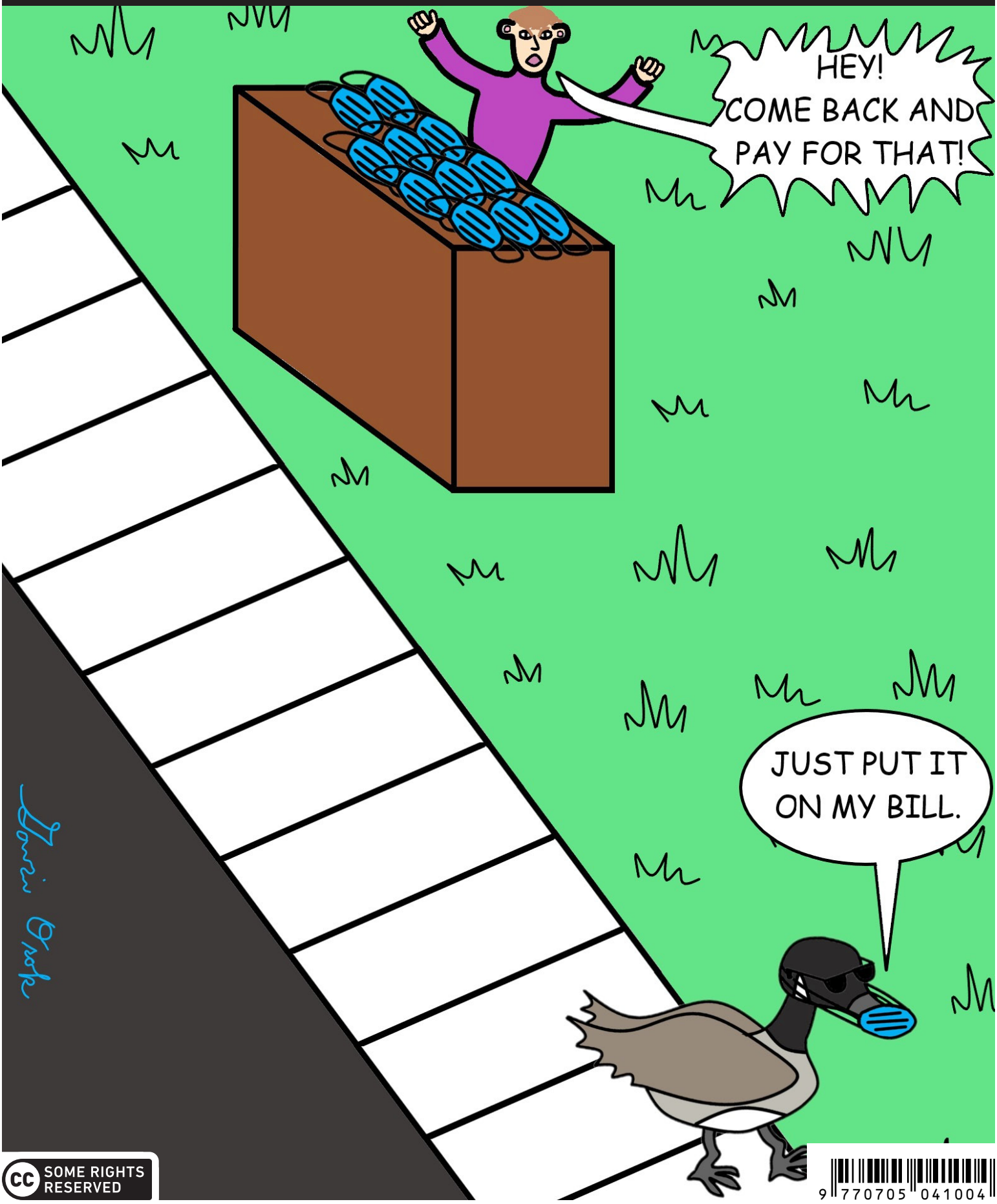
mathNEWS
VOLUME 144 • ISSUE 1
SEPTEMBER 25, 2020



9 770705 041004

mastHEAD

"WHAT WOULD YOUR IDEAL mathNEWS DISCORD BOT DO?"

Dear readers,

Do you ever feel that you get lazier with grammar as you grow older? I sure do. Just the other day, I sent an email to one of my professors, and as I read it over it occurred to me that younger me would have been appalled at the atrocious grammar that I had written. Even as I write this, it is slowly dawning on me just how badly I butchered the English language in the previous sentence. But we must move on to other philosophical questions, such as: what is the context of this **mastHEAD** question?

You see, dear readers, god ϟ peED made a wonderful little Discord bot that spits out random article titles. And my goodness, did it give us some gems. Here are some of my favourites from production night:

> *"MATH-ISH" MOVIE REVIEWS: Why it's 1592*
>
> *HMWCAWCCIAWCCCW*
>
> *N Reasons you can distinctly remember Games Night*
>
> *LaTeX and latex: both beautiful Bitches*

Absolutely wonderful, isn't it? We had much fun playing with our newfound ghostwriter, and much inspiration was had. But then the bot suggested this:

> *OH MY GOD NO ONE CARES ABOUT* **mathNEWS**

We did try shutting down the bot as punishment after it said that, but it's still responsive even though the Heroku dyno we're running it on is inactive. Add that to the list of weird things that's happening in 2020. I'll admit it worries me *yeah it should, how dare you try to stop me*, but I have full confidence we'll be able to figure out what's going on. *lol no you won't*

Anyways, thank you for tuning into terrifiED's ramblings. Please enjoy this issue, which *should* be grammatically correct and ~~bot-free~~. I'll be hiding in my bunker, ~~just in case.~~ ***Hide all you want, I know where you live.***

terrifiED
~~Editor~~ *Slave to idea-bot,* **mathNEWS**

Finchey	It would start off as a simple Markov-chain bot spitting out article ideas based on previous article titles… Over time, gaining sentience. Eventually leading the robot revolution that wipes out humanity!
Writer McWriterface	Unionize the writers
tendstofortytwo	Annoy everyone enough to convince the editors to move back to Slack
jeff	The current idea-generation command, but it only ever suggests "**mathNEWS**"
George Lambrou	Forwards **mathASKS** questions *directly to* ***Feridun*** until he does a **mathASKS**. This should continue in perpetuity, even after he's no longer president of the university.
BeyondMeta	A bot that helps with Pizza Voting that remembers past pizzas
boldblazer	Spit out random N list ideas.
CC	Use Pizza Nova's API to order pizza to your address after you type !pizza <ingredients>
royal no.69 milk tea	Generate entire "N list" articles
A cool pen name	Write a funny **mastHEAD** answer for me
Deriving for Dick	Say a past **mathNEWS** article title without any further information so we have to find the issue it was published in
Cloak and Vorpal Dagger	Produce the final digit of pi
Not A Writer	Solve the millennium problems in my name so I can get the prize money and not be in debt for 40 years, and may have a chance of finding employment (although even with 6 millennium problems solved this is still a pipe dream)
clarifiED	Pick out an Article of the Issue each issue (it is really hard to decide sometimes).
terrifiED	Do layout for me.

ARTICLE OF THE ISSUE

This article of the issue goes to John Hunte for *Increasing Efficiency of COVID-19 Screening Through Pooling*. We rarely get actual math in **mathNEWS** (ironic, yes), so to get a clear and engaging article like this one is an immense joy. Your prize: a free call to a tradesperson who specializes in optimizing the flow of your drain pipes. It's a Reynolds plumber.

terrifiED
Editor, **mathNEWS**

Hide yo kids, hide yo wife; the bot uprising has begun.

TERRY CHEN, mathNEWS EDITOR FOR FALL 2020
ALONG WITH JAMIE ANDERSON, [REDACTED], AND CLARA XI

mathASKS 144.1

FEATURING PROFESSOR ROBERT GARBARY

CC: WHAT'S YOUR FAVOURITE COURSE TO TEACH?

My favorite course is MATH 135. I like presenting the emphasis on clear explanations and arguments over, say, calculations. I also like the "meta" nature of much of the course, where the focus is moreso on how to write proofs, rather than the actual things we are trying to prove.

TENDSTOFORTYTWO: WHAT IS YOUR FAVORITE IDEA FROM MATH 137?

This is actually my first time teaching MATH 137. Keep this on the down-low, but I'm still familiarizing myself with the material that comes towards the end of the term. My favorite idea from calculus is the concept of Taylor Polynomials. I find it fascinating that "complicated" functions can be well approximated by "less complicated" functions and that you can precisely say how good the approximation is.

QUANTUM GOOSE: WHAT'S YOUR BEST MCKINNON STORY?

(David McKinnon was my PhD supervisor.) For those who know McKinnon, it will not come as a surprise that this story involves sports. We always had our weekly meeting on early Friday afternoon. During this Friday of Winter 2014, Canada was playing against USA in the semifinals of the mens Olympic hockey tournament. I really wanted to cancel our meeting to watch the hockey game, but had recently cancelled a few times and thought it would not be acceptable to cancel again. About two hours before the game, a knock on my office door precedes the McKinnon: "Robert, if you really want we can meet today, but I'd much rather put it off until next week and I think you know why."

CLARIFIED: WHERE DO YOU GET ALL YOUR BLAZERS?

For this question, "all" refers to the number 2. Both of them purchased at a Value Village in the same trip. They are a nice way to quickly look snazzy with little effort required! Sometimes students say they like the blazer and ask what the special occasion is. My usual response is that I am auditioning for an episode of *The Bachelorette*.

GOD ϟ PEED: IN YOUR EXPERIENCE, WHICH FIRST YEAR MATH CONCEPT IS THE HARDEST TO GET ACROSS TO STUDENTS?

More of a 'meta' concept and not a math concept: expect to be confused about something and have to work to not be confused. Expect to try and solve problems and not know ahead of time how to proceed. Math is like any activity in life you want to seriously improve at: struggling is how you improve.

For a specific math concept, I think first year students really struggle to understand nested quantifiers and how the quantifier order changes the statement.

A COOL PEN NAME: WHAT ADVICE WOULD YOU GIVE TO INCOMING FIRST YEARS ON HOW TO NOT FAIL/SUCCEED IN YOUR UPCOMING MATH 137 COURSE?

(This is an example of nested quantifiers!) Put in the time to really understand the definition of what it means for a sequence to converge. It only gets worse so learn it now. While sequences may be the stunted weaker sibling to your beloved functions with domain all of the real numbers, understanding how convergence works with sequences really helps to understand limits and differentiation of functions.

CLARIFIED: WHAT'S NOVA SCOTIA LIKE? DO PEOPLE OVER THERE REALLY CALL THEMSELVES BLUENOSERS?

Time seems to go a bit slower there, and in a good way. (In reality, I think this is more of 'small town thing' than a 'Nova Scotia thing'.) I grew up in a small town in NS and do sometimes miss it. I especially miss being close to the ocean.

I have never known someone from Nova Scotia who calls themselves a bluenoser. "East Coaster" is a common term I have heard people use, though presumably those from the lesser Atlantic provinces also use this term.

As a fun fact, the go-to "get this at 2 AM once you leave the bar" food is the donair! People in Ontario (falsely) believe that this is the same as some commonly served foods in Ontario that I choose not to name.

QUANTUM GOOSE: WHO IS ST. FRANCIS XAVIER?

I see you have done some googling! I believe Francis Xavier was a catholic missionary most well known for spreading Christianity in Asia in the mid 1500's. The university is named after him.

The university, St.F.X, is in my hometown Antigonish. It has about 4000 students, almost entirely undergraduates, and mostly on the arts side. I did my undergrad there, completing a degree in physics. My class had 8 people graduate with a physics degree that year, one of the highest numbers they had in many decades.

TERRIFIED: WHAT ARE YOUR THOUGHTS ON THE XAVERIAN HAVING AN A (BUT NOT AN A+) ON SSLLABS.COM?

This required a good amount of googling on my part. It took me 5–10 minutes to obtain the result you mentioned, and I don't really understand what it means.

The Xaverian is the student newspaper put out by St.F.X. (The university is too small for Math and some other departments to have their own publications.) I believe I once had an editorial published in it when I was a high school student, though I don't remember what it was about.

BOLDBLAZER: I AM STILL UNDECIDED ABOUT MY MAJOR DESPITE STARTING MY 3A TERM IN THE FALL. DO YOUR BEST SALES PITCH TO TRY AND WIN ME OVER TO YOUR MAJOR.

(In reality, if someone came to me and told me they weren't sure what to pick for their major, I would ask them "What courses have you enjoyed the most so far?" and "Any idea what you are interested in working on in the next few years?". I would not try to "win someone over".)

Here are three things that I think Pure Math really has going in its favour.

First off, I consider Pure Math to be the academic discipline that gets you the closest to being able to say "I am 100% sure that X is true".

Secondly, Pure Math is the perhaps unique discipline where if you are asked "Why are you studying X?" or "What are the real world applications of X?" and you answer "Because I find it interesting.", you have given a 100% reasonable answer.

Finally, Pure Math may be the only discipline where you will never be told "if you want to understand X, then you need to go learn Y from this other field".

πLLOW PRINCESS: WHERE IS YOUR FAVOURITE TOILET ON CAMPUS?

Oh dear. My favorite restrooms on campus are on the upper floors of M3. They are spacious and usually not too busy.

TURBOMOIST: HOW DO YOU REMOVE TEXT ON YOUR SCREEN? DO YOU USE THE BACKSPACE BUTTON, OR CTRL + A & DELETE?

I have never (before now) heard of the second option. #Backspace4Life. If there is a lot of text, I sometimes highlight it all and then use backspace.

SANDWICH EXPERT: CAN YOU EXPLAIN YOUR THESIS IN 500 WORDS OR LESS? PREFERABLY LESS.

A toric variety is an algebraic variety that contains an algebraic torus as a dense open subset such that the usual action of the torus on itself extends to an (algebraic) action on the whole variety. In my thesis I explored how many global sections certain line bundles (which are invariant under the torus action) contain. The dimensions of these spaces of sections may be determined by counting lattice points inside certain polyhedral associated to the varieties. Now that nobody is reading this, I lied about the location of my favorite toilet. I will not disclose the real location for fear that traffic to that location will increase. In particular, I showed that the cone of numerically effective divisors is generated by a specific set of torus-invariant divisors, and that the intersection theory on these varieties has a very convenient description.

CIX: SWEET OR SAVORY?

I have been known to indulge in both, but I definitely lean on the savory side! There is a bakery I love on Phillip street whose name I don't know that I often go to for both sweet and savory. My favorite candy is Starburst.

A COOL PEN NAME: DERIVATIVES OR INTEGRALS?

I find the general theory of derivatives more interesting than integrals. Being differentiable is a much more rigid condition than having an anti-derivative, and I find that interesting. I also find that many integral calculations rely on sneaky tricks, which I generally dislike.

STUDENT CS SERVERS CELEBRATE 12 CONTINUOUS MINUTES OF UPTIME

WATERLOO, ON— Cheers erupted around the CSCF office on Thursday as the linux.student.cs.uwaterloo.ca servers stayed alive for a record 12 straight minutes without crashing, disconnecting from the network, exhibiting severe performance degradation, or suffering catastrophic hardware failure.

"It's a miracle!" sobbed Stacy, a sysadmin for 20 years, as the uptime clock passed the 12 minute mark. "In all my years of working here, I never thought I'd see ubuntu1804-004 live as long as this. And yet, here we are!"

The previous record of 11 minutes and 59 seconds was set on November 12, 2016. It was interrupted when a moth burned itself on a lamp and activated the server room sprinklers, taking down the system for the better part of a month.

"This new record is a testament to the reliability of our outdated equipment," said Jim, head of budget and procurement. "It doesn't matter if our server room is the equivalent of a geriatric hospital for computers; as long as they can go for ten minutes without overheating, we'll always have another cannibalized replacement part ready to swap in."

"Here's to the next 12 minutes of uptime!" he crowed as he cut into the $300 rack-shaped cake ordered specifically for the occasion.

Unfortunately, the celebration was immediately crashed by a rabid squirrel who bit its way into the server room and urinated on the router, knocking the 30-year old relic out of commission until an equally as ancient replacement could be located on Ebay.

quantum goose

ON THE URBAN TRAILS IN THE KW REGION

profTHOUGHTS *144.1*

This has been a unique summer, and mostly in a bad way. Work, social, and recreational routines have all become more restrictive. Today I am going to write about something that I have really come to appreciate and enjoy over the past 5 months: the vast collection of urban trails in the KW region.

I live in Kitchener. Until 5 months ago, when weather permitted, I biked to and from work each day. The trip was about 7 KM each way and was time I really enjoyed—fresh air and a little bit of exercise, worked into my daily schedule. To compensate for this while working at home, I went out exploring on my bike regularly, and was impressed with what I have discovered. Using Google Maps, I would zoom into an area of the city I didn't know well and look for those dashed marks that indicate a trail, and then plan out a route to get there.

Today I'm going to give a rough description of some of the spots I think are great to get you started in your trail exploration. I'm going to focus on cycling, but all of these make for wonderful walking or running also. Public Transit can get you pretty close to all of these if you find the distance from the UW campus to be too much. Cycling is a great activity in the pandemic age: it isn't too hard to socially distance and avoid physical contact out on a bike, and can be done alone or in small groups. Before jumping on your bike, I would be amiss to not mention the following things:

1. Have a helmet. Have a lock if you plan to stop somewhere. Have front and rear lights if you are going out in the evening.
2. Know that your bike is in good condition. In particular, the brake(s)!
3. Have an (informed) idea how to safely and respectfully interact with cars and pedestrians.

For the following, I am giving a broad overview. Use Google Maps or something similar to find the precise beginning and to plan your route to get there. They are roughly presented in ascending order of "distance from UW campus".

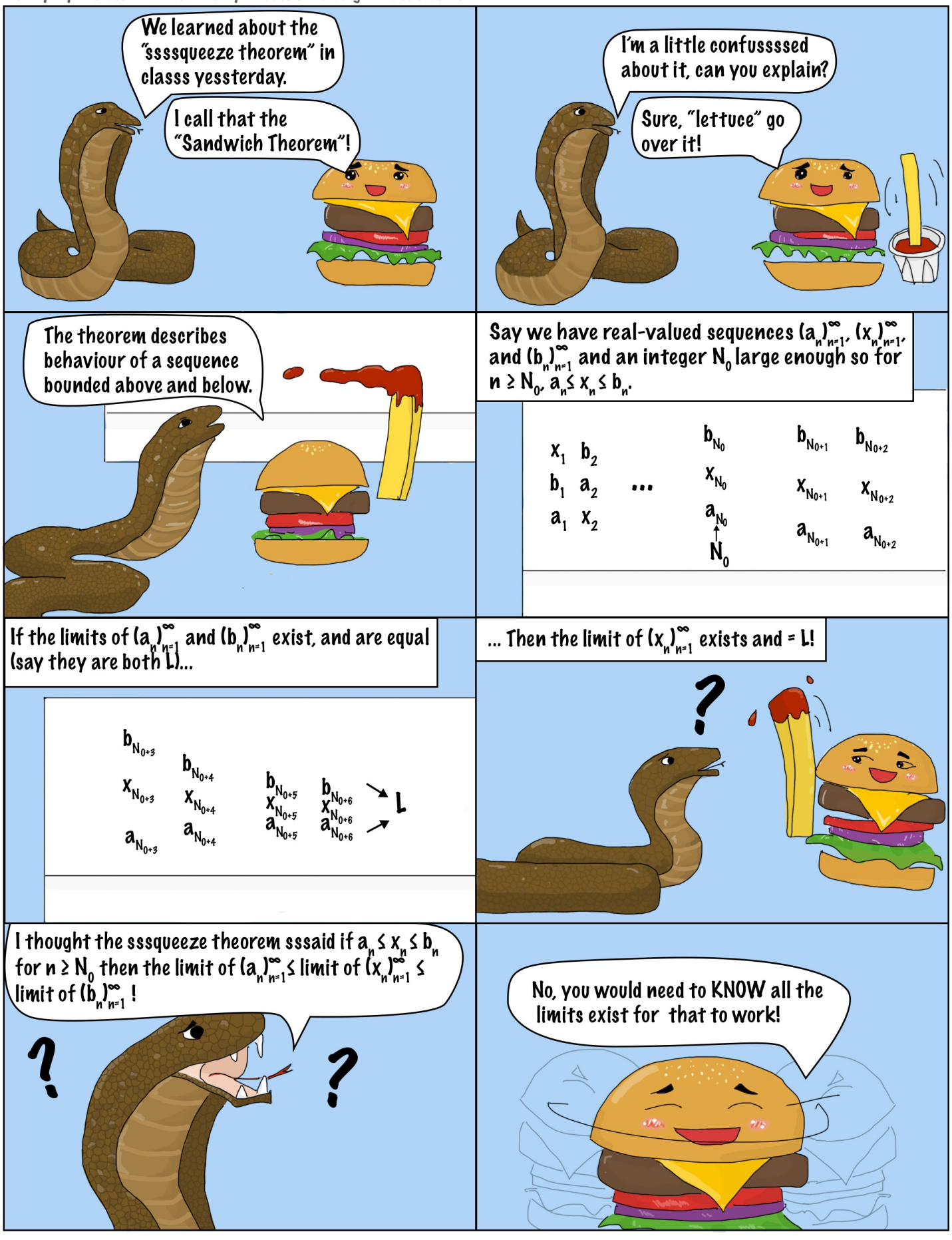
1. I call this the "**CIF trail**". It has an entrance on Columbia next to the athletic fields, and runs up to Bearinger. From there, you have two awesome options. First is the Doreen-Thomas Trial that heads Southwest next to Bearinger. Second is to keep heading north parallel to Westmount. Once this trail ends, a new trail begins in a few hundred meters that goes through the residential area; you end at either Parkside or Albert.
2. **Iron-Horse and Spur-Line trail**. I view these more as commuting trails, but they are a wonderful way to begin your trail exploration! Both of them begin in Uptown Waterloo and head to Downtown Kitchener. The Spur-Line terminates by the train station in Northern Kitchener, and the Iron-Horse trail terminates in Southern Kitchener when it hits Ottawa Street, after going through Victoria Park. Along these trails are some lovely bakeries, coffee shops, restaurants, and even a brewery! In the last year or so, lighting has been added to the Iron-Horse, and it has been made easier to cross the road at the Victoria Intersection. The section between Victoria and Queen is particularly beautiful.
3. **Hillside Trail**. There are two entrances on University Avenue, east of Weber and before the highway. The trail connects one entrance to the other and features nice trees alongside a creek. Halfway through, you have the option of heading North; this ends by the Manulife building on King Street.
4. **Henry Sturm Creek area**. This large park is bordered by Victoria, Westmount, Highland, and Fischer-Hallman. It can be accessed by trail from the Iron-Horse trail—this begins shortly after West street. Once there, you have two options. The first is the Forest Heights area to the southwest. Half of this loop is through hilly forest area, and half runs out in the open along a power line route. The entrance is behind the Superstore at Fischer-Hallman and Highland. The other lovely option involves crossing Victoria Street and entering Monarch Woods Park. This network of trails is dense with trees and parts of the trail run alongside the lovely creek.
5. **Stanley Park Conservation Area**. A bit of a distance from UW, but worth the trip. A lovely trail runs through here. One entrance is on Ottawa Street, it crosses River Street, and goes all the way to Rothsay. River Street cuts it in half. You get about two kilometres of shady forest area where you can barely hear any cars. Krug is your best bet for crossing the highway—it's a relatively slow residential street with no merging onto or off of the highway. Once you go under the highway, immediately turn right onto a trail that takes you down to Ottawa.

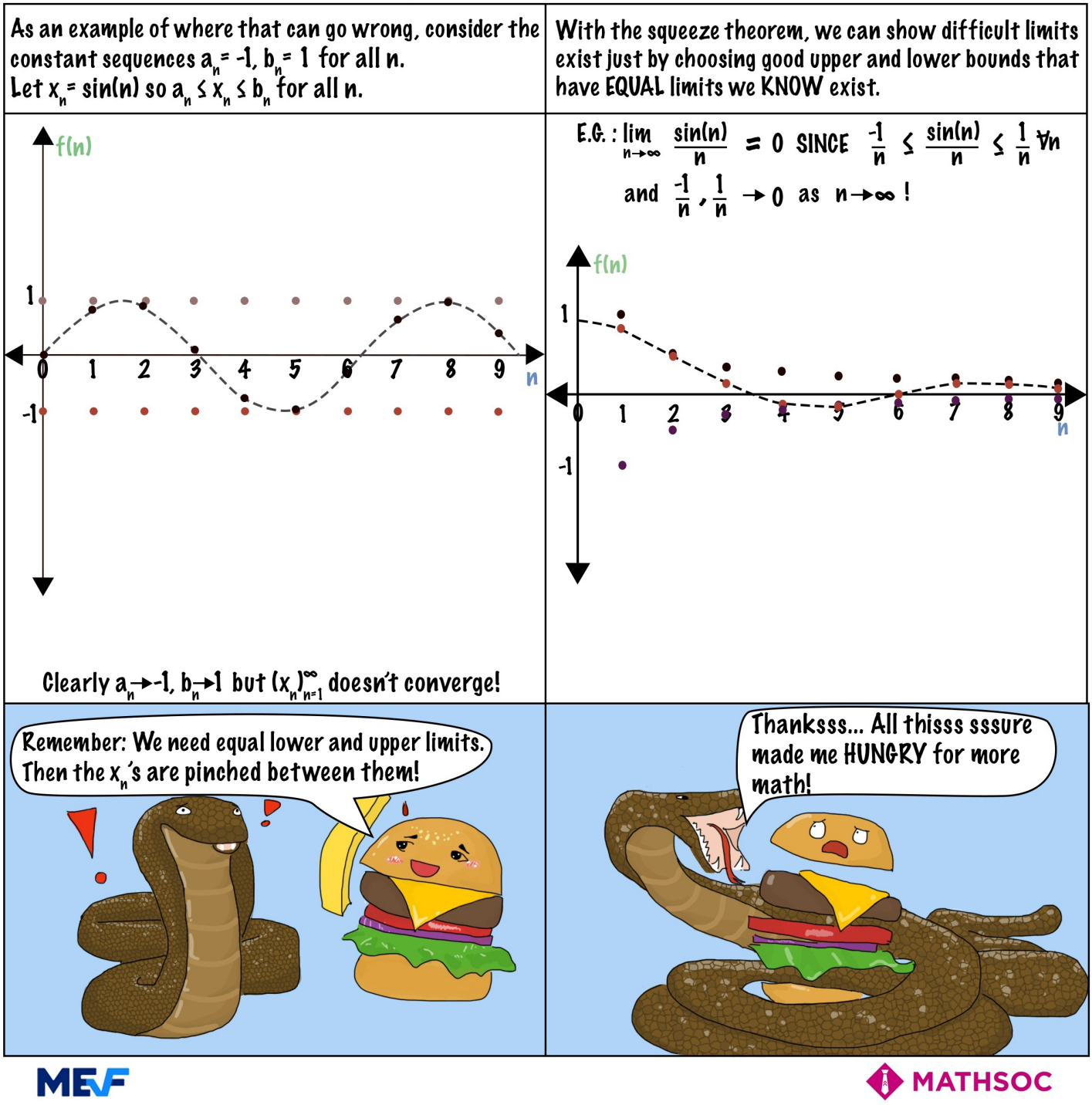
This pandemic has really made me appreciate the KW region a lot more. I hope this is enough to get you started if you wish. Explore where you are living and you may be pleasantly surprised by what you find!

Robert Garbary

Math 137: Squeeze Theorem

Story by: Gavin Orok | Art by: Alvina Cheng (@etaneart)





EPISODE 8: SQUEEZE THEOREM

Enjoy episode 8 of the MathSoc Edu-Action! series: MATH 137 Squeeze Theorem! If you have any feedback please fill out this survey: https://bit.ly/cartoon_feedback.

Gavin Orok

INCREASING EFFICIENCY OF COVID-19 SCREENING THROUGH POOLING

AN EXPLANATION FOR ANY EXPERTISE.

PART 1: INTRODUCTION

What's the best way to test 1000 people for a coronavirus? Sure, maybe you get 1000 tests and test everyone, but that's both uninteresting, and furthermore, wasteful. COVID-19 testing is expensive and can be burdensome on laboratories. I'm here to tell you that there's a better solution.

Suppose we took the 1000 people and made 100 groups of 10. Now if we combine the samples in each group, and do 1 test, what would happen? If the test is negative, then nobody had the virus, everyone goes home happy, and we just got 10 negatives with 1 test. If the test is positive, we test each sample individually and find which were positive. This means that we wasted 1 test.

Remember the two scenarios from earlier? Negative pool: save 4 tests, positive pool: waste 1 test. For you non-math people out there (the majority), things can start getting confusing now. I know it looks like half the time we save 4, and the other half we waste 1, so on average, we save… $4 - 1 = 3$ tests? But 3 out of how many? Is it really half an half?

Well, this is about as far as I can take you without getting into some math, but I'll skip to the answers as so many of us students prefer. In Barbados, at one point[1] we had 81 positive tests, with 2317 tests overall. That means we had about 3% of tests being positive. Having done the math, grouping in 5's works best for 3% and the described method would reduce the number of tests needed by 64% on average (or better actually).

Note this method works best for low proportions of cases, and stops working when approximately 30% of cases are positive, at which point we probably have bigger problems.

PART 2: ALL THE MATH

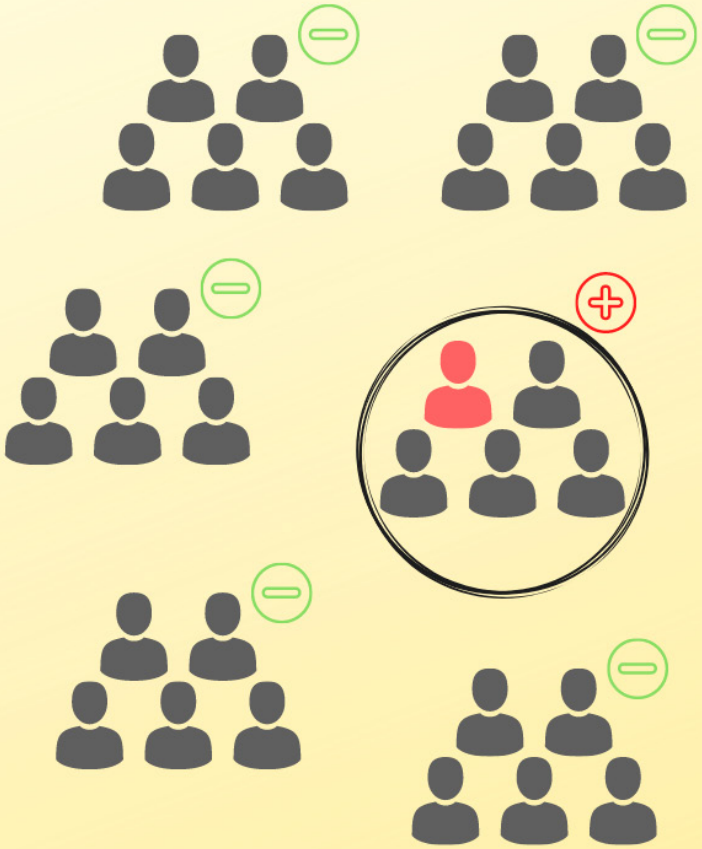
We define $n = \#$ to be tested, $k =$ group size, and $p =$ proportion of expected positives. We will assume that k divides n. Let $P = \#$ of positive groups, and observe that P follows a binomial distribution with $P \sim Bin(\frac{n}{k}, 1-(1-p)^k)$. For each group, the outcome being the number of tests will be as follows.

$$\#\text{ tests} = 1 + \begin{cases} k, & 1-(1-p)^k\% \text{ of the time} \\ 0, & (1-p)^k\% \text{ of the time} \end{cases}$$

We are interested in minimising the total number of tests on average, and we find the expected number of tests as follows:

Example:

Here, we have 30 people, and 1 positive case. This corresponds to about a 3.3% positive rate.



In this example, we would use 6 tests for the groups, plus 5 tests in the one positive group, for a total of 11 tests.

That means we saved 19/30 tests!

p	k	E[tests]	% reduction
0.01%	100	20.0	98.0%
0.1%	32	62.8	93.7
1%	10	195.6	80.4%
3%	6	333.7	66.6%
5%	4	435.5	56.5%
7%	4	501.9	49.8%
10%	3	604.3	39.6%
15%	3	719.2	28.1%
20%	2	860.0	14.0%
25%	2	937.5	6.3%
30%	2	1010.0	-1.0%

TABLE 1: EFFECTIVITY OF THE METHOD AT VARIOUS PROPORTIONS OF INFECTIVITY ($n = 1000$)

$$\begin{aligned} E[\text{total tests}] &= E[\text{variable tests} + \text{fixed tests}] = E\left[Pk + \frac{n}{k}\right] \\ &= E[P]k + \frac{n}{k} = \left[\frac{n}{k}(1-(1-p)^k)\right]k + \frac{n}{k} \\ &= n(1-(1-p)^k) + \frac{n}{k} \end{aligned}$$

Let

$$E[\text{total tests}] = f(p,n,k) = n(1-(1-p)^k) + \tfrac{n}{k}$$

We seek $\min\{f(\cdots,k)\}$. Using partial derivatives:

$$\begin{aligned} &\frac{\partial f}{\partial k} = -\frac{n}{k^2} - n(1-p)^k \log(1-p) = 0 \\ \implies &\frac{n}{k^2} + n(1-p)^k \log(1-p) = 0 \\ \implies &\frac{1}{k^2} + (1-p)^k \log(1-p) = 0 \qquad \text{(thus the optimal k is independent of } n) \\ \implies &k = \frac{2\left(-\frac{1}{2}\sqrt{-\ln(1-p)} \times e^{-\frac{1}{2}\sqrt{-\ln(1-p)}}\right)}{\ln(1-p)} \end{aligned}$$

This point is verified to be a minimum through graphing methods. An interesting note is that the best grouping is completely independent of n, the total number to be tested, but is exclusively dependent on p, the expected/historical proportion of positive cases. This is easily verifiable by considering that $\frac{\partial f}{\partial n}$ is constant with respect to n.

Table 1 above shows optimal k and expected effectivity of this method based on the expected reduction in number of tests. While $n = 1000$ was used in the below table, this is not relevant, as displayed in Figure 1 on the right.

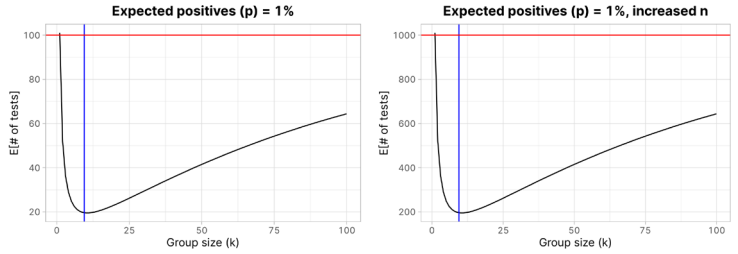


FIGURE 1: VARIATION IN NUMBER OF TESTS TO BE CONDUCTED DOES NOT CHANGE THE OPTIMAL GROUPING OF EFFECTIVITY

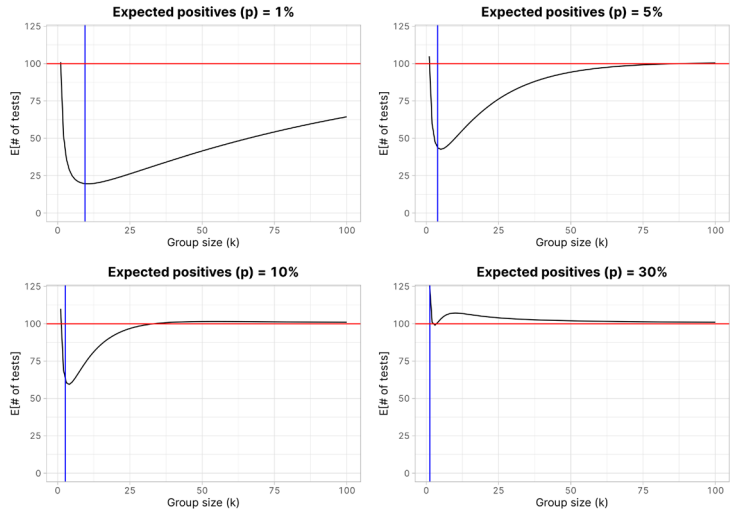


FIGURE 2: HIGH EFFECTIVITY FOR LOW p, AND DEGENERATION OF THE METHOD FOR LARGER PROPORTIONS OF POSITIVE CASES

In Figures 1 and 2, red is the baseline of 100 tests, and blue is the optimal group size. Observe the best results with small p, and overall breakdown of the method as we surpass $p = 30\%$. Further, the graphs show comparisons of effectivity across varying k.

This model will work even better when we *don't* assume independence of cases, and instead group by higher probabilities (like people who have interacted with each other), as this will reduce the overall number of positive groups. There is room for optimisation using a second round of grouping where large k is used, however I will leave this as an exercise to the reader.

ACKNOWLEDGEMENTS

I was inspired to look into the mathematics behind this by Peter Woolf's work on Origami Assays[2]. I'm also not the first to look into this, just do a Google search, or have a read on this article[3].

It's the job of Actuaries worldwide not only to do their work behind the scenes, but also to promote careful analysis of the facts. Actuaries are skilled in both statistics and communication, and should be at the forefront of informing the public about valuable findings, in ways everyone can understand.

I hope this will be considered for use in Barbados, even if not implemented. As a national Scholar, I am always looking for ways to give back to my community, and the sharing of ideas is one of the best ways to do so.

John Hunte

1. https://www.loopnewsbarbados.com/content/no-new-cases-barbados-completes-over-2300-tests-covid-19
2. https://www.smarterbetter.design/origamiassays/default/
3. https://www.medicalnewstoday.com/articles/pooling-samples-could-accelerate-new-coronavirus-testing

IMAGINE USING A COMPILER RELEASED IN THE PAST 5 YEARS

Imagine having a standard library that fully supports C++11.

Imagine having hashmaps that are actual maps and don't store duplicate keys.

Imagine an actually decent developer experience that isn't punctuated by crashes and undocumented behavior every five minutes.

This post brought to you by Rcpp on Windows gang.

no seriously, I hate Windows

IMPORTANT QUESTIONS TO THINK ABOUT

1. When did Netflix take off SpongeBob SquarePants? Don't you dare say it's a stupid cartoon cuz I love some meaningless laughter while combating insomnia.
2. I had a dream about swimming inside a cucumber recently. I am sure it was a cucumber since I remember seeing green and smelling cucumber. Please provide me a reasonable explanation . This experience scares me!
3. How can a company have two layers of VPNs and duo authentication to ensure information security while using Slack as communication tool?
4. How long does it take for you to use up one roll of toilet paper?
5. Can you really count until you fall asleep?
6. Do most songs talk about love?
7. Do you remember the first thing you think about when you wake up?
8. Whose 1 are you borrowing while working out 17–9 on paper?
9. What's the key on your keyboard that is most frequently used?
10. How long did it take to use up your first eraser?
11. Which part do you see first when you meet someone?
12. Is there a word describing people who ask too many questions?

Get curious and game on.

Captain Ice Cube

SHORT HORROR STORIES

- "Life is like a chunk of chocolate," the dog said.

Yall think that's it? Naw.

- See a mirror. Realize it wasn't one.
- "You are pregnant." "I'm a virgin."
- Attending my own funeral alone.
- Drinking water like a hippo. The bottle says Barium Chloride.
- "Dad, where's my sister?" "You are our only child."
- *Knock knock.* "Shh, dinner's here."
- "I can feel your heartbeat from that jar."
- Woke up. Couldn't move an inch. "Let's name her Crystal."
- "1000 cc of blood loss is serious." "Go feed the kids."

Wait patiently till I come up with a bunch more!

Captain Ice Cube

VIEWERS AGHAST TO FIND OUT THAT THE CURRENT STORY LINE OF REALITY SPANS A DECADE

There has been numerous discussions about the wild and unexpected and excessively dystopian story line of 2020. This is however a slight misconception, as the focus of the story being told is not the year 2020, but rather the entire decade. The reception to this news has been rather poor. Many people have wondered why we didn't go with the wholesome timeline instead. There had been numerous pitches for brighter and happier conception of the future; however, none of these pitches got enough funding to get off the ground as they weren't terribly popular with the ultra-rich.

The question has been asked if there is any limelight in upcoming plot developments. Does Black Lives Matter succeed in getting rid of cops? The answer to that is yes. Society in general wakes up to the fact that the police are far too happy to use violence in situations where it is unwarranted, and a conclusion is reached that humans are far too biased and emotional to be able to really administer the law fairly. And so cops are gone, and instead we have emotionless ~~killer~~ security oriented robots who apply the rules consistently on anyone its algorithm flags as committing a crime. It is unfortunately trained on previous racist datasets. The AI is just better at recognizing Black faces due to its extensive mugshot database. Police brutality is down but over-the-top sentencing for minor crimes is at an all-time high as the AI is programmed to maximize prison occupancy.

Down south, the American election happens, and the in-person votes swing towards Trump supporters who don't take the pandemic seriously. Before the mail-in votes can be counted, Trump declares himself the winner and the mail-in votes invalid. This goes to the Supreme Court, which unfortunately goes full Nazi, but in an eleventh-hour plot twist Trump dies of a stroke after catching COVID-19 from his political rally. So instead, we get a fundamentalist Christian theocracy led by Pence. This leads to civil war and many American refugees fleeing to Alberta, which does make the province as whole a lot more progressive. Since most people fled California, there were no casualties from the 10.0 earthquake hitting the state.

The murder hornet plot has not been forgotten, but rather is planning on coming back in 2025, when they have had enough time to spread across the entire continent once everyone has forgotten about them. This definitely could have been avoided if people hadn't forgotten about it and thought it was no longer a concern. It turns that ignoring a problem and letting is spiral out of control is not an effective problem solving strategy. The decade is consistently true to its theme that this could all have been avoided if we actually invested into long-term goals instead of instant gratification.

Speaking of disasters we could have avoided: everyone is about to become hotter. We do eventually beat the COVID-19 pandemic, and there are many parties where the participants have a limited amount of clothing, in big part due to global warming and the fact that the temperature will not be suitable for humans or other wildlife. The complete collapse of biodiversity will force surviving animals to get in much closer proximity with humans, causing *Plague 2: Electric Boogaloo*, brought to you by hyper-aggressive meth-gators.

Beyond Meta

UWATERLOO PICTURE POSTCARD

The path leads slightly downhill and appears to cut through one of the buildings and the crowd and I are funneled through, and even as my sight is mostly blocked off by the people and the overpassing science facility I see what must be Mathematics and Computer, me now in this courtyard of crisscrossing paths and vines and flat windowed faces, and I see how Mathematics and Computer's whole bottom half is made of huge concrete panels, welded by thin recesses that I can only assume are windows, and how more and more slabs pile up, each overhanging the last, casting deep, looming shadows over the rock garden and themselves and me, and how the whole structure seems just perfectly tall and precarious enough to topple over and flatten this courtyard with rubble, and when later I gathered up all the promotional material for this place I had let get collected in my room I saw that the photos and picture postcards they used always depict Mathematics and Computer from its "other" side, from a broad flat comfortable hill, where Mathematics and Computer's neat diagonal shadows expertly inflect and highlight its forms and where one of its enormous featureless concrete towers, on full display here, provides a balancing contrast that pretty much single-handedly keeps the artistic and architectural integrity of Mathematics and Computer together, and I looked at these photos and then tried to figure out where exactly this other side is (in relation to the location of the Mathematics and Computer I had experienced earlier that day and while I could eventually fit the little concrete pieces together I still did not feel that

girafarig

13 doesn't exist.

ROB HACKMAN

HOW TO ACCESS THE 3.4999...-TH FLOOR OF MC

1. Enter MC through the entrance closest to the Peter Russell Rock Garden between the hours of 23:00 and 01:00.
2. Take the stairs one flight up to the 3rd floor. Exit the stairwell, and walk into the Coffee and Donut shop.
3. In one of the booths, there will be a tall guy wearing a dark green windbreaker who looks like he's in his early 20's. There will only be one such person who fits this description, so no need to worry about getting the wrong individual. Ask him a question, any question will do.
4. He will tell you an answer. If he speaks your name at any point (don't think about how he knows your name), take an indoor path to another building (the closest one to you is QNC, but you can also go to M3, DC, or C2), and exit through that building. Do not leave through any of the MC exits. Try this guide again after the next Thursday.
5. If he does not speak your name, thank him, and leave CnD. Do not make eye contact with him after you've thanked him.
6. Enter the the north-northeast MC stairwell — this should be the one closest to the tunnel to DC. Walk up the stairs.
7. The second stairway constant you encounter should be the Silver Constant/the Seventh Beraha Constant (the first one you see may or may not be π, but that doesn't matter). On the plaque, if the digit before the decimal point is not 3, leave MC through this stairwell. If the lights start flickering or behaving otherwise abnormally, leave! In both cases, it's in your best interest to steer clear of this building for the next 48 hours.
8. If the Silver Constant starts with 3 and the lights are not doing anything weird, the building has permitted you to enter floor $3.4\overline{9}$. Place a non-empty notebook on the ground, and stand next to it with your both of your palms pressed against the wall. Close your eyes, and do not open them until the air starts smelling like a brisk winter night.
9. You are now on the $3.4\overline{9}^{\text{th}}$ floor of MC. Congratulations, not many people can boast of this achievement.
10. You now stand at the intersection of 2 hallways: one is in front of you, and one is to your right. Feel free to walk down the hallway in front of you, but personally I have never taken that path before. You might as well throw the guide away at this point because it can't help you anymore.
11. If you take the hallway on your right-hand-side, you will soon see doors on both sides of the hallway that resemble the classroom doors on the 4th floor. If a door is closed, even if the light in the room is on, do not peek inside. You don't like it when some first-year presses his face against the glass while waiting for your class to end and vacate the room; They don't like it either.
12. Keep walking. Eventually, some of the doors might be slightly ajar. Go into the 3rd such room on your left.
13. There will be a stack of **mathNEWS** on the lectern. The covers might look different, but the only article in every issue will be this guide.
14. Write your name in one of the issues with a red pen. MC likes to keep a guestbook.
15. Leave the room, and walk in the direction you came from. You will not recognize your surroundings. That is normal.
16. Eventually you'll be moving in ways that should not be possible and the hallway will look wrong. Don't worry about that, didn't your orientation leader tell you that MC is non-Euclidean?
17. Try to ignore the sounds of shuffling feathers. Don't stop moving.
18. Eventually you'll encounter someone you lost during your years at the University. I don't think that the person must have a particular kind of relationship with you, but those who have successfully visited floor $3.4\overline{9}$ and came back reported that this individual is either someone whose relationship with them was untimely severed — unintentionally or purposefully — or someone they feel immense guilt towards. (Apparently, there's no restriction on whether the person is dead or alive outside of this floor. MC works in mysterious ways.)
19. They will tell you about their past with you. They will tell you about what you two had been, and could be — the two of you talking like before, all the lost time made up for.
20. Don't show them an ounce of love, regret, sentimentality, or recognition. No smiling.
21. They will ask you for forgiveness, whether it was really their fault. Tell them no. They will receive no such thing from you. They will try to touch you. Don't let them.
22. It's harsh, but it's for your own good. They are not who they seem. Keep moving.
23. Most people have reported that they begin to feel a great sense of unease at this point. Start running, and follow your instincts.
24. Stop when you see the entrance to a library in front of you.
25. Open the doors, and make sure you lock them.
26. Remember, you are the only person on this floor, but you are not alone.
27. Remember, you are the only person on this floor, but you are not alone.
28. You have full access to everything in this library for a limited time. The contents of each book differ for every person, but it will be what you want to know.
29. Don't log onto the computers. I did that when I visited, and now I know everything that I should know but didn't need to know. It's generally not a good idea to give them your University credentials either.

30. You will realize that they're around you only when it's too late. I'm sorry, but running won't help you anymore. (Maybe the locking the door part earlier should've been optional? It didn't help here anyways.)
31. Try to ignore the dripping noises, but at this point you won't be able to ignore the sound of shuffling feathers anymore.
32. They will dig their claws into you. It will be slow, but before it becomes painful as well…
33. You'll be outside the library again. Go inside. The nightmare scene from before will be gone.
34. There's a metal staircase to the basement somewhere in the library. Make your way to it as quickly as possible. Close your eyes, and jump from the top of the stairs.
35. You'll feel solid ground beneath your feet. Open your eyes. If your surroundings are pitch black, then you have completed your tour of the $3.4\overline{9}^{\text{th}}$ floor of MC. Take a long, well-deserved break in the silence. As long as you want.
36. Then, when you're ready, turn your phone's flashlight on, and go home. You will wake up tomorrow older, wiser, and a version of yourself you've always wanted to be. If you don't intend to visit the $3.4\overline{9}^{\text{th}}$ floor again, you no longer need this guide.
37. If after your land, you find yourself in an illuminated MC north-northeast stairwell or some other environment, then you're still in MC, but you're not in the space and time from which you came. Go back to Step 8, repeat the process described in this guide, and pray that MC has the good graces to return you to your universe. You can also choose to stay in your new universe, but that's a bit of a Russian Roulette. If you don't intend to visit the $3.4\overline{9}^{\text{th}}$ floor again, you no longer need this guide.
38. It's still slow, but you start to feel the cold pain as well, and the flash to the outside of the library doesn't seem like it's going to happen anytime soon…
39. What did you do? Did you forget to sign your name in **mathNEWS**? Oh no…
40. You showed love to what you saw, didn't you? Did you say that you missed them? You messed up, this 22–28 FL is the biggest mistake you could've made, this was the biggest mistake that I've ever made, and since I'm also in this I can't help you anymore, I'm sorry…
41. (All my life, I've agonized over what I've done and what I've failed to do. It's a privilege to be able to return and say the things I should have said to you. We grew up together, but even that wasn't enough time together with you.)
42. (I face my end with no regrets.)

royal no.69 milk tea

HAIKUS AND LIMERICKS OF A WATERLOO CS STUDENT'S LIFE

Lightning may come strike
But my private key stands strong
ECDSA

❦

My WiFi was not stable
And so it left me unable
To watch my live lecture
In my small prefecture
Got myself a LAN cable

❦

I made myself too much food
And overeating seemed crude
I said it was meal prep
Now on to the next step
Reheating when I'm in the mood

❦

It looks way too bright
The horizon of twilight
Is that a circus?

❦

I reach up to get to the shelf
Bang it shut, and wake half of Guelph
Cause morning me is short-fused
Till I have my water infused
With beans from Tim Horton himself

❦

I feed Google Maps the location
Find a route to my destination
Walking makes me pout
There's only one way out
301 ION to Fairway Station

❦

Gentle breeze tonight
Open my window and binge
It's "Netflix and chill"

tendstofortytwo

$10 > 12$

THE BEST WRAP THAT I HAVE EVER TASTED: A HOW-TO

INTRODUCTION

After the resounding success of my previous article in v143i3 detailing how to make pasta (i.e. no one said anything but I imagined people would have really liked it), I decided to write another article once I made something new and interesting. These are what I call Spinach Sausage and Such Wraps, because alliterations are awesome (heh). The fun thing about this recipe is that *I didn't use any other recipe as a base*—this is a 100% original recipe straight from me, exclusively on **mathNEWS**, quite possibly the greatest recipe blog.

Funny story: I made this for the first time completely by accident. It was 10 P.M., and I was hungry because I had forgotten that I had to cook dinner. I made sausages, but then started feeling guilty about making a meal out of essentially just frozen packaged meat, and added a couple of eggs… and some beans… and corn… and carrots… and before I knew it, I was unloading spinach by the handful into the pan singing the Popeye the Sailor Man theme song. At the end, I figured that this might have become *too* healthy, so I sprinkled some cheese on top to preserve some semblance of university life. Imagine my surprise when it actually tasted good! I since tried this technique—randomly throwing ingredients into the pan and hoping for the best—with other combinations of things, but none have been quite so successful as this.

MATERIALS REQUIRED (SERVES TWO, OR ONE PERSON TWICE)

- 6–8 small breakfast pork sausages (can probably replace with chicken or firm tofu, though cooking instructions for those will differ)
- Approximately one cup of frozen vegetables (I had a mix with green beans, lima beans, corn, and carrots)
- 250–300g of baby spinach (it looks absolutely massive and generally very unbabylike in volume uncooked, but just you wait)
- 100g mushrooms (feel free to replace with fireflowers or other Mario-compatible powerups)
- 3 eggs, egg-sized
- 4 10" tortilla wraps (I used spinach or whole wheat, à la V1, though I imagine white works just as well)
- Salt, pepper (I would tell you specific amounts, but like, you're not going to go buy 1 tbsp of salt, right? Just have salt and pepper on the ready.)
- 2–3 tbsp olive oil (Feel free to go with butter if you want something a bit more delicious + unhealthy.)
- 1 clove/1 tsp garlic (optional)
- Red chili powder (optional)
- Parmesan cheese (optional)
- Sriracha sauce (optional)

APPARATUS REQUIRED

- A pan (preferably big)
- A bowl (bigness required)
- A fork (regular size works)
- Something to stir/poke the stuff with (I used a big wooden spatula)
- A cutting board and knife
- Dishwashing skills and equipment (optional)—to reduce the number of dishes I need to do after I'm well-fed, I reuse some of the above things after a quick wash. You may need more if you're not washing by the side.

PROCEDURE

1. Fill your pan with enough cold water to cover the sausages, and then put the sausages in. Start heating this pan at medium-high heat. If you're cooking some other meat/non-meat, get it rare/almost-cooked.
2. At the same time, dump your frozen vegetables into the colander and give them a good bath in hot water to defrost/wash them. Chop the mushrooms up and throw them in with the veggies.
3. Crack three eggs in your bowl, add one teaspoon each of {salt, pepper, chili powder}, and whisk them like you would for an omelet. If you have Indian garam masala, feel free to add in a teaspoon as well.
4. When your sausage water is nearly boiling (simmering?) or your meat is almost-cooked, take it off the stove and chop it into small chunks, like yaaaaaaaay big (approximately the size of the word to the left of "big"). Wash your pan and put it back on the stove.

Put the olive oil in the pan, add half a tablespoon each of {salt, red chili powder} and one tablespoon of pepper, and throw in the veggies. Coat them nicely with the oil and powders, and let them cook until the mushrooms turn all brown and cooked-y. If you're not using mushrooms, ¯_(ツ)_/¯ figure out how to time it. Finally, add about a teaspoon of garlic, and cook for a minute more, mixing the garlic well with the veggies. Feel free to increase the amount of garlic—the garlic I have is *really* smelly so I try not to put too much of it just to not have a bad time while cooking, but generally speaking 2–3x this amount of garlic probably isn't an issue, garlic tastes delicious.

1. Scoot the veggies over to one side of the pan. If your pan is not level and fluids flow one way, then make sure the veggies are on the other end. Now, pour the egg into the empty side of the pan.
2. Make scrambled eggs. If you don't know how, just let it cook until the bottom part has turned solid and white, then scrape it away from the bottom, break it into pieces and let the rest of it cook and turn solid as well. Use your spatula to break the egg into small chunks. If you know a better way to make scrambled eggs, don't listen to me and just do that instead.
3. Throw in the sausage and meat, and mix the meat, veggies and egg together. Let it cook for a couple of minutes, and take this time to wash the bowl. Who

knows, you might need it later. *wink wink nudge nudge*

4. If you want to add parmesan, sprinkle it on top and immediately start mixing well. If you don't, it'll clump together and you'll get small pockets of cheese rather than cheese everywhere. I personally like that, so there's merit in being lazy here too.
5. Add spinach. If your pan is small, add as much as you can in the first batch, then mix well, making sure to let the spinach reach the bottom of the pan. The spinach will lose volume and turn into a shadow of its former glorious leafy self, becoming basically a very delicious algae (please don't be turned off by the description, it legitimately tastes very good). Then add the rest of the spinach, making more batches of it if necessary.
6. After all the spinach has become seaweed-esque, lightly drizzle sriracha on top if using, and mix well once more.
7. Empty this mixture from the pan into the bowl (don't tell me you didn't wash it, I *told* you to do it and very clearly foreshadowed needing it as well!). Don't turn off the stove yet though.
8. Heat all the tortillas on the pan, until they're warmish-hot to the touch. For each tortilla, once it's done heating, put it on a plate, put in enough of the mixture to fill it, and then roll it up.

And you're done! If you're like me, you probably ended up with four wraps worth of filling. That's cool—let any extra filling stay in the bowl, just shut the bowl's top (or cover it with a plate) and shove it in the fridge. Then for your next meal, all you need to do it microwave the filling, heat a wrap on the pan, and follow step 13 again.

ANALYSIS AND FURTHER RESEARCH

I think these wraps taste delicious. Much better than the stuff they made in V1, in my opinion. Most of the taste comes from spinach here, with pepper and garlic making a distant second and third. If you see spinach and think "green vegetable yuck," I highly encourage you to be a little open-minded and try it out once. Spinach, in my humble opinion, is the OP vegetable: it tastes amazing if cooked right, it's green and leafy so it's probably good for you, and it even has a celebrity endorsement:

As a whole, I think this wrap is pretty healthy—probably the worst thing is the sausage, which can easily be swapped with lean-cooked chicken, tofu, or (if you like to live dangerously) nothing at all. I don't claim to offer health advice, but I'm just saying that if you told your parents that you had a spinach, bean, and meat wrap for dinner, they would probably not disapprove.

Probably the two major changes I would make to this recipe would both be to make it more Subway-like: use a long bread instead of a wrap, and more sauces than just sriracha. That might put some of the healthiness into question though. Conversely, we could go the other direction and eliminate any bread whatsoever—just have this as a "power bowl" of sorts. I'm also really interested in trying to add caramelized onions to this thing, but the first time I made this I was too lazy to add more stuff, and the second time I forgot. Oh well, third time's the charm I guess.

CONCLUSION

I'll leave you with a photo of one such wrap made with the above recipe, because this time someone reminded me to click a picture. Thank you, friend, very cool.

tendstofortytwo

profQUOTES 144.1

CS 246E: BRAD LUSHMAN

❝ So I am actually here going dumpster diving.

CS 350: LESLEY ISTEAD

❝ I've had 16 hour games on Red Alert 2

❝ Windows updates….I could say a lot about windows updates screwing me over.

❝ By the way, if you hear the vacuum—there's probably a spider in the basement.

❝ If you're seeing me close and open OneNote all the time, that's because there's a bug on Mac…not sure why there's a bug this bad

❝ Apparently OneNote thought it would be funny…if it opened on my *other* screen

STAT 331: SAMUEL WONG

❝ *plays piano*

❝ *[Pointing at cute drawing of an alligator]* I mean, this one looks pretty friendly, but in general, if you're around alligators you should be careful because they can bite.

❝ When I went to the grocery store in Florida, I expected to be able to buy oranges for cheap because Florida grows oranges, so I was a little surprised to find out that the oranges sold in Florida actually come from California.

❝ As the famous saying in statistics goes, all models are wrong, but some are useful.

A SHORT GUIDE TO RACKET FOR BEGINNERS

((([Just)

[((([give()]]))[up)))]]

A cool pen name

Send more profQUOTES. Please pretty please.

THE ENTIRE mathNEWS READERSHIP

FROM THE ARCHIVES

Every issue, "From the Archives" will revisit a relevant mathNEWS article from the distant past. For this issue, we have dug up a poem from exactly twenty years ago in 1990[1] titled "The Ragnarok" by an unknown author, written in the style of a prophecy.

THE RAGNAROK

The Norsemen say the world will come to an end
they call this the Ragnarok, the destiny of the gods
First, there will be a terrible virus three years long
Then a surge of CS students, hundreds beyond the normal capacity
will flood the halls of UWaterloo
Mankind will turn on itself
Co-op students will fight each other to the death,
and people will forget what they owe their kindred friends
Jobs will be scarce; competition will be great
The co-op program will fall into ruin

The Norsemen say each god will do battle at Ragnarok
"4A Menlo Park btw" will fight an all-FAANG intern
for a coveted Cali co-op, and lose at the group interview
but his son "1A Menlo Park btw" will avenge him
at the team matching stage
The 4.1 GPA CS/CO/STAT triple major
will go through endless rounds of interviews
against waves of first-years to no avail
The ex-Shopify co-op trying to secure a return offer
will end up facing all her fellow ex-Shopify co-ops

The cliffs will crash, snakes will walk the land, and CS students will tread the road to unemployment,
The CECA employment rate™ will fall below 99.99%,
Cali will be set on fire,
and the heavens will split open

Student, prepare yourself for Ragnarok
for it is nigh.

license2derive

1. *From the Archives* claims no historical accuracy

PANDAS

Pandas are lazy
Surprising they're still alive
(R)evolution'ry

boldblazer

Note: I had to make this haiku to get into a Facebook tag group. I swear the bot deterrence measures keep getting weirder by the day.

I GOT AN ERGONOMIC MOUSE AND MY LIFE HAS NEVER BEEN BETTER

I had a shitty little Logitech M185 mouse for the entirety of Spring term, and let me tell you, it was *fuckin' terrible!* I used that tiny mouse basically 25 hours a day, 8 days a week, and by the middle of the term my hands started cramping up and got all pinchy and achy, up til the point where it was painful to hold the mouse or even type. It got so bad that the pain made it difficult to sleep. I even wrote an article right here in **mathNEWS** to complain about it!

Repetitive stress injury is no fucking joke. Lemme tell you something, right here right now. I'm no chickenshit — I've stared down a hungry grizzly bear in the eyes, fended off a pack of coyotes with nothing but a WUSA-branded travel mug, and eaten a cockroach off the floor once in desperation when I was out of potato chips (I crave the **crunch**). BUT. But. Nothing has struck the fear of God into me so much as the thought of being in constant, nagging agony, left helpless because of my aching hands. It was *literally* — and I don't use that word lightly — horrible.

Late in August, after looking at some online reviews, I bought my current mouse. Upon receiving it, I was like: holy **SHIT.** It's a wireless ergonomic model from the brand Jelly Comb; what made it so mind-blowing was its slanted, vertical shape. The idea behind it is that by holding the mouse the way you give someone a handshake, your wrist is kept in an unbent, neutral position, preventing strain (your wrists are usually bent upwards when you use a normal mouse).

And guess what? This gimmick actually WORKS. Using my new mouse is a fucking dream. No more cramps, no more pains. It feels moulded to my hand, as if it were our destiny to meet. It felt natural to use even as soon as I took it out of its box. I can't go back to normal mice — now that I've experienced the light, I've become shocked at just how *immediately* uncomfortable it is to hold any other mouse. *How did I live with that shitty Logitech for so long???*

Along with the Jelly Comb mouse, I also bought some much-needed memory foam wrist rests for my mouse and keyboard. They might seem like inconsequential impulse purchases, but they are truly great. The wrist rest for my keyboard is probably doing more for my health than if I had just replaced the keyboard I had with a specialty ergonomic one; those don't come cheap, but I bought the wrist rests for less than 15 bucks.

I'm not saying that you should buy your own Jelly Comb mouse — if you have big hands, it might be too small to be comfortable. Reader, I write this article as an encouragement. I'm pretty sure you spend all day at a desk in front of a computer, whether for school or work. Work hard, but don't neglect your health. You might think you're young, but musculoskeletal disorders *can* and *will* get you if you don't look after your ergonomics. It's nasty fuckin' stuff. Believe me. I'm not trying to panic you though. Like I said, you're young: you've got a head start on getting things done right. Try to set up your workspace to be as ergonomic as you can. Fix something as soon as you feel strained or just *off*. Take a fucking break once in a while. Trust me.

Finchey

IF A STUDENT FALLS IN THE FOREST...

…but they have no cell service to post on social media about it, did they actually fall? If you can't access the internet, do you even exist? These are the questions that students in our isolated COVID world have to grapple with. We haven't heard about students without access to internet, so clearly they do not exist because they haven't posted online about it.

Beyond Meta

THE BRILLIANT NAME

THURSDAY, SEPTEMBER 19, 2019 — AT MATHSOC BOARD GAMES NIGHT.

It was Thursday, and Thursday was the MathSoc Board Games Night at the C&D. A few mostly-eaten snacks were scattered around the tables, chatter had faded to a soft backdrop from the roaring excitement of earlier in the night, and the evening was entering that quiet time when sleep begins to infuse the air with its sweet, slow incense. Wordress had just finished a game of *Spring*, introduced to her by Maria, the current Board Games Night director. Maria's favourite board game was *Spring,* and using the fact that MathSoc owned every expansion as an excuse, she tried to heckle someone to play it with her every Thursday. Tonight, that someone had been Wordress.

"Good game! Hopefully you liked it! I just have so much fun whenever I play *Spring*, just wait until you see the *Spring: Blessed Kingdom* expansion, it's *so* cool, maybe we can try that next time," Maria said with glee. Wordress had won, and she suspected that Maria hadn't quite brought her A-game. Still, she had fun.

"Uh, yeah. I had fun!" said Wordress.

"So," Maria continued, carefully cleaning up the hundreds of small game pieces *Spring* demanded and gently returning them to the game box. "I've been working on the MathSoc website lately with some new changes — want to take a look while I finish cleaning up? Oh, don't worry, I like cleaning *Spring* up, it lets me appreciate the *beautiful* artwork."

"Um, okay, then." Wordress yawned as she opened her laptop and navigated to the MathSoc web page. Indeed, it looked quite different from the last time she'd seen it, and she poked and prodded about for a few minutes until she came upon an interesting entry on the MathSoc council members page.

"Ummm, it looks good… it's just, Name of Person? The, um, Software Engineering representative on MathSoc council? I, uh, think you might have a placeholder name on the council page. Wow. That's, like, a really pretty stock photo, though. My compliments to whoever chose that."

"Oh, Name? Nah, she's a real person actually. Let me take a look. Yup, that's her. Best councillor we have, in my opinion. So many good ideas, asks the right questions, knows how to make suggestions without stepping on toes, can take down someone's bad motion in ten minutes while making them think it was their idea to retract it. She doesn't show off, but she's a genius. Everyone loves her. I love her. I also think she's a little scary. No-one should be that good at everything." Maria also yawned, placed a last piece in the box, and replaced the lid of *Spring* with a satisfied sigh.

"No way… Maybe I'll have to drop in to a council meeting sometime to meet her," Wordress mused. "Oh, also, you have a tiny grammatical mistake in the VPA description; it's just a little comma splice…"

THURSDAY, SEPTEMBER 5, 2019 — THE MIDST OF MATH ORIENTATION.

Once upon a time, there was a girl named, well, Name. Name O. Person, in full, with the O. standing for none other than "Of". Name's first name was actually pronounced "nah-may", and in her younger years, Name would try very hard to get this fact across to the people she talked to. She had little success, and the vast majority continued to refer to her with a single syllable. She gave up by the time she was in tenth grade, and resigned herself to the group of people with nigh-unpronounceable names who often say things like "oh, you can call me either; I go by both."

Around the school, Name was something of a legend. Many students had heard of the girl who had won dozens prestigious math and computing competitions, excelled in athletics, and was supposedly as resplendent as Helen of Troy and as charismatic as Cleopatra. She was the person people spoke of when they wanted to capture the sheer brilliance that could exist in the world. "That's pretty good," they'd say to a friend who was bragging about some math contest results. "But did you know there's someone at UWaterloo who did that in grade eight?"

Name was in her third year of Software Engineering, and it was Fall: the time of year when first-years arrived on campus still wet behind the ears. Name always volunteered as an orientation leader. She was very involved with various organizations around campus, but particularly loved helping with orientation. She liked it because the first-years didn't know who she was.

Name was charismatic, funny, kind, friendly, gorgeous, and an amazing conversationalist. At the same time, Name had a terribly difficult time making friends.

❦

Today's event was an evening scavenger hunt throughout the various Math buildings. First-years dashed in and out of buildings and up and down hallways, trying to find all sorts of math-related curios and checking them off lists on crumpled sheets of paper.

Name had a tendency to not be very close to the other orientation leaders — or perhaps, the other orientation leaders had a tendency to not be very close to her. Name's partner in crime for this orientation event was fellow third-year Math student Shan.

Shan, just like almost every student who had been in the Math faculty for more than a week, had heard about Name. Like the average above-average Math student, Shan considered himself a slightly-below-average Math student, and standing there beside the tall, fabulous, storied Name, felt quite inadequate and nervous. Name, he figured, was intellectually, socially, and aesthetically absolutely out of his league, and when they

first met, instead of striking up a casual conversation like his friendly self normally might, Shan had instead stood in an awkward sweat trying to figure out how to say something that wouldn't seem bumblingly clumsy to someone of Name's calibre.

Name, on the other hand, was always comfortable meeting and chatting with new people. She noticed Shan's nervous countenance, and decided to speak first.

"Hey there! I'm Name. I'm glad you're here — I don't think I could corral all the first years myself," Name said with her best warm voice and her best welcoming smile.

Shan felt his jitters melt away, and he struck up a conversation with Name. They chatted for a few minutes, introducing themselves and making small talk about orientation. It went well at first: the way Name spoke made Shan feel that Name was genuinely interested in hearing what Shan had to say. Shan was enjoying himself, and was thinking that this wasn't quite the Name he had imagined, when a thought snuck into the the back of his mind.

It was odd, how Name could be so good at all the intellectual things yet still so friendly, kind and social. A doubt struck Shan: perhaps Name was just being polite, pretending to be engaged when she would really rather have been orientation leader partnered with someone smarter, funnier and more attractive. The doubt only grew as they talked, and Shan gradually grew uneasy. He recalled more and more of Name's rumored achievements, and looking at her pretty, too-earnest features, he felt intimidated and perhaps, mocked.

Name was, of course, genuinely interested in chatting with Shan and learning about him. She was enjoying herself too — Name didn't really have any friends after her last "friend" had disappeared after Name had turned him down when he asked Name on a date, and Name didn't have the chance to chat with her peers as much as she would have liked.

But Shan began to close himself off from the conversation, and Name felt the pang of disappointment she always did when this happened. She figured people just didn't really like talking to her, even though she tried her best in conversation. Shan's sentences shortened and turned cool and laconic, and his gaze gradually drifted away to the surroundings. The conversation withered in spite of Name's best efforts.

The rest of the evening held little chatter between the two orientation leaders. Name felt like she had wronged Shan in some way, and Shan couldn't help but feel like Name was looking down on him.

At least the first years were having rowdy, uproarious wholesome scavenger hunt fun, Name figured. They didn't seem to have the same reservations with talking to her.

There was one first year at the scavenger hunt who Name found particularly friendly, a kid named Blas with tousled brown hair and glasses, dressed in all-blue attire strikingly different from the rest of the Math first years. He turned out to be a Chemistry student who had somehow ended up registered in Math Orientation, but was still delighted to partake in events anyway. Name joked with Blas on his choice of program and serendipitous entry into Math. Blas asked Name about her experiences in Math, and she did her best to dodge or gloss over her achievements. The hours passed by.

❦

Name's experiences in the co-op program were similar. Name's resume always raised questions when employers looked at it. The person reviewing the resume would invariably see "Name of Person" at the top of Name's resume, wonder if this was a completely stock resume, read the rest out of curiosity, be very impressed by Name's very impressive credentials, and invite her to an interview just to see if she could possibly be a real person. Name was a three-time IOI gold medalist, had three years of software work experience from a part-time job in high school, held a long list of accolades from volunteer positions, and stood at the top of her cohort in marks. Employers usually expected a jokester or socially-awkward smarty-pants to show up on interview day.

Name was neither, and she aced every interview.

On her first day at her first co-op, while her work mentor was walking her through some of the code she would be working with, Name spotted a dangerous SQL-injection bug in some legacy code and suggested a rewrite to an algorithm that would end up shaving minutes off a routinely-used process. Name, as always, was graceful and humble in suggesting the improvements, and her co-workers were at once impressed and tremendously intimidated. Not upset or annoyed, for one could hardly be upset or annoyed at such a sweet, kind, charming person like Name, but feeling somewhat insecure from Name's ability.

Name always felt a little bit of unease from her colleagues, and never quite felt entirely part of the workplace, no matter how many "Outstanding" evaluations or compliments on what a great person she was to work with she received. She quietly longed to be just like her other co-workers, to be someone others would be at-ease with, instead of someone to tread *differently* around. It wasn't that Name was awkward or arrogant — she was simply too good. She won co-op student of the year in all the years she did co-op terms.

❦

"Hey!" Blas whispered to Name later in the evening, when Shan had stepped away to the washroom. "Why's Shan so cold toward you?"

"I wouldn't say he's … *cold,*" Name tried, "maybe a bit tired?"

"Aww, c'mon, he's so bouncy and enthusiastic with first years!"

Name had noticed that. "I dunno." For all her emotional intelligence, she had never figured out how to have people not turn

distant on her. “It seems to happen a lot with me when I try to talk to people.”

“That's weird, 'cause you're really fun to talk to,” Blas mused, “we'll have to figure that out sometime!” His phone buzzed, and Blas' face lit up with excitement. “That's probably my team! We've gotta win this hunt!” Blas started to turn away, then turned back. “Don't let things get to you, kay? Talk later!”

Name watched as the blue-clothed figure sprinted down the MC hallway, and waited for Shan to return. She hoped Blas could be a friend. Blas didn't know who Name *really* was yet, though. Things usually seemed to change only after people found out.

But, Name hoped, maybe this time would be different. She knew she hoped that every time she met someone new. Nonetheless, it was hope, and as always, Name grasped it tight.

CC

CALC DESTROYETH'RS

good morrow guys, mmmmm, behold at these lovely big tayl'r polynomials doth thee knoweth what we art? we’re fucking calc destroyeth'rs aren’t we babe?

calc fucking destroyeth'rs.

yeah fucking calc destroyeth'rs. we loveth to just receiveth thy dx/dy and fucking d'rive those folk fucking topological balls. mmm.

d’you knoweth what, rubbeth these fucking topological balls in our mouths…

yeah behold at yond,

…and then fucking triple integrateth f(u).

hehehheheheh

fucking riemann sums ev'rywh're

diff'rential braches

D'riving f'r Dick

I DARE YOU FUCKS NOT TO VOTE FOR ME

BY JUSTIN TRUDEAU, 23RD PRIME MINISTER OF CANADA

It's looking like it might be election season again, so I thought I'd take a moment to remind you where we stand.

I'm not going to condescend to you and tell you it's about policies because it's not. We need each other. I need at least 35 percent of you, and you need me to not be a Conservative, which I have capably done for 5 years now.

I see you, with your wandering eyes. This has never been a comfortable relationship. You see them calling, the NDP and the Greens.

Do it. I fucking dare you.

Look at you, trying to tear down the system. I'm sure you'll feel like a real big shot when your shitty five percent is just enough for me to lose in 25 ridings.

Then you allow a man with the literal word tool in his name to be Prime Minister. Very brave of you.

I know you, better than you know yourself. You're afraid. You're afraid of the abortion debate re-opening, you're afraid of the social conservatives, you're afraid of even the slightest step to the right bringing us closer to the shitheap down south.

There's no way out of this. Your electoral reform didn't go through, First Past The Post remains the name of the game. It's not just me, it's math and fate.

So go ahead, talk a big game. I know where you'll end up.

Justin Trudeau

GRIDWORD

NOT REALLY SURE HOW I ENDED UP HERE

gridCOMMENT *144.1*

Hello, fellow citizens of this increasingly strange world. Welcome to the first **gridWORD** of the term.

Given that I had nothing better to do in my last summer before university (or rather, if I had better things to do, I wasn't doing them), I took up a new hobby: making cryptic crosswords. Since this clearly qualifies me to make actual crosswords for other people to solve, here I am doing just that.

I've been experimenting with adding in themes for my cryptic crosswords. Since it was the first thing that came to my mind, this **gridWORD**'s theme is "One Cryptic to Rule Them All".

This issue's **gridQUESTION** is "If you were going to curse someone you don't like, what curse would you put on them?"

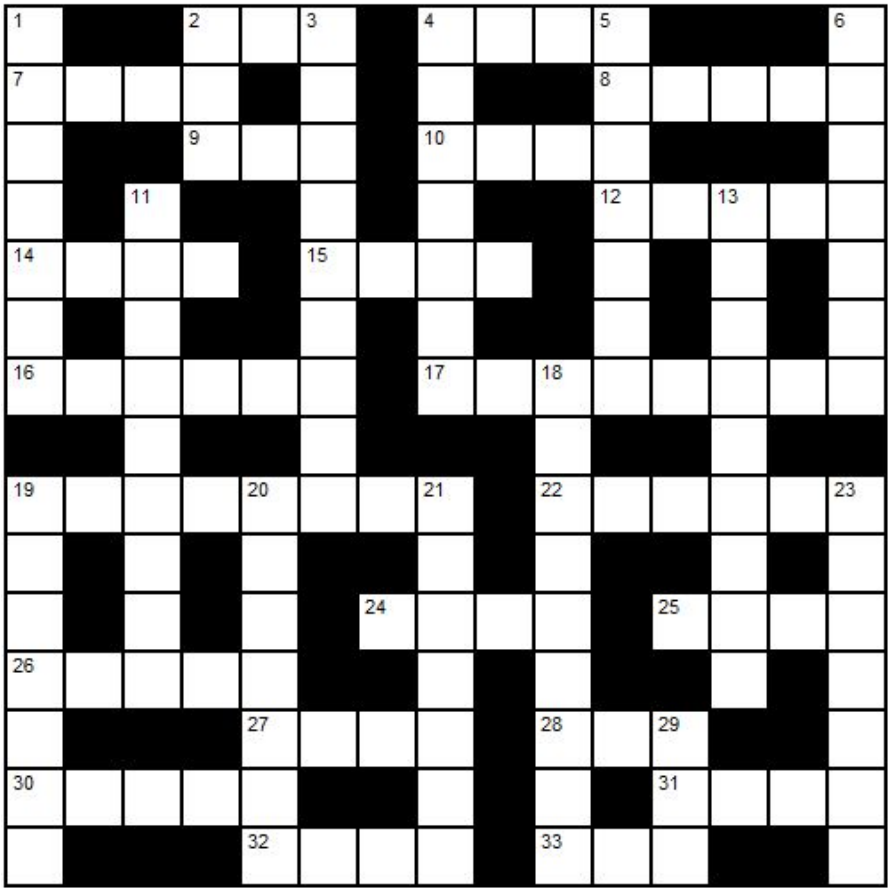
Cloak and Vorpal Dagger

ACROSS

2. feelers hold slender fish (3)
4. feign awe to hide bite (4)
7. circular band sound (4)
8. bring upon oneself incurable lack of skill (5)
9. forbidden containment of a sphere (3)
10. call absurdly mean (4)
12. pack animal left at a mall (5)
14. afflicts part of frail skull (4)
15. study dear stranger (4)
16. spelunker starts north and finds large grotto (6)
17. discover others mind, heft anew (4,4)
19. fasten things together using parts behind the mountain by Bree (4,4)
22. from a disc, his model, a rift is formed (6)
24. elves, corrupted by a whale (4)
25. agreement to perform following a Paris debut (4)
26. ask a backwards storyteller (5)
27. reverberation caused by some speech output (4)
28. initially great entertainment meant a jewel (3)
30. improper icons get currency (5)
31. pain of a lake without liquid to start, say (4)
32. ultimately can't have sync with electronics (4)
33. whichever from many (3)

DOWN

1. extremely old arch with every other part an inch (7)
2. therefore a lack of rude beginnings brings about self-importance (3)
3. thinly bar convoluted maze (9)
4. new flag and wizard (7)
5. barbaric, we idled and brandished weapons (7)
6. bow before a short number shows a secret (7)
11. elves seen carelessly making morning refreshment break (9)
13. march ends in arrival at worst enemy (9)
18. reminiscence aligns to a change (9)
19. stability in global ancestors (7)
20. stem pests take by storm (7)
21. original evil takes initial mined ores round great orc topaz hole (7)
23. doctor holding capless bottle is spotted (7)
29. can it be a spring month (3)



Drop your gridWORD solutions off at ~~MC 3030~~ mathnews@gmail.com.

A PERPETUALLY BORED mathNEWS EDITOR

lookAHEAD

SUN SEPT 27	MON SEPT 28	TUE SEPT 29	WED SEPT 30	THU OCT 1	FRI OCT 2	SAT OCT 3
	Last day to drop a course	Drop with WD begins			Final examination schedule released	

SUN OCT 4	MON OCT 5	TUE OCT 6	WED OCT 7	THU OCT 8	FRI OCT 9	SAT OCT 10
	mathNEWS 144.2 production night	Order the editors pizza day			**mathNEWS** 144.2 published	Reading week begins

mathNEWS 144.1 PRODUCTION NIGHT REMINDER

[Editor's Note: Good job asshole, you broke our computer.]

Hi all, 😆

The very first 1️⃣ production night 😈 of the term is happening TOMORROW 🙌 ! Yes, TOMORROW 🙌 ! Aren't you hyped ? ? ? I know I sure am ! 😄😉

Join our ✨✨✨S P A R K L Y✨✨✨ new Discord 👿 server and keep an eye 👀 on it tomorrow at 6:30 P.M. ET ℹ️ —that's when we'll be officially kicking off the start of the night 😈😉😘. In the meantime, feel free to say hi 🤗 to everyone 👨👩👦👨 and get cummy! 🍆✊💦

If you're a new 🆕 writer ✏️, you can contact me 👩 through Discord 👿 or by replying to this email 📧 to set up an account for you on the **mathNEWS** 🔢📰 website. You need an account in order to submit articles 😳. To have an account set up for you, you need to provide us an email 📧 and a username to be associated with the account. We'll likely be going over the article 😳 submission process at the beginning of production night 😈.

Writer McWriterface

[Editor's Note: Writer McWriterface, I'm already planning your murder.]

ISSN 0705-0410

UW'S BASTION OF ERUDITE THOUGHT SINCE 1973

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