mathNEWS
VOLUME 142 • ISSUE 3
FEBRUARY 14TH, 2020

LET'S GO ON A HONEYMOON

Valentine's Day 2020
Gift Guide

Celebrate the holiday with a gift that you and your loved one will truly adore, courtesy of all of us at **mathNEWS.**

1 **MATHNEWS** VINTAGE COTTON TWILL CAP **$21**
2 **MATHNEWS** ENGRAVED SILVER HEART NECKLACE **$10π + $2**
3 **MATHNEWS** BIKINI **$(10e + 3) ÷ 0.75**
4 **BLACKBOX** THROW PILLOW **$7 x $3**
5 **UPSILON PLEASURES** UNISEX HOODIE **$$\sum_{i=2}^{7} i$**
6 **MATHNEWS** BEANBAG CHAIR **9626¢**

store.aopal.dev

9 770705 041004

mastHEAD

"HOW WOULD YOU CONVINCE THE FACULTY TO STOP SCHEDULING MIDTERMS DURING PRODUCTION NIGHT?"

mathNEWS hat!

mathNEWS hat. **mathNEWS** hat **mathNEWS** hat. **mathNEWS** hat, **mathNEWS** hat **mathNEWS** hat **mathNEWS** hat (**mathNEWS** hat).

mathNEWS hat? **mathNEWS** hat **mathNEWS** hat, **mathNEWS** hat **mathNEWS** hat **mathNEWS** hat **mathNEWS** hat: **mathNEWS** hat.

(Translation: **mathNEWS** hat!

So. **mathNEWS** hats are here. From now on, you can buy them from the **mathNEWS** office (as stock allows).

Other merch? We will have all that soon, but in the meanwhile make sure to check out the ultimate form of **mathNEWS** merch: **mathNEWS** hat.)

itorED
Editor, **mathNEWS**

DERIVING FOR DICK	Show them videos of pizza-deprived first years.
SANDWICH EXPERT	I wouldn't. I would campaign for **mathNEWS** writers to be excused from exams with 100%!
WATER	Bribe them with free **mathNEWS** bikinis. Also, threaten to hold a bonfire on the roof of MC with all of the **mathNEWS** back issues.
mathNEWS-CHAN'S MANAGER	Stuff them with pizza 'til they physically can't decline.
WALDO@<3.LE-GASP.CA	Make writing for **mathNEWS** a communications requirement. Bonus points if they write *actual* math as though it were going to be read by their 3-year-old cousin.
PIKACHU.EXE	MATH 666: **mathNEWS** writing. Has a "lecture" every two weeks and thus forces the system to be unable to schedule a conflict. Grades are given based on how many times said student wrote an article in a "lecture," and the profs are the editors.
ITSH	Thanos snap.
ALYSSNYAH	The answer is 4.
SWINDLED	Pose a **mastHEAD** question about it, and wait for the profs who are reading this to make it happen of their own initiative, because they love **mathNEWS** that much ♥
TERRIFIED	Grant writers academic credit to create course conflicts on Quest.
ITORED	**mathNEWS** hat.
CONFUSED	All present and future editors must pursue doctorates for their respective fields, become professors, then not schedule any midterms during production night.

ARTICLE OF THE ISSUE

This week's article of the issue goes to cy for *Everyone Jaywalks in Boston*. **mathNEWS** gets a lot of good comedic articles, but articles that are eloquently written and genuinely thought provoking are fewer and farther between.

Don't forget to stop by the **mathNEWS** office in MC 3030 to pick up your prize!

swindlED
Editor, **mathNEWS**

mathNEWS hat. mathNEWS hat. mathNEWS hat.

MIN ZHU, mathNEWS EDITOR FOR WINTER 2020
ALONG WITH JAMIE ANDERSON, TERRY CHEN AND ANUJ OPAL

mathASKS 142.3

FEATURING PROF. SAMUEL WONG

WHILD: RATE [TERRRIFIED'S] PERFORMANCE ON A SCALE OF 0–17.

Before answering the question I should point out that is rather unusual to use a 17-point response scale. Survey respondents in particular might get confused by such a finely graded scale, as we might not have enough vocabulary to properly describe the differences between such fine gradations. For example, one might be left wondering, does 17 mean that terrifiED is "flawlessly awesome", while 9 means that he is only "ever so slightly above mediocre"? With that said, of course terrifiED gets a ⅝ for professionally handling my near-delinquent submission!

BEYOND META: WHAT IS THE MOST WHIMSICAL SAMPLING METHOD YOU CAN THINK OF?

Snowball sampling. (And no, that does not mean trying out different snowballs to throw while it's still winter!) In a completely hypothetical example, suppose **mathNEWS** was really unpopular and you wanted to find out characteristics of its readers (without asking in **mathNEWS** itself, as that would be Beyond Meta). If you could just start with finding a few people who read **mathNEWS**, you ask them some questions, and then request that they each find a few more respondents among their acquaintances. The reason this (sort of) works is that it gets at the idea that members of a 'rare' group are more likely to know other people who also belong to that group.

WALDO@<3.LE-GASP.CA: DO YOU THINK UWATERLOO COULD WIN A MEME WAR AGAINST HARVARD? WHAT WOULD YOU SAY THE ODDS OF THAT ARE?

Has anyone ever had their UW offer of admission rescinded because of memes they made? Hopefully not (or at least I couldn't find any news of this)! In contrast, there was a widely publicized instance in 2017 where at least ten students who received acceptances from Harvard actually had their offers rescinded for posting obscene memes to a certain Facebook group. So I think this may be a case where Harvard may have won the battle but lost the war against UWaterloo memers.

ITSH: SOME REAL LIFE FORESTS ACT AS ONE LIFE FORM. IS THERE ANY EQUIVALENT IN COMPUTATIONAL FORESTRY?

That's getting a bit philosophical as to what constitutes a 'life form', but I presume you mean that a forested region can act as a sort of ecosystem which is composed of self-regulating, interacting parts that make up a sustainable whole. One broad approach to solving computational problems is via simulation: so we could simulate random samples of lumber boards, then the random trees from which they came, and finally the random forests (pun intended, for any of you who've studied machine learning). Perhaps eventually the models will be sophisticated enough to capture detailed inner workings and interactions within a forest.

PUFFERFISH: HOW DO YOU LIKE VANCOUVER?

Vancouver was a beautiful city to grow up in! Many reasons why "Vancouver > Waterloo" have already been previously eloquently articulated on the pages of **mathNEWS** (see p. 13 of issue 140.5). Ironically: trees, which has been a major theme of this **mathASKS**, was a major theme in that piece as well. And yes, I do appreciate the many trees in Vancouver. So here is my modest proposal: let's pick up the UWaterloo campus and move it to Vancouver.

XX_420SONICFAN68_XX: HOW MANY TREES ARE IN A FOREST? (ON AVERAGE)

The answer is conceptually simple at least: count the total number of trees on the planet and divide by the total number of forests. Where it gets tricky, of course, is figuring out how to estimate the total number of trees (which could be done using some survey sampling approach), and what exactly defines a forest (e.g., in terms of tree cover percentage and/or other attributes, which I'll leave to domain experts in forestry).

SANDWICH EXPERT: WHAT IS COMPUTATIONAL FORESTRY?

It's a cool-sounding term we used in one of our research papers. But OK, generally, when we say "computational (insert subject here)", it means developing computational methods and algorithms to study that subject. In the case of forestry, one example of a modern development is the high-resolution images we can now obtain by scanning trees and lumber in realtime. To learn from these new sources of data, we collaborate with experts in the field to build new models and predictive tools, for things like the strength and reliability of lumber when used in construction.

SWINDLED: WHAT'S THE BEST OC MEME YOU'VE EVER MADE?

I must admit I had fairly limited experience with memes prior to coming to UW. But when I was in grad school, the "What People Think I Do / What I Really Do" meme was going around. At that point I didn't see one about statisticians yet (especially for those of us on the more computational side of the spectrum), so I took a break from futilely trying to debug code, to slap one together. Of course, I used the "What I Really Do" panel for a screenshot of the code that I was struggling with…

TERRIFIED: WHAT'S THE BEST MEME YOU'VE SEEN YOUR STUDENTS SUBMIT?

Ah, so I should mention that I do believe that memes can potentially be a useful educational tool. On that note, I've seen a lot of great submissions, e.g., several students used memes to sort out the differences between experimental designs that could be easy to mix up conceptually!

YEE: CAN WE USE COMPUTATIONAL FORESTRY TO STOP CLIMATE CHANGE?

Strictly speaking, there is no way at all to stop the kind of variability in climate that is natural from year-to-year – so I assume you are asking about the current trends seen in climate data. But no. On the other hand, models from computational forestry could be used to assess some practical effects of climate change on things like the properties and quality of wood – that's why there are long-term monitoring programs in place to keep an eye out on the health of our forests by regular data collection. In doing so, it's also important to robustly account for uncertainty around any climate predictions and clearly state assumptions that go into modeling. That's why statisticians tend to be careful about drawing conclusions, and that's why we get you to construct confidence intervals in our classes – to get an idea of the entire plausible range of outcomes!

PIKACHU.EXE: WHAT IS YOUR OPINION ON THE RISE OF A.I. AND HOW IT IS SPECULATED THAT THEY WILL TAKE OVER MATHEMATICS RESEARCH SOME DAY?

Certainly, what we colloquially call A.I. has managed some resounding breakthroughs in recent memory. As just a few examples, we've seen these coming from Google's DeepMind team alone: AlphaGo, AlphaZero, and AlphaFold. All of these beat humans and existing programs in convincing fashion – for Go, chess, and even the ever-elusive protein folding problem – by leveraging some version of deep reinforcement learning. (As a statistician working in the area of protein structure prediction, it was indeed remarkable that DeepMind, in the matter of a year or two, had leapfrogged research labs with massive teams that had been working on this problem for decades.) To put things into perspective though, I believe there are many research problems that will continue to be better catered to human intelligence (H.I.) rather than artificial intelligence (A.I.). So, one potential challenge for mathematical researchers might be to find and focus on problems that reward H.I. via things like insight and creative thinking, more so than problems that can be solved via brute-force computation.

PSYKARP: HAVE YOU EVER PLAYED CLUB PENGUIN?

I had to look that up on Wikipedia, so no. Does that suggest I'm getting old?

OLDA: HOW LATE DO YOU THINK THE DC TIMS SHOULD STAY OPEN?

I have only rarely gotten anything the DC Tims since it re-opened – there seems to be a long line whenever I walk by! Of course, the proper statistical way to solve the problem is a carefully designed experiment: the DC Tims should try a variety of closing times, randomly assigned to different days. Then using the average amounts of sales as a surrogate for demand, determine the optimal time until which it should stay open.

πLLOW PRINCESS: WHERE IS YOUR FAVOURITE BATHROOM ON CAMPUS?

M3, of course. Which other university can lay claim to having a Stats/ActSci department with its own building, and even more so, having one of the nicer buildings on campus?

DRAGONICKHAOS: HOW'S YOUR DAY GOING?

Great, thanks. It's been quite a relaxing evening fielding your questions.

MATH MAJORS AS NON-MATH MAJORS

Act Sci – ARBUS

Applied Math – Mathematical Physics

C&O – Planning

CFM – Mechatronics Engineering

Computational Math – Recreation and Leisure Studies

CS – AFM

CS/BBA – Music

Data Science – Aviation

FARM – Management Engineering

Math/BBA – Materials and Nanosciences

Math/Business – Human Resources Management

Math/CPA – Biotech/CPA

Math Finance – Kinesiology

Math Physics – Physics and Astronomy

Mathematical Studies – GBDA

Math/Teaching – Social Development Studies

Pure Math – Psychology

Software Engineering – Knowledge Integration

Statistics – Human Resources Management

Undeclared – General Science

Deriving for Dick

CYBERPUNK 2077 DELAYED RELEASE

It's with great sadness that we must hear about the release of such a highly anticipated game being delayed for months. However, sometimes news like this crosses our feeds, and we just have to be prepared for it. This was the case for CD Projekt Red's upcoming hit 'Cyberpunk 2077'. Originally scheduled to be released April 16, the company recently sent out a short statement in which they informed us that the release had to be delayed, and the game won't be hitting the market until as late as September 17. There goes my summer plans.

The in-the-moment update of the game's delay was unfortunately quite vague, however I had the courtesy to reach out to the game's lead designer, Konrad Tomaszkiewicz. "The game's delay is very unfortunate, however we believe it's a crucial part in the design of the game" he said. "There are some pieces of the design process that cannot be rushed. Like, you guys remember when MGSV was delayed, nobody really minded there either. That game turned out fantastic." I inquired more into the reasoning of the delay, however Konrad was reluctant and avoided the question with more examples. "Final Fantasy! Diablo! Kingdom Hearts, all have some pretty tragic delays of their own which weren't explained in depth!"

The conversation continued along this stream for several minutes. After a slight bathroom break (he may have cried in the bathroom), he came clean for the reasoning of the delay. "We needed an additional few months to refine the physics models on the characters. Because now that everything is in high-definition that's ALL you people care about. It's all innuendos with you heathens, I swear. I've seen it happening. What did everyone care about in MGS; Phantom Pain? It was the naked chick, Quiet. And in Skyrim, how many mods are there, SPECIFICALLY for boobs? Dozens? Why do you think Witcher 3 was so successful? We added a bajillion people for you to have sex with, that's why."

I attempted to calm Konrad down, to no avail. "We needed jiggle physics because tits are the only thing 70% of the players are gonna be looking at anyway. You think Sakurai wanted to add Bayonetta to Smash Bros? No, the synergy isn't there. But she's hot, so they added her anyway. Don't act like it's not true!"

After another brief intermission, where Konrad may or may not have done coke in our studio bathroom, he returned with a much more elated mood. "We also needed a bit more time to integrate some additional core features, not that anyone wants to hear about that garbage. Want to hear me count to 1000?"

This concluded the interview with Lead Designer, Konrad Tomaszkiewicz. You can look forward to seeing Cyberpunk 2077 available for purchase September 17, with an expansive multiplayer update currently scheduled early in 2022.

Fruitboy

A STUDENT'S QUEST FOR SPICY FOOD

Ever since coming to Waterloo I have craved spicy food. I have craved that feeling of heat in my food, that feeling of my tongue on fire, that feeling of my stomach developing an ulcer. In first year at Village 1, I was denied spiciness for 8 months straight. Not a single meal was spicy and the ones that claimed to be did not merit a single pepper rating.

I was highly disappointed by the spiciness of this university, but I persevered and decided to continue onto second year, giving it an extra chance. This time, I left the cafeterias and tried out the restaurants of Waterloo. Every time I ate out, I would look at the menu for the meals that had peppers next to their names. I would choose the ones with the highest pepper ratings, nervous about the regrets my tongue would soon feel. Unfortunately, these regrets never materialized. Even an Indian restaurant turned out to be mild, shaking my faith in the restaurants of Waterloo. Based on the sample of meals I had in Waterloo, I statistically conclude that no meal in Waterloo is spicy. And the pepper ratings were likely bell pepper ratings and are just there to trick those who seek spice. I have reported these fake stats and ask you to also report any false pepper ratings to the food inspectors of Waterloo.

And so, I decided to leave Waterloo entirely to continue my Quest. I believe it was my fault to search for spiciness in Canadian cuisine in the first place. Hence, I flew to China, to a city called Markham, to seek spiciness in asian cuisine. To pay for my stay here, I also decided to get a co-op here.

But sadly, I must report that I have yet to find spice here as well. The pepper rating seems to follow the same bell pepper rating used at Waterloo. Even requesting “Extra spicy” at a restaurant only resulted in extra disappointment.

But this has just been my first month, and I have three more months to find what I seek. Even better, I have a lead. My coworkers have talked about a noodle restaurant that serves homemade chili sauce so spicy that they post warnings about this sauce on the walls. I will go there and confirm these warnings myself. I will pour the whole jar of sauce to ensure I finally seize this rumored spiciness. And for all the spice seekers, I will report back—will it be a mecca of spice? Or another restaurant that deserves to be exposed?

license2derive

Hmm, well let's pretend this is right.

PROF. IAN MUNRO

ON DISCOVERING KNOWLEDGE FROM UNCERTAINTY

profTHOUGHTS *142.3*

In a broad sense, much of the work that is being done in statistics and data science is concerned with quantifying and reducing uncertainty about some aspect of the world. What I find to be most satisfying about data science research is being able to choose which aspects of the world to study – or in the words of the famous statistician John Tukey, "to play in everyone's backyard". For me, the scientific areas that I currently have a keen interest in are protein folding (which hearkens back to my days in grad school, more on that later), modeling biological systems in cells (an area I delved into during my last job), and assessing forest products (that's my home province connection – BC exports a lot of wood!). I've even done a fun project on quantifying musical differences between Haydn and Mozart's string quartets (on the surface, the two composers sound pretty similar!).

The only requirement, of course, is that the problems we study have generated sufficient data to guide our investigations. In our so-called "big data" era, this is increasingly conceivable – and sometimes, the challenge becomes how to handle these large and complex datasets! But what's the intuition behind why it's helpful to have more data? If the process we're observing is completely deterministic, then we gain little or no new information from seeing more cases or repeating experiments (this would be like saying your GPA is always going to equal 2 times the number of hours you study a week. Side note: how much would you study if that was true?). In contrast, it's when there is apparent randomness in the process that we stand to learn the most from data. That is when data scientists can find meaningful patterns and regularities from outcomes that are seemingly random, often by using probability models.

To give a simple illustration, suppose you found a unique goose-shaped coin in the basement of MC and you don't know how often it will come up heads when you flip it. To solve the problem, most likely you would start… flipping it. The outcome of each flip is random, but the total number of heads (H) or tails (T) you observe would start to give you an idea of how often you get heads. Now, if you flipped 10 times and got 7 H and 3 T, you might say that's a reasonable outcome for a 50% coin (Stat majors should pause to calculate a p-value here). But if you got to 10000 flips and saw 7000 H and 3000 T, you would likely conclude that a 70% chance of heads is much more plausible than 50% (Stat majors should calculate another p-value here and also recognize that 0.7 is your maximum likelihood estimate for the binomial probability). In other words, we discovered knowledge about the coin by observing its uncertain outcomes.

Evidently, few things in life follow such simple probability models. To continue the GPA example, we know that putting in the required hours is, at best, only correlated with academic performance. But from experience, we recognize there is sufficient correlation to justify going through the grind of university education. Borrowing from the coin example, we are likewise learning how to best use our time and efforts based on our outcomes (data) from previous tests and classes. Then again, what about your roommate who seems to put in only minimal effort but aces all the exams? (In Stat terms, he/she might be an outlier.) Indeed, outcomes at the level of an individual are much harder to predict than overall for a group. (I might predict with some accuracy the class average of the STAT 332 midterm, but I wouldn't have much success predicting individual scores.) You and I are certainly not the first to observe this phenomenon, that humanity is full of individual exceptions to general patterns. King Solomon, said to be one of the wisest kings in Jewish history, put it this way nearly 3000 years ago: "Again I saw that under the sun the race is not to the swift, nor the battle to the strong, nor bread to the wise, nor riches to the intelligent, nor favor to those with knowledge, but time and chance happen to them all." (Ecclesiastes 9:11)

Yet here we are, as individual people trying to make the best of the time, abilities, and resources we have, while not quite knowing how tomorrow till turn out. And some days we may feel like a victim to "time and chance" (whether in a positive or negative way). So let me go back to pick up on the story of grad school and protein folding. I was fortunate to have several research experiences as an undergrad (and thankful to this day for these professors and supervisors who gave me opportunities to assist in projects and learn what it's like to be a researcher!). I was particularly inspired by seeing how statistical methods could play a significant role in helping solve real-world scientific problems (my first ever project was fitting extreme-value models to wave heights generated by hurricanes, and our results were later integrated into software used by Canadian hurricane forecasters, which was pretty cool). Feeling motivated to do more of this kind of research work (and needing to be equipped with much in-depth statistical training to tackle harder problems), I began the journey of pursuing a PhD.

I had previously heard at one point the (half)-jokes that PhD could be an acronym for a number of things – among them would include Piled Higher & Deeper, and Permanent Head Damage. (You may ask our current Stat grad students in the S.A.D. club as to whether there is any kernel of truth to these.) So on the road to the PhD, the first few terms had a certain familiarity to it – in the sense of taking classes, doing projects, and writing exams (though the courses were definitely harder,

and the classmates around me were really smart!). And my point here is that going through classes had at least some predictability to it – I would put in the study and effort to get the results. After the required classes are done, PhD students transition to what is essentially full-time research on a thesis topic (besides working as a TA). And that's when I realized those acronyms were no longer just a joke.

After discussions with my PhD advisor, I decided to place a major research focus on a class of problems within protein folding (i.e., how to predict the 3-D structure of a protein from its amino acid sequence), to investigate how developing new sampling algorithms could help build more accurate predictions. It was, and still is, a really neat topic, but it was just really hard. As a disclaimer, some PhD projects go splendidly well and smoothly (and kudos to you!). But many of us struggle through long, rough stretches during the process. And in actuality, whether research goes smoothly or not, isn't strongly tied to how smart you are! (Again that Solomon quote comes to mind.) In fact, it isn't necessarily strongly correlated with the effort and hours you put in either!

What I mean by that: it is possible to spend the majority of one's waking hours on the thesis topic (which I did as a PhD student), over a period of weeks or even months, and make zero progress (experiments may fail, seemingly promising ideas don't actually go anywhere). I had a stretch like that for several months, and it was… rather depressing. Compared to before, the correlation between effort and results was now down to zero – and Statistics (as the study of uncertainty) couldn't help with the waves of uncertainty and doubt I was facing about my research future! But amidst this kind of uncertainty, as the title suggests, I also ended up gaining valuable knowledge in the form of life lessons. I learned that we need to remember that we have intrinsic worth apart from our accomplishments. I learned take a perspective beyond my own limited human understanding – and to live "walking by faith, not by sight" in the words of the Apostle Paul. I learned to hold onto things that were certain – including the support of friends and family, and the goodness of Jesus in my Christian faith. And I learned that it is OK to not have control over what happens in life.

Thankfully, my research career eventually turned a corner, which brings me to today, writing this piece to you. As I began it by saying, yes, I now enjoy the array of data science research projects that I get to work on. And so after these stories about coins, grades, and grad school, I would add that I've learned to work with a certain humility – knowing that I can't fully control the success of my efforts – and to embrace the uncertainty associated with the adventures of research. And I leave you with the thought that, perhaps, it is in those times when we have little control over the outcomes, that we stand to learn the most… not only in statistics, but also in life. I certainly did.

Prof. Samuel W.K. Wong

MATHNEWS-CHAN'S VALENTINE'S DAY HOROSCOPES!

Aries: Self-care comes first this Valentine's Day, Aries. Stuff that face of yours full of chocolate, send yourself some roses, and ram into that favourite body pillow of yours.

Taurus: The stars say if you mess with the bull, you get the horns. Maybe that's why no one's messing around with you this Valentine's Day.

Gemini: Chatty Mercury urges you to chat up every person you can. Shame everyone wears headphones nowadays. Better luck next year!

Cancer: Turn down those maternal instincts, no one wants to date their mother (except Oedipus;)).

Leo: Your big mouth and bigger ego will lead you to strike out this Valentine's Day. But don't worry, the rest of your pride will join you at Phil's.

Virgo: Let the blazing, dynamic Mars fire you up! Break the ice with that special someone you've been swooning over, and then watch as they burn up since you're coming on too hot.

Libra: You've been a loner too long, Libra, it's time to tip the scales! Find a lover, partner, friend, acquaintance, peer.. co-worker… someone! Please Libra, stop being anti-social, it's Valentine's Day.

Scorpio: Hmph! UWUSA will notice me this week, not you, Sc-whore-pio.

Sagittarius: The stars ordain you, the archer, to be Cupid this year. So shoot your shot, and be sure to miss! People don't come to UWaterloo to find a boy/girlfriend!

Capricorn: Stop bleating around the bush, Cappy. Strut your stuff, trip, fall, get hit by GRT-kun and start your new life in an isekai! 'Cause ain't no one gonna love you in this world.

Aquarius: Seductive Venus urges you to lose that cool, detached exterior and delve passionately into that fanfiction you were writing this Valentine's Day.

Pisces: With the Sun still in your spiritual zone, be sure to reflect on your past Valentine's Day. Or don't! The stars say you'll suffer either way (:

Hope you all have a lovely Valentine's Day! (✿◠‿◠)ﾉ*:･ﾟ✧

mathNEWS-*chan's Manager*

DECRYPTING CRYPTIC CROSSWORDS II

Salutations, math and puzzle fans!

We are back with another installment of *Decrypting Cryptic Crosswords*. If you missed the first one, pick up the previous edition of **mathNEWS** and give it a read!

The last time we saw each other, we talked about general clue structure, as well as hidden word, anagram, and initialism clues. This week we'll be looking at three more clue types, followed by another bite-sized mini crossword and the solutions to the previous one.

CHARADES

In a charade clue, the wordplay consists of several smaller clues which are added together. The smaller clues will generally be common abbreviations such as "*ace*" or "*king*" for A or K or "*direction*" for one of N, E, S or W, phrases such as "*leader of city*" for C (the first letter of the word "city"), or synonyms such as "*friend*" for ALLY. Other substitutions are possible too, such as homophones (e.g. cluing FUL by "*full*"), Roman numerals, or element symbols from the periodic table. I can't possibly list them all here, but Wikipedia has an article titled "crossword abbreviations" which is helpful.

Charades often don't have indicators, but may have joining words such as "*with*" or "*following*."

For example, the clue "*see six directions*" might have the answer VIEW: VI is six, E and W are directions, and the entire word is VIEW which means "see."

INSERTIONS, DELETIONS, AND SUBSTITUTIONS

In these clues, one or more letters will be added, deleted, or changed from part of the clue to create the answer. Generally the wordplay will consist of a base definition, and then some transformation to apply to it. The transformations may use the same sort of shorthand as charade clues.

Deletions involve deleting one or more letters, such as "*cover loses a bed*" for COT (COAT minus A). Insertions (also called containers) are much the same, but the letter is added instead of deleted. More complicated are substitutions, which incorporate both, as in this clue from the Times:

Unexciting story gets mark for length

In this case we start with the word TALE for "story," then replace the L with M ("*Mark for Length*") to get TAME or "unexciting."

Some indicators for insertions word clues might be *contains*, *holding*, *into* or *around*. Notice that a lot of these could be used to indicate substring clues as well!

Deletions could be indicated by things like *abridged*, *almost*, *cut short*, or *not quite*.

Substitutions might be clued by phrases like *instead of* or *in place of*.

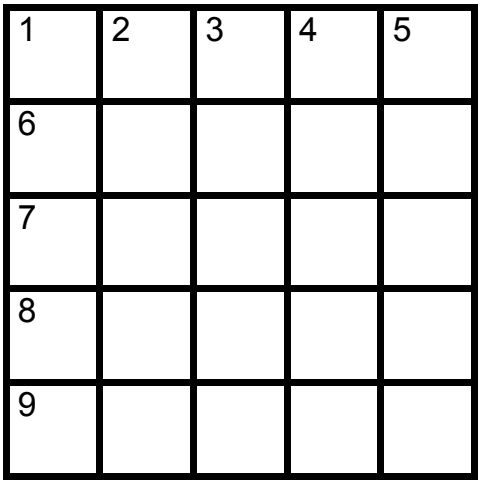
DOUBLE DEFINITIONS

Double definition clues don't follow the standard pattern of a definition and wordplay, but rather simply have two definitions side by side. Much like charades, they often have no indicator.

For example, "*horse pistol*" might be used to clue COLT, which is both a type of horse and a type of pistol.

SAMPLE CROSSWORD

This week we have a good number of the clue types above, as well as a few from last time just to keep you on your toes.



ACROSS

1. Recognized one did well to hold king (5)
6. Middle eastern money is part of the ordinary (5)
7. One donated tequila source (5)
8. Saves with parking for son (5)
9. Stress over losing first lock of hair (5)

DOWN

1. Commercial apartment to accomodate (5)
2. Smoke appears in the garlic I garden (5)
3. Untrustworthy man Jack (5)
4. Overhangs rest of leaves (5)
5. Don a ballgown (5)

LAST ISSUE'S ANSWERS

S	L	A	T	E
C	O	L	O	N
A	G	E	N	T
M	I	X	E	R
S	C	A	R	Y

by Grace Speaker and 7777777

GEESE SPOTTED SNEAKING AROUND MC

This is an important announcement to all students in MC.

There have been recent reports of several geese approaching the building, stacking up inside a trench coat, and wandering the halls of the building. In this state, paired with a striking fedora and some sick-looking sunglasses, could allow them to wander the building indistinguishable from any other students.

These reports also suggest they like to spend time around the entrance to the **mathNEWS** office, for reasons unknown. If they manage to gain access to the room, they could have access to the accounts of the editors, as well as any current contributors to **mathNEWS** itself. They may be out to send a message, or possibly sabotage the upcoming issue.

Caution is advised around these birds. If you think you've identified them, avoid confrontation and alert any nearby faculty staff to their presence. Whatever you do, DO NOT ALLOW THEM ACCESS TO THE MATHNEWS OFFICE!

Thank you for your time, and stay safe.

Fruitboy

mathNEWS EDITOR UNWITTINGLY SETS BACK SELF-DRIVING TECHNOLOGY BY 11 YEARS

MOUNTAIN VIEW — Data scientists are scrambling to undo tragedy after a writer for "that UWUSA paper north of the border" accidentally clicked the wrong squares on an image-labelling reCAPTCHA. The suspect in question, who goes by the pseudonym terrifiED, alleges that he did not notice that the reCAPTCHA was asking for crosswalks — not traffic lights — until it was too late. Inexplicably, the reCAPTCHA accepted his submission anyway.

It is long-suspected that Google sends the data extorted from reCAPTCHA victims to the Alphabet subsidiary Waymo, to help train self-driving algorithms. Waymo CEO John Krafcik seems to have finally confirmed this. At an emergency press conference, he blamed Canada for the recent crash at their top-secret test facility. The incident began when a Waymo vehicle mistook a yellow light for an elderly couple crossing the street. A placeholder trolley problem algorithm kicked in, causing the vehicle to accelerate into the Waymo server room. Fortunately, nobody was hurt in the incident, but the ensuing fire destroyed all of their deep learning models — 11 years of progress, worth billions of dollars.

On Reddit, an anonymous Waymo intern clarified that Canada wasn't entirely to blame. "If our team hadn't spent last week browsing Subtle Asian Traits, we would've pushed the alpha version of the trolley problem algorithm and avoided this whole mess." The alpha version included a rule that Waymo vehicles would avoid colliding with their servers at all costs — even if it means running over elderly couples.

Asked about his hand in the incident, terrifiED says "I do not regret the loss of data that has occurred. Frankly speaking, it gives my self-driving startup a chance to overtake Waymo." At press time, terrifiED would neither confirm nor deny whether he has any future plans to accidentally wipe out Uber, Tesla, or Huawei.

mathNEWS *accepts no responsibility for any self-driving technology that may or may not have been destroyed in the making of this article.*

water

A SPILT MILK ADVENTURE THROUGH SPACE AND MARGINALIA

BASED ON A TRUE STORY

“Eri—, I mean, Satie?”

"Oui, Robin?“ he said, looking positively sketchy. And not in his usual way—I mean ”sketchy“ in the most literal, straightforward sense I can possibly muster. His graphite eyes blinked opaquely behind his round glasses. ”What's the matter?"

"I knew you were a little weird. A little eccentric. But this?" I gesticulated wildly in his heavy charcoal coat.

“Careful. You almost stabbed your hand into that 'Y' over there.”

—

I was sitting on the sofa, scrolling through recipes on my phone. I'd been hankering to bake something all day: banana bread, caramelized pear cannoli—perhaps even a buttercream mille-feuille. From my peripheral vision, I saw Eric stalk out of his room and towards our kitchen fridge, wearing a heavy grey jacket with a thick black hood.

Eric was my only roommate. We were remote acquaintances from high school and never really crossed paths. I remembered him as having a reputation for being a mysterious oddball.

Eric usually secluded himself in his room and I hadn't the chance to learn more about him. In fact, I don't remember speaking to him since the term began. I would've been happy to have such a placid roommate if only it weren't for the occasional, sudden sounds of a banging piano juxtaposed with unintelligible French-sounding shouts from his room at three in the morning — but that's a story for another time. Anyway, I was able to live with it and so I wasn't dying to confront Eric anytime soon. However, as luck would have it, we'd end up talking for the first time that day—not about his sleeping habits, but for other reasons I could've never foreseen.

Eric reached for a glass from the cupboard over the fridge and filled it up with milk. Tossing the pitcher back inside, he plopped down on the living room ottoman, taking out a pocket notebook to scribble some words in while sipping his milk pensively. At that moment I decided I wanted to bake mille-feuille. I got up and prepared the ingredients I needed. From the pantry: flour, sugar, vanilla extract. Water from the sink. Puff pastry from the freezer. All I needed to get was the whipped cream, the eggs — and most importantly, the milk — from the fridge. Anyone who's had this happen to them can imagine my horror when, as I opened the fridge door, the milk pitcher toppled over from its precarious stance on the side ledge and sent the rest of its watery, white goodness splashing out onto the bottom shelf of the fridge.

I let out an unholy yell. The precious milk I needed for my mille-feuille filling was dripping all over the contents of the fridge: flung onto the surface of plastic condiment containers, pooling at the bottom of crisper drawers which were carelessly left ajar, and soaking through my cardboard egg carton and a stack of spiral notebooks on Eric's side of the fridge. I heard Eric's footsteps behind me. I picked up the pitcher and took out the milk bag. It was empty.

"AAAAH!"

“AAAAAAH!” I yelled in response, starting and looking back. Eric was mere inches behind me, his hands ruffling through his dark, spiky hair, jaw dropped to the floor.

"Merde, merde, oh putain de merde,“ he muttered under his breath, continuing to rake his fingers through his hair. He stepped forward a little. ”My manuscripts, my manuscripts," he muttered again, reaching towards the drenched notebooks with a tremble. Then he took a deep breath to steady himself, and slowly drew his arm away before quickly whipping out his pocketbook and scribbling something in it frantically.

“Uh, Eric…”

His eyes grew wide, as if surprised I were there. We stared at each other in uncomfortable silence for a while—the longest amount of time we'd held eye contact to date. Then he spoke:

"First things first, Robin,“ he said sharply, tacking on my name at the end of his address with an extra helping of distaste. ”Do not interrupt me when I am writing. Second, please call me Satie."

“Satie? What?”

“It's my last name.” He said flatly.

“Last name!” I exclaimed. “Isn't your last name Zheng, or Zhang, or something?”

“Ah! Sh-sh-sh-sh!” Satie held up a finger to his lips, his voice sailing up two octaves. “You're not supposed to doxx me in front of the reader!”

"What on earth— Okay, listen here, pal. The fridge is a fucking mess and I don't have any milk for my cake filling. And who's to blame? You. Drinking up half the damn bag and then spilling the rest everywhere like a fucking slob.“ I felt my face grow hot; thinking about my mille-feuille was getting me emotional. ”What am I supposed to do now?"

Satie put a hand on my shoulder. “Robin. Although I contest your unsavoury assertion about my cleanliness, I'm just as upset about this as you are. But I know a way we can fix this.”

“How?”

He grabbed two clean dishtowels and tossed one to me. “We'll soak up the milk in these and squeeze it out later. We'll have to act fast before it goes sour. Unless you planned on making buttermilk?”

"No, but—"

"Bon. I'm going to have to collect the milk from my manuscripts first,“ he said, flicking open the cover to the first notebook on the stack. ”Before the ink bleeds."

“Wait, what? How are you gonna mop up the milk from the paper?”

“Less talk.” He shrugged his coat off, revealing an identical grey coat underneath. "Put this on so you don't get cold. Allons y," he said, grabbing my hand. In an instant, he leapt straight into the fridge, taking me with him. Together we fell through the air; reality shrieked past in a nauseating flurry of light. All I knew of at that moment was the overwhelming smell of two percent milk, of which at that point I was starting to get sick. Then we landed.

—

Satie looked a little irritated. "Sacré bleu, stop gawking."

“It's… just like the video for Take On Me.”

“You think I haven't heard of that one before? Now come on, we've got to hurry. I'll go over towards the center. You stay here on the top corner and flip the page when I tell you to.” He scurried over to my left, wading through bouncy, looping lines of text written in his curly scrawl. Dragging his dishcloth over each word, he removed the little white droplets which clung to their curves like dew. It was only a few seconds before he called out to turn the page. Having overcome my initial bewilderment, I jumped and grabbed onto the top of the page, hoisting myself up. I was now crouching on the top edge of his notebook, and below me I could see everything that he had written on the page, although I had a hard time reading it upside-down. I pulled open a new page and watched as Satie cleared it as if he were old-school Superman bouncing past skyscrapers with a single bound. We went on like this for some time: wiping off the milk droplets, turning over pages. After about a minute or two, he called me down.

He presented me his dishcloth. It was fully soaked to touch: even gently squeezing it caused milk to seep from the stitches.

"C’était du gâteau. Once we wipe the milk from the rest of the fridge, I'm sure you will have all you need for your cake, and we can put this behind us." He reached out a hand towards me. I took it. He jumped forward with astonishing force, and reality whirled around us once more for a second before we were back in our 3D apartment kitchen: I staggering, Satie poised perfectly on his feet. Then, while I wiped up the rest of the spilt milk from the fridge with my dishcloth, Satie was busy wringing out the milk he had in his into a measuring cup. Once he was done, I handed him mine. I watched with anticipation as Satie wrenched out as much milk as he could from the dishcloth, his body wracking with physical exertion. Little by little, however, I watched as the drops slowly plopped into the cup. One by one. Until the meniscus settled perfectly at the 1 cup marking after engulfing the very last half-droplet. Satie had done it.

“I can't believe it,” I said, in genuine awe and gratefulness, gently patting him on the back. “Thank you, Satie. I'm sorry for what I said about you earlier.”

Satie's speech was hampered by his laden breathing — I'm sure the heavy coat he wore wasn't helping him (I'd taken mine off after we jumped out of his notebook). “No worries. I can almost hardly believe it as well. It has been a long time since I tried something like that. And I got to save my manuscripts.”

“I have to wonder, what are your manuscripts about, anyway? And why do you keep them in the fridge?”

"I like to write stories. Nothing very serious. I like the feeling of paper when it's cold and croustillant."

“Er… Okay. Anyway, Satie, I'll save you a slice or two of the mille-feuille I'm going to make, for all the trouble.”

“No, don't. I am lactose intolerant,” he said flatly, looking off somewhere in the distance. He burped softly. "Je voudrais faire une sieste," he mumbled, ambling over in the direction of his room. He stopped about one foot in front of me, however, to whip out his pocketbook. I tried to catch a glimpse over his shoulder of what he wrote — but all I saw before he snapped his pocketbook shut and wandered out of sight were the words 'adventure' and 'marginalia.'

Finchey

LOOKING AT THE TRANSIT STRIKES IN WATERLOO

- Transit strike occurs
- Talks break down
- An uncooperative region
- No solution in sight
- Thousands of university students affected

Vancouver: First time?

(At least the region doesn't become paralyzed and regular transit services do not break down in Waterloo due to 20 cm of snow.)

boldblazer

EXCLUSIVE: FOLLOW-UP INTERVIEW WITH THE HERO WHO FREED THE LOG

mathNEWS secured follow-up interview with MathCom, the hero who liberated the Log. I asked him for the truth about the story of the Log's liberation.

WHAT DO YOU WANT TO SAY?

Not a whole lot. You can have the *real* story now. The one that's not the official story. So, when it came to the log and the N-jSoc war, the war started completely as the official story goes. The n-jineers stole the log after some MathSoc executives delivered some cool whip to the N-jSoc doorstep as an offering of peace. It was a brutal betrayal of our relationship. Much of the official story is accurate, with the exception of how we got the log back.

Some MathSoc executives were hanging out late at night in MC, and it was the night that the n-jineers were going to wrap up their final plan with the log. Their plan was to take the log, and chain it to a tree in the rock garden, and then put up posters all over campus mocking MathSoc and the Non-Cowardly Action Committee for their failure to protect the log.

Okay. However, the amateur n-jineers made one fatal mistake. They put up the posters detailing their plan before tying the log to the tree. This means that the heroic NCAC had prior warning of their appearance tying the log to the tree. And indeed, we were able to confront them while they were in the process of figuring out how to use zip ties.

When they realized that we were not in fact filthy n-jineers they all with no idea what to do, froze, turned their backs, and just kind of stood there. I believe that object permanence is a skill beyond the capability of the simplistic n-jineers, and they thought that if they turned their backs and couldn't see me, that I couldn't see them. I tried to make conversation for a good 15 seconds, but none of them were responding. They continued trying to affix the log to the tree, but their naive minds could not figure out the advanced technology that is the zip tie. One of them responded to me, with, and I am quoting verbatim, “please just let us leave it up, it's more fun this way.”

Now, in my opinion, if you need to ask someone permission to let you finish your prank on them, you've probably already lost. To which I responded, “yeah, sure buddy.” with an attempt to deceive him, and then I left.

I then reconvened with another MathSoc executive, and we hatched our plan. We proceeded to tour the Math buildings, removing the many poster that the n-jineers put up prior to attempting to affix the log to the tree, with a noble goal of charging them a fee for unauthorized postings.

Having had enough time to pass for the n-jineers to be satisfied with their ties and the log, we made our way back to the rock garden where there were no n-jineers to be seen. To which we began what we thought would be the laborious process of attempting to free the log from its binds.

Upon inspection, we could see that they had used many zip ties, chain, and heavy rope to affix it. But when we walked up to it, the mere force of our breath was enough to free the log from the loose tying. It seems the n-jineers never figured out how to work the zip ties.

We then returned the log to its home in the MathSoc office, and got to work dressing it up and taking a couple glamour shots which we then posted to social media first, we would win. We wrote up our tale of how it was recovered, and made sure to get that out to our social media channels and other sources to make sure that everyone knew what really happened.

Our post received a lot of traction, and was the most widely seen post on Facebook of all time. It also did well on Instagram.

And that is how we stole their prank.

HOW DID YOU GET THE TOOL?

Oh! I forgot all about that! It was tied to the log, I have no idea why.

They tied up and tortured their own tool.

WHY ARE YOU COMING FORWARD NOW?

The n-jineers were thoroughly humiliated, but I wanted to get the true story out. And really, this adds another layer to their humiliation.

Senior War Correspondent

IN REPLY TO NARF DERT'S ARTICLE IN THE PREVIOUS mathNEWS ISSUE

If it makes you feel any better, my two articles were tagged v141i2 instead of v142i2. That's why there are so many articles of mine in this issue. Half of them were supposed to be for the previous one. Feels even more bad man.

boldblazer

THE CASE FOR COMPASSIONATE POLITICS IN CANADA PART 1.5: PARTISAN SHMARTISAN

Hello,

If you read my essay last issue, good on ya for getting through it. It was long and comically overblown, which is probably why it's a great idea to make it part one of a larger essay series. If you didn't read my essay last issue, congratulations, neither did 99.99% of people on earth. Please read on anyways, this affects you too, and I won't bite. The truth is, I've written a lot of different things for **mathNEWS**; humorous things, informative things, absurd things. But there are evil forces at play in our world and it makes me want to scream. I figure screaming onto a page is at least better than screaming into the void.

Things in Canada are not as good as they may appear to be. The status quo is failing far too many people. Did you know Canada has the highest infant mortality rate out of all countries with universal healthcare? How fucked up is that? We spend the second most per capita out of any industrialized nation, so what excuse is there for our children dying? I think we must talk candidly about the state of our nation. We need to agree on the ways we have failed, and come to the table in good faith to figure out the best way to solve them. This requires people from all ends of the political spectrum, those who consider themselves apolitical, and it includes bringing in people new to politics. We can all do more to direct the conversations we have towards finding a real solution to the needless poverty that affects us all. Now, I am a socialist. I do not expect any of you to believe in my framing of the world. I do hope that you are open to listening to someone who you might disagree with. Good ideas grow everywhere.

My last essay was admittedly more partisan than I tried to make it. I do not write these articles to turn anyone into anything. I believe that I offer perspectives that anyone from any party can understand and incorporate into their worldview. What I believe is that every party should be advancing discussion into what they can do to feed the hungry and house the homeless. Not lowering it x% in 10 years; what can we do to make homelessness and poverty exists only in history books. Solving these problems will help the economy, lower the need for welfare and bring more money to small businesses, which should appeal to conservatives. They will enhance our collective pride in our country and position us as a true world leader in progress, which should appeal to liberal voters. Solving these problems also help protect human rights and freedoms, something very important to many leftists and libertarians. It shouldn't be partisan to keep our communities healthy and secure. It shouldn't be partisan to keep our children under roofs. It shouldn't be partisan to not poison the water we drink and the air we breathe. Those in power want us to misrepresent our hopes of a better country as hatred of our country. The suffragettes did not hate this country, they hated the injustice. We fight for a better country because we believe in this country and want to see its full potential met. We discovered insulin, we can invent new clean energy technology and be a world leader in innovation again. We have sent Canadians into space; we can send Canadians out of poverty as well. That's as Canadian as it gets.

The solutions will not come from one party alone. The solutions won't just come from political science majors and lobbyists, much of the answers will come from the working class. After all, we know the reality of poverty. We know homelessness on a first name basis. We must not put our faith in one party, or one figure, or one ideological agenda. We must put our faith in compassion, fairness and community-building. Government will not lead to substantial improvements in the lives of the poor until all parties prioritize improving the material conditions of the people. The stock market is not important to the young adult drowning in student debt. Low unemployment is not encouraging to the elderly couple who are on 10+ year waitlists for the long term healthcare they desperately need. New trade deals mean nothing to a population that live paycheque-to-paycheque and can't afford a $400 emergency. New fighter jets don't make the indigenous communities without clean water feel any safer. Our economy is strong and our people should be strong too. That is my message. When some Canadians are doing so well, there is no excuse for anyone to be struggling like they are. Our economy is growing, and the wellbeing of our citizens needs to rise in tandem. That is my message.

I made an email for this series. Feel free to reach me at ITSHWrites@gmail.com. Feel free to send me feedback on the first part of this series, ask me questions you'd like to see me address in the future, or just tell me to fuck off.

ITSH

HONK

Honk honk honk honk honk honk honk. Honk honk honk!

Honk honk honk honk honk honk honk honk honk honk honk… Honk honk honk?

Honk! Honk honk! Honk honk honk.

Honk honk honk honk.

Honk honk honk honk honk honk honk? Honk!

Honk honk honk honk. Honk honk honk honk honk honk honk.

Honk.

Fruitboy

♥♥FLAG REVIEW 5: HEARTS EDITION♥♥

FLAG REVIEW 👏👏

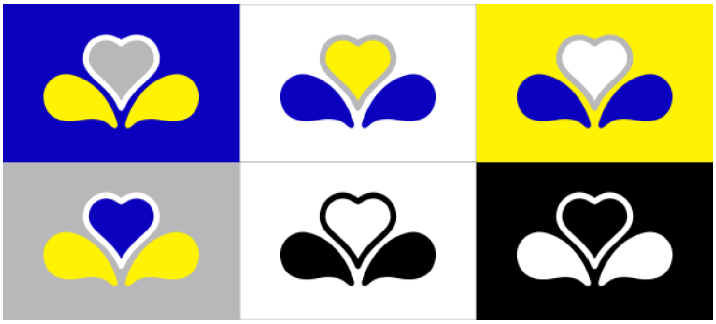
February 14th is fast approaching at the time of writing, and based on the usual cultural practices associated with that date, I have decided to theme this edition of Flag Review on hearts. Let's see if these flags can get more love than Laurier's ever will.

Here is the rubric I will be using to score these flags:

The flags will be scored out of 10, with 5 of those being my holistic subjective score, and the other 5 being based on each of the 5 basic principles of flag design as defined by the North American Vexillological Association (NAVA). They are:

- Keep it simple
- Use meaningful symbolism
- Use two or three basic colours
- No lettering or seals
- Be distinctive or be related

BRUSSELS-CAPITAL REGION, BELGIUM



Let me clear up something first. The image you are seeing as a whole is not the actual flag. Each of those six variations are together the official flags. The flag of the Brussels-Capital Region has a bit of an odd quirk to it to say the least. Before this current flag was adopted in 2015, there was actually quite a simply designed flag in use: a blue background with a yellow iris flower in the centre. However, that all changed with this new flag.

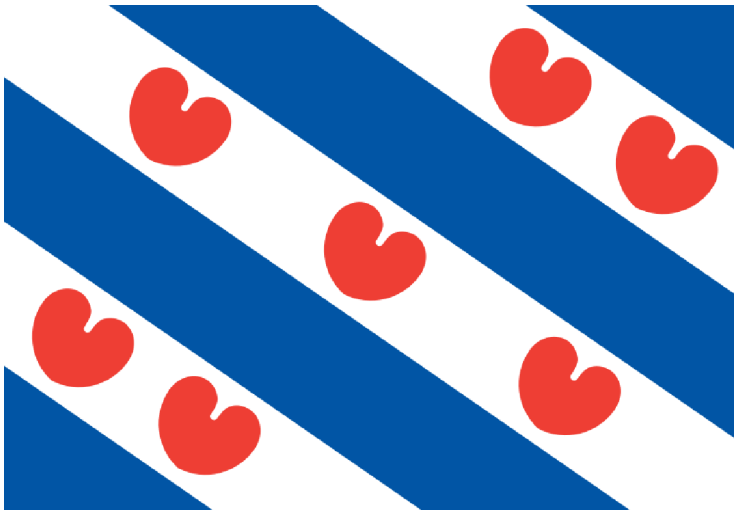
To start, we have these 6 variations of the flag: 4 in variations of blue, yellow, white and grey, and 2 in black and white. This is because they decided to co-opt the lily from region's logo as the central symbol of this flag. They basically treat this flag as an extension of the logo; there are differently-colored variations of the logo, hence the six variations of the flag. It's as if marketing were the main focus. Furthermore, because that logo is more abstract, the flag became more abstract as well. It isn't immediately clear what the symbol is supposed to represent at first glance, without having researched the flag's meaning or having lived in the Brussels-Capital Region. They sacrificed the clear symbolic meaning of the old iris.

Sure, the design may be simple and designed with aesthetics in mind, but the fact that the intended use is as a logo and branding, rather than as a flag, makes me feel uncomfortable in two ways. If more cities follow this idea of using a brand as a flag we can end up with more flags of flat design everywhere. Secondly, it reduces a good region down to what seems like a commodity, instead of doing what it's supposed to do, which is representing the people of the region. If they kept marketing of the city separate from its flag, I would be more comfortable with it. They could have even used the old flag as its branding; I would have been more content with that.

Design Score: ♥♥♥♡♡

Subjective Score: ♥♡♡♡♡

FRIESLAND/FRYSLÂN, NETHERLANDS



Unlike its cousin to the East in Germany, who have been the butt of a lot of jokes, the province of Friesland in the Netherlands has what I think to be one of the best flags around, and not simply just for the little heart shapes on its flag. Firstly, I have to point out the unusual ratio of 9:13. A unique ratio always helps to make a flag stand out for us flag nerds. Secondly, hear me out — I know that technically those aren't hearts on the flag, but they look like hearts[1] and a lot of people end up calling them hearts anyway, so it's in this list of flags with hearts.

Those hearts are actually water lily leaves, or *pompeblêden* in Frisian. The seven *pompeblêden* signify the traditional seven *zeelanden* or historical regions of Friesland. Think of them like the traditional counties of England. The design is also special in that, according to the Friesland government's website,

13 doesn't exist.

ROB HACKMAN

they should not be depicted as heart shapes, but as a special heart-like shape that you can download from their website. So this is actually a distinct shape that you'll only really get to see on this flag, and related flags of this region of Northern Europe like in Ommelanden in nearby Groningen.

I particularly like the diagonal feature of this flag for reasons that escape me, similar to how one cannot easily describe why a particular colour is their favourite colour. Maybe it's the simple combination of the blue and white, complimented by the red *pompeblêden*, or it could be that the diagonal slope is negative, which is more uncommon. The stripes also carry meaning in that, since there are seven of them, they represent the historical regions of Friesland, with the blue stripes also serving as rivers.

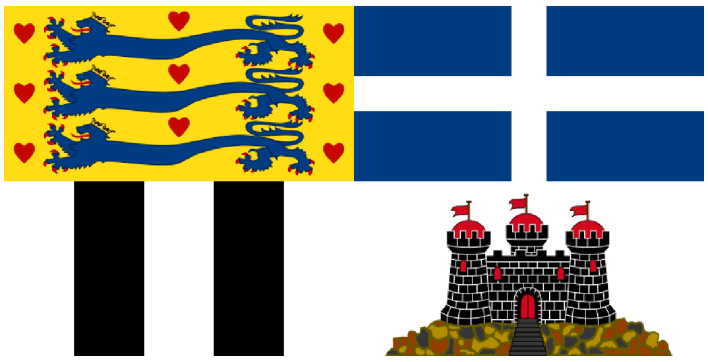
I think this is a good example of a flag that keeps things simple and unique while having enough detail in the form of symbolism and meaning. If I could give seven hearts, I would.

Design Score: ♥♥♥♥♥

Subjective Score: ♥♥♥♥♥

BONUS FLAG

THE ROYAL STANDARD OF PRINCE PHILLIP, DUKE OF EDINBURGH



Being interested in flags also means that I tend to read a lot about flags of royals, because they are usually unique and uncommon. Plus, it can be quite the historical read. One such flag, or in this case a royal banner, I come across quite often is of Prince Phillip, Duke of Edinburgh, Royal Consort to HM The Queen. I may delve away from a review and more into history and genealogy territory, but I just couldn't not mention this.

Each of the four quarters represents some aspect of the Prince. The first quarter or top-left is actually also found on the state coat of arms of Denmark. The surrounding regions and places with historical links to Denmark also typically use blue lions on a yellow background or some variation on that, but what Denmark has that is unique are those red heart shapes, called *søblad* in Danish, meaning water lily again. Nearby Lunenburg also uses hearts, but not in the same way where it is incorporated with the three lions. Unlike the *pompeblêden* used by Friesland, these hearts are spaced evenly with the three lions, giving a more balanced look, and the three colours are also distributed nicely. I suppose that's one of the few upsides of not using a prime number of symbols.

On to the second quarter, or the top-right portion, which represents Greece. It was even the former flag of Greece itself. An odd combination of countries, sure, but if you read about European royal families enough, you'll see how the two countries, separated across the length of a continent, appear together in a princely title, as Prince Phillip was born as a Prince of Greece and Denmark from his paternal line.

The third quarter or bottom-left is from the House of Mountbatten's coat of arms. Prince Phillip is of the House of Mountbatten from his maternal line, which he chose as his personal surname, which gives its name to the current royals' personal surname of Mountbatten-Windsor.

The fourth quarter or bottom-right is from the Prince's Dukedom. It originates from the coat of arms of Edinburgh, which is one of the few cases where a building is featured. In this case, it is Edinburgh Castle. It makes sense since the Prince was given the title of Duke of Edinburgh from King George VI as a sort of wedding gift in 1947.

The only problem I have with this is the way the quarters are ordered. I find it weird that the quarters from being the Prince of Greece and Denmark are in the first and second quarters. Usually when quartering happens the first and fourth are paired and the second and third are paired. Thus, the Greece and Denmark parts should be in the first and fourth quarters. The Mountbatten quarter should be the second and the Edinburgh quarter should be the third, because Prince Phillip becoming Duke of Edinburgh later in life is of lesser importance than the Prince being of the House of Mountbatten, and it would better separate the white background of these two quarters, which blend together.

Design Score: ♥♥♥♡♡

Subjective Score: ♥♥♡♡♡

Some flags here have missed their mark while others have succeeded in capturing the hearts of potentially millions everywhere. Next issue, in light of the Democratic Party Primaries that are going on, I'll finally review some US state flags, as many had requested me to do so. Feel free to send in flags through **mathNEWS** too, if you want me to review them. It's always good to have more bonus flags to review.

boldblazer

Disclaimer: All Dutch/Frisian — English translations have been provided by Google Translate and in using it, meaning may have been lost or straight up wrong translations may have occurred.

1. Mathematically speaking, they can be compared more to cardioids than the typical heart shape.

STAIRWAY CONSTANTS, PART [2,3)

FOREWORD

First of all, I'm quite offended that I was trolled by an editor who replaced all occurrences of $\frac{1}{\sqrt{2}}$ in last issue's *Stairway Constants, part [1,2)* with $\frac{\sqrt{2}}{2}$. The latter is superior, but not when you're trying to explain that there's two different ways to write the reciprocal of $\sqrt{2}$.

Second, I promised I would go back with a ruler and measure the distances between tick marks on the MC north-north-east number line, so I did. At the floor 3 landing, we find the white-space between adjacent tick marks to be about 22 cm. At the floor 1.5 landing, that space is at least a few centimetres past the end of my 30 cm ruler. That's a difference of over 10 cm! The painters really did an excellent job of making the transitions seamless.

Those (SandwichExpert) in disbelief that a number line could be irregularly spaced might find consolation in a few alternate explanations:

1. All this stair-climbing has made me so physically fit that I accidentally made some of the measurements while walking at relativistic speed.
2. MC is non-Euclidean.
3. Black holes.
4. Witches.

If you're tuning into the Stairway Constants series for the first time, we're looking at the constants in the MC north-northeast stairwell. So far we've covered the constants in the intervals [0,1) and [1,2); this issue we'll cover [2,3). It's highly recommended that you actually go to the stairwell with this article in hand, for a fully-immersive tour.

FLOOR 2

Two. 2! A couple. The number of sides of this page. The number of eyes it takes to see depth. The minimum number of elements in a field. Heck, fields can't even exist without the notion of binary operators. Two distinct points define a line, and two lines are obtained by cutting it. Undoubtedly, humanity and mathematics would be impossible without the notion of grouping and dividing things into pairs—so much so, that we *even* have words for when a number is divisible by two. 2 defines the even numbers, yet it defies them by being the only one that is prime. How odd is that?

Puns aside, there are more constants to look at…

FLOOR 2.5

You reach the top of the next flight of stairs (11 steps) before you can read the next constant. Are there really no interesting numbers near 2? (Quickly scouring Wikipedia, I couldn't find any seriously notable constants around 2.) *Exercise: invent a constant worthy enough to fill the void near 2.*

You recall that the last constant we covered (in the previous issue) was around 1.6 (the golden ratio), so this gap has lasted nearly 2 flights of stairs. Let's see what constant broke the silence…

GOLDEN ANGLE
2.3999632297...

(For more digits, see OEIS A131988.) A constant without a symbol? Let's give it a symbol—how about θ_G? It's an angle, after all. But what is θ_G the angle of? Let's do a thought experiment to find out.

Suppose you're a flower, and your main goal is to look pretty. Evolution has told you that the prettiest flowers appear to have their petals evenly spaced. Unfortunately, you can only grow one petal at a time. Once it's grown, you can't move it. You also don't know how many petals you will grow in your lifetime, so you better place them wisely. Even worse, plants don't have much free will. The only thing you can choose is the angle θ between the last petal you grew, and the next. Thus, the $(n+k)$th petal will be grown at the angle $k\theta$, relative to the nth petal.

So what should θ be? To ensure that your petals appear to be evenly spaced, you want to avoid having two petals that are close to one another. How might such a situation arise? Consider the ith petal and the jth petal, where $i \neq j$. The angle between them is $(i-j)\theta$. If they appear to be close to one another, then that angle is approximately a multiple of 2π: the number of radians in a full rotation. Then, for some integer k, $(i-j)\theta \approx 2k\pi$. If $k = 0$, then θ must be very small. Thus, we want to avoid small values of θ (but intuitively, you probably already knew that). Otherwise, when $k \neq 0$, we can rearrange:

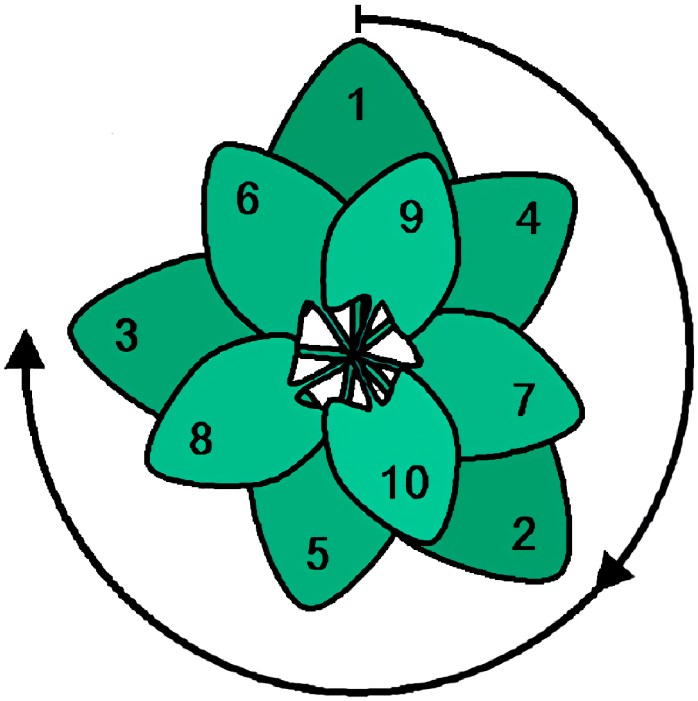
$$\frac{2\pi}{\theta} \approx \frac{k}{i-j}$$

In English, this means that we'll find two petals close to one another if $\frac{2\pi}{\theta}$, the number of times θ fits into a full 360-degree rotation, is well-approximated by a ratio of two integers. Aha! If we make $\frac{2\pi}{\theta}$ a number with bad rational approximations, we can avoid that. Let's make it the famous irrational number with *the worst* rational approximations. We've seen that number before in this stairwell: it's the golden ratio ϕ.

$$\frac{2\pi}{\theta} = \phi$$
$$\theta = \frac{2\pi}{\phi}$$

However, if you evaluate $\frac{2\pi}{\phi}$, you'll actually get a number around 3.88. To get the golden angle you must convert this to standard form: $3.88... - 2\pi = -2.39...$. Since direction doesn't matter here, that's equivalent to $+2.39...$.

To recap, the golden angle θ_G is explicitly tied to the golden ratio ϕ by the relation $\theta_G = 2\pi - \frac{2\pi}{\phi}$. It's the optimal angle (in radians) between consecutive items arranged in a circle, so that you minimize overlap.



FLOWER PETALS, SEPARATED BY THE GOLDEN ANGLE.
Image credit: Wolfgangbeyer on German Wikipedia.

Exercise: as much as we like our radians, most of us are better at visualizing angles in degrees. What's θ_G to the nearest degree?

K
KHINCHIN'S CONSTANT
2.685452001...

(For more digits, see OEIS A002210.) Aleksandr Khinchin was a 20th century Soviet mathematician who proved something remarkable about continued fractions. We've seen continued fractions before in this series - the golden ratio has the infinite continued fraction:

$$\phi = 1 + \cfrac{1}{1 + \cfrac{1}{1 + \ddots}}$$

It's a side effect of the alien probes.

PROF. DAVID MCKINNON

In general, simple continued fractions can be finite or infinite, and are of the form

$$a_0 + \cfrac{1}{a_1 + \cfrac{1}{\ddots + \cfrac{1}{a_n}}}$$

where a_i is positive for all $i > 0$. The finite continued fractions represent rational numbers, and the infinite continued fractions represent irrational numbers. Altogether, all real numbers can be expressed (almost uniquely) by a simple continued fraction.

Khinchin proved that the continued fractions for "almost all" real numbers have a very strange property. If you take the geometric mean of the coefficients (a_0, a_1, a_2, etc), that mean will equal K[1].

"Almost all" comes with infinitely many exceptions. For starters, we're pretty sure that no rational number has this property. (The irrationals far outnumber the rationals, so this is okay.) More interesting exceptions include the golden ratio, where $a_i = 1$ for all i. In that case, the geometric mean is obviously 1.

Khinchin's constant itself also has a continued fraction expansion. The coefficients go 2, 1, 2, 5, 1, 1, 2, … (for more terms, see OEIS A002211). However, we don't actually know if their geometric mean is K. In fact, we don't even know if K is rational.

Exercise: here's a throwback to the first stairway constant. What is the continued fraction for Liouville's constant? Does the geometric mean of its coefficients work out to K?

e
NAPIER'S CONSTANT (EULER'S NUMBER)
2.71828182845...

(For more digits, see OEIS A001113.) Chances are that you recognized this number by its symbol, rather than its name. Maybe you were even waiting to see it on this number line. That's how you know this is *some* constant. We don't use e for anything else, because that would be an insult to the one true e.

Why e? Euler was the first to use that symbol for this number, but his choice of e was probably not in honour of himself. When you're churning out papers like Leonhard Euler, you'll gladly take the first letter you haven't yet used for anything else. Before Euler, the number was also known as b. Nowadays, in honour of Euler, we use his notation. The fact that the notation happens to be the first letter of "Euler" and "exponential" is probably just a happy coincidence[2].

Indeed, Euler did not discover Euler's number. John Napier, the Scottish inventor of logarithms, published a table of values for the natural logarithm function ln almost a century before Euler was born. Since e is the base of the natural logarithm ($\ln = \log_e$), Napier is considered to be the first to observe the

special properties of e (hence the name Napier's constant). Euler comes into the picture with his many discoveries about e. Most notably, Euler's identity is the famous equation $e^{i\pi} = -1$[3].

How'd he come up with that? Short answer: Maclaurin series. The Maclaurin series is also how Euler computed e to 18 decimal places by hand! You can try it yourself:

$$e^x = \sum_{i=0}^{\infty} \frac{x^i}{i!}$$

A complete list of the properties of e could probably fill a book thicker than this stairwell is tall. You yourself are familiar with many of them. Here's a relatively accessible one from statistics you may or may not know: derangements. If you randomly shuffle a deck of n cards, the probability that no card ends up in its original position approaches $\frac{1}{e}$ as n increases to infinity. Of course, the proof of this result involves the Maclaurin series above. *Exercise: fill in the details of the proof.*

FLOOR 3

Another 11 steps later, you reach a big pink 3. The third floor! The hub of math hubbub. It's home to the MC-DC bridge (lower half), the Comfy, the C&D, MathSoc, and of course the filthy **mathNEWS** office. Perhaps one day it may also have a bridge to SLC, but for now the shit's *still* broken.

Hiding above the door to the 3rd floor is this article's final constant.

F
FRANSÉN-ROBINSON CONSTANT
2.8077702420...

(For more digits, see OEIS A058655.) This constant is relatively new. It seems to have emerged in Arne Fransén's 1979 paper *Accurate determination of the inverse gamma integral*. Wikipedia mentions a Herman P. Robinson, which is the name of a late OEIS contributor and co-author of the report *Mathematical constants* (Lawrence Radiation Laboratory, University of California, 1971). It's likely, but I'm not sure he is the Robinson after whom F is named.

As the title of Arne Fransén's paper suggests, F is the value of an integral of the inverse gamma function:

$$F = \int_0^{\infty} \frac{1}{\Gamma(x)} dx$$

In English, it's the area bounded above by the graph of the reciprocal of the gamma function and bounded below by the x-axis. If you're unfamiliar with the gamma function Γ, it is the continuous function where $\Gamma(n) = (n-1)!$ for all positive integers n. Essentially, it's what you get when you draw a curve of best fit through the points $(n, (n-1)!)$. $\Gamma(n)$ grows *really* fast—it's beyond exponential. (Next time someone uses the word "exponential" incorrectly, you can show them the gamma function and say that exponential growth is for babies.)

As a consequence of that growth, $\frac{1}{\Gamma(x)}$ approaches zero *really* fast. This is how K can be finite; it's the area between the x-axis and the graph of a function that pretty much kisses it.

Exercise: use lower Riemann sums to prove that $F \geq e$.

Halfway through the term, we have reached just short of halfway up the MC north-northeast stairwell. However, we have covered more than half of the stairway constants. Why is that?

We're not the first ones to notice. Simon Newcomb and Frank Albert Benford Jr. both observed this trend more than 80 years ago: numbers, in practice, tend to have small leading digits. This is known as the Newcomb-Benford law. It's not a theorem, but rather a highly-applicable pattern for all sorts of real-world ("realistically-distributed") data. In fact, the Newcomb-Benford law holds so reliably that it can and has been used to detect financial fraud!

Out of the numbers between 1 and 7, we've covered the leading digits 1 and 2 so far. According to the Newcomb-Benford law, almost 48% of all "realistically-distributed" numbers should begin with 1 or 2 (on average, of course). The rest of the constants we have yet to cover in this stairway begin with 3, 4, 5, or 6; those digits account for less than 37% of all "realistically-distributed" numbers. If you believe that stairway constants have a "realistic" distribution (whatever that means), then it should be no surprise that there are more of them on the lower floors.

Of course, there is also a bias towards smaller numbers in mathematics. We care much more about extremes, and many of the stairway constants are significant in the first place, because they are the smallest or the simplest number to satisfy some condition.

The only way to truly know why the stairway constants are distributed the way they are, is to ask the people who created this number line in the first place. Stay tuned for more developments.

water

Exercise: don't take the elevator.

1. For infinite continued fractions, you have to take the limit as n goes to infinity of the geometric mean of the first n coefficients: $\lim_{n\to\infty} \sqrt[n]{a_0 a_1 a_2 \dots a_{n-1}}$.
2. http://mathshistory.st-andrews.ac.uk/HistTopics/e.html
3. Whether Euler explicitly made this discovery is questionable, but it follows immediately from a more general equation called Euler's formula.

profQUOTES 142.3

CS 146: BRAD LUSHMAN

❝ What's the advantages of doing this? Not much.

❝ The designers of C... they really were a bunch of folks.

CS 146: ROB HACKMAN

❝ Always carry pocket Kleenex. People will love you. Not to say that otherwise you're unlovable, but...

❝ It's a good habit to get into. I don't do this.

❝ You can't torture C; C tortures you.

❝ Do you guys even know who Yoda is? They're old movies.

❝ Don't work out too hard. You need your arms for coding.

❝ When a program runs it uses some of your memory. Unless it's Java program, in which case it uses all of your memory.

CS 690B/CO 499: DAVID JAO

❝ y is already taken; fine, I will use ξ, the worse greek letter, to make you suffer.

❝ Most water bottled have genus one. Headphones, counter-intuitively, have genus zero.

❝ You guys need a remedial MATH239.

❝ Pac-man happened on a tors e.

MUSIC 140: SIMON WOOD

❝ He was a bastard, Thomas Edison.

❝ How many of you know Charles Dickens? Not personally of course, he's been dead for a while.

❝ I really don't get Billie Eilish.

❝ MIT of the North, my ass.

STAT 241: YINGLI QIN

❝ [has a coughing fit] Again, I am not having cold or fever, don't worry

❝ Because this is a 200-level class, I cannot prove that this works. But in STAT 850...

❝ The second [method]... [long pause] What is the second?

❝ Prof: What is this probability?
Siri on someone's phone: Just a moment!

❝ [day after the midterm] I hope you all had a good night's sleep yesterday.

❝ So say the Midterm 1 average is 39%...

❝ What you do is you assume you are a group of ten people.

❝ [going over midterm solutions] Now let's move on to Question 2, which was a disaster.

❝ Yes, I gave part marks for this question. Otherwise it would have been an even bigger disaster.

AN ARTICLE THAT ISN'T ABOUT BATTLE-CULTS :(

I know I said that my next article about the BATTLE-CULTS OF CLUB PENGUIN, however I just had a midterm and there's no way I'm writing an in-depth hit piece on the vicious secret fighting underworld of our favourite penguin island after that. Don't worry, it's still coming—possibly next issue, if I make it out of the rest of my midterms alive. For now, I have a couple corrections, and some devastating news worthy of this fine publication platform.

First, I'd like to clarify a few things from my last article: Most importantly, Club Penguin Rewritten has FREE MEMBERSHIP! Now you can do all the exclusive penguin-related activities without paying a monthly fee! Additionally, my penguin turned 30 days old, so was able to join the Penguin Secret Agency, the OG secret agent group that is much cooler than the dumb Elite Penguin Force. However, to my dismay, you don't get the cool black puffle with the welding mask [Note: Their name is Flare!] from the point-and-click PSA missions; they're actually originally from the Club Penguin DS games, which come with a secret code in the box. In CPR, however, you can get Flare by entering a different secret code that I found after 30 seconds of Googling. Apparently there's a whole group of Elite Puffles, but Flare is the only one available in CPR which is fine because Flare is the best puffle and anyone who says otherwise is a heretic.

In other news, tragedy has struck! To my knowledge, there are no longer any people at UWaterloo who have Blue Clearance for Mao! Now, I cannot explain what that means, but trust me, it is very sad. Blue Clearance is very important for playing Mao, so without anyone with Blue Clearance, how will we play Mao? Now, there is still one person with Green Clearance, but Green Clearance is not as good as Blue Clearance and is therefore worthless. Tune in next week to learn how we fix this problem! And also maybe Battle-Cults. But, as previously stated, I'm just here for Mao.

Psykarp

EVERYONE JAYWALKS IN BOSTON

THOUGHTS ON TRAVELING

In some turn of events I have found myself in Boston. I have to say that everyone I know has been to the U.S.A. before, largely because Vancouver is only a few hours away from Seattle and so it is a common occurrence to plan a shopping day trip and pop across the border a couple times over the summer. But for me, this is the first time. So I don't know about how it is in those outlet malls in Seattle. I guess they're mostly car-oriented, as they tend to be, and maybe you wouldn't really see pedestrians and intersections if you're just driving and walking around in a parking lot.

After I got off the plane and the subway, I was finally able to step on real American dirt. Well, it was concrete, but at least it was in plain air and above ground. So this is America. So this is the U.S.A. It didn't look that different. They still had sidewalks, streetlights. Cars. I managed to get to an intersection and waited, because there was an orange hand telling me, "Don't go. Stay."

Recently I have been reading about traveling on the internet (yes, I have to overlook a lot of threads about sex tourism). I remember when I was younger and everyone wanted to travel. It seems like it's one of those things that's universally liked. Now, they don't talk about it as much because I guess they're busy actually doing it. So many of the people that I observe on social media have posted about going to popular tourist spots just last year. Their pictures are beautiful, and it looks like they're having fun. They're going to restaurants and playing games and looking at sights from high places.

It was windy the evening I arrived in Boston. In general, it's windier than in Waterloo, but not colder. As I waited at the intersection, the wind was passing through my wool jacket and polyester sweater. The intersection lights and street signs were waving and bending and creaking and squeaking. I was standing still, waiting for the white man to light up on the sign.

People used to tell me that they liked traveling because of "culture". It was usually that one word response (maybe surrounded by a few other words that I wasn't paying attention to) but I *think* I can extrapolate from that. I'm pretty sure they mean that they like to experience other cultures, and what's a better way to do that than literally going to a foreign place full of foreign people? In a way, I do see it. I really do. I mean, culture encompasses "food" and "entertainment", so where is the lie?

The white man still hadn't showed up. He was taking his time. I pressed the button again.

There is no lie, but sometimes I think it is an excuse. It's fine to say that you like eating things that taste good and looking at things that are pretty and, in general, just dicking around and doing fuck-all because that's what you want to do. On the other hand, sometimes I feel like this is the general notion of what traveling is: Trolling about in another country under the pretense of eventually learning something. That was never my cup of tea. I used to say that I didn't like traveling, resulting in shocked faces demanding me for an explanation. I mean, if I wanted to screw around, I could do it at home and not have to bother with pretending that I came out of it a little smarter, a little more enriched. Right?

Even though the white man hadn't yet shown up, people were already crossing the street without even a second glance at the road. The wind kept blowing, and people kept moving, and I stood still, still waiting.

People keep asking me about Boston. How I like it. How Canada is different from the U.S.A. I only really have one thing to say at the moment: everyone jaywalks. I mean it literally. The only people who stop at intersections are old people and kids. And probably other foreigners like me. I saw a man on crutches jaywalk across a four-lane street.

Part of it is because of the infrastructure. In Vancouver, for the most part, intersections are just crosses or plus-signs. Two streets intersecting at a right angle. So, each direction alternates. There's about 40 seconds, give-or-take, for you and the cars to move in one direction, and then it flips, giving those same 40 seconds to the other. If you want to cross the street twice, like to get to the opposite corner of the intersection, you just have to cross the street once, wait for the cycle to complete, then turn and cross the street again.

This is not the case in Boston. The streets might intersect at a very acute angle, or multiple streets intersect. So there is no simple alternating cycle for cars and pedestrians. Each of these complicated intersections gets some sort of custom cycle,

not really optimized for pedestrians. Sometimes, the only time that pedestrians can cross is when *all* cars get a red light and stop. It's taken me over two minutes to get through one of these intersections, because the time between pedestrian crossings is longer and I'm not fast enough to cross multiple times in one cycle.

I can understand why people jaywalk here. Still, those kids don't jaywalk, and they all somehow grow into jaywalking adults. It makes me wonder what it's like to grow up here, what it's like to go through their education system (this part is bad, I've heard), what it's like to be told not to jaywalk when everyone on the streets does it. I can be a tourist here all I like, and I can do all the rest of my co-op terms here, and I can even choose to jaywalk, and still I would never truly understand anything about this place because it has been ingrained into me for long enough that jaywalking is bad, and we should never do it, most certainly never across four-lane streets unless you want to eat cement.

And yet, no one is interested when I tell them this, and they would rather know how many museums I've been to. I went to one so far, the Boston Museum of Science, and all I can say is that the kids here don't seem to be any smarter than the kids in Vancouver, for better or for worse. And that they will grow up to be jaywalkers, whereas the kids in the Telus World of Science will not, even though both museums have some of the same exhibits.

I like traveling, actually, as I found out after a school trip to Japan in eleventh grade. I don't know why I went even though I thought I hated traveling. I guess I thought I might come around to like it. Well, yes, we went to several shrines and fed the goddamned deer in Nara and hiked up some mountain with lots of red gates, and not to be disrespectful to these places which are indeed sacred and full of history, but I learned nothing more than if I had just read some Wikipedia article about those places.

Whereas I did not know that the shop counters in Japan have a little tray that you put your money in when you pay and the cashiers give your change back in the same tray. I don't know what this means. Maybe it's for hygiene reasons or their hands are too small like mine to properly handle cash. There is no Wikipedia article about this, like there is no Wikipedia article about why people jaywalk so much in Boston. Although I did find out that the fine for jaywalking is only $1 which may be a part of it.

Somehow I find myself relating more to the sex tourists who want to go to Japan for their pink salons and soaplands. I want to know more about other cultures, to know what it's like to live a life in another place as another person, and somehow masquerading as a affection-starved salaryman is closer to that than reading those signs that compress centuries of history into a mere 2–4 sentences at temples and shrines.

cy

KEN:

"How are you doing, buddy?" The sandal-wearing vegan—a frequent patron of our homelywatering hole—is the only one left in the restaurant. The dots game that we put out on ourmenu for bored families seems to have ensnared him in a miserable monomania. "What's thematter?" I press further. After a pause, the man blinks twice, as if only now perturbed by thequestions. Suddenly, in a violent fit, he swipes his hands across the counter, sending his cupof Beyond Water careening across the bar. The plastic cup settles lamely in a nook betweentwo floor tiles across the room. Unphased, I try to reassure him that everyone has bad daysevery now and then, but he just seems to have returned to his game. I try to discreetly peekover the bar and catch a glimpse of his work. He's scribbling over the dots with a piece ofcoloured chalk. I make out a word. It looks like "lipshits," but I'm not completely sure. Henotices my intrusion, allowing himself an annoyed scowl before folding up the paper anddepositing it in his back pocket. Is he storing it for later?

The evening commences in a similar manner until, upon his departure, the man lifts his eyesfrom the downcast state they'd been maintaining. His face is fissured by wrinkles and hiseyes betray a dread that could only be the result of some cataclysmic calamity they'dlong-ago witnessed. The man leans over the stool, maintaining eye contact throughout, untilhis face is mere inches from yours. His lips part and let out a trembling breath. He speaks oneword but it's apparent it requires a Herculean effort for him to muster the invocation: "djao."

What happened next, jeff?

supermagicTesseract

MATHSOC STATEMENT ON RECENT POSTERS

Earlier this week MathSoc staff discovered unapproved posters promoting hate speech and discrimination against individuals who identify as LGBTQ+ that had been put up in the DC, MC and M3 buildings. These posters contained some disturbing language and themes.

We are very sorry for everyone who unfortunately saw one of these posters before we took them down. If you were distressed by the content please consider reaching out to a trusted friend, setting up an appointment with a counsellor in Needles Hall or seeing a peer supporter through UW Mates to express how you feel.

Warm regards,

Gavin Orok
MathSoc VPA Winter 2020

THE QUEST FOR THE LOST CHILDHOOD ANIME

AboUt TWeNtY-onE moNThS Ago, I waS AbOut TO/ fall asleep in my dorm room at REV when the two guys in the room next to me woke up for their daily routine as they did everyday at 4:30 AM sharp. In AN aTTemPt TO maSk THe NoIse AnD FaLl A/sleep, a short but life changing 3 note tune had triggered a long forgotten memory of a show whose opening is all I could watch before my school bus at the time arrived to take me away. LitTlE diD I/ know, that short melody would initiate an epic adventure down the deepest of rabbit holes, through the most obscure of connections and ultimately, to the most gratifying discovery of my life.

I started where anyone would: replaying the song and trying to remember really hard. This worked for a while; I remembered a new fact about the show everyday for about a week until I had the following list:

- A three note-long tune from its opening song
- It was about a girl who became a witch
- She roped in 2 of her closest friends in and they became witches as well
- They derived their magical power through a wand that used magical balls which can be consumed and refilled
- They had to go through a test to attain full 'witch' status
- The MC failed this test when she took it with her friends but her friends passed on their first try
- She failed because when asked to conjure up the most delicious food imaginable, she created a jam sandwich since it was her favorite
- It aired on POGO, Cartoon Network, Nickelodeon, Disney XD (yeah, that far back) or Nick Jr between 2005 and 2008
- It aired at around 10 AM, but also at other times during the day

Despite being a longer listicle than most here at **mathNEWS** (**cough**[insert editor's choice of listicle from a previous issue here]**cough**) *[Editor's note: *cough* you don't tell me what to do 😛 *cough*]*, the lack of keywords made it incredibly difficult to search for it online. The abundance of anime with similar plotlines didn't help either. Without any character names or terminology specific to the show, I was stuck browsing through hundreds of lists with thousands of titles, and decade-old forums with ambiguous details. Still, I was determined.

So determined, in fact, that I had looked through not just the second page of the google search results, but even the third. At one point I got so desperate, I almost used Bing! Fortunately, I regained my sanity and closed the tab before following another rabbit hole about some CGDCT ('cute girls doing cute things' for the less cultured) manga about a girl becoming a fairy with her friends, only to hit an inevitable dead end marked by a comment from an accomplished basement dwelling weeb stating that he knew exactly what doujinshi OP was looking for. Truly the darkest of times. At this point, however, I was in too deep to give up.

10 months after that fateful night, I declared war upon the cosmic force keeping me from finding this fabled show, and finally looked to the TV archives for salvation. 5 channels, 3 years, and only one mythical title. It may take a long time, but even a sliver of a chance of finding what I was looking for made it worth the try. And so, I looked through every time slot of every channel for every week of 3 years, hoping to see that magical title that I imagined would, at this point, feel like achieving nostalgic Nirvana. Every day was a grind, and every day was fruitless. But I kept pushing on, kept reading on, fueled by equal parts hope and spite.

I passed by rewarding checkpoints of shows that shaped my childhood; Dexter's Lab, Johnny Bravo, Ed, Edd n Eddy, The Grim adventures of Billy and Mandy – all amazing shows calling out to me, begging me to watch an episode for old time's sake. But I shook the urge off to march through the weekly schedules, with only the witch girls with ball-filled wands as my target.

A year and a half in, my mind had started to question this Sisyphean obsession of mine. Was this show even real? What if it was a fake memory; the result of combining fading memories of two different shows that I thought worked well together? Perhaps it was just a show idea I had that subconsciously evolved into a childhood memory. But that was when I found it! The tiniest lead spotted in the corner of my eye: the show had the same series director as Sailor moon, Junichi Sato(u).

The next few clicks can only be described as surreal. Every microsecond each next page took to load felt like weeks; every glide to the next link took months. My entire life flashed before my eyes within the 45 or so seconds it took for me to navigate to the list of anime Junichi Sato(u) had worked on. Scrolling through the list, I thought of how much time I spent on this search. The gruelling quest through treacherous digital terrain and the deepest and darkest of online caves had all been for this moment. The list itself consisted of some of the most legendary animated works to come from Japan. Scrolling past Gundam, skipping over Sailor Moon, and hopping across Evangelion, I had finally arrived at the thing that would make me complete: 'Ojamajo Doremi'…

They say that the pupil of your eye can expand as much as 55% while looking at something you love, but I truly believe that were the scientists who conducted that study there when I saw the title, they would be scrambling to first take notes and

photographs, and then take me to the ER. I never knew how powerful a simple image of a trio of girls in witch uniforms could be. I never realized how many memories a simple two-word title could invoke. In the midst of the tsunami of a dopamine and serotonin cocktail drowning my melting brain, I felt the most ecstatic and amazing feeling that cannot possibly be described within the constraints of language. An emotion so intense, even a mother seeing her newborn child for the first time could not compare. I was one with the weeb within me, and the weeb was one with me. I had achieved, for the split second between finding the show and hearing the couple in the room next to me get going at 3 in the afternoon for some reason, true bliss.

The quest of a lifetime had finally come to an end.

HOW MANY BIRTHDAYS DO YOU HAVE?

For most of you reading this, you may instinctively answer my question by saying "One." In most circumstances, that answer would be correct. However, throughout the two decades I've been alive, I've encountered people who have more than one birthday. Chances are, by the end of this article, you may end up with a couple more birthdays of your own to observe.

We all have a birthday in the usual Gregorian Calendar, but what about in other Calendars? Like how some follow Christmas using the Julian Calendar, you can decide to observe a Julian birthday as well. You can take this even further if you want. Look up the list of calendars and see which may be applicable or interesting to you and start observing your birthdays according to those calendars.

An interesting one is the Islamic Calendar. Since it has fewer than the 365-ish days of the Gregorian Calendar, over the course of your life, you will end up encountering more Islamic birthdays than Gregorian birthdays. Every once in a while, you could end up celebrating two birthdays in one Gregorian year.

I personally like to observe my birthday using the East Asian Lunar Calendar. I don't know about other East Asian countries, but at least in Korea, the Lunar Calendar is still used by many people. It may sound odd, but a large proportion of the population, particularly seniors, still follow the Lunar Calendar for birthdays. Growing up, I decided that I should try observing a Lunar birthday as well. If I have to remember Lunar birthdays for my grandparents, why not for me?

Another sort of birthday that I've come across by being Korean is January 1st of the Gregorian Calendar. There is a Korean age system different from the usual International age, and it relates to this particular date. For those unfamiliar, this is the formula: (Korean Age) = (Current Year) — (Birth Year) + 1. This means that your age differs by 1 or 2 from your Korean age, which has a couple of interesting consequences. If you are born on December 31st, you are 1 on that day, then the very next day, you turn 2 years old. If you are born on January 1st, your Korean age and International age is always 1 year apart. Since everyone born in your year becomes a year older on the same day, it makes all birthdays so much easier to remember, don't you think?

If you want to involve maths even more in your birthday calculations, you can observe your Gregorian birthday (or any other birthday for that matter) while factoring in time zones. For example, people usually celebrate their birthdays from 00:00 to 23:59. However, if you were not born in the time zone you are currently in, then you would need to consider the time zone of your birthplace and ensure that no matter what time zone you happen to be in, your birthdays align with the timezone of your birthplace. That way, each birthday would be exactly a calendar year apart, instead of a calendar year ± a couple hours from the time zone offset. It obviously becomes complicated especially with Daylight Saving Time, and even more complicated if your birthday happens to be on a day when time shifts by an hour in applicable regions in Canada, but that's the fun with time zone math.

This last one is a birthday that only arises from circumstance. Occasionally you see cases, especially in older generations, where one's actual birthday is different from the birthday recognized by the government. I doubt Canada ever allows anyone to register a birthday that is not their physical birthday, but through circumstance and history it can differ in other places. Many decades ago in Korea, the rate of infant mortality was high and most infant deaths would occur within the first year, so parents would withhold registering their children for about a year. So, it became that for a lot of people, their official birthday was the day that they became registered instead of their actual birthday. The official birthday was used legally in every sense except when actually celebrating a birthday. Thankfully the need for this practice became obsolete a couple decades ago and the only way to encounter this difference is with seniors.

In the end, if you think this is all stupid anyway, and birthdays have no meaning to you, you can do what I also like to do: Count the number of full days, and do a small celebration every 100 days and/or other significantly numbered days[1]. You'll get about over triple the number of celebrations. For example, I've surpassed being 7300 days alive not too long ago. It's not too bad of a streak.

boldblazer

1. Interesting days of note that I have minorly celebrated since starting counting include powers of two, 6969, multiples of 1111, and runs of numbers such as 6789.

THE GREATEST SCENE IN THE HISTORY OF TELEVISION

The following dialogue is 100% plagiarized from the greatest scene in the history of television [citation needed and left as an exercise to the reader] because it's just that good. The proper nouns have been changed to see if you're able to guess which TV show this is from. Brag to your friends about which point in this article that you guessed correctly! Note: I almost cried copying and pasting this because it's just that good!

[Editor's note: some parts of this article have been redacted for copyright reasons. Policy 71 my dude]

Dante: [*REDACTED][REDACTED*][REDACTED][REDACTED]u.

[REDACTED][REDACTED][REDACTED]oom

Mark: [REDACTED][REDACTED][REDACTED]ing here?

[REDACTED][REDACTED]Scene

[REDACTED][REDACTED]e

Mark: [REDACTED]ou here?

Dante: [REDACTED][REDACTED]e truth.

Mark: [REDACTED][REDACTED][REDACTED][REDACTED] [REDACTED][REDACTED][REDACTED]eresting.

[REDACTED][REDACTED][REDACTED][REDACTED]ve

Dante: [REDACTED][REDACTED][REDACTED][REDACTED] [REDACTED][REDACTED][REDACTED][REDACTED]me.

Mark: [REDACTED][REDACTED][REDACTED] that?

Dante: [REDACTED][REDACTED][REDACTED][REDACTED] survived!

Mark: What?!

Dante: [REDACTED][REDACTED][REDACTED][REDACTED] [REDACTED][REDACTED][REDACTED][REDACTED] now.

Mark: [REDACTED][REDACTED][REDACTED][REDACTED] [REDACTED][REDACTED][REDACTED]you!!

Dante: [REDACTED][REDACTED][REDACTED][REDACTED] [REDACTED][REDACTED]e!

Mark: [REDACTED][REDACTED][REDACTED][REDACTED] [REDACTED][REDACTED]

[REDACTED][REDACTED]ds

Dante: [REDACTED][REDACTED][REDACTED][REDACTED] [REDACTED][REDACTED][REDACTED].

[REDACTED][REDACTED]Scene

[REDACTED][REDACTED]e

Dante: [REDACTED][REDACTED][REDACTED][REDACTED] [REDACTED][REDACTED][REDACTED][REDACTED] [REDACTED][REDACTED][REDACTED][REDACTED] [REDACTED][REDACTED][REDACTED][REDACTED] [REDACTED][REDACTED][REDACTED][REDACTED] [REDACTED][REDACTED][REDACTED][REDACTED] [REDACTED][REDACTED][REDACTED][REDACTED] [REDACTED][REDACTED][REDACTED][REDACTED]d?

Mark: [REDACTED][REDACTED] respect.

Dante: [REDACTED][REDACTED][REDACTED]g!

Mark: [REDACTED][REDACTED] nothing!

Dante: [REDACTED][REDACTED][REDACTED][REDACTED] [REDACTED][REDACTED] own!

[REDACTED][REDACTED][REDACTED][REDACTED] [REDACTED][REDACTED][REDACTED][REDACTED] [REDACTED]y.

[REDACTED][REDACTED][REDACTED][REDACTED] [REDACTED][REDACTED][REDACTED][REDACTED]orld.

[REDACTED][REDACTED][REDACTED][REDACTED] [REDACTED][REDACTED][REDACTED][REDACTED] [REDACTED][REDACTED][REDACTED][REDACTED] [REDACTED][REDACTED][REDACTED][REDACTED] [REDACTED][REDACTED][REDACTED][REDACTED] [REDACTED][REDACTED][REDACTED][REDACTED] [REDACTED][REDACTED][REDACTED][REDACTED] [REDACTED]ess.

[REDACTED][REDACTED]ly

Mark: [REDACTED][REDACTED][REDACTED][REDACTED]?

Dante: [REDACTED]as.

[REDACTED]ause

Dante: [REDACTED][REDACTED][REDACTED][REDACTED] [REDACTED][REDACTED][REDACTED]n.

[REDACTED][REDACTED][REDACTED][REDACTED] [REDACTED][REDACTED][REDACTED][REDACTED]r to me.

Mark: [REDACTED][REDACTED][REDACTED][REDACTED] [REDACTED][REDACTED][REDACTED][REDACTED]lure.

Dante: [REDACTED][REDACTED][REDACTED][REDACTED] [REDACTED][REDACTED][REDACTED][REDACTED] [REDACTED][REDACTED][REDACTED][REDACTED]u.

Mark: [REDACTED][REDACTED][REDACTED][REDACTED] [REDACTED][REDACTED][REDACTED][REDACTED] [REDACTED][REDACTED][REDACTED][REDACTED] [REDACTED][REDACTED]it now?

Dante: [REDACTED][REDACTED][REDACTED][REDACTED] [REDACTED][REDACTED][REDACTED]stiny.

[REDACTED][REDACTED]swords

Dante: Goodbye.

Mark: [REDACTED][REDACTED][REDACTED][REDACTED] [REDACTED][REDACTED][REDACTED][REDACTED] [REDACTED][REDACTED][REDACTED][REDACTED] [REDACTED][REDACTED][REDACTED][REDACTED] [REDACTED][REDACTED][REDACTED][REDACTED] [REDACTED][REDACTED]

[REDACTED][REDACTED]Scene

[REDACTED][REDACTED]e

Dante: [REDACTED][REDACTED]night!?

Mark: [REDACTED][REDACTED][REDACTED][REDACTED] [REDACTED][REDACTED][REDACTED][REDACTED] [REDACTED][REDACTED][REDACTED][REDACTED] [REDACTED][REDACTED][REDACTED][REDACTED] [REDACTED][REDACTED][REDACTED][REDACTED] [REDACTED][REDACTED][REDACTED][REDACTED] [REDACTED][REDACTED][REDACTED][REDACTED] [REDACTED][REDACTED]d.

[REDACTED][REDACTED]Scene

[REDACTED][REDACTED]e

Mark: [REDACTED][REDACTED][REDACTED][REDACTED] [REDACTED][REDACTED][REDACTED][REDACTED] [REDACTED][REDACTED][REDACTED][REDACTED] [REDACTED]hed!

Dante: [REDACTED][REDACTED][REDACTED]

Mark: [REDACTED][REDACTED][REDACTED][REDACTED] [REDACTED][REDACTED][REDACTED][REDACTED] [REDACTED][REDACTED][REDACTED]eeper.

The dialogue ends here, but the climax of the scene happens right after the last word. It's is such an amazing 5 seconds of animation that no amount of words will do it justice. This scene culminates in the greatest character arc of television history of Zuko from Avatar: The Last Airbender. It's an amazing show and you should all rewatch it!

A Mathematical Psychic And Astrologer

MATHSOC POSTING BOARDS GUIDELINES

Hello!

Recently, a series of unauthorized posters were distributed throughout several buildings on campus, including on official MathSoc posting boards. We would like to extend our sincere apologies to anybody who came across them.

MathSoc would like to remind everyone that anything going up on our official posting boards in MC and DC must come through the MathSoc Office in MC 3038 and be approved by our Postings Director, who will then distribute them during their next regular poster run. We're happy to take four letter-size posters or two of a larger size.

Additionally, MathSoc would like to reiterate that discriminatory or intentionally offensive posters are not tolerated.

Thank you!

Yuqian (Ina) W.
Winter 2020 MathSoc President
(on behalf of the Winter 2020 MathSoc Exec Team)

N THINGS OVERHEARD AT mathNEWS

- Writer: There is no such thing as a good **mathNEWS** article.
- Writer: There's this website where you can play as a cat on bongos.
  Writer: Can I see that?
  cat meowing intensifies
- Writer: If you're going to be this bougie, can you at least save the file?
- Writer: How long will the **mathNEWS** baby clothes be on sale for? Can I get some in advance?
  Writer: In advance of what? The 10 years from now when you have a kid?
- Editor: I prefer quality journalism over fast journalism.
- Writer: I only write top tier quick journalism.
- Writer: It's not kidnapping if you give them back in 10 minutes!
- Writer: Our meme group got a New York Times exposée on it.
- Editor: Thank you for supporting my toilet dreams
- Editor: Toilet…toilet…toilet…toilet?…toilet… toilet!
- Editor: The bigger, the hotter

2020 WATCH

EPISODE III: REVENGE OF THE PETE

Last column, we talked about Iowa. The world was waiting for the sage opinions of the corn-loving state, whose first-in-the-nation status gave them the chance to weigh in on the next leader of the free world, a job they took on with the caution and solemn competence it deserved…

So why, as I write this on February 10th, the Year of Our Lord Two Thousand and Twenty, do we not have final results from Iowa? The answer: Iowa is a disaster. From a broken app (embarrassingly tied to Pete Buttigieg) to delayed results to errors that kept accumulating throughout the night, including but not limited to: voters appearing out of nowhere, voters disappearing to nowhere and eliminated candidates being resurrected to life in some precincts. Oh, and DNC chairman Tom Perez is straight up declaring a do-over:

https://twitter.com/TomPerez/status/1225468833458245632

CAPTION: Get a glimpse of that ratio, folks

Sorry to all our Iowan readers, but y'all fucked up. They're probably taking your caucus away now. To make matters worse, the results are corn-shuckingly close. New rules mean that Iowa now has to report three sets of numbers. In the state delegates, (a metric that is derived from raw votes through a complex chemical reaction) Buttigieg holds the merest 0.1% lead, while in the other two popular vote numbers, Sanders holds a lead of a few percent.

What do we know? Buttigieg did better. Biden did worse. Everyone else gets a resounding "about as good as we thought they would." But thanks to the results disaster and the impeachment trial that occurred the next day, did anyone really notice? If a corn stalk falls in a corn field and no one hears it, does it make a sound?

Usually, the underperforming campaigns drop out after Iowa, after it becomes clear their polling results of "shit" really were "shit" the whole time. Not this time. Chalk it up to the damaged results, the increasing concerns about Iowa's whiteness being out of step with the nation, or just the fact that everyone and their mother is running this year, but no one's dropped out. Bernie and Warren still fight for the left lane, while Biden, Buttigieg and Klobuchar fight to be the "not-Bernie" candidate. Meanwhile, Steyer and Bloomberg bring the missing "fuck-tons of money" into the equation. Oh yeah, and a bunch of other dudes too, like Deval Patrick, Michael Bennet, and Paul Bunyan.

So, we look to New Hampshire, who, thankfully, vote like normal people with ballots and not in high school gyms like grade 9 orientation.

Going into the race, Sanders leads, while Buttigieg has ridden his half win of Iowa to about 5 points behind. For now, these two seem like the ones to beat. The rest, i.e., Warren, Biden, and Klobuchar, are looking to show enough strength to stay in the game and avoid their supporters cutting and running.

As I write this, the New Hampshire primary is tomorrow. Let's hope the New Hampshire primary results are tomorrow, too.

UW Unprint

AN IMPORTANT MESSAGE, BUT IT'S IN BRAINFUCK

```
+[--->++<]>+.-[--->+<]>---.++++++++.+[-->+++++<]>.---
---------.--[->++++<]>+.----------.++++++.-[---->+<]>+++.
[->+++<]>+.++.-[--->+<]>--.+.[->+++<]>++.++++++++++..-[-
-->+<].-[---->+<]>++.[->+++<]>++.++++++++++++.+++++.-
----------.---.++++++++++++.--------
-----.-.-[--->+<]>-.---[->++++<]>.-----.
[--->+<]>-----.---[->++++<]>.--.+++[->+++<]>++.++++++++++++.+++++.-
------.-----------.--[--->+<]>-.+++[->+++<]>.--[--->+<]>-.-
--[->++++<]>.------------.+.++++++++++.[->+++++<]>.+[-
->+<].++++[->+++<]>+.+[-->+<]>++.---[->+++<]>+.
[->++++++<]>-.-[--->++<]>-.++++.+++.++.-------------.
[--->+<]>----..++++[->+++<]>.-.[->+++<]>++.++[--->++<]>.>-
[--->+<]>-.[---->+++++<]>-.+.++++++++++.+[---->+<]>+++.-
-[->++++<]>-.-[->+++<]>-.--[--->+<]>--.+[---->+<]>+++.-[---
>+++<].++++++++++.--.+.[---->+<]>+++.---[->++++<]>-.++.-
----..-.++++.++++[->+++<]>.-.-[--->+<]>-.---[->++++<]>.-----.
[--->+<]>-----.[->+++<]>++.+++.--[--->+<]>-.---[->++++<]>-
.----.--.--------.--[--->+<]>-.+[->+++<]>+.--[--->+<]>-.------
--.----------.--[->+++<]>.++[->+++<]>+.------.++++++.---[-
>+++<]>.----------.+[----->+<]>.++.++++.+.[---->+<]>+++.
[-->++++++<]>.----------.++++++++++.+.----.--------.--[---
>+<]>-.---[->++++<]>-.+.-----.+..----------.-.-[--->+<]>-.---[----
->++<]>.-------------.----.+++.+++++.+++++.--------.-[--->+<]>--.
[->+++<]>+.+++++.-[--->+<]>---.+++[->+++<]>.++++++++++++.
[-->++++++<]>+++.---[->++++<]>.------------.---.--[--->+<]>-
.++[->+++<]>.+++.++++++++++.+.+.[---->+<]>+++.++[-
>+++<]>+.+++++.----------.++++++++++++.----------.++.
[->+++<]>-.++[--->++<]>.+[->++<]>+.+[--->+<]>+++.-
.--------.++++++++++.+++[->+++<]>++.--[--->+<]>-
.+.---------.----------.--[--->+<]>-.----------.++++++.-
.+++++.+[---->+<]>+++.++[->+++<]>.++++++++++.+++.
[-->++++++<]>+++.+[----->+<]>.------------.++++++++++.--
.+++++.--------.-[--->+<]>--.-[--->++<]>-.++++++++++.[----
>+<]>+++.---[->++++<]>.------------.+.++++++++++.+[----
>+<]>+++.++[->+++<]>.-----.--[--->+<]>---.++[++>---<]>.
```

[Editor's note: for the lazy, http://shorturl.at/beLSZ*]*

Fruitboy

DIVERSITY IN THE OSCARS

The Oscars, along with many other big television events, have been criticized in the past several years regarding their lack of diversity, so here's a little bit about this year's Oscars and what diversity related things happened.

For those of you who do not know, Parasite, directed by Bong Joon-ho, won best picture (among 3 other awards). This makes it the first ever non-English language film to win this award. Now the academy awards have been going on for 92 years. In that time, 11 foreign language films have been nominated and only one has won. Hmmm… 🤔🤔🤔

Another big issue surrounding this year's Oscars is the lack of female directors. In 92 years of Oscars, only five women have been nominated for best director, and only one has won. It's not like there are no female directors either. Natalie Portman wore the names of 8 female directors who could have been nominated for Oscars 2020, but were not. Additionally, the non-profit organization "Give Her a Break" protested the lack of female director nominees in their own way. They streamed the Oscars live while replacing all ads with trailers for films directed by women.

Finally, this is the second time ever that an Indigenous person has won an award at the Oscars, among 9 nominations (again, 92 years guys!!). Taika Waititi accepted an award for Best Adapted Screenplay for Jojo Rabbit this year. In his acceptance speech, he also did the first land acknowledgement ever spoken at the Oscars, acknowledging the ancestral lands of the Tongva, Tataviam, and the Chumash.

Anyways, some food for thought. How can we make the Oscars more diverse without forcing academy members to vote for specific films?

Whild

WUSA'S FIRST EVER ALL-FEMALE EXEC TEAM!

Waterloo, ON – February 11, 2020 – Undergraduate students at the University of Waterloo cast their vote for the 2020-21 incoming Executive, Students' Council and Waterloo Senate. For the first time in the history of the Waterloo Undergraduate Student Association (including our time operating as Federation of Students), an all-female Executive team will take office beginning May 1, 2020.

Among their other priorities, Team Vision collectively ran on a platform of mental health advocacy and student engagement, hoping to bring more collaboration to WUSA's internal and external operations. On being part of WUSA's first ever all-female Exec team, Vice President-elect Nada Abouelnaga shared, "I feel it's important that our gender identities don't come in the way of our experiences, qualifications and passion for serving students," something she believes was not the case in this election and hopes to see continue.

Current VPSL, Amanda FitzPatrick, remembers hoping for change after last year's election. She felt the results showed a lack of diversity and respect for racialized and otherwise marginalized candidates. She now looks to the future with hope, as this slate of powerful and qualified women prepare to take office. FitzPatrick is optimistic, "this will inspire more students to get involved in advocacy and governance, as for the first time ever they can see that succeeding is possible."

WUSA

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

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

USE YOUR OWN IMAGINATION FOR A TITLE FOR THIS ONE

gridCOMMENT *142.3*

I don't have anything witty to say this time. Midterms are hell.

It appears that I have made a horrible mistake on last issue's **gridWORD**. Yay. V142i2's 19-Down should have been 'tablespoon' instead of 'teaspoon' for 19 down. It still vaguely works, but the v142i2 crossword appears to have been declared war on by one of the submissions. I'm not sure how war between non-nations and non-sentient beings work, but if anything it's probably exciting. I still do agree that I should have triple-checked myself, and have done that this time around. Again, apologies.

Anyways. I received 3 correct submissions, significantly less than 9 from last time. Whether or not midterms played a role here, or it being from the tablespoon fiasco is unclear. Name (Moniker) followed by their answer to last week's **gridQUESTION**, "If you could teach a course of your own, what would it be on and why?"

- Cone: "GOOSE100: how to defend oneself from a goose attack"
- Alyssa: (no response to the **gridQUESTION** but included instead is a declaration of war)
- Vafflez, Whale: "A class on proofs by seduction"

Cone's answer is easily the most applicable to any poor soul wandering on UW, so congratulations! Go annoy the editors for your prize.

I just copied v142.2's boilerplate because I have no shame. The **gridWORD** is a feature column of **mathNEWS** wherein a tiny and edible crossword can be solved in your leisure. You may choose to submit it either via the **blackBOX** mounted next to the Math C&D's neon sign, or electronically to mathnews@gmail.com. Please include your name, optionally a moniker, and a **gridWORD** with your solution attempt on it. Also optionally your answer to this issue's **gridQUESTION**, "What is the best way to prepare for war against a **gridWORD**?"

May a war not occur again this issue,

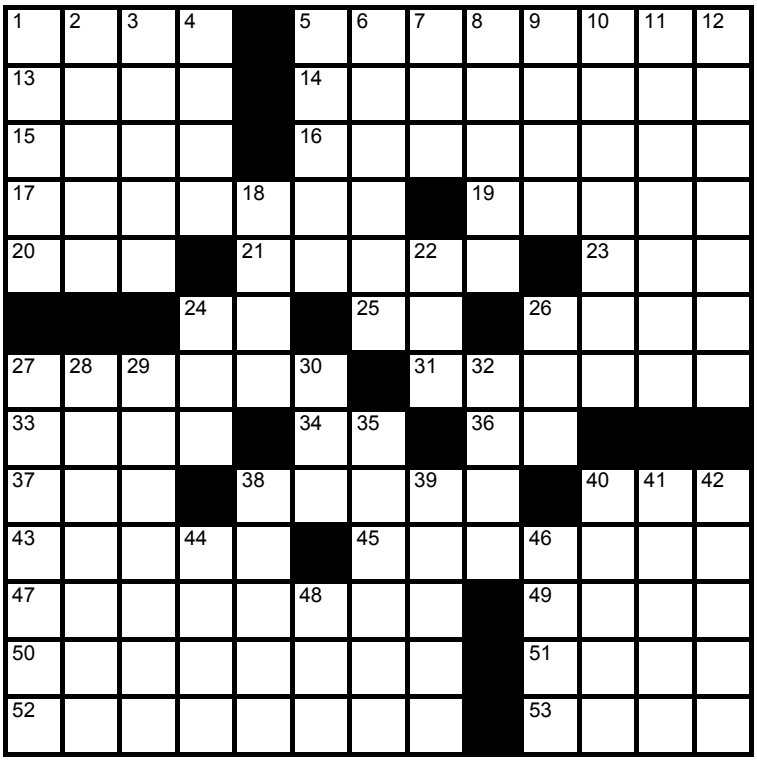
Solar Flare

ACROSS

1. Eve's mate (4)
5. What you're holding right now (8)
13. Lacking cover (4)
14. Of an embryonic sac (8)
15. 4,047 square meters (4)
16. Lives in a cottage (8)
17. French mansion or castle (7)
19. A scrambled chain (5)
20. 75 (ASCII) (3)
21. Second meal of day (5)
23. Pinch or squeeze (3)
24. 50 states (2)
25. To (2)
26. Oozing through a tiny opening (4)
27. Idle person (6)
31. Loud and boisterous (6)
33. About 1.45 canadian dollars (As of 3/10/2020) (4)
34. Logically ambivalent (2)
36. Male pronoun (2)
37. Past tense word that is an anagram of its present tense (3)
38. Travel course (5)
40. He is (3)
43. Made a vow (5)
45. With extreme anger (7)
47. Current geological epoch (8)
49. Grows on heads (4)
50. Obliterations certain in time (8)
51. Language spoken in Pakistan (4)
52. Scornful ones (8)
53. One possible method of pest controlling (4)

DOWN

1. Toward or situated to the back (5)
2. Russian summer retreat? (5)
3. Starts at 0 (memes say they start at 1) (5)
4. Join (4)
5. Chinese autonomous city (5)
6. Quantity (6)
7. Dynamite substitute (3)
8. Entangled Problem (5)
9. Boat captain from bible (4)
10. V6, V8, V12, .etc. (7)
11. Hotdogs (7)
12. Argumentative (7)
18. If-then-__ (4)
22. Corn remainder (3)
24. Flying unidentified disk (3)
26. Self-addressed envelope (abbr.) (3)
27. Restrains retrievers (7)
28. Obsolete (7)
29. Colourful anatomical circles (7)
30. Australian hopper (informally) (3)
32. Saturn satellite (4)
35. Spoiler (6)
38. Repeat again (5)
39. A lock of hair (5)
40. Date this issue is released on (5)
41. Omit when speaking (5)
42. Maple (5)
44. Same clue as 40-Down (4)
46. In this way, shut wrongly (4)
48. Before, before (3)



ANOTHER TINY PUZZLE

haltingCOMMENT *142.3*

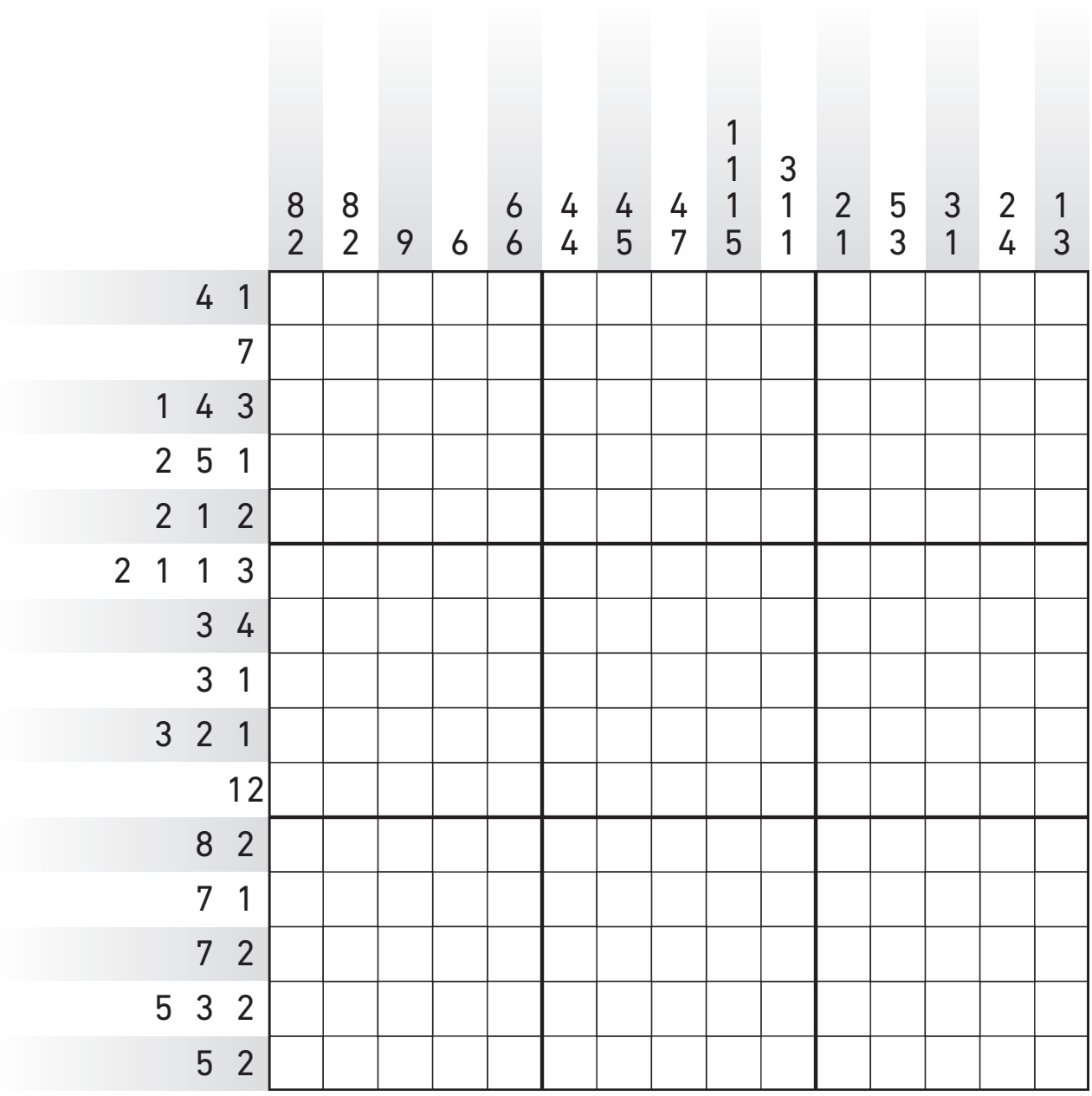
Welcome back everyone! Despite midterm season's inevitable approach, I still find in me the energy to continue making tiny puzzles. It's still another picross/nonogram, but it's something.

For first timers, what's a picross? A picross is a puzzle where numbers give hints to help you figure out in set of rows and columns which blocks should be filled. The numbers at the start of a row or column indicate the discrete chunks of filled blocks in a row there are. So if a column states '2 4 3' then there is an arbitrary amount of unfilled blocks before two filled blocks in a row, followed by at least one unfilled block, then four filled block in a row, then at least one unfilled block, then 3 filled blocks in a row, then another arbitrary amount of unfilled blocks, etc.

If that's a bit confusing, just search it up wikipedia. They're more reliable as an explanation than I am, especially since I just did a midterm so my mind isn't functioning properly.

That's all, have fun!

Pikachu.exe



lookAHEAD

SUN FEB 16	MON FEB 17	TUE FEB 18	WED FEB 19	THU FEB 20	FRI FEB 21	SAT FEB 22
	Reading week - no classes! Family day	Reading week - no classes! 90th anniversary of the discovery of Pluto (1930)	Reading week - no classes!	Reading week - no classes!	Reading week - no classes!	

SUN FEB 23	MON FEB 24	TUE FEB 25	WED FEB 26	THU FEB 27	FRI FEB 28	SAT FEB 29
	mathNEWS 142.4 production night	Mardi Gras	Ash Wednesday		**mathNEWS** 142.4 published Last day of main round co-op interviews	Leap day

ADFS SERVICE OUTAGE FEB 18 10:30 PM

IST has announced that all services using ADFS authentication will be unavailable from 10:30 p.m. Tuesday February 18 to 12:30 a.m. Wednesday 19th.

This affects Quest, LEARN, Office 365 email, Workday.

More information is available on the MFCF web site.
https://uwaterloo.ca/math-faculty-computing-facility/news/adfs-active-directory-federated-services-outage-feb-18-19

MFCF

LAST WEEK'S gridSOLUTION

S	C	I	E	N	C	E	■	C	O	C	A	S
C	■	C	R	O	O	N	■	R	E	A	C	T
E	P	H	E	D	R	A	■	E	R	R	O	R
N	E	O	■	■	O	T	T	O	■	A	N	I
T	E	R	S	E	N	E	S	S	■	C	I	D
■	■	■	O	C	A	■	P	O	T	A	T	O
S	P	U	D	S	■	■	■	T	A	S	E	R
P	O	T	A	T	O	■	C	E	P	■	■	■
A	L	E	■	A	P	P	O	S	A	B	L	E
M	E	N	■	S	T	I	R	■	■	R	A	G
M	A	S	A	I	■	V	O	I	C	I	N	G
E	X	I	L	E	■	O	N	I	O	N	■	E
D	E	L	L	S	■	T	A	I	L	E	N	D

LAST WEEK'S haltingSOLUTION