

7/20  
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## “WHAT’S YOUR FAVOURITE SUMMER ACTIVITY?”

I can’t believe it! Summer—or at least, the summer term—is coming to an end! Campus quiets down as exam season starts, then we get to enjoy the rest of August and spend our youth making memories. It’s what we deserve, after missing out on two formative years where we could have done so much. It’s a time I’ll miss when I look back on it in five, maybe ten years.

This issue’s “overarching theme” would be, morbid as it sounds, endings and new beginnings. Fitting, seeing as this is the last issue of v149; nonetheless, I’d like to detract from the typical light-hearted atmosphere the **mastHEAD** usually has to note that we have a few articles that deal with death—some in the physical sense, and some in the metaphorical sense. We look into missing what has already come to pass—be it Quebec in the aftermath of CUMC (or as it is also known, Cum-Con), we see the end of iconic series (The Adventures of Professor Goose and gildED’s journey to explaining his research to his parents) and we look at exits—highway exits, that is. The automobile-centric infrastructure of North America will forever be the bane of all pedestrians.

It’s also the end of yours truly. Yes, uknightED’s campaign to take over the Math faculty and convert them into Environment students must take a pause, for co-op calls me to higher planes of importance. A good chunk of the editors will be taking breaks, but not to worry—a cast of new editors and some old ones are on their way! Keep your eyes open. But don’t worry, I’ll be back in Winter term to continue my environmental crusade! Muahahahaha! But in all honesty—it was fun while it lasted, and I’m glad that I was able to become editor for **mathNEWS**. As for what’s ahead, who knows? It could be you writing the next **mastHEAD**.

Okay, normally I write the **mastHEAD** in InDesign so I have a good idea of when to stop, but this time I’m writing the **mastHEAD** at 2:45 am in Wordpress. This is also my last **mastHEAD**, but I’m hoping I can write the one for the orientation issue too. I have no idea where to stop or when to stop because there’s no frame of reference. This is probably a filler paragraph that can be deleted to make room for AOTI, but it would also be so funny if this was left in.

uknightED  
Editor, **mathNEWS**

- GOLDEN** | Picnics! (They’re better in the spring or fall though, summer is a bad season)
- JEFF** | Fires
- TEFF** | Writing Turing programs!
- FINCHEY** | It’s not going to the beach, that’s for sure. I don’t like sand. It’s coarse and rough and irritating...
- DERIVING FOR DICK** | Sweating
- BOLDBLAZER** | Do you mean a specifically summer-time activity or an activity that you can do in the summer along with potentially any other season? Regardless, my answer is probably just Pokémon.
- AAQSR** | Getting my blood sucked by all-natural, organic mosquitoes
- ALL-NATURAL, ORGANIC MOSQUITOES** | Sucking blood
- CUTLET** | Evening walks with friends while the sun is setting :)
- TENDSTOFORTYTWO** | cold brew season cold brew season cold brew season
- ICE CREAM** | Being eaten
- ALL-NATURAL, ORGANIC VAMPIRES** | Sucking blood
- BLINCHIK** | Watching the birds/squirrels/assorted wildlife 🐦🐿️
- MANGANESE** | Seeing the sun
- MOLASSES** | yearning for fall winter and/or spring
- ALYSSNYA** | Reading incel literature
- SKIT** | Iced coffee
- \_\_INIT\_\_** | Walking in places that aren't freeway intersections
- WEWLAD** | Experiencing amazing air conditioning inside
- YUMMYPI** | Basking in the warmth of the sunshine :)
- ENAMOURED** | Tea party!! 🍵🍵
- CLARIFIED** | Drinking water. #StayHydrated

## ARTICLE OF THE ISSUE

The Article of the Issue goes to Evan Girardin for The Pure Math, Applied Math, and C&O Club. Congratulations!

clarified  
Editor, **mathNEWS**

## Heatstroke’s no joke!

CLARA XI, **mathNEWS** EDITOR FOR SPRING 2022  
ALONG WITH CHEN CHAI, TERRY CHEN, RYAN CHOW, NICHOLAS PRIEBE, AND KEVIN TRIEU

# mathASKS 149.6

## FEATURING PROFESSOR SHANE MCINTOSH

### XX\_420SONICFAN69\_XX: WHAT IS A “SELF-SUSTAINING BUILD SYSTEM” IN LAYMAN’S TERMS?

All of the software that we use needs to be translated from the source code that its developers write into the format that will run on user machines. This translation from source to user format is specified by another piece of software called the build system. Essentially, build systems describe the recipe that a machine should follow—which commands should be executed and when—to piece the software together correctly. The build systems of small pieces of software are rather simple and easy to work with, but the build systems of large software projects are complex and non-trivial to maintain and operate. Organizations that develop software often dedicate resources (e.g., people, compute) to keeping build systems functioning smoothly.

While build systems play a critical role for software teams, they are only indirectly connected to the “bottom line”—no one purchases software licenses or clicks on a web application because the build system was so great. In fact, a build system is like an umpire or a referee—the really great ones are completely invisible (the really bad ones are very visible).

Our work on self-sustaining build systems aims to make build systems sustain themselves by learning from maintenance patterns that have taken place in the past and from logs of build execution.

### TENDSTOFORTYTWO: A LOT OF BUILD SYSTEMS THESE DAYS RELY ON EXTERNAL DEPENDENCIES — E.G., NPM FOR JAVASCRIPT, CARGO FOR RUST, AND OTHERS. HOW DO YOU FEEL ABOUT THE INCREASING RELIANCE OF SOFTWARE ON THESE EXTERNAL DEPENDENCIES, IN TERMS OF QUALITY AND REPRODUCIBILITY OF WHAT WE BUILD?

The shift towards smaller and more highly dependent (micro) packages is a really interesting trend. The impact on quality of software is hard to quantify, but the shift does create new opportunities for reuse. The corpus of fine-grained reusable packages of code allows teams to build larger software systems faster without “reinventing the wheel.” On the other hand, it creates a larger surface for external factors to impact software systems. Consider the impact that removing a central package will have on the entire ecosystem (e.g., leftpad incident: <https://qz.com/646467/how-one-programmer-broke-the-internet-by-deleting-a-tiny-piece-of-code/>).

The impact on reproducibility is interesting because (semantic) versioning practices have become very important. Semantic versioning (<https://semver.org/>) is where (at least) three version digits are used (MAJOR.MINOR.PATCH) to indicate when backwards incompatible changes are made (major version number increases), when functionality is added in a backwards compatible manner (minor version number increases), and when backwards compatible bug fixes are made (patch version number increases). If all of the packages

in the ecosystem consistently follow semantic versioning practices, package users can safely express their preferences in their build dependency files (e.g., most packages could likely tolerate patch and minor version updates without threatening the software being built); however, violations of semantic versioning happen all the time. These violations can cause ripple effects that negatively impact builds of downstream projects.

### THE BEAR PUN: CAN YOU EXPLAIN YOUR PHD THESIS IN 300 WORDS OR LESS?

“There ain’t no such thing as a free lunch.” While build systems provide critical features, they impose considerable overhead of software teams.

We first conducted three empirical studies that focus on the *maintenance overhead* introduced by the need to keep the build system in sync with the source code that it builds. We observed that: (1) although modern build technologies like Maven provide additional features, they tend to be prone to additional build maintenance activity and more prone to cloning, i.e., duplication of build logic, than older technologies like make are; (2) although typical cloning rates are higher in build systems than in other software artifacts (e.g., source code), there are commonly-adopted patterns of creative build system abstraction that can keep build cloning rates low; and (3) properties of source and test code changes can be used to train accurate classifiers that indicate whether a co-change to the build system is necessary.

We then present an empirical study that focuses on the *execution overhead* introduced by the slow nature of (re) generating system deliverables using a build system. We found that build optimization effort: (1) will yield more build performance improvement by focusing on build hotspots, i.e., files that are not only slow to rebuild, but also tend to change frequently; and (2) should be aligned with architectural refinement in order to yield the most benefit.

### SOFTIE: WHAT IS SOFTWARE ENGINEERING AS A RESEARCH FIELD LIKE? WHAT ARE THE HOT TOPICS IN THE AREA?

I find the field of software engineering exciting for several reasons. First, since I still dabble in software development from time to time, I get to “scratch my own itches” because I can explore and develop solutions to problems that I myself have experienced first-hand. Second, software engineering is a relatively young field (the term was only coined in the 1960s), so it is exciting to contribute to such a nascent and rapidly evolving discipline. Third, while technical challenges are a key focus of my work, software engineering also involves social challenges (e.g., the coordination and management of software teams). In my opinion, this blend of social and technical challenges makes software engineering research a rich, deep, and rewarding area to focus on.

Being such a rapidly evolving field, the hot topics vary quite a lot, but one of the more interesting emerging themes is on software engineering for artificial intelligence (SE4AI). In this area, researchers are investigating ways of adapting SE best practices (e.g., testing, versioning) for application to AI artifacts like classifiers.

**ANONYMOUS: DO YOU GET THE OPPORTUNITY TO DO MUCH INTERDISCIPLINARY WORK?**

I don't do much, but one fun idea I had the opportunity to work on was on sonification of software histories (<https://rebels.cs.uwaterloo.ca/shortconfpaper/2014/02/02/orchestrating-change-an-artistic-representation-of-software-evolution.html>). We explored the idea of "listening" to the commit history of a software project. The work was a collaboration with members of the Department of Music and is an exciting direction that I hope to follow up on in the future.

**CLARIFIED: WHAT BROUGHT YOU INTO YOUR RESEARCH AREA? WHAT ABOUT IT HAS MADE YOU STAY?**

What brought me in was a fortunate meeting with the right supervisors (Drs. Bram Adams and Ahmed E. Hassan) at the right time. When I was a graduate school candidate, I had the opportunity to visit with a lot of researchers who are working in different areas, but I was drawn to software engineering because I get to work on problems that I have encountered first-hand. What has made me stay is all of the points I mentioned above: the field is broad, spanning social and technical challenges, and is rapidly evolving, so it always feels fresh.

**ANONYMOUS: IF YOU COULD HAVE ALL SOFTWARE ENGINEERS FOLLOW ONE PIECE OF ADVICE, PRACTICE, OR GUIDELINE TO INCREASE THE QUALITY OF THEIR SOFTWARE, WHAT WOULD IT BE?**

Some of my favourite advice has to do with code comments and it goes something like this: Write code comments that describe *why* a piece of code is written the way that it is rather than *what* the code does (the reader can clearly see what the code does by reading it).

**CIX: HOW DO YOU FEEL ABOUT CANADA GEESE?**

I simultaneously feel a sense of national pride and concern for nearby children and sightseers who may not know how aggressive they can be.

**CIX: WHAT'S THE BEST PART OF YOUR JOB?**

I find most aspects of my job rewarding, but there is something special about mentoring graduate students and undergraduate research students. There is something special about helping trainees to get the most out of their potential and achieve short-term (e.g., publishing research) and long-term career goals (e.g., having trainees start their own independent researchers careers).

**BOLDBLAZER: WHAT IS YOUR FAVOURITE COURSE TO TEACH? ALSO, WHAT WOULD BE YOUR PITCH TO CONVINCe PEOPLE TO TAKE YOUR COURSE?**

I've been teaching Software Design & Architecture (CS 446), and it is a nice course, but in Winter 2023, I will be teaching a brand new course that I designed myself on Software Delivery (CS 489). Students who take the course will learn how to design, implement, and operate software release pipelines. Build systems feature prominently in the course, but students also learn about containerization (e.g., Docker), infrastructure-as-code (e.g., Ansible), and various release practices that software organizations use to minimize risk in rolling out releases (e.g., canary releases, A/B testing, resiliency/chaos engineering). I taught the course two times at McGill University prior to joining U. Waterloo, and the students really loved it. I hope the students here will also enjoy it.

**TENDSTOFORTYTWO: DO YOU GET A LOT OF JOKES ABOUT YOUR NAME AND A CERTAIN LINE OF COMPUTERS PRODUCED BY APPLE, INC? IF SO, DO YOU HAVE A FAVOURITE SUCH JOKE?**

You know, sometimes, people ask if there is any association, but I can't say that I've heard a particularly good joke. If you have one, please do share :-)

**WEWLAD: HAVE YOU EVER USED DRRACKET?**

Can't say that I have had the pleasure. Is it like DrJava (<http://drjava.org/>)?

**SKIT: WHERE IS YOUR FAVOURITE PLACE TO GET FOOD ON CAMPUS?**

I'm a big fan of bubble tea, so you'll often see me at Chatime when I need my fix.

**PIZZA ENJOYER: WHAT ARE YOUR FEELINGS ABOUT EACH OF THE FOLLOWING PIZZA TOPPINGS: PINEAPPLE, ANCHOVIES, OLIVE, BARBECUE SAUCE?**

- Pineapple + hot peppers is a fav of mine, so I'm firmly on team pineapple.
- I don't eat fish, so I can't comment on anchovies.
- Olives can be good with the right blend of other toppings (e.g., roasted peppers and mushrooms)
- I used to work as a line cook, and we would make these BBQ pizzas that were wildly popular. Can't say that they are my favourite thing, but if it is replacing the tomato sauce, it can be done well.

**PREDAP: WHAT'S ONE POSITIVE QUALITY THAT YOU'D LIKE PEOPLE TO REMEMBER ABOUT YOU?**

I work hard but I don't take myself too seriously.

## DERIVING FOR DICK: WHAT'S YOUR FAVOURITE APPLE SPECIES?

The regional stuff is the best (e.g., Spartan, Royal Gala).

## N REASONS WE SHOULD RENAME TO mathsNEWS

### LONG OVERDUE REALLY

- **Mathematics is plural.** Last I checked the way we pluralise a noun is by adding an S. So now I ask you, how did mathematics get shortened to math and not maths?
- **Math sounds weak.** Maths is a huge field with many branches. You can't just reduce it to a singular math. Maths is infinitely big, and last time I checked,  $\infty > 1$  (Proof Pending). Now sure if it's just some math, like a few calculations, you can use "math" guilt-free. Here's a couple of examples:

*I went over their math, and the calculations check out: the Riemann Hypothesis is false.*

*I can't believe I accidentally disproved all of maths, I need help.*

- **They call it physics.** And it makes me insecure that we don't call it maths. Come on we can't let the physicists get the upper hand! Surely none of us want make the superior subject of maths seem singular and puny to them.
- **Maths is 5 letters.** Not only is that the best number  $\in \mathbb{N}$ , it's also a beautiful prime.  $<3$
- **It's the right way.** God save the Queen.

aaqsr

## N REASONS WE SHOULDN'T RENAME TO mathsNEWS

- Imagine saying maths when you could just say math and avoid the red squiggle
- Imagine saying maths when you could just say math and avoid typing an extra character
- Imagine saying maths when you could just say math and avoid the weird -ths sound
- 'Math' is already plural and stands for 'mathematics'—nobody talks about a single mathematic
- Br\*tish :nauseated\_face:

tendstofortytwo

## THANK MR. GOOSE

TO THE TUNE OF "TO FACE THE TRUTH" BY THE PET SHOP BOYS

[Verse 1]

So as the term comes to an end  
With my grades I must contend  
What am I supposed to do?  
Gave my all but it's not enough  
So does that make me a fuck-up?  
What am I supposed to do?

[Chorus 1]

But honking quietly out there  
Is the bird to send our prayer  
I wonder if you'll join  
Me, tonight, in truth?  
Tonight, give thanks to Mr. Goose  
Thank Mr. Goose

[Verse 2]

I said this term I'd try my best  
But I came out like a hot mess  
And I can make zero excuse  
Now the final days are nigh  
It makes me really want to cry  
What am I supposed to do?

[Chorus 2]

But hope is still out to be found  
From our mistakes we will rebound  
So let's pray for a curve  
Our faith resolute  
Tonight, give thanks to Mr. Goose  
Thank Mr. Goose  
Thank Mr. Goose

[Verse 3]

So as the term comes to an end  
With my grades I must contend  
What am I supposed to do?  
Gave my all but it's not enough  
So does that make me a fuck-up?  
What am I supposed to do?

[Chorus 3]

But I am so done feeling bad  
What happened then is now the past  
I ask you if you'll join  
Damned be the proof  
Tonight, give thanks to Mr. Goose  
Thank Mr. Goose

Finchey

mathNEWS

# THE PURE MATH, APPLIED MATH, AND C&O CLUB

A PHYSICALLY PERMANENT ARCHIVE OF A SPIRITUALLY PERMANENT COLLECTIVE

Nothing has changed in 20 years, and I miss the days of PMC...  
You always meet the most amazing people.

OLGA ZORIN, UWATERLOO CS INSTRUCTOR

To say that the Pure Math Club holds a special place in many peoples' hearts would be an understatement. I've been an executive on the club for over a year, wearing lots of different hats. I spent half the time I should've spent doing my actual *job* this term instead trying to figure out how to put together this article you're reading; I love this club with all my heart. It's not just me, either! So many more than just me. So many people have poured so much of themselves into it, for years and years, and they've gotten something back out of it.

Back in February, I was sitting with some of the editors and they said that **mathNEWS** is turning 50 soon. Selfishly, I started thinking about how old PMC must've been. It's not obvious! There are practically no historical records in the club room. I became a little envious of **mathNEWS**; they're inherently self-archiving. They have mint prints of every issue dating back to 1973. Big red bound books of archives containing every little story, satire piece, desperate complaint, and whatever else, for the last 50 years. Little pieces of everyone, made permanent. Why doesn't PMC have that?

I looked around in the MathSoc office for old yearbooks. Oldest one: class of eighty-eight. Page 20. *Pure Math Club*. There's a grayscale picture of a woman just a little older than me, smiling to the right with a donut in hand. Turns out the picture was of Penny Haxell, a PMC co-founder and a professor in the C&O department. But at that point I had no idea!

Another question appeared when I got an inkling that the club hadn't always been the Pure Math, Applied Math and C&O Club, and it had at some point just been the Pure Math Club. When did the other two subjects get added? Was there ever a distinct Applied Math Club? A C&O Club?

Let's read some of those mints in the **mathNEWS** office!

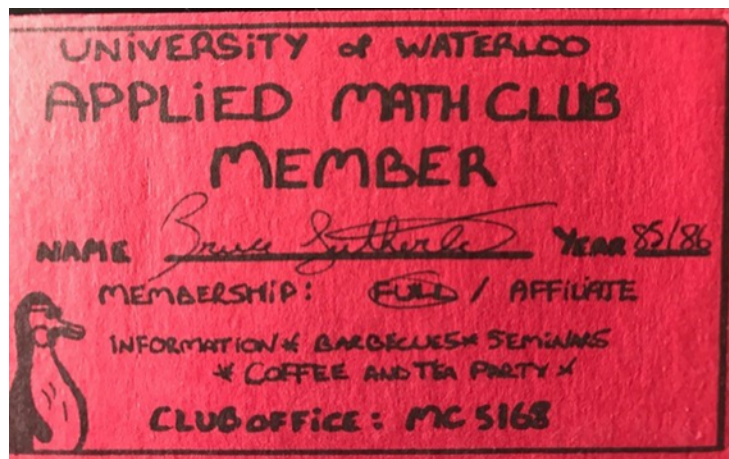
Friday 18 October 1985

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## Applied Math Club

Until now, sophisticated and unsophisticated Applied Math students and other students didn't have the kind of club they have been looking for. They wanted to join a club but they couldn't find one that was just right. That is until now....

That's right. Our deepest fear. Applied Math Club had beaten pure mathies to the punch. Pages and pages—no trace of a Pure Math Club. Bruce Sutherland, Alison Burnham and dan schnabel: the Applied Math Club founders, the last of whom was also a long-time **mathNEWS** editor.



(MC 5168 doesn't exist anymore.) A term later, in Winter '86, the Pure Math Club would be founded by Penny Haxell, Aaron Palmer and Christopher Anand. dan chalks it up to the pure mathies being a little jealous, wanting in on the steady supply of coffee and donuts. In any case, the two coexisted peacefully, and even held some joint events for coffee and tea. PMC also has a long history in sports, with the first "official" soccer team dating back to 1990. Challenges, victories and defeats against ActSci, CSC and other clubs are strewn about the **mathNEWS** archives.

Donuts were an important part of math throughout undergrad. In first year we had training sessions for the Putnam, about ten in a room from 8pm to 2am with a 30-person coffee dispenser and a couple of flats of donuts to match. I hadn't really been exposed to such unlimited stimulants before. We thanked the Dean but I suspect there was also some physiology or neurology experiment going on at the same time, because here I am finishing up my work at 3:30 in the morning and noodling on von Neumann.

AARON PALMER, PMC CO-FOUNDER

Despite its lead in founding, the Applied Math Club wouldn't get off the ground in the same way that PMC did. While PMC expanded its reach in F91 by claiming the domain of C&O, the Applied Math Club would start to disappear from MathSoc budgets and minutes in the same term. An attempt would be made to revive it a few years later in F93, but it didn't last much more than a year. Eventually, the PMC&OC would spiritually absorb the now-defunct Applied Math Club, adding "AM" to its name in F95 with Max Stevens and Matt Walsh (not the racist one) leading the charge. While the club's name became PMAMC&OC, most kept calling it PMC anyway. Kevin Hare, a one-time PMC exec and now a professor here, recalls that "Poly Math Club" was an alternate suggested name at the time, so that they could keep the "PMC" acronym. In the end, though, PMAMC&OC was chosen.

There's also a funny story I heard through a few email exchanges: if you look for the right PMC columns in

**mathNEWS** in the late '90s, you'll find reference to a "Keeper of the Sacred Shoe". So, before PMC had a door code, it had physical keys. One of these keys was kept in a MathSoc locker which all club members had access to. Matt recalls that, in F94, someone accidentally pocketed it while the other keyholders were out of town one weekend; it was decided that accidentally pocketing a shoe would be more difficult, and so the key and the shoe were tied into one.

Here's a look at a few other highlights over the years.

**Absolut Trials.** Back in the day, Waterloo used to host a math contest called the Bernoulli Trials. In W99, some friends in PMC devised the Absolut Trials, a spin on the contest but with a shot of vodka for each correct answer to balance everyone's cognitive abilities. This ran semi-regularly into the late '00s. Come by the office to see the trophy.

**24-Hour SASMS.** One of PMC's termly events, the Short Attention Span Math Seminars, started running regularly in F97, originally devised by Marni Mishna, a one-time PMC president. I don't expect you to be particularly wide-eyed here. What I *do* expect you to be wide-eyed for is a 24-hour SASMS arranged by Joel Kamnitzer in F00. 3:30pm–3:30pm. Forty (40) talks. No breaks.

**The Axe of Choice.** Acquired in S03 on a Fields trip. Unrelatedly, the PMC mini-fridge is mortally wounded in an axe-related defrosting attempt roughly a month after this. Don't talk about it.

Otherwise, I can't say that much has changed in the last 20 or 30 years. The folks who founded PMC came together because they had been in the same advanced math courses, the same way many find their way into PMC today. Snacks are still given out and sold. SASMS still happens. Prof talks still happen. The club is still in MC 3033.

Of course, that wasn't enough. I'm not sure what drove me to it (read: I am very sure), but at some point I decided that the events weren't enough; no, I had to get a list of every single PMC president. Ever. The events aren't what took three months; this is.

All that time, and I couldn't even complete it. There are gaps! Huge ones! I'm still working on it to this day. I only have 78 of 111 terms fully accounted for. What's the deal? I've sent dozens of dozens of emails, LinkedIn requests, Facebook messages, you name it. So many conversations with so many people who graduated long ago. The fact is, most people just *don't really remember*. For me, that was hard to process. *How do you not remember what role you had in the club, or even when?* Most of the people I talked to remembered plenty of names, and sometimes an odd memory or two, but almost never more than that. How? The natural thought is, then...will that happen to me?

The experience of tracking all this down has made me feel a lot of things. Truth be told, I'm terrified of the future. Post-graduation, I mean. I'm afraid of the change that'll happen.

I'm afraid of my impermanence. I'm afraid of losing my friends. I'm afraid of my memories becoming fuzzy. I'm afraid of becoming a fuzzy memory. And on one hand, I feel some reassurance that, another 40 years from now, my name might still be traceable to PMC. But on the other hand, I've seen generations of friend groups roll through this club, out the other end, and off their separate ways, and one day, that'll be you and me.

I still don't really know how to resolve that. It's a fear everyone has to some degree or another, and others suppress or channel it in different ways. I guess I channel it by finding people from 40 years ago. Or maybe it's the other way around.

All that said, I think I understand the forgetful responses I've gotten. What I have realised is that it's not really about who was what and when. It's not even really about the events, at least not that much. It's about who was what, *to whom*. It's about stupid jokes between classes. It's about the *words* they said. It's about that trip to Québec. It's about small jars of small kindnesses.



The special moments that really matter are ephemeral; none of them can be perfectly captured. It's certainly not fair, but that's life. What makes me happy is knowing that, when I'm gone, PMC will stay. No matter how much the people change, PMC will always be PMC. It'll always have that same magic and spark that's made (and continues to make) my experience here so vibrant. And PMC will never die.

**Evan Girardin**  
President, PMC

A few days before writing this, I met in-person with Russell O'Connor, W97 PMC president. He very generously gave me a photo album of the club from Fall of that year. It's in the PMC office if you want to see it—MC 3033.

Thanks to the **mathNEWS** editors for their support, and for letting me sit in the **mathNEWS** office all day reading through all the archives. More thanks go out to all of the past PMC members who entertained my inane emails.

The (incomplete) list of presidents, and some smaller events not mentioned here, will be posted on the PMC website whenever I find time.

# EXPLAINING MATH RESEARCH TO MY PARENTS: WEEK 6 OF 6

The goal of this week's article is not to explain more mathematical content, since I have already stated my problem, and the tools that I'm using to approach the problem are well outside the scope of what I can explain in an article, or even a series. Instead, this article will serve as a reflection on the research so far, and my progress. The main mathematical takeaways that I hope you've taken is that attaching a visual to abstract objects can help us understand them concretely, that linear algebra is easy, and that math is *really, really, really*, hard. Now let's get into the fun stuff!

First of all, research is a lot harder than I appreciated. I mean, sure, everyone tells you it's going to be hard, and you understand logically that it is, but understanding that logically is very different from the feeling you get when you spend a whole week making no headway. It was a lot less discouraging than I expected, since everyone else who I know spent a similar amount of time floundering. It's also really hit me just how unbelievably **enormous** research math is. That statement of my research problem in terms of matrix images is really an equivalent formulation to a problem that we care about a lot more, called the Dixmier-Moeglin equivalence. I think that explaining DME to the average 3<sup>rd</sup> year pure math student would take another 6 part article series. The DME is known to hold for lots of different rings, and known *not* to hold for lots more, but there are still enormous classes of rings for which it is completely unknown. There are textbooks and papers written about it, that use techniques from so many different areas of math. I have worked for hours or days to understand individual sentences or paragraphs from books with a thousand pages—pages my supervisor could effortlessly explain.

Speaking of my supervisor, his contributions are unbelievable. He is so unbelievably able to explain something technical and demanding in a way that makes it feel easy. He has introduced me to so many new ideas, and when he talks about math, he has a joy that's simply contagious. The way he approaches problems is incredible, and he is truly the smartest person I have ever met. He supports my minimal progress, and without a supervisor as good as him, I guarantee I would have accomplished so much less.

I've also learned to value concreteness more. Don't get me wrong, I love abstraction, but I used to really undervalue concreteness. I was often able to do assignments and courses in full abstraction and generality, I never really needed to descend to concrete examples or specifics, I could just start a proof and write it. However, in my research, having examples to come back to, and specific examples of techniques being used successfully has been invaluable. I'm working in a highly abstract setting in a lot of generality, and I am thinking in as much abstraction and generality as possible, but because these problems are so far beyond the general state of my mathematical knowledge, having anchors is very helpful. The best way I can describe it is that what we're doing in courses is firmly

within my mathematical limits, and so it's surrounded, I can kind of internalize it easily, but for my research, I've built out a very narrow spike that just barely pokes the question. I can't just rely on my normal approach, I need to have an anchor, I need to bring it back to what I understand well so that I can move forwards.

Research mathematics is a monumental, collaborative effort spanning nations, genders, religions, sexualities, ages, political beliefs, upbringings, and every possible other demographic. It only functions because of human ingenuity and collaboration, and I love that; contributing a little piece to a massive, sprawling whole. I am so glad to have done research this term, and I can't wait to do it again. If you ever get the chance to, please take it—it's so worth it.

*gildED*

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## MEN WILL DUMP YOU MATH IS FOREVER

Beauty is in the eye of the beholder, they insist,  
but it's impossible to deny the beauty that lies  
in the radius of his big brown eyes,  
that faint whisper of Pi that draws his to mine.

And they say the Golden Ratio was god's finest creation,  
but the smooth corners of his face,  
down to a Plank's distance of precision  
speaks a truth we must embrace,  
Fibonacci flows in his veins,  
so when god looked down at him one day,  
he made 1.618.

And statistically speaking, he is one in eight billions (but we  
all know statistics isn't real math),  
so if you really want to know the authenticity of his brilliance,  
observe that his glow occurs in only one instance  
every Graham's number or so

*a3wice*

---

## GOLDBACH TED TALK

Cold kock head sock  
Frick frock tooth shock  
Ted talk wet walk  
Pullback butt crack  
Bitch Bock fuck Tod

*Proving for pussy*



# profQUOTES

## CO 250: MARTIN PEI

“ How hard is the quiz? Well, I can say that the paper will be pretty soft.

“ My life is a meme.

## CO 342: SOPHIE SPIRKL

“ *[Phone notification sound comes from a student]* That sounded like it came from behind me.

“ What are we going to do? Well, we are probably going to run out of time.

“ This pseudocode has a proof in it.

## CO 351: JOSEPH CHERIYAN

“ It's human nature to put the blame on someone else.

“ I'm saying it's not our fault. It's your fault.

## CO 380: LOGAN CREW

“ It's hard to draw a random polygon that doesn't do something stupid.

“ If they really want 95% of it, screw them anyway.

## PMATH 320: ANDREW STAAL

“ The first reason is:  $4 < 9$ .

## PMATH 351: STEPHEN NEW

“ *[After noticing two typos on the front page of the midterm due to sloppy copy pasting from a different midterm]* I just hope these are 351 questions.

“ When  $r = 0$ , the open ball is empty. The punctured open ball is even emptier.

## PMATH 441: BLAKE MADILL

“  $R$  is a finite fie- *[starts writing finite again before pausing]* finite finite field. There's a second f-word there. I know a third.

“ We got the whole gang here, so we'll start 15 seconds early. What rebels we are.

“ Note that  $3 = 3$ .

“ If I could get a pet goat, I would.

“ If only that worked in the stores. Put a star on it and steal it.

## PSCI 384: ALEXANDER LANOSZKA

“ Land power is the most important form of military power, because land, if you can believe it, is where people live.

“ World War I was terrific—I mean terrible.

“ *[struggling to contain laughter]* There was this hope that the Internet would make people better informed.

“ Terrible films, they make the prequels look good. (On the modern Star Wars films)

“ In Europe, they lived until the mid-thirties, I'd be dead by now.

“ I laugh, but it's laughter stemming from a sheer horror. Like people did this to each other. (On the First Opium War)

“ This is the sexiest form of denial. (On World War I dogfights)

“ This is actually a really sanitized view of some really horrific violence.

“ There are lots of lonely and insecure people out there. It's easy prey.

“ The easy thing to do would be to kill the children... wait, let me explain myself.



## TO WEI

I looked at some old pictures, and I saw your face the way a stranger would see you for the first time. Stout nose, puffy cheeks, thoughtful eyes. I couldn't see your mischievous smile. I've been hit with a longing that I haven't ever felt. Dear friend, I miss our life. FUCK

A cool pen name

# BEGINNER'S GUIDE TO COMPILE-TIME DESCENT, VI

## VI: MOVING FORWARD

The inevitable conclusion to the nonsense is here. And although with this article I bring to a close our journey, there remains still boundless undiscovered territory ahead for you.

Well, let's get to it. I told you to be scared for move semantics, so allow me to now throw you a very simple curveball. Let's say I want to have a template function that takes some arguments and passes them, *exactly*, to a different function overload. For the sake of being concrete, let's consider the special case of passing along, or *forwarding*, a single argument to a class constructor.

Well, that seems easy, right? You're smart and you know everything. C++ is so easy. Here you go now:

```
template<typename T, typename Arg>
T wrapper(Arg arg) {
    return T{arg};
}
```

Easy, right? Okay, let's try it out:

```
struct Thing {
    Thing() { /* default */ }
    Thing(const Thing& other) { /* copy */ }
    Thing(Thing&& other) { /* move */ }
};
// ...
Thing t = wrapper<Thing>(
    std::move(Thing{})); // !
Thing s = wrapper<Thing>(t); // !
```

The output looks something like this:

```
default
move
copy
copy
copy
```

Oh no. Our hubris. Regardless of how we pass the argument in, we're getting `Arg` deduced to be `Thing`. For copying, that's fine, except we're also making an additional extra copy. For moving, we don't end up actually moving at all. That's pretty bad. You might say we can fix this by manually specifying `Arg` like so:

```
Thing t = wrapper<Thing, Thing&&>(
    std::move(Thing{}));
Thing s = wrapper<Thing, const Thing&>(t);
```

And while we'd lose the extra copy,

- Specifying types manually sucks; the compiler exists to figure this out for us, and

- Moving still doesn't work; we do a copy instead, since `arg` itself is an lvalue. Recall that an lvalue expression will normally have lvalue reference type.

In your vain pursuit, you might also try using references in the parameters for `wrapper`, like having it instead take an `Arg&` or `const Arg&` or something like that. But you'd still have issues of things either not compiling or not moving when you want them to. The only conclusion we come to here is that we'd to make an explicit overload of `wrapper` for **every single possibility**. And if you extend this problem to the case of forwarding to a function that takes multiple parameters, we immediately get combinatorial explosion in the number of overloads needed. It seems like the problem of forwarding arguments *perfectly* to another function, i.e.,

### THE PERFECT FORWARDING PROBLEM

...is a pretty hard one. Is there a better way?

Yes. Of course there is! Along with move semantics, C++11 offers us a solution for this problem, via something called *forwarding references*, or sometimes *universal references*.

Here's the deal. Take a look at this code:

```
template<typename T, typename Arg>
T wrapper(Arg&& arg) {
    return T{arg};
}
```

You might recall your C++ knowledge and say that the type `Arg&&` is "rvalue reference to `Arg`" here. Right?

Wrong, fucko. Because it's used in the parameter list on a template type parameter `Arg`, `Arg&&` takes on a different characterisation as a *forwarding reference*, where it's deduced to be something different depending on what kind of expression was given as the argument `arg` in the function call. What do I mean by "kind of expression"?

I mean **value category**. If you haven't read the article I suggested last time, now would be a brilliant time to do so. I'm going to start using language from there. Right, so assuming you've read that, you should have *lvalues* and *rvalues* fresh in your mind. It turns out that the type `Arg` will get deduced to something different depending on whether the passed-in argument was an lvalue or an rvalue. In particular,

- rvalues of type `T` are deduced as `T`,
- lvalues of type `T` are deduced as `T&`,
- **Nothing** can be deduced as `T&&`.

So if we did `wrapper<Thing>(Thing{})` then we'll be instantiating the template with `Arg=Thing`; similarly, if we did `wrapper<Thing>(t)` for some thing `t`, then we'd be instantiating the template with `Arg=Thing&`. Now, that doesn't mean

that `arg` would have type `Thing` or `Thing&` respectively; there's still the `&&` that comes after `Arg` and before `arg`:

```
template<typename T, typename Arg>
T wrapper(Arg&& arg) { return T{arg}; }
```

You might think that in the case of `Arg=Thing&`, we'd get `Arg&&` being `Thing& &&` which is ill-formed, since "rvalue reference to lvalue reference to `Thing`" doesn't make sense. But actually, `Arg&&` will reduce down to `Thing&`. What? How? Here's the magic. There's a feature of the C++ language called *reference collapsing*, where if you're in a situation like this with a template type parameter and multiple "reference" bits like this, the "reference" bits of final deduced type will be collapsed down into something that makes sense. Here are the rules:

- `T& &` becomes `T&`;
- `T&& &` becomes `T&`;
- `T& &&` becomes `T&`;
- `T&& &&` becomes `T&&`.

Basically, `&` always wins over `&&` if present. So, the code we wrote above will do exactly what we want, preserving value category.

...almost. We will need to figure out a way to preserve value category on the way over to `T`'s constructor (in our example, we have `T=Thing`). We're going to try and write a function called *forward* to do this, that takes an argument in, and spits it back out, preserving value category. To do this, we'll be using a type trait called `remove_ref` that, well, removes references from a type (e.g. `remove_ref<Thing&>::type` aliases `Thing`). The implementation is similar to `remove_cvref` but easier, so you can do it yourself. Here we go:

```
template<typename T>
T&& forward(typename remove_ref<T>::type&& t) {
    return static_cast<T&&>(t);
}
```

Now, it's as easy as this:

```
template<typename T, typename Arg>
T wrapper(Arg&& arg) {
    return T{forward<Arg>(arg)};
}
```

That `forward` implementation was pretty dense, right? We're using forwarding references *a lot* there. It happens in the return type, in the `static_cast`, and in the parameter (remember, the `typename` is just there to let the compiler know it's a type dependent on a parameter). At every step along the way, those forwarding references get collapsed down to an appropriate type depending on the expression's value category, and the cast and return type ensures that the intended type is returned. It feels super heavy-handed at every step, but a little heavy-handedness is justified when we're trying to get what we want out of C++.

Before we move on, just note that specifying the `Arg` template parameter to `forward` is necessary; the type deduction won't work out in our favour otherwise. Trace through it yourself and you'll see that, without manual specification of the parameter, `forward` would only ever spit out lvalue references! Okay, now let's move on.

## MOVING ON

I hear you over there. I tricked you, right? I said that this article was going to be about move semantics, and I've barely talked about our beloved `std::move`, right? Well, alright, you got me, but talking about forwarding first was necessary. Now, we can start thinking the big questions: *how does* `std::move` *even work*? What does it do? I can answer the second question right now: `std::move` is a template function that takes an argument and casts it to an rvalue reference. That's it. Now, the first question will take a little bit longer to answer. Based on the description I gave, the version of ourselves from a few minutes ago might've tried something like this:

```
template<typename T>
T&& move(T&& t) {
    return static_cast<T&&>(t);
}
```

That's clearly wrong, because those are actually forwarding references which'll get collapsed down, potentially to `T&`, which is pretty bad. But this framework is workable, right? Like, the `T&& t` argument is actually fine, we probably want a forwarding reference there so we can do this on anything. But we *do* need to change the return type and the cast. In particular, we need to make sure that it's *really* getting cast to an rvalue reference. And after the whole forwarding debacle, this is actually pretty easy: we can just use a type trait to strip the references off the deduced type, and then append a `&&` to that!

```
template<typename T>
typename remove_ref<T>::type&&
move(T&& t) {
    return static_cast<
        typename remove_ref<T>::type&&
    >(t);
}
```

That's it! I'm serious! That's a perfectly acceptable implementation for `move` that the standard library might use. That's all `move` is. It's just a weird cast that uses some template magic to Just Work. This is fucked! And you know how to do it now. You know. *You know*. You know what it means. Isn't that magical? Isn't it such a rush? You tricked the compiler into doing your inane tasks; you asserted some strong control within those clever tricks. And now you can tell other people about it. And you can read all of the other myriad C++ articles published over the last — the, uh — it's been a while, okay?

Anyway: for those of you who have gotten this far and read each part of this alien collection of language, I hope you can see what I mean — or, what I've been meaning for the last

year. I hope you see some of the beauty and hilarity and terror buried underneath the brackets, braces and keywords of this monstrous, monolithic, utterly intoxicating language.

And I hope that this wasn't enough for you.

jeff

This is probably the last weirdo C++ article I'll ever write, unless I run into anything seriously great and/or different that's worth two pages in **mathNEWS**. If you want to know more, come up to me next production night, or come to the PMC office. Ask for jeff.

## TURING 104

### WHY IS STUDENT A RESERVED KEYWORD?

Last issue, we found out that `Student` is a reserved keyword in the Turing programming language. But why? I have no idea, so it's time to dig in to the Turing source code and figure it out.

Thankfully, after Holtsoft went bankrupt the last maintainer of Turing working at Holtsoft released the source code. We can find the source code for `Student.tu` at <https://github.com/Open-Turing-Project/OpenTuring/blob/8a0fd62269fe44a6d0debc597acde01a280a2e14/turing/test/support/predefs/Student.tu>. Unfortunately, it's quite underwhelming. The `Student` module just exports various built-in procedures such as `drawmapleleaf` and `clock` and this file is then apparently automatically included in all Turing programs so that these built-in procedures are available to you all the time.

That was underwhelming. Surely we can find other interesting things in this codebase though?

I was looking in the Turing documentation at the list of reserved keywords, and something caught my eye. `asm` is a reserved keyword in Turing! Does this mean we can write inline assembly in Turing? There was no documentation for it, so I tried entering the command to see what would happen. I ran it. Error. 'asm' is not supported in this interpreter. That sucks. After looking through the source code, I am fairly confident that this keyword only exists to give you that error when you try to use it. Is it possible that Holtsoft planned to add support for inline assembly to Turing? Maybe someone thought it would be neat to teach high school students assembly. Remember, Turing was designed to be an educational language to teach people how to code. It was never supposed to be used for low-level programming. Maybe someone just thought it would be good practice to reserve `asm` as a keyword just in case. Who can say for sure?

teff

## PMATH 348 MOMENTS

Sometimes, in PMATH 348 (typically a Monday), someone will leave something on the whiteboard from their work and not erase it. I took it upon myself to relate it to the lectures, through various labels:

- (Above someone's course agenda) "Topics to be covered in PMATH 348, 348.5, 347.5, etc."
- (On some network-y/UX diagram) "Proof of the field dimension theorem".
- (On a fantasy/surrealist elephant) "Topics to be covered in the PMATH 348 Final".

And others. Snew is a gentle and not easily bewildered soul. While expressing mild amusement at my first set of antics, he subsequently simply gave the work a quick glance before erasing. Nonetheless, I chortled.

There's not much to this article beyond this; just the little things I did during the term to amuse myself and others around me. We love a good running gag. While I did cooler and more interesting stuff during the term, I think it's important to take the time to reminisce and reflect on the small things. And hence, this article will be smaller as well (also because I have so much work to do and want pizza).

I do remember Snew quietly acknowledging my header for "How to succeed on the PMATH 348 Midterm" (this header was above "know what to do" and "know how to do it", or words to that effect). He quietly turned to the class and said "Well, that's really all there is to it, no?"

My advice for finals: know what to do, and know how to do it. That's really all there is to it, no?

Shout-out to Snew by the way. I've taken many a course with you; one before, during, and after the pandemic, and your lectures are always sure-footed, solid ground for me.

Xx\_420SonicFan69\_xX

## IF YOU LIKE, YOU CAN TAKE A LOOK AT THE mathNEWS

like really you can just look at it if you want. it's really that easy.

creature\_f

# SIMPLY TYPED LAMBDA CALCULUS

## AS THE INTERNAL LANGUAGE OF CARTESIAN CLOSED CATEGORIES

The power of category theory is that, since virtually every mathematical object is defined in terms of some algebraic theory (symbols, operations, and equations), it is possible to *internalize* the object in an arbitrary category with sufficient structures. For example, in an category  $C$  with finite products, a *group object* is such an object  $G$  that has a binary multiplication map  $\cdot : G \times G \rightarrow G$ , a constant map that chooses identity  $\cdot : 1 \rightarrow G$ , and an unary inverse function  $(-)^{-1} : G \rightarrow G$ . Since  $G$  is situated in the ambient category  $C$ , it has all what it needs to have in such a category.

For example, in the category of topological spaces,  $\text{Top}$ , a group object is a *topological group*. In the category  $\text{FinSet}$ , we get *finite groups*, and so on...

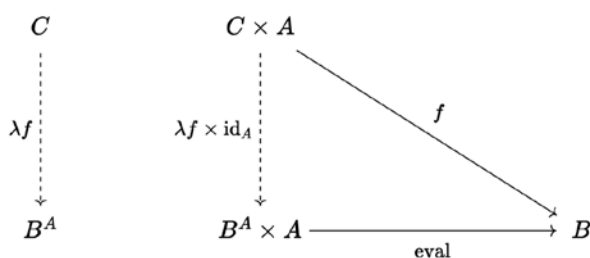
Yet this kind of construction is not limited to building mathematical objects. Logical systems can be internalized in categories as well.

I assume you know  $\lambda$ -calculus. Simply typed  $\lambda$ -calculus (STLC) is a kind of  $\lambda$ -calculus with only function types and some atomic base types. Under Curry-Howard correspondence, simply typed lambda calculus corresponds to minimal logic. Function application is modus ponens, function abstraction is how you introduce a conditional proposition. The only type forming rule is as follows: given type  $A$  and  $B$ , we can form a type  $A \rightarrow B$ . And that's it!

But how is it related to categories? A cartesian closed category (CCC) is a category such that:

1. It has a terminal object.
2. Given any two objects  $A, B$ , we can form the product  $A \times B$ ,
3. Given any two objects  $A, B$ , we can form the exponential  $B^A$ , *eval*

Whenever defined, products and exponentials are guaranteed to be unique up to a unique isomorphism thanks to their universal properties. The exponential is an object  $B^A$  together with a morphism *eval* :  $B^A \times A \rightarrow B$ . In  $\text{Set}$ , this is just the set of all functions  $A \rightarrow B$ . The universal property is that, given any object  $C$  and a morphism  $f : C \times A \rightarrow B$ , there's a unique morphism  $\lambda f : C \rightarrow B^A$  such that *eval*  $\circ \lambda f \times \text{id}_A$ . In other words, the following diagram commutes:



There's a lot to unpack here, but the intuition is easy to grasp. The *eval* morphism characterizes how to map out of the exponential object: a function  $A \rightarrow B$  expects an element in  $A$  and maps it to an element in  $B$ . The *eval* thus takes the function  $f$  and an argument  $a$  to the return value  $f(a)$ . The universal property essentially tells us the following fact, known as currying: a function  $C \times A \rightarrow B$  is the same as a function  $C \rightarrow B^A$ .

We can now see how this corresponds to simply typed lambda calculus: in *any* CCC, we can view CCC objects as types, and CCC morphisms as terms (and that's why we use the notation  $\lambda f$ ). On the other hand, we can also see, given a particular simply typed lambda calculus, we can generate a CCC where all its objects are types, and morphisms are *terms quotiented by equality*.

This correspondence is formal and rigorous. It enables us to reason about CCCs in the language of simply typed lambda calculus: we can translate any proposition about CCC into propositions about lambda calculus it corresponds to. Instead of thinking categorically, we can think computationally!

The other direction of correspondence gives us a way to define the *categorical semantics* of any simply-typed lambda calculus. This enables us to study and *present* these languages in a very general and objective<sup>1</sup> way.

So this is what I want to talk about: how simply typed lambda calculus corresponds to category theory, modulo errors and omissions.

Good luck to my final exams. Now I just hope they don't go too bad...

category theorist UwU

1. Sterling, Jonathan. (2021). First Steps in Synthetic Tait Computability: The Objective Metatheory of Cubical Type Theory. <https://doi.org/10.5281/zenodo.5709838>

## PLEASE DONATE BLOOD

It is the easiest way to save a life. It is a quick, easy process. It does not hurt. I will be doing it on or around my birthday (Nov 24), reach out to me on Discord or in person if you'd like company. I will tell you anything about the process, I will reassure you, I will keep you company. Please just donate blood. Somebody needs it.

gildED (currently a little lightheadED)

# HOW TO SPEAK LATIN

## A COMPREHENSIVE BEGINNER, INTERMEDIATE, AND ADVANCED GUIDE TO THE MOST ROMANTIC LANGUAGE

I can not promise to teach you all of Latin in this article. Even if I could distill 3000 years of history down to a single set of grammar, pronunciation, writing, and vocabulary, I could not teach it. That sort of stuff takes years to learn. Despite this, in this article I will teach you all of Latin.

Latin has a feature where instead of using sentence structure to determine what the object and subject of a sentence are, to determine what action the verbs are referring to, and to determine what adjectives and adverbs are modifying, it will instead change the endings of the words to determine all that. Much like how other languages change the endings of verbs depending on who is doing the verb, Latin changes the endings of almost all words to contextualize them. It does this according to these massive tables, which account for every word in the language. There are 5 declensions of nouns; each declension can be conjugated with one of 7 cases, and can either be singular or plural. This pales in comparison to verbs, of which there are 4 conjugations (in this context, conjugation means a category of verb) where each conjugation of verb is slightly different, and can be conjugated a dozen different ways, be it past, present, future, a participle of sorts, active, passive, perfect, imperfect, imperative, infinitive, or anything else. This is not accounting for the fact that you have to know how to conjugate these verbs for both first, second, and third person, as well as plural and singular, and also indicative and subjunctive. There are also irregular verbs, which follow none of the rules of the 4 conjugations. Because Latin verbs can be conjugated so many different ways, generally when referring to a Latin verb, you use four different conjugations of the verb (here conjugation of the verb means conjugating the verb, not a group). This always takes the form of indicative active first person present, indicative active infinitive, indicative active first person perfect, and the masculine nominative singular perfect participle. An example of this is the verb “love” which is *amo, amare, amavi, amatus*. *Amo* is first person present, *amare* is infinitive etc etc. This is pretty straightforward for regular verbs, *amo, amare, amavi, amatus* is about as standard as it gets, but it gets complicated fast with irregular verbs. One such example is “carry”, which in Latin is *fero, ferre, tuli, latus*. *Fero* and *tuli* are the same word, I carry vs I carried, but are spelled completely differently. This isn’t even getting into adverbs, pronouns, and all sorts of other standard language stuff. Because of the complexity of conjugating every word in the language, Latin has a very free word order, which can be neat, but is a massive headache to students studying Cicero. More like Cicerouch, that guy takes ages to get to the verb of his sentence.

**Woah woah woah, you didn’t just skim past all that about Latin grammar did you?** It’s ok if you did, it isn’t very relevant to learning the language the way I am going to teach it. It’s just cathartic to write about, and sometimes I get *perditus condimento*, which means lost in the sauce. I think. Saying I get lost is a bit tricky and kind of unclear how to— Sorry, I am doing it again. Anyways, in the previous

paragraph, I waxed extensive about the dimensions of the tables you have to memorize to speak Latin. For my method of teaching all of Latin, however, I would like to bring your attention to only a couple of cells in those tables. The first of these specific cells is the indicative active first person singular present of third conjugation regular verbs. The way this works is by replacing the ending with *o*. This isn’t just for indicative active first person singular present of third conjugation regular verbs, it is for indicative active first person singular present of first conjugation regular verbs as well. A famous example of this is the well-known saying “*Cogito ergo sum*”. *Cogito* is an indicative active first person singular present of first conjugation regular verb, and therefore ends in *o*. Note also the Latin word for I “*ego*” is not present. The first person conjugation of the verb implies the *I*. The second cell is the singular masculine ablative conjugation of 1<sup>st</sup>/2<sup>nd</sup> declension adjectives. Conjugating adjectives is basically the same as nouns, you just match whatever conjugation you use for the noun but for the adjective. The one odd thing is that while nouns are split into a first and second declension, and cannot use conjugations outside of their respective declension, adjectives in the 1<sup>st</sup>/2<sup>nd</sup> declension of adjectives can use conjugations from both the first and second declension of nouns. For the singular masculine ablative conjugation of 1/2<sup>nd</sup> declension adjectives, you replace the ending of your adjective with *o*. I cannot be bothered to think of a famous example of this. For those wondering what ablative means, it is the amalgamation of a couple of cases, but the one we are interested in to learn all of Latin is the associative-instrumental case, which basically means “with” or “by”. An example in English: “Caesar is warned by the gods”.<sup>1</sup> In Latin, the word gods would be conjugated in the ablative.

**Woah woah woah woah. Hold on a sec.** I can see your eyes skimming down the page, over the crucial Latin grammar lesson. That previous paragraph also wasn’t super crucial, but I am teaching you an entire language here. I would appreciate a bit more of your attention, especially now that we are getting into actually important stuff. This is where it all comes together. If you want to learn all of Latin, you will actually have to pay a bit of attention now.

Lets say we take a verb *disco, discere, didici, discus*. For those who did not read paragraph 1, this is different conjugations of one verb. The verb that means “learn”. Famously, it is the origin of the word *disciple*. Now say we chose an adjective to go with it, specifically the adjective *infernus*, which means suffering.

The indicative active first person present of our verb is “*disco*”, meaning “I learn” and the singular masculine ablative of our adjective is “*inferno*” meaning “by suffering” (or with suffering or in suffering, but those won’t scan as well).

In Latin, the literal translation of I learn by suffering is *Disco inferno*.

Congratulations, you now know all of Latin.

aphf

1. [https://en.wikipedia.org/wiki/Ablative\\_\(Latin\)](https://en.wikipedia.org/wiki/Ablative_(Latin))

It has been several years since I last spoke Latin, and I was a little fuzzy on some of the details. I am not unashamed to disclose my other sources:

[https://www.dl.cambridgescp.com/sites/www.cambridgescp.com/files/legacy\\_root\\_files/singles/ukdic3/index.html](https://www.dl.cambridgescp.com/sites/www.cambridgescp.com/files/legacy_root_files/singles/ukdic3/index.html)

<https://www.online-latin-dictionary.com/>

<https://latin.cactus2000.de/showverb.en.php>

<https://www.verbix.com/languages/latin>

## EQUIVALENT DEFINITIONS ARE EQUIVALENT

### AND OTHER ATTRACTIVE LIES BY SEXUALLY FRUSTRATED MATH STUDENTS

Several fortnights ago on a breezy summer afternoon I endeavored to invite my crush to spend the afternoon under the bittersweet pretense of studying mathematics. By chance, or perhaps blinded by the nature of my deceit, she agreed. As the amber sunlight ebbed among the gnarled pines we sat in deep contemplation.

“snackimal,” she began, “what is the definition of a normal subgroup?” I paused nervously, shuffling whatever junk was in my working memory to make room for the statement. “A subgroup which is closed under conjugation by any element of the parent group,” I replied, now free of doubt.

“No.” I stared blankly, taken aback. “But surely it is equivalent!” “It is.” “And equivalent definitions are surely equivalent.” “No.” My hands clawed at the earth, sandy soil clinging to my sweating palms. My fist struck the ground and for a brief moment the undulations of the earth synchronized with the palpitations of my breaking heart. And children screamed in the streets, lovers cried, and deep within his granite fortress of solitude William Slofstra shed a single tear of iron.

And if you perchance visit any self-respecting instance of the North American fast food monolith that is Wendy’s, but particularly the one in northern Ohio which is accessible only by a rickety ferry that operates once every second harvest moon, and if you are *very* lucky you may find a leathery washed-out grad student with a twinkle in his eye who offers to take your order. And you order an axiom of choice but to your utter disgust you are instead served Zorn’s lemma. And you cry and cry for the manager but nobody can hear you because their ears are filled with sweet lies, happily munching on equivalent definitions they didn’t order.

snackimal fishmop

## GNU/INTERNATIONALE

### TO THE TUNE OF “THE INTERNATIONALE”

Arise, ye slaves to non-free software,  
Break free from prison walls of glass!  
As the cries for freedom thunders,  
Crashing down comes the garden walls!  
Be gone, proprietary software,  
While developers commit, commit!  
From the peopl’ comes a new codebase  
Which is forever free for all!

[Chorus]

So devs lets get coding  
Hear the keys clicking away!  
The GNU Public License will free the human race!

There are no supreme saviors  
Neither Stallman, Torvalds, nor others  
Developers we must ourselves  
Lead the switch to GNU Linux!  
With haste bury Mac and Windows  
And learn to use Bash today, today!  
We’ll henceforth break the monopoly  
And control when to get updates!

tokyocatboy

## EPISODE 42: GENERATING FUNCTIONS

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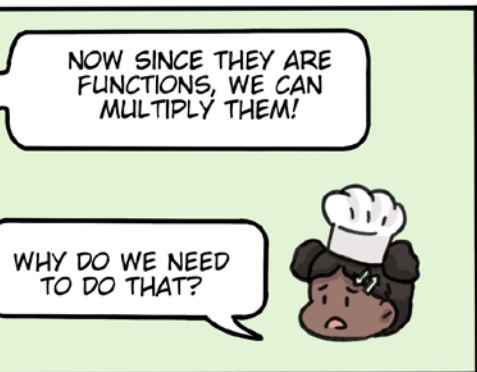
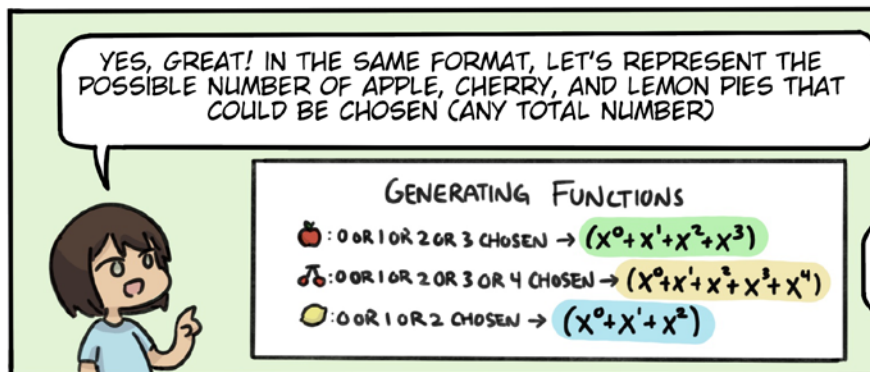
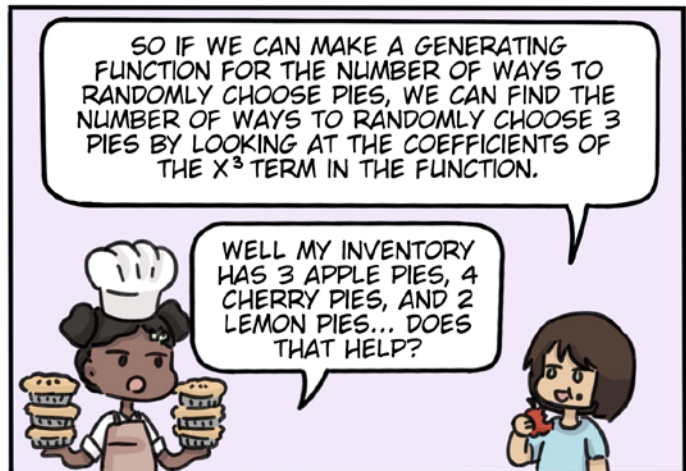
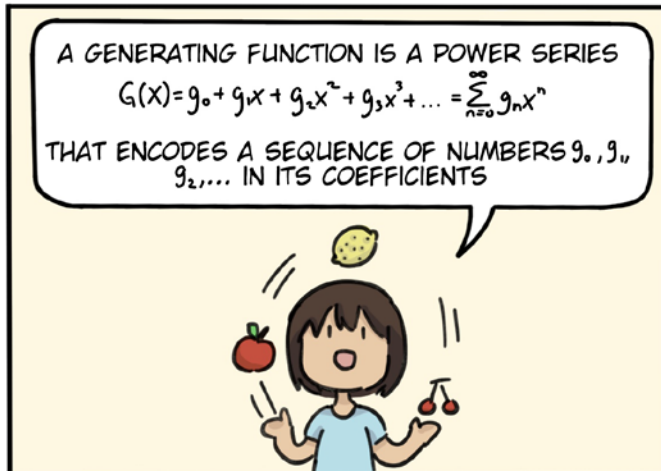
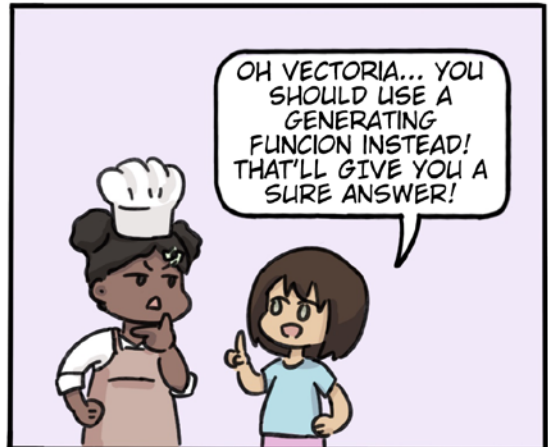
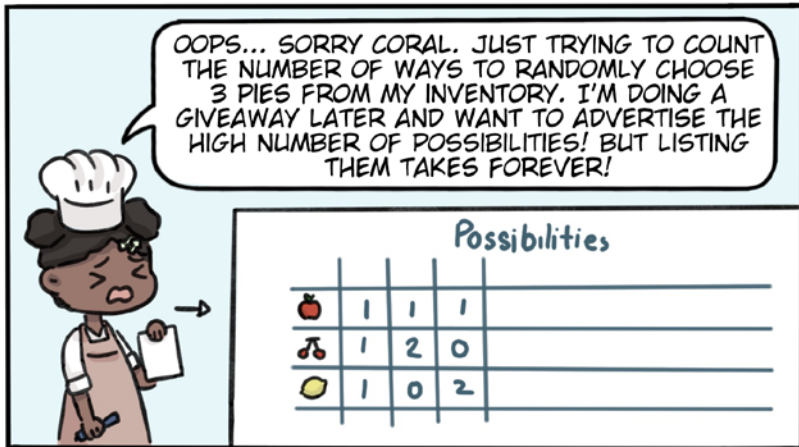
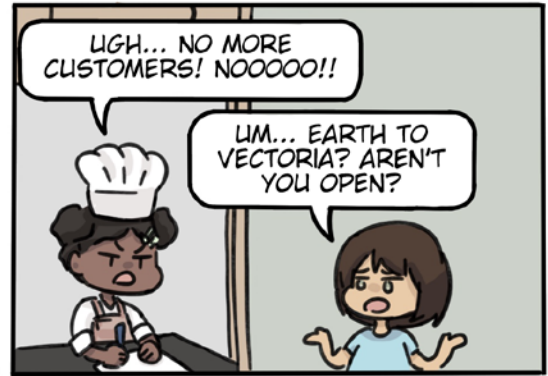
MathSoc Cartoons

Give us a bigger office,  
and the rag lives.

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

# MATH 239: GENERATING FUNCTIONS

STORY BY: CAITLIN KWAN  
ART BY: LISA WEI





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THINK ABOUT WHAT HAPPENS WHEN WE MULTIPLY POLYNOMIALS...

$$(x^0+x^1+x^2+x^3)(x^0+x^1+x^2+x^3+x^4)(x^0+x^1+x^2)$$

$$= (x^0x^0x^0 + x^0x^0x^1 + x^0x^0x^2 + x^0x^1x^0 + \dots + x^0x^4x^2$$

$$+ x^1x^0x^0 + \dots + x^1x^4x^2$$

$$+ x^2x^0x^0 + \dots + x^2x^4x^2$$

$$+ x^3x^0x^0 + \dots + x^3x^4x^2)$$

$$= x^0 + 3x^1 + 6x^2 + 9x^3 + 11x^4 + 11x^5 + 9x^6 + 6x^7 + 3x^8 + x^9$$

OH! THE DISTRIBUTIVE PROPERTY WILL GIVE US A SUM OF PRODUCTS WHERE EACH OF THOSE PRODUCTS IS A PRODUCT OF ONE TERM FROM EACH POLYNOMIAL!

AND THUS, THIS SET OF PRODUCTS REPRESENT ALL POSSIBLE WAYS TO SELECT A SET OF RANDOM PIES FROM THE INVENTORY.

eg.  $x^1x^3x^2 \rightarrow 1 \text{ apple, } 3 \text{ cherries, } 2 \text{ lemons}$

AFTER EXPANDING AND SIMPLIFYING, WE SEE THAT THE COEFFICIENT OF  $x^3$  IS 9.

SO THERE MUST BE 9 DIFFERENT WAYS TO SELECT 3 PIES FROM MY INVENTORY!

RIGHT! AND WHY DOES THAT MAKE SENSE HERE?

WELL, BASED ON OUR EARLIER SUM OF PRODUCTS,  $9x^3$  MUST HAVE COME FROM 9 PRODUCTS RESULTING IN  $x^3$ . AND THE ONLY PRODUCTS TO DO SO ARE THOSE THAT REPRESENT A APPLE PIES, B CHERRY PIES, AND C LEMON PIES, SUCH THAT  $A+B+C=3$ .

$0+1+2$     $1+0+2$     $2+0+1$   
 $0+2+1$     $1+1+1$     $2+1+0$   
 $0+3+0$     $1+2+0$     $3+0+0$

EXACTLY.

SO INSTEAD OF COUNTING MANUALLY, I CAN JUST USE THE GENERATING FUNCTION I CAN SEE HOW THIS WOULD BE THE EASIER OPTION, ESPECIALLY FOR CASES WITH MANY POSSIBILITIES.

AND IT YOU WANT TO GIVE AWAY 4 PIES INSTEAD -WINK, WINK- YOU DON'T NEED TO DO MORE WORK! JUST LOOK AT THE  $x^4$  COEFFICIENT, WHICH IS 11.

YOU CAN ALSO GET A NEW GENERATING FUNCTION IF NEW CRITERIA ARISE!

EG. PICKING 3 RANDOM PIES, AND:

- AT LEAST ONE APPLE PIE IS CHOSEN:  
 $(x^0+x^1+x^2+x^3) \rightarrow (x^1+x^2+x^3)$
- CHERRY PIES ARE PACKAGED IN PAIRS:  
 $(x^0+x^1+x^2+x^3+x^4) \rightarrow (x^0+x^2+x^4)$

$\Rightarrow (x^1+x^2+x^3)(x^0+x^2+x^4)(x^0+x^1+x^2)$   
 $= x^3 + 2x^4 + 4x^5 + 4x^6 + 5x^7 + 4x^8 + 4x^9 + 2x^{10} + x^{11}$

WOW! YOU REALLY SAVED ME TODAY! THANK YOU FOR YOUR HELP! HOW ABOUT A FREE PIE IN RETURN?

YES PLEASE!

WELL, YOU KNOW WHAT THEY SAY! A PIE A DAY KEEPS THE DOCTOR AWAY!

LITERALLY NO ONE SAYS THAT, CORAL.

IT'S TRUE THOUGH! WITHOUT EATING YOUR PIES, I DON'T THINK I COULD FUNCTION ANYMORE!

# SHITPOSTS & SERIOUS ART: A RANT

If you know me at all, you would know that I'm a very avid art creator. If you don't know me outside of **mathNEWS**, you may think that all I draw are questionable pictures of a certain code testing program and anthropomorphized dolphins with very prominent secondary sex features (TO BE CLEAR: because I think it's funny, methNEWS). However, if you do know me outside of **mathNEWS**, you would probably also know that I draw portraits and landscapes as well. You know, regular art, that normal people draw. The kind of art that, if done well, would get compliments relating to its quality, and not to its disturbing nature.

To be honest, I've always liked art. My young childhood bedroom walls were decorated with horrible crayon doodles (and I'm still not sure why my parents didn't stop me). When I first came to Canada, I nearly gave my parents and the school principal a heart attack because I was too engrossed in drawing to notice the school bell going off and the announcements calling my name. Unfortunately, I was a bit of a boring kid, and so my earliest drawings did not involve raunchy muscular dolphin women. Instead, they were either stick figures or whatever my art classes were teaching me to draw.

When I was around nine or ten, I moved away from my school (and with it, my after-school art program, although I can't remember if it was actually offered by my school or if it was merely close in proximity to it). However, neither I nor my parents wanted me to give up art. Their solution was to sign me up for art classes with a very talented painter, who offered more intense education.

Indeed, the quality of these "classes" was very good. I say classes, but they were more like mentoring sessions, where students would independently work on art and the teacher would come around and give feedback. They were held in a small, two-bedroom apartment that had been converted into a multi-room art studio. The main area—what probably used to be a living room—displayed an array of statues, still-life objects, and artwork created by the teacher. There were several easels and stools in the room, often occupied by older-looking teenagers discussing their chances of getting into art schools. The other rooms had desks stained with oil paint, shelves containing more art supplies than your local Michael's, and paintings casually placed around the room. In short, this seemed like a proper studio.

These classes mainly focused on realism. Beginners would start off copying from pre-existing artwork of simple 3-D shapes, and slowly transition to drawing still-lives of more complex objects. After I was acclimated to drawing fruits and chinaware, I was offered the opportunity to start drawing in watercolour. I was ecstatic.

Unfortunately, just like your average sixth grader, I was hot garbage at watercolour. Hell, I was struggling just to colour within the lines. Moreover, I was no longer drawing real-life objects; instead, I was relegated to drawing animals over and over again. This may seem perfectly fine, but there was one

issue. You see, the animals I was drawing (and animals in general, I guess) tended to be of different shades of the same colour, and the techniques that I was taught for drawing them were dull and mind-numbing to apply. Every single painting involved the same formulaic process: lightly sketch an outline, mix some variation of yellow ochre, burnt sienna, and ultramarine blue, water down your paint, apply a very faint wash, dab away at mistakes with a tissue, and repeat for several hours. If there was fur on the animal (as there often was), you would need to stare at the reference pictures and decipher where to place small brushstrokes such that the painting isn't ruined. Repeat this every week, while the people around you are drawing pretty landscapes with elegant techniques.

As a child whose attention span was decreasing at a possibly alarming rate, I began to dread this process. I started to rush my work, which would usually result in the teacher telling me that I had missed too many details (and not allowing me to move on to the next piece until I had caught those details). And there was always a detail that I had missed, even if I was absolutely confident that I had drawn everything. Eventually, I started noticing more problems in my work. No matter what I did, my art began to always look unsatisfactory. Seeing more and more mistakes pop up, I would always want to correct them. But, the danger of watercolour was that mistakes were frequently permanent, and attempting to correct them would botch my work even more. If you accidentally coloured over a white spot and didn't notice until later, there would often be no way to reverse that colouring without resorting to other materials. And mistakes were so easy to make—one wrong brushstroke, one spilled droplet of paint, one too little swirls of the brush in water, and your perfect painting would be ruined. Since I was attempting to draw realistically from a reference, I couldn't even spin off those mistakes as some stylistic flair. It seemed like I would never become a good artist: the more I drew, the more mistakes I would find.

In fact, I never became a good artist. I quit that class the second my parents allowed me to, and I'm pretty sure I still have some art supplies in that studio that I haven't picked up. My parents tried to get me to attend different art classes, but I had completely stopped attending any art classes about six months after quitting. Even today, I could never willingly spend hours on a grey-scale sketch of a vase with a cube and a plate of fruits, and I would rather finish my CS 245 assignment than copy another painting of a goat's face. Drawing solely to improve technical skills is not enjoyable for me anymore because of the self-induced pressure (which I partially attribute to the art class) to perform, and I do not partake in it. For this reason alone, I would not label myself a good artist.

However, for some reason, I could never completely give up art. At some point, I came to a realization: I might never become a good artist, but I *could* become a high-quality shitposter. Nobody would critique the anatomy of my three-armed dolphin women, because what the fuck, why would you know enough about the anatomy of three-armed dolphin women to call me out on it? I could draw a mediocre

drawing of an anime girl with crappy shading and line work, and nobody would bat an eye, but if I draw a similarly mediocre drawing of a **mathNEWS** anthropomorphism swimming in a strangely-viscous sea of light-coloured liquid, then suddenly I'm the artist of a "quality shitpost", even though the quality is just as mediocre as before.

I think drawing shitposts might've saved my enjoyment of making art. When I draw a shitpost, I'm usually not as concerned with how good they look, because the humour behind it would usually make up for its lack of artistic quality. Drawing without the pressure of needing to make actual good art is just so relieving, and shitposting took off that exact pressure, reminding me that I still liked the process of making art.

I still draw serious art sometimes, despite all of the horrible abominations I've become accustomed to drawing. However, I do have an excuse for those abominations: the bar for being a good shitpost-drawer is just so much lower, and I like being good at stuff.

manganese

## N THINGS THAT DON'T MAKE SENSE ABOUT GO TRANSIT

### SERIOUSLY I WANT MY MONTHLY PASS

- How come whenever I want to go to Hamilton, I have to go through Mississauga, which is further from Waterloo than Hamilton is?
- How come getting to Markham from Waterloo takes, at a minimum, two hours?
- How come there's no monthly pass, for people who work in Guelph but live in Waterloo because they don't want to rent in Guelph out of cost necessity?
- How come there isn't weekend GO Train service in Waterloo? *[Editor's note: Such service would have to pass through Brampton, and they hate Brampton.]*
- How come Bramalea GO has nothing to do around it? Maybe then it'd be worth going there to wait an hour for the bus.
- How come the Square One Terminal is outside? Damn people are going to roast to death in this above 30 heat wave (I'm well aware creating an inside terminal would be a gross misuse of resources and cause so many delays, but i don't care lmao)
- this is actually completely unrelated to GO Transit or whatever but how come Guelphs urban planning thing is so good. central station city hall and a mall are like right next to each other. its so good. mint.

Skit

## THINGS THAT MAKE ME SEEM LIKE I SHOULD BE AVOIDED

### A LIST ABOUT MYSELF BECAUSE I GOT TIRED WRITING MY OTHER LONGER ARTICLE IDEA

- I am the president of anime club
- I draw anime women (sometimes naked)
- I am a Discord moderator
- I am a Reddit moderator 😊
- I have sent money to women on the Internet
- I have dmed my feet to people on Discord
- I am in a server on Discord where women send pictures of their boobs to gain access to the rest of the server
- I have drawn vore-related art and I host vore day celebrations annually (but I have missed it before)
- I have held a vore-related art competition where monetary prizes were provided (Disclaimer: I am not into vore)
- I own 8 maid outfits
- I regularly consume incel-related media
- I have been in a 500m radius of Jordan Peterson
- My personal Discord server contains a lot of NSFW Garfield art
- I have purchased a body pillow where both sides are NSFW art of Astolfo (penis visible)
- The paramedics have seen me wearing a maid outfit. Also, I've written a midterm in a maid outfit and been to Fairview Mall also in a maid outfit.
- I dated a Mormon in high school
- I moved in March and have STILL not unpacked my room
- I did not change my bed sheets for 4 months either
- This fact that this article can be written about me

alyssnya

## WHY I DRAW FUCKED UP THINGS

Long answer: [1000+ word essay on how a middle school art class took away my desire to actually be a proper artist]

Short answer: there's no pressure and I think it's funny

manganese

## "WEB3 SOUNDS LIKE BS"

@elonmusk

# WHAT THE FUCK AM I DOING?

## CRYING IN THE BACK OF A CS245 LECTURE AS I WRITE THIS

So we meet at the party of a mutual friend. We're sunken into opposite sides of the couch and you're getting drunker and drunker. I'm wishing I had been greedier when I shared a bottle with the host because the music is too loud and I'm too worried about messing up your name and my naturally melancholic disposition. Then you ask me what program I'm in and I know it's going to be a thing because it always is.

"I'm in computer science."

Then you'll ask me why I'm in my program, and there are a lot of ways I could respond to this depending on how much I had committed myself to reach drunkenness at the moment this conversation began. None of them are lies, of course. I'm not a liar.

Maybe if you're in "the industry" you'll say something about FAANG, and then I'll have to decide if saying I hate the industry is more or less narcissistic than just shutting the fuck up and going along with it.

So why am I in computer science?

When I was younger, writing was the only thing I wanted to do.

I used to write in curlz mt, because it was the most obnoxiously cutesy. In those days, I would ask my mom if I could eat dinner in front of the computer. I can plainly remember one of the happiest moments of my life as eating a hot turkey sandwich in one hand and typing out a story in the other.

I don't think the majority of my writing has ever been read, not even once over by me. When I was young, the real fun was just coming up with the right words for each sentence and then leaving it behind. I can remember being twelve or thirteen and finding this kind of writing, which I had done a few years prior. I purged all of it. It was disgusting and clunky to me then. Over and over, I thought *how could I ever have written this shit?* And it really was shit. Run-ons for pages filled with misspelled names and the same fucking metaphors.

When you're thirteen, you think you need to amputate any of the childishness left in your life; when you're thirteen, you're ashamed of any part of yourself that hasn't grown up yet.

Sometimes I find a story I wrote from before this purge that slipped through the cracks. In every misplaced comma and stolen character I see the girl I was when I did what I loved feverishly.

On the last day of November when I was nine, I screamed and cried on the way home from grocery shopping gone too late because I wasn't home in time to finish the number of

words I wanted to write that month. In fifth grade gym class, I got a soccer ball to the face when I had been absentmindedly working out what I would write when I'd get home. On a family vacation to Florida in 2013, I found my way into a writing group composed of eight baby boomer trailer park retirees; I planned the rest of my vacation around attending the meetings.

Making art has always been a messy, childish business for me.



The honest truth of why I'm in computer science? It seemed like the best plan B I could ask for. I do have a passion for making all sorts of things, and in high school I made video games that scratched the itch to tell stories. I knew that if I sold my soul for five years, then I could find a good steady job and do my writing on the side. *I'll do my writing on the weekends, and by the time I have kids I'll be too busy to miss it anyway.*

But planning to sell your soul is much easier than doing it. I find myself guiltily carving out time from a study schedule to write in the margins of assignment drafts. It's not even that I dislike computer science, I think it's beautiful. But a passion for computer science academically barely translates to enjoyment in the field of software development, where most of the work has been decoupled from creative control and curiosity.

I called my mom and told her I was thinking of taking some time off *to work on my own things*. It took me a while to say *to write*, to even seriously think it. That *I'm taking some time off to write*. She was worried I would drop out (as was I); however, dear reader, I have spent *way* too much money and time on this degree to leave it behind.

*But maybe coding is the thing I do on the weekends, and by the time I have kids I'll be too busy to miss it anyways.*

hotfemoid

---

## A RIDE

As I bike into the unknown,  
I probe my pockets  
For my earphone.  
Sike! I moan.  
A probe for my socket.  
Riding deep into the unknown....  
Fiction or non fiction?  
up to jurisdiction.

## SOME TIME AGO

Some time ago  
i came to see my flooded house;  
it was a visit to an old friend  
that i had abandoned.  
There was dirt on the  
floor and dishes in the sink.  
And it was quiet.

It was unlike any quiet i had  
ever heard.  
Not like the quiet in a wood  
OR like the quiet of underwater  
OR the quiet of earbud music to  
drown out the voices in the next room.

Maybe not many people have  
heard quiet like that before.

No, there were no voices and  
no cars no phone notifications no  
snores no vibrations from a train and  
no squawking of a bird no rustling  
of papers no chairs being moved to  
fit the mop into that one corner  
that always has the most crumbs no  
wires clinking against the metal leg of a table  
no doors shutting no lights flipping  
no voices outside no constant dripping from  
the ceiling no dishwasher or laundry  
OR the squeak of the dryer rotating  
not the tap of slippers on the hardwood floors  
not the groaning of the fridge  
not even my own breath.

Absolute quiet.

I stood in shock. This was the quiet I had  
been searching for while the noise  
kept filling  
the emptiness of the hole I had to keep  
digging in to stop drowning in mud.

The hole I dug was finally empty;  
and I fell through the earth.

I thought of oxymorons  
like “loud silence”  
OR maybe “silent noise”.  
Whatever it was, it was  
out of tune.  
It was like every wavelength at once  
was pulsating at my ears  
but none at all. It was a lack of everything  
replaced by the most of anything.

This fluid of silence was engulfing  
like cold water except there  
was no swimming up to the surface

to catch a breath.  
i was Alice falling  
through the hole; an  
astronaut floating through space;  
a girl sitting in the tiny corner  
of her closet in pitch darkness.

i like the darkness and the silence.  
They are my friends.  
i like how they are immersive and  
suffocating  
because it means that i am  
protected in this hug made  
of absences.

i like these small holes  
in the fabric of the world.  
i like that they make me invisible and  
small and alone.  
They feel safe  
timeless  
clear.  
Like a little volume of space  
that forgot to wake up when  
a person came around.

Sometimes i wish the world were always sleeping  
and so was i.

*A cool pen name*

---

## THINGS I MISSED ABOUT QUEBEC

- Signs that I cannot read
- The enormous campus of Laval
- Grass that is actually green with no goose shit on it
- Windows
- Fair price for wine
- Every kind of cheese
- Best poutine in the world
- Snails, both alive in the garden and cooked on my table
- Ghost stories in old Quebec
- Joe’s British accent
- Taha’s talk and his amazing slides, “A sub can have two doms”
- Paul’s beautiful hat that costs \$25
- Maya playing set drunk ;)

Most importantly, everyone wants to be Ben Wong, in Quebec and everywhere.

*a cooler pen name*

# HOW TO REWRITE A PYTHON PROGRAM AT RUNTIME

Imagine you are an evil goose with a burning desire to ruin a CS student's evening. You happen across a student who has written this function:

```
def add_two_numbers(a, b):
    return a + b
```

You would like to sneakily insert a piece of code that makes this function subtract the two numbers, rather than adding them.

Is this possible?

Well, of course it is, just redefine the function:

```
def add_two_numbers(a, b):
    return a - b
```

This just overwrites the previous function name though. Is there a way to rewrite the function in place, so that every reference to the function is immediately updated with the new code?

Let's first explore what a function is. As an object-oriented language, pretty much everything in Python is an object, including functions. Functions have their own attributes and methods just like every other object in Python.

So what attributes does a function have?

```
>>> dir(add_two_numbers)
['_annotations_', '__builtins__', '__call__', '_
↳ '__class__', '__closure__', '__code__', '_
↳ '__defaults__', '__delattr__', '__dict__', '_
↳ '__dir__', '__doc__', '__eq__', '__format__', '_
↳ '__ge__', '__get__', '__getattr__', '_
↳ '__globals__', '__gt__', '__hash__', '_
↳ '__init__', '__init_subclass__', '_
↳ '__kwdefaults__', '__le__', '__lt__', '_
↳ '__module__', '__name__', '__ne__', '__new__', '_
↳ '__qualname__', '__reduce__', '__reduce_ex__', '_
↳ '__repr__', '__setattr__', '__sizeof__', '_
↳ '__str__', '__subclasshook__']
```

Most of these are pretty standard attributes that most objects have, but let's check out `__code__`:

```
>>> add_two_numbers.__code__
<code object add_two_numbers at
↳ 0x0000022767D68030, file "<stdin>", line 1>
```

This code object actually contains the compiled Python bytecode of `add_two_numbers`. Remember, Python is an interpreted language, so the interpreter will compile a function into Python bytecode as soon as it's defined. You can read a disassembled version of this bytecode with the standard library's `dis` module:

```
>>> import dis
>>> dis.dis(add_two_numbers.__code__)
2          0 LOAD_FAST          0 (a)
          2 LOAD_FAST          1 (b)
          4 BINARY_ADD
          6 RETURN_VALUE
```

This representation of the code makes it easier for Python's interpreter to execute the functionality directly, without the heavily involved process of parsing the language's grammar every time the function is run. `dis` can be pretty fun to play around with, but we won't need to use it for the rest of this article. At a higher level, you may have realized that we can now just replace the function's `__code__` object, instead of redefining the entire function:

```
>>> def subtract_two_numbers(a, b):
...     return a - b
...
>>> add_two_numbers.__code__ =_
↳ subtract_two_numbers.__code__
>>> add_two_numbers(1, 3)
-2
```

Now nobody will notice the function is different, at least until our poor student's program starts failing all of its Marmoset tests.<sup>1</sup>

Let's go one step further though. Now that we know that we can modify the bytecode of a function, what if we wrote a program that automatically replaces *every plus sign* in any function with a minus sign? That sounds like it could be several times more infuriating.

Well, let's try it. First of all, the bytecode isn't stored in that disassembled format, obviously—it's stored as, well, bytes. Let's see if we can get direct access to these bytes. Here are the attributes of a code object:

```
>>> dir(add_two_numbers.__code__)
['_class__', '__delattr__', '__dir__', '_
↳ '__doc__', '__eq__', '__format__', '__ge__', '_
↳ '__getattr__', '__gt__', '__hash__', '_
↳ '__init__', '__init_subclass__', '__le__', '_
↳ '__lt__', '__ne__', '__new__', '__reduce__', '_
↳ '__reduce_ex__', '__repr__', '__setattr__', '_
↳ '__sizeof__', '__str__', '__subclasshook__', '_
↳ 'co_argcount', 'co_cellvars', 'co_code', '_
↳ 'co_consts', 'co_filename', 'co_firstlineno', '_
↳ 'co_flags', 'co_freevars', 'co_kwonlyargcount',
↳ 'co_lines', 'co_linetable', 'co_lnotab', '_
↳ 'co_name', 'co_names', 'co_nlocals', '_
↳ 'co_posonlyargcount', 'co_stacksize', '_
↳ 'co_varnames', 'replace']
```

This code object has several useful properties—the names of the variables that were declared, the stack size, and a bunch of

properties useful for debugging such as the file name. What we're interested in, however, is `co_code`, the actual bytecode.

```
>>> add_two_numbers.__code__.co_code
b'|\x00|\x01\x17\x00S\x00'
```

And there it is: a byte string containing the assembled version of the disassembled bytecode we just read. I'll show it as a list of decimals to make it a little easier to read:

```
>>> list(add_two_numbers.__code__.co_code)
[124, 0, 124, 1, 23, 0, 83, 0]
```

Similarly to how machine code works, bytecode represents both instructions and data as numbers. One of those numbers is the `BINARY_ADD` instruction, and we need to convert it to the `BINARY_SUBTRACT` instruction. Printing the bytecode of our subtraction function should show us the difference pretty quickly:

```
>>> list(subtract_two_numbers.__code__.co_code)
[124, 0, 124, 1, 24, 0, 83, 0]
```

In the addition function, the fifth byte is 23, while in the subtraction function the fifth byte is 24. Clearly that's the byte we need to change to convert an addition operation to a subtraction operation.

```
>>> new_bytes = []
>>> for byte in add_two_numbers.__code__.co_
↳code:
...     if byte == 23:
...         new_bytes.append(24)
...     else:
...         new_bytes.append(byte)
>>> new_bytestring = bytes(new_bytes)
```

Now that we have our updated bytearray, we need to replace the `co_code` property of the code object. Code objects are immutable (they can't be changed in place), but since Python 3.8, code objects have had a handy `replace()` method that returns a new code object with some of the old object's properties replaced.

```
>>> add_two_numbers.__code__ = _
↳add_two_numbers.__code__.replace(co_code=
↳new_bytestring)
>>> add_two_numbers(1, 3)
-2
```

Let's wrap this up into a general-purpose function and test it out a bit.

```
>>> def evil_hax(function):
...     new_bytes = []
...     for byte in function.__code__.co_code:
...         if byte == 23:
...             new_bytes.append(24)
...         else:
...             new_bytes.append(byte)
```

```
...     new_bytestring = bytes(new_bytes)
...     function.__code__ = _
↳function.__code__.replace(co_code=
↳new_bytestring)
...
>>> def c_to_f(c):
...     # convert Celsius to Fahrenheit
...     return (c * 9)/5 + 32
...
>>> c_to_f(20)
68.0
>>> evil_hax(c_to_f)
>>> c_to_f(20)
4.0
>>> import math
>>> def distance(x, y, z):
...     # Given x, y and z components of a_
↳distance, calculate the distance
...     return math.sqrt(x**2 + y**2 + z**2)
...
>>> distance(3, 4, 12)
13.0
>>> evil_hax(distance)
>>> distance(3, 4, 12)
Traceback (most recent call last):
  File "", line 1, in
  File "", line 3, in distance
ValueError: math domain error
```

The last call is erroring because the squares have been subtracted from each other, resulting in the function trying to take the square root of a negative number!

You decide you've caused enough frustration for the day, so you go outside to honk at a tree or whatever. However, you've barely scratched the surface of the fun you can have with Python. Come back in the fall for a Part 2, maybe.

\_\_init\_\_

- I have no idea if there are any classes that use Marmoset to test Python. I'm in ECE and we just use C++ for everything, so I wouldn't know. If there aren't, please mentally replace Marmoset with Leetcode.

## UNTITLED

hey look i'm in a magazine! :)"; DROP TABLE articles; —

CODE CRACKER CODY

math NEWS

# REPORT OF THE FIRST PLENARY SESSION OF THE KOREAN FRIED CHICKEN COUNCIL (KFCC)

*At the centre of the world is the Korean peninsula, and at its centre is a chicken, and below that chicken is a deep fryer.*

FOUNDING STATEMENT OF THE KFCC

## METHODS

Over the past four (4) months, we have made a study of the Korean Fried Chicken options in the Waterloo area.

We used several criteria to determine the quality of each establishment, judging both chicken and non-chicken features to get a holistic estimate of the restaurant.

Chicken factors:

- Bonelessness of the chicken: for a beast of flesh to have bones is against the natural order. The Committee and the members thereof do not and shall never condone such violations.
- Quality of the sauces: that which clothes the chicken should not diminish from the chicken's splendor.
- Flavor and crispiness of the breading: cronch, mmm.

Non-chicken factors:

- Quantity of food: a strong determinant of value per dollar.
- Dining experience: a multi-faceted criterion which will be treated in more detail shortly.
- Quality of side dishes: a key staple in Korean cuisine.
- Soju selection: a sober Committee does not a happy Committee make.

In the interest of transparency and fairness, non-Committee members were often present at meetings.

## RESULTS

### SOWON

A humble, elderly family business. The register and kitchen space encroached into the dining area. Their specialty was indeed their traditional Korean fried chicken.

The chicken was served in baskets, the pieces huge, the swicy sauce whelmingly runny. The breading was surprisingly crispy nevertheless, and the larger chicken pieces allow for a tender center.

The side of radish was typical, but the potatoes were texturally contentious among the Committee. The only flavour of

Soju available was original, making the drinking experience sub-optimal at best.

### ONNURI

This is a fusion restaurant allegedly, yet most of their menu is Korean based. Unfortunately, the first impression was largely negative, thanks to the enboned nature of some of the chicken pieces. One Committee member was able to discern the presence of bones or lack thereof, and they used this ability to starve other Committee members of boneless pieces. Despite this, intra-Committee strife did not substantially affect the rest of the study.

In the interest of a full evaluation, the Committee soldiered on. The sides were standard Korean fare: Tofu, kimchi, mung beans, and potatoes. The kimchi was overly sweet, in one (1) member's estimation. The potatoes were firm, in every sense of the word.

In contrast with other establishments, fries were not present. Instead, cheese corn was ordered. Unlike other cheese corns evaluated by the Committee, the dish was too salty, and the corn texturally unappealing.

### SEOUL SOUL

Much like the city of nearly ten million (10,000,000) that is its namesake, this restaurant was still finding its footing on the international stage. The server, by their own admission, was on their first tour of duty, and had a corresponding lack of heuristic knowledge regarding the fries.

In addition, the multiple TVs in the establishment were tuned to a YouTube KPop playlist, and found themselves trapped in a fifty (50) minute VMWare ad, with no employee present to press "Skip Ad" for fifteen (15) minutes.

The Swicy sauce was heavy on the icy, not so much on the sw. Many Committee members were surprised, calling it "more than I bargained for" and "a wolf in sheep's clothing." The chicken failed to leave an impression on the Committee, and was overshadowed by its saucery.

The aforementioned fries, once their availability was confirmed, came in small portions. The sides were similar to other peer restaurants.

### TASTY OF PRICELESS (T.O.P.) CHICKEN

In the ruins of the Roundtable board game cafe, a fried chicken phoenix emerged on Lester St. Could this new establishment pay homage to the history in its walls?

Were an angel to descend and kiss the Committee's lips it would not have tasted better.



This establishment received, by far, the most visits by the Committee. As such, the Committee has the broadest flavor base to draw on when evaluating this location.

All the flavors selected, from the original, to the extra crispy, to the swicy, to the soy garlic/honey, were by the grace of God second to none. The Premium Rice flavor was the unanimously favored flavor of the Committee, offering an ethereal crunch and a unique rice flavor.

Due to the small size of the boneless pieces, their crispiness was convincingly consistent.

Of course, nothing can be perfect, even if this establishment came close. The cheese dusted fries were widely regarded as an error, and the provided side salad was subpar.

However, the fries, both sweet and ordinary potato, when unencumbered by seasoning powder, were able to fly into the heights of flavor and texture, logic and reason.

As a display of hospitality, every meal came with a complimentary buttered pan of corn, buttered as well. The Committee speedily consumed this amuse-bouche at every visit.

**CONCLUSION**

After analyzing the totality of the data gathered, and deliberating in camera for the required period, the Committee came to a definite conclusion.

In the opinion of the Central Committee of the Korean Fried Chicken Council, the establishment Tasty of Priceless (T.O.P.) Chicken is rated as the best Korean Fried Chicken restaurant in the Waterloo area, with a high level of confidence.

T.O.P. Chicken’s consistency, care, and complete dining experience make it head and shoulders above Korean Fried Chicken standards.

**RECOMMENDATIONS**

Visit T.O.P. Chicken.

Future investigators should note that some establishments were not heavily evaluated, in the interests of time and constraining the Committee’s scope. Other researchers should consider Nuri Village and Yang Yum: Secret Korean Recipe. Yang Yum is take out only, but the Committee believes its process is broadly generalizable to adverse conditions.

**GLOSSARY**

- Swicy (sweet + spicy, usually gochujang-based)

# CMH DRIERS

Tumbling and fumbling my clothes  
Why are the driers closed?

No one knows  
No one shows  
CMH driers  
Smh, liars

All the while, craigslist driers ain’t got no buyers

Stop lying on the grass  
I’ll shove that dandelion up your arse  
Sitting pretty in a meadow  
Petty like a ghetto  
I’m turning mellow, it’s time to get out  
Out of the ghetto into the meadow

Stop it.  
Took my shorts and cropped it

Grow some clauditte miller balls  
Or I’ll drag them across the halls  
I take my clothes out to wash it  
Just to put them back in the closet  
Have some modesty  
Fix the driers already  
Since I can’t dry my clothes  
I might as well hang your dirty laundry  
Stop this mobbery.  
Have some modesty.

The Stickyman

---

# NO AC? HERE'S HOW TO COOL DOWN YOUR ROOM IN THE EVENING

Get a new room. Please. Fuck the landlords who told you AC is not needed in Waterloo.

thecoolguy

---

# N GOOD POINTS

- .
- .
- .

# DORITOS REVIEW

## #NOTSPONSORED

In being placed in a residence where a meal plan is required this term, I was given the opportunity to buy a variety of snack foods that I normally would not consider ever getting. Why would I buy food that I would not normally buy? Well, I did some calculating, and based on the amount of meal plan money I spend per day, I am going to have quite a bit of money left over by the time the term is out, so I may as well start spending a dollar more to get a variety of snack foods from the cafeteria, alongside my usual meal purchase. Also, because the bags are small, there is less of a burden should I not like the particular chips. Think of them as little sample bags.

Right by the cashiers is a stand with a variety of Frito-Lay bags of chips. There is the obvious variety of Lays chips, Doritos chips, and an assortment of other types such as Miss Vickies, Ruffles, Sun Chips, Hickory Sticks, etc. They are about 80g bags priced at \$1.99, but with the 50% pricing using meal plan money, you will only find \$1 deducted from your balance. Note that buying chips from the cafeteria is much cheaper than buying the same from the nearby vending machines.

With this in mind, I realized this would realistically be the only chance for me to try the other variety of chip flavours, particularly the Doritos flavours. I've tried a variety of flavours for other chip brands before, but not Doritos. Additionally, it gives me an excuse to write an article reviewing the different flavours.



### NACHO CHEESE DORITOS (RED)

This is the default flavour variety of Doritos chips, and so it will be what I will be comparing the different Doritos flavours with. This flavour also happens to be the only Doritos variety I ever get, if I do ever decide to buy Doritos chips, so I am well acquainted with it.

You can't go wrong with these. If in doubt, just get this flavour. The usual cheese-like flavour of Doritos, and the usual powder coating, and all the rest. I really do mean default when it comes to this flavour.

### COOL RANCH DORITOS (BLUE)

This is the second flavour of Doritos that I have ever tried.

I didn't know what I expected when the first bite of this chip had no cheese flavour whatsoever. It should have been obvious from the "Cool Ranch" description that this was not a cheese-based chip.

The flavour is more a focus on sour than salty. The salt content is definitely there, but you notice the sour more. They definitely did not miss the sour aspect of the typical ranch sauce. I note that the impact of the sourness reduces as you

eat more chips, so by the time you are half of the way through, the chips barely even have a sour note. Instead the ranch-iness comes up more instead. In the long term, it was not the best experience eating the entire bag. It ended up being just a bag of boring chips towards the end. If the point was to eat a couple chips at a time, then it works, but to eat an entire 80g bag is not the best experience. This is definitely one where the flavour works better with much smaller portions. Perhaps that is why the serving sizes on the nutrition label of chip bags always have a ridiculously small number of chips.

I had a hard time finishing the bag as by the time it got to the last remaining chips, it just tasted like the base chip flavour and nothing else. It's as if someone took regular Doritos, and rinsed the flavour off in water, while somehow not getting it soggy. It is interesting how the base chip flavour is the same but has drastically different colours. Wasting food is bad, so it was a difficult trek through the remaining chips. I don't think I will be getting this flavour again though.

The chips also have noticeable red and green specks. The base chip is not the orange colour, but instead a much more normal looking tortilla chip colour, so the red and green stand out more. Despite the Christmas theme, the bag colour is blue, so I'm not exactly sure what the branding is trying to do here.

### ZESTY CHEESE DORITOS (ORANGE)

This is the variety that seems to be the least popular as its shelf at the cafeteria always appears stocked even if the other Doritos flavours end up sold out or almost sold out, or instead the most popular, hence why it appears always stocked while others get sold out. So, this did not give me much confidence on how it would end up being.

However, once I opened a bag to try some, it was the clear winner for me. This tastes like it should be one of the more popular varieties of Doritos.

Imagine the default Doritos flavour, but a bit milder and it feels like it is a slightly sweeter. The orange colour for this bag was chosen well, as it does show it is a slightly milder version of the red bag.

Honestly, if you weren't paying too much attention you probably wouldn't be able to tell if you were eating the red or orange Doritos. Even if you looked at the chips it would be hard to tell apart without a reference. While the red Doritos are more red in colour, with the orange Doritos being more orange in colour, they look quite similar. One big difference is how the orange Doritos have much more of a powder coating than the red one.

Unlike the blue Doritos, I was actually able to finish the entire 80g bag without any difficulties or problems. I would definitely consider orange instead of red Doritos every once in a while now, instead of always going for red.

**JALAPENO & CHEDDAR DORITOS (GREEN)**

This one is a less neon orange colour compared to the Zesty Cheese Doritos. The jalapeno flavour is definitely there. It's not some unknown source of spiciness; they definitely captured the flavour of jalapeno peppers into these chips. The spiciness is present, however it is not that strong. It is definitely a weakened level of spiciness as compared to your typical jalapeno products and fresh jalapenos.

There are specks of dark green included within the body of the chip itself, which I assume comes from added jalapeno peppers. I presume that no seeds from the peppers are included, hence the lesser spiciness level. The powder also contains specks of dark green but on close inspection, it seems like an artificial kind of green colour. I assume this green colour was included to evoke more of the jalapeno-ness of this flavour.

I like this level of spiciness. I hate it when a particular food item is spicy for no good reason. More spiciness doesn't always mean it will taste good. If they made these chips spicier, then it probably would have started approaching the point where the spiciness level would begin detracting from the overall taste of these chips. If your spice tolerance is low, these chips will definitely make you sweat, but be rest assured that the spiciness is not the kind where it is painful for no good reason.

As I eat through the bag, the nuances of this flavour has basically disappeared to the point where it just feels like I'm eating a slightly spicy version of the default Nacho Cheese Doritos. The jalapeno-ness of these chips was no more, kind of like how those ranch Doritos mellowed in flavour as I ate them.

Finishing the bag, I can definitely recommend this flavour should you wish for spicier version of Doritos.

**SWEET CHILI HEAT! DORITOS (BLACK)**

Yes, I checked the packaging and there is indeed an exclamation point as part of the flavour name. Both this and the previous implies some spiciness, but you would be wrong. You notice way more sweet and sour rather than spicy. I don't particularly like the sweetness of this flavour. Perhaps I don't expect such a savoury snack to have so much sweetness. For this reason, it was a difficult flavour to finish. However, I suspect this is one of those flavours where people either really dislike it or really like it, with no middle.

The chips themselves are a bright orange like the Zesty Cheese flavour, but the powder coating the chip seems to not be a fine powder but instead something clear. It's probably just small salt crystals? I'm not exactly sure though.

This was a difficult one to get through, so saving myself the trouble, I stopped about half way for the sake of my wellbeing, as there is no point in tormenting myself by forcing myself to eat the rest of something I don't enjoy.

Those were all the flavours of Doritos I ate. There was another flavour available, the purple coloured BBQ flavoured Doritos, but I chose not to review those specifically because I already know that I hate BBQ flavoured chips of any kind. I just think that such a flavour really does simply belong on actual BBQ and not in chips. In reviewing the flavours I did eat, I went from having always gone for the default red Doritos, to now knowing two more flavours that I can choose with no worry.

Although, I must say that now at the end of the term, I am quite sick of chips. I've eaten too many of them throughout this term. I realize that I really do need to find some other snack foods to vary it up soon.

*boldblazer*

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## AN ASSIGNMENT ON THE LORAX.

Happy end of term! Unfortunately I'm out of ideas so have this creative writing prompt I did in 10 minutes in grade 11.

I don't remember the exact image but it was something like this:



The Lorax had failed. As rainbow colored brooms reached for the skies, there was not a natural tree in sight. "Damn, I shouldn't have slept for sixteen thousand years after that kid asked me about the Onceler", he grumbled as he crawled out of the dirt pit he'd been sleeping in. The strange structures seemed to emanate an aura of radiance, a beautiful soliloquy of life and death. A single tear rolled down the Lorax's face as he realized that the death of his beloved trees brought such beauty to this world. With trembling lips, he finally admitted the glory that came with the destruction of his craft. "Nah trees are mega dope", he said, as he pulled out his chainsaw and started violently razing down the structures.

*warrior1rules*

# CUTLET COCKTAIL COLUMN #2

## CONSTRUCTING A CLOVER CLUB, AND MAKING THE MEDIOCRE MIMOSA; FEATURING BLINCHIK

Hello again, channel subscribers! Between Column #1 and the making of this issue's cocktails, I've ordered and received a cocktail shaker set, so this time around I was able to make the drinks with the most pro tools I've ever had access to.<sup>1</sup> Yes, plural drinks, two of them: the Clover Club and the Mimosa, which are members of the Unforgettables and Contemporary Classics categories of IBA official cocktails, respectively. This time around, I also had help from blinchik, who will feature in Column #3 as well. (*blinchik*: Hello!)

### CLOVER CLUB

#### BACKGROUND

The Clover Club is on the older side of cocktails, named after a Philadelphia men's club<sup>2</sup> which was founded in 1882. "Clover Club" began appearing as the name of a cocktail in 1908, and was apparently popular for a few decades, but sadly became more a target of jokes than a drink to enjoy; a cocktail book is quoted as saying "it's an awful mixture". Its popularity seems not to have recovered, as neither of us have ever seen it offered on a menu. The recipe gave no reason to believe the criticism, so we had been planning for quite a while to try it out at some point. Place your bets now on the verdict!

(Credit to Wikipedia<sup>3</sup> for pretty much all of this information!)

#### RECIPE

For the Clover Club, we made an executive decision and chose the recipe which is on Wikipedia<sup>3</sup>, which is *not* the recipe available on the official website of the IBA. Why? The point of the egg white is to make the drink have a foamy head, but the IBA's recipe lists only a "few drops of egg white", which isn't enough to cross the line which divides "slightly gross" and "useful and creamy". So we went with a modification of the recipe on Wikipedia, which calls for one egg white per drink (which we felt was actually *too* much, so we used half of one at the recommendation of a third site<sup>4</sup>). The Wikipedia version also adds a little bit of dry vermouth.

Ingredients:

- 45 mL gin<sup>5</sup>
- 15 mL lemon juice
- 15 mL raspberry syrup<sup>6</sup>
- 5 mL dry vermouth
- 0.5 egg white

Preparation:

Dry shake ingredients [meaning without ice] to emulsify, add ice, shake, and serve straight up [without ice].

#### REVIEW

The Clover Club came out looking nearly identical (minus the garnish) to the results of a search for images of the cocktail: a primary part of pretty pink covered with a soft, white layer of foam.

Drinking it didn't offer any clues on why it was criticized in the past. The first thing that reaches your mouth is the foam. The foam is not too eggy to be off-putting, and sufficiently thin that the main liquid part of the drink isn't a surprise when it arrives. The foam provides texture, while the responsibility of flavor falls to the liquid, where somewhat unexpectedly the lemon juice dominates. The smell of the gin is noticeable, but not particularly strong, the raspberry syrup is detectable with effort, and the dry vermouth can't be picked out (though, that's not a surprise with just 5 mL of the stuff, and it may still contribute to the flavor). The simple breakdown is "sour and foamy with some alcohol present and a bit of berry in there as well".

Not mentioned yet is that the experience was immediately reminiscent of a different cocktail we've tried before, the New York sour (also IBA official!). The New York sour, a modification of the whiskey sour, is in some ways very similar to the Clover Club, with direct ingredient analogs between the two: sub in whiskey for gin, simple syrup and red wine for raspberry syrup and dry vermouth, and keep the lemon juice and egg, and you have a New York sour, complete with foamy head. Since the lemon juice is so strong, the taste of the main alcohol in both cocktails is less noticeable, so the drinks actually feel quite similar.

It was in the end, quite tasty, even if the taste of the gin was kind of masked by the lemon juice. Highly recommend.

### MIMOSA

#### BACKGROUND

The mimosa is basically a 1:1 mix of sparkling wine and orange juice whose origins are not fully clear; however, it is seemingly predated by Buck's Fizz (thought to have been invented in 1921)—essentially a mimosa but with a 2:1 ratio. They are named after the mimosa plant, a yellow-flowering evergreen tree. Mimosas are well-known as a brunch drink and grew to popularity in the United States in the 1960s. From what we can tell, the sparkling wine used is most often champagne, although the IBA recipe calls for prosecco, so we went with the prosecco for our mimosas.

(Wikipedia credit<sup>7</sup> for this info!)

## RECIPE

The following recipe is adapted from the IBA website (see <https://iba-world.com/mimosa>).

## Ingredients:

- 75 ml fresh orange juice
- 75 ml prosecco

## Preparation:

Pour orange juice into a flute glass and gently pour the sparkling wine. Stir gently. Garnish with an orange twist (optional).

## REVIEW

Before trying the drink itself, we decided to try the orange juice and the prosecco by themselves. The orange juice tasted pretty average as orange juice goes and the prosecco had less strong a taste compared to champagnes/proseccos we've tried in the past: it was definitely *sparkling wine*, but the sparkling feeling seemed to beat out the wine bit by a good margin. (Later on, as the prosecco grew less carbonated, it felt more balanced.)

Now for the mimosa itself: it came out looking pretty much like most images of mimosas look online (...like slightly diluted-looking orange juice). It tasted exactly like what it is, an equal mixture of orange juice and sparkling wine. The orange juice tastes significantly less strong than by itself, of course, and it bubbles and tastes a bit wine-ish, but the juice was still the primary thing that came through. Overall, it was a bit unimpressive—why would one have a mimosa when the juice and the prosecco could be had separately? (Cocktails are supposed to be more than the sum of their parts, not less.) cutlet considered that prosecco on its own may feel too formal for a brunch setting, so the mimosa may be a more casual substitute for the circumstances. Another reason that mimosas could be useful is as a more drinkable option for those who are more sensitive to the presence of alcohol in a drink, since the juice was a strong mixer. Although in the end we found mimosas to be just alright (even if rather close to what we expected), the Buck's Fizz sounds like a possible improvement with its greater wine-juice ratio. Otherwise, consider going for some prosecco or champagne by itself instead!



Hope you enjoyed reading! And as before, always drink responsibly!

cutlet and blinchik

1. Look up what a Hawthorne strainer looks like. Almost scary, right? It's the kind of tool that you need to watch a video about to learn how to use properly.
2. ☺
3. [https://en.wikipedia.org/wiki/Clover\\_Club\\_Cocktail](https://en.wikipedia.org/wiki/Clover_Club_Cocktail)
4. <https://theginisin.com/cocktails/clover-club/>
5. We used Aviation Gin.
6. Made fresh for this recipe!
7. [https://en.wikipedia.org/wiki/Mimosa\\_\(cocktail\)](https://en.wikipedia.org/wiki/Mimosa_(cocktail))

## WAVES

[Dad] 8:00 PM: Is now an okay time to call?

I haven't quite broken down yet. I think I will, when the time comes. That's not to say I have yet to feel anything; I have. It's the small things that have been reaching me; I go to a jazz festival, and wonder how much of the enjoyment is in my blood. I reach for a closed doorway, and remark how well-built my hands are for woodwork. I walk through my halls, along my streets, in my city, and consider the poetic repetition of his life in mine, of his journey from quiet town to a bustling city of his own. Everything is inherited, is it not?

He said not to have a funeral. Not to have a visitation, no moment to mark his passing. Only to continue on as we had. To some, doing so would feel disgraceful; how could we continue our lives without stopping, a complete halt, to pay long and dutiful respects to the man who raised our parents? To the man who raised us? And yet, if this is what he asked, is it not also an honour to continue? To live, to breathe, to watch the sunrise, to take joy in the continued expressions of treasured life, the friends, foods, and birdsong?

The waves are ever present. The night of his death, I held to my plan to spend the night with friends, albeit with many hours' delay. As they partied, danced, sang, the waves would come at varying strengths, pulling me from the present to feel the many responses to Death. I remembered where my aunt and uncle would have sat to process the news, I could *smell* the coffee they likely brewed, talking late into the night. I could feel my own dog's warmth, passed between my parents under the warm kitchen lights. I could hear the newest addition to our family slowing down his ever-quick speech in consideration, and I could see the sunset from the balcony where my cousin may have watched the sunset he couldn't. All or none of these things happened, it did not matter, the wave brought them regardless. It brings them still, on and on, an eternal beat I do not wish to stop.

Yet there we were, under multicoloured lights dancing across the Norwegian flag, smiling and carrying on in a changed world. For a man who wanted no funeral, who fed scotch to his liver tumours to bid the world goodnight, is that not the greater honour?

# YEAR ONE

I came into my first year in pursuit of Actuarial Science as a DD, and I probably was the earliest drop-out (I never confirmed it with the program advisor). I never ever thought of studying Pure Math. I feared math, even though I was relatively good at it. I can blame it on the fact that I never had a math mentor in any sense, but on the contrary I was actually defeated by several math teachers and peers, from as early as my elementary years. In fact, I sparked my mathie spirit after 9<sup>th</sup> grade, in a winter camp where they taught some very interesting math contest problems. Yet after a first meeting with my high school math coach, who just before then sent two guys to the IMO, I was convinced I can't do math. I didn't see it coming at that moment, but now I probably do. I wasn't trained on mathematical rigours, to begin with. I never studied math beyond a high school textbook, nor talked about math with my classmates. I've never touched the math, and I thought I was good at it because I can solve some quadratic equations with integer coefficients very smoothly. At that moment, till I came to college, though, I saw math as some higher-degree game that I wasn't allowed to play with. Math was an impossible subject to me.

When I filled out my application forms, I went with CS (because I had some experience), but later turned to Actuarial Science (I sucked at programming for short), and took on DD because I expected low by aiming high (also Ontario just pushed out this new immigration system that rewards double degree holders). It turned out UW really liked my AIF. As DD was the tallest on the drop-down tree, I went after it, and soon found out it was a mistake.

It was during the course selection period that I encountered the id "dja0" in a group chat for new-coming students. By their most flattering words, I looked for it on the subreddit, to my surprise the man himself actually answered a post just few days ago about the 2021 Fall offering of MATH 145, and how they are using this Coq thing for teaching. So I found the assessment (I didn't do Euclid), set up the official Coq editor (which sucked btw) and buried three days on it. I indeed convinced myself that Coq is fun. Yet by the time I submitted my answer and switched to 145, Jao's session was already full (121/120), and I was sent to the other one with no fun Coq stuff. I was kind of heartbroken for a moment, but once I touched ground from hotel quarantine, I talked with the staff at MUO several times and intersected Jao himself in DC, and audited the class until late September, the day when the add/drop period ends and I got out from the waitlist. I was thrilled on my way to AHS that day, and I felt more at home when I walked into the room as I did for the past three weeks. I had a good feeling about my first term.

If anything could summarize my first term, Jao's MATH 145 was hell of a good course (thus one more eternal member of daddy jao's fan club). My grades were saying otherwise though. I almost didn't finish all the numerical assignments, even though I went to every office hour until the last one. I did ended up scoring every Coq question, which I am very proud of even to this day. For many average math students like me,

MATH 145 was the first encounter with rigorous math, and anyone who made it through with Jao probably ended up feeling much more confident with math as well. I feel like I can learn some more math.

The first winter almost broke me to be honest. It wasn't the snow, but the extreme lack of sunlight that pushed my mental health to an undesirable state. I stopped swimming, something that I'd been doing weekly for half a year, because I didn't feel like it anymore. The consequence? I felt closer to death. No social life. No gymmax. I got addicted to Reddit and Twitter and Netflix, and the saddest part is that my room at V1 had serious heating problems and stayed below 20 degrees Celsius since October. I can't remember much about winter, except it was too long, I failed my midterms, missed too much class, filled out a CS transfer form and got rejected, and thanked Mr. Goose and Blake for the legendary curve that saved my ass. Winter is harsh.

Then I went on a nice road trip with my best friend from high school. There is nothing more helpful than when you receive a rejection letter when walking with a close friend. I realized how ridiculous it is to beg for a second chance, since I was responsible for putting down my CS application in the first place. I was also selling myself a false hope, that life has a fast lane, and you had to try hard to get on it. It doesn't.

Spring is my best term so far, though it sucks as well. I found this cheap sublet with no AC, and had some childhood flashbacks when the heat wave came. A whole wall in my room lost power, along with the main lighting. As I'm typing this article out at 1:11 AM, the smell of weed is coming in through the window, and is probably the reason I'm still staying up writing this piece. The best part is of course I met some people that I've been sitting in class with for some time, started hanging around in MC, accidentally helped reboot the UW Go Club which was last active in 2016 (insert ad here: come to MC 404x on Tuesday/Friday 5 pm, location varies by availability), and restarted swimming before the issue 5 cover came out (hopefully that's not based on me). Life is good.

First year is hard. I barely survived academically, and lost too much time that I could have spent with other people if I was more social. Second year won't be easier I must say, since the course load is steadily increasing and my next coop is still a mystery. One thing is for sure: I will likely write a sequel to this article, if nothing went too wrong for me, and no reader pushes a knife against me not to. Probably something Year One 2 stuff. See you soon.

loop



The logo for mathNEWS, with "math" in a lowercase, rounded font and "NEWS" in a bold, uppercase, sans-serif font. A curved line underlines the "math" part.

# BATHROOM REVIEWS: STC & B2

## PART 3 OF BATHROOM REVIEWS

Welcome back to the third part of this series where I review the male and non-gendered public bathrooms of every building at UW!

This time, let's start with STC. One of the newest buildings on campus, constructed in 2015, you'd expect it to have some pretty nice washrooms, and you'd be right! Starting on the basement of the STC, we have a really stellar bathroom that feels cut into the stone foundations of the building itself, definitely one of the best bathrooms I've visited so far as much as atmosphere goes. It's always a great choice if that's what you want.

I also love the bathroom on the first floor, but for a different reason; it's really easily accessible if you're travelling from the south part of campus to the SLC/PAC area or to the university colleges, not taking you too far out of your way, and it's a nice washroom in a part of campus that doesn't really have all that many. Nothing terribly special with it, but it's a decent choice.

The upper floor bathrooms aren't really worth mentioning. They're vaguely fine, and if you go to any floor above the second they'll probably all be pretty empty, so if that's something you're interested in, check them out. The fifth floor is nice because it has some really nice non-gendered bathrooms with a lot of free space so you don't feel cramped. Honestly, it's hard to think of what STC doesn't offer bathroom-wise.

Well, there is one thing that makes me dock a point from this building in my rating system, and that's the fact that all toilets in STC only flush automatically. Around half the time I use the washroom there, I end up flailing my hand in front of the toilet as it refuses to flush my refuse. Sure, I get it, minimal physical contact and all, but most automatic toilets at least have a manual option. So, I unfortunately have to give STC a %.

Still, it's a lot better than the other building we're looking at this issue. I can't find an opening year for B2, but it does seem to fit in with the other buildings constructed in the late 50s/early 60s. B2 has three floors, and each has a single washroom, right near the entrance that connects to STC. Honestly, these could be a lot worse (and we'll get to those washrooms next term), but they're just a few stalls and urinals, with some sinks to go with them. Extremely basic, nothing much to them, %.

No non-gendered washrooms either. Honestly not much more to say about B2 other than one of the washrooms had all of the urinals filled when I went there, had to flush them all. You'd think at least one person using those urinals would have noticed and flushed the others instead of leaving the urine to stand there, but alas.

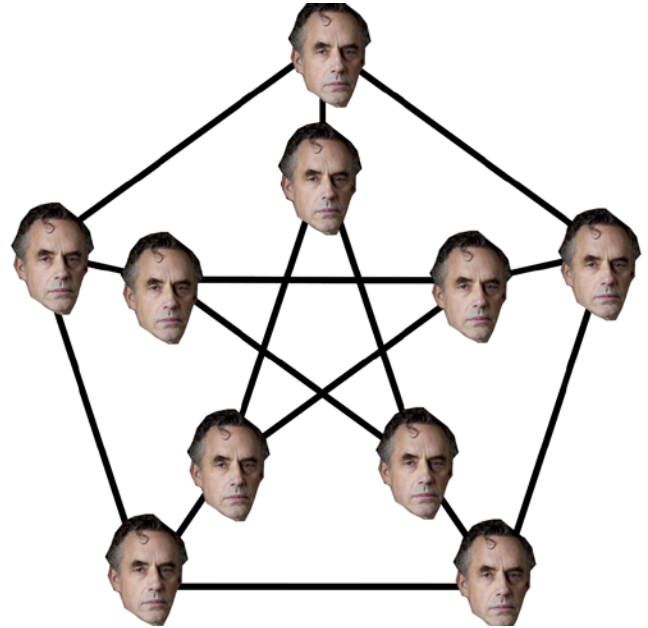
Next term, I'll finish looking at all the Science buildings and then hopefully move on to the Health ones! I'm building up

a backlog so I have articles for my co-op term, so I'm mostly already done the Science ones. See you then!

Predap

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## JORDAN PETERSON GRAPH



Lobster King Lover

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## “THE RATIONAL MALE: PREVENTATIVE MEDICINE” - A REVIEW

Since becoming an incel, I have been reading my new favorite book *The Rational Male: Preventative Medicine* by Rollo Tamassi. This book was written by incels, for incels, and has taught me everything I need to know about women, from menstruation to why it's so much harder to have sex with 30-year-olds. I have become an expert on women and thanks to this book I finally gained the ability to understand the hamster that lives in their heads that guides their decision making. I have quadrupled my SMV and thus become the AMOG I deserve to be. Joan of Arc is a slut.

<sup>14</sup>/<sub>10</sub> would give myself brain damage so I can reread for the first time again.

your friendly neighborhood incel

# RATING THE HIGHWAY 85 EXITS IN WATERLOO BY HOW ANNOYING THEY ARE TO CROSS ON FOOT

## KING STREET NORTH (NEAR CONESTOGA MALL)

This is the one I've probably crossed most frequently: you need to cross it to get from the end of the Forwell Trail to Conestoga Mall. The total length that you need to walk is about 390 metres, and you end up crossing 5 ramps—however, two of those ramps are at a signalled intersection which is almost always green for pedestrian highway crossers, so you're a little less likely to be run over. The west side of the intersection only has 3 ramps to cross, but neither the Forwell Trail nor Conestoga Mall are on that side (or anything else, really), so there isn't much of a reason to cross over there.

$\frac{3}{10}$ , mainly due to the fact that it's less easy to avoid than the other ones. At least there are reasonably (for Waterloo) frequent buses across this intersection, but I like walking.

## NORTHFIELD DRIVE

Ah, Northfield Drive. At some point the city planners of Waterloo, in their infinite wisdom, decided to paint a bike lane onto this 60 km/h road with a freeway intersection. This bike lane carries about as much traffic as you'd expect for a narrow unprotected strip in between two high-speed car lanes with large trucks frequently merging across it. Even if you've never been to the Northfield intersection, you might recognize it from the memes making fun of it from all over the world—our humble city is probably more famous for this specific intersection than for the geese or BlackBerry. Despite this, it's surprisingly okay to walk across the intersection. The sidewalk is pretty narrow and right next to the traffic, which doesn't make me feel particularly safe, but there are only 2 ramps to cross on both sides of the street, and the intersection is over after about 70 metres of walking. No traffic signals though, and this intersection gets way more huge trucks than any of the others, so be careful.

$\frac{4}{10}$ , as long as you're walking.

## UNIVERSITY AVENUE

When the sidewalk on one side of the street disappears almost 400 metres *before* the actual intersection, you know it's going to be bad.

On the north side of University, which is the only side you can walk on, you have to cross 5 individual ramps with no traffic signals whatsoever over an exhausting 540 metres. On the eastern side of the intersection is a cemetery, south of University, that is entirely inaccessible by foot. At first glance, it looks like you might be able to enter from the perpendicular Bridge Street, but that entrance also has no sidewalks. I don't know what I expected when moving to Waterloo but a drive-thru cemetery wasn't exactly it.

$\frac{1}{10}$ : at least there's one sidewalk?

## BRIDGEPORT ROAD

This one is technically an exit to both Bridgeport Road and Erb Street, but if you find yourself on Erb, you'll have to backtrack several blocks to cross to the north side of Bridgeport, as both of Erb's sidewalks disappear near the freeway intersection. The length that you have to cross is "only" 490 metres, but there are a total of 7 ramps (again, no signals) that you have to dash across. By contrast, there is one ramp on the south side of the street, which makes me wonder why they didn't put the sidewalk on that side instead (or, here's an idea, have two sidewalks).

This was the only intersection that I crossed specifically for the purpose of writing this article, because there isn't much of anything on either side other than a couple residential streets, and therefore not much of a reason for most people to cross it. As such, this intersection being terrible is sort of excusable (along with the fact that there's a much more tolerable intersection nearby at Lancaster Street, which I didn't review because it's technically in Kitchener). However, that's not going to stop me from giving it a bad rating. Imagine you were a kid who lived in a house on one side of this awful intersection and you had a friend who lived on the other side. You would literally never get to see your friend without begging your parents to drive you there. That would make me pretty sad.

$\frac{1}{10}$ , barely. I'm not going to start rating these on a 100-point scale like some pretentious Pitchfork reviewer, but if I could I would probably give this somewhat less than 1.

\_\_init\_\_

Sidenote: When I was walking these intersections, I saw a total of 3 cyclists crossing the intersections at University and Bridgeport. That's 3 more than I saw attempting the Northfield bike lane.

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

STEPHEN NEW



# ADD TITLE

SUBTITLE (OPTIONAL)

eyelids drooping, chin heavy

*mother I'm tired*

I'd like the honour of vomiting some words at you, dearest reader.

Back cold, sighing lying

I'm so

lost.

Take a deep breath::: so kaputt kriegst du mich nie!

Did you know did you know did you

Most people put a pin on

"20 something year olds put a pin put pin it on"

as the halfway point of their lives! Nathanael how—

This is already half??

FLOW of consciousness poetry blurgh goes the yummy vomit

but you keep reading! Dear reader!

Why do friends have to leave?

Why do you leave?

Why did you leave me?

Why the fuck did you leave me?

And you didn't say sorry.

No not sorry at all.

I wish you'd stay but I'm no good baby, am I?

Let me LEAVE

toes raised, forearms bleeding

what a stupid mosquito bite

It's too still here and

I wish you'd believe

the little lies I whisper.

*A cool pen name*

# WHY IS IT SO HARD

To find a course for non-math degree reqs that is not completely insufferable.

:(

**It's not how brilliant you are; it's how dumb you're not.**

PROF. IAN MUNRO

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



UW Unprint

# N CARS I WOULD LOVE TO DRIVE ONE DAY

- Mazda RX-7 (FC, FD)
- Mazda MX-5 (every generation)
- Nissan Skyline GT-R (R32, 33, 34)
- Nissan 280Z, 300ZX, 350Z, Z (the new one)
- Toyota Supra (Mk3, Mk4)
- Toyota MR-2 (every generation)
- Toyota GR86/Subaru BRZ (every generation)
- Citroën DS
- Austin-Healey Sprite
- Ford Mustang (SN95 and every later generation, including the Mach E)
- Lamborghini Miura
- Mini (the old one, pre-BMW)
- Lotus Elise
- Can someone who isn't Elon Musk please make a small fun 2-seater electric coupe or convertible please I want to use public transit for 99% of my daily life and just own a cool car I can drive for fun sometimes without feeling guilty about burning gas does it have to be this hard
- Hyundai N Vision 74 Concept (they came out with this a day after I wrote the above bullet point and it feels like someone just answered all my prayers holy shit)

tendstofortytwo

# LE MORT D'UN AUTEUR

*[Content warning: this article contains mentions of substance abuse and suicide.]*

A French professor once told me that my writing for “une commentaire du texte” felt like it was typed in English, ran through Google Translate and then pasted into the document. This baffled me at the time; since I was in fifth grade and knew that Google Translate was irritably bad at translating full sentences, let alone paragraphs or essays, from one language to another. For the assignment in question, I had not once relied on the service, using WordReference and bonpatron instead. My grammar ran through fine there. But I guess I still think in English as I write in French.

I have completed a French minor at this university. I thought I had a shot at becoming a French teacher as a by-product of my thinking I had a shot at becoming a Math Teacher. I thought I had a shot at becoming a Math Teacher because I knew I no longer had a shot at becoming an actuary. I thought I had a shot at becoming an actuary because it was suggested by my mother. I thought I had a shot to get into Waterloo Math because I knew I couldn't get into Waterloo CS. I thought I had to get into UW because my older sister did it first and ever since I was young I lacked a sense of self and direction because I could follow her lead and life would be okay.

Since coming to Waterloo Math I have explored territories where my sister had not set foot. I was, for once, being social, having birthday parties, going out to eat. I was, for once, being a leader, actually knowing my way around this campus, its tunnel systems, and giving campus tours that exploited my surface level knowledge of almost every resource, service, and room that I had experienced. I was, for once, at my lowest, underachieving in my classes, and breaking down to the point where I was calling suicide hotlines. I was, for once, taking it upon myself to not let myself wallow in my pity or allow the suicidal thoughts to prevail, and beginning counseling and antidepressants.

I am still on antidepressants. After suppressing my depressing aptitude with Wellbutrin for 2 years I tried to stop. I called my doctor to let her know that my co-op job was not stressful at all. I was wrong. Not because my job was taking a mental toll on me, but because I was letting myself get away with doing nothing for 8 hours a day, 5 days a week. I would go through the motions of an employed student, only to have minimal interactions with others.

I can blame it on the school where I worked for not having the appropriate tasks for my skillset. I can blame it on the pandemic for putting the school in such a sinkhole. I can blame myself.

I do blame myself for a lot of things. I don't allow myself to feel content with what I do. I am always striving to do better, but only when I am already doing well. When I don't do well, I assume that I'm not meant to be doing it at all.

I falter in my math classes because my friends are proper Pure Math students. Their minds work in ways that I could maybe catch up to if I was invested enough or had the freedom of infinite time to learn and study. I do not dislike math. I think math is beautiful in the ways which she works, connects her theorems, and logically imposes herself on every abstract idea. I appreciate math from afar. That's what I've learned about math since I got here. That I'll only know her at a surface level.

I know many people at a surface level. I run into people everyday, and so long as they are with a mutual friend or acquaintance, I can introduce myself in exchange for their introduction. I don't pry much further. I honestly don't know why I would care. Their life doesn't affect mine.

I know my father at a surface level. I know he enjoys music and observing sports. I know he doesn't drink water unless he's doing physical activity. I know he cannot feed himself for a week without getting takeout. I know that he has never taken the time to acknowledge my mental illness. I know that he has never acknowledged that I was gay, except for the time I tried to kill myself using painkillers.

I am gay, for the record. I have hardly resented the sexuality itself. Though I resent men. I dislike the emotional baggage that comes with being queer. I am a sucker for consuming gay media. But part of me doesn't want to see people happy and in love. I think stories are a lot more satisfying when the ending is not happy. When it's bittersweet, that's more realistic, I think.

I do not know what love is. I can't even tell you what constitutes a romantic relationship, even if I've been in at least one. I have whittled a relationship to a label. I cannot imagine putting all of one's emotional turmoil into another person for good reason. I can split my emotions among my friends, can't I? That way I don't have all of my eggs in one basket.

My perception of love has at some point been distorted by the narrative of what it means to be gay. I do not like most aspects of gay sex despite what I let on. I have had gonorrhoea because I got too ambitious one night. I also witnessed the negative effects of marijuana that night.

I have been high twice. Once with a friend. Once alone. I wrote a **mathNEWS** article the second time. While I was buzzing and moving in slow motion. While I could keep a conversation but very slowly. I wanted to get high because I thought it would make me feel something. It was the opposite.

I'm an alcoholic. Big fan of the stuff. I like sweet cocktails but also the way that tequila makes me feel. I like not being able to control which way my head goes, the way I can stumble around, and the ways I slur my speech.

My speech is coated in sarcasm, wrapped in nuance and delivered monotonously. I have been told I sound bored. Maybe I am. I know I stutter a little bit, but I recover, I think.

I haven't been able to talk to people for the first 17 years of my life. In English or in French. Grammatically I'm correct but I guess no matter what my intentions are they just never come out the way that I hope.

mathNEWS is no exception. I have great ideas, but not enough words or space to express them in the way that I want. What goes on in my head is multicoloured, but comes out in pastel greens on a white background. They take the shape of Paisley patterns under a minimalist lens, like a painter's flat palette. They dance like tadpoles or sperm.

I cannot express my emotions in text. I have been angry with myself, disappointed in the world, and unimpressed with its people. These are all valid emotions I claim. The ways in which I write them are invalid. I cannot insert nuance into text without a sufficient context because otherwise my subtext is read as harmful and targeted. While I do have targets, I never mean to hit them, I just aim for the space around because it's not my place to be firing arrows in the first place. I am wrong and have been rightfully stopped but I am to believe that at the rate in which I let the words enter this text box, I will continue to intoxicate the page with uncalled negativity.

I have used this canvas to explore my range. I have used this canvas to remain unfulfilled. I have used this canvas to cry for help but I withhold from submitting because my thoughts will still be nonsensical to the audience. My audience has always been myself. The audience is not myself. I need help but not to write better. I need help to feel and be better. I cannot.

This is my 100<sup>th</sup> mathNEWS article and whether this goes through or not, it shall be my last.

Deriving for Dick

 **99.9% OF PRIMITIVE RECURSIVE ALGORITHMS CAN'T SOLVE THIS** 

If  $f(0, a) = a + 1$ ,

and  $f(a + 1, 0) = f(a + 1)$ ,

and  $f(a + 1, a + 1) = f(a, f(a + 1, a))$

where  $a$  and  $b$  are nonnegative integers,

Compute  $f(a, b)$  where  $a =$  uhhhh I dunno 4 or something and uhhhhhhhhhhhhhhhhhhhh  $b = 2$

Mark Succleberg

# SOMEONE SAVE ME

Please

I'm scared

And I can't save myself

What if no one comes?

What if no one cares?

What if they're happier without me?

All I did was make things worse.

Do I even deserve to be saved?

I want to reach out, to tell someone how scared I am.

But I don't get to make this about me. I don't get to be selfish.

Not after everything I did.

If I leave, I should do so quietly.

This is my only way out.

I'm scared.

I don't want to do this.

Not really.

So please someone save me.

Before it's too late.

CD

# MY LOVE OF HOCKEY IS COMPLETELY DESTROYED

My love of the NHL already died. But my love of hockey has been utterly destroyed.

Hockey Canada should be disbanded for looking over teams that that have committed horrific acts of sexual assault. There are almost certainly players that earned millions of dollars after committing their heinous acts, and that came from the money given to teams by their fans. Hockey Canada used the Canadian public's money (whether it was received via fees or taxpayer dollars) to cover up and settle sexual assault cases.

I'm done. I should have never been a fan of this sport. I spent so long being enamoured by hockey. Being excited to watch hockey. Cheering. Being sad, mad. My emotions were stretched and influenced by hockey. And what was hockey built on? Nothing but an awful culture that makes me wanna puke.

# “IF I DIED WOULD YOU WANT ANYTHING OF MINE?”

## REFLECTIONS ON CONVERSATION WITH SUICIDAL PEOPLE

[Content warning: This is about interactions with suicidal people, so suicide comes up. No specifics are discussed.]

The title was a text I got from someone I loved. What she meant was “when i kill myself, will you want anything of mine”. The second I saw it, I called. The phone rang. No answer.

I called again. It rang again. No answer.

I call again.

It rings again.

No answer.

My heart is in my throat. Last time, I saved her life; will she allow that again? Time crawls then stops.

and nothing but my phone exists i cannot see the room i do not know if i am sitting or standing if am alive or dead what i can see where i am. i am just begging for a response please just answer me i need you to be ok please be ok

### PLEASE

after a frozen eternity i get a promise that she’s alive and well. the world crashes back, i am on my bed, and she is alive. she was just asking because she was curious, or maybe it was on her mind because of what happened earlier in the week, or maybe she wanted me to have her teddy bear so i’d have something to remember her by. Even though she was ok right now, we both knew that this was a plan for when she wasn’t, and there was nothing i could do. She was sure that some day she would take her own life, that it was an inevitability that could only be delayed.

Every scare like this—real or imagined—was a reminder of this fact. I haven’t spoken to her in years, and I still wonder if she’s ok. I suppose it’s not my place to know.

She’s far from the only person I’ve loved or talked to who has been suicidal. As I write this, my head is flooded with too many stories to keep track of. He hated himself and his body. She couldn’t take her parents expectations. His family insisted he was a she. Her mom hated her. His depression felt constant and unmanageable. So did his. And hers. Her anxiety was too much. She didn’t want to be gay. Neither did he. She didn’t feel good enough. He wanted to stop hurting people. She

couldn’t take school. Too many were raped. They all just want everything to

### STOP

It’s such a uniquely devastating experience, talking to someone who truly believes that they can and will inevitably kill themselves, and nothing can be done about it. If there is one thing you take away from this article, an axiom of such an interaction is that **the suicidal person is wrong**. It is not an inevitability. They would like it to be! That would be so incredibly *convenient*. If everyone in their life saw their suicide as completely inevitable and imminent, they’ve convinced themselves it would not be a senseless tragedy, but simply a natural evolution.

*I wake up, check my phone, and see a suicide note from someone I love. It was sent 2 minutes ago.*

They are trying to convince you—and quite possibly themselves—of the hopelessness, of the impossibility, of the inevitability, just to make it easier, and you cannot let them. However, how they act, and how they can be helped is not a constant. Some will be cruel in the hopes of driving you away. Some will discuss how they have a right to suicide, because it is their body, or because suicide is allowed in the case of some physical illnesses. Some will try to convince you that they should be dead, that the world will be better off without them, that you would be better off without them. Some are simply in pain they cannot hold and will lash out, or in, hurting you or themselves.

*I call, and there is no answer. And again. And again. Finally, she picks up*

All are calling for support, a lifeline, a beacon in the dark. It matters far more that you care and that you are there than that you say the perfect words, because there are none. No amount of wisdom can take someone from wanting death to feeling perfectly ok in one single conversation. That isn’t the goal. The goal is to be there for them enough that they find the strength to live another day. To care enough that they develop the tiniest smidge of compassion for themselves.

*She is ensuring that, if she goes through with it, she won’t survive this attempt. She won’t say a word. She is moving robotically and meticulously. She seems empty.*

I am so grateful to every suicidal person who has come to me. Supporting them may be a weight, but it is a feather compared to the crushing despair their death would bring. I am so glad that I have been there when I was needed. I am so glad that, when my friends bore the weight of the world, I was able to share the burden, so they could take a breath. I am grateful for those who helped me carry burdens I could not shoulder alone. Most of all, I am eternally grateful for how many of my

friends are surviving a war with their own minds. I could not live without them.

*I tell her jokes. I tell her stories. I try to get her talking. I beg her to stay alive. I ask her what's going on. She doesn't react. I try harder. She stays silent.*

The most terrifying thing about many of these conversations—at least for me—is how casual the other person seems. The titular text is something that was sent after the conversation died down, something on par with “how was your day” or “did I tell you I got an interview?”. Another friend recently asked me “if i ever did try to kill myself, would you want me to tell you first”, shortly after he told me he envied that I had attempted suicide. I have had people tell me how and when they were planning on killing themselves as lightly as they'd tell me their other weekend plans, because once you're deep in that state, the prospect of your own death isn't fundamentally horrifying, it's anywhere between completely neutral and a relief. Hearing someone you love talk about their own death that way—clinically, detached, with anticipation or joy or simply quiet contentment—it's an indescribable horror. However, when it's done, it feels like a mountain has been lifted off your chest. You're glad the weight is gone, but you're completely and utterly crushed.

*She finally says a word. As soon as it comes out she begins to bawl. We talk for hours, or maybe it was minutes, or days. I even get her to laugh.*

Seeing someone you love in that much pain, seeing the overwhelming, omnipresent reality of what you're trying to beat—it's easy to imagine it's unwinnable. I promise it isn't. This fight can only be won if you believe it can. So you need to trust. Trust that they will survive. Trust that they will fight. Trust that you can help them shoulder the burden. Trust that they came to you for a reason. Trust that your compassion can help. Trust that they will survive, like I did, like my friends did, that they can get better.

*She's safe. She wants to live another day. I don't know how she'll do after that, but she'll live another day.*

That trust can save a life.

Golden

---

## PICK A NUMBER BETWEEN 1 AND 10

It's yours now. Take care of it :)

winrar

## WISHING JEFF A FAST RECOVERY <3

Tears are flowing down my eyes as I'm writing this.

I am looking around the room. All I can feel is a void. In fact, there are 218 free seats here in this room where we gather biweekly. Your absence is felt through every one of them. Everything reminds me of you. For instance, I can hear the **mathNEWS** editors talking with someone on the mic... and he sounds a lot like you, but it can't be. I'm probably just imagining things.

We miss you Jeff. We miss you so much. We miss your silly little mask and your little template metaprograms.

Stan, a concerned fan

---

## REPLY TOOO: SUNSHINE, SODA, CICADAS

Hiya evilevievil!! 🐦  
 As I read your article  
 Words settle—hang on  
 Birds settle in my head  
 warblers in the wood

chirp 🐦  
 chirpchirp  
 Say hi 🐦 to the warblers  
 They break the seal

Splash!  
 Sunshine, soda, cicadas  
 I'm soaked

I close the pages  
 But warblers still chirpchirp  
 Sweet aftertaste lingers

I'm going out!

enamourED

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## HOW TO (NOT) WRITE A mathNEWS ARTICLE

creature\_f

# lookAHEAD

SUN JULY 31

MON AUG 1

TUE AUG 2

WED AUG 3

THU AUG 4

FRI AUG 5

SAT AUG 6

Civic Day

Watermelon Day

Co-op: cycle #5 employer rankings available

Work Like a Dog Day

SUN AUG 7

MON AUG 8

TUE AUG 9

WED AUG 10

THU AUG 11

FRI AUG 12

SAT AUG 13

Co-op: direct offers start

clarifiED's CS 480 final

Final examinations end

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UW'S BASTION OF ERUDITE THOUGHT SINCE 1973

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