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mastHEAD

"WHAT'S YOUR FAVOURITE BOARD GAME?"

A quiet week this time here at **mathNEWS** HQ as the typical editors are off somewhere, a bunch of contributors presumably went with them, and the rest are being picked off by midterms as we speak. It's dead nutty out here. I've been called back from retirement, for this one issue, to fill in.

Honestly, being a "provisional" editor feels better than being a real one, kind of like how substitute teachers can be cool in ways normal ones can't be. They don't have to clean up any messes. All I have to do is get the job done. No emails, no tedious accounting work, it's great.

You know, I have a theory about the **mastHEAD**. It's intended to be a place where we talk about what's in the issue, to give a sort of preview of it, but that barely ever happens. I think I know why! It's because, if I wanted to point you to an article, I would have to write its name, give it the "article reference" style, and set up this really complicated link thing in InDesign that I've forgotten how to do. It's a mess, and by far the most irritating thing you usually might want to do when laying out an issue. So I try not to do it.

So, well, you're going to have to take my word for it that this issue is full of great articles. This issue is a lot shorter than usual, so why not at least skim through everything?

Okay, like, seriously. Go back to issue one and two and read the **mastHEAD**s there. You see how awED and evaluatED refer to a bunch of articles, but never once actually name one? I'm not saying that they're lazy or anything; it's just what you naturally do under circumstances like these, when naming an article takes like five minutes of work and referring to it obliquely takes ten seconds. I didn't even notice this until today, I've been doing it subconsciously the whole time.

Oh, wow, I'm reading last issue's **mastHEAD** where evaluatED talks about these old issues that turned up. I guess the new editors weren't here for it, but we had boxes and boxes of those around a year or two ago. Our predecessors seemed to have consistently over-printed issues by the hundreds. It took a few weeks to recycle them all. Now that's something a provisional editor doesn't have to do.

bipED
Provisional Editor, **mathNEWS**

NORMALPARAMETERS	tokaido
DICK SMITHERS	None, they all make me feel board
TENDSTOFORTYTWO	computer (it's on the mother-board game)
MOLASSES	the one where i hit my head against a 2x4 is pretty good
__INIT__	I have a lot of favourites but they're all variations of Scrabble
CHICK'N STRIP	scrabble!
BOLDBLAZER	Axis & Allies
SKIT	cluedo
WINK WONK	among us
JAMCHOWDER	surfing! cow-a-bunga!
PTKYR	Avalon
LABYRINTH	Submitting a motion to MathSoc Board to find out what their favourite game is, stay tuned!
RAYMO	Chess. I play bullet on Lichess on my phone. Before you laugh at that I'll have you know I have a >2000 rating.
LARS NOOTBAAR	Monopoly: D Day
PLATYPUS GOD	Mouse Trap, assuming you don't jostle the board by accident
JEFF	It's a toss-up between chinese checkers and dominoes...
APHF	Either Avalon or Seasons
PSYCHGIRL	Set
DISTRACTED (~~ON VACATION~~ AT CUMC)	idk about favorite, but still haven't found anyone to play bughouse with
BIPED	Twilight Struggle

ARTICLE OF THE ISSUE

Article of the Issue this time goes to __init__, for A memory! Great flow, great concept, and at a perfectly **mathNEWS**-sized length.

Come claim your prize at MC 3030, but don't come the day this issue releases. The other editors will still be in Las Vegas, to my understanding.

bipED
Provisional Editor, **mathNEWS**

Tip: If an editor puts the flying goose filler image under your article, that means they like it.

YANG ZHONG, mathNEWS PROVISIONAL EDITOR FOR SPRING 2023
ALONG WITH HELP FROM THE USUAL EDITORS

mathASKS 152.3

FEATURING PROFESSOR ERIC BLAIS

JEFF: HOW DID YOU GET INTO STUDYING ALGORITHMS AND COMPLEXITY THEORY? WHAT PULLED YOU TO IT?

There are so many compelling open problems in the field, and so many surprises. For example, here's one I like: Alice and Bob claim to have a telepathic link. To test that, you set up the following game:

- Alice and Bob are put in separate rooms.
- You show Alice a bit that we call x and Bob a bit that we call y.
- To win, Alice and Bob must both give the same answer, and that answer must be either "Alice has x" or "Bob has y" (with the correct value of x or y, of course).
- As long as we flip a fair coin to determine the value of x and y, Alice and Bob can only win this game with probability ½. But that's still pretty high, so to make the game harder, we can play it two times, back to back.
- Now the probability that they win both rounds is at most ¼.
- But to make the game go faster, it's tempting to just play both rounds in parallel: give Alice two bits x1 and x2 and Bob two bits y1 and y2, and ask them to give the two separate answers for the two rounds at the same time.
- They should still only be able to win with probability ¼, right? Wrong.
- Alice and Bob can devise a strategy for this parallel game where they win with probability ½, the same as for the original game. (How? Figuring out for yourself is where the fun really begins. But after you do so, look up notes on Parallel Repetition for the answer to this problem, which is due to Uriel Feige, and lots more about why this question is surprisingly central to fundamental problems in computer science.)

4TH YEAR: WHAT'S A TOPICS COURSE YOU'D LIKE TO OFFER?

First choice: Complexity Theory, for the reasons mentioned above. And if you're interested in it as well, do keep your fingers crossed and keep an eye on courses for the W24 term, when I'm hoping that we'll be able to offer a 4th-year or graduate version of the course.

Second choice: Algorithms through the works of Jorge Luis Borges and John Cage. At the very least, I do hope to incorporate a performance of John Cage's 4′33″ in one of my lectures at some point.

PREDAP: WHAT'S YOUR FAVOURITE FRUIT AND WHY?

Whichever is currently in season. So, at the moment, this would be strawberries and dazzlefruit.

XX_420SONICFAN69_XX: ANY CHANCE THAT CS 462 WILL MAKE A COMEBACK?

I'm not sure. I hope so!

JEFF: WHAT'S YOUR FAVORITE BATHROOM ON CAMPUS?

Well, to be honest, none of them can compare to the thunderboxes in the Algonquin backcountry.

TENDSTOFORTYTWO: WHAT'S YOUR MOST MEMORABLE STORY FROM A CONFERENCE?

I had too many answers and couldn't pick between them. Sorry!

TENDSTOFORTYTWO: THIS IS NOT A QUESTION, BUT I WAS IN YOUR CS365 LAST TERM AND I HAD A FANTASTIC TIME! THANK YOU SO MUCH.

Thank you!

COURSE TAKER: WHAT'S YOUR FAVORITE COURSE TO TEACH?

As of one (non-)question ago, it's definitely CS 365. In general, I have to admit that my favourite courses to teach are the ones that are "unnecessary". (We usually use the much nicer term "elective" instead.) Why? Because there are essentially only two reasons to take any particular class during your undergraduate career: because it is necessary for your future career, or because it is fun and introduces interesting new ideas. By definition, a course in the unnecessary category has to be of the latter type.

BOLDBLAZER: WHAT COLOUR WOULD YOU CHOOSE WHEN PLAYING AMONG US?

At the moment, Ironclad. Wait, sorry, wrong game.

LAZEEZ PROMOTER: HAVE YOU EVER TRIED LAZEEZ?

I have not. Oh, what a missed opportunity for some free advertising. To all restaurateurs in the region: to avoid such disappointing answers in the future, do feel free to arrange donated lunches to the Algorithms & Complexity Theory seminar where our graduate students always welcome free food.

CUTLET: TEA OR COFFEE? WHAT ARE YOUR PREFERENCES W.R.T. THE ONE YOU SELECT?

Coffee! I really enjoy the ritual of making pour-over coffee. Here's my current recommendation for how to prepare it optimally:

1. Get outstanding coffee beans. (see, e.g., Monigram coffee or the many outstanding roasters in the GTA)

2. Prepare the coffee following Tetsu Kasuya's 4:6 method (if using the V60) or James Hoffman's recipes (for any method and all things coffee).
3. Sit down with your freshly prepared coffee, your favourite pen, and your notebook.
4. Have a breakthrough insight on the math problem you're currently working on.
5. Enjoy your coffee.

Step 4 is admittedly difficult to complete reliably, but it does make the coffee taste much sweeter.

TR1E: WHAT'S THE WORST COURSE YOU'VE PERFORMED IN DURING YOUR ACADEMIC CAREER?

I distinctly remember thinking at the beginning of Probability Theory: "Here's a topic I will never, ever use again in my computer science career." I mean, how much more deterministic (and hence non-probabilistic!) can we get than with computers? I should have known that just having this thought immediately guaranteed that it now use it constantly every single work day.

CUTLET: HOW DO YOU FEEL ABOUT THE RISING POPULARITY OF AI/ML AND RELATED TECHNOLOGIES? DO YOU THINK IT'S POSSIBLE TO PROVE ROBUST RESULTS ABOUT ML MODEL BEHAVIOR?

I, for one, welcome our new AI overlords.

I can offer a more serious answer to the second question: Yes! After all, theoretical computer science is filled with countless examples of "big" questions that, with the right definitions and models, have been studied effectively in similar ways. Plus, the machine learning theory community already has established quite a few results along these lines. If you're interested to learn more about what we already know, check out CS 485. And if you're more interested in what we don't know, then grad school is for you!

profQUOTER: DO YOU READ profQUOTES?

Definitely. As an undergraduate, I probably read it more assiduously than of my actual course materials. And now, from time to time it has the added bonus of reminding me of some of the ridiculous things I say in class after I forget about them.

profQUOTES

CS 349: JEFF AVERY

- These are not 5-hour assignments… they're 15-to-20-hour assignments.
- We're gonna go over the history of computation in 15 minutes.
- Don't worry about copying things unnecessarily—in this course memory is cheap.
- Kotlin, how dare you remove C-style for loops? How dare you?
- Don't tell your CS 246 profs I said this.
- Undo is the greatest invention in the history of computer science.

CS 458: DIOGO BARRADAS

- If you're defending against a meteorite striking the Earth, good luck, maybe consider some off-site backups on Mars.
- First thing, ditch C, and use a programming language with bounds checking.
- In white-box testing the box is still white and you still can't see through it.
- *[classroom is cold]* This room is always cold, and so is my office. If you want to hack something, hack the thermostat in my office.
- If you put all your eggs in one basket, and drop that basket, you can no longer make an omelette.
- You don't want this super complicated firewall to live on your washing machine.

CS 486: PASCAL POUPART

- If you present a super duper complicated model in industry when you could have done a simple linear regression, you're stupid.
- This is like going to a casino to play blackjack and counting cards, but casinos don't like that.
- Statisticians typically divide themselves into two religions: Frequentist and Bayesian. They like to fight over it a lot.

Enjoying mathASKS?

Thank Professor Furino. It was his idea.

A mathNEWS EDITOR WHO BELIEVES IN CREDIT WHERE CREDIT IS DUE

MATHSOC SEZ

WHY CALL IT MATHSOC SEZ WHEN YOU CAN CALL IT MATHSOC TALKS?

Hey everyone! In the midst of midterm season, we're wishing you all the best! Don't forget to take a break from studying and check out what MathSoc has in store for you this week!

MATHSOC FLOCKS (TO THE POLLS)

Last issue, we let you know that there were N positions open in the MathSoc general election. This issue, we're here to let you know the results of the election!

We're pleased to announce that **Damian Mustatea** will be your President for F23, and that **Logan Batson** will be your Vice President, Academic for F23—both pending ratification by MathSoc Council.

We also have program representatives that will sit on MathSoc Council in F23—also pending ratification from MathSoc Council. They are as follows:

Statistics Rep: Cooper Stone
PMAMCO Reps: Henry Li, Kareem Alfarra, Evan Girardin
CS Reps: Grace Feng, Daniel Matlin, Laura Nguyen, Awab Qureshi, Sarah Wilson
Teaching Rep: Arushi Sapra

Congratulations to everyone who was nominated in the election, and thanks to everyone who participated!

Interested in getting involved in MathSoc?

- **Exec positions** for Fall 2023 (VP {Internal, Operations, Finance, Communications}): keep an eye out for an announcement from MathSoc soon!
- If you'd like to **represent your program** in F23—wait for Fall for news about by-elections.
- **Incoming First Years** who read **mathNEWS** (yay!)—there are First Year Representatives on Council—stay tuned in Fall!

MATHSOC STOCKS (UP ON EVENTS)

We've really stocked up on events for the rest of this term, and you should come and check them out!

- **Regular Games Nights—June 27 and July 11 | 6–8 PM | Math CnD**
  We'll provide the games and snacks—all you have to do is bring yourself, and an enthusiasm for games and hanging out with friends!
- **MATH 239 Midterm Review Session—June 30 | 5–7 PM | Location TBD**
  Our MathSoc VP Academic has your MATH 239 needs covered! You'll be enumer*great* at knowing how to enumer*ate*.
- **Party with Profs—July 7 | 5–7 PM | Grad House**
  Grab a bite and have a drink with your favourite profs in a chill, non-academic setting!
- **MathSoc Semi Formal—July 14 | starting 6 PM | The Turret**
  A wonderful night of dancing with friends, music, and refreshments! Ticket sales opening very soon.
- **MathSoc GM—July 19 | 6–8 PM | M3 1006**
  Come to GM. This is where you find out what MathSoc has been doing for you this term, as well as vote on important issues in the Faculty of Math. Food will be provided. Come to GM. Come to GM. If I don't say it three times in a row they're going to aaaaaAAA—Come to GM!
- **Pi Approximation Approximation Day—July 21 | MC 3rd floor hallway**
  Since the 22nd is a Saturday, we have to approximate the approximation day. We're serving approximately pie (cake), reciting pi, and throwing approximately pie (whipped cream) at MathSoc Executives.
- **Games Night with Profs—July 25 | 6–8 PM | Math CnD**
  Same as regular Games Nights, but now with our wonderful Math Faculty profs in attendance!

MATHSOC OPS

MathSoc doesn't just do advocacy work or run events. We do a lot for the day-to-day operations of our student spaces too:

- **We're organizing and adding new books to our textbook library** in the MathSoc Office, and working on a new catalogue on our website.
- **Our VP Operations is hard at work** with life in our office — drop in and chat! Lockers are being assigned and student spaces are being booked. The office always has snacks. New board games are being acquired and rented. We can't do all of this without our wonderful office staff and board games directors!
- **We're rebuilding the MathSoc Website**, and it's coming along well! Lots of redesigning and reworking is happening behind the scenes.
- **We offer support to the Math clubs situated under us!**
  Whether it's assisting with marketing materials and promoting club visibility, or working together to create a great environment for every Math student, we're here to support the clubs you know and love.

MATHSOC(IAL)

In Person: MC 3035 and MC 3038
Our Website: https://mathsoc.uwaterloo.ca/
Email us: info@mathsoc.uwaterloo.ca
Instagram: @uwmathsoc

Grace Feng (MathSoc President, S23)
on behalf of the S23 MathSoc Executive Team

READING RECOMMENDATIONS VIA ALGORITHMS & COMPLEXITY THEORY

profTHOUGHTS *152.3*

The start of the summer is a great time for lists of reading recommendations. Lots of such lists are available online. For example, NPR's *Books We Love* gives tons of great recommendations from the last ten years and *One Grand Books* has recommendations from your favourite musician, scientist, actor, etc. But all of those lists have one important weakness that this article aims to address: they are not published in **mathNEWS**.

Of course, a list of reading recommendations published as part of **profTHOUGHTS** couldn't just be put together in an ad hoc fashion. So let's take a principled approach using the methods of algorithms & complexity theory. First, we want to define a m*odel of reading* that addresses the resource that is bounded and the measure of the value of a particular written work.

In a typical CS problem, the bounded resource is time/space/energy/etc. and the value represents how well an algorithm solves a given problem. For this list, we define and examine a *thru-hiking reading model*. In this model, the bounded resource is the number of pages of the book (as a proxy for the weight and size of the book) and the value of a book is the number of days that the book provides entertainment in the course of a 6000 km trip over 8 months.

We're looking to optimize the entertainment/pages ratio of the book. Note that we explicitly consider only physical books in this model, in part because e-readers do not survive falls or crushing at the bottom of a pack as well as books do, in part because e-readers make terrible emergency fire starting material, but mostly because otherwise the exercise becomes a lot less interesting. (Reading recommendation: put all the books in your e-reader. Enjoy. See?)

Here are how various reading suggestions fare in this model. Due to space constraints, the mathematical formalization of the reading model, the analysis of these suggestions, and the proofs of all claims are deferred to the full version of the article.

NOVELLAS / SHORT BOOKS

The most obvious option for maximizing the entertainment/pages ratio is to pick a short book. There are lots of options in this category. In fiction, some great options are:

- César Aira's *Episode in the Life of a Landscape Painter* (97 pages),
- Tove Jansson's *Summer Book* (184 pages), or
- The recent releases in New Direction Books' *Storybook ND* series (all around 100 pages).

For non-fiction books, one can choose something like Joseph Brodsky's *Watermark* (144 pages) or, even though it is perhaps a bit long for this category, Joan Didion's *Slouching Towards Bethlehem* (238 pages). Or, for a completely different direction, one can select Peter van den Ende's *The Wanderer* (96 pages). Incidentally, this book has unmatched entertainment/cost ratio in the different reading model where we measure cost in terms of words instead of pages.

But, overall, each of these options has limited entertainment/pages ratio because of one fundamental limitation: as the description of the *Storybook ND* series puts it, these books are meant to give the experience of "reading a marvelous book from cover to cover in an afternoon." On an 8-month hiking trip, this leaves 242 other afternoons to fill after that first one, and alas I don't know of any book in this category that can withstand this amount of repeated readings.

THE BRICK

So, perhaps the key to maximizing the entertainment/cost ratio is to go to the opposite extreme and pick a brick of a book. Books like

- Leo Tolstoy's *War and Peace* (1440 pages) or
- Homer's *Iliad* and *Odyssey* as translated by Emily Wilson (720+582 = 1302 pages)

certainly offer significantly more than one afternoon's readings, but do they offer enough re-reading value to last the entire trip and justify the additional pages? Perhaps. After all, in *Travels with Herodotus*, the reporter Ryszard Kapuściński describes how he received a translation of Herodotus's *The Histories* (1024 pages) early in his career and then brought this book as a thoroughly re-readable constant companion throughout his travels in the following decades, not just on one 8-month trip.

POETRY ANTHOLOGY

The thru-hiking reading model is inspired by Sylvain Tesson, a French writer who hiked, biked, and rode horses from Yakutsk to Calcutta and described his experience in *L'axe du loup: de la Sibérie à l'Inde sur les pas des évadés du Goulag* (279 pages). In this book, Tesson describes the problem considered here of finding a book that can provide entertainment over long trips. He then dismisses the categories we have discussed above as woefully inadequate in his case.

Eventually, Sylvain Tesson found a much better solution in Jean-François Revel's *Une Anthologie de la Poésie Française* (704 pages). He describes his method for getting the most out of the anthology during a trip. In the morning, pick one of the poems. Throughout the day, read it out loud and memorize it. At the end of the day, the page can be thrown away. Ideally the poem remains memorized to be accessed again later, and the method has the advantage that the book gets lighter and lighter as the trip goes along. (Hmm… this suggests that

the thru-hiking reading model really should have distinct worst-case and average-case variants. Future work.)

MATHEMATICAL TEXTBOOKS

Sylvain Tesson's method can actually be generalized beyond its application to poetry anthologies. After all, the core of his method is the observation that the entertainment value of a book is greatly increased if one does not seek to read and re-read it as one would a novel or general prose book, but if instead one can pause and dwell on a small part of the text for extended periods of time.

There is a class of books that appears to be ideal for this method which all readers of this article will certainly be well acquainted with: mathematical textbooks. Maybe the best suggestion I can think of in complexity theory is Eyal Kushilevitz and Noam Nisan's *Communication Complexity* (189 pages). From the very beginning of the book, a reader will find a number of tantalizing problems that range from simple exercises to extremely challenging.

One word of warning if you do take this book on a long-range expedition without internet access: many of the open problems stated in the book have been resolved since its publication. But, then again, this can serve as extra motivation to think about them: approach them knowing that they are solvable, and when you do get back from your trip you can check your solution against the ones that have been published. Or have the pleasant surprise to learn that the problem you solved was one of the stubborn ones that was still open.

I'm sure that lots of you have many more great suggestions for mathematical books with excellent entertainment/pages ratio. Let me know your favourite in the comments below! (Oh, wait, does **mathNEWS** even have comments? Well, feel free to write it in your own copy of it in marker below anyways if you picked up a hardcopy.)

BREAKING THE MODEL

The last four sections have explored four ways that we can try to optimize suggestions in the thru-hiking reading model through various concrete suggestions. But to understand the model itself better, we should really try to determine what is the optimal entertainment/pages ratio attainable.

One possible way towards the optimal ratio was proposed by Raymond Queneau in *A Hundred Thousand Billion Poems* (10 pages). This book indeed contains the promised number of poems, using the power of combinatorics: he composed 10 distinct sonnets all using the same rhyming patterns and then cut the pages into strips so that their lines can be recombined in any way to yield another sonnet that follows the same format. This book does offer a stunning amount of material for a very small number of pages. But it is not optimal.

Jorge Luis Borges' *Labyrinths* (240 pages) offers another even stronger approach. Namely, in *The Library of Babel*, Borges describes an enormous library that contains books of 410 pages each with every possible ordering of letters. At first glance, this library appears to be the opposite of what we seek: it may even be seen as an attempt to *minimize* the entertainment/pages ratio since most of the books are full of nothing but gibberish. But, as Willard Van Orman Quine noted, the books in this library contain not only all possible 410-page books that could be written, but also all the longer ones, since we can assemble multiple books together to form larger volumes.

Once we do this, we realize that with the same process we could write *all* books much more economically: have two (very, very short) volumes that contain a single symbol each (0 and 1, say). Then, compose any book of your choosing by reading these two volumes in the correct sequence. This argument shows that the *theoretical* entertainment/pages ratio of Quine's construction is unbounded. The theoretical reading list research community is still divided, however, as to whether the practical entertainment/pages ratio of this construction is infinite, finite, or zero.

Prof. Eric Blais

N ALTERNATIVES TO REDDIT

- Look at a map (seriously, have you seen those things? they're so cool)
- Go to the newly opened area of Waterloo Park by the lake
- Buy a samosa from the Math C&D and sit on the Math C&D balcony and eat the samosa
- Read **mathNEWS**
- Ride a bus route you've never been on before
- Go to one of the empty roundabouts on Hagey Blvd and walk around the entire road part (watch out for cars)
- Find a slightly too far away grocery store and buy one item
- Play a game of Scrabble
- Say hi to the llamas in Waterloo Park (must be audible)
- Go to Best Buy and play with the folding phones
- Pay a visit to `engagewr.ca`, browse through the cool projects the city and region are working on, and take a walk over to where they're building one of them to check out the construction progress
- Pop into the PMAMC&OC room, take an interesting-looking book off the shelf, read the first page, then put it back
- Open like 20 train and bus schedules in tabs and plan an elaborate trip to nowhere (actually doing it is optional)
- Write for **mathNEWS**

__init__

ECE PROGRAMMING COURSES

How come some people love C++ and some people love JavaScript? How come some people love both? Or neither? The answer may be found in the way that a student is taught. In my experience taking both ECE and CS courses programming courses, I've found a difference in the pedagogical focus of the faculties which draws a divide reminiscent of programming language culture wars.

In my experience, ECE programming courses have a greater focus on optimization, while CS courses tend to care more about the high-level organization of code. This aligns with the programs: ECE is associated with low-level embedded hardware, while the CS program could be considered a more abstract window into computing.

That's why it was rather jarring to walk into a fourth year ECE course on distributed systems and be told to "avoid Java objects — the garbage collector is slow," and "code your own string-to-int parsers and hash tables." I believed that, at this level, these sorts of small optimizations were not too relevant to the course, and I defiantly skipped any sort of low-level optimization. To my further annoyance, when the professor returned my grade, I'd lost 25% of the total assignment mark for poor performance. The other ECE students, however, seemed to enjoy the challenge to speed up their code.

There's only so much time for students to work on assignments, so instructors have to choose a few aspects of a problem to teach. There's the main concept — the actual distributed system in this course — and then the auxiliary concepts, like performance, or object-oriented organization, or source control. The ECE courses I've taken seem to select performance as the secondary metric quite often.

I suppose I have a bias against early optimization of code, with my primarily-CS pedigree. I'd have preferred if more focus had been put toward code structure, but I can ultimately see the value of learning optimization too. It seems the "cultural upbringing" of university students to prefer some techniques or priorities significantly changes their perspectives on problems, and I imagine it's probably best to learn a variety of perspectives to approach a problem with.

CC

EXPERTISE

YOU CAN'T KNOW EVERYTHING, DON'T ACT LIKE IT

There's this barrier between the personal and general that's hard to really wrap your head around. We generally build our opinions and views based upon what happens to us, personally. That's just how people are. Thousands of deaths from COVID were just a statistic before it was your grandparent. A recession is just background noise until you and your friends struggle to find jobs. It's when it hits you that you feel the impact, no matter how much you know about an issue secondhand.

On the other hand, this phenomenon can also cause the inverse effect, where we ascribe something greater importance than it deserves due to anecdotal evidence. I had an acquaintance in one of my classes a couple years back who was quite reticent about the COVID vaccines due to how doctors had mistreated her and how one of her friends had gotten very sick from them. Sure, these are obviously biases, and most of the time you know they're biases, but just because you know you are biased doesn't mean you know how biased you are.

And that often leads to this doubt, this question of how your microexperience compares to the macroexperience of life.

Is it really that hard to make friends, or build a solid relationship, since everyone else seems to manage? Will it really be that hard for me to find a job when I've easily found one every term up until this point? I think this all ties back to resistance to change. People tend to take the things that they have been told are normal their whole lives for granted, and when they're told the normal is changing, they still want to hold onto that which they have grown accustomed to.

Change is scary. I think that's a human constant. We take certain things for granted, even when that's unwise. We discount the possibility that things might change; our minds struggle to imagine how things could be any different, sometimes. Those outlying chances of calamity are so negligible, why should one even insure against them?

It might feel like giving up, but the only true solution is acceptance of the fact that things will change, and that you may not know how. And sure, prepping defences against any minor probability no matter the cost doesn't make sense, but we do what we can to help defend us and those around us from the fallout of these changes.

Because there's something else that we have to accept, which is that we can't be an expert on everything. That there are people with great insight and experience on topics, who can speak with both personal and general knowledge on matters, and that most of the time, you're not going to be one of them. Pretending that you know more than you do based upon your personal experiences and misleading others is a sin, especially when people already trust you and will believe you on the topic no matter your actual knowledge. Humility matters.

And it can definitely be scary to know who you can trust, I'm not denying that, but intuition only takes you so far. Lack of knowledge is scary… but the solution isn't to pretend you have it.

Predap

THINKING ABOUT: REDDIT

Recently, Reddit announced that they were going to roll out a few changes to their third party API — namely, they were going to start charging exorbitant amounts of money for it. This means that most, if not all third-party Reddit apps — apps that a lot of people used because the official Reddit app didn't exist until very late, and the third-party apps are often more fully-featured and performant anyway — will stop working unless they pay that exorbitant fees. In protest, a lot of communities on Reddit went dark, and when forced to reopen by the website admins, engaged in other forms of protest, like r/pics exclusively posting sexy pictures of John Oliver. Basically, large parts of the website are now unusable, and a lot of the more active users feel unable to continue using the platform (including me).

You can read all sorts of takes about

- how Reddit is stupid for alienating its users like that
- how users are stupid for expecting decency from a profit-driven corporation
- how everyone involved is stupid and Redditors and Reddit both probably deserve it

and whatnot. As a regular user of Reddit, my take is slightly different… Reddit filled a very specific niche in my life and I'm not sure how I will fill it.

Reddit used to be my go-to place to find experts (or at least enthusiasts) about any field. r/hardware for computer hardware, r/speedrun for speedrunning, r/coffee for coffee, r/uwaterloo of course… and that's just the communities I was subscribed to.

Sometimes, I just wanted an expert opinion on something that I wasn't an expert in, and Reddit had those experts at the touch of a button. I picked a durable and long-lasting umbrella by checking r/buyitforlife, I first learned the ins and outs of PC building almost a decade ago by reading r/buildapc, I found a good dry-cleaner in the city by checking out r/waterloo.

Both of these use cases seem unfulfillable now. I guess for the former I can use Discord servers, and I did join the r/IPv6 and r/CuratedTumblr Discord servers in light of the API changes, but it feels less structured and the vibe of a bunch of concurrent conversations is different from Making A Post and Getting Replies. For the latter… I don't know, internet forums? Are those still a thing in 2023?

Internet forums probably exist for my more technical interests, but the less computer-y and more niche the interests, the less likely it is that someone exists in that community who has the technical know-how to create a forum, social capacity to moderate it, and financial capacity to pay for its existence. Not to mention they have to get everyone else in the field to sign up for said forum and participate in it. That's something that Reddit provided: a ridiculously easy way to make a community, and a centralized place for everyone to come find it. It's something that I feel that we may lose.

The loudest alternatives I've heard of are federated alternatives like Lemmy and Kbin — basically, instead of one big company controlling the communities, it's a bunch of little servers hosted by individual people that sync up with each other so you can interact with people on one server from any other server. In practice, the Fediverse is filled with drama, only has technically adept people on it (which also means it only has the technical communities), most attempts to make the platform more accessible are met with derision from the existing users, and half the posts on the platform are about how good the platform is — never a good sign[1]. I say this as a regular user of Mastodon, another federated platform: federated platforms will not fill the void that Reddit left. I hope I get to eat my words.

Until an alternative emerges — *if* one does — I'm not sure what I'll do. I guess I won't use Reddit on my phone anymore, because my third-party app of choice is dying and the official app is so bad I'd rather just be bored than use it. I'll still click on search result links that lead me to it, but it's likely that the information there will slowly go out of date over time as people stop posting and subreddits go to chaos.

I've *kinda* replaced the social aspects of Reddit with a combination of Lobste.rs, Mastodon, and Discord. I still haven't found a good car community in any of those places — cars being a topic I'm passionate about. I guess I'll try using a forum, or subscribe to an RSS feed for some car news website, or something.

I don't know. I just wish it didn't come to this, and I hope something can bridge the gap going forward.

tendstofortytwo

1. It is my belief that you can measure how good a social network is by how bad its users say it is. This is because if a user says it's good, that means they're trying to convince someone (either themselves or someone else) that it's good — which means that it's not good enough to just attract people to it. But if a user says a platform is *bad* (like Reddit or Twitter or Tumblr), and they keep using it, that means that there's something really good and useful about the platform that's irreplaceable to them despite all the caveats they're voicing.

THE BIG CHUNK OF ICE ON THE BIG METAL THING OUTSIDE C2

UW REVIEWED 3

I don't know what it does or why it's there, only that it has something to do with the massive liquid nitrogen tank. I pass by it every day on the way to MC. It feels alive. Breathing, on a geological scale. Growing as Fall terms progress, peaking in size a month into Winter terms, then evaporating unevenly as the weather warms, becoming all mottled and dimply. In Spring terms it is only a small patch of ice, a remnant of what it once was. On Google Maps, in Spring 2015, there wasn't even any ice there. In Winter 2019 it expanded an inch or two outside of its enclosure and I touched it.

❦

"Why'd they put it here?" girafarig says to me. "Do you know how many students walk this path every day?"

A lot, probably, including us. It's the most efficient way to get from Phillip Street to MC.

"At other universities they hide this thing, because it's so ugly."

This is true. We visited UBC, U of T, and Western, walked all throughout campus to find their big piece of ice, thinking every university with a chemistry department should have one. We only found Western's, visible only from afar, from the highway behind their medical building.

"I can't believe they would just put it here. And isn't it dangerous?"

It might be, actually, if someone climbed the fence and touched the bare metal. I'm not sure.

"It shows how little the university cares about design. One of the most popular paths to get to one of the most popular buildings on campus is an alley for trucks to drive through and chemistry equipment to be stored."

I don't disagree. The sidewalk here doesn't even connect, and I'm constantly dodging cars. But I don't think the ice is ugly. I think it's beautiful.

❦

On Reddit people say it's "dummy thicc" and a "big boi". I don't know why it's male, but… it *is* kind of thick, and seems to have legs sometimes, owing to the four posts that hold it up. I call it the Big Ice, personally.

Hundreds of students walk through this place every day, lost in their thoughts and worries about assignments, co-op, exams, but for a brief second, resting their eyes on the Big Ice. They don't know I call it that, and probably only a rare few would even care, but that's enough to give me a sense of connection, in a place where I usually don't feel any sort of connection at all.

When I get close to the Big Ice, I see that the chain link fence protecting it has some stretched-out holes. I can piece together what happened; a few students standing in this very spot had stretched the fence by reaching their arms through it to pet the Big Ice. It could have been a few days ago, it may have been before I came to this university. All I know is that for one very brief moment, someone saw the same beauty as me, felt the same joy. This place was a little less lonely.

❦

Twice I have seen the liquid nitrogen tank being refilled. A very long and tubular truck with "Air Products" printed on the side had driven in and was attached to the tank. I like to think it was, indirectly, feeding the Big Ice, nourishing it, sustaining it for another few months. A worker in a high-vis vest stood next to the truck, looking at his phone, paying no mind to my presence. Nitrogen leaked out slowly as the truck emptied, enveloping the area in an ominous mist.

cy

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UW'S BASTION OF ERUDITE THOUGHT SINCE 1973

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A MEMORY

201X-XX-XX— It's a normal day. A good day. I'm in a mundane, yet special, place.

I'm enjoying the presence of the person next to me. We're quietly, but somewhat excitedly, chatting as the world around us seems to fade away. Am I reading too much into the way we look at each other? I don't know. In retrospect, I suspect I'm completely infatuated at this point.

Do I say anything? Why would I?

Life is good right now. I have this to look forward to tomorrow, and the next day, and the next day. I wouldn't dream of doing anything that could change that.

Maybe this is selfish, or something. But I don't think I can even help it.

❦

Do you guys learn about stability in math courses, or is that just an eng thing? I'm sure some of you mathphys people know what I'm talking about. Imagine a causal system—a function that depends on both present and past inputs, like the position of a ball precariously placed at the top of a hill, as a function of the force applied to it. Leave it alone, and it stays put—the force of gravity cancels out with the horizontal surface it's resting on. But give it a little nudge, and suddenly it's in a new place where gravity doesn't cancel out with the hill, and as time progresses these new factors push it farther and farther away from where it started. This is an unstable system, as opposed to a stable system where pushing the ball away from its starting position creates new forces to push it back to where it started—like a ball at the bottom of a pit. If you study control systems (like, things that control other things), instability is an important thing to try to avoid, otherwise you could very well end up with something like a steering wheel that you can swing and send the car swinging back and forth harder and harder until it rolls over. Where am I going with this?

I'm sorry. As I write this, I've spent the last several days studying for midterms, and this stuff is very much lodged into my brain. I'm not usually this weird.

But like—I'm going over these practice problems before my midterm, I'm constructing equations for these overly complex systems and trying to figure out whether they're stable or unstable, and I also decided for some reason to read a couple of my old journal entries at the same time. And like I know by the time this article comes out my midterms will all be over and I'll be rereading this and wondering why I ever saw a connection here. But thinking about all this stuff at the same time is making me get confused and start thinking about modelling my emotional state as a way-more-complex-than-what-we-cover-in-class causal system, one where the already-way-too-complex calculations get even more complex.

If I'm already at something that feels like a peak—it feels impossible to figure out whether this state is stable or not. And if it's not, how will any input change it? Am I prepared? If I keep every variable the same… maybe I can stay here a little longer.

This is probably nothing. But it seems like a… reasonably believable explanation, or even a justification, for why I never really change anything about how I behave, even when I kinda want to. Maybe. Idk it might just be that when people try to teach me a complex mathematical concept and don't give me enough real-world analogues I try to make up my own, relating to whatever the hell I'm thinking about at the time. In the end, mathematical models probably don't work that well for modelling vibes.

But the math worked out this time. It did what it was supposed to do. I would go to the same place the next day, and sit down next to the same person, and do the same the next week, and the next month, and life would be good for a little while longer.

__init__

BLÅHAJ REVIEW

My dad once impressed upon me that as part of growing up, I should get rid of my stuffed animals.

Fuck that, I now say. I went out and bought the IKEA stuffed shark.

The shark is blue and white and is a meter long. Like all products from IKEA, it has a name: Blåhaj.

You don't really realize how long a meter is until you actually see the shark. It's quite large. Despite this, it's small enough that it's not a hassle to carry. I took it home on public transit. If the size is a problem for you though, IKEA does sell a half-size version.

Blåhaj itself is very soft and squishy, more than I expected. It turns out it's pretty much the perfect size for cuddling while laying down. I sleep with it now, and it definitely makes me want to stay in bed a little longer after I wake up in the morning. My mom thinks I have no space on my bed now, but it's honestly fine. I love it anyway.

Surprisingly, Blåhaj was cheaper than I was expecting. At $40, it's still an investment for sure, but compared to other large stuffed animals, it's pretty affordable.

Personal rating: 5/5 stars. Highly recommend.

hyperlynx

BLACK MIRROR (2023)

The new Black Mirror season just dropped! I binged it over 3 days at my brother's apartment and, by god, it's a journey. It's certainly different, but that's what happens when you watch an anthology show. There are a lot of people who argue and say it was bad or that it wasn't "true" Black Mirror, but I kid you not, if they made what they thought would be "true" Black Mirror, they'd just get the same criticism.

Without further ado: the newest 5 episodes of Black Mirror (2023). *Light spoilers ahead.*

JOAN IS AWFUL

Can I just say, when I heard the premise of the show I immediately made a theory and was proven right? This was really good and really funny. There was one scene that was difficult to watch and, honestly, you know why it happens, it's just… hard to watch. Very hard to watch. "Joan is Awful" is awful…ly good. 9/10.

LOCH HENRY

Stuart my beloved. This was a really good episode that might fit within the original ranks of Black Mirror's first two seasons. A good take on true crime with a really good Black Mirror twist, and a really shocking one at that. My jaw was gaping the entire time. Anyways, Stuart, one of the characters in Loch Henry, has my heart. 8/10.

BEYOND THE SEA

This one is really good, especially with the time period it's set in. It's really good to get a grasp on the tech, not to mention Aaron Paul's acting as absolutely stellar. Loved it. The final scene really had me, but I've gotta say, that was one of the most fucked up things I watched. I mean, I saw it coming. Still fucked up. 9/10.

MAZEY DAY

GLACIERS MELTING IN THE DEAD OF NIGHT AND THE SUPERSTARS SUCKED INTO THE SUPER MASSIVE (YOU SET MY SOUL ALIGHT)

Jokes aside this would have worked a little better under the red mirror title that Demon 79 has. There is going to be a Moment™. Everyone who watches knows the Moment™. 7/10.

DEMON 79

This one's different for a good reason. It did a good job of capturing the feel of England in the late 1970s, including the Cold War fears, the music, and the dress—not to mention the cinematography! The characters had amazing chemistry and it was really poignant and ended somewhat bittersweet. 9/10.

The entire season, honestly, I would give the Seal of Approval. Would recommend. The weakest episode is Mazey Day, but it's one of those episodes that really makes you think, and it makes sense after a while. Strongest is a toss-up between Demon 79 and Beyond the Sea, but I'm leaning toward Demon 79.

skittlerc

WHEN TIME STOPS

I've always been a fan of pauses in art. Someone getting stabbed, lying down to die, and the only visual change being a slow spread of blood? Love it. A character begging, pleading for validation, desperately wanting to be told that they're a good person, only to be met with silence? Kill me now because I can die happy. Whether it's a panic attack that slows the world, a character's mind racing as they figure out a crucial detail they needed to know 3 hours earlier, the deafening silence after a gunshot, or even just the quiet black that reflects your haunted face, the stopping points eviscerate us. It makes us slow down, and everything that we just saw has a chance to catch up. Take a breath, and the world catches up.

Sometimes, a pause lasts longer than a few seconds. We see someone's life falling apart one second, and the next, we get a second, a minute, an hour, a year of normalcy. We know, we're *certain* that the consequences will catch up. We mourn for the character, we want to change what's written, we pray for a solution that doesn't exist, then we grieve. The bell was rung, but at least we can savour the last seconds of silence. Those moments *hurt*, in a way that few others do.

Sometimes, though, sometimes a piece of art will do more than pause. Sometimes, it gifts you a little slice of eternity. You hear a sentence, and everything freezes. There isn't a pause in the art—instead, it stops you. Time is a powerful plaything; the art that can pull at its strings is rare, and all the more precious for it.

I wish I had a point when I sat down to write this. I think the best articles I've written have all had points. Maybe the point is that you should watch BoJack Horseman, the best show I've ever seen, a work that has truly and fully mastered time, and one inspiration for this article. But that wasn't the *point*. I love art, I love analyzing every detail of the writing and animation and acting of my favourite shows, and this is the one phenomenon I can't explain. I can point to moments that made it happen, but I don't know how, and I *hate* not knowing. Maybe I was trying to figure something out by writing, but as I tried to, I realized I didn't want to know. Magic loses its luster when you know how it's done, and this is a trick I want to enjoy for a little while longer.

Golden

UW ALUMNUS ANNOUNCES INDEPENDENT BID FOR PRESIDENT

Supporters packed the lobby of the UGO Tower on Wednesday morning, where the mononymous Bobby announced his bid for the 2024 U.S. presidential election.

"In the last four years, we have seen the world move faster than we can comprehend. We are so focused on problems of the past, that we are losing sight of the future. That ends in 2024. That ends in Bobby's America." he told the crowd.

A recent graduate from the University of Waterloo, Bobby has quickly become one of the university's most successful alumni. In 2019 he founded Bobby Leather Services, selling premium handmade wallets. After BLS was acquired by the mysterious international conglomerate UGO II in 2020, Bobby quickly climbed the ranks and became CEO of UGO II.

"Nobody knows how he did it," a company spokesperson explained, "I'm pretty sure his degree is in math, not business. Anyways, if Bobby can do all that in just a year then who knows what he could accomplish as president of the United States?"

If elected, Bobby plans to make crime illegal and invest in public infrastructure. Other big platform items include daily nationwide scrum meetings and a transition to 100% green energy. "We will build affordable housing for the rich, and also the poor." Bobby promised in his speech, referencing his 2020 campaign slogan.

Though he lost the electoral college, Bobby's 2020 presidential campaign made U.S. election history by getting the most popular votes per campaign dollar spent. He credits his "not-for-cost" management approach, that has also kept UGO II thriving during a time when similar companies have been forced into layoffs. Bobby hopes the same strategy can now revolutionize the public sector.

However, this time, the campaign is definitely not-for-cost. To get the message out, Bobby unveilled brand new merchandise at the rally alongside his new campaign slogan: *It's Over*. Opponents have been quick to react. "If he's talking about his political career, I certainly agree," quipped long-time rival Wa-Bobby at his own campaign event the same day.

To learn more about what will be over when Bobby becomes President, visit bobby-2024.com for the full campaign website.

UGO II Media

A REVIEW OF NANNA'S FIRST SOLO ALBUM

Nanna, one of the lead singers of *Of Monsters and Men*, has a new solo album! It's called "How to Start a Garden." I actually mentioned this in issue 151.4, when I recommended the two singles from this album that were out at the time, "Godzilla" and "Crybaby."

The album starts with the titular song, and the chirps of birds sets the mood. It's a calming, gritty song that's indie folk, and that's pretty much the style that the album takes on. A masterpiece, I'd say.

"Sputnik" is the next song, and it has a backing track that sounds slightly spacey. Has a bit of a haunting vibe. "Crybaby" follows, and it probably has the most energy of any song. "Disaster Master" brings back the calming vibe, and was actually released as a single after I recommended Nanna's first two singles. It actually took a bit for it to grow on me, but I eventually came to love it.

After that, it's "The Vine." The piano is the most noticeable instrument, and the song is one of my favourites for it. "Godzilla" follows, and I think there's a reason why this was her first single. It sounds the most like OMAM, and is a good starting point for people easing into the vibe of her music via OMAM.

Following that, "Bloodclot/Andvaka" comes in with a ticking metronome as a backing track at the start. Honestly, this, "Milk," and "Igloo" were initially forgettable to me, but that could be that I'm not used to giving my undivided attention to an album, as I've grown to appreciate them as well. "Milk" is a slow buildup from calm, all the way to the last lyrics. "Igloo" leans heavily into the folk genre.

"Voyager" is probably my favourite song on this album. It's extremely calming. The way the mixing is done, with the instruments, Nanna's singing, and the background voices saying "oh no" and "don't go" in the chorus makes it an amazing song.

"Seabed" ends the album, and you get the feeling that this is the last song just by the vibe the background gives. The last two minutes are sung in Icelandic, which is very cool.

If the names seem weird, it's understandable. Sometimes the title is Nanna's interpretation of the subject, like how "someone has to play the villain" in "Godzilla." You can really tell that this was a personal project for her, and she's done an amazing job making this solo album.

lwo

RANKING MATHSOC DREAMS: PART 1

If you walk into the MathSoc Executive Office this term, you will see a counter on the whiteboard that counts the MathSoc President's MathSoc Dreams. As of this article being written, it is at 27. I should note that not all these dreams occurred during my term as president, but many are from this time. From these, I've picked out a few highlights for your reading pleasure.

ORIENTATION DANCE

I was a frontline leader and a tie guard during Math Orientation F22, and as every Math student knows, the cornerstone of Orientation is the Math Dance. My math spirit transcended into my dreams.

I dreamt that I was teaching my boyfriend the Math Dance. The only catch was, it was happening near a playground close to where I grew up. We were walking down the sidewalk on a sunny September day, and I was happily dancing to Sunshine by One Republic.

7/10 — very happy and cheerful, not super exciting.

SCHEDULING COUNCIL MEETINGS

At the time that this dream happened, I was trying to schedule MathSoc Council's meetings for the term. So when I fell asleep, a bit of that bled into my dreams and I began scheduling Council meetings in my sleep.

In my dream, I went to Rose (MathSoc's Business Manager) with a when2meet and asked her for help on picking a good date. I had narrowed it down to Mondays and Tuesdays — which were the dates that I was thinking of in reality, too. Please note that the actual Council availability form was in Google Forms format, which means that I manifested an entire when2meet.

I don't remember what Rose and I decided on. In actuality, Council meetings were decided to happen on Tuesdays for this term.

4/10 — Entertaining story to tell, but stressful. I do not want to schedule Council meetings while sleeping and while being awake.

CSC'S CONSTANT SUPPLY CLOSET

I was standing in the CSC office with their treasurer, and we were going to grab some snacks to restock the CSC office. That's to be expected — CSC has a great supply of pop for sale, and I gladly decided to help restock the office. (PMC also has a great supply of pop by the way!)

What I didn't expect was to find a top-secret CSC storeroom hidden in the basement of MC. And not only was it top-secret, it was *rooms* long. I stepped into the storeroom, which was stocked with chips, ramen, and pop, only to find even more doors leading out from that room. Each room I opened was similarly stocked with office snacks, some of them piled to the ceiling.

The CSC office isn't selling chips this term — I don't know where I got that from — but CSC can now also stand for Chip Supply Club or Constant Snacks Closet.

8/10 — An endless storeroom of snacks is a fun premise!

REMOVING NEW BUSINESS FROM THE COUNCIL AGENDA

I fell asleep on the bus next to my boyfriend, and he had his arm over me. The bus was super bumpy, and what I *meant* to tell him was to please move his arm, because it was bumping into me. What I *actually* said was: "can you please move your new business?" Cue his confusion.

It turns out that I was dreaming that Rose was giving me new business to add to the Council agenda. For context, the MathSoc Agenda has a section for general orders, which are meeting items submitted ahead of time, and a section for new business, which are meeting items submitted much closer to the actual time of the meeting.

9/10 — Flawlessly executed line, entertaining story. Missing points for the bus being incredibly bumpy. There wasn't even a Council meeting happening in the next few days…

REMINDER TO FINISH MY CS ASSIGNMENT

In my dream, I had to finish a CS assignment, attend a meeting with a Faculty member, and pack for a trip that was happening *that night* that I hadn't packed for yet. I had to fit everything in before I left for the flight.

And then I woke up. Only two of those three things were true. I had a CS assignment due that day. I had a meeting with a Faculty member. What I didn't have was an impromptu flight that I hadn't started packing for.

2/10 — Stressful and disappointing. There was no trip, the scheduling was tight, and I don't want to dream about unfinished assignments.

MATH GRAD BALL BUT EVERYTHING GOES WRONG

I was one of the Math Grad Committee chairs for the W23 Math Grad Ball, which basically means that running Grad Ball was my responsibility. The week before Grad Ball, I dreamt that everything that could go wrong with Grad Ball did go wrong.

The venue cancelled, and we had to host Grad Ball in a random classroom in MC. The floral centerpieces never arrived, so the tables were barren. The buses cancelled. The DJ cancelled. There was no food, and we had to pull out snacks from the MathSoc Office, as well as run out and grab food.

We had one single disco ball from Dollarama for lighting and ambiance. I was trying to check everyone's tickets for the event, and people were signing themselves in.

Thankfully, the actual Grad Ball went smoothly, and I'm super thankful to everyone that helped out with the event. None of the stuff that was in the dream came to fruition.

Either 1/10 or 9/10, no in between. It was a *very* stressful dream, but it also makes for a *very* entertaining story when looking back.

labyrinth

OZYMANDIAS

UNFORTUNATELY NOT IN IAMBIC PENTAMETER

I met a teacher of Anglican knowledge, who bequeathed unto me the tale of the desert king:

And I, an exploratory fellow, made way posthaste to that site, amidst desert sands, and gazed upon those legs with strange appreciation.

And from beneath cursed sands, the winds converged, the frequencies congealing ex nihilo into an oddly familiar, sneering voice:

"Yet another insolent soul comes wandering unto my wretched statue? Nay, for that accursed Shelley slanders my name. For this site was once indeed prosperous, and enviably rich, yet not bestowed unto me. A rival king, who dareth oppose me, owned this site, it's existence a mockery to my empire. And now… a vast desert."

"Look at my work, and despair, for I returned the metropolis into ash, razed it into the sands from which it once came!"

I collapse on the coarse sands. "Nay, cur," I postulate, "thoust warpeth the truth, and thou have not done that. Thou saveth thyst face, and dareth lie in the jury of history!"

"Yet raze I have done, just like your mother."

"What?"

"Bequeath your blind eyes towards my beautiful legs, and thou shall see a list of all I've done."

Daunted, I turn my eyes to those twin pillars of stone, and squinted. The Fall of Ashignor, The rise of Ramasses, and … with much terror I see the name of my own siress, emblazoned in gold.

"No, no, no!" I curse into the wind. "And so what?"

"Then thyst are my son, and a new vessel for my spirit. Come hither, new body, and thou shall be mortal no more."

And thus I was not.

andoiii

BOJOHN MCGEE HAD HAD ENOUGH

BoJohn McGee had had enough
His goat was got, his life was rough
His years filled with mis'ry and decades with strife
BoJohn McGee sought to end his life

BoJohn McGee wasn't too frugal
He spent like he'd not held his father's approval
Now with mortgages mounting and gambling debts
BoJohn McGee was filled up with regrets

BoJohn McGee wasn't too loyal
His wife found out and she wasn't all joyful
Now the kids didn't visit, the wife got the house
BoJohn McGee wanted to end himself

BoJohn McGee had never had guts
Hence why he mouldered down in the dumps
With not dignity befitting even half of a man
BoJohn McGee came up with a plan

The world didn't see, nor did it care
That BoJohn's life was tough, a chore, and unfair
With no trepidation, his dismal plan was a go
With a car, its exhaust, and 12 feet of hose

BoJohn McGee closed his eyes
And began to fade into sleep or demise
Silently slipping into the dark night
BoJohn McGee sought the afterlife

His life was sad, his goals unfulfilled
Time seemed to stall, at least, until
"Warning!" A flashing light on the dash repeated
"Your Tesla's new battery is almost depleted."

aphf

SHORT BUT TRUE HAIKU THAT HAPPENED LAST WEEKEND

Opened the porta potty *[Editor's note: this line has 7 syllables]*
Inside a famous athlete
What do I do now

Lars Nootbaar

FTPWND PART 2: CLOSE SHAVE

ORIGINALLY WRITTEN FOR CS 458

ACT III: PWNED

```
-- 29 April 2023 --
11:44:00 PM  Also, I noticed that some random
PHP files keep on popping up in the mirror
user's homedir
11:44:04 PM  Are we getting pwned?
11:48:48 PM  ^ szclsya[m]
11:49:08 PM  If nobody knows what those are,
then I think potassium-benzoate has been
breached
11:49:51 PM <szclsya[m]> I didn't do it
11:50:07 PM <szclsya[m]> which folder exactly?
11:50:10 PM  Run `git status` in the mirror
user's home dir and you'll see
11:50:27 PM  The alexusMailer_v2.0.php script is
really concerning
11:51:03 PM <szclsya[m]> I see russian
11:51:10 PM <szclsya[m]> I would say yes we are
pwned
```

SYSCOM IRC LOG, 29 APRIL 2023

While I was on vacation after a long year of serving as sysadmin, merenber, long-time syscom member and past sysadmin, notices that alien PHP (PHP: Hypertext Preprocessor, a programming language used by web servers and prone to remote code execution) script files keep appearing in the "mirror" user's home directory. Szclsya, then-sysadmin, confirms that he knows nothing about them and, due to the appearance of Russian text in one of the scripts, agrees that mirror has been breached.

Merenber suspects initially that the push updates some distros use to update our mirror (instead of us pulling updates as is usual for most projects that we mirror) had something to do with this, but upon checking the SSH (Secure-SHell, service used to remotely log into servers) daemon, confirms that only the "push" user (which does not have access to the "mirror" user's home directory) is able to log in using SSH. Zseguin, another long-time syscom member and past sysadmin, confirms that the "push" user is severely restricted, and that only merlin and its sync script are run by the "mirror" user.

Zseguin rapidly searches the system's journal entries, and finds concerning logs dating to the previous week, that coincide with the creation date of the PHP script:

```
Apr 21 21:05:45 potassium-benzoate proftpd:␣
↪pam_unix(proftpd:session): session opened for␣
↪user mirror by (uid=0)
Apr 21 21:05:53 potassium-benzoate proftpd:␣
↪message repeated 2 times: [ pam_unix(
↪proftpd:session): session opened for user␣
↪mirror by (uid=0)]
```

POTASSIUM-BENZOATE JOURNAL LOGS, 21 APRIL 2023

He digs deeper into the ProFTPD logs and finds:

```
Fri Apr 21 20:05:50 2023 1 2607:reda:cted::e20
↪2523226 /mirror/root/.cscmirror0/gentoo-
↪distfiles/distfiles/3c/lirc-0.10.1.tar.bz2 b
↪o a -wget@ ftp 0 * c
Fri Apr 21 20:05:51 2023 0 2607:reda:cted::e20
↪39392 /mirror/root/.cscmirror0/gentoo-
↪distfiles/distfiles/42/lirc_0.10.1-
↪7.debian.tar.xz b _ o a -wget@ ftp 0 * c
Fri Apr 21 20:05:52 2023 0 2607:reda:cted::e20
↪24177 /mirror/root/.cscmirror0/gentoo-
↪distfiles/distfiles/35/libcue-2.2.1.tar.gz b
↪o a -wget@ ftp 0 * c
Fri Apr 21 21:05:54 2023 0 196.206.81.161 1598
↪/home/mirror/ARS.php a _ i r mirror ftp
↪0 * c Fri Apr 21 21:05:55 2023 0
↪196.206.81.161 648113 /home/mirror/
↪alexusMailer_v2.0.php a _ i r mirror ftp 0
↪* c
Fri Apr 21 20:05:59 2023 1 2607:reda:cted::e20
↪1758632 /mirror/root/.cscmirror0/gentoo-
↪distfiles/distfiles/3c/fluidsynth-2.3.1.tar.gz
↪b _ o a -wget@ ftp 0 * c
Fri Apr 21 20:06:02 2023 0 2607:reda:cted::e20
↪1554516 /mirror/root/.cscmirror0/gentoo-
↪distfiles/distfiles/1d/libopenmpt-0.6.6+
↪release.autotools.tar.gz b _ o a -wget@ ftp 0
↪* c
Fri Apr 21 20:06:03 2023 0 2607:reda:cted::e20
↪933448 /mirror/root/.cscmirror0/gentoo-
↪distfiles/distfiles/7a/jack2-1.9.22.tar.gz b
↪o a -wget@ ftp 0 * c
```

POTASSIUM-BENZOATE: /var/log/proftpd/xferlog, IPV6 ADDRESS REDACTED FOR PRIVACY. *Emphasis mine. Note the '`i r mirror`' in the two middle logs, compared to '`o a`' in other logs. In contrast to outgoing files requested by anonymous users, the PHP scripts were incoming files uploaded by the mirror user [6].*

Zseguin runs a search across all `xferlog` files and generates a list of uploads and deletes to the "mirror" user's home directory, dating back to early April. Having confirmed that the breach stemmed from the ProFTPD daemon, he rushes to patch its config.

ACT IV: DAMAGE CONTROL

Upon investigating, zseguin realises that there is a compromising default set by ProFTPD. It allows writes and logins by all users, by default.[7] He adds the following to the ProFTPD config to stop the malicious uploads once and for all:

```
...
ServerName "mirror.csclub"
ServerType standalone
```

```
 ...
TransferLog /var/log/proftpd/xferlog
 ...
# A basic anonymous configuration, no upload_
↪directories.
<Anonymous /mirror/root>
# Limit WRITE everywhere in the anonymous chroot
<Directory *>
<Limit WRITE>
DenyAll
</Limit>
</Directory>
+ <Limit LOGIN>
+ AllowAll
+ </Limit>
</Anonymous>
+<Limit LOGIN>
+ DenyAll
+</Limit>
```

GIT DIFF ON POTASSIUM-BENZOATE: `/etc/proftpd/proftpd.conf`

By denying all logins outside of the anonymous chroot, the mirror user is no longer able to login via FTP, and thus cannot upload any more malicious scripts. The vulnerability is now fully patched.

Syscom members run further diagnostics to pin down a list of files possibly touched by attackers and add further safeguards in systemd (from which ProFTPD is run) to prevent ProFTPD from accessing home directories. Copies of merlin code and sync scripts are checked against to ensure they weren't modified. Private SSH keys stored in the "mirror" user's home directory (used to update from secured upstreams) are rotated. Emails are sent to relevant upstream projects to notify them of the breach, and to invalidate the compromised SSH keys and rsync passwords. The University's Information Systems and Technology Information Security Services Security Operations Center (IST SOC) is notified of the breach, since it occurred on the campus network.

Finally, five hours after the initial discovery of the breach at midnight, the syscom members on duty could get some sleep.

ACT V: LESSONS LEARNED

When I woke up that morning (my first day back from vacation) and checked IRC, my heart nearly stopped. This could have been catastrophic. An attacker could have modified the sync scripts to compromise all the files we served from our mirror. It was really a stroke of luck that the attacker that got detected first only intended on spreading malicious PHP files, and we were not running PHP on our mirror.

Several things had gone wrong here. The "mirror" user didn't have a password. The default settings of ProFTPD were too insecure for our use case, and the documentation is incredibly hard-to-read.[8] We didn't prevent logins via FTP. We didn't prevent unnecessary access to home directories. We didn't check our FTP logs often, or have an automated way to do it. If even one of these factors had been mitigated, the breach that we finally detected wouldn't have occurred. Syscom would eventually switch over to vsftpd (very-secure FTP daemon, a more secure implementation with much more readable documentation) instead, for a simpler configuration to avoid further mishaps.[9]

When asked for comment for this blog post, zseguin emphasized that it's "important to know what's running, where your points of entry are and where your logs are", and merenber stressed the importance of checking "inherited legacy cruft" for security issues, since "our faulty ProFTPD config had been there for a *really* long time and that's probably the reason why nobody bothered to check whether it was secured or not." He also mentioned that syscom "needs to be more proactive" and that "the vsftpd configuration is far simpler (only one config file)... This makes it far less likely for someone to screw it up."

FOOD FOR THOUGHT

1. Can you identify where ProFTPD documents (or even find the source implementation) that it allows writes and logins from all users by default?
2. What are some additional ways we could have prevented this breach, or detected it earlier, that aren't mentioned in this post?
3. If you wrote an FTP daemon, what are some guard rails you would add to prevent incidents like this?

raymo

6. https://linux.die.net/man/5/xferlog
7. Determined through experimentation, proof left as an exercise for the reader
8. http://proftpd.org/docs/
9. https://security.appspot.com/vsftpd.html

EPISODE 57: LINEAR PROGRAMMING

Enjoy Episode 57 of the MathSoc Cartoons series: *CO 250 — Linear Programming*!

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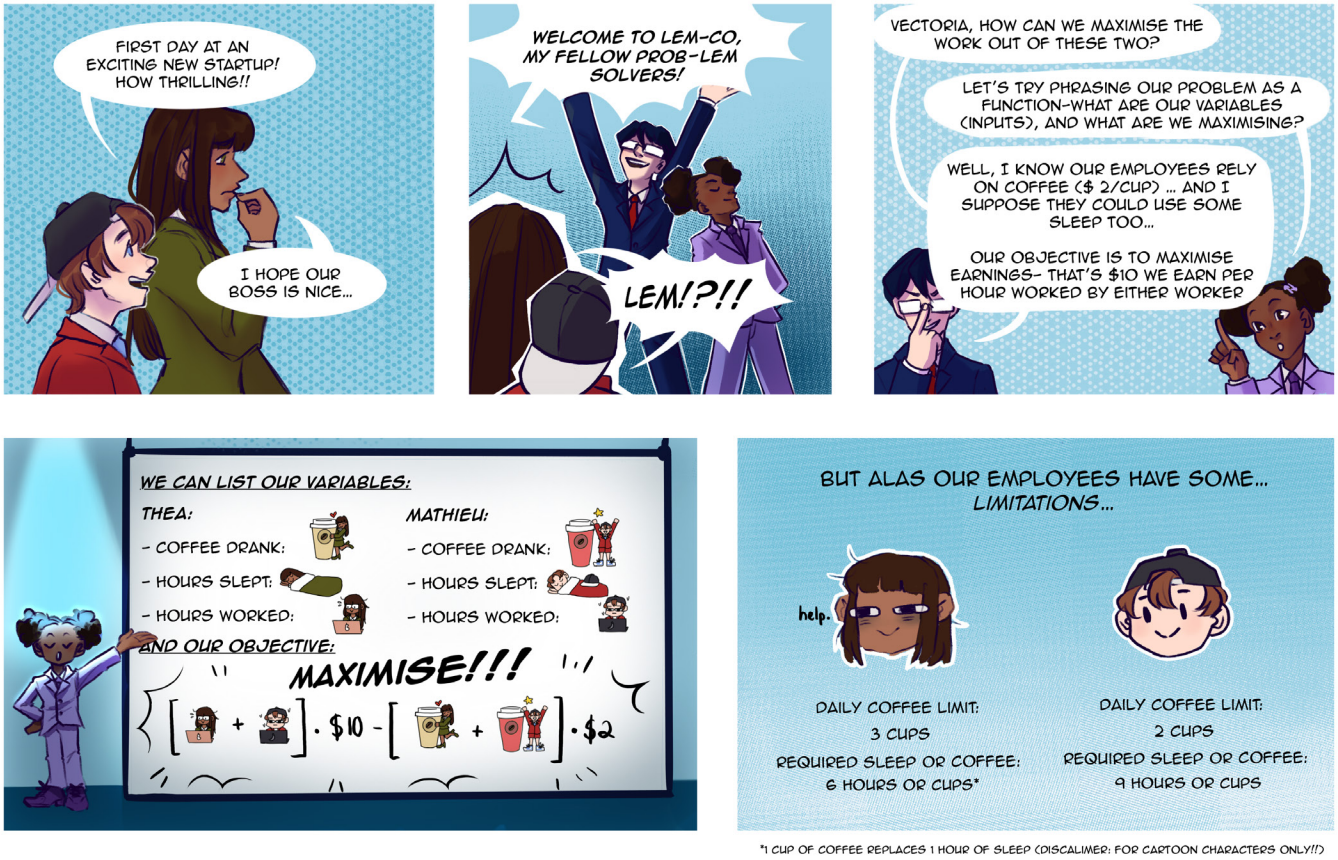
Want to see the next comic when it's released? Follow @mathsoccartoons on Instagram and Facebook!

As always, feedback, suggestions, and fan art can be left on the MathSoc Cartoons channel in the MathSoc Discord server or sent to cartoons@mathsoc.uwaterloo.ca.

MathSoc Cartoons

CO 250 – LINEAR PROGRAMMING

WRITER: ISHAN SHASTRI
ARTIST: AICHA GHIDAOUI



MEF Mathematics Endowment Fund
MATHSOC

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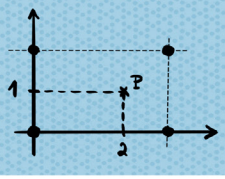
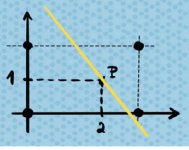
IF WE PICKED P TO BE OUR SOLUTION (2 CUPS OF COFFEE FOR THEA, 1 FOR MATHIEU), THEN OUR OBJECTIVE FUNCTION (EARNINGS) WOULD BE:

$330 + 8(2) + 8(1) = 354$

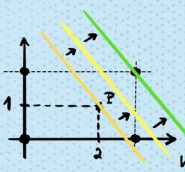


SINCE THERE ARE MULTIPLE SETS OF [thea] AND [mathieu] VALUES THAT CAN RESULT IN THIS EARNING, WE CAN DRAW OUR EARNINGS AS A LINE:

$330 + 8([thea]) + 8([mathieu]) = 354$



NOTICE THAT I CAN INCREASE THE RIGHT HAND SIDE OF THIS EQUATION (INCREASE MY EARNINGS), WHICH MOVES MY LINE UPWARDS, WHILE STILL HAVING A PORTION OF MY EARNINGS FUNCTION PASS THROUGH THE FEASIBLE REGION, UP UNTIL...



THE LINE REACHES THE TOP-RIGHT VERTEX OF THE REGION! AFTER THAT, IT CAN'T BE SHIFTED ANY FURTHER!

INTUITIVELY, WE CAN ONLY BE USING OUR RESOURCES OPTIMALLY IF WE ARE PUSHING OUR CONSTRAINTS TO THE LIMITS—WHICH HAPPENS AT THE ***VERTICES*** OF OUR FEASIBLE REGION

HMM... THAT DOES MAKE SENSE... IN THIS SIMPLE CASE BUT HOW CAN WE "LOOK FOR VERTICES" IN GENERAL? SURELY, NOT WITHOUT SOME ***REALLY COMPLEX*** ALGORITHM....

NO... BUT WITH A ***SIMPLEX*** ALGORITHM!

SNAP

YOU MADE THAT UP*

LEM-ME SHOW YOU

*IT'S A THING (SORRY LEM)

NOTICE THAT WE CAN REWRITE INEQUALITIES AS EQUALITIES USING ***SLACK VARIABLES***

$a + b \leq z \longrightarrow a + b + S_1 = z$

slack variable! $(S_1 \geq 0)$

SO WE CAN REWRITE OU CONTRAINTS LIKE THIS:

[thea] ≤ 3 ⇒ [thea] $+ S_1 = 3$

[mathieu] ≤ 2 [mathieu] $+ S_2 = 2$

$S_1, S_2 \geq 0$

AND REARRANGE OUR COST FUNCTION TO LOOK LIKE THIS

Earnings $= 330 + 8([thea]) + 8([mathieu])$

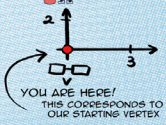
$\Rightarrow$ Earnings $- 8([thea]) - 8([mathieu]) = 330$

? UM, WHY ARE WE DOING THIS?

SO WE CAN PUT OUR EQUATION IN A ***TABLE!***

LET'S SAY THIS IS OUR MOST BASIC FEASIBLE SOLUTION, WHEN [thea] AND [mathieu] ARE 0

[thea]	[mathieu]	S_1	S_2	$	Constraint
1	0	1	0	0	3
0	1	0	1	0	2
-8	-8	0	0	1	330



YOU ARE HERE! THIS CORRESPONDS TO OUR STARTING VERTEX

[thea], [mathieu] $= 0$ $S_1 = 3$ $S_2 = 2$ $\$ = 330$

BUT THAT'S DEFINITELY *NOT* THE OPTIMAL SOLUTION!

EXACTLY! WE CAN ALSO TELL THAT FROM THE NEGATIVE ENTRIES IN THE BOTTOM ROW:

-8	-8	0	0	1	330

$\$ = 330 + 8([thea]) + 8([mathieu])$

THIS MEANS THAT OUR EARNINGS CAN STILL INCREASE BY INCREASING [thea] OR [mathieu]—WE HAVEN'T PUSHED OUR VARIABLES TO THEIR LIMITS YET

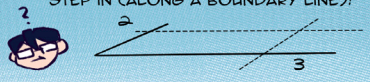
WAIT! IF OUR TABLE IS JUST A SYSTEM OF EQUATIONS, WE CAN PERFORM ***ROW OPERATIONS*** TO ELIMINATE THE NEGATIVE ENTRIES IN THE BOTTOM ROW WHILE SATISFYING EACH EQUATION (I.E. SATISFYING OUR CONSTRAINTS)

GOOD THINKING! LET'S ELIMINATE THE -8 IN THE [thea] COLUMN**

[thea]
1
0
-8

**IN PRACTICE, YOU'D PICK THE ROW WITH THE MOST NEGATIVE BOTTOM-ROW ELEMENT—BECAUSE YOUR COST FUNCTION IS MOST SENSITIVE TO THAT CORRESPONDING VARIABLE!

NOW WE PICK A ROW TO DO OUR OPERATION WITH—THAT IS, PICK AN ***EQUATION*** TO PUSH TO ITS LIMIT—GRAPHICALLY, THIS IS LIKE PICKING A ***DIRECTION*** TO STEP IN (ALONG A BOUNDARY LINE)!



SINCE WE WANT TO PICK THE DIRECTION WHICH REQUIRE THE ***FEWEST NUMBER OF STEPS TO REACH A CONSTRAINT (VERTEX) WITHOUT THE HELP OF A SLACK VARIABLE***, WE'LL SHIFT THE FIRST ROW OF THE [thea] COLUMN

THIS WILL REACH A CONSTRAINT AFTER ***3/1 = 3 STEPS***—THE SECOND ROW ***NEVER*** REACHES ITS CONSTRAINT IN A FINITE NUMBER OF STEPS!

[thea]	...	Constraints	Steps to reach constraint
1	...	3	3/1 = 3
0	...	2	2/0 = infinite!

NOW WE TAKE 3 "STEPS" IN THIS DIRECTION TO REACH OUR CONSTRAINT BOUNDARY—THAT MEANS SETTING [thea] TO 3, AND UPDATING OUR EARNINGS FUNCTION TO:

$\$ = 330 + 8(3) + 8(0) = 354$

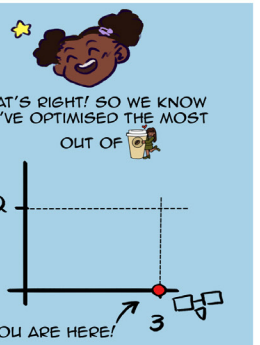
NOTICE THAT S_1 BECOMES 0. WE'VE ELIMINATED 1 SLACK VARIABLE!

THAT'S JUST LIKE SUBTRACTING 8*(ROW 1) FROM THE BOTTOM ROW OF OUR TABLE! THIS ALSO ELIMINATED THE NEGATIVE IN THE BOTTOM ROW OF THE [thea] COLUMN—JUST LIKE WE WANTED!

R_3+8R_1

[thea]	[mathieu]	S_1	S_2	$	Constraints
1	0	1	0	0	3
0	1	0	1	0	2
0	-8	8	0	1	↑ 354 ↑

VISUALLY, WE'RE TAKING 3 STEPS IN THE [thea] DIRECTION!



THAT'S RIGHT! SO WE KNOW WE'VE OPTIMISED THE MOST OUT OF [thea]

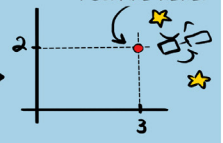
NOW LET'S TACKLE THE NEGATIVE VALUE AT THE BOTTOM ROW OF THE [mathieu] COLUMN!

THE ***SECOND ROW*** SEEMS TO BE THE FASTEST WAY TO REACH A CONSTRAINT***

YOU ARE HERE!

R_3+8(R_2)

[thea]	[mathieu]	S_1	S_2	$	Constraints
1	0	1	0	0	3
0	1	0	1	0	2
0	0	8	8	1	↑↑ 370 ↑↑



***LOOK AT THE SECOND ROW'S VALUE IN THE [mathieu] COLUMN AND THE CONSTRAINT IN THE SECOND ROW. COMPARE THAT WITH THE FIRST ROW'S VALUE IN THE [mathieu] COLUMN AND THE CORRESPONDING CONSTRAINT IN THE FIRST ROW. WHAT DO YOU NOTICE?

SO...

3 CUPS OF COFFEE AND 3H OF SLEEP FOR THEA...

... AND 2 CUPS OF COFFEE AND 7H OF SLEEP FOR MATHIEU!

HOW LAME!!

HOW LEM.

SLAM

SIGH THAT (LI)NEARLY WORKED...

MEF Mathematics Endowment Fund

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ESSENTIAL ADD-ONS TO SURVIVE THE ZOMBIE APOCALYPSE

Now if you looked at that title and thought there would be fun advice for a legitimate, hypothetical zombie apocalypse in this article you'd be out of luck. However, if you thought of adding hundreds of mods that blur the line between hilarious irony and complete unplayability to a zombie horde shooter (Left 4 Dead 2) that came out in 2009? Oh boy do I have recommendations.

COACH'S VIOLENTLY LOUD FRIENDLY FIRE LINES WHEN HE GETS SHOT BY ANYONE

Simple but effective, this mod turns one of the survivor's friendly fire voice lines into ticking time bombs. Not only are these friendly fire lines loud, they are also extremely crunchy, base boosted, and slightly muffled. Not only has this mod destroyed my eardrums and sides multiples time, it has also unironically made me shoot my friends less for fear of accidentally hitting coach and setting off the force of a thousand dying suns. Highly recommend.

[XDR] TANK FORTNITE TAUNTS / TANK MODELS / FREE BIRD (TANK THEME)

I've combined three mods into one section because they work together amplify the pure chaos that ensues when fighting a tank. For the uninitiated, a tank is a big, strong special enemy which has a lot of health and does things like one shot survivors by throwing cars at them. It's a scary encounter that's kinda like fighting a zombie hulk. That being said, why not completely destroy any sense of seriousness this encounter normally brings by changing:

- The music that plays when fighting a tank to be Freebird on loop.
- The taunts it does to be a random assortment of Fortnite dances.
- The model of the tank, so you are being beaten to death by shrek, a giant gorilla, steve from Minecraft etc.

Notice I said the "seriousness" of the encounter, because I assure you it is still terrifying. You have not felt true fear when over half an hour into a mission you see a buff, rainbow Nijika from Bocchi the Rock flossing over the downed corpses of your friends while free bird is being blasted into your ears. Also highly recommend.

GENJI KATANA

This one is much more on the "not immensely disruptive" side but I've included it here because it's a genuinely high effort mod which I think is pretty cool. This mod just replaces the katana with Genji "I need healing" Overwatch's dragonblade ultimate ability. It comes with the entire animation and voice line every single time you pull out the weapon for maximum spam-ability.

[XDR] CALIFORNIA GIRLS + SOUND + FIXED

Another straightforward animation mod, this replaces the medkit healing animation with a hilariously unfitting animation of the survivors dancing to "California Girls" with music included. Chances are you'll be using the medkit a lot so you'll have to get used to you and your friends ripping out

the dance moves whenever there's a break in the action. Or alternatively, while you or your friends are getting mauled to death during an active zombie wave, which is even funnier in my opinion.

JOCKEY VERGIL CHAIR

This plastic lawn chair has had enough of being sat on and will now do the sitting. This mod replaces the jockey zombie (it jumps on you and beats you up) with a plastic lawn chair (it also jumps on you and beats you up but this time with lightning, edgy one liners spoken in a husky voice, and a sick theme song). An essential part of the experience is getting mounted by a lawn chair and getting shot multiple times because it is very difficult to shoot a gangly lawn chair that is squirming all over your face. Highly recommend.

For the sake of brevity, I'll stop here, but know there are tens of thousands of mods made over the years that have contributed to modded Left 4 Dead 2's reputation that it can accurately represent an intense fever dream. Keep modding and thanks for reading.

warrior1rules

A NEW ECONOMIC INDEX?

Forget stocks, forget cryptocurrencies, and definitely forget about the typical indicators of the economy, for I have something even more volatile than all of those. For that very reason, I think it will be fun to think about them in terms of an economic index itself. So, without further ado, I would like to introduce the Green Onion Index, or GOI.

Why use green onions? Sure, green onions may not be the most staple of food items, but they sure are versatile and can be used in just about every food, particularly as a garnish. I sprinkle that s*** on everything[1]. But I'm not here to write about the culinary side of green onions.

Green onion prices are absolutely wild when it comes to price fluctuations. But first, I want to cover some background information. Green onions are sold everywhere, but between supermarkets the prices will vary. However, even though the prices vary, I find that supermarkets which have cheaper green onions will always sell them cheaper regardless of any general price fluctuation. It seems that whatever affects these prices affects all stores equally. Because of this tendency, I am basing the price on the cheaper store.

At this store, the typical way green onion prices are listed is "N bundles for $1" for $N \geq 1$, where each unit is a bundle of some number of green onions. The size of each green onion bundle is stable, and so the prices change by changing N instead of the dollar amount. At least, that's what usually happens. Sometimes, when the prices really get worse, it will go down to 1 bundle for more than $1. The worst seen so far was 1 bundle for $2, which surprisingly didn't occur quite as much during the pandemic's start.

So that is what I'm considering as the index. It's N where N is the number of bundles of green onion per $1.

I'm not sure why it is that green onion prices vary so much. From one week to the next, I once even witnessed them going from 4 for $1 to 1 for $1.50 and then back up again to a cheaper price in another couple of weeks. What other consumer good goes through such a difference on a regular basis? Maybe gasoline. Those prices definitely do fluctuate but to a lesser degree.

Now, I'm no expert in farming, but locally, these price fluctuations must mean something, hence why its usage as an index could work. I'm pretty sure someone can find meaning in all these green onions. Although, I personally have a pretty easy way of getting a feel for inflation. Burger King sends my home a coupon sheet regularly every couple of months, and if you end up having a bunch of those steadily piling up in your home, you can track inflation with the prices shown in it. That, however, is an article topic for a different issue.

boldblazer

1. Please don't sue me, unspecified hot sauce brand.

FIXING YOUR RELATIONSHIP WITH YOUR FAMILY

A STEP-BY-STEP GUIDE

STEP 1: FIX YOUR RELATIONSHIP WITH YOUR MOTHER

take no action towards this whatsoever. get hospitalized for 3 weeks[1]. your mother is more understanding now :) if you see her trying, give her room to change. holding on to past grievances helps nobody and remember that change does not happen overnight.

STEP 2: FIX YOUR RELATIONSHIP WITH YOUR SIBLING

aka more fixing your relationship with your mother

so you resent your sibling. you've been compared to them your whole life and can't stop comparing yourself to them even when your parents stop directly comparing you two. you see them easily getting freedoms you wanted but were denied. you can't stand them for it. when you last tried fixing your relationship with your sibling, it started getting better, but she hurt you and you stopped trying.

so obviously, i didn't have the relationship with my sister where i could work through these issues with her. most of my resentment also doesn't stem from something she's done and it's not fair to unload this on her. however, thanks to step one i do have the relationship with my mother where she is now someone i talk to honestly and feel comfortable around.

before going home for the weekend, i asked my mother to get coffee with me so that we could talk. going to a public also lessened the chance of outbursts and gave us the privacy to talk away from family. we talked candidly about where we were both at emotionally at the times of my resentment. she acknowledged when she started noticing i was hurting and wanted to fix that. i got a better understanding of why my sister gets the freedoms she does. i'm less mad. already, i see my relationship with my sister improving. things are not as clouded by resentment and jealousy anymore.

this conversation with your parental figure(s) will not be a comfortable one, but if you can get your relationship with them to the point where you can talk to them comfortably, i highly recommend it. maybe you don't resent your siblings, but there's something else from your childhood or present that you're still upset about. talk through it with your parental figure(s). be open to considering where they're coming from. put yourself in their shoes. hearing their point of view can help way more than you'd think. my conversation with my mother was genuinely so therapeutic. we had never talked like this before and our relationship has grown through it.

STEP 3: FIX YOUR RELATIONSHIP WITH YOUR FATHER

lol idk how to do this. you tell me.

chick'n strip

1. don't actually do this. oftentimes changes made (if any are made at all) will not last. my mom is an outlier.

THE SQUARE FOOTAGE OF MY APARTMENT

Ventilate the apartment
3 fans isn't enough for one room
Does no one else feel like there's nothing left to breathe

I stick my head out the window so I can hold onto the small courtesy of not vaping indoors
I hit my head on the frame
This window will be blocked soon anyway

The door handle breaks, I cannot leave
I'm starting to feel like something bad is going to happen
Though I guess it already has

I haven't seen my roommate a lot
As of late
As of ever
I eat her food in the fridge and then replace it
I wonder if she notices that her limes never go bad

Turn on the yoga video, get halfway through
Tired
There's smoke everywhere today they said
Though I haven't gone outside in any way that matters
This reminds me of something

Visit me please, I worry you'll forget
I spend a lot of time in this palace for creatures that long moved away
Will you forgive the things I cannot control

Set my bedroom lights to Frog Mode
Put on thick covers so my dog can have AC
Another night, another dream

Look up to the dough boy and smile
Best workers in the world he says
Where are the fair wages you promised
Sucked dry by your friends once again perhaps
One plant dies, another lives
This isn't by accident

Rein Dreams

SELECTED EXCERPTS FROM THE WIKIPEDIA ARTICLE ON "NONE PIZZA WITH LEFT BEEF"

ALL OF THESE ARE REAL

- It has been described as a "corporate yet hilarious monstrosity",[1] a "perfect troll",[2] and a "monument to humanity's achievement and hubris".[2]
- On October 19, 2007, Steve Molaro performed an experiment to "test the limits of topping customization";[3]
- The post subsequently "went viral",[2]
- Necklaces of the pizza were available for purchase,[3] and the troll became a part of Tumblr "lore".[10]
- "Users will find ways to play games, to tell surprising truths, and invent combinations you cannot foresee".[14]
- Brian Feldman wrote in a 2017 *New York Magazine* retrospective that it was a "perfect troll": an absurd order that affects everyone it touches in some way. … Feldman posited that "we've become so focused on whether or not we can make None Pizza With Left Beef that we've forgotten to ask if we should."[2]

Dick Smithers

Author's Note: This article was written a month ago, for inclusion in issue 152.1. It was rejected twice by the editors for spacing purposes. It was based on an inside joke at that specific meeting. In retrospect, it wasn't even that funny at the time, let alone a month later. I am submitting it again anyways, entirely out of stubbornness. Thank you for your understanding.

NO CHICKEN DAY

Today, this first day of the CUMC, I independently conned myself out of *two* Fried Chicken Events. First, at a dumpling place, I failed to notice the fried chicken on the menu. Easy miss; it's a dumpling place, right? Fine. I'll live. But then, at the pub in the evening, I waited too long to get a plate of provided dinner. I went, and the chicken wings were all gone. Just a mountain of shitty flat-noodle vegan pasta and a few admittedly okay shrimp.

My heart is broken; I am inconsolable. At this point, how can I, in good conscience, call myself a voting member of the Central Committee of The Korean Fried Chicken Council? I wasn't even that hungry either time, but I failed myself nevertheless. Never again.

jeff

SEEN

I love feeling seen
Feeling known
Feeling loved

I love being surrounded by people
Who have spent an abnormal amount of time with me
Who have learned me

Because you know my quirks
My faults
My preferences

You give me the booth side of the table
Without question
When we go to Harvey's

Because you know I like to feel enclosed
You know it settles my restless hands
And my fluttering chest

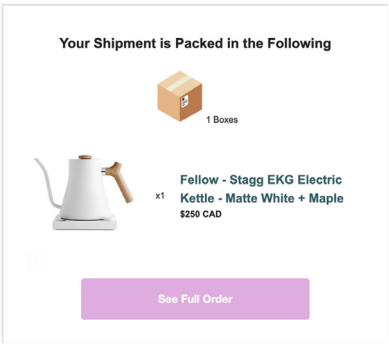
I know
The campus plaza isn't particularly poetic
But this matters more to me than grand gestures

Thank you for seeing me
Knowing me
Loving me

normalparameters

THE FIVE STAGES OF BUYING A VERY EXPENSIVE KETTLE

1. Hmm, my kettle's lid isn't closing.
2. Let's just get a cheap one so I can boil water again.
3. Wait. but this one looks really nice. Too bad it's way too expensive.
4. *PAYCHECK ARRIVES*
5.



UW Unprint

AN AVERAGE L4D2 RUN

OW2 COULD NEVER

You look up as the rescue helicopter flies over your head, cursing as your sole escape flies away, stranding you on the roof of the burning hospital. Realizing you need to make your way out somehow, you grab a sledgehammer, as well as an emergency rat. You look around at your fellow survivors as they do the same — Maya Fey picks up the glock, Coach is carrying his entire desktop setup, and Chuck from Angry Birds is carrying everything at once. You open the stairway doors and turn on your flashlight, and see nothing but Ram. Unfortunately, turning off the flashlight results in darkness, so red anime girl is all you see instead.

As you head down the stairs, you hear the horde — the undeniable screeching of the Pippas. Bashing your way through the horde, rainbow blood flying everywhere, you manage to find a Baron Bunny, and throw it to attract the horde as it blows up. Searching the now rabbit-free room, Maya Fey finds some hand sanitizer, as you find Walter White TV. After watching it with your friends, you continue to head down the hallway. Coach manages to find Genji's Katana as well as some pills, and constantly swaps to it screaming 竜神の剣を喰らえ. Having swapped to a pistol and holding it sideways to be cool (rotating Ram 90 degrees), you shoot Coach in an effort to get him to shut up. Unfortunately, this action causes him to yell **DO I LOOK LIKE A 10 FOOT TALL MONSTER TO YOU** at a volume several decibels louder than necessary, causing you to admit defeat. All of you use emergency rats while "We're the Rats" plays, which, combined with your impressive Gangnam Style moves, allow everyone to heal up and grab some spare rats.

Leaving the room, a loud *SHIA SURPRISE* is heard as Chuck gets pounced on by Kanna, who unleashes a 500 hit combo into him, causing him to be downed rapidly. Laughing at his misfortune, you fail to notice Cirno on a scooter ramming into you at max speed with rainbows trailing behind her as she screams "THY END IS NOW," the fear causing you to hear ORDER as she telekinetically slams you into the ground repeatedly. Once the other survivors help you two out, you notice Cirno Scooter refuses to fall over, and even in death stands upright — a monument inspiring fear upon those who gaze.

Going through more corridors, slaying more rabbits, hearing 'A' with every shot fired, and the occasional **ROCHELLE! YOU SHOT ME** (while wondering who Rochelle is), you end up nearing the elevators, hearing a soft *byeah*. Turning the corner, a boomer vomits in your face, causing all the horde to surround you as you frantically panic. Unfortunately, despite swinging Mudrock's hammer as much as you can, and hearing "Look at this wholesome moment" countless times, you are swarmed and downed. Unfaltering, you pull out your trusty dual pistols, reload them with a flip, and continue to fire, looking cool. Finally, the other survivors manage to clear the path to you, and resuscitate you. Joining the others in the elevator, you look back at the floor littered with pastel pink corpses, the walls covered in rainbow blood.

Some time later, you find yourself at the entrance to a convenience store, armed and willing to risk your life for Coca-Cola. Although Maya Fey was brutally mauled to death by Painis Cupcake, you managed to find an identical clone of her, armed with a shotgun and Luigi. Chuck has consistently gotten in the way of your shots, despite shooting far above the tiny feathered fiend, and is rather hurt, but nobody cares about Chuck. Coach is still gaming. Wielding W's grenade launcher, the four of us break down the door.

Immediately, alarms start blaring — Benjamin starts yelling *"Uh, Guys?"* repeatedly, the crunchiness of the audio causing your heart to sink as the Pipkins approach. Having set the floor on fire with TBH, Maya Fey suffers unfortunate immolation as Big Stewie manages to latch onto her with his rainbow tendrils, pulling her into the flames. The three of us eventually make it out, cola in hand. Leaving the store, you hear Suzaku yelling about solving violence the only way he knows how — with more violence! Despite your best efforts, the hotdog latches onto your head, causing you to drop the cola. Once Chuck manages to pull his weight and save you, you figure you may as well go all out, just this once, and pull out Pochita. Revving up the pooch, you hear the familiar intro to PekoRap, devolving into yet another rabbit screaming as you tear through screaming rabbits, Ram staring back the entire time.

The grueling fight ends and the cola is delivered to the arms dealer; the safe house is finally in sight, beneath the billboard exclaiming to Make Trump Great Again. Only Coach remains, his superior gaming skills clearly aiding his survival. As he turns the corner, his heart stops as Free Bird blares loudly. Coach turns to run, desperate to escape "the gorilla" — but escape is futile. Bocchi the Blob manages to throw Petah Griffin at Coach, causing him to fall over and stumble. The yabbits, smelling blood in the metaphorical waters of the parking lot, surround him and destroy his gaming system, the composition of various pinks being the last thing he sees. We never reached the safe room, visions of Jaden Smith tweets never entered our eyes, and our ears never heard the relieving jingle of Fortnite Default Dance.

PlatypusGod

Any other accounts of the zombie apocalypse are made by the delusional, this is the only truth.

I love games! They're comfy and easy to play!

A PRO GAMER mathNEWS EDITOR

BIPED GIVES BELATED THANKS

Thank you, enamourED. I know you got thanked for this already, but the layout system you made is world-changing. Thanks also for being my partner on the "prod night outreach" team, and thanks for being the person who actually did most of the outreach while I fiddled with the document camera.

Thank you, god⚡peED. We did a lot of fieldwork together. Thanks for scanning all those books, especially when we screwed up the USB transfer and had to re-scan like 100 pages. I think when you go and use these kinds of machines, it wouldn't be right for everything to go well the first time. Thank you for finding that 3D model, and for making me follow through.

Thank you, terrifiED, for always keeping the ship together. I don't think you receive enough appreciation for your work. I feel like, and maybe I'm wrong here, but I feel like **mathNEWS** history is recorded pretty much only in these pages, and that everything else fades away almost immediately. I guess that's part of the appeal; getting to peek through the cracks and guess at what all these people must have been like. But isn't that sad, for us who are living right now? For the editors who've done so much behind the scenes?

Really, I guess the thing I'm most afraid of is *me* forgetting these things. I'm not very good at keeping a journal. Writing this, I'm realizing that I have only the faintest notion of what went on in the four-ish terms I've been here for. Like, I can barely remember which issues I've laid out, and I spent hours on those. Everything disappears so fast! At the very least, thanks for updating the website so that I no longer have to live in fear of pressing that big red button.

Thank you, caffeinatED. I think you're a person who can make a Prod Night more approachable and friendly just by being there. Well, I shouldn't put it that way. I think you put in a lot of effort to do that, and that sort of effort is the kind that is hardest to notice. It's not a tangible impact, it's not something you can write down and record without great effort. But I think the intangible impacts are the ones that are the most important. Thanks for talking to all sorts of people with your all. I owe you a lot.

Thank you, clarifiED. Thanks for drawing all those covers. I honestly don't know how much appreciation you get for being responsible for like 40% of **mathNEWS**'s readership. People talk about the **profQUOTES** being the only reason why they read **mathNEWS**, but isn't the cover even more important than that? I should put together a top-10. I think my favourite is that one with the three geese all twisting around and hissing, in S21. Thanks for many other things, also. I owe you a lot too.

Thank you, uknightED. I hope this doesn't come across as backhanded, but thank you for not getting totally sucked into the life of being an editor. I think **mathNEWS** editors tend to take their job too seriously sometimes. I think if you weren't around, things wouldn't run as smoothly; you have the right attitude towards this job, and I at least need to be reminded of that. Thank you for always writing really good **mastHEAD**s; it's a rare skill.

Thank you awED, distractED, evaluatED, and gildED. I'm bunching you all together because I admittedly haven't worked with you much. Thanks for carrying the torch. Of course, thanks to evaluatED and distractED for putting together the wonderful 50th anniversary volume.

I remember the last time I wrote an article like this: it was a few terms before the anniversary. I was kind of sad when I wrote it, which you could probably tell. I was very worried about the past, and about the future. I was basically saying: "What's the point of celebrating if nothing is going to be left behind, if everything will undoubtedly change, if it will all get forgotten?"

I really liked the interviews with past editors last volume, but they made me think of these worries again. No matter how much exhaustive detail you go into, you can't capture exactly what it was like: I was reminded of that over and over again, reading those articles.

But it doesn't matter. What's gone is gone, what happened happened. I've been thinking about it, and in the end I realized that I shouldn't really worry about people in the past, or about people in the future: they can handle themselves. Thank you to everyone who's here now.

bipED

IT IS OVER!

Convocation is all done, and congratulations to everyone! We can all take a well-needed rest now. Although, I must say that they made the paper size of the diplomas you receive really big but just small enough to fit inside your typical suitcase for checked luggage. They really need to add to the convocation checklist that you need to bring a suitcase large enough with you to Waterloo if you are flying in. It'll be even more of a necessity if you decide to buy and take a frame back with you. Have you seen those? They are massive! I have no idea if UW just made this stuff larger for some reason or if every university does this.

boldblazer

A blackBOX a day keeps whitespace away.

A HEALTHY mathNEWS EDITOR

N THINGS I SHOULDN'T KEEP IN MY PHONE CASE, EVEN THOUGH THEY'RE ARGUABLY USEFUL

BECAUSE LOSING YOUR WHOLE PHONE IS NOT FUN....

- My WatCard
- ANY bank cards
- Bus passes (Presto, GRT, etc.)
- A complete list of all my medications and health conditions
- Shopping rewards cards (Optimum, Air Miles, etc.)
- My fortune from a cookie (even though good luck charms help sometimes)
- Driver's license
- Health card
- CAA Membership
- My appointment card with the contact information and date of my next counselling appointment (I will never remember it now LOL)
- My sanity (I can't read my comics now or remember where to get counselling nooooooooooo……+50 depression points for me)

Update: N hours after writing this article, a kind human turned in my phone to lost and found. It was a huge relief.

A Mediocre Kitty

SKIPPING STONES

Skipping stones: The art of throwing disc-shaped stones found on a rocky beach into the water, with the intent to make them bounce off the water, in large bounces at first, bouncing increasingly fast before inevitably sinking below the surface.

I've never been very good at skipping stones.

My dad and I both love water. When my family goes on vacation, the two of us will almost always find a way, individually or together, towards a riverside, lakefront, or ocean beach. When I was very young, he showed me how to skip stones. How to seek out the right stone, to reflect off the watery surface with every contact. How to angle your throw, such that at every contact, the water pushes back up on the stone at the perfect angle to send it soaring into the air again. How to launch your stone with enough power that it can bounce off the water, again, and again, and again.

But he's had more experience. He grew up on the Gaspésian coast, with nothing but time to perfect the art of angling a stone to launch back up again after every fall. He's had years and years more time to perfect his art, to identify precisely the right stone, at precisely the right angles, so practiced at launching these stones, it has become second nature. I grew up near water, but never appreciated it until the isolated years when there was nowhere else to go. I've had time to get better, but not the time to become naturally gifted in throwing the right stones.

I think maybe I always figured that I'd always live nearby, and that he would always throw the stones, and I could watch, and that would be enough. I don't think I realized how much stress it took to get stone skipping right. To set oneself up so that every time you glance off the bottom, you're ready to soar into the air again.

This is what we do, every term, every time we leave home, returning to this town. We are the skipped stones we throw time and again, praying that we'll skip to the opposite riverbank, praying that we don't sink below, drained and burnt out.

the riverbank is awfully far away

and the bounces are growing

much closer

together.

i'm afraid

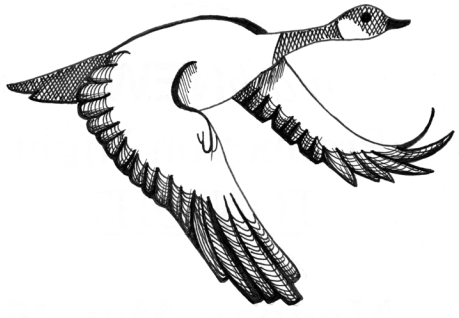
that i'm running out

of bounces

this

time.

molasses



GRID. WORD.

gridCOMMENT *152.3*

yippie!!! new **gridWORD**!!! i once again am proud of all my little gridlings and their attempts at the **gridWORD** :oooo

i asked you last time, "what, if anything, do you desire most?", to which those who had solved the **gridWORD** had said:

- Mr. Goose: *Mrs. Goose*
- MJ: *iced coffee*
- normalparameters: *refreshing drink on a hot day, or my loved ones*
- awmlet: *love and also insanely fat wads of cash*
- dommymommy6: *the girl reading this ;)*
- Scatterbrain: *when a new edition of* **mathNEWS** *pops up in the hallowed halls of MC <3*
- spaghettiinhalers: *the release of a new* **gridWORD***!!!!!!!*

we certainly love a good **gridQUESTION**, because someone lucky gets a CnD gift card, which this time i shall gift to dommymommy6 for their great name (sorry that i am not a girl tho :v). please drop by MC 3030 (**mathNEWS** office) to pick up your prize when you can!! :ooo

i saw a video of a cat pissing all over the floor, so in honour of that video this **gridWORD** is quite **pissy** (i am sorry). this time i ask, "who want lasagna?"

please send **gridWORD** solution, **gridQUESTION** answer and pseudonym to mathnews@gmail.com by july 3rd at 6pm :000

掰掰

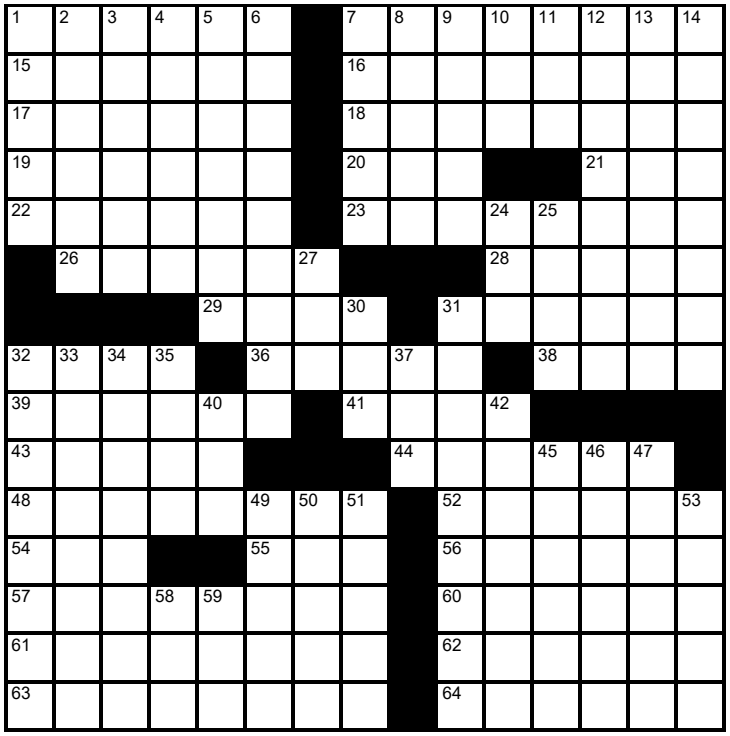
Wink wonk

ACROSS

1. Tee-hee
7. Church features
15. Conceive
16. Most intoxicating
17. Dislikes (in the bathroom)*
18. Speak with gravity
19. Belong
20. **gridWORD** theme
21. Doctor's charge
22. Breastbones
23. Northernlion (bald), e.g
26. Kind of seat
28. You've just been ____d!!!
29. Favor one side?
31. Place for beer
32. ___ room
36. Hospital cry
38. Combines
39. On track?
41. Not theirs
43. Ancient Greek marketplace
44. European subways
48. Salt containing chromium
52. In need of repair
54. Mauna ___ (Hawaiian volcano)
55. Fan setting
56. Live
57. City dweller
60. Melodic
61. Traffic-cop's command
62. More rigid
63. Driving hazards (because they need to use the bathroom)*
64. Trimming tools

DOWN

1. Conical tents
2. Short sequences shown on television between programmes to identify the channels
3. Michael Jackson
4. Alehouse
5. Going on and on
6. Equipping new seats
7. Harbor sights
8. Doctrine
9. Fast finisher?
10. Old Tokyo
11. A.T.M. need
12. Decomposed leaves
13. Prized
14. Helmsmen
24. "I" problem
25. Dwarf buffalo
27. Australian runner
30. Debate position
31. Ponder
32. Very funny jokes
33. Bigwig
34. Cute
35. Novice
37. Total
40. Vet's memory, maybe
42. Guided
45. Completely destroying
46. Good-for-nothing
47. Soap opera, informally
49. Not dead
50. Schlepper
51. Decorative pitchers
53. Friends at the urinal*
58. Amber, e.g.
59. Affirmative action



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

A PERPETUALLY BORED mathNEWS EDITOR

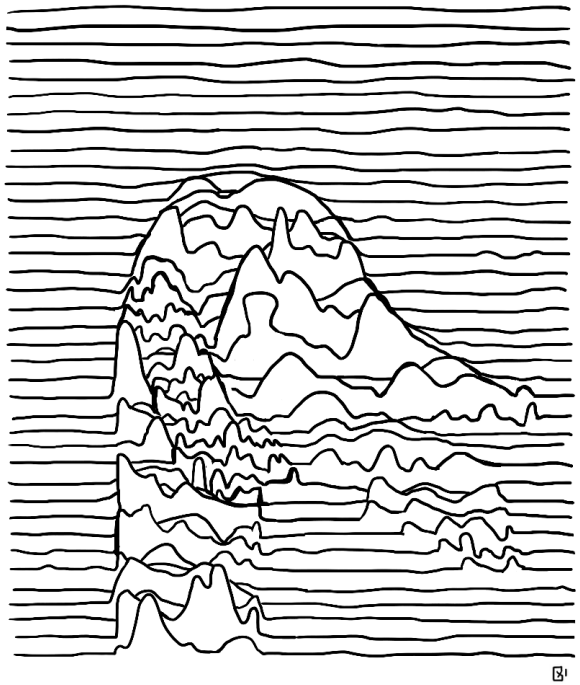
lookAHEAD

SUN JUN 25	MON JUN 26	TUE JUN 27	WED JUN 28	THU JUN 29	FRI JUN 30	SAT JUL 1
	Cycle #2 interviews begin	Cycle #2 posting #2 applications due			Last day to select an examination centre or submit a proctor for online course exams	Canada Day

SUN JUL 2	MON JUL 3	TUE JUL 4	WED JUL 5	THU JUL 6	FRI JUL 7	SAT JUL 8
Crossword Compiler Appreciation Day	Canada Day long weekend, no classes **mathNEWS** 152.4 Production Night	Independence Day (regional holiday celebrated in the United States of America)			**mathNEWS** 152.4 published Cycle #2 interviews end	

LAST ISSUE'S gridSOLUTION

1 A	2 S	3 A	4 P	■	5 H	6 E	7 A	8 P	■	■	9 B	10 A	11 T	12 S
13 D	A	M	E	■	14 O	G	L	E	■	15 S	A	L	O	N
16 A	M	O	S	■	17 T	O	G	A	■	18 E	C	O	L	I
19 M	O	R	T	20 A	L	S	I	N	■	21 A	T	E	U	P
22 S	A	T	O	R	I	■	23 N	U	24 R	S	E	■	■	■
■	■	■	■	25 E	N	26 D	■	27 T	E	A	R	28 O	29 S	30 E
31 L	32 I	33 N	34 K	■	35 K	I	36 T	■	37 S	L	I	N	K	Y
38 O	N	A	I	39 R	■	40 P	A	41 W	■	42 T	U	T	E	E
43 S	O	R	B	E	44 T	■	45 D	R	46 Y	■	47 M	O	W	S
48 E	N	C	O	D	E	49 R	■	50 Y	O	51 U	■	■	■	■
■	■	■	■	52 S	N	E	E	53 R	■	54 U	P	55 L	56 I	57 N	58 K
59 N	60 I	61 C	H	E	■	62 C	O	63 U	N	S	E	L	O	R
64 E	T	H	I	C	■	65 T	U	R	K	■	66 A	L	S	O
67 B	L	I	N	K	■	68 O	G	E	E	■	69 S	E	E	N
70 S	L	A	G	■	■	71 R	E	A	R	■	72 E	R	S	E



Have something you want to publish in mathNEWS?

Drop it off in the mathNEWS blackBOX by the C&D or send it to us at mathNEWS@gmail.com!

A mathNEWS EDITOR WHO CRAVES MORE WORK