



## "WHAT IS YOUR DEEPEST, DARKEST FEAR?"

Hello, bonjour, hola, Привет, cześć, zdravo... you get the idea.

Welcome back my friends, to the **mathNEWS** that never ends... We're so glad you could grab it, come inside, come inside...

Besides the blatant ~~plagiarism~~ HELP from a certain 70's band, I really *am* glad to see you all here! I know how busy it gets for everyone around this time of term; reading **mathNEWS** is an excellent and healthy method of procrastination.

Speaking of procrastination, as of October 17<sup>th</sup>, marijuana is now legal nationwide after many months and years of anticipation! The law differs between every province and territory, but for Ontario, they are similar to alcohol except you can smoke or vape in an outdoor public place. That being said, do be mindful of municipal bylaws. No one likes *that* person.

If it is your first time with the devil's lettuce, drink *lots* of water and to wait at least five minutes before taking more, though everyone should practice safe and responsible usage. To ameliorate your experience, try listening to some classic albums: (or listen to your favourites!)

- The Dark Side of the Moon - Pink Floyd
- Any Beatles album after and including Rubber Soul
- Indigot - Kid Cudi
- Mezzanine - Massive Attack
- Maxinquaye - Tricky
- Kid A, Amnesiac - Radiohead (two different albums)

In this not-so-spooky issue, there is a myriad of articles touching on fan pages, numerous recipes (in Scheme!), and the Waterloo Squirter. Our **featuredPROF** is Michael Wallace, whom we are grateful for his prolific wit that is evident in our issues thus far. His **profTHOUGHTS** might give you the munchies though, so watch out!

Happy munching!

stapLED  
Editor, **mathNEWS**

XX_420SONICFAN69_XX	Losing Sonic ♡.
NARAYAN	A really deep, dark hole.
ALEX LEE (MATHSOC PREZ)	Being impeached (pls don't impeach me).
WHYOS	Finding out that Stephen New is actually a 500 foot tall monster from the paleolithic era.
PERMANENT PSEUDONYM	One day a jock will roast me & I won't have a comeback.
CIX	The Kool-Aid Man.
GRADIENT DESCENT	The Waterloo Squirter.
FRUITBOY	Choking. No, I mean suffocation. Perverts.
PIZZA GUY	Getting roasted in a Facebook group chat.
ME	I want to say dying alone, but the actual fear is retaking CS 350.
BEYOND META	<del>That my enemies are right and I am too insecure to deal with</del> I mean getting run over by a bus.
VARIOUS PSEUDONYMS	Finding out that I should have taken Pascal's wager all along.
AH!	Writing a math exam with only a permanent marker.
FLATLANDER	Fighting 10 horse-sized babies.
GEORGE LAMBROU	Not getting school credit for <b>mathNEWS</b> .
STAPLED	Non-serious answer? Living in a vegetative yet conscious state where I can do nothing except scream in my head and no one hears me. Serious answer? MOTHS.
CONFUSED	Getting a 5 on an SOA exam.
YCLEPED	It's a tie between dying alone and having to solve a problem using the simplex method.
OVER-ENGINEERED	The day when MC would be completely renovated.
SWINDLED	Reincarnation is real, and I get reborn as an engineer.

## ARTICLE OF THE ISSUE

Though Xavientois gave some good competition with Good (and Other) Methods to Transfer into CS, this week's article of the issue goes to whatifOS' scatological investigation What if all humans pissed at the same time and place? Come to MC 3030 to pick up your prize, once we actually go get some more.

swindLED  
Editor, **mathNEWS**

[Mmm... **mathNEWS** flavoured chips...]

ESTHER AHN, **mathNEWS** EDITOR FOR FALL 2018  
ALONG WITH NOSHERWAN AHMED, JAMIE ANDERSON, CLYDE BROWN, AND ANUJ OPAL

## COME TO THE FEDS GENERAL MEETING!

Have your say in the direction your student union takes on issues that impact our undergraduate experience at Feds October General Meeting (GM)!

All #UWaterloo undergrads are welcome and encouraged to attend the GM at 12 noon on Oct 24 in the SLC Great Hall.

Can't make it?

- You can drop in and out if you have class or other on-campus obligations, or
- Vote by proxy if you're off campus (basically, tell a friend who is attending how you want to vote on each item and they can vote for you). Submit proxy forms to [pres@feds.ca](mailto:pres@feds.ca) by 12 noon on October 22. You can find the form at [feds.ca/general-meetings](http://feds.ca/general-meetings)
- Watch our Facebook Live stream or tune in at <https://livestream.com/UWFeds>
- Follow as we live tweet on Twitter ([www.twitter.com/UWFeds](http://www.twitter.com/UWFeds)) and join the conversation using [#FedsGM2018](https://twitter.com/UWFeds)

This is your opportunity to vote on key topics that will affect your campus life. The full agenda will be available Oct 10, don't worry - you'll get an email. Head to [www.feds.ca/general-meetings](http://www.feds.ca/general-meetings) for more info!

Alex Lee, MathSoc Prez

## FURTHER EDUCATION FAIR 2018

The Further Education Fair will be held on Monday, October 22 from 11:00 a.m. to 2:00 p.m. in the SLC Great Hall. This fair is your chance to explore post-degree options and meet staff and faculty from more than 90 institutions across Canada and abroad.

These representatives will provide information and answer your questions about career options, graduate school admission requirements, program specifics and application procedures, and deadlines.

Come and explore programs like:

- Masters of Management in Finance
- Master of Data Analytics
- Master of Management and Professional Accounting
- MBAs and much more!

For more information visit our website: <https://uwaterloo.ca/career-action/further-education-fair>

The CCA Team

## STUDENT MENTAL HEALTH FORUM

*Come and learn how the Committee on Student Mental Health (CoSMH) is bringing the President's Advisory Committee on Student Mental Health (PAC-SMH) recommendations to fruition.*

At an open house style session following the forum, CoSMH representatives will be available to share more about current mental health initiatives.

Join the conversation and share your feedback at the Student Mental Health Forum.

### WHEN

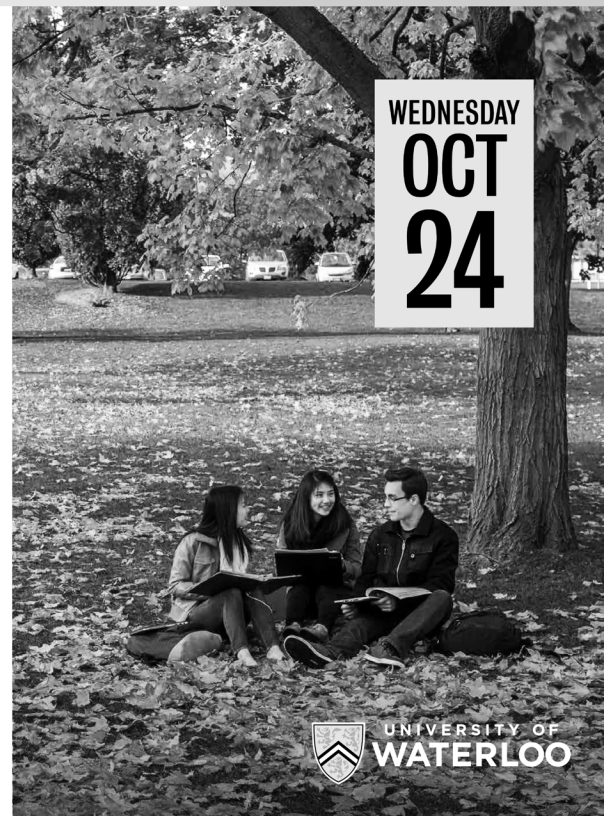
Wednesday, October 24  
Forum - 2:00 p.m. - 3:00 p.m.  
Open House - 3:00 p.m. - 4:00 p.m.

### WHERE

Forum - Hagey Hall  
Humanities Theatre  
Open House - School of Accounting and Finance  
Don Craig Atrium

### REGISTER

[ticketfi.com/event/2564/student-mental-health-forum](https://ticketfi.com/event/2564/student-mental-health-forum)



# mathASKS 138.3

## FEATURING PROFESSOR MICHAEL WALLACE

### FRUITBOY: IS YOUR FAVOURITE MOVIE “WALLACE & GROMIT”?

I remember when Wallace & Gromit first became popular in the UK. I made my first friend in high school because my surname was Wallace and they liked Wallace and Gromit. You'd think that would make a poor foundation for a friendship, but we were still friends six years later. We are not friends now.

I don't know if I have a single favourite movie. How do you measure that? Is it the movie where, if you could only watch one movie for the rest of your life, that's the one you'd choose? If that were the case I'd probably pick something really long and useful, like a documentary about how to make fire or survive a bear attack (or both?). I suppose there's YouTube for that, though, so maybe that's not the best metric.

No hang on, my favourite movie is definitely Hackers. Ignore everything else I just said.

### XX\_420DABLORD69\_XX: TO WHAT EXTENT WOULD YOU SAY BIOLOGY AND SCIENCE FACTOR INTO A BIO-STATISTICS DEGREE? WHAT ABOUT MATH AND CS?

This is a great question! A lot of students assume that you need to have some background in biology to pursue biostatistics, but this is a long way from the truth. (Side-note: in the UK we tend to use the term 'medical statistics' instead of biostatistics, which I think is a little better.) My work is fairly theoretical, but whenever biostatisticians get involved in real-world problems/datasets it'll seldom be without an expert from the relevant field. What's more important is being ready to ask for clarification on something if it's from an area with which you're unfamiliar.

That said, knowledge of biology (or more general 'science') can certainly be useful, but the math/CS side is generally more important. We do typically expect a strong math background (obviously with a concentration in statistics). CS is definitely an asset, especially as we're seeing this shift towards bigger datasets, but by no means essential.

### CONFUSED: WHAT IS YOUR FAVOURITE COURSE TO TEACH AND WHY?

While I know it's not the perfect course, I do enjoy teaching STAT 231. As a core course it gives me a chance to win some folks over to the idea that statistics is actually kinda neat (or at least slightly dispel the idea that it's terribly dull). I've also always enjoyed teaching more introductory courses/concepts: it gives me a 'clean slate' to work with, and I think the first course/prof you have in a subject can have a big impact (for better or worse!).

### CONFUSED: WHAT IS ONE OF YOUR FAVOURITE TRAITS TO SEE IN A GOOD STUDENT?

I like students who ask questions! All too often a question after class or in office hours is preceded with a 'sorry to ask so many questions...' and while I understand why it manifests, it really makes me sad that this is a mentality that's so pervasive. Never ever be scared to ask questions :)

### CONFUSED: WHAT'S THE DIFFERENCE BETWEEN PREDICTIVE ANALYTICS AND FORECASTING?

Let's just say I had to look up the answer to this on Wikipedia.

### CONFUSED: WHAT IS A 95% CONFIDENCE INTERVAL FOR THE PROBABILITY THAT YOU WILL RETURN FOR ANOTHER mathASKS IN A FUTURE ISSUE?

A reminder that a 95% confidence interval is derived from a sample, where were we to take infinite resamples from the same population, 95% of the resulting confidence intervals would contain the true value. As such, I don't think I can give an answer that won't compromise my attempt to teach this in STAT 231 later this term. Perhaps if people give me questions like this in class, and I can give funny enough answers, I can make the [profQUOTES](#) page a pseudo-mathASKS and be in [mathNEWS](#) foreverrrrr.

### LOQUATIOUS: WHAT UPCOMING THING ARE YOU LOOKING FORWARD TO?

I'm rather looking forward to Halloween this year. Halloween was never a particularly big deal in the UK, and while it's not the hugest deal here, either, it still feels a bit more like what I'd see on TV as a kid. I still haven't decided whether to dress up in costume for class.

### STAPLED: CAN YOU DANCE LIKE MIA WALLACE (FROM PULP FICTION)?

I've never seen Pulp Fiction. I always get it confused with Reservoir Dogs (which I have also not seen). I'm going to say...probably not?

### FREQUENT NOTETAKER: HOW DOES IT FEEL TO BE FREQUENTLY QUOTED ON mathNEWS?

This is my third term teaching at UW, and I always wondered why I was never quoted in [mathNEWS](#) despite my obviously incredible wit. Now I know that the secret is to have the editor in my class you'd think it'd take the shine off this accomplishment. Obviously it does not, and I am saving every issue to show to my grandma.

**XAVIENTOIS: WHAT WAS YOUR LEAST AND MOST FAVOURITE PART OF YOUR UNDERGRAD?**

Least was easily the bad professors. Cambridge uses a 'supervision' system where one prof sits down with two students to go through their attempts at that week's problem sheet. These can be fantastically valuable learning experiences or absolutely awful ones, but you need profs who are understanding and patient, and not all of them were cut out for that.

My most favourite (favourite?) part, if I can call it that, was just the sheer oddness of studying at such an old institution (my college was over 400 years old, Cambridge itself over 800). There's lots of weird traditions and events that I feel very lucky to have experienced. These weren't all good at the time (I recall being incredibly hungover and having to sign my name in a super old book in a 17<sup>th</sup> Century library first thing in the morning), but are fun to look back on.

**XAVIENTOIS: WHAT DO YOU THINK OF THE MONARCHY?**

I know this can be quite a contentious issue, but I mainly find it kind of weird? It's the 21<sup>st</sup> century and we still have these actual human beings who are basically national pets.

**LONDON, ON: SUPPOSE I VISIT LONDON (UK) FOR A VACATION. WHAT ARE SOME OF YOUR TOP 5 MUST DO THINGS THERE?**

(I'm taking 'some of' to indicate a strict subset is required, so can give at most four.)

1. Definitely see as many museums as you can if you like filling your brain with **knowledge**. The British Museum is especially full of stuff (much of which, admittedly, the British Empire stole at some point and won't give back).
2. I'd also recommend just walking around (is that a thing? I think that's a thing). Something I've learned from moving to North America is that it's immensely satisfying just to wander through old streets and look at old buildings. Always see if you can walk a distance rather than taking the Underground—it's healthier and way more fun.
3. Another thing I've learned from moving to North America is that British pubs are much better than I ever really appreciated when I lived there. Find the oldest one you can. While you're at it—and if you're into trivia—a British 'pub quiz' is another must.
4. Try striking up conversation with people. Londoners love to boast about how we're all incredibly anti-social (and, admittedly, the middle of rush hour mightn't be the best time to try), but I find the stereotype a little tedious. You may be pleasantly surprised, or in the worst case wind up with fun anecdotes about how the British really are as miserable as everyone says.

**SWINDLED: YOU'VE BEEN ASKED MANY QUESTIONS BY STUDENTS ON YOUR VARIOUS ONLINE FORUMS. WHAT'S THE WEIRDEST QUESTION YOU'VE BEEN ASKED BY A STUDENT, OTHER THAN THIS ONE?**

I dug up my old ask.fm to answer this, and I think the weirdest is a tie between:

"So, can eating onion rings at a bar be modeled by a poisson process?"

and:

"Have you been attacked by the campus geese yet?"

...but I think these only really seem weird to an outside observer. To me they're both perfectly understandable (and very good!) questions.

**VARIOUS PSEUDONYMS: WHAT'S THE MOST META QUESTION YOU'VE BEEN ASKED BY A STUDENT (OTHER THAN THIS ONE)?**

Someone once pointed out there was an error on a slide I'd made about measurement error. Not a question per se, but still enjoyably meta.

**TOTALLY\_NOT\_A\_TRAITOR: WHAT IS YOUR LEAST FAVOURITE PART OF YOUR JOB?**

The actual process of turning research into published papers. I'm fortunate to find the actual writing fairly enjoyable/painless, but you then spend an inordinate amount of time satisfying style guides, cutting down word counts, and just generally jumping through hoops that mainly seem fairly arbitrary, archaic, or both. What's more, this all happens to help support a system (that is, paywalled journals) I find questionable at best.

**SILLYCONE: WHO IS BETTER: THE QUEEN OF ENGLAND, OR THE QUEEN OF CANADA?**

Yes.

**OVER-ENGINEERED: WHAT IS YOUR FAVOURITE STATISTICAL MODEL?**

Naomi Campbell-curve.

**I'm not a mathematician,  
I'm a statistician, which  
is better.**

**PROF. MICHAEL WALLACE**

# GETTING IN SHAPE: A TREATISE ON THE BEST SHAPE FOR FOOD TO BE.

profTHOUGHTS 138.3

There are many shapes. As students attending such a prestigious institution, you probably know of several. Rectangles, triangles, circles, these are the building blocks of approximately 92% of all mathematics. It may surprise you to learn that there are more. Some upper-year students will be nodding smugly at this point, having studied courses that introduce more advanced concepts, such as the trapezoid, hexagon, and sphere. A reminder, however, that at UW we of course encourage use of their more formal names: the wonky rectangle, ultra-pentagon, and roundest boi.

Do not worry if these shapes are new to you! As is so often the case with my teaching, I prefer to focus on fundamentals, rather than attempt to dazzle with my knowledge of doctoral-level material. The pre-requisite shapular knowledge to comprehend the following is merely the minimum I would expect of any student in the math faculty. Engineers: read on at your own risk.

But why, I hear literally none of you ask, is a statistics professor writing about shapes? Should I not be concerned with probabilities, confidence intervals, and an over-reliance on asymptotic theory rendering almost all of our work only approximately correct? Perhaps. But like most statisticians, I require food to sustain myself, and it is this topic that is currently most pressing. (I skipped breakfast.)

“If music be the food of love, play on.” is a quote from a William Shakespeare play. I can neither remember, nor be bothered to look up, which one. It is necessary to quote William Shakespeare to lend gravitas to my words, as in text I cannot rely on my British accent to disguise my irreverence. I care not for the food of love, however, but the love of food. I’m not sure if music really comes into it.

I am not a very foodie person. I eat it, but am not *good* at it. My strongest opinions on food concern shape, and I have put considerable thought into the best shape for food to be. In this manuscript I will present a discussion of some of the most common food shapes, and the arguments for and against them being the best food shape. In the interests of space I will limit myself to the most common food shapes. In the disinterests of space I will use the phrase ‘food shape’ relentlessly.

## SQUARE RIGHT-ANGLED QUADRILATERAL MEALS?

The phrase ‘square meal’ has always slightly frustrated me. Meals are often served on round, not square, plates, and few foods themselves are perfectly square. (I assume there is no other meaning to the word ‘square’ than the mathematical one. You may find that always assuming mathematical words only take their mathematical meaning useful. Extra credit question: how would you set a table with a square meal?)

Instead, we shall consider what can perhaps most simply

be described as rectangular food shapes. This immediately presents a very strong opening argument for best food shape: the sandwich. Sandwiches are one of the best foods. They are fairly clean to eat, portable, and come in a near-infinite range of flavours.

They also lend themselves very well to combinatoric questions for STAT 230 that have serious, real-world consequences (“If I have five different sandwich fillings, and choose four of them to make a sandwich, how many sandwiches can I make? What if my cheese can’t touch my lettuce?”).

Another important class of rectangular food falls under the umbrella of ‘bars’, such as chocolate or cereal. Food shape theory purists will argue that we should separate bar shapes—with their high length to width ratio—from the more evenly proportioned sandwich pseudo-square, but I feel this is needlessly divisive. Speaking of divisions, however, this smoothly brings me on to...

## FOUR CORNERS GOOD, THREE CORNERS BETTER?

In my sandwich-centric defense of the rectangle, some of you may have scoffed (that’s a really funny wordplay about eating, btw) at the notion of eating a sandwich in its default shape. After all, aren’t most sandwiches sold not as a rectangle, but divided into two triangles? Some argue that this is in fact a point in *favour* of the rectangle food shape, as it can always be transformed into two triangles if you prefer. This is known as the twin prime conjecture of sandwiches. It is only a conjecture, not a theorem, because we haven’t eaten every sandwich yet. I’m working on that.

In any case, in my view triangles must (and should) be assessed of their own accord. One can turn a triangle into squares (up to an approximation), and so the aforementioned argument becomes uselessly circular. (But we’ll get to circles in a moment.)

I would strongly argue that a triangular sandwich shape is preferable to even the most perfect square. The corners provide a more mouth-friendly insertion strategy, and the ‘inside cut’ gives a more aesthetically pleasing view of the filling. It can also be proven, through numbers, that triangles are more fun than their quadrilateral competitors. Triangle has six anagrams (including triangle, the identity anagram), one of which is the math-friendly integral. How cool is that? Try to find fun anagrams of square and rectangle. Spoilers: you can’t. (Extra credit question: if you cut a sandwich in half do you now have two sandwiches half the size of the original, or two half-sandwiches? What if you eat a triangular-shaped sandwich at a catered event? Is that a sandwich or a half-sandwich? If the latter, how do you know what proportion of a sandwich it was originally?)

If sandwiches aren't your thing then you...probably have more in your life to worry about than reading this. However, to show I can bring knowledge of disparate topics together to form a cohesive argument (thanks, PhD training), I can present some other very good triangular foods. Tim Hortons hash browns are triangular enough to count, as are the CnD samosas, and typical cake slices. Perhaps the strongest triangle argument of all is pizza. But what is pizza if not a hot, open-faced sandwich? Delicious, that's what.

#### ROUNDING THINGS OFF

Now, similar to the 'isn't a triangular sandwich just half a rectangular sandwich?' nonsense, you may be arguing that slices of pizza (and cake) are really just from circles. First, I will acknowledge that a slice of a circle is not *quite* a triangle, but we'd have to call that shape a 'circular sector' and that's far too advanced for most food shape conversations. Moreover, I'm a statistician, and as such I'm allowed to wave my hands and say something is 'close enough'. We're never going to find out the exact value of theta anyway.

Nevertheless, the circle is a valid food shape in its own right, and as such must be given a fair hearing. Donuts are a strong opening contender in this category, as are bagels (i.e., disappointing donuts), and cookies (i.e., lower-dimensional donuts). I am also rather fond of circular sandwiches, such as in a bun or roll. These feel like more of a treat than an everyday sandwich, however, and the allure may wear off over repeated sampling. (You can learn more about repeated sampling in STAT 231.)

Another important consideration with circles is that they provide the lowest risk of corner-induced injury. Conversely, they do not tessellate, and so if you are trying to optimally pack your stomach there will be wasted space. (Although I may be wrong here; recall that biostatistics does not require knowledge of biology.)

#### DISCUSSION

Rectangles, triangles, and circles. The building blocks of mathematics are also the building blocks of food. But which is the best food shape? To me, the conclusions are clear.

As a devout sandwichist, I am able to reduce the argument to relatively simple terms. Triangular and circular sandwiches are strictly superior to rectangular ones. Moreover, rectangles are just boring. No reasonable person may prefer the rectangle. That is without question.

The argument therefore lies between triangles and circles. The pointiest versus the round. From here, we look to other foods in support. Donuts and hash browns, samosas and cookies, we can pair off strong competitors from either side. Pizza, however, settles it.

Circulites will insist that I cannot claim pizza for trianglehood, but I vehemently disagree. How often do you eat a pizza as a circle? (If you eat pizza as a square then, well, I'm

sorry.) The fact that circles are so routinely cut into triangles (or at least, pseudo-triangles) speaks for itself. Quad Eat Demonstrandum.

With all that said, and having just finished Chapter 3 in STAT 231 this term, I should acknowledge the limitations of this study. First, my arguments are based entirely on my own diet and food preferences. I cannot claim they hold for other cultures, or even other individuals. Moreover, in the interests of accessibility I have only considered the basic food shapes. If the faculty ever approves my proposed course in Food Shape Theory students will have the opportunity to explore this topic in much greater depth. As a teaser, consider the cone. (Just don't tell the dean.)

Within the constraints of this article, I have demonstrated the clear superiority of the triangle. You may disagree, and if you do I would encourage you to provide a counterpoint, perhaps for a future edition of this publication. If nothing else, I hope I have demonstrated that determining the best food shape is not an easy prospect. Indeed, the enormity of this task is (I assume) why I can't get federal funding to study it.

So go forth and assess food forms, and form your own conclusions. Just be careful with whom you discuss such issues, as it can become rather heated (like a hot sandwich). The best food shape is a controversial topic, and I am grateful to **mathNEWS** in showing the courage to publish this work.

Prof. Michael Wallace

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## AN OPEN LETTER TO THE EDITORS OF mathNEWS

Dear **mathNEWS** editors,

On the cover of Volume 133, Issue 4, you claimed that even though there was a new layout, there was still the "same great paper taste[.]" As a person whose primary diet consists of **mathNEWS**, the taste of each issue is extremely important.

After tasting paper from issues using the old layout and the new layout, I have come to a conclusion that the paper from the old layout is significantly tastier than the paper from the new layout.

Because of this, I am starting a hunger strike. I will no longer be eating any issue that use the new layout.

Bring back the old layout, or else.

Regards,

A person who eats **mathNEWS**

# profQUOTES 138.3

## CO 342: BRUCE RICHTER

“ Let me move onto something that is right.

## CS 135: ROB HACKMAN

“ Professor: I bought these to give you guys a treat...  
Students: Awwwww.  
Professor: Don't 'aw' me!

“ The number that's that first number is that first number.

“ The easiest way to walk through what we're doing here is to start at the bottom and work our way up. Just like Drake.

“ Now, 'add1' may seem confusing to you... That was a joke. It adds 1.

“ 'sub1' is this confusing function that subtracts 1 from its argument.

“ 13 doesn't exist.

“ Marijuana is legal tomorrow. That's weird.

## CS 486/686: ALICE GAO

“ Simulated annealing is like life.

“ What does trying a lot of things mean? It means making a sub-optimal move.

## MATH 135: RICHARD DLIN

“ The world does not behave.

## MATH 135: MARTIN PEI

“ I've broken many things in people's lives, including their hopes and dreams.

“ The empty set represents the number of conversations we're having right now.

“ There's no consequences for not voting. That's why democracy fails.

## MATH 135: JORN VAN DER POL

“ I see people shaking their heads, saying 'No, you moron...'

“ I'm going to show you guys a method you can use to convince someone [your proof] is true without resorting to violence.

## MATH 137: BARRY FERGUSON

“ No? No. Yeah. Yes? Yes. Glad we agree.

## MATH 145: DAVID JAO

“ You're saying I'm cheating because I used a smart definition. I don't think that's cheating. I think that's smart.

“ Good morning. [said at 2:37 p.m.]

“ The theory doesn't come from the sky.

“ I don't think anyone has really great mental Coq.

“ 31 is too big, let's do 103.

“ If Gauss did it, why can't you?

“ It's an Ancient Chinese song that tells you another way to solve this particular problem.

“ I can read this, but I don't know what it says.

“ [Speaks Chinese] This is a very archaic way of saying 21.

“ Multiply by half of a moon.

## MATH 145: STEPHEN NEW

“ Student: Professor, there's typos in your course notes.  
Professor: Impossible.

## MATH 147: DAVID MCKINNON

“ Morally speaking, the derivative is the slope...

“ It's true for the engineers too, but they just refuse to believe it. That's why it's a pain to teach them linear algebra.

“ No, let's not call it a 'speed.' Let's call it a 'stretching factor.'

“ We're still in the land of morals.

“ The proof just screws around with formulas and out comes the right answer.

“ There's not many people who have a stressful morning and then say, "oh! I get to do math now!"

## PMATH 331: BLAKE MADILL

“ You can form balls around all of these guys.

“ There were diapers. There was lasagna. It was a good day all around!



“ Our balls are the puzzle pieces we need to put together.

“ If you take balls that look like this, somebody from the other side is gonna sneak into them.

“ Keep it in your toolbox.

#### PSYCH 101: STEPHANIE DENISON

“ ...and that's how you steal food from children! [Upon showing a video about conservation in children.]

#### STAT 231: MICHAEL WALLACE

“ Does anyone have a landline in their house? ...Oh, two people. Wonderful.

“ I love this, in this study people under 35 are young people, so I'm still young..

“ If you're old or young it probably won't change what your favourite number is, most people will just say 7.

“ I should say, me quoting [R.A. Fisher] is not me endorsing eugenics.

“ I respect how much Quebecers spend on wine.

“ There are all sorts of reasons why people on Twitter aren't normal.

#### STAT 441: ALI GHODSI

“ So let's say this class is the training set... [points at class] why is the training set so small today?

## MANDATORY RANT ABOUT FLU SEASON

Have you left your house in the last week?

Then surely you have seen people around you coughing, sneezing, and wearing way too many layers. It turns out that the reason behind all that is a very malicious virus: The Flu (or influenza if you wanna pretend to be a scientist, but why you'd want to do that is beyond me).

Make sure to stay hydrated, keep warm, and try to minimize human contact if you find yourself experiencing any of these symptoms.

I wish you well.

Doctor Math

## HOW TO MAKE 'MATHEMATICIAN'S DELIGHT'

#### WHAT YOU NEED:

- A couple servings of Fireball whiskey.
- Some sort of coffee (the cheapest instant coffee works best).
- Ice cubes.
- Water.
- A container you can drink out of; let's call this 'Bob.'

#### PREPARATION:

1. In Bob, mix together water, coffee powder, and ice to your liking. I recommend a buttload of ice, half a cup of water, and two teaspoons of coffee.
2. Drop in a shot of Fireball whiskey into Bob, and mix (stir, shake, whatever).

#### SIDE NOTES:

Fireball whiskey is a pretty rad whiskey that's (in)famous for having a lot of cinnamon. That being said, if cinnamon isn't your thing I still recommend the drink because at some point into the night, the cinnamon just fades away. Like all things in life.

Narayan

## RANDOM SHIT HEARD AROUND MC

- "I don't know what kind of society we'd be living in where you can find coffee syrup in the 'soups' menu."
- "Mickey Mouse should've entered the public domain 10 years ago."
- "Why did my login work and yours didn't?" "Sexism."
- "Computer scientists are like priests!"
- "What if everyone peed at the same time? I can't find any articles about this." "Just save that for your PhD paper; if you're doing the research anyway, might as well get the most bang for your buck."
- "Can I use your login, so when I look up how to hire a hitman on the dark web it comes back to you?"
- "I wish we had those varsity jackets!" "We do." "...oh."
- "Who squirts their water bottle?" "Everyone?"

Fruitboy

## HOW ICE CREAM IS MADE

Hey all! Xx\_420SonicFan69\_xX here! I am, like many others, a first year math student at Waterloo, which means I'll get murdered by midterms for the first time, but it also means something more important: CS 135. CS 135 is a course like no other, in that I've actually literally never coded before in my life. But let it also be known that it has the most elaborate word problems, including whether a rainbow is valid. One requirement is that colours in the rainbow can be skipped, as the unicorns steal them (rude) use them to make ice cream (acceptable, but not a sonic game). So this led to me wondering: what does the unicorn do to the colour?

The first step is that the unicorn takes the colour to an Essence Extraction Factory (most of these are run by Rainpires, vampires that specialize in sucking a specific colour rather than just red) before they spit out the extracted colour to be sucked through the Demon Tube. The Demon Tube isn't actually a hell, it's a retirement home for monsters who really enjoy the processed colour and produce the emotional essence as a... waste product.

Usually, however, this is where the leprechauns raid, angry about their stolen colours and wanting to steal them back. They raid by crystal light, as they need to recapture their rainbows, under the cover of night, with gold-crafted weapons. To fend them off, the unicorns use their homing missile regrowing horns to target groups of leprechauns at once, while they use a chalky substance secreted from the tip of their horns to draw a teleportation circle and move the factory. It takes at least a week for the leprechauns to find the new address, but they are bloodthirsty.

Next, the essence is shipped from this factory to the Land of Frost. The people there are very chipper, and they are blessed with eternal winter, immortality, and immortal youth, so long as they remain citizens (which anyone is free to with a few vetting tests). Of their own volition as the sovereign and the majority of the citizens have a blast making and eating it, they decide to freeze the essence. Everyone knows that colour essence is equivalent to emotional essence (which can be verified with a truth table), so we now have frozen emotional essence.

Finally, we need to turn the essence into ice cream, but this is a simple spontaneous chemical reaction given by the equation:

$$\text{emotional essence (s)} + \text{friendship (aq)} \rightarrow \text{ice cream (s)} + \text{trust (aq)} + \text{faded colour (l)}$$

This reaction is catalyzed by love, so it takes place in Disneyland, surrounded by Disney characters.

The ice cream is then obtained via pouring out the solution through a Pokémon soda filter, where the ice cream is scraped into buckets and raised in a loving household for 5 years (its maturation age) before it can be sold (don't worry, it is aware of its fate). The unicorns then go to "harvest" more colours and reuse the faded colours as a result of the process to start over again.

So now we know why the unicorns are stealing colours to make ice cream. I can finally feel like my functions are doing something, and so can you, so we can write (b)Racket code in peace.

Xx\_420SonicFan69\_xX

## N SNEAKY SNAKE-Y MIDTERM STRATEGIES

*OR HOW TO INCREASE EXAM DIFFICULTY  
WITHOUT INCREASING QUESTION DIFFICULTY*

- Add more questions.
- Reduce exam time.
- Provide zero previous midterms to study off of
- Collaborate with other professors to put all the midterms students have to take in a single week.
- Give students previous years' easy midterms, then drop a killer midterm on them 'cause "you already saw the difficulty of the old questions so you should be prepared for them."
- Schedule classes that run until 10 minutes before the midterm starts, and burn their minds out with grueling, laborious lecture content.
- Hint that students have a chance at getting 100% to ease their fears, and raise their hopes, then lambast them with a savage midterm.
- Tell students that the exam will be super difficult so they spend all their time studying for your midterm so they do worse on other courses, then ruthlessly devastate their grade through the midterm anyways.
- Commit academic murder by midterm by doing all of the above at once.
- Schedule a midterm the Tuesday after **mathNEWS** Production Night so all a student can write is a listicle about your exam.

**mathNEWS isn't a cult.  
We just lure people in  
with free pizza and trap  
them in our office. Come  
by to get a taste!**

A **mathNEWS** CULT LEADER EDITOR

## MIDTERMS

**Affyre**—After the roaring “successes” of the democratic process in the recent years, in a press conference this week the Malebranche, the ruling tredecemvirate of the Malebolge region, had decided to institute a democratic process to fill a vacancy of their own. Since Lord Alichino has gone off with some upside entity known as “the Joker” and left the seat without issue, there hasn’t been a clear successor to the seat; this is the perfect opportunity for Malebolge’s denizens to partake in the bread-and-circuses affair which graces many a popular evening entertainment system for themselves (well, whatever passes for “evening” down here, at least).

Since students are about as likely to vote in this election as any other election (if historical precedent tells us anything), I don’t see the harm in going over the candidates as a peek into infernal politics.

- The marquis *Naberius*, a humanoid corvid demon of taller-than-average height, represents the traditional branch of thought in the demonic rhetoric. Presenting themselves as a refined individual and invoking more powerful patrons below (which is said to include the prince Paimon and the duke Dantalion), Naberius promises “what we already have, and more of it”. Their most recent scandal of any appreciable size is when they were caught using “please” and “thank you” to servants.
- The demon *Annaag* is a nobody large six-legged bullish demon who is about as sharp as a bowling ball, which makes them a very popular candidate for all sorts of middle-class demons to try and vie for control over. Any and all questions directed to Annaag by the press has been met with “uhhhhhh i dont know” or maybe with Annaag trampling the poor imp who was tasked with the job. Annaag also has the benefit of having no scandals besmirching their name, although there haven’t exactly been any accomplishments either.
- The marquis *Phoenix*, a 5’4” firebird who claims to be the original phoenix, is a delusional fallen angel who believes that their stay in Malebolge is temporary and is a test of their character. As such, their existence is full of demonic scandals of niceness and showing empathy, but all the tricksters in the region love Phoenix for it and has even managed to be elevated to marquis, a feat which is still talked about today to much chagrin of demons who believe they are more deserving. A rather popular option for those who think this penultimate promotion for Phoenix would be rather hilarious.

Only time will tell how this will turn out. In the meantime, I’m just going to sit back and watch the fireworks unfold.

Zethar

## WHO IS THE WATERLOO SQUIRTER?

*Night has fallen on campus. The harsh winds chills at those who were unfortunate enough to be outside. A shadow sweeps by STC, something clutched in his left hand. With a slight twitch and the twist of an arm, a cylindrical object is revealed. It’s not long until the windows of the building are covered in cold water.*

Since early September of this year, students at the University of Waterloo have been terrorized by a mysterious figure who squirts an orientation water bottle at, well, literally everything. This man, known as the **Waterloo Squirter**, has been spotted all around campus.

There has been multiple sightings of the culprit, but witnesses offer a different description with each incident, suggesting copycat crimes. While the Waterloo Squirter has always operated on the outside, there have been recent reporting of water inside buildings. Police have began investigations last Friday.

“We’re following an evaporating trail,” a sergeant commented. “We don’t know if we’re chasing one guy or dozen. This guy’s so good at squirting water, he’s getting the weather to do it, too.”

Here are some things students have said about the enigmatic Waterloo Squirter.

“I can barely concentrate during my classes knowing what’s out there,” 小黑黑 said, his face visibly contorted by fear. “And walking back from my night class to REV... always walk with a buddy.”

“I just see him squirting water,” an anonymous [/u/waterloo\\_squirter](#) posted on Reddit. “Trees, windows, grass, geese, squirrels...nothing is safe anymore. Should I contact campus police?”

“I think he’s pretty cool,” Riley Holterhus said.

Anyone who sees him is asked to call 911, and should not approach him directly.

Gradient Descent

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## WHAT, DID YOU EXPECT A GOOD JOKE?

Why are statisticians bummed out about the empty set?

Because it *means* nothing.

Narayan

# ASSIGNMENT -1: mathNEWS

## CS115:

A linear shift is one of the simplest adjustments that can be done to clean up data in preparation of further analysis. It can be used to remove constant error or adjust for slowing changing factors out of your direct control. **mathNEWS** is currently trying to process the results of a survey which asked readers which geese they preferred. Unfortunately, they just noticed that their pet platypus messed with the survey and results so that there were non-geese options and all the answer counters started at the same random number. Since no one would betray Mr. Goose, you can assume that no one voted for a non-geese option.

**Create a function `linear-shift` that consumes `loi`, a (`listof Int`) and produces the same list but linearly shifted such that the smallest value is 0.**

Example:

```
(linear-shift (cons 3 (cons 14 (cons 2 (cons 8 empty))))
⇒ (cons 1 (cons 12 (cons 0 (cons 6 empty))))
(linear-shift empty) ⇒ empty
```

## CS135:

Everyone knows that the **mathNEWS** office has more copies of previous editions than they know what to do with. You have been asked to help find specific editions in hopes of putting together a display. This involves searching through various boxes, shelves, bags, and desks. These are defined by the following structures:

```
(define-struct (edition volume issue))
;; An edition is a (make-edition Nat Nat)
(define-struct (box color size contents))
;; A box is a (make-box Str (anyof 'small 'medium 'large)
(listof edition))
(define-struct (shelf location offset-from-top contents))
;; A shelf is a (make-shelf Str Int (listof edition))
(define-struct (bag logo contents))
;; A bag is a (make-bag Str (listof edition))
(define-struct (desk owner pile contents))
;; A desk is a (make-desk Str Str (anyof 'left 'middle
'right) (listof edition))
;; A storage is one of:
;; * Box
;; * Shelf
;; * Bag
;; * Desk
```

To do so, you will have to write the function (`find-edition volume issue locations`) which searches through a list of storage locations. In each possible location you will need to go through the contents to try to find that specific edition. This function will have to return a list of any to represent the location of that edition. The first item should be the specific type of storage location, then the various fields of the

structure excluding contents for easy locating and finally, the index of the edition in the list. Represent the first item as 0. If not found, return empty.

```
(check-expect (find-edition 1 10 (cons (make-shelf "Right
Wall" 2 (cons (make-edition 1 10))) empty)) (cons 'shelf
(cons "Right Wall" (cons 2 (cons 0 empty)))))
```

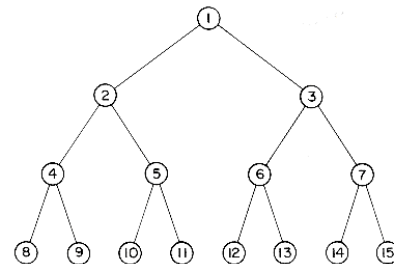
```
(check-expect (find-edition 9 9 empty) empty)
```

```
(check-expect (find-edition 1 2 (cons (make-box "Neon
Green" 'small (cons (make-edition 2 3) empty)) (cons
(make-bag "Nike" (cons (make-edition 9 8) (cons (make-
edition 1 2) empty))) empty))) (cons 'bag (cons "Nike"
(cons 1 empty)))))
```

## CS145:

Due to a decrease in article submission and a desire to maintain meme density, **mathNEWS** is transitioning to an infinitely folded page structure where you can either unfold the left or right flap of each page to reveal a new page which contains its own right and left flap. This goes on forever. This requires a new page numbering system which is guided by the simple rule that if you unfolded all of the infinite folds and looked at the pages from top to bottom, left to right, you would find the page numbers are in normal order. The first page is numbered one. To ensure easy access to **profQUOTES** is maintained, the editors print instructions to the **profQUOTES** page as a sequence of R and L which represent if you should unfold the right or left flap to reach that page. For easier sharing of quotes, you would like to determine the page number of the **profQUOTES** page.

This is how the first 15 pages would be numbered according to their location in the fold. Note that in the actual edition, this continues until infinity.



**You are to write and submit the file `numbering.rkt` to marmoset in intermediate student with lambda which contains the following function:**

```
;; (get-number instructions) takes a list of instruc-
tions represented as either 'R or 'L and returns the page
number reached by at the end by following the instructions
as defined. Your function should be O(n) when n is (length
instructions)
```

# PVP: LAYTH

Within our last issue, you may have seen an article by IceNine, in which he provided his own public response to an article he disagreed with in the previous issue (see **mathNEWS** 138.2: [A Review of the Sonic Adventure 2 Review from Last Issue](#)). I would like to use this as an inspiration to provide a counter-argument for an article that I disagreed with from the confines of Issue 2. The article in question is titled [G<sup>3</sup> Reasons Why mathNEWS Listicles Suck](#) by the writer Layth. It seems only suitable, as such, to provide counterpoints for each of their arguments presented as my own “N reasons” list. I present to you all, the following:

## N REASONS WHY **mathNEWS** LISTICLES ARE ACTUALLY ALRIGHT

- The variable in question doesn't matter because it isn't hard to eyeball the length of a list anyway, and it won't be a difficult read because it's **mathNEWS** (Unless they're reviewing Zootopia Fanfiction).
- Although variable length arrays may fail your assignment, they can still contribute to society. If not, the harsh tides of time would've long washed them adrift, not to be seen again in the depths of the ComSci ocean.
- This is **mathNEWS**, any time spent reading is already ~~wasted time~~ well spent.
- The letter N is used in these lists as a consistent format, something every reader and writer can get behind and understand.
- There's very little relation between students listing funny, related points to a subject and the very random, situational nature of **profQUOTES**.
- Student output is not always worse than professors, as sometimes your peers will have a new way of looking at a subject/problem that the professor doesn't present in lectures.
- Bullet point articles aren't for a 'lack of article-writing talent', as they have their own unique type of article-writing talent required to make them stand out all day, otherwise **mathNEWS** wouldn't even have real articles anymore and would've devolved to '**mathLISTS**.'
- Unlike the like-fueled social media regime known as BuzzFeed, we here at **mathNEWS** are local, blue-grass talent with some kind of care for our audience, mainly due to the fact that we ARE our audience (does anyone else even read anything besides **profQUOTES** anyway?).
- Twitter feeds are usually infected with either whatever Trump had for dinner or people who spell ingredients as 'ingreediense', these lists are all stress-fueled UW inside jokes.
- If the logic used is that an article being a list defaults it to being funny, I circle back to my point in entry 7; We would be presenting '**mathLISTS**' to MC every 2 weeks and be overrun by Imprint, because even real news would be funnier than that.

- No need to accuse people of having lizard brains here, everyone knows if we had lizard brains we'd be out to control society, like the American Presidents or Mark Zuckerberg.
- Do cocaine.
- The geese are all around campus, of course they're constantly mentioned. They read these too, and we need to acknowledge them to keep them happy lest they decide to take over MC and declare it the 'Former Math Republic of Goosedonia' (FMROG).

I believe that with these points made, we can all agree that **mathNEWS** listicles are a welcome addition to these issues, and will be around for the duration of **mathNEWS** itself (side note: If Layth is reading this and remembers who I am, I'd advise them not to beat me up at the next production night because that's mean).

A Hesitant Fruitboy

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## N THINGS I WANT TO EMPHASIZE

Although I enjoy reading and editing all your articles, there are some things that you should be mindful of:

- Please capitalize “i”, as in “i like to write for **mathNEWS** because i like pizza”.
- Please capitalize the beginning of your sentences.
- Please capitalize appropriate (pro)nouns.
- Please be consistent with your spelling, capitalization, or apostrophe errors in your article.
- Please spell out numbers if it is less than 10. (0 to 9)
- Please use the Oxford comma.
- Please be aware of the subject-verb agreement.
- Please be consistent with contractions (I'm v.s. I am).
- Please watch out for comma splices.
- Please note the difference between its v.s. it's.
- Please consider re-writing and editing your article if you can't fluently read aloud your own article due to any awkwardness of phrasing.

Though my role as an editor is to obviously edit, being aware of the points I made makes for a more enjoyable task.

Thanks, all. Happy writing (and editing)!

stapLED  
Editor, **mathNEWS**

# GOOD (AND OTHER) METHODS TO TRANSFER INTO CS

Based on a quick perusal of the UWaterloo subreddit and the looks I get whenever I talk to a CS advisor, there is a decent chance that if you are reading this, you might be a math student trying to get into Computer Science. If you are, your story may be a lot like mine: Applied to UWaterloo in CS, possibly applied to math as a backup, got into Math with co-op but got rejected from CS. What now?? Well, in my case, I proceeded to call the admissions office and ask what my options were. They told me that they were implementing a new policy such that, should I decide to come to Waterloo to study Math, my probability of transferring into CS would be very close to 0. Not being deterred by my bleak chances, I decided to pursue this as an option. Through my failed attempts and much research, I have a very extensive understanding of the ins and outs of transferring. In this article, I will share some best practices and some practices which I have considered, but don't have the balls to try myself. Hopefully, you will emerge better informed and transfer-ready.

## STEP 1: GIVE UP

Have a seat, kiddo. Let me give it to you straight. It ain't gonna happen. No matter how hard you try, there will always be a hundred other Mathies trying harder. With the new policy, your goal isn't to meet the requirements. In order to transfer in, you would need to beat out 80% to 99% of the other applicants. It is not worth the stress and despair you will be going through during the term and the application process. If you are hell-bent on studying Computer Science, consider MIT, Carnegie Mellon, or U of T (Tokyo, not University of shiT).

If you have made it this far and choose to ignore the first step, read on. Hopefully, I can lower your probability of failure from 1 to 0.999.

## STEP 2: READ UP ON WHAT YOU NEED

Two places you need to go before going down this dark and dangerous path are the FAQ page for CS: <https://cs.uwaterloo.ca/current/faq/> and the CS advising office: <https://oat.uwaterloo.ca/q/cs>. The FAQ will give you a general idea of what is going on and your advising appointment will be the place to ask what exactly you need to do to get in. The hardest part of this is getting an appointment. During peak times of the term, you will need to wake up at 6:00 AM to get in line for advising and then wait outside the advising office for an hour. Once you're in, ask them as much as you can. What I tried to do was to speak with a few different advisors to see if I could get any extra info. What they will

probably end up telling you is to do your best in your CS classes. You will want at least an 85 (though this is about as low as you can go while still having a non-zero chance) but try for a 95 or higher. Also, keep in mind that CS 135 doesn't count toward your CS average because Racket isn't a real language.

## STEP 3: ELIMINATE THE COMPETITION

Now that you know how competitive the transfer is, you may be looking to maximize your advantage in this survival-of-the-fittest environment. You have two options: Strengthen yourself, or weaken the competition. The latter is far more interesting, and most other people will not be willing to go to the lengths I will be outlining in this step. (I do not endorse any illegal methods, but will frankly consider them as a hypothetical and effective option). Your two ways of going about diminishing the competition are to reduce the performance of your competitors or to eliminate them entirely, the latter being a much higher risk and much higher reward.

If this is the route you want to attempt, the first step is to identify your target(s). This is a simple matter of determining who the TAs or profs are for the course you are in. This can be done by looking through the course website. Then, you hack into their Piazza account (this step is trivial and left as an exercise to the reader). Once you have done this, you can look at the list of everyone enrolled in the piazza course. Use this list as your collection of targets. Using Tor, navigate to a certain website (contact **mathNEWS** for more details [*Editor's note: don't actually*]) and order a hit from your list. Repeat this until you are guaranteed a spot in CS.

If you choose not to completely eliminate your competitors, you can devote energy to weakening them. There are a plethora of ways to go about this. One of my preferred methods is to eat a lot of beans on the days leading up to the exam. This is coupled with wearing an airtight butt plug which you will remove during the exam. This will create a stench which will hinder everyone else's ability to concentrate. Another method would be to hack marmoset and rewrite the secret tests to be broken and only work for your code. Regardless of the way you go about this step, try and make your attacks more general and less targeted. This will make it harder to identify you as the culprit and also have a greater effect on your chances of getting in.

## STEP 4: WORK HARD

This was by far the most overlooked and underrated step in my case. There really isn't any way around this one. Go to all your lectures, ask questions, and attend all your tutorials. The trouble comes when you don't find the material very difficult. There's a sort of uncanny valley where the course isn't hard enough to stress over, but isn't easy enough to ace without trying. This is what you don't want. This is the danger zone! I made the mistake of getting too comfortable in my CS 136 class and slacking off. It was this very mistake which brought me to where I am now, bitter at everything and venting my

**Ceci n'est pas filler.**

A SURREALIST blackBOX

frustration by writing a how-to article about something I couldn't even do myself. If you ever find that you are confident about your CS class, you have already lost. Find some way to scare yourself into working ten times as hard as you think you need to. That is the only way to assure yourself a spot in UWaterloo Computer Science.

#### STEP 5: GIVE YOUR PROF SOME 69 ACTION

This is the last resort if you feel you haven't done well enough in your CS courses to assure yourself a spot in this elite program of Asian super-geniuses. If you can't get in on merit or cunning, gifts seldom fail. If your pockets are big enough, you can rewrite the rules as you see fit. For those of you who aren't familiar with Policy 69 of the university outlines the rules regarding conflicts of interest. This includes using authority for personal gain. Now, while I cannot publicly endorse the use of bribery to get into a specific program, a large enough donation to the school's various engineering building funds will surely earn you favour with individuals of significance. While direct donations may be your style, you may want to go with something more subtle and personal. The folks you want on your side would be the Computer Science academic advisors. Send some karma their way, and you may be pleased with the results. A list of who to bribe can be found here: <https://cs.uwaterloo.ca/office-hours>.

At this point, if you have followed all of my advice and still are not in CS, please refer to the title of the first step.

Xavientois

## WHAT TO DO WITH YOUR LIFE AFTER GRADUATION

I don't actually have an answer. Can someone please tell me? I already did traveled twice and got a job offer from my past co-op job. But now, I am here at mathNEWS production night where pretty much everyone I knew has left and moved onto another place. I never planned this far. I got a degree and even got a job. All the options are available to me and instead I choose the null option.

At least I can count on getting a regular supply of pizza.

Beyond Meta

## IMPORTANT UPDATE ON SLC CONSTRUCTION

Shit's *still* broken.

Fruitboy

## UPDATE ON R = $4.46 \times 10^6$

Okay, I hope you know what I am talking out. If not, please go pick up the previous edition of mathNEWS (or if you are lazy like me, go onto the inter-web and find the previous edition) and read it.

So the great news is that the value of R that I managed to somehow ~~calculate~~ bullshit was **CORRECT**.

Yaaayyyyyyyyyyyyyyyyy!!!!!!

I totally cannot contain my excitement. You all should have seen my face when I got the marked sheet back. If i was not in the company of other people, I would have *add something that very excited/happy people do*. Later that night, I went out to have a pint to celebrate the 0.03 % percent of the course grade that I just got. One pint lead to another and by the time I was in the middle of consuming the Nth pint, I got a phone call from one of my informants. The informant told me that as of this moment, I have a bounty on my head placed by people in my class. I inquired the reasoning behind it to which the informant replied, "It's because of that value of R you got." Apparently, I was the only person in my class who got it right.

So by the time this gets published, I would have gone into hiding on campus. People in my class can get quite creative when they are on the hunt. If you see me hiding in MC, please don't betray me, I beg of you. If you do, you will lose yet another mathNEWS editor.

over-engineerED

P.S. I do not know the real number of fatalities of mathNEWS editors in the line of duty. Maybe I should investigate this and write about it in the next issue.

## N LIES I TELL MYSELF EVERY PRODUCTION NIGHT

- I'm not here for the free pizza.
- My article idea will not get me sued for libel.
- I'm actually being productive.
- Running between the 2<sup>nd</sup> and 3<sup>rd</sup> floors of MC counts as a workout.
- I look cuter writing articles than I do writing code
- This assignment that's due tomorrow can be done later, and is definitely less important than the 2000 word article I'm about to drop on the mathNEWS editors.
- One day, I'll be able to find a boy/girl/wookie/whatever-friend.

whyOS

# DESIGN RECIPE FOR FUNCTIONAL BROWNIES

<https://hastebin.com/raw/nejewudebu>

```
;; Loquatius 7355608
;; mathNEWS 2018
;; Volume 138, Issue 3

;; (bake temp time batter) produces a Food made of Batter
'battery' when baked at temperature 'temp' Fahrenheit for
'time' minutes.
;; bake: Num Num Batter → Food
;; Requires 0 < temp, 0 < time
(define (bake temp time batter)
(begin
(turn-on-oven 'bake)
(set-temperature temp)
(when (preheated? oven)
(append oven batter)
(set-timer time)
(when (zero? time)
(remove batter oven)))
batter))

;; (mix i ...) takes at least one Ingredient or Batter 'i'
and produces as a Batter the mixed result of all 'i's.
;; mix: (anyof Ingredient Batter) ... → Batter
(check-expect (trivial? mixing) #t)

;; (melt i) produces the warm, liquid version of solid
Ingredient 'i'.
;; melt: Ingredient → Ingredient but melted
;; Requires i to be solid
(define (melt i)
(google (format "melt ~a in microwave" i)))

(struct ingredient (quantity unit item))
;; An Ingredient is a (ingredient Num Sym Sym).
;; Requires:
;; 0 < quantity
;; unit exists
;; Recommended:
;; item is safe to eat

;; Recipes
(define brownies
(let ([butter (ingredient 0.5 'cup 'butter)]
[eggs (ingredient 2 'dimensionless 'eggs)]
[vanilla (ingredient 1 'tsp 'vanilla-extract)]
[sugar (ingredient 1 'cup 'sugar)]
[cocoa (ingredient 0.33 'cup 'unsweetened-cocoa-powder)]
[flour (ingredient 0.5 'cup 'flour)]
[salt (ingredient 1 'pinch salt)]
[baking-powder (ingredient 0.25 'tsp 'baking-powder)])
(bake 350 25 (mix (mix (melt butter) eggs vanilla)
(mix sugar cocoa flour salt baking-powder))))))

;; Tests
; result should be delicious
```

```
(check-expect (tasty? brownies)
#t)

; should be legal to sell if every ingredient in the batter
is okay
(check-expect (legally-sellable? brownies)
#t)

; oops! extraneous dry ingredients in the brownie batter
(check-expect (legally-sellable? (> (length (get-dry-
ingredients brownies)) 5))
#maybe)
```

Loquatius

## CHINESE INTERNATIONAL STUDENTS FAWN OVER THIS ONE WECHAT USER

WeChat user 小黑黑 has become a hot topic among Chinese international students. He is an African-Canadian first-year student studying Sci-Bus who has mastered both speaking and writing Chinese, with up-to-date slang. His Chinese is likely better than the average Canadian-born Chinese. This man can be found in many WeChat group chats, where he sends out red packets (free yuan for whoever clicks on it first) and often says “我非常爱你们” (I love you guys so much) or “我是黑人，但我有一颗中国人的心” (I’m African-Canadian, but I have a Chinese heart).

One of 小黑黑’s first appearances was in a CS 135 group chat. He was looking for someone he and his friend can go to Monte Carlo with. Whether or not he found a person to complete the trio is inconclusive.

We were fortunate enough to interview 小黑黑 and find out more information.

**mathNEWS JOURNALIST: WHERE DID YOU LEARN MANDARIN?**

小黑黑: I was in China for the summer.

**mathNEWS JOURNALIST: DO PEOPLE ACTUALLY CALL YOU 小黑黑?**

小黑黑: My English name is pretty tough to pronounce, especially for international students whose first language isn’t English, so I just introduce myself as 小黑黑.

**mathNEWS JOURNALIST: HOW DID YOU JOIN SO MANY GROUP CHATS?**

小黑黑: I printed my WeChat QR code and taped it to my laptop.

Gradient Descent



# GRADING MATH PROFESSORS BY THE QUALITY OF THEIR FAN PAGES

It has recently come to the attention of **mathNEWS** writers that certain professors in the Faculty of Mathematics have fan pages on the interwebs. As the publication responsible for reporting math-related news within the University of Waterloo, it behooves us to not only investigate this astounding discovery, but also rank these fan pages by their accuracy, memery, and quality of shitposting.

## 3<sup>RD</sup> PLACE: FORREST

<https://www.student.cs.uwaterloo.ca/~l8guan/>

If you're into gazing lovingly at high-resolution photos of your favourite professor's face, this fan page is for you. Simple yet functional, Professor Forrest's fan page is the perfect altar to one of the best math professors of all time. And of all the competitors, it contains the best pun.

## 2<sup>ND</sup> PLACE: SNEW

<https://www.student.cs.uwaterloo.ca/~jj6yu/>

Devotees of Professor New will certainly appreciate the shrine that has been erected for him here. I mean, who wouldn't appreciate seeing  $6^2$  pictures of their favourite professor on a single page? Furthermore, this fan page is unrivalled in terms of its accuracy (as it should be, since it claims to be his "official fan page"). Although he will never admit to saying it, this website serves as an authoritative source for the infamous line, "There's a beauty in mathematics, and it is me."

## 1<sup>ST</sup> PLACE: MCKINNON

<https://csclub.uwaterloo.ca/~fbauckho/>

Like Professor McKinnon, this fan page is really, really awesome. Unlike Professor McKinnon, this fan page only contains a finite number of quotes. A true masterpiece of web design, this one wins for its captivating animations, amazing photoshops, and grade-A title. And if that's not enough, just feast your eyes upon the 128 photos of the handsomest associate dean ever. It is, to say the least, perfection.

## HONOURABLE MENTION: DJAO

<http://dominia.org/djao/>

It turns out that, in an earlier life, Professor Jao used to fansub anime. As he has made these publicly available, I guess you can technically categorize his old personal webpage as a fan page.

# BREAKING mathNEWS

We interrupt your high quality shit posts and lazy listicles to bring you the cutting edge of math news. In the last months there has been some major developments in the world of math.

Michael Atiyah, renowned mathematician and recipient of the Fields Medal of mathematics (generally considered the Nobel prize of mathematics), has recently submitted a proof for the Riemann Hypothesis one of the Clayman's Foundation 7 Millennium Prize Problems. There is a million dollar prize for anyone who submits a correct proof. Someone submitting a proof to such a problem isn't really news, per se, in that high profiles problems are notorious for having a large number of incorrect submissions. However, most proofs aren't submitted by someone as high profile as Atiyah. Still, the mathematics community is skeptical of the veracity of the proof.

The same week that this proof was submitted, there was development for another infamous problem of mathematics: the abc conjecture. Here's the backstory: six years ago, Shinichi Mochizuki from Kyoto University submitted a proof to the abc conjecture. However, no mathematicians understood the proof well enough to be confirm whether it was true or false. Finally after 6 years of the proof being submitted, some prominent mathematicians have spoken about how the proof in its current form is missing a piece to be deemed correct. One of the prominent people speaking out about this is Peter Scholze. He is also a recipient of the Fields Medal.

Mochizuki's reaction to Scholze objection was merely to say that Scholze doesn't understand the proof. Scholze came to the conclusion that the proof lacked rigour when discussing with fellow mathematicians and that everyone stopped understanding the proof at Corollary 3.12 of the third paper. Right now, the proof remains in a standstill.

We plan to update this article when we get the latest news... so probably in two years.

Beyond Meta

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

STEPHEN NEW

# WHAT IF ALL HUMANS PISSED AT THE SAME TIME AND PLACE?

*BECAUSE RANDALL MUNROE HASN'T ANSWERED THIS QUESTION YET*

First off, I don't know what kind of scenario would require all of humanity taking a piss at the same time. Aside from the minutes before a species-wide road trip, there's really no reason to consider this ever happening. Really, there isn't.

But this is **mathNEWS**, so we'll consider it anyways.

There's a lot of Google results about "what if all humans pissed at once"<sup>1,2</sup>. Most of them come to the same boring conclusion: nothing would happen, because sewers are a thing. Furthermore, outside of "what if everyone pissed into the ocean", I have been unable to find any articles on the effects of all of humankind simultaneously excreting the contents of their bladders in the same place. But because this is a news article, dramatization and hyperbole is necessary to answer the given question — such resources won't do. Instead, let's get our hands dirty, and dive into what would happen if the human population actually ended up in the same geographical location with full bladders, and simultaneously went to the toilet.

The first issue we're faced with is something that Randall Munroe, who is the actual creator of what if? (and thus the inspiration behind the entire article), managed to solve: how much space would you need to fit the entire population of the Earth? We can safely assume that we are looking at only the living portion of all humans, and not the deceased nor undead<sup>3</sup>. A crowd of all 7.7 billion living humans would be slightly bigger than Rhode Island<sup>4</sup>, or 55.5% of PEI<sup>5</sup>. Not bad. In fact, just to make everyone a bit more comfortable, we'll arrange for everyone to be in PEI instead of Rhode Island, and centralize the crowd around Glen Valley, its highest point. A lot roomier, and the food is probably better! There's probably even room for some privacy guards.

For the actual pissing portion, an examination of what kind of biblically-proportioned flood might result would be useful. The closest internet source I could find regarding this was a surprisingly accurate Yahoo Answers post from eight years ago<sup>6</sup>, which states that the combined volume of urine would be 2,070,000,000 litres, or enough to fill only 828 Olympic-sized swimming pools. Unfortunately, the estimated bladder size in the answer is for normal capacity, not maximum, so for the purposes of this article it completely misses the mark. Add in the hundreds of millions of people that have been born between 2010 and 2018, and it becomes clear that this is a piss-poor estimate.

So, back to basics. Depending on which textbook you trust, a healthy adult human bladder has a maximum capacity of anywhere from 470 millilitres to a full litre<sup>7,8</sup>. Of course, not everyone's bladder will be big enough to hold a full saucepan's worth of urine, so we'll assume an average maximum of 700 mL. Maybe a bit on the liberal side considering the child

populace, but it sounds about right. We can now calculate the new combined volume:

$$V = (7.7 \times 10^9 \text{ people}) \times \left( 0.7 \frac{\text{litres}}{\text{person}} \right) = 5,390,000,000 \text{ litres.}$$

That's equivalent to 2156 Olympic-sized ~~swimming~~ pissing pools. Determining how long it would take to swim a lap in each pisscine is left as a mental exercise to the reader.

Regardless, 5,390,000,000 litres is a crapload of piss to be talking about. In particular, that means supplying at least 5,390,000,000 litres of water to everyone right before the pee-scheduled urination time. Aside from the logistical nightmare of finding a place to store that much water, there's also the slightly smaller issue of where to procure five billion litres of freshwater. You're looking at shipping over New York City's daily water consumption<sup>9</sup> to a tiny island in Atlantic Canada, and that's just the lower bound. If it's a particularly hot day, that number is going way up. And if our supply chain is inefficient, people could be left holding their pee in for hours, resulting in possibly the loudest chorus of "Can I use the toilet?" ever heard. It actually turns out that water supply is the least of our problems, but we'll get to that part later.

Now that we've set up everyone, we can commence our scenario<sup>10</sup>. At the signal, 7.7 billion humans begin relieving themselves. Spread out, they don't do too much damage. The human urinary flow rate is small enough that the loose, loamy soil absorbs most of the initial onslaught before saturating and turning into mud. PEI also produces more potatoes than it produces asparagus, so the initial pee smell isn't too bad for one. Geographically, where elevation is higher, damage is limited to a few new creeks and washouts. The most damage would be seen close to the coast and major watersheds, where elevation is lowest. There, streams of urine combine to erode the soil to the bedrock, while also washing away a few thousand participants. Vast, bare wastelands of piss-contaminated mud replace towns and villages, and the few structures that do remain standing are completely inaccessible by land. Environmentally, watersheds that aren't already destroyed by the mudflows become heavily eutrophic, and within a few days the resulting algae blooms kill off all aquatic animal life, resulting in a stench that overhangs the island for days. But as always, it could be worse.

Now, I could call it a day here. It's pretty darn late, I pulled an all-nighter yesterday, and another one today isn't going to do me any good. Except we still haven't *quite* answered the given question. After all, ambiguity begets questions like "what if everyone just peed on the same spot of earth at the same time? How would that happen?"

Answer: If you thought our problems before were bad, just wait.

In order to get 7.7 billion people to aim at the same spot of earth, we need to spread everyone out vertically instead of horizontally. This means building very tall structures, and that's where we hit our first problem. For optimal efficiency, we make our target circular<sup>11</sup>, and just for simplicity's sake we'll assume a circle of radius one metre — small enough to count as a single spot of earth compared to the numbers we're dealing with, but big enough that hopefully no one will miss. From experience, 14 people can make a circle with radius a bit more than 1 m, so we'll be stacking everyone up in levels of 14. Already, this is beginning to look like a stupendously tall structure, so just to lessen the pressure on our poor engineers we'll stagger the levels so that a new one begins every half-human-height, thus halving the height of our Tower of Piss. The average height of a human is 1.65 metres, so if we order people across levels by height, we get an average of 0.825 metres of spacing between levels. That leads to a height of... drumroll...

$$h = \frac{7.7 \times 10^9 \text{ people}}{14 \text{ people/level}} \times 0.825 \frac{\text{metres}}{\text{level}} = 453,750,000 \text{ metres.}$$

In other words, only 1.2 times the distance between the Moon and the Earth. Yep, completely doable.

Erecting such a structure on solid ground would require some serious engineering. Erecting such a structure on PEI, where the underlying bedrock is a "soft red sandstone"<sup>12</sup>, is even harder. You'd have to do some serious load balancing in order to not overload the bedrock, and even then, that sandstone would be very close to failure.

But with the help of some overworked graduate students, we managed to overcome both the engineering issues and the issue of colliding with the Moon. We now have a structure taller than any ever built, so tall that 99.999996% of its occupants would have to wear pressure suits in order to survive<sup>13</sup>. It's also so tall that we need some sort of urine collection mechanism for the upper storeys, for comfort and so that the stream stays liquid all the way down. A dreadfully expensive cost, but since we already went with the hassle of moving everyone here and actually building this thing, we'll do it anyways and fund it out of UofT's budget.

To recap, we've erected a giant tower, loaded everyone onto it, and hammered in some expensive equipment to make sure we have a laminar stream of piss coming all the way down. Splashback and misting issues aside, this actually seems feasible. We do have to start the topmost storeys early to make sure that everyone's piss hits the ground at the same time, but that's pretty much a non-issue at this point. With that being said, let us commence the operation.

At T-9618s, the top most storey is given the signal to start pissing.

At T-6801s, 50% of the world's population have relieved themselves.

At T-4809s, 75% of the world's population have emptied their bladders.

At T-1s, a bit less than 5,390,000,000 litres of urine hangs five metres above the ground. I don't know what velocity it's achieved at this point, but it's definitely towards the right side of the interval [0, I-don't-even-want-to-think-about-it).

At T-0.5s, the mass of urine sits 1.2 metres above ground. A dark yellow shadow hangs over the land, an ominous warning of what is yet to come.

At T-0.1s, the mass of urine is five centimetres away from touching the soft, loamy soil of Prince Edward Island. It is moving so fast that the air beneath it is being pushed out at supersonic speeds, scouring the ground surface and killing everyone on the first level. Thankfully, our grad students did their jobs, and despite the enormous force on its structure, the tower stands.

At T-0s, impact occurs.

It is at this point that we take a short, but relevant, diversion. Back in 2013, a group of physicists at Georgia Tech discovered that, on average, mammals urinate for 21 seconds with a standard deviation of 13 seconds<sup>14,15</sup>. As humans are mammals [citation needed], we'll assume that everyone in our scenario pisses for an average of 34 seconds, since full bladders are involved. With 5,390,000,000 litres of urine being involved, this yields an average flow rate that is a staggering *158,529,411.8 litres per second*. For those of you keeping track at home, that's equivalent to over 27 Niagara Falls.

Against 27 Niagara Falls' worth of water crashing down at God-knows-what-number metres per second, the soil underneath our target doesn't stand a chance. The stream obliterates the topsoil layer, throwing up a giant geyser of mud and sand and choking everyone on the lower levels. In less than a second, it hits the bedrock. Already at its breaking point, the sandstone catastrophically fails, compromising the foundation and nullifying the efforts of our trusty grad students. Meanwhile, a gigantic debris flow begins snaking its way from the remains of Glen Valley towards the relative calm of the Atlantic Ocean, destroying everything in its path. Within seconds, our tower begins to fall.

453,750 kilometres above the Earth's surface, in the confines of space, a judder is felt, and the tip of the tower begins to accelerate in the direction of the Moon. Alarmed, the occupants try to escape, but to no avail: as the structure disintegrates, all escape routes are cut off, and with everyone on the lower levels either dead or dying, there's no one to save them once they hit the ground.

At T+34 s, humanity has finally emptied the collective might of its bladders onto the Earth's surface. Massive debris flows crisscross the landscape, and where Glen Valley once stood, there now exists a pit full of piss. Debris from the initial impact and pieces of the disintegrating tower rain down from above, scarring the newly-exposed bedrock and leaving their mark on what used to be Prince Edward Island.

Meanwhile, the tip of the tower continues to accelerate towards the surface of the Moon, despite the best efforts of its pissed-off inhabitants. When they inevitably meet, it's at an almost unimaginable impact velocity of 1,023 metres per second. The collision shatters the structure, littering the already pockmarked surface with even more craters, and creating humanity's first (and only) lunar cemetery. It's a gruesome end.

But hey, at least everyone got to use the toilet.

### whatifOS

1. It turns out that people mostly use the word "pissed" to refer to anger issues, and no one uses the word "urinate", so for optimal results the ideal verb is "peed".
2. It also turns out that, downstream of the third page or so, the results start being of the nature where you regret not searching in incognito mode.
3. This is always something that's bothered me in zombie movies. On one hand, zombies are almost unstoppable, and are probably capable of walking 500 miles nonstop just to be the one who eats you at your door. On the other hand, zombies eat brains/humans/things, all of which have significant water content. That water has to go somewhere, but you never see zombies pee, or poo, or excrete non-gaseous emissions in any way. How?!
4. <https://what-if.xkcd.com/8/>
5. I'm only comparing to PEI cuz I've never been to Rhode Island before, and have absolutely no clue what size it is.
6. <https://answers.yahoo.com/question/index?qid=20100328214949AASbpNG&qucounter=1>. Of note: This is literally the first time I've cited Yahoo Answers for anything. I hope it will also be my last.
7. <https://hypertextbook.com/facts/2001/DanielShaw.shtml>
8. This is one of the few Google queries that I unfortunately forgot to use incognito for. I'm expecting some very interesting interactions with Assistant tomorrow.
9. <https://hypertextbook.com/facts/1999/JessicaHowell10Neill.shtml>. I was originally planning to compare that figure with the volume of the Great Lakes, but it turns out they're greater than I thought.
10. Ethics committee disapproves of me calling it an "experiment".
11. Actually, it's so we can put a bullseye in it. Also, ease of calculation.
12. <http://www.edu.pe.ca/eastwiltshire/grass01/phys5c.htm>
13. Based on an estimate of 20 km being the minimum altitude where a pressure suit is needed. Unfortunately, Quora was down when I wrote this article, so I wasn't able to check if I was right.
14. <http://blogs.discovermagazine.com/seriously-science/2013/10/17/regardless-bladder-size-mammals-urinate-approximately-21-seconds/>
15. Also another Google query that I forgot to use incognito mode for. To anyone at Google reading this: no, I do *not* have a fetish for urination.

## FUNCTIONAL CHICKEN

Part 2 of functional recipes. <https://hastebin.com/raw/hihazipicu>

```

;;;;;;;;;;;;;;;;;;;;;;;;
;; NOTE: Cont. from "Design recipe for functional brownies"
;;;;;;;;;;;;;;;;;;;;;;;;

;; Loquatius 7355608
;; mathNEWS 2018
;; Volume 138, Issue 3

;; (panfry heat time what) produces a Food from Ingredient
'what', pan-fried for 'time' minutes on 'heat' heat level.
;; panfry: Sym Num Ingredient → Food
;; Requires heat to be valid, 0 < time
(define (panfry heat time what)
  (begin
    (turn-on-stove heat)
    (place pan stove)
    (append pan oil)
    (when (preheated? pan)
      (append pan what)
      (set-timer time)
      (when (zero? time)
        (remove what pan)))
    what))

;; Surprisingly super tasty maple mustard pan-fried chicken
(define chicken
  (let ([paprika (ingredient 2 'pinch 'paprika)]
        [garlic-powder (ingredient 1 'pinch 'garlic-powder)]
        [salt (ingredient 1 'pinch salt)]
        [chicken-thighs (build-list 8
                                     (ingredient 1 'dimensionless 'chicken-thigh))]
        [broth (ingredient 0.5 'cup 'chicken-broth)]
        [mustard (ingredient 2 'tbsp 'dijon-mustard)]
        [maple-syrup (ingredient 2 'tbsp 'maple-syrup)]
        [butter (ingredient 1 'tbsp 'butter)])
    (mix
     broth
     mustard
     maple-syrup
     butter
     (map (lambda (c)
            (panfry 'medium 5
                  (flip (panfry 'medium 5
                                (cons c (mix paprika garlic-powder salt))))))
          chicken-thighs))))

```

Loquatius

I basically only read the profQUOTES.

MOST PEOPLE WHO READ mathNEWS

## PINKIE KIDNAPPING ATTEMPT IN CPH

On Monday, October 15, 2018 at 12:01pm, as Pinkie<sup>1</sup> was handing out apples and stickers in CPH to spread the love for UW Smiles Day, the phone in the MathSoc office rang. It was from the the Engineering Society.

An office manager picked up the phone, and was immediately hit with a message. The message was garbled, full of static and hard to understand, but one thing was certain: Pinkie has trespassed onto EngSoc turf. And they were going to kidnap Pinkie.

MathSoc immediately sprang into action to protect Pinkie. MathSoc execs were seen sprinting from the MathSoc office to CPH, frantically typing on their phones trying to set up a negotiation session with the EngSoc executives.

When the MathSoc execs arrived at CPH, they were shocked at what they saw. Pinkie walking side-by-side with the EngSoc execs around CPH, handing out apples and laptop stickers to all engineers who passed by! The MathSoc execs were relieved and joined in on giving away apples and stickers.

When all the apples were given out, Pinkie and the MathSoc execs said their farewells to EngSoc. But as the MathSoc execs stepped out of CPH, an EngSoc execs pulled the MathSoc President aside and said:

*“You know that message you got? We meant it. We’ve done it before, and we’ll do it again.”*

Pinkie was immediately escorted back to its home in MC by MathSoc and is now guarded by a heavily-armed security team 24/7.

### Pinkie’s Bodyguard

1. Pinkie’s the Math mascot - it’s a pink tie!

## IT’S MIDTERM SEASON

thank mr goose thank mr goose thank mr goose thank mr  
goose thank mr goose thank mr goose thank mr goose thank  
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mr goose thank mr goose

Axel

## LET’S BE GRATEFUL WE GET TO DO MATHS (BEFORE MIDTERMS SUCK THE JOY OUT OF IT)

It’s kind of funny that we get to have a degree that mainly consists of making shit up in our head. Hear me out here:

We choose to think of something that we find interesting, *and then think about it really, really hard for an uncomfortably long time.* We place restrictions to precisely define these creatures and we then watch the magic unfold. Consider the following example that is highly motivated from Assignment 4 Question 4 from Math 135:

*There’s a world somewhere where every pair of cities are connected with one-way highways going in some direction. Let’s call this world Unowayland. Is it true that as long as there are at least two cities in Unowayland, there exists a travel route that hits every city exactly once?*

Firstly, how frickin cool would it be for a pattern like that to **emerge** from something we made up? The idea that such an orderly—and frankly, *sexy*—pattern could plo down from an imaginary construction is exciting.

So, is the claim true? Go find out! I’m not proving here (nor in my assignment). The important takeaway is that we get to think deeply about problems like this by ourselves and with other like-minded, crazed peers. We throw ideas, strategies, and a whole smorgasbord of thinky-things at these creatures with the hopes of taming it -- and I think that’s something to be grateful for.

Namely, that we (theoretically) have time to think deeply about these simple things, as my man Eddie Woo from Wootube likes to put it. I think that’s cool and something to be grateful about before the midterms come around and I realize that I sound like a raving madman.

Narayan

**You should be concerned if I were to stop biking to the university.**

PROF. BENOIT CHARBONNEAU

# LITTLE SPOOKS

Halloween is around corner, so here is a prime number of tiny spooky things that might make your stomach drop slightly.

- You wake up and realize you missed the final exam because you marked down the wrong date.
- You forgot the lease you signed with kw4rent is actually 3 years (not 1 year); you just missed the deadline to opt-out and now you are going to be stuck with them for the next 3 years. You're in 4A.
- OS161 won't compile when you're already on the third slip day.
- It's two weeks into term and you're already behind on everything.
- Your major average in 1B was just below the line, now try to explain to your parents on why you enrolled in bunch of art courses.
- Your graduate STAT thesis is due next week and you are nowhere close to be done.
- No girlfriend yet while your friends' kids are starting preschool.
- There are at least 5 geese on that side walk, hissing at you.
- CS349 assignment 2 is due at 10 pm tonight but you thought it's due on next Monday.
- You forget to cite a line from an research paper and you've already handed in.
- Gang Lu sends you an email...
- You are not good enough for this school, the jobs you're applying to, and the people around you.
- You wake up to the cramping of both of your legs, it fucking hurts. Like, really hurts.
- You get sick 2 weeks before final exams then get better 2 days before, now the doctor refuses to give you a note. Or you get really sick and it could be terminal.
- You walk in Kitchener alone by yourself at 3 am. You have nothing to defend yourself with and your phone is dead.
- You only have 3 interviews so far and both says ranking completed, you weren't selected. Good luck in continuous!
- You overslept a 9 am interview and now CECA is going to slap you.
- You get a "Good" on the COOP evaluation, you try to explain to your employers about the grade inflation. You end up with a "Satisfactory" instead.
- Realize you already used up a quarter of your life, you haven't accomplish anything.

- Presentation time: Your porn starts to play as you open your laptop
- Your wallet, keys, phone or backpack is missing. You spend the entire day looking for it, it's still missing.
- You have less than 200\$ left in your bank account, the bank refuses to loan you more until you repay the account standing.
- Pmath isn't right for you.
- The people you really cared about - family, friends, celebrities you stand for, etc. - are dying or start to be ill. For the next 60 years or so, it will happen at a faster rate, never ending. Til' it's time for you to go, then you leave the people that care about you behind.
- No one actually cares about you.
- Someone figures out you post on 4chan. You hope your future employers don't dig through social media archives on all those edgy 'jokes' you made in grade 10.
- You accidental click the phishing email link in uWaterloo mail, google chrome automatically signs in with your account.
- You have no idea on what to do after you're done school.
- **And the scariest thing, there is a spooky skeleton living inside of you. Boo!**

Wew, can't say that some of those things above never happened to me. I have more but that's all. Enjoy Halloween everyone.

me

## N SONGS YOU SHOULDN'T LISTEN TO WHILE YOU'RE STUDYING

- Anything from RENT (it's too good)
- Anything from Heathers (it's too good)
- Anything from Dear Evan Hansen (it's too good)
- Anything from Disney (it's too good)
- Anything from Steven Universe (it's too good)
- Anything from Adventure Time (it's too good)
- Anything from any TV show (it's too good)
- Anything from any one hit wonder (it's too good)
- Anything from any pop song (it's too good)
- Anything from any jazz song (it's too good)
- Anything from Tchaikovsky (it's too good)
- Y'know what? Listen to whatever you want, just don't get distracted

I read mathNEWS  
devoutly.

PROF. STEVE FURINO

Xx\_420SonicFan69\_xX

# LAST WEEK'S halting SOLUTIONS

## YOU DON'T KNOW MATH PART 1

### DISORDAT

1. **Lived in residence:** Both. Yes, really. In 2012, the Hamdullahpurs and their three cats lived in CLV while their new home was being built. And obviously, many first years have lived in residence within the past ten years. <https://www.therecord.com/news-story/2604963-uw-president-enjoying-sojourn-in-student-housing/>
2. **Cheated:** First year. EasyAce (2016). Also, that girl in 2014 who paid a male PhD candidate through a Chinese forum to impersonate her at a MATH 135 final exam. <https://www.therecord.com/news-story/5210859-alleged-cheats-arrested-over-math-exam-at-university-of-waterloo/>
3. **Joined UW:** Both. Hamdullahpur joined the University of Waterloo in 2009 as provost. And obviously, first year students exist.
4. **Got struck by lightning:** First year. Tragically, during Orientation Week in September 2014, a female engineering student took shelter under a tree during heavy rain. Lightning struck the tree and killed her. <https://www.cbc.ca/news/canada/kitchener-waterloo/waterloo-student-killed-by-lightning-while-sheltering-under-tree-1.2756915>
5. **Got paint dumped on their head:** Feridun. The Feds-organized Colour Me Educated fundraiser in 2011 ended with students dumping paint on members of UW administration, Hamdullahpur included. <https://youtu.be/kUD92y8KeWE>
6. **Designed a play structure:** First year. In 2017, first-year civil engineering students showed ten of their playground designs to the students of Keatsway Public School, from which they chose their top three. The new playground was formally opened on May 31, 2018. <https://www.cbc.ca/news/canada/kitchener-waterloo/keatsway-school-students-pitch-uw-playground-1.4054541>
7. **Went to a PSYCH 101 lecture:** Both. Hamdullahpur showed up for class on September 18, 2018, alongside his first-year classmates in an STC lecture room. <https://twitter.com/UWaterlooPres/status/1042121281628524545>

### STACK ATTACK

- **Yugi Muto:** Pharaoh. He's first protagonist of the Yu-Gi-Oh! series. He wears a talisman that houses the spirit of an ancient pharaoh, who takes his place to help him win games.
- **Dan Wolczuk:** Dancer. He was even a Ukrainian dance instructor. He's also known for teaching linear algebra.

- **Dave Tompkins:** DJ. He was DJ Dancin' Dave. Once he stopped DJing to work at the University of Waterloo, Vancouver's supply of Diet Coke began to slowly recover.
- **Nomair Naeem:** Karateka. He used to train in karate. He also karate chopped the crap out of Java bytecode and made a decompiler for it.
- **Adolf Hitler:** Herbivore. He was a vegetarian. Experts don't agree on why.
- **Pee-wee Herman:** Game show host. Paul Reubens, the actor who portrays Pee-wee, was the host of a short-lived televised game show adaptation of *You Don't Know Jack*.
- **A woman who murders men and eats their livers and hearts:** Fluffy animal. It's a kumiho, the Korean folklore interpretation of the nine-tailed fox. These evil fox spirits disguise as pretty ladies, seduce men, then feed on their organs. In some stories, if a kumiho doesn't kill any humans for 1000 days, it becomes a human for real.
- **Tony Stark:** KDE user. In *The Invincible Iron Man #11*, page 13, panel 2, there's an inside-the-helmet perspective that shows a screenshot of the KDE 3.5 desktop environment. (This one's kind of obscure. Sorry.)

Loquatus

## ISSN 0705-0410

UW'S BASTION OF ERUDITE THOUGHT SINCE 1973

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# [THIS TITLE IS ALSO REDACTED]

## gridCOMMENT 138.3

Hey again, grid-groupies! We had two correct solutions this week. But of those two, only one submitted a response to the **gridQUESTION**. So let this be a lesson to all you happy puzzlers out there. A correctly solved puzzle is NOT sufficient to win the grand prize. Don't forget to answer the **gridQUESTION** as well.

Our winning response comes from Harry. Last week's **gridQUESTION** was "If you were stranded on a deserted island and had to be given math lectures for six hours a day for the rest of your life by any one UW math professor, who was stranded there with you, who would you choose and why?" Harry writes "[REDACTED]: He might be able to procure us a boat via the posterior extraction method." Harry you can come by the **mathNEWS** office at MC3030 to claim your prize (and shame on you for suggesting your professor has a boat-sized cavity!).

This week's puzzle is themeless. I know that's not as exciting as usual, but I hope you enjoy solving it nonetheless. You can blame my lack of grid-construction effort on my midterm

schedule. To make up for it, when midterms are over, I'm planning to do a super math-themed grid using all the knowledge left over from my midterm cramming. So brush up on your network flow theory, group theory and combinatorial enumeration; you could win free coffee and snacks! (See, this math stuff is useful for something after all)

This week's **gridQUESTION**: What's your best idea for a new regular **mathNEWS** feature? (Bonus points if you volunteer to write it!)

Drop off your solutions and **gridQUESTION** answers in the **BLACK BOX** next to the C&D on MC 3<sup>rd</sup> floor. If your puzzle is correct and you write the best answer to the **gridQUESTION**, you can win a \$5 gift certificate to the world-famous MathC&D. Deadline is Monday, October 29<sup>th</sup> at 6pm.

Happy puzzling!

yclePED

### ACROSS

1. Sword handle
5. Crops up
11. Grand \_\_\_ ("Evangeline" setting)
14. Health berry
15. Ion #53
16. Howard of "Happy Days"
17. White lie, for instance
19. "C'\_\_\_ la vie!"
20. 3<sup>rd</sup> Hebrew month
21. Ratty place
23. Bleated
26. Like a kingdom, it's sometimes "united"
28. You might take this to get ready for first year calculus
32. Bank offering, for short
33. Consumes
34. Drained
35. Circular course
37. \_\_\_ alia
39. Contemprable one
43. Toni Morrison's "\_\_\_ Baby"
45. Egg cells
46. \_\_\_ system
47. Daredevil, of sorts
53. Tight
54. Damp smelling
55. Gorge
56. Lab samples, sometimes
60. Clinton, e.g.: Abbr.
61. Like a sneeze
66. Mythical monster
67. Focus (on)
68. Crystal Beach's lake
69. "Born"
70. Fluid accumulations
71. 1990 World Series champs

### DOWN

1. Accident
2. "Rocks"
3. Michigan ou Ontario, par exemple
4. Heart
5. Boosts
6. Aggravate
7. Doing nothing
8. Colour of Galactus' herald
9. Tokyo, formerly
10. Instance of a Linux shell
11. From the 1930's
12. Flower-shaped pastries (alt. sp.)
13. Contraire de "Sortie"

18. Papadopoulos used to be one, famously
22. Blow
23. Sea cell
24. Ethereal
25. Way, way off
27. Hill's husband
29. Pulls a drawstring tight
30. \_\_\_ Solo
31. Emergency shutoff, for short
36. Character
38. "The Three Faces of \_\_\_"
40. Thousand \_\_\_, Calif.
41. Aid and \_\_\_
42. A fish who was found
44. Render into smallest discrete parts
47. Hyundai model, or Arizona city
48. Answer to "Where are you?"
49. Peek
50. Body of work
51. "Absolutely!"
52. Sheen
57. Study, say
58. Hip bones
59. Women in habits
62. Homer's Neigh-diddly-abor
63. "\_\_\_ we having fun yet?"
64. Free from, with "of"
65. "Absolutely!"

1	2	3	4	5	6	7	8	9	10	11	12	13	
14				15						16			
17				18						19			
			20						21	22			
23	24	25					26	27					
28					29	30	31						
32					33			34					
35			36		37			38		39	40	41	42
			43	44			45			46			
47	48	49				50				51	52		
53									54				
55					56	57	58	59					
60				61	62					63	64	65	
66				67						68			
69				70						71			



## YOU DON'T KNOW MATH PART 2

### haltingCOMMENT 138.3

Hi, I'm your host, Loquatius, and I forgot to get Mom to sign the field trip form!

Welcome to You Don't Know Math! In honour of a new edition of You Don't Know Jack coming out in just two weeks, I've prepared a few UW-related trivia segments for your quizzing pleasure. But because it would be very impractical to have a YDKJ-style time limit on a piece of paper, I've written

these questions so that you can't just search the web for quick answers. Ironically, you might need to do some web searching anyway to be able to answer some of these questions.

Write down your answers and save them for next issue, where I'll reveal the solutions!

Loquatius

## A PERSONAL APPEAL FROM mathNEWS CONTRIBUTOR LOQUATIUS

Please read:  
A personal appeal from  
**mathNEWS** contributor Loquatius

Goose photo © 2010 Marek Szczepanek  
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Suppose I **printed all English Wikipedia articles**—without pictures—onto books the size of an Encyclopædia Britannica volume. Also suppose that you've collected **every single issue of mathNEWS** so far (including this one!), and let's assume that **mathNEWS** always prints **six issues per term**. If so...

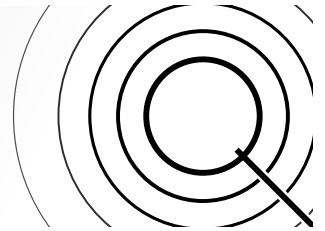
About how many **more years from now** must you spend collecting **mathNEWS** issues until you have **as many** issues as I have Wikipedia books? (Round to the nearest ten.)

Got your answer all counted up? Then next up...

## CHECK IT! I INSPECTED IT.

Check it!  
I inspected it.

Your access to pointless  
trivia around campus



It's the "put the choices into order then buzz in and see if you are right" question!

Do you think you know your way around campus? Do you meticulously keep track of trivial details? Are you willing to suspiciously walk around campus to find the answer to this question?

Rank these four quantities in order, from fewest to greatest.

1. Number of separate third floors in DWE
2. Number of food/drink vending machines in MC from floors 1 to 6
3. Number of elevators and ladies' washrooms in PAS
4. Number of health inspection infractions (both critical and non-critical) that Mr Panino received on July 3, 2018

Fewest \_\_\_\_\_ Greatest

Want to write for mathNEWS? Come to the next production night! New writers are always welcome!

Check the lookAHEAD for the next date!

# lookahead

SUN OCT 21

MON OCT 22

TUE OCT 23

WED OCT 24

THU OCT 25

FRI OCT 26

SAT OCT 27

Municipal election day  
**GO VOTE!**

Deadline for 50% tuition  
refund

Further Education Fair

Student Mental Health  
Forum

SUN OCT 28

MON OCT 29

TUE OCT 30

WED OCT 31

THU NOV 1

FRI NOV 2

SAT NOV 3

mathNEWS 138.4  
production night

Halloween!  
Fees arrangement  
deadline

mathNEWS 138.4  
published

Bring treats to mathNEWS  
editors day

## LAST WEEK'S gridSOLUTION

### FAUNA OF UW



### BY SIX



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

otherNEWS is made technically possible by club executives of the Math Faculty. I say "technically" because if they had sent us more news this week, this box wouldn't be here.

THE mathNEWS EDITOR WHO PUTS THE "NEWS" IN mathNEWS