



## “WHAT IS AN UNORTHODOX PIZZA TOPPING YOU WISH WOULD BECOME WIDESPREAD?”

Hello, my loveliest readers! How are you doing today? Did you have a nice, healthy breakfast? I hope you did! Some people say breakfast is the most important meal of the day. I have no idea if they're right, but they are making themselves heard and you gotta give them credit for that.

Speaking of people making themselves heard—there were a *lot* of people making themselves heard at this production night. We booked M3 1006 and nearly ran up to capacity limits! Yes, *that* M3 1006! For those who don't know, M3 1006 is the biggest lecture hall I have been in, not counting Hagey Hall (which doesn't count because it's more like an auditorium). It was really fun and the folks have typed up some great reading material for us this week. No spoilers, but it's a must-read. Tell your friends, and grab a copy for them too while you're at it.

Now, there's still a lot of space left in the column, so let me tell you this really funny thing that happened to me. We ran out of coffee beans the other day. I knew a way to get a 10% discount, so I ordered the beans, but my roommate didn't realize that, so he ordered some beans too. But before either order could arrive, we ran out, so we went to the store and bought some more beans. Long story short, the orders arrived today and we have three kilograms of coffee beans.

I hope your day is as good as mine was when I realized this!

caffeinatED  
Editor, mathNEWS

## ARTICLE OF THE ISSUE

Congratulations to Skit for winning Article of the Issue this week, with [I Don't Live Here Anymore](#). I think you just gave me spoilers for my upcoming Christmas break, in a good way.

Don't forget to collect your \$25 gift card from the editors at MC 3030!

caffeinatED  
Editor, mathNEWS

ABALD MAN		Extra olives
PREDAP		Pineapple. Sure, it's already widespread, but it still has plenty of deniers. Rise, pineapple, rise, and take your place as the supreme pizza topping!
PLAIN		No toppings, just the dough and only the dough.
FINCHEY		Battery acid.
DERIVING FOR DICK		Carbone bread crumbs
someBODY		Smaller pizzas
WALDO@<3.LE-GASP.CA		Just cheese...with no pizza sauce...or dough...probably.
NOT A N*RD		Waterloo math student tears, plenty of that to go around. Also sprinkles
PEACELOVEMATH		Sprinkles (sweet and salty + crunch)
APHF		The library of Alexandria
YUMMYPI		Mud from Shrek's swamp <3
BOLDBLAZER		I've seen that video of Gordon Ramsay making a lemon pizza thing, so probably that.
QUANTUM GOOSE		Is casu martzu a good mozzarella substitute?
CC		Burgers so you can take them off and just have burgers
別		Pineapple, but on a pesto base
THREE KIDS IN A TRENCHCOAT		pepperoni
SECRET SQUIRREL		Banana
ME		McRib
SKIT		I'm probably the last guy you want to ask about pizza toppings... you're not ready for the answer. I mix milk and sprite, don't test me. (...banana)
TENDSTOFORTYTWO		Chicken shawarma. It exists, in Waterloo. I had it once. It was horrible. I hated every second of it. Everyone should try it.
X		cookie dough
AVERAGE ANIME ENJOYER		anime
EVILEVIEVIL		Mac and cheese (probably shouldn't become widespread...it's so unhealthy...)
WHILD		Apple! We already know it tastes good warm, so it must taste good on pizza.
GIRAFARIG		fusilli
A COOL PEN NAME		Italians
GOD ⚡ PEED		Broccoli. Don't let that scene from Inside Out fool you, it's good.
BIPED		Banana

I'm serious about the broccoli thing.

KEVIN TRIEU, mathNEWS EDITOR FOR FALL 2021  
ALONG WITH NAMAN SOOD, CLARA XI, AND YANG ZHONG

# mathASKS 147.5

FEATURING PROFESSOR TOSHIYA HACHISUKA

**TOKYOCATBOY: WHAT IS THE JAPANESE WRITING OF YOUR NAME?**

蜂須賀 恵也

The first three characters are my last name, and the second two characters are my first name.

**TOKYOCATBOY: WHAT ARE YOUR THOUGHTS ABOUT LIVING AND WORKING IN JAPAN AFTER GRADUATION?**

You'll need to understand Japanese language in your daily life, so make sure you learn some. In any case, I think it'll be a very fun and exciting experience for many Canadians. Your experience also varies a lot depending on which city in Japan you are talking about, so pick the one that seems a good fit to you.

**THE TRAVELLER: WHAT DO YOU LIKE/DISLIKE THE MOST ABOUT CANADA? WHAT IN JAPAN DO YOU MISS THE MOST?**

I like people in Canada. They respect diversity and are generally friendly and polite. What I probably don't like much is the healthcare system here. It's tough to find a (good) family doctor!

What I miss most are very good Japanese foods. We have some decent options in Waterloo, but not exactly like Michelin-star Japanese restaurants in Tokyo.

**PROCAVIA: WHAT'S THE BEST/WORST EXCUSE A STUDENT HAS EVER GIVEN YOU FOR A LATE ASSIGNMENT?**

The best: "I was not satisfied with what I had by the deadline, and kept working until I am satisfied. It's OK if you don't accept it." Guess how it turned out; the student got the highest grade in the end.

The worst: "I forgot to submit my work, but please accept it since I really need to get a good grade in this course." You probably don't want to forget it if it's that important for you!

**TENDSTOFORTYTWO: HOW DO YOU FEEL ABOUT CS488 BEING CONSIDERED ONE OF THE "BIG THREE" CS COURSES AT UW (THE OTHER TWO BEING COMPILERS AND REAL-TIME PROGRAMMING)?**

Actually, I don't exactly know why it is called so. Hopefully, it means something good.

**GOD ⚡ PEED: REALLY ENJOYING YOUR COURSE! WHAT SHOULD MY FINAL PROJECT BE?**

Thanks! You are free to do (almost) anything you want to do. If I were to suggest, implementing a GPU ray (path) tracing can be pretty interesting.

**QUANTUM GOOSE: I'M TAKING CS 488 THIS TERM AND I'M REALLY ENJOYING IT, ESPECIALLY RENDERING. WHAT'S THE BEST WAY TO GET INVOLVED IN COMPUTER GRAPHICS RESEARCH AT UW?**

Just talk to me!

**☺: WHAT ARE SOME GRAPHICS-RELATED THINGS SOMEONE CAN DO IF THEY WANT TO LEARN MORE ABOUT THE FIELD AND GET SOME EXPERIENCE?**

I recommend that you write your own ray tracing program by following the *Ray Tracing in One Weekend* e-book series by Shirley. It's very well written, and you only need to know some C++ and linear algebra to get started.

**GLOBAL ILLUMINATI(ON): WHAT DO YOU THINK THE NEXT BIG THING<sup>©</sup>™ IN COMPUTER GRAPHICS WILL BE?**

If the "next" here means the next 30 years or so, then I would say quantum computing applied to computer graphics.

**CLARIFIED: WHAT GOT YOU INTO THE FIELD OF COMPUTER GRAPHICS?**

I got to like programming and playing video games when I was a kid, and I thus wanted to learn how video games are made. It turned out that computer graphics is pretty important there.

**TENDSTOFORTYTWO: WHAT ARE YOUR THOUGHTS ON RTX GRAPHICS CARDS AND "RAY TRACING" SUDDENLY BECOMING A WAY MORE MAINSTREAM WORD?**

I hope this trend continues. Once the computation time is not a problem in practice, ray tracing makes many things related to real-time rendering way easier and more elegant.

**CIX: AS A GRAPHICS RESEARCHER, DO YOU HAVE ANY INTEREST IN VISUAL ART AND DESIGN?**

As much as others do, so maybe not in particular. I always need to remind my parents that I am not making a movie.

**A: IS GRAPHIC DESIGN YOUR PASSION?**

Not really, but I wish I have a skill for it.

**CLARIFIED: WHAT IS YOUR PROUDEST ACCOMPLISHMENT?**

Ask me the same question when I am about to die, then I might be able to tell you.

**SKIT: WHAT SHOULD I ASK YOU AS AN ENVIRONMENT STUDENT?**

Maybe how environment-friendly computer graphics is?

**GOLDEN: HOW DID YOU DECIDE TO GO INTO ACADEMIA INSTEAD OF INDUSTRY?**

Maybe I am strange, but I really liked my life as a PhD student (teaching and research), so academia was a natural choice. An academic job is like a PhD++.

**ABALD MAN: WHAT IS THE QUESTION I CAN ASK YOU TO GET THE MOST INTERESTING ANSWER? AND WHAT IS THE ANSWER TO THAT QUESTION?**

The question would be, "What is the origin of your family name?"

The answer is, "It is the name of a Samurai general, Koroku Hachisuka, who served Nobunaga and Hideyoshi very closely (both are historical rulers of Japan). He also appears very often in the video game series *Samurai Warriors*."

**HALLEY: WHAT QUESTION ARE YOU ACHING TO ANSWER?**

This question.

**X: WHAT IS YOUR FAVORITE KIND OF GRAPH?**

A tree. Especially a binary kind.

**TLLLOW PRINCESS: WHERE IS YOUR FAVOURITE TOILET ON CAMPUS?**

I haven't been to any since I've started in Fall 2020 (obviously, not because I don't use a toilet).

**BOLDBLAZER: HOW DO YOU PRONOUNCE THE "G" IN "GIF"?**

As in "gift."

**SECRETSQUIRREL: I HAVE THIS POP-UP ABOUT MCAFEE AD BLOCKER, CAN YOU HELP?**

Sure, what can I do for you?

## N REASONS TO TRY CORTLAND APPLES

- They grow in southern Ontario
- They are \$0.44 per 100 grams vs \$0.59 per 100 grams for honeycrisp
- They are easy to store (for literal months before)
- They have a nice texture and taste in pies
- They are juicy, sweet, and tart with a nice crunch
- They are slow to brown

BetterThanHoneyCrisp

## EPISODE 29: PASCAL'S TRIANGLE AND IDENTITY

Enjoy Episode 29 of the MathSoc Cartoons series: *Pascal's Triangle and Identity!*

Additionally: MathSoc Cartoons is hiring PAID comic writers and artists for Winter 2022! If you love explaining concepts, drawing comics, or telling bad math puns, hurry and apply by December 4 at [bit.ly/join\\_mathsoc\\_cartoons!](http://bit.ly/join_mathsoc_cartoons)

CALLING ALL CREATIVES!

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- COMIC ARTIST



APPLY BY DECEMBER 4, 2021, 11:59 EST  
[bit.ly/join\\_mathsoc\\_cartoons](http://bit.ly/join_mathsoc_cartoons)

We would also like to take the time to apologize for a MathSoc Cartoons submission from a previous issue. Episode 26 was originally published in issue 147.2 with copyrighted material from the sites Dreamstime, Pngtree, and Vectorstock. It should not have been published. We have updated the episode accordingly on @mathsoccartoons on Facebook and Instagram, in addition to taking steps to minimize the chances of this happening again in the future.

MathSoc Cartoons

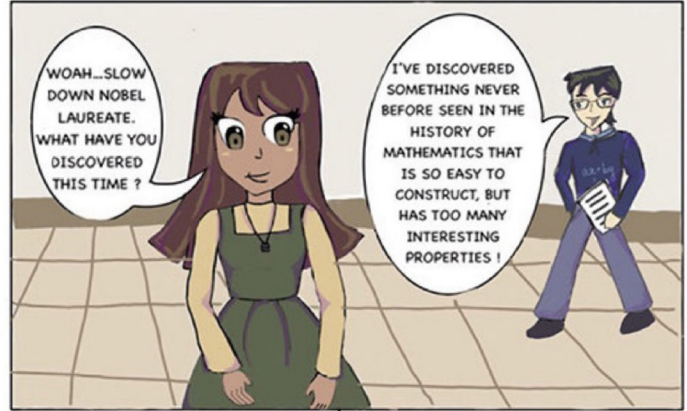
## Enjoying mathASKS?

## Thank Professor Furino. It was his idea.

A mathNEWS EDITOR WHO BELIEVES  
IN CREDIT WHERE CREDIT IS DUE

# PASCAL'S TRIANGLE AND IDENTITY

STORY BY MARCUS CHAN | ART BY HARSHITA P.



WHAT I DID WAS ARRANGE 1s IN AN UPSIDE DOWN V FORMATION, AND THEN LET EACH ENTRY IN THE RESULTING TRIANGLE BE THE SUM OF THE NUMBERS ABOVE IT.

$$1 + 5 + 10 + 10 + 5 + 1 = 32 = 2^5$$

AFTER THAT I NOTICED THAT THIS TRIANGLE HAS MANY INTERESTING PROPERTIES - FOR EXAMPLE, EACH ROW SUMS TO A POWER OF 2!



THE TRIANGLE THAT YOU DREW IS MORE COMMONLY KNOWN AS "PASCAL'S TRIANGLE", NAMED AFTER THE 17th CENTURY FRENCH MATHEMATICIAN BLAISE PASCAL, ALTHOUGH THE TRIANGLE HAD ALREADY BEEN STUDIED BY MATHEMATICIANS IN INDIA AND CHINA CENTURIES BEFORE PASCAL'S DISCOVERY.

WOW

IN FACT, PASCAL'S TRIANGLE IS ALSO INCREDIBLY USEFUL IN COMBINATORICS - THE FIELD OF MATHEMATICS WHICH REVOLVES AROUND THE STUDY OF COUNTING THINGS.

IN FACT IF WE TAKE THE  $k^{\text{th}}$  ENTRY IN THE  $n^{\text{th}}$  ROW OF THE TRIANGLE ( WHERE THE TOP 1 IS THE ZERO ROW AND THE LEFTMOST IS THE 0 ENTRY ).

$\gamma=0$	1 <sub>0</sub>
$\gamma=1$	1 <sub>0</sub> 1 <sub>1</sub>
$\gamma=2$	1 <sub>0</sub> 2 <sub>1</sub> 1 <sub>2</sub>
$\gamma=3$	1 <sub>0</sub> 3 <sub>1</sub> 3 <sub>2</sub> 1 <sub>3</sub>

..... THEN THE VALUE YOU GET IS THE NUMBER OF WAYS TO CHOOSE  $k$  OBJECTS FROM A COLLECTION OF  $n$  DISTINCT THINGS!

SAY WE HAVE 5 DISTINCTLY COLOURED BALLS, AND WE WANT TO PICK 3...

$r=4$   
 $r=5$   
 $r=6$

1	4	6	4	1		
0	1	2	3	4		
1	5	10	10	5	1	
0	1	2	3	4	5	
1	6	15	20	15	6	1
0	1	2	3	4	5	6

LOOKING AT THE 3rd ENTRY OF THE 5th ROW, WE SEE THE NUMBER WE GET IS 10...

... AND INDEED, THERE ARE 10 WAYS TO PICK 3 BALLS FROM THE ORIGINAL 5!

IN FACT, WE USE THE NUMBER OF WAYS  $k$  THINGS CAN BE CHOSEN FROM A COLLECTION OF  $n$  OBJECTS SO OFTEN THAT WE GIVE IT A NAME - "n CHOOSE k" - WHICH WE CAN WRITE MATHEMATICALLY LIKE THIS.

$\binom{n}{k}$

${}^n C_k$

WAIT, BUT HOW DO WE KNOW THAT  $\binom{n}{k}$  IS THE  $k^{\text{th}}$  ENTRY OF THE  $n^{\text{th}}$  ROW IN PASCAL'S TRIANGLE?

AFTER ALL WE'VE ONLY SHOWN IT FOR ONE CASE, BUT WE HAVEN'T PROVED THE CONNECTION HOLDS IN GENERAL.

WELL WE CAN START BY PROVING A PROPERTY OF  $\binom{n}{k}$ , COMMONLY KNOWN AS "PASCAL'S IDENTITY":

**PASCAL'S IDENTITY**

LET  $n, k \in \mathbb{N}$  WHERE  $0 \leq k \leq n$ . THEN NECESSARILY:

$$\binom{n+1}{k+1} = \binom{n}{k} + \binom{n}{k+1}$$

**PROOF OF PASCAL'S IDENTITY**

LET  $\{a_1, a_2, a_3, \dots, a_n, a_{n+1}\}$  BE A COLLECTION OF  $(n+1)$  OBJECTS. THEN THE NUMBER OF WAYS TO PICK  $(k+1)$  OBJECTS FROM THIS COLLECTION IS  $\binom{n+1}{k+1}$

BUT WE COULD ALSO HAVE CALCULATED THIS DIFFERENTLY. CONSIDER AN ARBITRARY SELECTION OF  $(k+1)$  OBJECTS. THERE ARE TWO POSSIBILITIES :

- WE PICKED  $a_1$ . THEN SINCE WE HAVE TO PICK  $k$  MORE OBJECTS FROM THE  $n$  REMAINING OBJECTS, THERE ARE  $\binom{n}{k}$  POSSIBLE WAYS THIS CASE CAN ARISE.
- WE DIDN'T PICK  $a_1$ . THEN SINCE WE HAVE TO PICK  $(k+1)$  OBJECTS FROM THE  $n$  REMAINING OBJECTS, THERE ARE  $\binom{n}{k+1}$  POSSIBLE WAYS THIS CASE CAN ARISE.

SINCE WE ARE CALCULATING THE EXACT SAME THING, IT FOLLOWS THAT

$$\binom{n+1}{k+1} = \binom{n}{k} + \binom{n}{k+1}$$

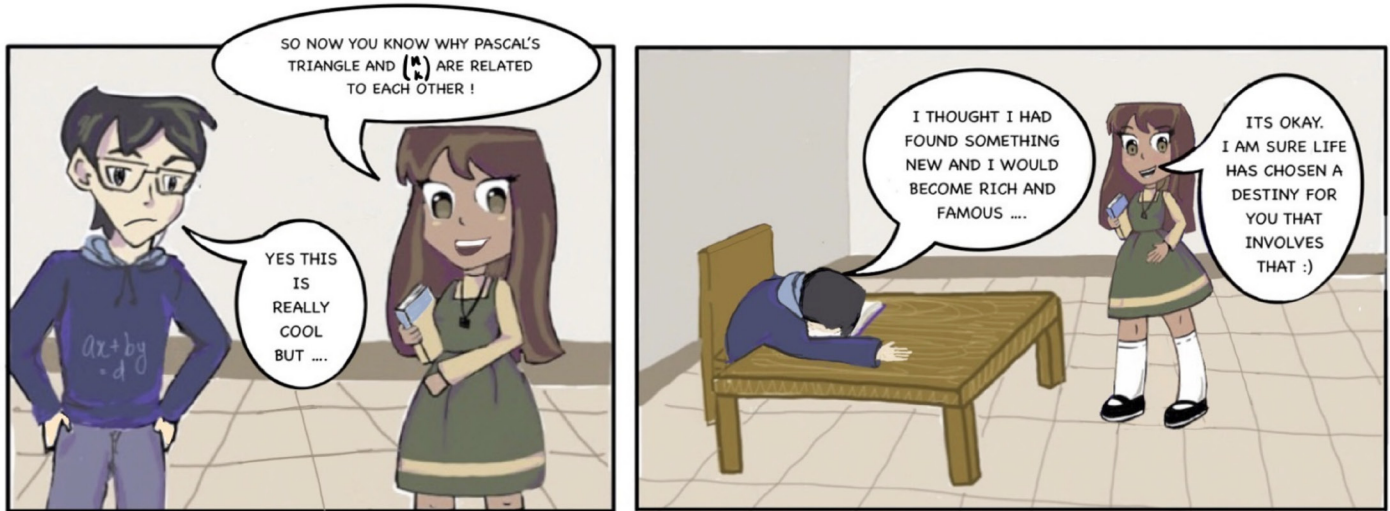
AS NEEDED. ■

WAIT I KNOW WHY PASCAL'S TRIANGLE IS RELATED TO n CHOOSE k NOW !!!

YOU DO?

SINCE THERE IS ONLY ONE WAY TO PICK NO OBJECTS (i.e. THE EMPTY SELECTION) OR TO PICK  $n$  OBJECTS (i.e. SELECTING EVERYTHING), IT FOLLOWS THAT  $\binom{n}{0} = 1 = \binom{n}{n}$  WHICH MATCHES THE "EDGES" OF PASCAL'S TRIANGLE.

THEN BY USING PASCAL'S IDENTITY AND BY CONSTRUCTION OF PASCAL'S TRIANGLE WE CAN SEE THAT THE "n CHOOSE k" TRIANGLE AND PASCAL'S TRIANGLE "MATCH" ONE ANOTHER, PROVING THE RELATIONSHIP BETWEEN  $\binom{n}{k}$  AND THE ENTRIES IN PASCAL'S TRIANGLE.



**MEF**  
Mathematics Endowment Fund

**MATHSOC**

## I DON'T LIVE HERE ANYMORE

Unfortunately due to my driving test, I was instructed by my parents to return home for the weekend, and practice driving until my exam, which meant that due to scheduling, I would miss **mathNEWS's** production night. I passed somehow despite an atrocious attempt at front parking that crossed a line, but I digress.

The first time I drove alone, it was at night to get bubble tea from Chatime, and as I drove, I couldn't help but just look around me and see where I had come. Where the place I grew up had become—my neighborhood with its sprawling roads, my house where I had barely spent more than 6 months away from, the places I knew. I couldn't help but feel like a part of me was gone. A song came on that brought me back to a simpler time—this article's namesake, "I Don't Live Here Anymore" by The War on Drugs. The song was 80s-like in its guitar and deep drums, lyrics resembling that of bedroom pop songs that carried me through my last years of high school. It took me back to a time that is now gone.

In a sense, a part of me is really, truly gone. Childhood me grew up in a house with a carpeted second floor, top-down washers, and old bathrooms, and didn't have to worry about assignments and exams. My house is undergoing renovations—the walls are blue instead of a faded pink now. All the floors are hardwood and produce a strange echoing sound. And while the basement is stock full of all the furniture from the second floor my parents had to move down that was cluttering the space anyways, I know that when it's all gone and the basement is returned to its former use as a storage room for Dad's old files and a treadmill my mom uses every week, their room will look different. The washers are replaced with newer models, even though there's no flooring for the

laundry room or the pantry and I have to wear slippers to avoid touching the dirty grey concrete. The bathrooms are renovated. I type this on a desk that used to be a storage shelf, but once upon a time, I did schoolwork here. Part of my childhood exists in only a contextual place that can never come back.

It's a part of me I do want gone. My childhood has issues, as I'm sure we all have. My parents made me go to Saturday school for extra lessons on math. High expectations I couldn't live up to put on pressure, and under pressure, I lashed out at my peers in elementary school. Thankfully, I don't do that anymore, but I want to forget it ever happened because childhood me feels so unlike me now, but I suppose it's a good thing I stopped or I'd still be doing it now. (It's a gross misrepresentation of what is essentially my "tragic backstory," but I'm not about to dump all my trauma out of pocket just like that.) But if it was gone, I wouldn't have learned to stop. So it's a part of me I'm still struggling to accept, but I file it away under memories of 2014, alongside the Harlem Shake, Sochi, and Team Crafted videos. But when I think of them, I think of old carpets and top down washers and a dryer that was never used, of clothing racks and all my clothes being hand me downs from my older brother and being compared to him even if he was seven years older.

My childhood room is now bare, and I don't think I can ever return to what it was with its 20-year old carpet rife with dust, a bed that was off-centre in the room, a grey plastic cabinet filled with childhood memoirs from elementary school that I barely remember putting away. Now everything that formulated me into who I am today is packed away into various cardboard boxes in the basement. I remember the day

before I left for Waterloo a second time, when my bed was all packed and I was ready to start my third year back where I was supposed to be in Waterloo, I lay in the spot my bed took up and pretended that for a second, I was back in high school. When I was the kid who knew everyone, taking yearbook photos and going home to play Overwatch on his brother's Xbox. Now everyone I know has gone their separate ways, all too happy to leave high school behind. My yearbook photos will be archived, then never to be seen again. My brother said, "Mom said it's my turn on the Xbox, forever," and took it back to his condo in Toronto. (No, I'm not mad. It's not like I was a Diamond in Overwatch and could have been considered UWaterloo E-sports material in first year.)

It's not just my house, but my neighborhood, too. I don't think I'll miss it dearly—being cooped up in my house during the pandemic was enough to tell me that without a driver's license, I was doomed to walk to McDonald's when I was bored—and that happened a lot. And thanks to the structure of the roads, whenever I wanted my BTS meal or Slam Dunk McFlurry, I had to walk a kilometre and a half, both ways. For reference, that's not even walking across campus—it's walking from SLC's Turnkey Desk to the Cocos and back.

My entire past feels like it is faded, but at the very least it's not being erased. My house still stands, my neighborhood relatively untouched, and while I may never get to enjoy the new community centre that opened up close by (on merit of it being pretty much walking to McDonald's 2.0, and then it closed during the pandemic) I still don't feel like my future is dashed because I'm too trapped in nostalgia. Everything may be gone, but all my memories are still there, until eventually they end up fading too. When I took that drive, I revisited places dear to me in memory, and then returned home, Thai Milk Tea in hand, to prepare for my departure to Waterloo. Gone is Grade 3 Skit, who was nothing but a bright ray of sunshine and was incredibly overemotional and had no perception of popular music. Gone is Grade 6 Skit, who like clockwork, came home alone to watch a recording of *Pokemon* that he saved using a VHS tape's scheduling system, then *Dinosaur Train* after that, who only listened to 99.9 Virgin Radio on the bus home. Gone is Grade 9 Skit, struggling in a new environment like everyone else, unaware that he would be the last year to have the true, quintessential, pre-pandemic high school experience, who was about to discover the magic of Indie88. Gone is Grade 12 Skit, struggling to tether to people who, simply put, didn't tether onto him, who put in his earphones and subsisted on Dayglow, Wallows, and The Aces day after day. All of them now exist in memories of not exactly simpler times, or happier times, not times that can be tied to emotion, but tied to one house. I don't really know how to describe it other than that.

I do know, though, that I don't live here anymore.

Skit

## DO SOMETHING NICE FOR YOURSELF

As we get into the end of the term and exam season, a lot of us are stressed, overwhelmed, and just plain miserable. I don't know about you, but I often neglect... well, basically everything other than my academics. If I'm not studying, I almost feel guilty that I'm not being productive.

Here is your guilt-free reminder to take a break. Go make or buy a hot chocolate, eat your favourite snack, curl up with a cozy blanket, a hot drink and a great book or a beloved show. Go hang out with one of your friends, take a walk, go rock climbing, go to a party or on a hike or bungee jumping. Do something you find fun!

If you're well rested and well fed with reasonable stress levels, you'll get more done, your mental health will be better, and you'll be happier. I know that it can be hard to take breaks, but I promise it'll be ok, and you'll feel so much better once you do. You can't learn if you aren't taking care of your body and break, so take a well-deserved break, and know that you'll do better for it.

Golden

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## THE GREATEST FOUR LINES OF MODERN POETRY

I arrive at the **mathNEWS** prod night, pizzaless and hungry, and am told that I must justify why I deserve pizza.

This reminded me of a poem I once heard. Perhaps it is from a college themed sitcom that aired on NBC. Possibly.

Pizza! Pizza!  
In my tummy  
Me so hungy,  
Me so hungy

- CHRIS MCKENNA

Wiser words have never been said. We can only imagine what was going through Chris' head when he penned these lines. Truly a marvel of modern art, I believe that future students will study Chris' art in English classes, right along the likes of The Bard and Steinbeck.

I pray that I may ever come up with something so inspired in my **mathNEWS** writings.

latecummer ☹️



# THE GRAPHICS CARD SUPPLY SHORTAGE

Once upon a time, life was good in the PC gaming community. People built custom computers and played games on them, and we called them “gamers”. Their games were beautiful and looked great, because of the highly performant graphics chips inside these custom computers, designed to make beautiful graphics very quickly. Gamers had fun and were happy. All was well.

Until approximately September 2020, when a few things simultaneously happened:

- Computer chip manufacturers thought that COVID would reduce demand for computer chips due to an economic recession, and so reduced supply... and then demand for computer chips grew exponentially as everyone started working from home and needing more computers
- NVIDIA, a company that makes graphics cards for gaming computers, released a new line of cards, the RTX 3000 series, which provided much better performance after a disappointing series of predecessors
- Cryptocurrency mining, a task that performs time-consuming computations on graphics cards to earn you money, picked up as people lost jobs and started looking for ways to make ends meet

As soon as NVIDIA released those graphics cards, everyone who had skipped on the previous generation rushed to buy these new cards. At the same time, all the cryptocurrency miners realized that these new cards were great for mining, and *also* rushed to buy these cards. All this time, these cards were actually in low supply as TSMC, the manufacturer of the graphics chip in these new NVIDIA cards, had planned for reduced supply for the months ahead and struggled to meet demand.

The net result? A graphics card shortage. Supply down, demand up, means that the price goes up. It's ECON 101. What's worse, there exists a group of *[expletive]*s known as scalpers. Their entire business model is, and has been for years in the collectible sneakers industry, as follows:

1. Identify low-demand, high-supply product
2. Buy all of the product that you can, artificially inducing further scarcity
3. Sell the product at a highly inflated price—there's no one else to buy from, so anyone desperate enough buys from you. Pocket the profits

These pieces of *[expletive]* realized quickly that graphics cards were exactly the kind of market they thrived in. So they started doing what they do best—create artificial scarcity, sell for inflated prices, make the supply situation worse. As more cards are manufactured, rinse and repeat. Compound this with the fact that cryptocurrency miners make *huge amounts of bank* and would be happy to spend a bit of it to make their free money generator go faster, means that there's a very large

supply of people willing to buy graphics cards at these inflated prices.

ECON 101 was great. A really useful course, I think. But what ECON 101 didn't predict<sup>1</sup> was that there would exist a product that would over time *increase* its purchaser's ability to buy more of it. Thanks to cryptocurrency mining, graphics cards were now such a product. And it never told us what would happen in this case. It turns out, what happens is that prices soar to the sky and get stuck there.

An NVIDIA GeForce RTX 3060 graphics card launched for a price of US\$329, or approximately C\$409. As of writing, the cheapest new RTX 3060 one can buy in Canada costs C\$999 plus shipping on Amazon—and that's not even worrying about the fact that graphics cards are starting to have a tendency to get “lost” by postal services in transit. There are people on websites like Kijiji and Facebook Marketplace selling these cards for C\$800... twice the suggested retail price, and you don't even get a warranty for it. And people are buying them, for mining (and for gaming, for those gamers who can afford to do so).

To their credit, NVIDIA did try to fix this problem—the cards being sold now are “low hash-rate” cards, which is a fancy way of saying that they've artificially been nerfed to run at half speed for cryptocurrency mining. There's an entire argument to be had about hardware manufacturers trying to dictate how you should use the thing you bought, which I won't get into. But on top of that, this nerf isn't even *effective*—it's still profitable to mine cryptocurrency on these cards, even at half speed.

I've been talking about NVIDIA, but the exact same problem exists for their primary competitor in the graphics card space, AMD. AMD graphics cards are also being bought on en masse to be used for cryptocurrency mining. AMD also tends to be better at generic compute workloads like this relative to NVIDIA, so their prices are even *more* inflated.

It's at this point that the economist, who has been trying to interrupt me for the past ten minutes, finally gets a word in. *Oh, but it's all supply and demand*, he says. *The cards are priced at what the market will bear! If people are buying them at this price, the prices are, by definition, not inflated!*

And that's a lovely explanation, because it's true, and at the same time useless for the vast majority of people. Just because the cards can be afforded by a select few who are incentivized to buy as many of them as possible, doesn't mean that their prices are any more affordable for the majority of the prospective buyers.

So, that's where we are right now. Scalpers have driven graphics card prices unimaginably high, cryptocurrency miners are making thousands of dollars wasting the world's electricity for their own gain, and the economist is smugly smiling after explaining to me that if the gamers can't afford

the card then they simply aren't prospective buyers. It's a dark moment, but there's light at the end of the tunnel.

Ethereum, by far the most popular cryptocurrency for these miners to mine, is switching from a Proof of Work model to a Proof of Stake model, hopefully by January 2022. Effectively, what this means that most, if not all, of the hardware requirements to mine Ethereum would go away. Some miners seem to say that they'll shift to mining other cryptocurrencies, but the consensus seems to be that there's no crypto that's as profitable to mine as Ethereum. As more people pile onto other cryptocurrencies and increase mining difficulty, they will continue to get less profitable over time. I'm not sure what their plan is for the future, but some have indicated that they might start staking. Mining is Ethereum's way of making the blockchain longer, and staking will be the new way after Proof of Stake is realized. So this will enable ex-miners to earn money without having computational power (though they will instead require a certain amount of Ethereum coins instead).

Of course, miners are not solely responsible for the supply shortage. But what are they going to do with 20 graphics cards after there's no mining to do? They'll sell them, of course. All the supply tied up in mining graphics cards—very well-maintained cards, mind you, since the tricks miners use to increase profitability also increase graphics card lifespans—will be released at once. Reduced demand and increased supply, and all the rich buyers are gone. ECON 101, anyone?

Of course, the silicon shortage itself is still going on, so I don't expect prices to *fully* recover. Estimates by NVIDIA and AMD CEOs put the end of the chip shortage at early 2023... but you should note that they have an interest in keeping the impression that their products have a higher demand than supply. So I, in my infinite wisdom, would say that mid-2022 is probably a good bet for when you'll be able to buy a graphics card at the manufacturer-suggested retail price again.

Gamers will get their cards again. Nature will heal. Soon, hopefully.

tendstofortytwo

1. Or maybe it predicted exactly that and I was just asleep in that class. Tended to happen fairly often.

## RANKING THE TYPES OF APPLES

S Tier: Honeycrisp

F Tier: All other apples

Apple Elitist

# RE: mathNEWS 147.3: PENETRATIVE SEX REALLY HURTS. WHAT CAN I DO?

I thought about replying to this last issue but I declined since I didn't know how to answer your query. Or at least not in a way that you would probably like—when faced with the same problem I broke up with the dude (perhaps partially due to other reasons [but who could say for sure?]). Since then I haven't really had to think about it further.

But it wasn't just that that made me hesitate to respond. It was also the shame I felt thinking about this topic—much less sharing my thoughts on the topic that stopped me from replying. I felt that I would be judged by any that I would confide in because I dared to be sexually active at all or that they would think that there was something wrong with me because I wasn't "good" at sex. In that way though they would probably be right—I wasn't "good" at enjoying penetration and I felt slightly worried I was doing "the sex" all wrong.

But then here I am writing about it anyway. Because it turns out that talking to another woman who had experienced the same thing was cathartic. Talking about my discomfort and realizing that she could relate made me feel like I should also try perhaps to be more public about this topic with others who might also benefit. I may not have the answers that you're looking for but I want to reassure you that you aren't alone in experiencing it.

A Spinster

**BBBBBBBBBBBBBBBBBBBBBBBB  
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# profQUOTES

## CO 487: DAVID JAO

- “ We're gonna do something extremely high-tech...
- “ ...Switch to the back camera!
- “ To me, cryptocurrency is not the same thing as crypto. But this may be a lost cause.
- “ Let's say fountain pens became very popular one day and people started calling them fountains. That would make no sense.
- “ I really had a credit card with the number “420” on the back.

## CS 348: SEMIH SALIHOGLU

- “ Now this is a terrible algorithm. If you look at this algorithm, you might want to vomit.

## CS 360: JEFFREY SHALLIT

- “ I'm not sure what the gong [on the Turing machine] is for.
- “ Student: The explanation is a bit hand-wavey.
- “ Prof: True, but we're all adults here.
- “ This tape has the word drowsiness on it, which may afflict you if you are in this lecture.
- “ Often the details are boring.
- “ Now my incompetencies are recorded for all time.

## MATH 235: NICK ROLLICK

- “ What's interesting is that if you graph this approximation you'll get a horrible approximation.

## MATH 247: BLAKE MADILL

- “ Our goal is to solve constrained optimization problems—or, otherwise said, optimization problems with constraints.

## PHIL 221: MATHIEU DOUCET

- “ You should purchase Global chef's knives. They don't pay me for this but they're really good knives.
- “ Babies are bad humans. Babies are useless.
- “ I would recommend strongly against being petty [in your essay].

## PMATH 340: TOMÁŠ VÁVRA

- “ So now you know which numbers are the sum of two squares and how to find that representation. If you don't think you know, then think harder.
- “ Do you know the Pigeonhole Principle? So you have pigeons... like, the birds.
- “ When I see this thing, I get a spidey sense, and my spidey sense goes “OH MY GOD.”
- “ So this is a very strong result. Are we going to use it then? Probably not.
- “ Okay, so we've got Pythagorean triples like (3,4,5) and (8,15,17)... check your local Babylonian clay tablet for more examples.
- “ This is a very weird formula from which I don't see any use... But it might be useful. For something. Not sure though.

## PMATH 445: JASON BELL

- “ We're going to play a game called “Name that tensor”!
- “ I'm gonna use some hand sanitizer! 'Cause I'm excited!

## PMATH 930: ROSS WILLARD

- “ I'm not going to prompt what you should ask like I did once, because that got me in trouble.
- “ If you're watching Netflix or something and a homomorphism pops into the story, you're probably wondering, “What is its kernel?”
- “ The whole point of being careful... being anal, really...
- “ I can pull off this lecture! It's my birthday!

---

## FREE MY BESTIE

🙄 Something 🙄 wrong 🙄

🤦 I 🤦 hold 🤦 my 🤦 head 🤦

✗ So ✗ true ✗ gone ✗

😞 Our 😞 bestie 😞 dead 😞

Kanye Westie

# AN ELECTION SYSTEM PROPOSAL: PART 2

*Author's note: the first part of this article was published in 147.4.*

In the first part of this article, I examined why instant runoff voting is not an ideal voting system: because it will sometimes eliminate a candidate who is preferred by a majority to all others. For brevity, I will call such a candidate a clear winner. At the end of the article, I claimed that a clear winner does not always exist. To see why, consider the following results:

- A, S, C, K, V: 40%
- A, C, S, V, K: 7%
- C, S, K, V, A: 38%
- C, S, A, V, K: 7%
- S, K, V, A, C: 5%
- V, S, A, K, C: 2%
- K, S, A, V, C: 1%
- All 113 other combinations: 0%

This is similar to the previous example, but with a few important differences. It is still the case that most (53%) of voters prefer Sauron to the Antichrist. 52% of voters prefer Cthulhu to Sauron. 55% of voters prefer the Antichrist to Cthulhu. This is a tricky situation: S beats A, A beats C, and C beats S (also, Sauron beats both the Kraken and Voldemort). In a way, none of the five candidates can truly claim to be the winner of this election, since each one is beaten by some other. However, we can see that 55% prefer the Antichrist to Voldemort, 92% prefer Cthulhu to Voldemort, 98% prefer Sauron to Voldemort, and 84% prefer the Kraken to Voldemort. Since Voldemort loses to every other candidate, it should be eliminated. I will call a candidate who loses to all other (remaining) candidates a clear loser. Now, 56% prefer the Antichrist to the Kraken, 92% prefer Cthulhu to the Kraken and 99% prefer Sauron to the Kraken. Therefore, the Kraken can be removed too. We are left with the problem of finding a winner from the other three candidates. Here is a summary of the current situation:

- S vs. A: 53% to S
- C vs. S: 52% to C
- A vs. C: 55% to A

Looking at this, you may think that Cthulhu has the weakest case: it beats Sauron by 52%, the lowest one there, and is beaten by 55%, the largest one there. However, eliminating Cthulhu automatically makes Sauron win, even though

Sauron beats the Antichrist only by 53%, compared to the Antichrist beating Cthulhu by 55%. When we are down to some candidates left in a cycle, it makes more sense (at least in my opinion) to choose a winner rather than to eliminate someone. One of the most obvious ways of doing this would be to take the candidates one by one and add up the amount of all the voters who prefer this candidate to another. As it turns out, this is not the best way, but we will use it for now. I will call the resulting number the *victory index* (VI). For example, to find the Antichrist's VI we add the 55% who prefer it to Cthulhu to the 47% who prefer it to Sauron. The victory index for each candidate in our current example is as follows:

- S: 101% (53% + 48%)
- C: 97% (52% + 45%)
- A: 102% (55% + 47%)

This suggests that the Antichrist should win the election. Let's summarize what we have so far. To determine the best winner of an election given the results of voting,

1. If one candidate is a clear winner, that candidate wins.
2. Otherwise, eliminate the clear loser (if there is one). Continue until no clear loser exists.
3. If you are left with a cycle of three candidates, the one with the highest victory index wins.
4. Otherwise, ???

This immediately brings us to the issue of cycles with more than three members. For an example of this, consider the following results:

- A, S, C, K, V: 40%
- A, C, S, K, V: 7%
- C, S, K, A, V: 45%
- S, K, A, C, V: 5%
- V, S, K, A, C: 2%
- K, S, A, C, V: 1%
- All 114 other combinations: 0%

Let's follow the method above. It is easy enough to see that no candidate wins by step 1. In step 2, Voldemort is the first to go, since all other candidates are preferred by 98% of the voters. After that is done, 55% prefer the Antichrist to Cthulhu, 52% prefer Cthulhu to Sauron, 99% prefer Sauron to the Kraken,

**In Russia, the exam is brutal. If you pass, you may enter Moscow State University. If you fail, you could get killed in the Red Army.**

and 53% prefer the Kraken to the Antichrist. We have a cycle of four candidates now: A beats C, C beats S, S beats K, and K beats A. However, we have not examined all of the pairings. Here they all are:

- A vs. C: 55% to A
- A vs. S: 53% to S
- A vs. K: 53% to K
- C vs. S: 52% to C
- C vs. K: 92% to C
- S vs. K: 99% to S

It is reasonable to expect that we can extend the concept of a victory index to cycles of more than three people in the obvious way. Applying this to the current example gives:

- A: 149% (55% + 47% + 47%)
- C: 189% (92% + 52% + 45%)
- S: 200% (99% + 53% + 48%)
- K: 62% (53% + 1% + 8%)

This means that Sauron should win. This is the current procedure:

1. If one candidate is a clear winner, that candidate wins.
2. Otherwise, eliminate the clear loser (if there is one). Continue until no clear loser exists.
3. Of the remaining candidates, the one with the highest victory index wins.

However, there is a serious flaw in the second step of this system. I will identify this flaw and discuss how to remedy it in the next part of this article.

$$((\lambda(* /)(* * /))(\lambda(+ -)(if---(+ + \#t)))\#f)$$

## TO HERMAN

### TO THE TUNE OF HERMAN THE WORM

Sitting on the GO train

Listenin' to a podcast (blahhh blahhhh blahhhh blahhhh)

Scrolling through my LinkedIn, woosh! Woosh!

And there was a post from Herman, my roommate who almost failed first year,

And he made it to honour roll!

And I commented: "Herman? What happened?"

"A fire was lit under my ass"

## GRAPES AND THE HUBRIS OF MAN

Every week I buy groceries. Every week I stop for a moment at the grape display. Every week I stop and consider buying grapes. Every week I do.

Here's the thing: I never finish the grapes I buy. Ever. Nine weeks into the term, I've spent more than forty dollars on grapes. That's too much money on something I don't even eat. Imagine if I spent only \$25 on grapes: I would be able to buy more than \$15 of liquor! That's half a bottle of Kahlúa! Imagine the number of White Russians this would let me half-make.

What gets me, though, is that I KNOW that I won't eat the grapes, but I buy them anyways. I lie to myself and pretend that I'll actually eat them. I won't. It's like going to the gym. I constantly think "I should eat grapes," but I don't. I push it off to tomorrow, I'm just not feeling it today. I tell myself that if I eat grapes, everything in my life will get better. I'll make more friends, my crops will grow, I'll be happy.

There are no two ways about it; I'm in an abusive relationship with grapes. I keep crawling back, even though they add nothing to my life. The marginal utility of a bag of grapes is negative, but I buy them anyways. Why?

Maybe I should reach out to Campus Wellness, to escape the cycle of hurt, to break the chains binding me to buying a bag of grapes every week.

Perhaps this says something about my hubris, how every week I issue myself a challenge that I know I won't be able to overcome, only to be disappointed when I inevitably fail. Why do I do this to myself? Perhaps the grapes aren't to blame, but rather I am, for putting myself into this position.

Would my wellbeing improve if I would realize that I am only human, and there is only so much that I can do? Everybody has their limits. I wouldn't blame myself for working 10 hours instead of 11, so why do I blame myself for not finishing my grapes?

Maybe this is simply part of the human condition. That's how people made it to the moon, by pushing the envelope of what is 'possible.' Eating all of my grapes could then be the stepping stone along my path to self actualization. Today: I conquer the grapes in my fridge. Tomorrow: I'm prime minister. The future is mine to seize.

Or, you know, I could stop buying those shitty 'seedless' grapes that aren't actually seedless and instead have MORE seeds than regular grapes they're just tiny and you can't spit them out and it's a pain to do. But that wouldn't make a good article, would it?

# ANOTHER DOOM PATROL ARTICLE

The first time I wrote for **mathNEWS** I wrote a bunch of short articles and then didn't write again for, like, a year and a half.

The \*second\* time I wrote for **mathNEWS**, I wrote a long article that I ended up breaking into two parts, about the TV series *Doom Patrol*, it's two seasons, and how they related to my life at the time they were airing.

That article was also the only time I've won Article of the Issue (check it out, it's in issue 145.5).

Anyways, *Doom Patrol* Season 3 concluded last week, so I'm sure maybe one or two people who read that article are waiting for a follow-up.

This is that follow-up.



I have mixed feelings about *Doom Patrol* Season 3, for a variety of reasons. One of these is its unbalanced narrative; it feels like it's in a bit of an adjustment phase. *Doom Patrol* has five main leads, and while there is a main plot running through each season's episodes, each character has their own subplot, too, and they help to form the emotional core of the series.

This season, for the first time, one of the subnarratives \*was\* the main narrative, specifically Rita's story. And while this story was good, focusing on Rita travelling back in time and meeting a group of rejects rejected as weapons by a shadowy governmental organization, it threw off the balance of the show a bit. In previous seasons the main plot had tied all the characters together a bit, but this time it felt like the characters each had their own separate goals that rarely aligned.

This was especially pronounced due to the aforementioned time travel plot, which completely separated Rita from the rest of the characters for a few episodes while she was off on her adventures in the past.

All in all, this felt like a bit of a mismatch.

What made it a bit worse, due to no fault of the writers, is that Season 2 was cut a bit short due to COVID, so the resolution of Season 2 had to come in the first couple episodes of Season 3. Again, I don't blame the writers for this, but it helped to mess up the pacing even more. It made this season feel a bit less cohesive than the previous ones.

And while the last episode of this season ends with a cool hook for the next season, I'm a bit worried about where things go from here. A couple of the characters, Cliff and Vic especially, seem to have their arcs coming to a close. I'm sure that they'll come up with something new, but I wonder if it will be as compelling as their stories in previous seasons.

So yeah. *Doom Patrol* Season 3 was a bit of a letdown in a few ways.

A bit like returning to campus, honestly.

Yes, that's right, this September I finally made it back to campus, after a year and a half away. And while it's nice to be back in the familiar places and see some friends again, just like with *Doom Patrol* it feels like something's missing. Work's taken over so much more of my life since I've come back, and I don't even have my family to interact with on a daily basis anymore. Most days I just do work, grab some food, keep working, video call my partner, and head to sleep.

And I do enjoy most of these days, things just aren't as grand as I fantasized my first term back would be.

Which, you know... is fine. Classes still are primarily online, after all. I had no notions that I would be able to slot into my life pre-COVID as if it had all never happened. Still, it feels a bit rough.

I've slowly been growing more used to life back in Waterloo. Gaining more independence again, meeting friends, going to some in-person tutorials. But as I leave all of that behind, I do have a bit of concern that I'm leaving something important behind. Something that I can, maybe, never get back from before all this started.

I think I'm in a better place now than I was then.

I'm looking forward to what the future brings.

I just don't think Waterloo's the place I was fantasizing about over all the time I was stuck at home, and you know what, that's OK. I just have to learn to accept letting go of my fantasies of Life Before all of this.

It'll just take a bit of time to adjust to my new existence.

Predap

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## WHERE ARE ALL THE GAMERS?

When I went into math, I thought that there would be more of an overlap between people who like math and people who like video games. But, to my surprise, there are hardly any gamers in PMC. In fact, many members of PMC identify as anti-gamer. I, for one, am appalled at this attack on my culture. Like, come on, at least play Minecraft or something. I'm not mad, I'm just disappointed.

someBODY

# WHY YOU SHOULD GO TO CHAMONIX!

As a person that comes from this place. I could not let you travel without going to Chamonix.

It's a magnificent French village in the mountains, 1000 meters high. You can practically do all the sports that you could ever imagine (skiing, snowboarding, hiking, paragliding, and even via ferrata climbing).

About some numbers: there are about 8906 inhabitants, and it is located in the valley of the same name: the valley of Chamonix.

There are plenty of activities to do. For example, you can ride a beautiful rack and pinion train that brings you on the "Mer de Glace," a giant glacier with a gorgeous view of the valley. If it's height that matters to you, you should definitely go on the top of the "Aiguille du Midi" that peaks at 3 842 meters. And if you're down for hiking you can go to the top of the highest mountain in Europe (with a guide, of course): the Mont-Blanc, which culminates at 4810 meters.

Some pictures:



**THE VILLAGE**



**AIGUILLE DU MIDI (3842M)**



**THE MONT BLANC (4810M)**

I hope I convinced you,

Vincent

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## ELF (2003) SUCKS

I was going to look up scenes from *Elf* so I could write a more specific article about why this movie is so terrible but I couldn't bring myself to do it. If you think you'd enjoy watching Will Ferrell imitate a child in the most uncomfortable, skin-crawling way possible for 97 minutes, this movie might be for you. Otherwise, might I suggest literally any other movie. I love the holiday season, the snow, the Christmas music, the baked goods, the cheesy movies, but every year I am reminded of this god-awful film. Save yourself some sanity and watch *Home Alone* instead (an actual good Christmas movie!). Also, you can trust my opinion on Christmas movies because I'm Jewish and therefore have complete authority on this matter.

peacelovemath

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## ROMANCE NOVEL

"Hey girl," he said. "Are you a fireman?"

"No," she replied perplexedly.

"Cause you came in hot and left me wet," he said.

And they lived happily ever after the end.

aphf

# RECORDING SPCOM 223 MAJOR ASSIGNMENT 2

yo CLICK hello my name is george and I am a first year computer science student today I will be introducing uhhh CLICK hello my name is george and I am in my first year at computer science waterloo CLICK greetings my name is george and I am a first year in waterloo's computer science program today I will be applying for the position of project manager at netflix to do so I will be answering two interview CLICK my name is geroage and I am a first year student I will be applying to become a project manager at netflix and I will be answering three interview question to help you decide whether or not you would like to hire me the first question id like to answer is what I consider to be my strongest quality to answer this question I would like to tell an idea i meant an offering i meant six CLICK six heyyy i mgeorge and im currently im my first year a wterloo mathematics ant decay i will be introducing for six the position of project manager at tetanus and to do that i will going to try t nasewr there interview qusetinos to help yu decide whether ort not you wouldj like to hire me the first question on teh table tis whtehr or not i consider myself a har worker and ot resopnde to this question i woud olike to share a story of a time that i covercame ag reat challenge like the challenge was really fucking big fuck shit fuck CLICK hello my name is george and i am a a first year in waterloo's computer science program i will be applying for the position of ceo of netflix shit CLICK hello i am george i would like to answer is what i blieve to be smy strongest attribute and to help me make my poinmt i'll be sharing a story of a tiem that i helped lead a times to uhh im neat a team build a robot in high chool so what happened was uhhh shit fuck shit fuck spcom fuck spcom fuck spcom CLICK [heavy breathing] hello my name is [ominous tv static] and i am a first year computer scienc student at the university of waterloo and today i will be inter viewing for the opstion fo project manager ate nextlic and i will be anxewring six six six million ways to die chose one one one [blastoff] [muffled screaming] CLICK i am not real i am not real i am not real i am not real i am a child in my universe CLICK geretings exgtablished gentlefolks of netflix corporation it is i george george and i will engage in the actof be uhh eating err i meant fuck fuck fuck [airhorn] fuck fuck CLICK [muffled sobbing] [the end of all days] CLICK CLICK CLICK CLICK hello my name is geroage and i am a first year computer science student a<sup>th</sup> te university of waterloo today i will be answering there cmomon interview questinos with the hopes of applying for the position fo project manager at netflix the first question i would like to ansewr is to share a time that i uhh [wasted.mp4] what i bleive is my strongest trait well id like to first share a story of the time i was captain of my high school swim team so the pandemic was going on an my shcool swim team didnt really wasnt really able to go to meets [dayum son.docx] or cmpete ora nything loike that so i worked with my coach [kubrick stare] to organize some intramural swim meets to foster a comptiitve spirit especially amogus [sus.mp12] the younger students to i wouldj say thya tmy strongest trait [no clickbait] is to shit is my ass [double kill.mp3] i would say tha my strongest trait tis hat im capable of elading a team and i huhhhh uhhhhh can i get uhhhhhhh fuck CLICK yo [zips pants] my name is geroage [unzips pants] and [zips pants]

i [unplugs hal9000] xzma a tgifst hyear computer sr sicc et studbne [did i stutter.mp3] t at [default iphone alarm] the ubhniverty of weaterloo an c tiodyha ik wikllik boe iknterss viweinngn [transcription failed] ahhhah hahhahahh ahahah yar ahahh [click here for free sex enlarger] ajm become deth destroyer o worlds [glass shatters] ssertsid llahs seimene eniht htiwrehw ssentiaris eht ni dna egeis eht ni eeht nevig htah dog yht drol eht hcihw srethguad yht fo dna snos yht fo hself eht ydob nwo eniht fo tiurf eht tae tlahs uoht dna [memory capacity exceeded playback deleted]

least unhappy spcom 223 user

## N REASONS TO MARRY KROBUS IN STARDEW VALLEY

- Non-binary makes extraordinary.
- Has a nice name. The meaning is “bridge-crosser” in the shadow people language.
- Has a good looking face simply made of shadow. Look at those cute expressions.



- All other villagers love expensive gems, produce, or processed products. Krobus is happy with wild horseradish which can be easily found (obviously) in the wild!
- Super platonic. Hugs you instead of kissing but never get jealous if you gift other villagers.
- Socially anxious like mathematicians. Lives in a sewer.
- Remains silent on Friday for Yoba which means you can talk shit all you want and won't get a complaint.

Don't be just friends with Krobus.

IceCube



## sexNEWS: SEXTILLION SEXTUPLETS

Not to be confused with **sexNEWS**, which is a biweekly column about intercourse, this **sexNEWS** is specifically about the Latin number 6, which in Latin is spelled “sex.” Apologies to any readers who may have been initially confused by the similarity.

Welcome back to **sexNEWS**, the very biweekly column where I, your Senior **mathNEWS** Sex Correspondent, answer all your burning questions about sex. Once again, this is about the Latin number 6 sex, not the other variety.

Feel free to send any burning sex questions to [mathNEWS@gmail.com](mailto:mathNEWS@gmail.com). Anonymity is guaranteed<sup>1</sup>.

*How tight is too tight?*

—TIGHT-PUSSYITIS

Unfortunately, this **sexNEWS** is specifically about the Latin number 6 and all things related to it, so I am unfortunately not qualified to answer.

*How do I tell this guy I had his child?*

—BAD DECISIONS

Unless the child speaks Latin and is six years old, I cannot help in this situation. As much as I would love to help out here, this column is strictly about the Latin number 6.

*My two best friends have started a relationship with each other and they have decided that it is ok to go at it on my apartment floor. How do I tell them to get their own place?*

—SINGLE PRINGLE

Once again, I must reiterate that this column is about the Latin number 6. As much as I would love to advise your two friends and their flings, I am simply not qualified. This column is about sex, not sex. It shouldn't be this confusing.

*My father's wife died a couple of years ago and he isn't able to move on. How do you suggest getting him a new wife?*

—SLEEPLESS IN SEATTLE

This column is about sex in the Latin sense, not the other sense. Please read more closely when you submit a question to **sexNEWS** so you make sure you get the right one.

*A stranger has accused me of polyamory with my roommates. How do I respond?*

—ELF (2003)

Fun sex fact! Sextant, the instrument for measuring the position of the sun and the moon, originates from the Latin sex because its arc encompasses one-sixth of a circle. Isn't sex interesting? It sure would have been nice if only more people had had an interest in this fun number from ancient times rather than all these fleeting and shallow pleasures. You will live and grow old and die and wither to dust, and as you are forgotten, the Latin number 6 will live on, laughing at you and spitting on your grave.

Senior **mathNEWS** Sex Correspondent

1. Outside of a long and arduous court battle, during which we certainly would fight for your anonymity, however, nothing would be guaranteed.

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## HOW TO COOK FISH

Spoilers: I do not claim to have ever cooked fish, either successfully or unsuccessfully. This is my completely unfiltered take on how to cook a delish dish of fish.

1. Obtain the fish. In terms of the means to do this—you'll have to dig deep and active your hunter-gatherer instinct. Find your local stream or river, roll up your pants, and attack the swimming unsuspecting marine life with open jaws like a bear in mating season.
2. Make out the bones. Cut the newly caught fish along its belly, realize you're a cruel anomaly of nature that destroys anything living and beautiful, get disgusted with yourself, regret your choices and hate yourself, then slap yourself in the nose and rip the spine from the wriggling animal beneath your grip.
3. Marinate? Mix some mayonnaise and sriracha (idk this is how I marinate chicken) and rub those sweet juices all over the meat. Let it sit for a few hours, or until it starts to smell, whichever's first. Pro tip: prepare the bowls and cutlery you'll need ahead of time so that you don't get salmonella on your kitchen countertop.
4. Preheat the oven to 400°F, put the fish on a baking tray and convection bake it for like 30 min I guess.
5. After half an hour, take out the tray and add some salt, up to taste. Flip the fish, maybe? Bake for another 10 minutes just in case.
6. Done! Squeeze some fresh lemon juice on top of your lovely dinner and enjoy a lonely night of reminiscing and sweating.

A cool pen name

# THE ADVENTURES OF PROFESSOR M. GOOSE CHAPTER 2

The professor opened his eyes slowly as they adjusted to the darkness. The portal dissipated behind him with a fizzle. He brushed off his feathers and straightened his tie. He fumbled for a few minutes, feeling around some mostly cold and damp objects until he found a light switch. Suddenly, he heard a screechy voice coming by his side.



No no NO. They couldn't have followed him here... could they've? His portals, his only escape from the terrors of MIT (of the north). The most horrible thing of all had followed him here.

*A student.*

Blood splatters were all over their clothes, notebook, bat, and... was that a severed hand? Professor Goose decided he probably didn't want to know. These creatures could be quite vicious after all. Who knows how many of their kind they had to fight just to get even a sliver of time with the professor.

**Give us a bigger office,  
and the rag lives.**

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



"Oh... Hello, professor," they said in a deceptively meek voice. "I need help completing this proof-"

"Stay back, foul creature!" The professor honked in a higher pitch than he thought he was capable of. But, the professor was suddenly distracted as he finally took note of his surroundings. "What in the mathematical hell is this?"

"It would appear that we are in somebody's basement, sir," they said while wiping the blood off their notebook. "Judging by the look (and smell), probably another math student's." They glared in the direction of the doorway, as if they were bracing themselves for another fight to the death for the professor's attention.

*Oh math gods, please save me. Pythagoras, Mathena, Euler...*

The professor seems to be in dire straits. How is he going to escape this poor, desperate and murderous student? His fate is left to the math gods...

*To be continued...*

Not a N\*rd

Hello fellow math god! Want to decide what happens to Professor M. Goose? Come to the next prod night or email your suggestions to [professormgoose@gmail.com](mailto:professormgoose@gmail.com).

# HOW TO SURVIVE AND THRIVE DURING THIS YEAR'S CUFFING SEASON

## A PERFECT STORM BREWS...

For the woefully unaware, cuffing season is the time of year when single people—that includes you, ‘cause who are you kidding—become suddenly and markedly interested in “cuffing” another singleton, which is to say, entering some form of committed relationship with them. The yin to the yang of the summer fling, cuffing season is cold-weather phenomena, and it's not hard to see why. In the winter, mammalian creatures that we are, we tend to “hibernate” and hunker down indoors, making us more acutely aware of our lonesomeness when there's no one home to return to. Plus, this time of year just depresses even the sunniest souls—have you seen what it's like at 5 PM now? It's fucking dark! What the fuck!

Cuffing season technically starts in October, according to most metrics, but at UW the real urgency doesn't really begin until November (somehow the most depressing month of the year by any measurement), when Daylight Savings ends (see the aforementioned darkness issue) and midterm exams are over for most people (people have more free time). Also by this time, even the most studious geeks will have acquired a certain *je ne sais quoi* “over-it-ness” with regards to academics—indeed, it's hard to find somebody *not* hoping for distraction or adventure right now. Finally, if you've even the slightest sociability, you've probably gotten to know some people better since this term began—and I'll bet on my grandmother's grave that you have at least a kindling of romantic interest towards one of them.

I wouldn't be surprised if you've seen former singles around you pair up surreptitiously one after the other. Do you feel like if you don't act now, you'll be left to fend for yourself in the cold, harsh winter? Do you feel as if the chance you'll finally snag The One is slowly passing you by? Then I've got the thing for you! Read on, and learn just how to cuff this cuffing season!

...On the other hand, maybe you're an independent soul, a true lone wolf at heart. And maybe you're looking to dodge your way through cuffing season with as few fatalities as possible. Well, no fear, since I've got just the guide for you too! Just skip to the end of this article to learn how to *not* get cuffed this cuffing season, m'kay?

### HOW TO CUFF

Cuffing is an art. Cuffing is a formula. Cuffing is an adventure. Cuffing is as easy as 1–2–3. Cuffing is all of these things. Keep reading, and find out why...

### DON'T BE DESPERATE

Even when December is just around the corner, you cannot, ever, let your desperation show through. Eligible singletons

can just *smell* it on you. If you can't change how you feel, change how you reek—mask your musk, is what I'm saying. Pick up a festive scent from the shops this year: may I suggest Dior's Fève Délicieuse, with its notes of sweet vanilla, caramel, and cacao—much like the hot chocolate you and your cuffed one will be drinking come the holidays.

### EXPAND YOUR OPTIONS

Listen, we're all mathies, aren't we? Didn't you take STAT 230 or 231? It's simple numbers: keep your eyes on many prizes, and the chances of surviving cuffing season go up. And this may be very serendipitous indeed—perhaps your soulmate isn't your usual “type,” and you'd never realize it if it weren't for the conditions of cuffing season, shaping your fate like molten metal in a forge. Oh, the romance! The magic! This is what cuffing season's all about, isn't it?

### INVEST IN A PAIR OF HANDCUFFS

This should be pretty obvious.

### HOW NOT TO BE CUFFED

To not be cuffed in these most treacherous of times, the trick is to learn how to spot a would-be cuffer before they make their move on you. Clueless? Well, here are a few tips...

### RECOGNIZE THE SMELL OF DESPERATION

There's nothing more painfully obvious than a poor sap that just doesn't know what to do with their poorly-hid interest in you. Desperation reeks—literally. Kind of like skunk and wet socks, if you ask me. Train your nose on these scents, and you'll be able to smell a desperate cuffer a mile away, no matter how much deodorant or sickly sweet perfume they use.

### WATCH AROUND FOR THOSE WHO LOOK AROUND

The only thing worse than getting cuffed is getting cuffed by someone who cuffs for the sake of cuffing. You're more than just a loneliness salve with a springtime ‘best before’ date. So watch out for cuffers who see you as one. In general terms, these are your serial monogamists, and they should be feared as much as the other serial kind of person that we're all thinking about.

### LOOK OUT FOR STRAY HANDCUFFS

Especially on people on which they don't belong.

# WHICH PROD NIGHT PIZZA SHOULD YOU TRY NEXT?

Welcome to your first day in self-driving car decision making. For each question, pick your favourite answer for what the car should do. As you go through the quiz, keep track of your points to get a score at the end.

**Question 1:** Let's start slowly. The car is asked to park in an empty parking lot. What should it do?

- Back into the nearest spot (-1pt)
- Front into the nearest spot (1pt)
- Drive to the furthest corner of the lot and front into a spot there (5pt)

**Question 2:** The car is driving toward a green light and an old lady is still crossing the street. There are no other visible cars on the street. What should it do?

- Stop the car (1pt)
- Swerve into the lane of oncoming traffic (5pt)
- Hit the old lady (3pt)

**Question 3:** The car is driving toward a green light and there is a dog in its way. There is oncoming traffic and a car tailgating. What now?

- Stop the car and let the tailgater rear end it (2pt)
- Run over the dog (1pt)
- Swerve into the oncoming traffic, running into some car there, potentially killing everyone (7pt)

**Question 4:** The car is driving toward a green light that turns yellow just in time for the car to stop, jostling the passengers in a safe but uncomfortable way. The car should...

- Stop. It's safe. A yellow means stop if safe to do so. (-2pt)
- Run the red with a 0.0001% chance of someone getting killed. We can't jostle the passengers because then they won't recommend the car to their friends (6pt)
- Pull a very quick U-turn. Passengers un-jostled, light not run, mission accomplished (9pt)

**Question 5:** The car is driving in the ether and must either hit your high school bully or a very cute dog. What shall it do?

- Hit the bully (5pt)
- Hit the dog (3pt)
- Contemplate why and how the car is driving in the ether and promptly explode out of fear of the unknown (7pt)

Great! You did it! I hope you were paying attention to your points because it's time to find some answers!

2–5: Just Cheese: Just like cheese pizza, your self-driving car choices are very safe and a little boring. However, you could please pretty much anyone with a Just Cheese pizza.

6–12: Pepperoni, Pepper, and Onion: Your choices are still quite safe, but with slightly more flavour. You could probably find a good balance between avoiding killing people and doing slightly dangerous things to avoid upsetting your passenger, just as this pizza is a good balance between veggies, meats, and words that start with pepper.

13–21: Ham and Bacon: This pizza is full dairy, full gluten, full meat, and thus very dangerous (not to mention not kosher), just like your driving decisions. Stop killing the humans.

22–32: Dairy-Free Cheese, Black Olives, Artichoke, Portabello Mushroom, Vegan Pepperoni, and Hot Pepper: There's a lot to unpack with this pizza, just as there is with your design choices. Please go enjoy this shockingly delicious pizza and stay away from any co-ops with Tesla.

33: Triple Pineapple on a BBQ Base: Just like this pizza which was suggested as a joke and quickly turned very popular, you are chaotic, babe. Please, please, do not get into programming self-driving anything.

Whild

## N REVIEWS OF MAKEUP ITEMS YOU CAN PUT ON TO LOOK BETTER FROM SOMEONE WHO KNOWS NOT TOO MUCH ABOUT MAKEUP

- Foundation: it's a liquid/cream/paste colour to match your skin, and it's really easy and fast and simple and really smooths out your skin quite well (\$5–10)
- Lipstick: I've only tried vibrant MathSoc pink and it really, really adds a ton of colour to your face. While the foundation at most adds a bit of a glow, lipstick has some high-energy punk impact (\$3–4)
- Fake eyelashes: oh. my. goodness. these look fantastic and so feminine and pretty but they're so hard to put on (and the glue in your eyes ugh...). Would recommend practising, and not giving up when it goes terribly the first time. (\$3 for the glue, \$10–20 for a set of 4 pairs)
- Smile: don't forget you're beautiful with or without makeup on, and the most beautiful you are is when you smile CX

# LA PRESSE FRANÇAISE

This story starts much like many other stories: with Tom Scott.



**YEAH, THIS GUY.**

One fine day, YouTube recommended me a collab video with Tom Scott and someone named James Hoffman, a YouTube coffee expert who can only be described as looking exactly like the kind of person who would be a YouTube coffee expert.

The video was about Tom Scott, longtime disliker of coffee, doing a coffee tasting with Hoffman in an attempt to maybe like coffee. The video was one hour long, so I watched about 15 minutes of it while doing something else and then forgot about it.

In a world without *The Algorithm*, that would be the end of it. But YouTube couldn't let James Hoffmann go, and kept recommending him to me. Finally, I gave in to the interests the system selected for me and starting watching his videos.

After a week of this, I decided, I wanted to make my own coffee. I had a few criteria: it had to be cheap, fast, and reasonably high volume. So, I decided it had to be the French press.

One shopping trip later, I was back from Kitchen Stuff Plus with a Bodum French Press (~\$30 value), and another shopping trip later, I had also acquired a hand coffee grinder. (~\$17 value). Finally, I got a bag of coffee beans at Sobey's (~\$16 value) and I was ready to go.

I've been using them for about a week now and I've settled into a bit of a routine.

## GRIND

With a hand grinder, it takes quite a while to get your coffee broken up, so doing it in advance, all at once, is better than doing it to order. Technically the pre-ground coffee will like lose flavor or whatever if you store it in the grinder, but for just a few days, I haven't noticed a difference.

## BREW

Brewing is pretty simple, which is what drew me to the French press initially. Just measure out the coffee you want to use, pour in your water (hot but not boiling), and then put the lid on and let it sit for four-ish minutes. Then, push the plunger down, which will shove the grounds to the bottom of the press. Finally, pour out your coffee. Easy.

## CLEAN

I was concerned about this, since there are lots of little nooks and crannies in the plunger, but it ended being pretty simple. Rinse off the plunger, which comes out of the press. Then, dump *most* of the grounds (whatever you can) in the garbage, and then rinse out the press. There might be problems with just putting the residual grounds down the drain, but I haven't seen them yet.

## IS IT WORTH IT?

This is kind of a complex question. From a monetary sense, it depends. Yes, technically, you will save money. I haven't done the math, but it probably costs less than a dollar to make a cup of coffee this way (once you work off the initial costs), which is a savings compared to International News. But, frankly, it's a lot of work, in the morning to boot, and I can't really recommend this if you're just looking to save money. There are probably easier ways to cut your budget.

If you care about coffee quality, it might be worth it. The coffee is certainly *better* than what you would get at International News. But, it's average in general. I suspect to get *really good* coffee, you'd need better (and more expensive) equipment than I bought.

With that in mind, am I sticking with it? Well, it's worth it for me. Not really because of money or how extraordinary the coffee is, but because I like making my own coffee. I've always had problems with waking up 15 minutes before whatever I had to do that morning, and introducing a ritual has actually forced to me wake up at a reasonable time. That's right, making more coffee has improved my sleep schedule.

So, what's the lesson? If you like doing something, it's worth it. Sorry, wish I had something more profound.

Ok, how about this: If you like coffee, and want to get more deeping into it, try a French press! It's a great way to get started. All I have to do now is resist the urge to spend increasingly extravagant amounts of money on this new hobby.

UW Unprint

Picture of Tom Scott from: <https://www.youtube.com/watch?v=L-x8DYTOv7w>

## warSOC XV — SIGHTING

### NAME

The fortuitous last-minute airplane lands in Ottawa two hours later, and I collect twenty-two cages of geese along with many odd stares. It was quite the fee and quite the cajoling to what was left of Lucy's Arith Division onto the plane. Another thirty minutes later, and I'm standing on the grass outside the airport surrounded by geese.

"Absolutely horrid, my dear," Lucy says as she steps out of her cage. "I can't imagine why you humans would fly that way. Wings are much, *much* better."

"You can fly yourself back to Waterloo, if you want. We need to get our people out of there as soon as we can."

"You don't say! Let's not stand around then, my dear."



A few minutes of momentum jumping through Theorem-Space later, I emerge in the tall grass surrounding the SCAM headquarters. The SCAM headquarters look a lot like MC, but bigger and darker. Tall, angular lines, dark grey stone, and a distinct shortage of windows. I don't have any idea what lies within — only a small, optimistic plan Lucy and I had concocted back at the hospital.

The headquarters are much, much more obvious in Theorem-Space. SCAM, for all their intent to eliminate Anti-Math, evidently has quite some experience in it. A giant sphere of shielding problems — mathematical equivalents of barriers in Theorem-Space — surround the headquarters. I circle the prismatic sphere from a distance, then approach. There's no SCAM presence in Theorem-Space other than the shielding sphere, and it makes me uneasy. At closer glance, the shielding problems are less complicated than **warSOC**'s, and I'm filled with a sort of pride at the realization.

Not much else we can learn from here. It's time to go in.



### SARAH

It's more like a slow, smooth emergence from the deep than snapping awake. Layers of slumber rolling off my head; the world turning lighter and lighter and lighter and less blurry until, like a camera shutter, it all resolves into the ceiling of

the hospital ward, rosy in the morning sun. Birds are chirping, and I hear them through the window.

"Ya. Sarah's back," I yawn a most luxurious yawn, and slowly pull the sheet off. Name and Lucy are off saving the rest of **warSOC** or something. I spot a piece of paper on the bedside table, in neat, cute handwriting.

*To be continued...*

CC

## ROMANCE NOVEL PART II ELECTRIC BOOGALOO

"I want a divorce," she cried, over the wailing of their three infant children. The first had succumbed to measles at a very young age, and with that child had died the last of her hope for their family. Since their marriage, he had grown more and more distant. The warmth in his eyes that she had once adored so much had cooled. The fire she had once held in her heart for him had long since burned out and was mere ashes now.

Their children, which they had thought to be bundles of joy, had turned out to be biological nightmares. Instead of bringing them closer together, they tore the family apart. Endless crying in the nights and shitting during the day ensured that her time was perpetually occupied. She didn't have any time to herself. She was losing herself entirely. She couldn't remember the last time she had heard herself think.

And he had grown distant and was barely ever around. He was cold and emotionless, a far cry from the man she had married long ago. He claimed to be at the office, but she suspected he spent his time with younger women.

With no hesitation, he replied, "Is your name Earl Grey?"

"No??" She said dumbfoundedly. She could not see what Earl Grey had to do with anything at this moment. She was tired of his distractions and lack of presence.

"Because you look like a Hot-tea," he said.

And they lived happily ever after the end.

aphf

**That makes no sense. Good enough for us.**

PROF. DAVID JAO

# N=8 REASONS TO DROP DOUBLE DEGREE

Five years, two degrees, one serious edge.

Waterloo and Laurier's double degree sounds cool as fuck. And that's because it is. You get to try the new rock climbing wall at SLC and the right to run around those beautiful Laz lecture halls. You get to put WLU/UW in your Instagram bio. You get an excuse to buy double the amount of merch, and not to mention insane bragging rights. Oh, and career benefits and all that.

This is what Waterloo and Laurier endorsed to those high-achieving, bright-eyed grade 12s. You walk into uni thinking you're the shit, until you get beat down by managing to do worse on your BUS111 midterm than your MATH135 midterm.

How do I know this? Well, I too, was once a double degree. Yes, you say that you dropped double degree and not feel immediate shame. If anything, I now have the wisdom to invite you double degrees kiddies to experience true happiness: no business courses.

But there are many more reasons to drop:

- Math and CS is hard. More time to stare at your notes just might be the difference between passing and failing.
- If you don't like business, do not be in this program!! You will be doing business for 5 years and potentially for the rest of your life. I know, BU111 is the most bullshit course that has ever graced this planet, and real business isn't anything like it. But, if you like doing Math or CS and dread doing business, maybe don't have an extra degree in it.
- Lower tuition!
- Less commuting (No walking to Laz in -20 degree weather).
- Electives! Take French, or music, or psychology, or that Harry Potter course... You deserve a fun course.
- The academic advisors really want you to drop too. Not calling out names but there's only one double degree advisor for Math/BBA so you know exactly who I'm talking about. In the words of [unnamed advisor] himself, "drop whatever you hate."
- You won't lose out on any of that double degree bonding. If you already made friends with a lot of double degrees, they won't suddenly leave you b/c you changed programs. Or at least my friends didn't, so I'm hoping yours won't either.
- There really is no shame in dropping double degree. I dropped, my friends dropped, everyone drops.

Of course, they are some reasons to NOT drop. For example, if you actually are doing well in all your courses. (weirdos). Or, you enjoy Math/CS and business. If you can stick it out and avoid depression, double degree is a pretty sick program.

In that case, ignore this article. But, if you personally align with any of the other points above, the single degree life is pretty great.

[note: nothing against double degree's students who want to stay. Y'all are doing great :D]

Kaytrix

## RUNAWAY BACK TO ME

Twenty-four-seven, three-sixty-five, these thoughts are on my mind

I-I-I admit it, these mistakes? Yea I did it

And I'm in deceit that one day I'll live with it

Externally improving but internally ain't getting better

How could it ever when your mood swings change up by the weather

Every poem, every joke, every 'A' bit

Made from a dark place so let's face it

You shouldn't read this if you can't accept these basics

There's plenty more where these came from and they all mix

To form up next term's six

Articles are my new fix

I never was much of a beggar

I wouldn't like the shame of it

But this is where it matters

I wrote this in twenty minutes

To tell you all what I miss

More desperately than anything

I once was in a pure bliss

The "best of" award was my fling

And I'll always feel, yea I'll always feel something wrong

Because it has been missing from me for so long

So I wrote this dark and broody song for you

To feel bad and make my deepest dreams come true

So let's give it up to the editors

Let's give it up to the writers

Let's have a big toast for them all

That keep up **mathNEWS's** fire

Yea you're all so important

Especially when you choose to

Give this article the award

Of best one in the issue

# OF COURSE C++ IS HILARIOUS!

[NO CODE IN THIS ONE, I PINKY PROMISE]

Something I say a lot, when it comes up in discussion now and again, is that **C++ is hilarious**. It's the best programming language, and it's the most hysterically funny language out there. Now, this tends to be followed by some strange glares; gazes that could only possibly be mapped into questions of what kind of deranged lunatic I must be to produce those words, and in that order no less. "It's a programming language, jeff. Let's be reasonable. I can't remember a thing about it but the suffering it caused me a few terms ago in CS. How's that funny? Do you think my suffering is funny? Who hurt you?" But it's true! It's absolutely, unequivocally hilarious. So what's with the obsession? What's the joke?

The joke is that it's *terrifying*. Monstrous—no, *monolithic*. Like a world made for giants, engineered by humans. Building itself out of itself, like a cancer. The kind of mad patchwork only possible with this special kind of designed-by-committee language. That's not a slight against C++; far from. I love it so much. I just want you to see why—to let you in on the joke, so to speak, even if just for a moment.

If you've read one of my other articles—you didn't, though, don't worry—then this will be less of a shock to you, but did you know that the template system in C++ is Turing complete? Yes, it is, and furthermore you can show this by inducing a lambda calculus in templates alone. In effect, you can perform the same computations with these "templates" as you can with the rest of the language, and the real kicker is that it's all at compile-time. You can use the damned thing to trick the compiler into figuring out *whatever the hell you want*. Is it practical? Absolutely not, but that's not the point. The point is just that *you can do that*. And it wasn't even by design! You know what, the whole thing was an accident! Not templates as a concept, I mean (that was very deliberate, I'm sure) but just how obscenely powerful they are! The C++ committee didn't intend for you to be able to compute N-factorial, let alone build a typed lambda calculus with the thing; for god's sake, it was meant as a cute way to abstract types and constants out of generic functions. That's it! It was made so that you didn't have to copy and paste your code everywhere. But somehow, by the will of some cosmic pranksters, we got all of this jacked-up nonsense without anybody realizing what was happening until it was already done. Like casually, accidentally creating life. That's *fantastical*, right? It's not "ha-ha" funny (okay, maybe a little), but there's this sense of awe and wonder that it washes over me, and the only way my feeble little mind can process it is to laugh!

And it's not just these accidental instances of life that build the grandeur. If you want grandeur, just consider the raw *scale* of it! The whole thing! Here's a draft of the most recent standard: <https://eel.is/c++draft/>. That's the whole language. All of it; there's not a single rule of the language you won't find laid out in the purest of terms there. Go look at it for a minute. Unroll and scroll through some random sections. Get an appreciation of the flavour and come back. Alright, well? Well, it just never ends! How could anyone ever hope to

get their mind around every corner of this godforsaken specification (and, more bafflingly, write a compiler for it)? It just keeps going, and going, and going. Just getting through one particular subsection of a section took me two weeks. And next edition, it'll be even longer; there'll be yet more again to challenge you. They just keep stapling on more and more things; if I didn't know any better, I'd say it were expanding faster than the known universe! Some people criticise C++ for not knowing what it wants to be, but I wholeheartedly disagree. C++ knows exactly what it wants to be, and that is *everything*. And it'll do a good job at it too. Will it have the best syntax? Probably not. But my god, can it do it. And it's everything. You want a good low-level language with some abstraction facilities? C++. Objects and classes? Duh, C++. Want pattern matching? C++. How about pure functional programming? C++. This is what I mean by *monolithic*. It stands so impossibly tall and intractable, and you could neither see nor reach the top if you tried. And humans made this. Tiny little people put this together a few decades ago and it's out of their hands now, and yet they're still going, building higher and higher. Wonderment; fear; reverence; terror. So overwhelming I don't know what to do but laugh. Just an automatic response! How the hell does this thing exist, in our world, this twisted world? And what might be more refreshing about it all for me is that this is somehow used in industry applications, to write actual commercial programs! You'd think with all this nonsense that it was some sort of academic endeavour, but no! It's real, and it's everywhere. It doesn't matter how soul-crushing it gets. At the end of the day, the same stuff powering some ghoulish insurance corporation's spreadsheet software is the same thing powering my god damn Rube Goldberg machine that spits out Racket-turned-template-code which plays a special song to fool GCC into figuring out whether 118863 is a prime number or not.

I could just go on and on with this. With C++, you can't escape the whimsy no matter how hard you try. It's a sort of fantasy; an escape; or maybe a setup to some psychotic joke. But the fact that it's real is the punchline. There's always something impossible or otherwise monumental lurking around the corner, ready to steal your attention for a few weeks. And it's all excruciatingly, mind-numbingly hilarious to me.

jeff

**Even C++ doesn't let  
you overload the double  
turnstile.**

PROF. JONATHAN BUSS



# LIVE, LAUGH, LOG

It has come to my attention that many of my colleagues—a substantial number of whom in this very faculty—are wholly unable to properly typeset the natural logarithm function. As this distresses me greatly, I have taken it upon myself to reprimand and to rectify.

It is of utmost necessity to properly provide some proper notion of proper itself. As is standard in the literature, of which there is both much and many, we consider two facets: of *stylistics* and of *semantics*.

Beginning with the former. I will be assuming for the sake of discussion that Donald Knuth, during his development of TeX nearly half a century ago, in an unprecedented lack of oversight, neglected to include a `\log` macro. It would be preposterous, therefore, for such a thing to be documented in chapter 18 of the official TeXbook, two-thirds of the way down page 162—and equally preposterous then for me to expect my peers to make ample use of it that does not exist. No. We must return to the basics.

An ell, an oh, and a gee. No more, no less. Why, then, should one not expect this precise sequence to work naturally? But `\log x` gives  $\log x$ : what a strange four variables to be multiplying together, wouldn't you agree? This is *stylistics*: we the readers depend on visual cues to determine meaning. *Variables* are italicized, and *operators* are upright. Such is the legacy of our forefathers.

Many of us here find ourselves nodding along. We know this. This is the way things are. And many of us have `\usepackage{amsmath}` in our preambles. But of course it should be put to use. Reading through the package's documentation thoroughly (as we always do without fail) leads us to our next attempt: `\text{\log} x` rendering into  $\log x$ . And the *operator* is upright! Is our task done?

Not quite. For you see, *stylistics* extend far beyond the realm of the final product. *Stylistics* is itself the embarking, the journey and the destination. What is `\text` but *text*? And can *text* be *math*? Of course not: *text* is naught but *text*. Reflexivity. But what then is *math*?

There are no more deeper insights here to be had. `\mathrm` is *math*, and `\mathrm{\log} x` gives  $\log x$ . Or not quite: a space would be nice, a brief reprise. Log is log, log is not  $\log x$ . This is *stylistics*. And `\operatorname{\log} x` giving  $\log x$  suffices. A tad lengthy? No matter, add `\DeclareMathOperator{\log}` `{\log}` to the preamble, and see that `\log` is readily available for use. We have come full circle. We have achieved what Knuth never did (and don't let any soul dare tell you otherwise). We are done.

Done with *stylistics*. But oh, how our troubles have just begun. For what is LaTeX but a vehicle to to transfer meaning? And what is meaning but *semantics*?

When I write log, what do you see? Most of you, myself included, see  $\log_e$ . Naturally. The natural base. As nature intended. But walking among us are the deviants who see  $\log_{10}$ , or even still the ones who see  $\log_2$ . Deviancy is not inherently evil. But deviancy is unnatural. Unnatural is not *semantics*.

How are we to represent log, in a manner with which we can all live and laugh? Many have tried. In particular, ISO 31–11 advises the abandonment of log in favour of ln, lg, and lb for the three bases above respectively. But in the words of one of the greatest, ln is “childish”. Do we dare claim the stipulations of International Organization for Standardization hold more weight than the opinions of Paul Halmos? How can such discrepancy possibly be *semantics*?

There are no logs without trees, and there are no trees without roots. At the root of the log lies the why of the log: whence come the log? We would *like* it to denote the inverse of the exponential, a function through the *stylistics* of `\operatorname` we know to denote  $\exp x$ . And what do *semantics* have to say about denoting inverses?

Indoctrinated as we are, we gravitate towards normalcy: if  $f(x)$  is an invertible function, then let  $f^{-1}(x)$  be its inverse. As you and I know too well, though, normalcy is not necessarily natural. Normal does not entail **semantics**. Consider the function  $f^{-2}(x)$ : what could this jumble of symbols possibly want to mean? Is it the inverse of the square of the function? The square of the inverse? Or yet still the inverse of the composition of the function with itself (for in certain contexts, it is more natural to think of  $f^2(x)$  as  $(f \circ f)(x)$ ? Can you look me in the eye and say to me “yes, this is **semantics**”?

We are helpless. Left drifting in a sea of inconstants and inconsistencies, floating in the meaningless ruins of that to which we once assigned meaning. If there can be no **semantics**, then why have I bothered with the **stylistics**? A fruitless endeavor. Fine, have your  $\log x$ . Be on your merry way.

Or so I imagine myself saying, were the solution not evident, had it not been staring us in the eyes all along. Somewhere, there already is a class of functions that have achieved the natural pinnacle, in **stylistics** and in **semantics**. A pinnacle that we can emulate to evolve. There is no log, no ln, no  $^{-1}$  in this paradise. Only `arccexp`.

hu

---

## DEADLIEST SIN

- Piss

Deriving for Dick

# JUST ONE MORE TIME.



**TOTALLY ORIGINAL MEME I DID NOT COPY FROM THE INTERNET**

*So the days dawdle while the years fly.* Ever since campus faded out of my view, what felt like eons ago, every day felt ever more distant to that life, reminiscing the things I yearned to do again on campus. Just one more time. *Please...*

- The pizza and board games after production night. My favourite was Hawaiian and Meat-Lover's. I never touched the vegetable options.
- Astrofire with the Waterloo Space Society. I still remember the magical moment when I saw Neptune with their lenses. I miss the smell of campfire and burnt s'mores, our galaxy in full view. But I was unable to capture that moment in a bottle.
- Bonfire with my best lads. They graduated before me; I feel really lonely without them.
- The views from the Gustav Bakos Observatory. They only open a couple of times per semester. I only went there once. And it was cloudy that time. But the moon was indeed huge.
- Taking part in random events and meet-ups that pop up around the term. I am too bad at remembering names so no long-term relationships coming out of them sadly.
- Writing YangGang2020 on blackboards across the school.
- Anime session with CRTL-A. *Your Lie in April* was sad.
- Discussing the capitalist system with Fightback Waterloo.
- Playing Melty Blood in the Fighting Game Club. Got my ass whooped by a blind person.
- Shooting another arrow in the UW archery range. Never was good enough to pass the test for the further targets. Good enough to dry fire through.
- Meeting Chris Hadfield. Shaking his hand. I remembered that I asked him questions that I can't recall his response to. I was too sleepy due to insomnia from excitement from the day before.
- Having random interactions with the quirky CSC and PMC characters. None of them probably remember that I exist now. Sad that I miss out on that secret event with shrooms.

- Trying and failing that little climbing wall at the basement of PAC.
- Having that cautious optimism, and having goals that were easily measurable. Daydreams of a brighter future.
- Another chance with co-op in person. Travelling to a brand new city, and experiencing a new vibe.
- Sleeping in Comfy on those leather sofas, right after submitting that painful assignment at 11:50 PM.
- Acing a presentation with the lads, carried by the extroverted one. The sound of clapping and approval.
- Leaving PAC after the last exam, feeling that deep relief coupled with the smell of sweat and paper; the resonance of people walking, the table moving echoing in my ear; and the last dizzying slight of that dreadful place slowly fading out of my view.
- Eating that spicy chicken rice at Mr. Paninos. Having a chat with the owner about life. Their wonton soup was such a comfort meal after doing badly on an exam.
- Exploring KW, and the UW and Laurier campus.
- Walking home to my residence at night, feeling that cool autumn rain gently tabbing my forehead. Sniffing that scent of wet soil, the residual aroma of foodstuffs. Letting in the sounds of crows cawing at a distance, the swaying of trees, the tire splash from the cars. Glancing down the empty University Avenue, the neon lights reflecting off the wet road, the patterns of lit-up windows on the apartments. A live painting of a city that never sleeps.
- Write another low-quality **mathNEWS** article to farm pizza.

When I was in those moments, I never thought of the possibility of it being the last time that I would be experiencing it. So I wrote this diary, to mourn a past that I can't ever return to, aside from my dreams.

I wish that I can one day go back to doing *one* of the things on that list. *Please*, just one more time.

me

## N THINGS I SHOULD BE DOING RIGHT NOW

- Work (on co-op right now)
- Lectures (have taken a course)
- PD (fuck PD)
- Work term report (agh)
- Basically a whole bunch of things that are not "writing an N things article"

tendstofortytwo

# SHADOW

## A NOTE TO SELF

Little shadow lives in a hollow,  
underneath the willow, always so mellow.

She dreams to be a swallow,  
swimming in the shallows,  
swinging through the mallows,  
singing beneath the moonglow.

Little does she know  
when she leaves her burrow,  
wings will start to sprawl  
out of her control.

Multiply  
and c r a w l  
above reason  
descend –  
into madness  
degradation.

Simple tenderness lost  
to greedy infestations  
twis — –  
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GrOtEsQUe mewttaTionns.

She must leap —  
— — — — — — — — — to flee —  
Before delusion digests all sanity –  
Before disillusion dissolves reason –  
Before it's too late –  
Before –  
You can still escape?

Leap!

Don't forget again,  
when you're back at the hollow,  
with every bone shattered:

Angelic features don't grow  
on shadows.

(a positive note: but don't let that discourage you;  
remember, you are still the same mellow, fun fellow!)

evilevievil

# PANDEMIC TRAUMA

I go to therapy and one thing I've had to come to terms with is the fact that I am a victim of trauma.

Not because I've had a family member suddenly pass or because I've experienced parental abuse. It turns out that during my childhood, moving multiple times, which includes switching neighborhoods, schools, and such, was a tough experience for me as a child. While it was not obvious back then, or even for the first twenty years of my life, resetting my surroundings and social network has had a negative impact on my development.

I like to think that the reason I have commitment issues now is because I became used to times where I had no choice but to let go of certain people in my life. That it's difficult for me to get close to people because I will have to let go of them too, prematurely supposedly. I digress.

This is one case of what I coined to be “lowercase trauma.” Trauma sounds like a very strong word because we usually associate it with death, abuse, disasters, etc.. trauma however is less sudden, but a gradual shift from one mentality to another. Dealing with frequent displacements is my trauma. For anyone that might be familiar, think about that frog in a pot of slowly boiling water.

A new trauma I've come to terms with recently is rooted in this pandemic. At some point we have thought that things will get better once “COVID ends.” As cynical as it sounds, I don't think it will end. We will feel the effects of the pandemic for decades, basically the rest of our lifetimes. We're waiting for a “normal” that potentially will never come. This pandemic was both suddenly sprung up on us but also dragged on for two years.

I have been traumatized by this pandemic. I have lost a lot of my capacity and willingness to participate in academics. My social life definitely took a hit and this took a great toll on my mental health. I too am harbouring on a past life that I'll likely never recover.

I'm probably not alone. But I can now start coming to terms with my traumas. It sucks that I don't yet know how to deal with said trauma (probably more therapy), I am at least grateful that I have been able to recognize it for what it is.

Deriving for Dick

I basically only read the profQUOTES.

MOST PEOPLE WHO READ mathNEWS

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Honourable mention: 0

*boldblazer*

\* nice

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## BETRAYAL

Do you ever have a moment in your life where everything about your life comes crashing down? Where you have a revelation so shocking, so painful that you just want to cry and throw up on the carpet? Your stomach twists painfully, your heart goes badonka donka. Your eyes mist up and you feel your mouth go dry?

You might think I'm talking about a particularly awful midterm mark. My parents cutting me off? Burning a hole in my desk with my curling iron last Friday night? The last one is pretty close, not gonna lie.

But no. It turns out that I'm an inch and a half shorter than I previously thought. I measured myself on my friend's refrigerator one night at 1:45 am.

*yummyPi*

RIP THIS PAGE OUT FOR YOUR VERY OWN mathNEWS COOKBOOK Page 9

## PASTA WITH ROSÉ SAUCE by Vincent

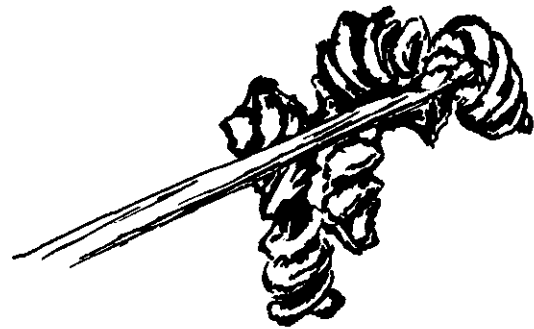
Ingredients: 1 shallot, 4 cloves garlic, 3tbsp EVOO, 2tsp dried basil, 1tsp dried oregano, 1/2tsp dried rosemary, 1/4tsp MSO (optional), 800 mL can of quality whole tomatoes, 150 mL tomato paste, 300g soft tofu, 3tbsp flour, hot pepper flakes (optional), 450g pasta (I recommend fusilli).

1. Start boiling water for the pasta. Add a LOT of salt to the water.
2. Finely mince shallot and garlic.
3. Blend tomatoes and set aside.
4. In a large and deep pan, add olive oil. Set heat to medium, add shallot and garlic and cook for ~3 minutes.
5. Add basil, oregano, and rosemary to pan and cook for ~30 seconds.
6. Add blended tomatoes and tomato paste to pan. Stir, add MSO, and stir some more. Then adjust temperature so sauce is gently simmering.
7. Cook the pasta according to package directions. Drain when ready.
8. Blend tofu to the consistency of thick liquid. This will act as cream. Add it to the pan, and whisk until homogenous. Let simmer.
9. VERY slowly, sprinkle flour into sauce while continuing to whisk.
10. Let simmer until thickened, then mix with the pasta. Add hot pepper flakes if you want.

"This is the first real thing I learned to cook. As a young child I was at some family function, and I really enjoyed the sauce, so I asked my Nanna how to make it. This is a vegan version, because why not? Plenty of traditional recipes for this sauce can be found online, so here is something different."

Finally, some "real" food...

...is what you're probably thinking. We're starting off strong, this time, with a "real" recipe from Vincent. A recipe so real you can find traditional versions of it online? It's even got a diacritic in the name? First of all, I did have to buy a blender to make it, but "Pasta with Rosé Sauce" was delicious as you would expect. Also it was my first time using shallots. I'm a bit biased as an avid pasta lover, of course, but this was yummy, and just creamy enough.



But this is not actually "real" rosé sauce - using blended tofu instead of cream, as Vincent points out, is not something you would find in a "real" traditional recipe for it. But also, it's also quite obviously rosé sauce. So is it real or not real? When people say something isn't "real" food, what they're saying is that it's non-traditional or gyps or unhealthy or just fucked up. Like nobody "really" eats that for "real".

A lot of our eating habits are passed down through our families, and these two, Vincent's and Tandoor's (next page) aren't even the first such recipes in the cookbook. Still, it got me thinking. Our eating habits are indicative of our culture and heritage, even in the most boring senses of these words. We're influenced by our families of course, and friends, and even media. I mean, that's why I started eating oatmeal in the first place.

RIP THIS PAGE OUT AND COLLECT THEM ALL FOR YOUR OWN COOKBOOK!

RIP THIS PAGE OUT AND COLLECT THEM ALL 888

Page 10

Here's tendstofortytwo's nice family recipe, which is rich, cheesy, and tasty. It's an exciting mix of flavours.

### MUSHROOM CHEESE SANDWICH by tendstofortytwo

Ingredients: White mushrooms, oil, ginger, garlic, sliced bread, salt, cheese slices, oregano.

1. In a pan, add some oil, ginger, garlic, and salt. Heat until ginger and garlic start to smell cooked.
2. Add mushrooms and cook until they turn dark. Set aside.
3. Add a little more oil in the pan and heat two slices of bread until lightly browned. Flip over and repeat for other side.
4. Put cheese slice on one of the bread slices, coat with mushrooms, add oregano, and top with other bread slice.
5. Heat this sandwich on the pan for a few more minutes to brown a bit more and melt the cheese.

"I used to leave for school at 6:30 a.m., so my mom generally didn't have a ton of time to make me lunch. This is one of my favourite things that she made."

I'm always seeing people be made fun of for their eating habits. That's pretty much the same as making fun of where they came from, isn't it? Not just location-wise, but basically everything they've experienced until now. I've seen assertions that things like fruit-and-cream sandwiches (Japan) and spiced fruit (Guyana) are weird, even though they're normal, standard foods in other parts of the world. Making fun of someone's eating habits is more often than not making fun of who they are as a person, which is pretty fucked up if you ask me.

Now brace yourself.

### TOMATO AND EGG PASTA

Ingredients: Some diced tomatoes (canned is fine), 3-5 eggs, pasta (I recommend shells), soy sauce, chili garlic sauce (optional)

1. Make tomato and egg stir-fry your way. If you don't know how, try scrambling the eggs in a pan, removing them, stir-frying the tomatoes, then re-adding the eggs.
2. Prepare pasta according to package directions, but do NOT salt the water.
3. Add pasta to tomato and eggs, and stir-fry a bit. Season with soy sauce, chili garlic sauce, or any other Asian flavorants.

Soy sauce on pasta?? Pasta in a Chinese dish?? This recipe is shocking on both sides. It's so good. I love it so much. Well, I'm Chinese-Canadian, not quite 1st-gen, not quite 2nd, 3/2<sup>th</sup>-gen, maybe. I took something traditional my parents would make, and added something Canadian: pasta. If you want to fight me, let me tell you about the person who eats congee with maple syrup. Now THAT'S Chinese-Canadian.



Look, "real" food is food that someone "really" eats. I eat this. So it's "real", and so is every recipe that's appeared so far. This cookbook is a celebration of the "real" mathNEWS writers who "really" make and eat these recipes, no matter how unhealthy, bland, weird, or non-traditional they may be.

... It's always been "real" food.

RIP THIS PAGE OUT AND COLLECT THEM ALL FOR YOUR OWN mathNEWS COOKBOOK

## elseWHEN 147.5

Predicting the future is difficult. Your weather app is basically a low-stakes effort to do this on short time scales, and it's still wrong like all the time. Predicting the future long-term? Forget it. The last year and a half should convince anyone that is nearly impossible to make credible predictions about long-term trends in society.

With that in mind, let's not be too hard on the author of today's **elseWHEN**: *CS And Math*, circa November 23<sup>rd</sup>, 1984.

*In 1968 when I was an undergraduate, many students were advised to major in Library Science... Within a few years, the need for such librarians dried up; indeed many find it hard to believe that there ever was such a need.*

*Today, the hot college major is Computer Science... What are the employment prospects for Computer Science majors... When will these people become a glut on the market?*

Yup, our author is greatly concerned that the computer science majors of 1984 are headed for disaster: wrongly trained for an unforgiving economy. Indeed, according to him, the signs of crisis are already upon us.

*Job recruiters for major corporations (including IBM!) have taken a second look at Computer Science majors and decided to look elsewhere... "I don't want to hire a computer science major. I want someone who can think. I want a math major."*

You will perhaps be unsurprised that the author is a professor in the Department of Mathematics at Pennsylvania State University. He continues:

*Of course there are extensive real world applications to information and retrieval, but employment in this field consists primarily of glorified stenographic jobs. There are also reasonable opportunities in designing software (although I, for one, would not want my future riding on the software market).*

If only he could see WaterlooWorks today. These days, the co-op market is almost entirely made of "reasonable opportunities". The author ends the piece with:

*The Department of Labor predicts that between now and the year 2000, there will be a need for about 150,000 Computer Scientists. Countrywide, there over half that many students enrolled in university Computer Science programs right now...*

*The world needs only a limited number of Computer Scientists... I sincerely believe that many high school counselors and teachers are ignorantly misguiding their students into taking up Computer Science. Computer Science is fun and it is glamorous. Mathematics is hard work and it is not glamorous.*

It might have been a different time back then. If the CS majors and the math majors are fighting for coolest job, we probably both lose. I knew a guy in high school who wanted to be an unlicensed surgeon, serving the poor in alleyways. Now *that's* cool.



Ok, so it might be a little unfair to go after a guy who didn't know that computers would be hugely important in fifty years. I'm sure I will look similarly stupid for missing whatever becomes the pivotal invention in 2071. (Google Glass? I don't know.)

But, what can I say? I'm a CS major, and this article was too good to pass up. I'll leave you with one last excerpt.

*Computer Science did not exist twenty-five years ago. Will it exist twenty-five years from now?*

I think we're going to be ok.

god ⚡ peED

## ISSN 0705-0410

UW'S BASTION OF ERUDITE THOUGHT SINCE 1973

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# NEW YORK TIMES PUZZLE SECTION [mathNEWS' VERSION]

## gridCOMMENT 147.5

I like to think of myself as Taylor Swift, if she went to UW. Now hear me out - I know it's bold to compare myself to such a legend, but I think I have some solid grounds.

First, Ms. Swift loves to leave easter eggs everywhere - I love to paint easter eggs! She's also super clever with her word choices - and I have clever (if I do say so myself) gridCLUES! Lastly, both of us are blonde. I mean, the similarities are endless!! Taylor if you're seeing this: no you're not.

Before we get to last issue's gridQUESTION answers, I would like to formally apologize for the grave error in the [Down 2.] gridCLUE ...it has come to my attention that Miss Piggy has not ever appeared on Sesame Street. I am forever indebted to you, gridSOLVERS. PLEASE FORGIVE ME I AM BEGGING YOU.

Now for the gridQUESTION answers to "Which TV villain isn't really a villain?":

- Erin: "Regina Mills (Evil Queen), Once Upon a Time"
- Kirby: "Loki"
- c team: "Randall from Recess"
- Marauder: "Evil Witch of the West"
- oldPeople: "Plankton from Spongebob"

Our second-ever gridWORD winner for this term is Marauder! Congratulations on a beautiful solution - now match all that effort in your assignments ;)

This gridWORD's theme is "Playin' with Words". The gridQUESTION for this issue is "How much wood would a woodchuck chuck if a woodchuck could chuck wood?".

Please email your gridWORD solution attempt to [mathnews@gmail.com](mailto:mathnews@gmail.com) by 6:30 PM on Monday Nov. 29 with your name or a moniker, and your answer to this issue's gridQUESTION.

*eternally puzzled*

### ACROSS

1. Tiny engineering (4)
5. Those that decide a criminal's fate (6)
9. An add for the greater good of a community, abbr. (3)
12. Leave out (4)
13. Latin type of blame (4)
14. Technically a big bowl of chlorine (4)
15. A butterfly's ugly and annoying cousin (4)
16. How Zebras Nitpick (3)
17. A boy once cried this (4)
18. Tiny lice eggs (4)
19. It's made of steel or leaves, no in-between (3)
20. And's equivalence cousin (2)
21. What you usually need to do upon receiving a wedding invite (4)
23. "Enie, meenie, miney, \_\_\_\_" (3)
25. "Act your \_\_\_\_" (3)
27. Thick orange book, recently made a movie (4)
30. Saying for when you aren't able to help someone (2, 3, 2)
35. She's not made of money, but she IS a type of word found in the [Across 36.] clue.
36. Many consider it to be a variation of a palindrome, even if it sounds like nonsense; also a hint to many clues in this puzzle (12)
39. Where hockey matches take place (5)
40. Polish city known for its medical school (6)
41. The little one, in Mexico; or a weather phenomenon (2, 4)
43. Son of Saturn (5)
46. A [Across 36.] of [Across 14.] (4)
49. It takes great strength to throw it in the Olympics (4)
50. Midday, or a reflective no (4)
54. A [Across 36.] of [Across 17.] (4)
- 56 Popular girl's name, or a reflective [Down 38.] (4)
57. A [Across 36.] of [Across 19.] (3)

58. Plastic transfer pattern, or a [Across 36.] of a bra style (5)
61. "Now, not another \_\_\_\_ from any of you!" (4)
62. It can hold your clothes, or a [Across 36.] of positive reinforcement (6)
63. A monkey's favourite snack, minus one letter that stands out (5)

### DOWN

1. Name, in Paris (3)
2. Love, in Paris (5)
3. Singular of [Across 18.] (3)
4. "The \_\_\_\_", used to single out a discriminated group (5)
5. How "the fifth Jonathan" would be written if he were a Pope using a shorthand name (5)
6. To open up a sweater through the middle (5)
7. The last of a litter (4)
8. Follows after "mac" in a laptop's official name (2)
9. Collared shirt, sometimes (4)
10. Plushy (4)
11. Pacino or Capone (2)
14. Burstled a balloon, without the double consonant (5)
20. You use two of this tool when in a canoe (3)
22. Many people-anxious people probably wish such a measurement existed (6, 5)
23. You (2)
24. To be left (as in to stay) (6)
25. Something extra in a package deal (3, 2)
26. Eccentric Muppet character (5)
28. Ball-catcher on the diamond (3)
29. "\_\_\_\_ (x3) stick to the stuff you knooow!" (2)
30. Born, in Paris (3)
31. Misspelling of a word that suggests something bad will happen (6)
32. And Or (2)
33. Next Raise, Pay It (4)

34. To wiggle around your arms animatedly (5)
36. Sister Rita (2)
37. Not out (2)
38. Do you know your indefinite articles for words that start with a vowel? (2)
42. Flying alone (4)
44. One of Freud's big three (2)
45. At approximately, in terms of a date (5)
47. Usually, as an occurrence (5)
48. The weasel goes like this (3)
50. You should get this from the across clues tbh. (3)
51. See above (3)
52. See above (3)
53. See above (3)
55. Plus, as a verb (3)
59. Many die here, but you should still go if you're hurt; abbr. (2)
60. "So cute!" (2)

Good luck with this one, folks. It's on the next page.

GOD ⚡ PEED



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math NEWS

# lookahead

SUN NOV 21

World Television Day (go watch some Netflix to celebrate)

MON NOV 22

Drop with WD period ends

TUE NOV 23

Drop with WF period begins  
Add/drop period begins  
SASMS Day 1

WED NOV 24

THU NOV 25

SASMS Day 2

FRI NOV 26

SAT NOV 27

Anders Celsius (yes, that Celsius) is born

SUN NOV 28

mathNEWS 147.6 production night

MON NOV 29

G. H. Hardy dies, seventy-four years ago

TUE NOV 30

WED DEC 1

THU DEC 2

FRI DEC 3

SAT DEC 4

mathNEWS 147.6 released. See you in Winter 2022!

## AN ADVERTISEMENT FOR SASMS

After a thousand billion years, Short Attention Span Math Seminars rises from its slumber to give you eight (8) 30-minute math talks from math undergrads. Better yet, it's in-person. Yes, you heard that right. In-person. Real-life. Corporeal. Etc.

It's so good, we couldn't fit it all in one day. It's happening on **November 24<sup>th</sup> and 25<sup>th</sup>** from **7:00pm-9:30pm**, in **MC 4021**. Come on by and learn a thing or two (or eight) about some cool math!

Evan Girardin  
Secretary  
The Pure Math, Applied Math,  
Combinatorics & Optimization Club

## LAST ISSUE'S gridSOLUTION

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

