. Suddenly, I heard a conversation at the front of the deck. I peeked through the window of the engine room. They are a weird group—a middle aged man with a monkey sitting on his shoulder, a young man holding the leash of a wolf, and a woman who giggles all the time. The wolf started growling and the monkey was making super annoying noises. The animals must have discovered me!

Maybe they came in peace? I had this thought at first, until I heard their discussion about finding the captain and commanding the ship. I heard footsteps approaching. I started panicking. I ran towards the boxcar via the hook and almost lost balance. Then I started browsing for a good hiding place. I found a dusty shipping box filled with paper scraps that smelled like fish lying in a dark corner. I hopped in and closed the lid. I immediately felt safer.

Why is there still light coming through after closing the lid? I found a hole on the side of the box. Through the hole I saw a white rabbit curling up behind a water bucket. Oh no, what's gonna happen to the rabbit? The wolf will tear it apart! I heard footsteps approaching the boxcar. There was no time to think. I jumped out of the box, grabbed the rabbit, and quickly hid myself under the paper scraps. I embraced the rabbit in my arms and peeked through the hole. The rabbit was so soft and warm. She wasn't scared of me at all.

The box car is basically sealed, there's no way I can escape if they block the entrance. So I waited quietly. I was super lucky the box smells like fish and the wolf couldn't sniff me out.

We finally arrived at the sea area where rainbow Dorado live. I can tell from the reaction of these intruders, since they kept screaming with joy about how beautiful the sea looks. Then they spotted a rainbow Dorado through the water and hopped into the sea. It was a good time for me to escape.

I found an empty glass jar for the rabbit, screwed the lid tightly, then tied the jar to my waist with a rope. The wolf heard the noise I made and started warning the swimmers. I ran as fast as I could and jumped ship towards the opposite direction with a leap of faith.

I dived deeper and opened my eyes. I saw a rainbow Dorado that glowed, it looked like rainbow indeed, brighter than neon light. I was too afraid of being spotted on the surface and didn't leave enough time for taking a breath. I reached out to the sun but my vision got blurrier and blurrier.

I woke up in a public pool, floating in one of the lanes. The rabbit was alive and well inside the jar. Then I saw a monkey squatting by the edge of the swimming pool, making sarcastic noises. I realized the intruders might be around. I got out of the pool and splattered water on the monkey. He screamed and fell into the pool.

I ran towards the only exit around the pool but couldn't find a way to the open air. The staircase was like a complicated maze. I couldn't remember how many twists and turns I made, but ended up in the starting point again. There's no way I can escape this place. The intruders will find me and harm me.

I sat on the staircase and freed the rabbit but she stopped moving as soon as I put her on the ground. Then I heard a giggling sound from a woman. My heart started pounding so fast and I woke up.

End of the dream.

My friend: "What a suffocating story. I think the rabbit might be a really important person in your life."

Nobody had given me the feeling of that white rabbit in real life. It's been weeks and I'm still trying to decipher this dream. Maybe the mystery better remains undisclosed.

IceCube



N THINGS EVERY WATERLOO STUDENT HAS SEEN

- The person with boba tea in class
- An engineering/math/CS student absolutely breaking down in a study space (your average Monday)
- That one kid wearing shorts when it's snowing
- The lost soul wandering around study spaces at 4:43 PM to find someone to help them with their 5:00 PM deadline
- The guy with the crusty windows laptop and an anime wallpaper
- The person with the tote bag
- The person consuming monster energy drinks like it's oxygen
- The person who never finishes his assignments or artic-

peanut

N PROOFS EPSTEIN DIDN'T KILL HIMSELF

Proof via graph construction: Let G be the graph of people the CIA must kill in order to kill Epstein without evidence getting out. G is constructed so v is the vertex representing Epstein himself, and $N(v)$ is the people that must be killed to securely kill Epstein, the same patterns holding for their neighbours. The majority of people only require money for their silence, and thus this tree will be of a reasonably low degree (we will let d denote the maximum degree of G). We also know that the CIA is capable of killing a reasonably large number of people at once. If any vertex has its neighbours killed at once, we do not need to worry about the status of the other vertices, therefore the tree will be easy to deconstruct. QED.

Probabilistic proof: Let $P(E)$ denote the experimental probability of sustaining thyroid cartilage and left hyloid fractures, and S denote the event of a suicidal hanging. Notice no suicidal hanging in the sample space of all other suicidal hangings has never caused such injuries, and therefore $P(E|S) = 0$ is our experimental probability. If $P(E|S) = 0$ and E occurred, then it must be the case S did not occur. QED.

Proof by contradiction: Assume for sake of proof by contrapositive that Epstein did kill himself. See how dumb that fucking sounds? QED.

Proof by astrology: He's a Sagittarius. QED.

Proof by construction: Observe that if one is locked in a cell with a muscle-bound ex-cop charged in murder who was moved before one's death, it is trivial to construct a method by which one could be murdered. QED.

epstein tuwuther

WINNING THE TIDE POD CHALLENGE

I just turned all of three this week and I'm ready to strike out on my own! Mom and Dad, thank you for guiding me these past few years but I've got this! I am grown up now in my toddlerhood and see the world for what it is. I know so much! I don't need any more of your rules or instructions.

For a fortnight now those shiny orbs in the laundry room have tempted me. Glorious colours and acetic smell have me hooked. I wanna gobble them up and wolf them down. One after another. For I want to win the Tide Pod challenge!

Just when no one's around and it is safe to go into the room, I reach up and turn on the light, climbing on top of the shelves to reach it. Oh careful there! Almost fell over. Ah yes, knocked it over. Thanks for not closing it mom! Now all those shiny delicious orbs are on the floor, beckoning me.

I get down and grab the first, seems awfully big to fit in my mouth, but I've got this! I shove it in and grab the second one, cram it in. I grab the third. Oh there is not a good feeling coming from my tummy. I'm feeling queasy. Ugh. I put my hand over my tummy. I feel bad. But I have to win, Mom and Dad, you'll be proud of me when I do. I'm sure you'll understand!

I shove the third one in—it's getting hard to cram them. It's really tight in there. Oh I can't see clearly anymore, I'm getting dizzy. Oh the pain! I just have to lie down on the floor for a little bit. I'm sure this feeling will go away.

I wake up over my house, seemingly floating! What's happening? I'm drifting upwards into the clouds, and head to the pearly gates. I'm in heaven?! I don't understand. Mom, Dad, where are you?

It's been a week here now, and well heaven is not all it's cracked up to be. Frankly, it's really boring. There's too many rules, and more instructions! Nothing like the seven minutes in heaven the older kids talked about.

Mom and Dad, If only I'd listened to you, I wouldn't end up in this place. For now I know: the only way to win the Tide Pod Challenge is not to play!

ON GOOGLE DEFINITIONS

As ~~all~~ many of the writers here at **mathNEWS** know, writing is hard. Sometimes, the words just don't come to your head quick enough. You want to say something, something uhh—something... something. But you just can't remember the right word. Happens to everyone, right? But in our advanced day and age, the right word is simply one Google away! Simply type in “balderdash synonym,” and you get such wonderful alternatives like claptrap, blether, flapdoodle, and poppycock. Don't know what those mean? No worries!! Type in “flapdoodle definition,” or equivalently, “flapdoodle meaning” to get your answer:

flap·doo·dle
/ˈflap,doʊdl/
noun

INFORMAL•US

1. nonsense.

Wonderful.

Equivalent. Hm. Equivalent?

e·quiv·a·lent
/əˈkwiv(ə)lənt/
adjective

1. equal in value, amount, function, meaning, etc.

Are “meaning” and “definition” actually equal? Or was this a ruse spread by big-Google to ~~prolong~~ perpetuate ignorance in the face of clear *inequality*?

So being the public serving journalist I am, I decided to ~~investigate~~ scrutinize this pressing issue. The investigation began by searching up the obvious—“meaning definition”:

def·i·ni·tion
/ˌdefəˈniʃ(ə)n/
noun

1. a statement of the exact meaning of a word, especially in a dictionary.

Aha! Those suckers thought we were none the wiser, but Google clearly has a semantics bias towards “meaning.” Curse those blasted AI's. We have unearthed the truth.

“definition meaning”

mean·ing
/'mēniNG/
noun

1. what is meant by a word, text, concept, or action.

Ah, fuck. I see.

A cool pen name

TAYLOR SERIES

This project was prepared by UW students working in the Edu-Action! project to explain a technical math concept in an accessible way with lots of visual aids. Here are our sources (for more information):

<https://mathworld.wolfram.com/TaylorSeries.html>

[https://math.libretexts.org/Bookshelves/Calculus/Book%3A_Active_Calculus_\(Boelkins_et_al\)/08%3A_Sequences_and_Series/8.05%3A_Taylor_Polynomials_and_Taylor_Series](https://math.libretexts.org/Bookshelves/Calculus/Book%3A_Active_Calculus_(Boelkins_et_al)/08%3A_Sequences_and_Series/8.05%3A_Taylor_Polynomials_and_Taylor_Series)

<https://www.mathsisfun.com/algebra/taylor-series.html>

<https://financetrain.com/taylor-series-expansion>

If you have any feedback for us on the presentation or explanation or want to learn more about Edu-Action!, please send us an email at eduaction3@gmail.com or visit our website at www.edu-action.ca.

Edu-Action!

One of the greatest joys of computer science are the endless opportunities to make up new words.

PROF. ONDŘEJ LHOTÁK

TAYLOR SERIES

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What is a Taylor Series?

Basically (as seen in your notes), a **Taylor series** expresses a function as a power series of the function's derivatives centered about a point " $x = a$ " within a distance $\Delta x = x - a$ from a (usually small). For the notation, we write:

$$\begin{aligned}
 f(x) &= f(a) + f'(a)(\Delta x) + \frac{f''(a)}{2!}(\Delta x)^2 \\
 &\quad + \frac{f'''(a)}{3!}(\Delta x)^3 + \dots \\
 &= \sum_{n=0}^{\infty} \frac{f^{(n)}(a)}{n!}(\Delta x)^n
 \end{aligned}$$

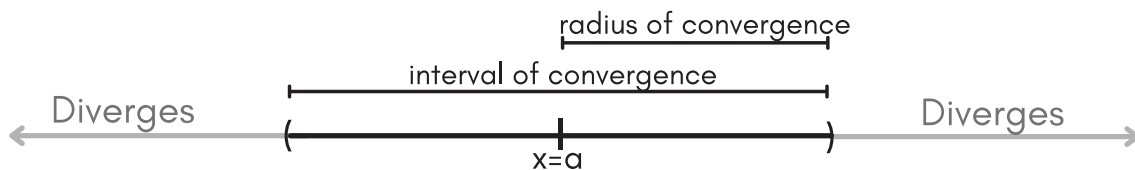
The Taylor series about the point $a = 0$ is a special example, called the **Maclaurin series**.

In order for the series to work properly, you must be able to take the derivative of the function infinitely many times.

Some examples of infinitely differentiable functions are:

- Polynomials (although they will have a finite series),
- Sine and cosine functions,
- Exponential functions,
- among others!

This expansion only converges (gives a finite answer to the infinite sum) when the distance from the variable to the central point is small. The unique distance where the series converges for any smaller distance between x and a and the series diverges for any larger distance is called the **radius of convergence**.



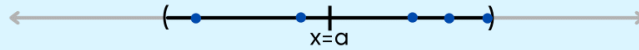
- Notes:
1. Endpoints may or may not converge.
 2. Some functions have a Taylor series that converges everywhere.
In this case we say they have an infinite radius of convergence.

Why is the Taylor Series useful?

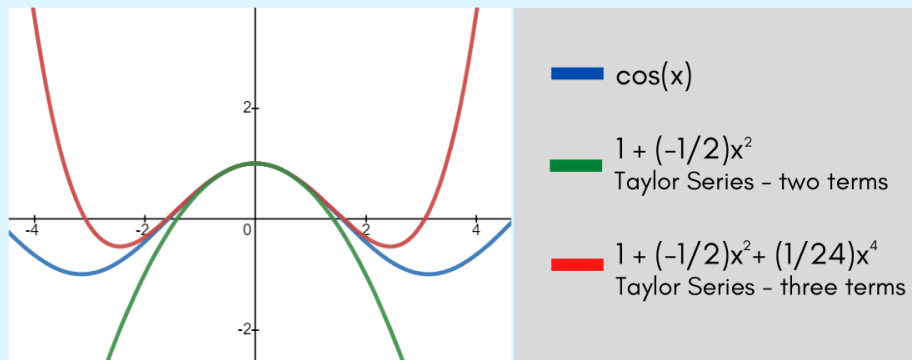
The Taylor Series is based on two key ideas:

1) Approximation of functions

For points within the radius of convergence



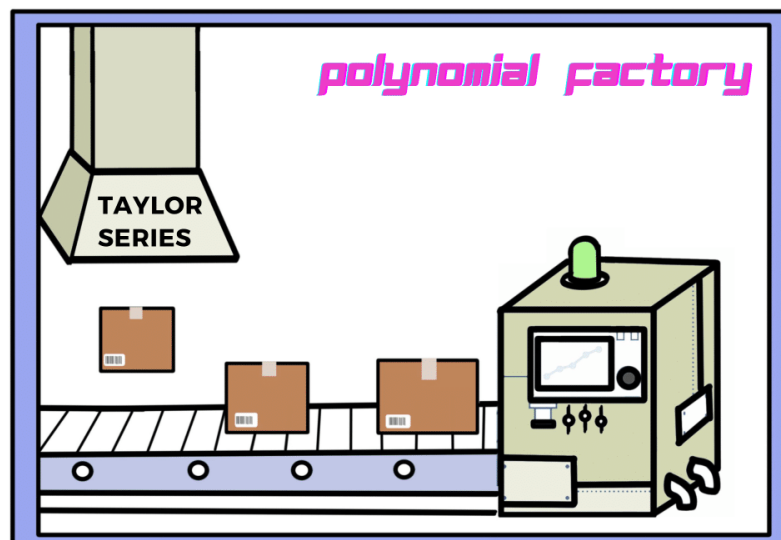
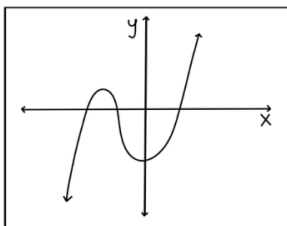
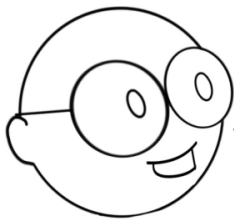
the sum of the first few terms of the series is close to the function value. If we know the first and second derivative well, we can get a good approximation of a complicated function. The more terms in the summation, the closer the approximation. Calculators use approximations like this to calculate function values while storing little information.



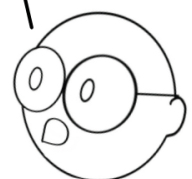
2) Expressing complex functions in terms of polynomials

The polynomials produced have some great properties that make them easy to work with!

Their derivatives and integrals are easy to compute, they're continuous everywhere, and multiplication and addition work out nicely.



What a deal!



Taylor Series Example

Say $f(x) = \sin(x)$

Let's try approximating $f(x)$ with a Maclaurin series (Taylor series centered around $x=0$).

Note: all even derivatives of $\sin(x)$ are 0 at $x=0$. So we add two terms at a time.

$f(x) = \sin(x)$

$$\sin(0) = 0$$

$$\sin'(0) = \cos(0) = 1$$

$$\sin''(0) = -\sin(0) = 0$$

$$\sin'''(0) = -\cos(0) = -1$$

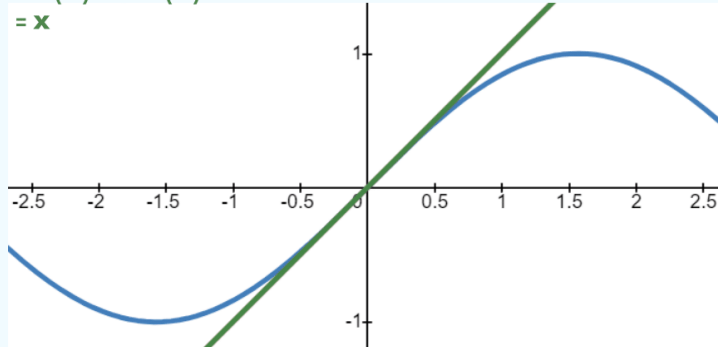
$$\sin^{(4)}(0) = \sin(0) = 0$$

$$\sin^{(5)}(0) = \cos(0) = 1$$

$$\sin^{(6)}(0) = -\sin(0) = 0$$

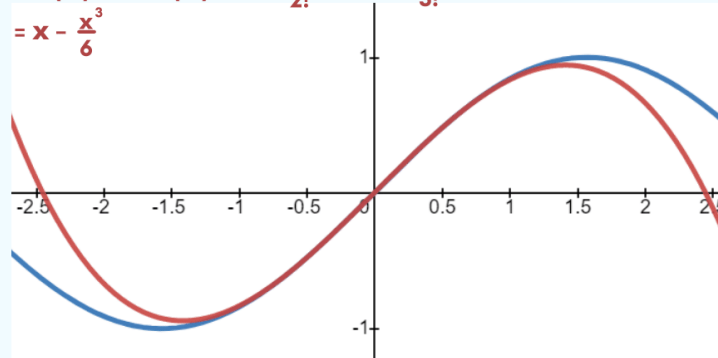
$$\sin(0) + \sin'(0)x$$

$$= x$$



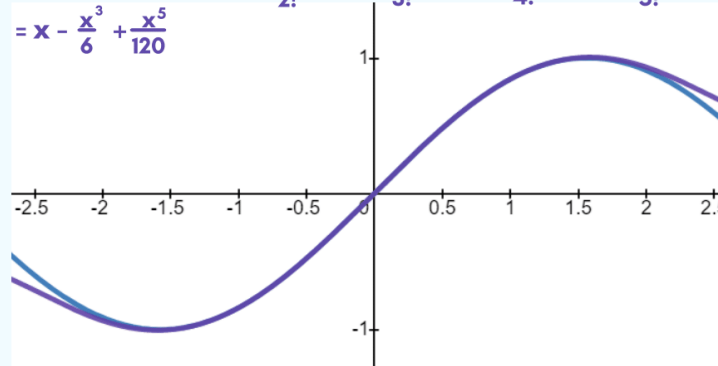
$$\sin(0) + \sin'(0)x + \frac{\sin''(0)x^2}{2!} + \frac{\sin'''(0)x^3}{3!}$$

$$= x - \frac{x^3}{6}$$



$$\sin(0) + \sin'(0)x + \frac{\sin''(0)x^2}{2!} + \frac{\sin'''(0)x^3}{3!} + \frac{\sin^{(4)}(0)x^4}{4!} + \frac{\sin^{(5)}(0)x^5}{5!} + \frac{\sin^{(6)}(0)x^6}{6!}$$

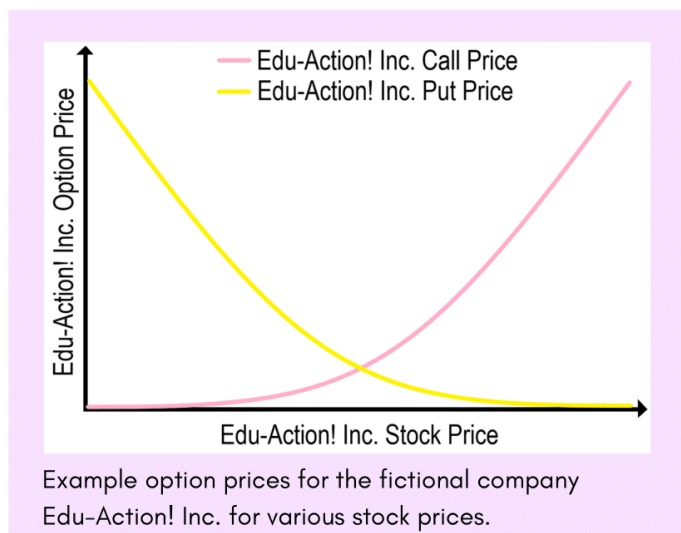
$$= x - \frac{x^3}{6} + \frac{x^5}{120}$$



Application of the Taylor Series in financial mathematics

Let's look at a cool application of the Taylor Series!

In finance, a **stock option** is a contract that gives someone the option to buy or sell a stock at a specified date and price. An option is called a **derivative security** because its value is derived completely from the price of the stock.



A **call option** gives you the option to buy a stock, and a **put option** gives you the option to sell a stock. In general, as the stock price rises, the value of the call option will rise and the value of the put option will fall.

We use the first few terms of the Taylor Series to model how the value of a stock option changes with a change in the price.

If we expand the expression $V(P)$ (the value V at the price P) as a Taylor Series (at point $P + \Delta P$), we have:

$$V(P) = V(P + \Delta P) + V'(P + \Delta P)(\Delta P) + \frac{1}{2} V''(P + \Delta P)(\Delta P)^2 + \dots$$

which means the change in value, $\Delta V = V(P) - V(P + \Delta P)$, is about

$$V'(P + \Delta P)(\Delta P) + \frac{1}{2} V''(P + \Delta P)(\Delta P)^2.$$

We refer to the first derivative of the value as the **delta** of the stock, and the second derivative as the **gamma** of the stock. So if we know the delta and gamma, we can predict about how much the value will change based on how the price moves!

FOR mathNEWS IS A JOLLY GOOD FELLOW

gridCOMMENT 147.6

'Tis the bittersweet season. The last issue of the term... Some during prod night may be sighing with relief as they click "Save Draft." I wouldn't know, your girl is remote desktop-ing this volume.

Now I won't lie, I'm a tad disappointed in y'all—we've gotten only three, *THREE* gridSOLUTIONs (& that of my coworkers, who completed it in front of me). After I busted my bum to give you an ~exquisite~ gridWORD. For *shame!!* Was looking forward to seeing more answers to the gridQUESTION "how much wood would a woodchuck chuck if a woodchuck could chuck wood?" :|

I'm almost tempted to deprive you of the ones I did receive, but since Christmas is upon us in just a few weeks, consider this my gift to you:

- c team: "probably all of it"

- Aeschylus: "A woodchuck would certainly chuck lots of wood if it could chuck wood—unfathomable amounts, in all likelihood."
- char and donnay: "0, Unless the woodchuck is ambitious then I'll say 100, I won't stop them ☺"

Congratulations to Aeschylus for a PERFECT gridSOLUTION, I hope you had as much fun solving it as I did creating it :)

It has been a pleasure to be your gridMASTER for these four months, and I cannot wait to see you all again next term! Or not... I guess you'll have to wait and see.

xoxo,

eternally puzzled

[Editor's Note: This issue's gridWORD is courtesy of perkiED from 104.2!]

ACROSS

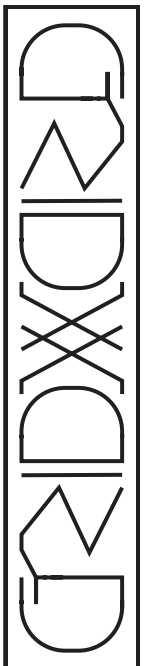
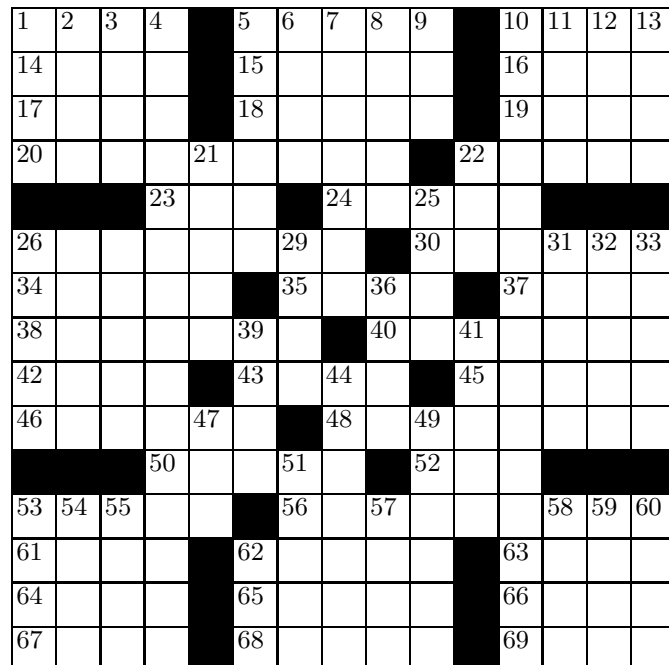
- Cooking Instruction
- Terminal
- The Fatted _____
- Bigshot
- Cookie that you're Not supposed to buy (2 wds)
- Lily Plant
- Israeli Foe
- _____ and Mortise
- Sound Quality
- Season's _____
- Performed _____
- Rapid Eye Movement (Abbr)
- Bloodsucker
- Emasculate
- That's Hard _____
- Sellers or McQueen
- To Date (Fr.)
- Arm Bone (Var)
- Supergroup
- Greek
- U.S.A.
- Otherwise
- Stomach Disorder
- Have Respect For
- Expels Liquid Waste
- Tightfisted One
- _____ Stevens
- Woody _____
- In the Hotspot (2 wds)
- Enrol
- Miss Barton
- Strange Person
- _____ of Gold
- Steal from Again
- Russian Mountain Range
- Descartes
- _____ de Menthe
- Part

- Greatest Pirate
- Sister _____ By Don McLean
- Arab State
- Snarls
- Mr. Bruce, for short
- Album by 52-A (4 wds)
- Quite a Bit (2 wds)
- _____ Ranger
- Nourish
- _____ Firma
- Analog Computer Operator
- To Be (Fr)
- Hiding Place
- Pains
- Wilt the _____
- Rigid _____
- Vote into Office

- Year (Fr)
- Those About to Start in a Golf Game
- Sooner (Ger)
- Rubies
- Of the Moon
- Jones or Wilson
- _____, Zwei, Drei
- Period of Earth's History (2 wds)
- A Mathematician
- Slightly Open
- Slow Walk
- Leo
- Snare or Kettle
- Japanese Medicine Box
- Existing
- _____ Stanley Gardiner
- Math Tables Book (Abbr)

DOWN

- Type of Rug
- Yukon, for One (Abbr)
- Dies _____ (Days of Wrath; Latin)



lookAHEAD

SUN DEC 5

MON DEC 6

Last day of Hanukkah

TUE DEC 7

Classes end

WED DEC 8

Pre-examination study day

Drop with WF ends

THU DEC 9

Final examinations begin

FRI DEC 10

Ada Lovelace's 206th birthday

SAT DEC 11

National Noodle Ring Day

SUN DEC 12

MON DEC 13

Tuition and fees due

TUE DEC 14

Late fees begin

WED DEC 15

National Chocolate Covered Anything Day

THU DEC 16

International Migrants Day

FRI DEC 17

SAT DEC 18

LAST ISSUE'S gridSOLUTION

N	A	N	O	J	U	R	O	R	S	P	S	A				
O	M	I	T	O	N	U	S			P	O	L				
M	O	T	H	H	Z	N			W	O	L	F				
	U	E	R	N	I	T	S			P	O	T				
O	R	S	V	P				M	O	E		R				
A								A	G	E	D	U	N	E		
R				N	O	C	A	N	D	O	F	M	O	M		
		S	E	M	I	O	R	D	N	I	L	A	P	A		
A	R	E	N	A		P	O	Z	N	A	N	I				
				E	L	N	I	N	O	I	S	N				
P	I	C	U	S						L	O	O	P			
		D	I	S	C			N	O	O	N		F	L	O	W
A		R	C	A		A		A	N	N	A		T	O	P	
D	E	C	A	L		P	E	E	P							
D	R	A	W	E	R						A	N	A	N	A	

THIS ISSUE'S gridSOLUTION

S	T	I	R		F	A	T	A	L		C	A	L	F		
H	E	R	O		A	D	A	R	E		A	L	O	E		
A	R	A	B		T	E	N	O	N		T	O	N	E		
G	R	E	E	T	I	N	G	S		A	C	T	E	D		
			R	E	M		L	E	E	C	H					
C	A	S	T	R	A	T	E		T	O	B	E	A	T		
A	C	T	O	R		O	S	E	R		U	L	N	E		
C	H	I	C	A	G	O		H	E	L	L	E	N	E		
H	E	L	L		E	L	S	E		U	L	C	E	R		
E	S	T	E	E	M		U	R	I	N	A	T	E	S		
					M	I	S	E	R		C	A	T			
A	L	L	E	N			U	N	D	E	R	F	I	R	E	
J	O	I	N				C	L	A	R	A		O	N	E	R
A	P	O	T				R	E	M	U	G		U	R	A	L
R	E	N	E				C	R	E	M	E		R	O	L	E

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