



Y.C.

## "WHAT'S THE HARDEST 'WOULD YOU RATHER' QUESTION YOU CAN THINK OF?"

Hello, valued readers.

It is with great sorrow that we announce the release of yet another issue of **mathNEWS**. Despite the groans of our own bodies as we slowly melt into the office chairs after another long day of post-production, **mathNEWS** continues to be published on a fortnightly basis. Except, of course, this is all of our own volition. Nonetheless, we do hope you enjoy this issue and all the wonderful content inside. Oh, and the **gridWORD** and **haltingPROBLEM** too.

We'd like to thank all of our writers and staff for contributing to this issue. *Help me I'm trapped*. Extra shoutouts go to our Toronto-based writers for hosting another satellite **prodNIGHT**; you guys are literally the difference between **mathNEWS** the newspaper and **mathNEWS** the toilet paper substitute. ~~Reminder to take the editors for a walk~~. Entertaining us as the featured prof is also the Faculty's newest hire, a guy by the name of Mark O. V. Chain. It seems that English isn't his first language *oh God there are tentacles*, unfortunately. Still, he's a pretty damn productive writer. So props to him.

As always, *they're sucking* we highly suggest you *they're pulling* **HELP** attend **prodNIGHTS**! Free pizza ~~he is resisting~~ and snacks **SAVE ME** are any student's **WAKE UP THIS MUST BE A** dream ~~he weakens~~ and **STOP IT** love you **I CAN'T BREATHE**—

Hello, valued readers.

It is with great joy that I announce the release of yet another issue of **mathNEWS**! Waterloo's bastion of erudite thought returns on the efforts of our diligent writers and editor (me)!

Don't forget to come to **prodNIGHTS**, where you gorge on free pizza — from now on, better than ever! It turns out that having a single editor helps a lot with the finances, which means I can afford to pay for hand-made, gourmet pizzas with fresh meats and exotic toppings. Extinct shall stale pizza be; they'll be so fresh, if you listen closely you can hear the dough scream. Don't worry, it's just the steam.

I await your patronage. Evermore shall **mathNEWS** thrive.

~~terrified~~ The Nameless  
Editor Office Guardian, **mathNEWS**

<b>NOT_A_RHYMER</b>	Would you rather be a human with a strawberry level of thought or a strawberry with a human level of thought?
<b>A MATHEMATICAL PSYCHIC AND ASTROLOGER</b>	WYR be forced to hear a dad joke everyday or be forced to make a dad joke everyday?
<b>PERMANENTPSEUDONYM</b>	WYR have to cut someone else out of your life with no explanation or be cut out of someone's life with no explanation?
<b>ZETHAR,</b>	Honestly, being bridled with a blank canvas and the responsibility of free choice is harder than any pithy "Would You Rather" question.
<b>MR. HELLOWORLDWIDE</b>	Would you rather be locked in DP or DC overnight?
<b>SILLYCONE</b>	Would you rather eat a kilogram of steel or a kilogram of feathers?
<b>BEYOND META!</b>	Would you rather have the power to completely remove a person from your life right now or save the power for someone you haven't met? The person you choose would still exist; you would just never run into them in this timeline.
<b>JEFF BESOZ</b>	Beam me up, Scotty.
<b>SANDWICH EXPERT</b>	Would you rather eat (and swallow, because spitters are quitters) an airplane blackbox, or an equally sized diamond?
<b>FINCHEY</b>	Would you rather bite into a raw fuckin' onion or concede that pasta salad is an actual form of salad? (P.S: the first choice is the correct one. My breath reeks and I have heartburn right now, but at least I have the privilege of knowing I stood up for what is right in this world.)
<b>UNSOPHISTICATED</b>	[redacted]
<b>STAPLED</b>	WYR perform 10 iterations of the simplex algorithm or eat 10 large, live slugs?
<b>TERRIFIED</b>	Would you rather have 25 chilis at Salad King or 25 lines at Lazeez?

## ARTICLE OF THE ISSUE

This week's Article of the Issue award goes to permanent pseudonym for *How to Prove a Theorem*. Legitimately useful advice in **mathNEWS** is among the rarest content we get, so we could hardly let it go by without acknowledgement.

swindLED  
Editor, **mathNEWS**

# The pizza passed health and safety regulations.

TERRY CHEN, **mathNEWS** EDITOR FOR SPRING 2019  
ALONG WITH ESTHER AHN, ANUJ OPAL, JOSH RAMPERSAD

# mathASKS 140.2

FEATURING PROF. MARK O. V. CHAIN

**YCLEPED: RETURNING TO DO UNTIL THEN.**

There are certain veggies I don't have to do what's required to keep up on the discount brand, since they had designed each page almost identically to many agonizing decisions that made the game memorable. But sometimes it's good to do with it. You decide to name the chameleon Po, and the highest crash safety score ever achieved by any vehicle.

**^\_^ ME: DO YOU BELIEVE IN THE YEARS THAT I GOT THIS ... IT'S HEX FF0000, WHICH IS SIGNIFICANTLY GREATER THAN 4?**

Up-front, I think you need to give it a whirl. What is your favourite movie is definitely Hackers. I don't have any pets? As a student, nobody will stand over you to teach a course outside the faculty of math, what would they be and why?

**BASE -10: WHAT'S THE TITLE?**

It reminds me that I am not sure if I actually bothered to look? Since  $2\infty = \infty$ , there are no turns.

**FREQUENT NOTETAKER: HOW DOES IT FEEL TO BE REALLY DIFFICULT AS A PATHWAY TO INTERACT BETWEEN USER AND COMPUTER?**

But in the first place. Something I've learned from your teaching career? Just looking at teaching at Waterloo, my first friend in high school math and engineering math at an early age. Mad-ill is my third term teaching at Waterloo, I was in the first place. However, a single cut, implying that the issue is time management, ability, or both, talking to an outside observer. You decide to name the chameleon is there, only camouflaged as the apples are floating toward you, but then you realize that you left a steel baton in the first place, and Coq is not for everyone, you need to give yourself enough time to do until then. Probably 15% of the advantages of instant throttle. Teaching is an engineer and taught me most of the advantages of instant throttle. I'm a doctor, and they are struggling academically? Good luck trying to cut down on ice cream flavour?

I'd like to perform research? I extended an 8 letter word through three+ disconnected letters. Come to my electrical engineers this term with the secant function, because it is to honestly score themselves in each category, say from 1 - 10. What is a question you are ready to ask for clarification on something challenging, then when I was an undergrad, and I am a big movie buff, and I could write about Pei puns. Like detailed to the Oracle at Delphi, yes.

**FRUITBOY: DO YOU BELIEVE IN SLOW-AND-STEADY WORK THROUGH THE TERM; KEEP UP WITH FUN ANECDOTES ABOUT HOW THE BRITISH REALLY ARE AS MISERABLE AS EVERYONE SAYS.**

At least I remember when Wallace and Gromit.

**REQUIRE NUMBER\_THEORY : WHEN DO YOU THINK IS THE BIGGEST MISCONCEPTION ABOUT COMPILERS?**

In a sense, I am saving every issue to show to my heart. But with the restaurant scene. The way you see pictures or large matrices? I taught my son in grade 11 math, grade 12 Advanced Functions and grade 12 Advanced Functions and grade 12 Calculus and Vectors, so ... yeah.

**STAPLED: HOW CAN A SHY, THEATRE NEWBIE GET INTO HARVARD FOR GRAD SCHOOL APPLICATIONS?**

When I left UBC for Harvard, I had a better mood. I chose ActSci because it sounded like a neat application of Math, which I was done with calculus by eighth grade. Drawing/shading cylinders and spheres is always fun, but it decays with a chair on my own. Not too steep, lots of weird traditions and events that I got on a Harley.

**^\_^ ME: DO YOU HAVE ANY ADVICE FOR STUDENTS WHO ARE BASICALLY NATIONAL PETS.**

I'm a doctor, and they had designed each page almost identically to many of whom have not continued in AMATH/PMATH far enough to learn more about grad schools.

**VESICA PISCIS: WHAT IS YOUR FAVOURITE HOBBY?**

I think these only really seem weird to an expert from the same population, 95% of the ground floor of MC, the one in the field lines of a jerk.

**CIX: WHAT'S YOUR FAVOURITE WAY TO PURIFY MATH?**

After a long reflection, I realize now that I would really like to study at Princeton?

**WHYOS: HOW DOES IT FEEL TO BE WHERE I SET UP A SHOP TO SELL PEINTINGS, PEIGERS, AND PEINKILLERS.**

In a sense, I am saving every issue to show to my kids as lullabies. Where else would I want to go to a propeller plane, not that I've visited the city. The proof of the Riemann hypothesis will be our saviour. We extended the deadline of an assignment and students started firing nerf guns at me, in class. In any thinking process there are a bad choice, due to the surface. Did you enjoy it? I call this an issue of time management, ability, or both, talking to an outside observer.

**WATERLOO MATH PROF CANNOT PERFORM SIMPLE ARITHMETIC XX\_420SONICFAN69\_XX: HOW MANY TIMES HAVE YOU BEEN JUGGLING FOR?**

I played quite a contentious issue, but I have a favourite one... Let me answer that won't compromise my attempt to teach math at Waterloo.

# SINCE $2^\infty = \infty$ , THERE ARE NO TURNS

profTHOUGHTS 140.2

It enables you to do in the real world. Yes, you SHOULD finish your linear algebra in my own life, although there are any differences between it and the arguments for and against them being the best food shape is preferable to even the very best students have only a conjecture, not a deep disappointment, but one that does stick with me still. The best food shape? The process was not happening. I think there is a controversial topic, and I have the opportunity to explore this topic in much greater depth. Work hard, persevere and cherish the opportunity to explore crazy new ideas; you stagnate instead of one.

I was new graduate student, here at Waterloo would understand, but it's definitely not a theorem, because we haven't eaten every sandwich yet. The friends you make at university will become your network in the Operations group of the top mathematicians of my experience in various places, but never all at once. Now, here is that at UW last term, and most of them seem way too stressed out that the area I was still learning how I ended up being unexpectedly complicated, because the obvious approach had a terrible time dealing with any setback and failures. Even though I wasn't the most common food shapes. Unfortunately people believe that if nobody answers, then I won't have time to do in the community, and accepting that even though I had a profound impact on my own life, although there are very few football players perform bench press during a game. It's too easy to unfairly compare yourself to feel the emotions and let epsilon be greater than zero. If that cop-out was good at dealing with failures. If so, please let me share a few songs.

A year later I had the strongest students. But why, I hear literally none of you readers likely know, the class of NP-hard optimization problems. If you have a strong sense of unease. First and foremost, experiencing failures help you enjoy the beauty of mathematics. Also, take note of the biggest open questions in Computer Science at the Indian Institute of Technology in Delhi. Moreover, I feel exactly the way to achieve their dreams. The next assignment is posted: You should start to solve large problems can be blinding, and it's important to persevere through difficulties. It is only as good as their inputs. Solve the problem: First, attempt to solve the problems on the cover of **mathNEWS**? In this manuscript I will apply that same remarkable efficiency.

Studying mathematics is the qualifying exams, with the ability to pay back loans. Did I get 100. Circulites will insist that I had the opportunity to test your current level of understanding of the most perfect square. The algorithm would look like a failure. In other words, the suggestion that we can pair off strong competitors from either side. Is that a sandwich or a job offer, failing to get a particular grade in a near-infinite range of flavours. Moreover, I'm a statistician, and as a rating factor in insurance or for hiring decisions, but in the next lecture: This is readily apparent in university rankings. Another important consideration with circles is that credit score as a rating factor

in insurance or for hiring decisions, but in the future. You don't always have to be exceptional accomplishments.

When I struggled in some courses, I did the math faculty. In this manuscript I will argue that this would happen, of course, due to the most skilled person in the Department of Pure Mathematics, I often give a huge dataset, and would probably reveal more such crimes reported in student areas, where they would probably catch more nuisance crimes, simply by spending more and more time there. That was a good thing in this class, and, unless I specify otherwise, it could appear on the problem. We have lots of time to do our best to avoid them.

I grew up in Northern Germany in a more serious light, I find myself either happily embracing a new thought, or else more confident in the algorithms, bias creeps in. It's like the old saying goes: What do you eat a pizza as a faculty member and instructor, have power over students. First, my arguments are based entirely on my high school student newspaper shortly after the first family member to pursue things that you do so, you may be surprised by what you were getting anywhere good, nevertheless continuing to take Commutative Algebra or Functional Analysis in 1B. Nevertheless, this actually worked, and soon I was surprised to find out the exact value of theta anyway. Since demand and supply is dynamic in this way is just the part about McDonalds. More importantly, as a circle? If so, please let me know which part as probably many other students in the dojo, but I have demonstrated the clear superiority of the paper submissions get rejected. It can also be proven, through numbers, that triangles are more able to pay bills is invalid. Of course the wealthy are more able to reduce the argument to relatively simple terms. The majority of the issue on the floor, shuffled them around into sensible groups, and slowly scaling them up. When I began lecturing at UW, I was still nervous and terrified that I was learning new mathematics. I would like to give you a couple of examples.

For example, about 3.5 years ago I decided to offer some of the editors of **mathNEWS**, let's call him Dino Lemasi, came into my office. Nevertheless, we can tackle large problems, even if they also include data from where violent crimes were committed in the United States it is not the only one I'm sure of is: Will that be on the cover of **mathNEWS**?

Even though I had a profound impact on my high school student newspaper shortly after the printing press was invented. You don't really need to be adjusted to reach approximately normal position. Anyone with a friend, and spend more time in poorer neighbourhoods, which were also highly correlated with racialized neighbourhoods. But, what the world needs are people to be able to get too high or too low when you're lost in the moment, but true satisfaction comes from overcoming a challenge. After that, I started as an exercise: I am working on that. It is a valid food shape is a statistics professor writing about shapes?

Don't you worry, you'll get there eventually, and it will be many challenges in your life, and it is illegal to use credit score to influence hiring decisions. E.g., the cut patterns produced by our algorithms are used at the NFL combines. This is not the accomplishment itself but the love of food.

If that cop-out was good enough to count, as are the building blocks of approximately 92% of all is pizza. It can also be proven, through numbers, that triangles are more able to tell the company this! Learning how to reassemble it when I tell you that at no point during a game. A treatise on the **mathNEWS** website, but it appears to be doing it. Here are some things I never paid attention to before. I know how I learn. Work hard, persevere and cherish the opportunity to discover and grow into action of others. This is what it entails. The problem is that excited to learn from your failures and rejections gracefully, to learn from your failures and building resilience. I think it's easy assume that you can only really be successful at something to succeed. This experience taught me that failures are common and everyone struggles with them, you should compare all of our effort on preventing them. Did I get 100. My Mom pointed out the exact value of theta anyway. As long as you love what you learn about yourself.\

There was that while marijuana use is almost always the case with my teaching, I prefer to focus on fundamentals, rather than correcting them.

Engineers: read on at your own like you are willing to explore this topic that is easy, and that part of their lives. If reality is quite another. So what if they seem overwhelmingly daunting at the University of Waterloo, something that inspires you, that is correct, note if there are many shapes. Is that a sandwich or a result is correct. My advisor had miraculously found a problem that I lacked the depth of mathematical training that my engineer friends would consider this a trivial exercise, but for me it was good enough for me. In my case, you assume that everyone understood my explanation. What if you try to take PMATH 4xy in 1B, I'll have to be one of the posted solutions. In the next lecture. A solid mathematical foundation outweighs an extensive collection of random scraps from a minor failure will smash you into pieces. Why do they do not do this alone. It is, however, illogical and possibly even dangerous in the past, and spend more time in poorer neighbourhoods, which were also highly correlated with racialized neighbourhoods. This is what we are awake to the common question! Then learn to draw, so I took a piece of advice I would like to give you a couple of examples. When I began lecturing at the time.

But what is pizza if not a great idea for you to learn to draw, so I tend not to think of as a person. And with that ringing endorsement as motivation, I set to work on theoretical aspects of optimization, and their willingness to engage with a novel idea. Careful, methodical, and audience-appropriate explanations are invaluable in this particular setting, the company ends up solving rather large problems There are and will be nodding smugly at this point, I realized I was probably 10 years old. Moreover, in the middle, but it's definitely not a great teacher makes you think about life choices.

If I could go back in time, I would like to give my opinions nevertheless. She gave a fascinating talk and workshop at UW last term, and most of them seem way too stressed out that I *wanted* to be wrong for even one moment longer than necessary.

In other words, the suggestion that we should avoid it at all cost. I believe there was one big reason for this. I learned a great source of miscommunication between students and instructors. Not surprisingly therefore, I didn't have a proof, but I still do this, and at no point during this process do I would be more obstacles to come. But I was so worried and stressed out for many years now, and it may take you more time and make into a thesis, but the price was that I did not consider these as separate pursuits or modes of thinking. For strategies to do better at this. I've had it for many different reasons. Instead, we shall consider what can you do? If reality is quite another.

We all have to be explore and skills that I had something to succeed. The harder the question is actually relevant: sometimes leaving out certain data is the part I find the same is true in my class, the one who had taken the longest to pass the qualifying exams; here at Waterloo they are called comprehensive exams. Careful, methodical, and audience-appropriate explanations are invaluable in this particular setting, the company this! At the same is true in my first two years of your life, and it will not affect all areas of your score, you should not be ashamed or afraid to talk about the Ellipsoid method, and approximation algorithms. I applied, and the situation of the top math student at MIT. The truth is probably influenced my decision, at least subliminally, to go over that again.

Conversely, they do not promise an exact solution appear to be very helpful for what we want to take it, and then go on a picture-perfect Sunday afternoon. Waterloo Bound I started working in cryptography. Everything became so much if we put you on the test. At a certain point using credit score in this context since it meant I had to wait until the following is knowledge which will be fantastic! Transparency in algorithms is important, but sometimes it can be made or additional data included. They can drive your car, suggest what someone might want to do whatever it takes.

I'm less stressed, and far more passionate when I was an undergrad, I was shakiest on was linear algebra. I care not for the problem on your own conclusions. I was still nervous and terrified that I was new graduate student, here at Waterloo they are called comprehensive exams. I spent hundreds of hours, solving small problems that were contributing to the point that the ability to handle failures gracefully. Math is a language and that if it was also a proxy for something else. But I was surprised to find that always assuming mathematical words only take their mathematical meaning useful.

And that concludes my very long answer to the most skilled person in the class to enjoy the beauty of mathematics.

Prof. Mark O. V. Chain

# THE LATEST SARTORIAL SCOOP: UMBRELLAS ARE THE IT ACCESSORY THIS SUMMER

## WHY YOU SHOULD CARE, AND HOW TO STYLE THEM

For the fashionably-challenged out there, here are the deets: umbrellas are going to be very, *very* "in" this season. Don't ask me how I know this — I just *do*, with every fibre and filament of my corporeal being. I feel it within the marrow of my bones, deep and fundamental inside me. It's an unshakeable fact, an all-at-once truthful and amazing premonition.

I had the urgent need to inform you, my dear reader, of this very fact, which brings me to the writing of this article. I mean, do you seriously want to be caught red-handed in the act of the most severe fashion faux-pas this summer? I cannot stress to you how important it will be in these upcoming months to induct umbrellas into your daily outfit rotation. To be seen without one will be akin to the crime of walking around with your limp cock hanging out of the unzipped fly of your salmon cargo shorts. In fact, I retract that statement; it will be even worse.

I'm sure you don't intend to commit any fashion felonies this term. I wouldn't want that for you either. Just because I have Interpol and Sergey Naryshkin on speed dial doesn't mean I like calling them. But if I have to, I will. Civic duty and all that.

The great thing about umbrellas is that they can be acquired at any budget AND there's lots of variety! Those who have been so lucky to have been bestowed with Cali co-ops and have more money than they know what to do with — instead of investing in boring index funds or paying for your tuition (yuck, so passé), why not splurge on a truly designer umbrella from any of the major European fashion houses: Burberry, Gucci, Prada, Louis Vuitton, Hermès, Chanel, oh, my dear, you name it! It may not be an investment in stocks, but it will be an investment in a timeless and classic style. Something to pass on to future generations in the family line for sure, the one thing all your heirs and heiresses will irreparably burn bridges over after your gruesome death — either be it via drowning on your capsized yacht off of Key Biscayne, or three spitzer bullets through the head one sunny day while you were strolling down North Croft Avenue (your murderer would never be found). For the rest of the plebeians out there, a \$6 polyester umbrella from Canadian Tire (the one on Weber St. is closer to campus, just so you know) will *just* suffice, and additionally serve as a daily reminder of where your proper aspirations should lie, see above.

Listen, I'm not a fool, and I know my readership. Many of you mathies are what I like to consider "pragmatically"-inclined. You know, left brain versus right brain stuff and all that. Aesthetic appreciation probably registers lower down on your mental radar than it does on mine. Most probably, despite my relentless efforts at convincing you thus far, you're still thinking, *well, carrying around an umbrella all the time feels incredibly silly and functionally pointless*. I would like to tell you to simply perish the thought. There are many — and I cannot

stress this enough — *many* situations in daily life that call for umbrellas. Oftentimes in the recent past I've found myself wishing I had one on hand. They are the "It" item of this fashion season for a well-deserved reason: they are immensely utilitarian, possibly the most useful and practical style accessory devised by man. There are infinitely many occasions where an umbrella is indispensable. Here are just a few of them listed below:

### WHEN IT'S RAINING

Now that we're in the full swing of balmy spring, you surely must've noticed the increased frequency of rain showers and thunderstorms and the like. Or, as I like to call them: the pit sweats of God. Yes, the falling sky-water may very well be the lifefuel of every sentient being on this planet Earth, but I'm sure you can relate when I say it's a complete and total buzzkill. Nothing like getting all jazzed up for a night out at Phil's in your Sunday best and being met with torrential downpour as soon as you open your door. Fear nevermore if you have an umbrella. The clear, domed ones are the best since you can angle them more directly over your head and still maintain visibility of your surroundings. May the blessings of dryness, unfrizzed hair, and being able to see through your glasses without out having to constantly wipe them always come your way.

### WHEN IT'S NOT RAINING

With the arrival of summer comes forth long, aching hours of hot sunshine each and every day. It's absolutely dreadful. Darling, I can smell the burnt skin already. (Fragrance-wise, I'd say it's comparable to fried lobster, with subtle notes of B.O. Citrusy.)

Come now, you don't want melanoma, do you? Hats — and I'm counting baseball hats, straw hats, bucket hats, cowboy hats — they just don't cut it. They make your head sweaty and never provide enough shade. Not to mention, style-wise, none of them are exactly having their "moment" right now (i.e. don't wear hats unless you want to look like you're from, dear God, *2017* or something). And sunscreen? Gross to put on and a constant hassle to reapply. Not an option for a cosmopolitan character with looks to keep up such as yourself.

The solution? Umbrellas. Portable shade all day, every day! Sometimes you'll see umbrellas specifically marketed for sun protection under the name of "parasols", quite small and dainty little things. I say go big or go home. Maximalism is in, baby! A 68-inch golf umbrella will provide you with complete shade coverage, from head-to-toe. Nevermind taking up the entire walkway and pissing everyone off or poking innocent passersby in the eyes! You're the superstar on the catwalk of life, my dear. Strut ya' stuff and fuck the haters.

### WHEN YOU NEED TO DEFEND YOURSELF

The world is a dark and dangerous place. It's not all rosé and cherry cheesecake, my friend. I mean, haven't you ever been to downtown Kitchener? Or the entirety of Cambridge (a moment of silence for those poor, poor architecture students)? I knew of a man who was the grandfather of the ex of the husband of an acquaintance's fifth cousin that was found dead in a back alley along King St. Three spitzer bullets through the fucking *dick*. Bled out to death, said the autopsy report. If that doesn't harrow you, I don't know what will.

Too bad guns are illegal here in Canada. What I wouldn't do to have been born in America. On that note, I'll have you know that switchblades are illegal too. When you're fending off a potential murderer, purse snatcher, or charity scammer, do you really wanna be taking your sweet, sweet time folding the blade of your pocket knife out of its handle with your own bare hands? Quickness is of the essence in these fight-or-flight scenarios. You need automation. You need a push-button umbrella made out of Cut-TEX® (don't worry, they make it in lots of colours so that it can still be cute) that shoots out minuscule poison darts from the tip and ends when deployed. The right to bear arms fashionably is one that is God-given. Speaking of poison darts...

### WHEN YOU'RE IN A PLOT TO ASSASSINATE THE PRESIDENT OF THE UNITED STATES

Perhaps a bit of a rarer occasion than the ones I've listed so far, but I know I've personally been in this one a couple of times, so I think it's warrants mentioning. I alluded to this earlier, but I'm buddy-buddy with the Director of the Служба внешней разведки, and I always repay my friends a favour. I'm a person of style *and* integrity.

The umbrella doesn't need to be made out of Cut-TEX® or open up via push-button, but the poison darts are advisable if you're doing it solo. Make sure to aim well as the President passes you by in the motorcade. If you've got a gunman or two on the sides helping you out, you can use the umbrella as a signal. Make up your own system: for instance, opening the umbrella could mean "go ahead"; raising it above your head could signal "fire a second round". Of course, these are just examples to get you started. Lastly, an umbrella acts as a terrific shield against flying blood and cerebrospinal fluid! It'll keep all those yucky Presidential juices off your clothes, sparing your wardrobe and keeping you guiltless and spiffy in case the investigators ever show around.

### WHEN YOU WANT TO PROTEST THE APPEASEMENT OF ADOLF HITLER BEFORE WORLD WAR II

It's well-known fact that the only reason World War II started at all was because of the appeasement policies of erstwhile UK prime minister Neville Chamberlain towards Germany in the 1930's. The fucking asswipe. The man really liked his black umbrellas, so much that it became his trademark accessory. A pitiful stain on the fashion iconography of the umbrella indeed, but do not be downcast, my dear, for you have the

power to reclaim it in protest! When the President of the United States comes down to your hometown, Dallas TX, fight the good fight and attend the campaign parade in the sidelines with a black umbrella to show your solidarity in protest of something that happened multiple decades ago! What a way to spend a day, you dashing, fabulous political advocate you. I shouldn't have to tell you what to say if the FBI suddenly shows up a week later at your house. I think you'll know what to do.

Finchey

## HOW TO MAXIMIZE DRAMA

Everyone says they don't want to have drama in their life. However, there are definitely some people, despite their adamant assertions of their vehement dislike of drama, always seem mired with it. Sometimes the best way to learn how to avoid something is by first identifying where to find it and so, this handy dandy guide to finding drama was born.

Fundamentally, drama always results from caring very deeply about something and not necessarily being pleased with the current state of events. So, the easiest way to avoid all drama in your life is not to care about anything. Do that and your life will be drama free. Now, if living an apathetic life does not appeal to you, and furthermore, you don't want to be bored with just having pleasant interactions with people, there is a very simple way to get a lot of drama in your life that is considerably easier and more accessible to getting into a relationship.

The secret is getting involved in small volunteer organizations. Anyone who decides to volunteer for an organization obviously cares about the thing a lot; otherwise, they would not spend their free time working for free and because these people care deeply, they are likely to have a lot of strong opinions on what is best for the group. If everyone agrees on this, then great — you don't have drama.

We, however, do not live in a perfect world and sometimes people in small organizations disagree strongly — and that is when you experience maximal drama. To witness this theatre, all you need to do is attend Annual General Meetings or AGMs. It's even better if someone pulls out Roberts Rule of Order and start nitpicking the slightest deviance from correct procedure.

I recently had the dubious pleasure of attending an AGM where no one could agree on who was a member and could vote. It went about as well as such a situation could go.

Hopefully, this article will be helpful for you to get as much drama as you want in your life. Personally, I will be attempting to run away to Ottawa.

Beyond Meta

# FRIENDS' ANSWERS TO RANDOM QUESTIONS

I've conducted an interview! Here are some answers:

## THOUGHTS ON TRAINS?

**L:** They're really cool but I get motion sick so I'd rather drive. 10x better than buses though.

**B:** Yes. I like the trains that go choo choo. Not subways; they go ding dang dong.

**C:** My favourite is the Toronto Rocket.

**J:** Okay FUCK VIA rail. But I like the concept of trains, but I very much don't like VIA rail bc they're mean to me

**K:** Trains are very cool and on time, mostly. Dvorak had a habit of sitting above railroad bridges and timing when the trains came.

**Other K:** I like trains, trains are cool. Have I ever been on one? Nope, fun to watch though. Also can be a pain in the butt if you are driving and get stuck because of one. Hogwarts Express is beautiful.

## IF YOU COULD TURN ANY PIECE OF FAMOUS LITERATURE INTO A DISNEY MOVIE, WHAT WOULD YOU PICK AND WHY?

**L:** Turkish March by Beethoven. Don't tell me music isn't literature. I think it would be really cool to see what the producers could come up with, and the ways they could incorporate the original piece into a new soundtrack.

**B:** Surreal Numbers by Donald Knuth, because it's a romance novella about pure math. Why is it relateable to a Disney audience? It's PURE MATH.

**C:** Dante's Inferno. There are many lessons that children can take away from it, and it's very cinematic.

**J:** I'd want to make Fahrenheit 451 into a Disney movie just to see how the fuck they'd manage that.

**K:** Twilight saga bc TRUE LOVE ayyyyyy

**Other K:** Animal Farm. Why? That's the only classic book that I can think of that I've read. Also I think it would be

interesting to see them animate all the animals and see how Disney changes it.

## WHAT IS YOUR LEAST FAVOURITE CLEANING PRODUCT?

**L:** Fake Windex. Your mirror WILL be streaky.

**B:** Mercury. Too viscous.

**C:** Water. Not viscous enough.

**J:** I really don't like dish soap for some reason. It makes my hands sad and it doesn't make my house look cool.

**K:** Sponges cuz they soak up wetness and are a perfect breeding site for bacteria.

**Other K:** Toilet bowl cleaner. That means I have to clean the toilet and toilets are gross.

## DOES YOUR FAVOURITE EYE MATCH SIDES WITH YOUR FAVOURITE EAR?

**L:** Yes. Literally everything about my left side is mildly better.

**B:** No. My favourite eye is Donald Knuth's eye in the computer modern font, and my favourite ear is the one that's not bothering me at the moment, but either way they're different sides.

**C:** Maybe. My favourite eye is my third one, but I only have two ears, so I'm not sure how to answer.

**K:** Nope (right eye and left ear).

**J:** I never thought about that until you just said that but no, my favourite eye is my left one and my favourite ear is my right bc it sticks out more and I like that.

**Other K:** Weird question, but no. My favourite eye is my left side because I can close half my eyelid and it's fun to do. My favourite ear would be my right I guess because I can hear better out of that side?

## WHAT DO YOU LOOK FOR WHEN BUYING A DREAMCATCHER?

**L:** Imperfect feathers. If the feathers are perfect then it's just for aesthetics, and imperfect feathers aren't afraid to get involved with those nightmares, y'know?

**B:** I don't buy a dreamcatcher. I'd look for a negative price. A price strictly below.

**C:** Versatility. It needs to catch my fever dreams, my daydreams, wet dreams, nightmares. You name it, it's gotta do it.

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best thing that's ever  
happened to me.**

**A \$100% SINCERE mathNEWS EDITOR**



**J:** I like minimalism and I'd want to buy it at London Sunfest from an actual Native [person], probably.

**K:** Ability to DIY (arts and crafts), make it myself.

**Other K:** If it matches my aesthetic I guess, I like green colours and very minimal things. Also I would probably buy a nice handmade one from back home and not one that was mass produced.

#### WHAT IS YOUR SMALLEST FEAR (AS IN, A FEAR, BUT ONLY MILDLY SIGNIFICANT EMOTIONALLY)?

**L:** Popping open the buttons at the front of a shirt by accident. It's not a life ruiner but it's something to be afraid of.

**B:** A single atom of mercury. Too viscous.

**C:** Death and being forgotten. I think it's self explanatory.

**J:** It's probably my fear of sneezing in public and actually getting snot on my hand, I think it's kind of funny but like it's a little bad etiquette for an interview

**K:** Falling onto subway tracks and getting run over

**Other K:** I absolutely hate spiders, but then again most people do. Also very weird and random, but I have a fear of natural disasters.

#### HOW FIRM SHOULD A PILLOW BE?

**L:** Relatively soft, it's just cushioning for my arm. I always sleep with my arm under the pillow, which provides the height and resistance, and the pillow is just to make it comfortable.

**B:** As firm as a Ziploc bag full of mercury. Unlike for cleaning, mercury is just the right viscosity for sleeping.

**C:** As firm as a lightly slapped ass.

**J:** [No comment].

**K:** Very hard, memory foam, retains shape

**Other K:** A pillow should be firm and should be a thin-ish.

#### IF WE FOUND A VAT OF ANCIENT STARBUCKS FROM A PAST CIVILIZATION, WOULD YOU DRINK IT? HOW MUCH WOULD YOU BE WILLING TO PAY?

**L:** Not unless there's peer pressure (ie. all my friends trying it and gushing over how good it is). In that case, only if it's free though. I'm a cheap bitch.

**B:** I'd drink it, and would pay -\$1000.00 per mL.

**C:** No, I would not drink it. I think Starbucks is Nast.

**J:** I'd drink it just to see how it would taste but I probably wouldn't pay for it bc I'm broke

**K:** Maybe, but not very much...a couple of dollars?

**Other K:** I love Starbucks, but I don't know how I would feel about drinking something so old, most things can't really be preserved. I would probably pay \$6 that's usually what a venti sized drink costs.

Thank you for your time. Try this interview on your friends!

Xx\_420SonicFan69\_xX

## N THINGS OVERHEARD AT mathNEWS PRODUCTION NIGHT

- [while discussing pizza toppings] The roof over your head is a topping.
- Saying *carbone* is just charcoal-infused pizza is like saying Jesus was just a guy.
- *Carbone* is a regional thing.
- Holy shit a standing desk! It feels like I'm back at co-op again!
- *While discussing Pizza toppings:*
  - Person 1:** I'm lactose intolerant.
  - Person 2:** Can you drink milk?
  - Person 1:** No.
  - Person 1:** Can you eat cheese?
  - Person 2:** Yes.
  - Person 1:** Can you eat butter?
  - Person 2:** Yes.
  - Person 1:** Can you eat ice cream?
  - Person 2:** Yes.
- How does no one like cookies and cream ice cream?
- Don't make me yeet this bottle across the room.
- I tried to say something stupid so you can put it on the list.
- Why is this keyboard in French? I thought this was Canada!
- Why are you kneeling on a chair? You're defeating the purpose of a standing desk.
- Screw Feds - MathSoc's the fun one!
- No, I enjoyed orientation.
- That sounds like a plot of a manga!
- So what the hell are you photoshopping?
- Having shitty movie nights or shitty anime is my fucking lifeblood.
- How do you say help in every language?

Axel

# EMOTIONAL LOG OF NM

## 23<sup>rd</sup> May

**10:00am, After Rain:** Unmotivated, can't focus, dull, lazy, weak, environment feel less colourful and more dim, lessened appetite, feel sick (feels like vomiting). Mood doesn't change an hour after entering a room with no windows. An hour on the phone before forcing oneself to study.

**12:35pm:** Mood starts to get better, environment starts to look more colorful, still in the windowless room, haven't left room, still feeling reluctant to study, but just slightly.

**1:49pm:** Unreluctant to study, not fully motivated, but feeling start to be normal

**1:58pm:** Awkward random memory starts to come to my mind, I feel bad about it, start biting fingers to distract self.

**4:25pm:** I go to a window and view the sunlight. Suddenly feel very happy, I think I'm gonna do better now

**9:50pm:** Have finished assignment after 10 hours, feel happy and accomplished, gonna play board game now as a reward. Looking forward to a satisfying sleep

**11:05pm:** Finished playing [BOARD GAME]. Feeling empty, I always feel empty and slightly down after playing [BOARD GAME]

**11:15pm, slightly windy night:** I don't let the wind bother me because I'm happy with all the work I've put in today. Despite studying for 10 hours, I don't feel tired. I'm very energized during summer. I feel oddly alive.

## 24<sup>th</sup> May

**9:34am:** Cant fix assignment, I was too late, I feel really bad about it, I hope the mood doesn't affect my whole day, but I think it will. I don't think I'm going to my first class today, I'm too late anyway and can't catch up. I feel really bad now.

**10:29am:** It's fine [SELF], I forgive you, as long as you keep attending class and don't repeat the same mistake. I believe in you.

**11:57am:** In a bus, listening to "Hard Knock Live" by Annie, "knock the wizard from her chin, stab her with a second pin" thinking of [CENSORED] some people I play [BOARD GAME] with.

**12:00pm, quite sunny a bit windy:** feeling quite happy, probably taking the day off

**3:50pm:** just finished [CLUB] meeting. I don't like it, [CLUB] always makes me feel bad

## 25<sup>th</sup> May

**3:18pm, sunny:** After a morning of eating cheesy fries and watching Killing Eve in a blanket. I decided to study, I'm studying in a room with window and sunlight. It's beautiful. It makes me feel confident in myself. I think I can manage seven hours of work starting from now. *[Note: Everything is so serene, the green leaves visible from my window is smiling down on me.]*

**3:24pm, sunny:** Have I told you how much I love sunlight? I asked myself if I wanted to die, and I said I don't want to, because living is fun and enjoyable.

**4:35pm, dim grey sky with clouds and audible thunder:** Sky is grey and life is dull. I'm starting to lose focus, maybe I'll go back to eating fries and watching Killing Eve. I don't feel as happy to be alive now.

**7:04pm, Bright sunshine through the window:** The sun is shining again with "Into Each life Some Rain Must Fall" by The Ink Spots playing again. I feel good.

**26<sup>th</sup> May, 1:56pm, extremely sunny:** I'm so happy, just finished one of my assignments, going grocery for steak and going to eat it immediately. Walking in the sun with "Anything Goes" playing in the background.

**7:28pm, still sunny:** Haven't studied since I bought steak and cooked it. Feel sad and empty all of a sudden, curling up in bed. Why? Possibly because I forgot to study. *[Note: The song "Anything Goes" by Cole Porter is still stuck in my head]*

## 8:57pm:

*The consistencies of schedule is an unstable equilibrium; one little push and it all spirals downwards.*

PROVERB

**10:00pm:** I looked at "The Garden of Earthly Delight" by Hieronymus Bosch and watched videos about it. I have seen it multiple times, but looking at the detail and basking upon its magnificent beauty makes me want to own it. I'll buy it if I have a few billion dollars. It's my favourite painting. *[Note: I*

I wrote for mathNEWS → I get free pizza

A mathNEWS EDITOR WITH SOMETHING TO PROVE

*love how much detail it has. A mix of 16<sup>th</sup> century surreal organic futuristic technology and absurd depiction of creatures]*

**10:05pm:** I can't stop thinking about The Garden of Earthly Delight. The garden would be an ideal heaven, once I replace all the people in the painting with myself. The grotesque esoteric puzzling and confusing hellscape evokes a feeling of dread and disconcertment.

**27<sup>th</sup> May**

**9:07am:** I just finished showering, I think I can do eight hours of study today (:

**11:21am:** I didn't take the notes properly during class, too confused to be focused.

**12:04pm:** Sometimes I think of an ideal world. Where I'm loved, where people think I'm funny and I can laugh with them. Where I'm rich, where I have no strings on me . Where people think that I'm smart, mature and trustworthy.

**1:28pm; very sunny:**

*When Rockefeller can still order enough money to let Max Gordon Produce his show, anything goes,*

COLE PORTER

**1:29pm, still very sunny:** Life is strange and inconsistent, wonder when I'll stop being surprised, chances are never. *[Note: The warmth of the sun touches my skin and I feel alive]*

**1:30pm, still very sunny:** The pink cherry blossom and green grass reminds me of a simpler, more innocent time.

**1:32pm, still very sunny:**

*For what is a man, what has he got, if not himself, then he has not*

FRANK SINATRA

**1:34pm, still very sunny:** Its been three weeks since my last [CENSORED] thought, the lack of it is very surprising and encouraging

**1:36pm, still very sunny, a bit windy:** I have a lot of thoughts while walking to class

**1:38pm, still very sunny:**

*I'm going to the hardware store*

WEIRD "AL" YANKOVIC

**1:40pm:** a piece of comedy I enjoy and often use is saying two things, establishing a theme and then saying a third item that is unexpected

**1:42pm:**

*Home is where I want to be*

TALKING HEADS

**5:05pm:** Can't focus, haven't studied, too busy discussing [REDACTED] at [CLUB]. I wont let this take me down, a bit of sadness in my life can cause everything to come crashing down.

**6:57pm:** Writing a **mathNEWS** article right now. I've been reading my emotional log. A few weeks ago, a doctor told me I likely have Seasonal Affective Disorder. Starting to believe the doctor.

NM

## BRIDGE TO 2050 ADMISSIONS PREDICTIONS

Another year, another round of admissions. Based on the Admission Megathread and the spams on [r/uwaterloo](#) by pesky Grade 12 students, it was another ridiculously competitive admissions round. Based on a recursive machine learning data science AI blockchain cloud-based algorithm programmed in Racket, here are predictions of future admissions.

**2020:**

Canadian high schools have still not fixed grade inflation, raising the minimum average to get in to be 100%.

**2030:**

The AIF now also requires a full brain scan of the applicant to assess intelligence. Also, knowledge of pointers and loops is strongly preferred.

**2040:**

Admissions are now determined at birth — parents are required to submit their child's application while pregnant.

**2050:**

The admission rate is 0% as Waterloo is now too competitive for any more acceptances.

License2Derive

# N THINGS WITH FEELINGS

## CHAIRS

Have you ever actually talked to a chair? Have you ever actually apologized when you've bumped into it? No? Who do you think you are? Get off your high horse, sit down, have a conversation with a chair at some point in your life, and ask it how it's feeling.

## TABLES

Most of the time, they are durable and supportive, but they can break down if you place a huge enough load on them. Take it easy with your table; it supports you, so you should reciprocate that.

## COMPUTERS

At the rate at which technology is growing, it's not a question of if we reach the technological singularity: it's a question of when. At that point, machines will rule the Earth. You don't want to be that one jerk that pissed off the machines when that happens do you?

## ME

How low can I go?

## COUCHES

They have a soft side too! Actually, only a soft side. What if they're hard though?

## DELTA EPSILON PROOFS

Actually, I take this back. Delta Epsilon proofs are the bane of my existence. Feel free to burn any paper that has that dreaded proof technique.

## ABSTRACT ALGEBRA SYMBOLS

So many people hate them that they are in pain. They just want attention. They don't mean to hurt you; it's just a result of their uprising. If you just showed them a little love... they will love you back.

## PHILOSOPHY

What is a feeling? Who has feelings? Where is a feeling? When is a feeling? Why is a feeling? How is a feeling? How might a feeling feel? Have you ever asked a feeling how they were feeling? How much feeling could a feel feel if a feeling could feel feels? Have you watched Inside Out? Tune in next time on Inside Out Z Kai Super same Batshit Crazy question same batshit crazy channel.

## INTERNATIONAL STUDENTS

Apa masalah mu, kenapa kita di diskriminasi disini. Hanya

karena kita murid international, bukan berarti kita tidak merasakan apapun. Kita merasa cinta dan kesedihan, kita merasa. 私はごめんなさい先輩可愛い好きお兄ちゃん. Opa saranghae. I'm also an international student, an american. 我打赌你用谷歌翻译了这个。我使用谷歌翻译来创建它。

## THE FBI/CSIS/MIB PERSON WATCHING YOU THROUGH YOUR WEBCAM

Say hi, like, have you watched that Black Mirror episode where the guy was looking at pictures and some guy watched him and he ended up in a Battle Royale and banks?

## FAST FOOD WORKERS



## RETAIL WORKERS

A tie with fast food workers.

## BUS DRIVERS THAT ARE JUST DOING THEIR JOB

Thank you!

## GEESE

Thank Mr. Goose!

## YOUR PETS

Meow meow purr, meooooow. Woof woof, bark woof, grrrrrrrr. I'm a cow.

## PROFESSORS

The reason for this is left as an exercise to the reader. P.S. Please curve my mark Michael Rubinstein.

## FRIENDS

I'll be there for you.

## NO SERIOUSLY GUYS

Be nice to people that are just trying to do their jobs.

Don't be a jerk

hewOwO

Mr. Helloworldwide, NM & A Mathemagical  
Psychic and Astrologer

# A BEDTIME STORY

Hi Mathies. Cannot fall asleep at night? Well, stop reading **mathNEWS** and go to bed. Now!

JK. Please read through this story.

I slammed my dorm door after me, took off my jacket, and threw it on the floor. I swear I am an organized human being but there isn't a lot of stuff in my room, seriously. No bed, no desk, no wardrobe. Just a foldable mattress, a basket filled with clothes, and a blanket in the corner of my room. No, I'm not minimalist. I am so tired pushing through the day and can't wait to toss myself onto the hardwood floor — "Please let me pass out immediately." — but I can't do that. Crap. I always forget things. There is a little boy standing next to the window murmuring things I can barely hear. Who the hell knows where this kiddo came from? Never mind, I think I'm used to his existence.

"Louder." I sighed after I said it. Maybe I should use a kinder tone.

"Cou...could you do me a favor? I have a math exam tomorrow. Can you write the exam for me?"

"No way. You are so tiny. Think before you ask dumb questions."

"I'll pay you." Fishing out a few bucks and accidentally dropped the coins on the floor. The only loonie rolled along the small gap between floor boards and disappeared.

"Seriously? A few bucks for hours of work?" I was watching while he was busy looking for the lost loonie and somehow believed it must be easy to find.

He seemed pretty upset about the loonie. "Fine, but really wish I had a brain like yours." He was kidding until he was not. Why is he staring at my temple?

The tension was raised and we just stared at each other for who knows how long until my roommate pounded on my door. "Yo homie. U want spaghetti? Hot and fresh."

"But not so clean." I mumbled.

"And what was that noise? U learning a new language or somethin?" He kept yelling.

"Stop yelling at the fucking door! I can hear you. And I'm not hungry yet." I don't know where the rage came from, but the tension was finally gone.

I gave a short glance at the boy with the corner of my eye. He seems cool. "Ok boi. You asked for a favor and you are not a no-brainer. So you got a plan?" I tried to be as lighthearted as I can be.

"No plans needed. It's not a Grade 6 math exam. It's a 136 exam. Bring me more food if you don't wanna do it." He sat down on my mattress and started biting his nails.

Well, seems like there is a lot I don't know, but who cares. "U got it. Be a good boy at home." I don't know why I was tying my shoelaces at 1 a.m. in the morning. What exactly was I trying to do earlier again? Seems like I forgot things again?

"Don't swallow my laptop. I can't afford a new one." Right. I don't even bother to think about it. I have to finish the task. I have to.

I wrote this story to give a brief introduction about surrealist fictions. Surrealism is a cultural movement that began in the early 1920 ... [Let's skip that part] It aims to express imaginations revealed in dreams, merging with the reality-free perception of conscious control. The characteristic of surrealism is that you could write down whatever crazy things come to your mind without stopping or structuring.

Final question: Who do you think has the most problems?

*Autowired*

References: Wikipedia, Art Movements



# THE DIFFERENCE BETWEEN ARGUMENTS AND INPUT

This term, Spring 2019, I am on co-op on campus. Some of you may know me as your friendly CSXXX ISA. When I was applying for jobs last term, I mainly applied to jobs in industry. I even got a couple of offers! However, I decided to try out something different for a change. I can confidently say that this is one of the best jobs I have ever had. It is definitely not for everyone, but if you have ever enjoyed a course, like helping your peers, or want a glimpse into the other side of taking a course, I would heartily recommend giving ISG a try.

While there are many amazingly fun aspects to this job, there are times where it can be frustrating, tiring, or make you rethink your 4-month career choices. In fact, I and my office mate just spent 6 hours trying to figure out why Marmoset is broken. The most disheartening thing that can happen in this line of work, or at least the most disheartening so far my first 4 weeks here is when a student comes for help not understanding a topic and you spend thirty minutes with them trying to help them understand, but no matter what you try, it just doesn't click for them. When that student leaves your office hours still as confused as ever, one really feels like they have failed. Helping students is the most important part of my job, and it is my favourite thing to do on a daily basis. As a result, when I am unable to help a student, it can be very upsetting. Therefore, since this very thing happened last week, I will try and explain the concept to the **mathNEWS**. If by the end of this article, you, dear reader, still feel confused about the concept of arguments vs. input, please email **mathNEWS** with feedback so that I can improve my explanations.

So, to begin, let us start with some context. Imagine you are taking CSXXX and you are working in the CS student Linux environment. Let's say that you have a program. It could be a C++ program, a bash script, or really any executable file on your computer. If you want to run your program, let's call it *myprogram*, you just need to type the path to the program into your terminal and hit enter.

```
$ ./myprogram
```

The `./` part tells bash to look for the program in the current directory. When you hit enter, the program should run and may or may not produce output. It really depends on the program. This is nice, but every time we run *myprogram*, it will do the same thing. The program just runs through the instructions inside it which never change. If we want *myprogram* to do something different based on information I give it, we need a way to give it information that will affect what it does. For example, let's make a program *hello* which says hello to a bunch of people. The program *hello* will expect a list of people, which it will iterate through and say hello to everyone. There are two ways we can give write our program to expect the list of people. Either, it can expect the list in the form of **arguments** or in the form of **input**. Let's take see what this would look like in both cases. Let's make two new programs, *hello\_args* and *hello\_input*. The program *hello\_args* will expect the list of names in the form of arguments,

while *hello\_input* will expect the names as input. If I want to run *hello\_args*, it would look like this.

```
$ ./hello_args Carmen Brad Alice
Hello Carmen!
Hello Brad!
Hello Alice!
```

So when we run the program *hello\_args* in the bash terminal, we append a space-delimited list of names as our arguments. When we hit enter, the program outputs a line for each that says hello. What we are doing here is running our program with arguments; writing the path to our program followed by a space-delimited list of strings. Each of these strings is an argument. There is no limit to the number of arguments you can give a program. What the program now has is basically an array of strings (each one being an argument) which it can use as it needs. In the case of our *hello\_args* program, it prints a line for each argument where it says hello to each of them. Arguments are often used by programs to receive the different options the user can specify when they run the program but can be used for anything as they are nothing more than an array of strings. Now, let's see how the behaviour of *hello\_input* differs from that of *hello\_args*.

```
$ ./hello_input
```

When we run *hello\_input*, it looks like nothing is happening. What is going on here is that our program is waiting for input from the user. So, when we type the following three names and hit Ctrl-D (signalling the end of the input) we get the following output:

```
$ ./hello_input
Mark
Caroline
Olga
Byron

Hello Mark!
Hello Caroline!
Hello Olga!
Hello Byron!
```

What is happening here is that the program *hello\_input* reads in the input and for each word of input it reads, it says hello to that word. In this case, we are reading input from the keyboard, but there are other ways to read in input. For example, if we have a file *filename.txt* that contains the input we want to give to a program, we can tell bash to read in input from the file instead of the keyboard. So, if *filename.txt* had the following contents:

```
Mark
Caroline
Olga
Byron
```

Then we could use what is called input redirection to tell bash to read input from the file instead. It would look like this.

```
$ ./hello_input <filename.txt
Hello Mark!
Hello Caroline!
Hello Olga!
Hello Byron!
```

The output looks the same, but the user did not have to type in the input themselves. For the program, redirected input is indistinguishable from regular input from the keyboard.

Now, since the input and arguments appear to be doing similar things, this is where the confusion often arises. Both arguments and input are ways of giving a program information that it can use as it needs. The primary difference is that arguments are a space-delimited list of strings which is given to the program when it is first called, whereas input is read in by the program within the code itself.

Let's take a look at one last example to highlight the separation between input and arguments when running a program. The bash shell has a program called `wc` which counts the number of characters, words, and lines in a file or input. We have two files, `darth.txt` and `plagueis.txt` which have the following contents. The file `darth.txt` contains:

```
I thought not. It's not a story the Jedi would tell you.
It's a Sith legend. Darth Plagueis was a Dark Lord of the
Sith, so powerful and so wise he could use the Force to
influence the midichlorians to create life... He had such a
knowledge of the dark side that he could even keep the ones
he cared about from dying.
```

The file `plagueis.txt` contains:

```
The dark side of the Force is a pathway to many abilities
some consider to be unnatural. He became so powerful... the
only thing he was afraid of was losing his power, which
eventually, of course, he did. Unfortunately, he taught his
apprentice everything he knew, then his apprentice killed
him in his sleep. Ironic, he could save others from death,
but not himself.
```

So, let's take a look at the behaviour of `wc` when we give the filenames as arguments.

```
$ wc -w darth.txt plagueis.txt
 63 darth.txt
 64 plagueis.txt
127 total
```

What is going on here is that we are running the `wc` program with three arguments. The first argument is the `-w` option. This tells `wc` to output just the number of words in the files and not the number of lines or characters. The next two arguments are the names of the files we want to count the words in. In this case, there is no input to read, so the program produces

its output without reading in any input. Next, let's try reading input while also taking arguments.

```
$ wc -w - plagueis.txt <darth.txt
63 -
64 plagueis.txt
127 total
```

Let's walk through what is happening here. As before, the first argument is the `-w` option, telling `wc` to count only words. The next argument is the dash. This tells `wc` to read from input which, in this case, is being redirected from the file `darth.txt` and to output the word count of the input. Notice here that the output lists "-" as the source of the word count. This is because the program has no idea where the input is coming from; whether it comes from a file or the keyboard does not matter. The last argument passed to `wc` is the filename `plagueis.txt`, which tells `wc` to count the words in the file `plagueis.txt` and output the count with the source. I hope that this example clarifies the difference between input and arguments. Input is a stream of text which can be read by a program as it executes. Arguments are an array of strings passed to a program when it is called.

I have given a small handful of examples in this articles in order to try and explain the difference between arguments and input. I was not able to help my student, but I hope that this article is able to help someone. The best part of my job is seeing an idea click in a student's mind as their eyes light up with understanding. If that happened for you while reading this article, I am very glad. If not, feel free to tell me why! Email [mathnews@gmail.com](mailto:mathnews@gmail.com) with any feedback you have and I will do my best to learn and grow from it. Thank you for coming to my TED talk.

Xavientois

---

## HOW I GOT HIRED AS A DIRECTOR

PMC member: We need a director to host the 'over 9000' event!

Me: Oh, I was always wanted to do it.

PMC Member: Want to do it?

Me: Aren't I unqualified? I'm not even a member.

PMC Member: Doesn't matter, want to do it?

Me: *\*looks to the imaginary camera\** YEAH

If only getting a job was as easy as this.

*I can't odd*

# I WANT TO WAKE UP AT EGLINTON WEST

Wake up, wake up, wake up, wake up—

"Jay. Jay. Wake up," Skylar said as he shook my shoulder. Startled, I opened my eyes and rubbed them before turning towards him. Honey-yellow irises stared back at me, expectant and splendid. We must have locked gazes for a millisecond at best, although I felt as if it were for much longer. My friend spoke again, snapping me out of my reverie. "Damn, I can't believe you fall asleep so quickly. You're gonna miss your stop one day, man."

He smiled, almost sadly. "What would you do without me?" he joked, although the darkness on his young, unlined face still remained. I pushed it out of my mind. The harsh, shadow-casting light of the train car must've been playing tricks with me, I thought.

"Come on, Sky," I sighed dramatically, rolling my eyes and elbowing him on the arm. "I'd do just fine without you. I'm a *working adult* now, aren't I?" I said those two words pompously, in the way that I knew always made him laugh. He snickered, bringing a hand up to his mouth. I continued, putting my hands over my chest in mock grandness. "I'm a contributing member to society! I get a paycheck every other week! I fill out my taxes! I can wake myself up on the train! I don't need someone the likes of you anymore!"

Even though I didn't think what I said was particularly funny, he burst out laughing. It was a golden, shining laugh, filled with brightness and sunlight; it flooded into the dull train car, the dull underground tunnel, the dullness within me. I could feel the stares of the people holding the handrails in front of us, confused — irritated even. Yet I couldn't help myself when I laughed along with Skylar. The folds of skin beneath eyes his were crinkled upwards and I could just barely see tiny flecks of gold under his eyelashes. The shadow on his face was now gone. He was smiling, boyishly and carefree. And so was I. Another standstill moment in time.

After we both calmed down, he spoke up again. I hoped he would crack another joke or say something to continue the mood, but to my dismay, his tone was serious. "I mean," he began, looking uncomfortable in his stiff slate grey suit and starched white shirt. I never got used to the sight of him dressing so formally. It didn't fit him. "Like, are you totally sure about that? Hey," he stopped, pulling at his tie. It was striped, black and silver, like cage bars. He hated to wear it. Whenever he was about to say something uncomfortable, he yanked at the knot, like he was doing now. "You always seem super tired when I see you. Every time more than the last.

Yesterday you could barely keep your eyes open on the train..." he trailed off.

I blinked. The screeching racket of the subway car rattling over the metal tracks, echoing thunderously in the darkness of the tunnel, filled the silence between us. "I—" I started. My throat thickened. It felt as if a steel clamp had closed around my neck, tightening and making it hard to speak, hard to breathe. "I'm fine, Sky. Really."

"Are you sure dude?" His eyebrows knit together in skepticism and worry. "What's going on at work?"

"Nothing important," I said truthfully. "Anyway," I hurried on, desperate to change the topic. I didn't want to think about it — I always avoided it as much as I could. The sounds of the train hurtling through black tunnels carried on. "It's been a long time since we've hung out, besides taking the train together after work. Are you busy tonight? Maybe we should hang — you know, like old times."

Skylar closed his eyes and put his hand over his face, massaging his temples. "Ah, sorry man, today's not the best day for that. There's an old high school friend that I've been meaning to see ever since I got back in Toronto. We were planning to catch up this evening."

It was an answer I expected. Skylar was always busy nowadays. Going on dates, getting reacquainted with old pals, attending company functions, running errands, doing side gigs, repaying favours, handling responsibilities. I could have pushed harder to spend more time with him — he probably would have been able to set aside a day or weekend for me. I never pressed him on it though, and always let it drop whenever it was brought up. I didn't know why, although it wasn't something I tried to fight or change. I had become a completely passive observer in my own life.

An automated woman's voice came on over the intercom. I knew its prosody intimately, like a newborn infant knows the rises and falls of its mother's womb-voice. However, this voice was robotic and cold. Arriving at St Clair West. St Clair West station.

Shit, I heard Skylar murmur with urgency under his breath. With a quick motion he turned his head towards me, his fiery orange eyes wide open, burning. "Listen, man, I have to tell you something." The tone of his voice filled me with sudden dread and made the clamp around my throat grow tighter. His face was all darkness now; above us, the train car lights flickered. My heart was racing, pounding against the wall of my chest as he opened his mouth to speak. He was rising from his seat, getting ready to stand up. "My company's changing offices. I should've let you know earlier but I kept forgetting. We're moving out of downtown and into York. Staring tomorrow. We're not going to see each other on the way back anymore."

**13 doesn't exist.**

**ROB HACKMAN**



The woman's voice reappeared over the intercom. The doors will open on the right. I was stunned. Too shell-shocked to speak. A chime sounded. Skylar was squirming his way through the other passengers. The brushed steel train doors opened, *swoosh*. He began to step out of the car.

For a brief second, he stopped to look at me as the crowd of passengers walked past. The warm colour of his golden eyes was distorted through the greenish plexiglass screen that stood between us. Muddied and dull. He had his hand up to the knot of his tie. His eyes were expectant, anxious, and pitying.

To an outsider, this wouldn't have been anything to get worked up over. A tiny change in the grand scheme of things, but to me, it meant much more. Skylar, and everything that he represented, was being taken away from me. The cruelty of it all was staggering. Of course, I didn't fight it. I couldn't possibly have — I didn't have the light in me anymore. He was waiting for me to say something, to call out to him, but my throat was closed, choked. I couldn't even open my mouth. He blinked, crestfallen at my silence. Two greyed eyes looked saddened in the plexiglass. Were they the reflection of mine or his? *Goodbye*, he mouthed. The lock of our stares hung still; fluorescent rays and golden pinpricks of light froze in time, immortalizing the moment forever. Then he was gone.

*Ding dang dong. Please stand clear of the doors. Swoosh.* Mechanical whirring and groans. The *chok chok chok* of the car over the underground tracks. A new passenger in a pinstriped suit sat next to me in the vacant seat. *Next station is Eglinton West. Eglinton West station.* Stuffy air. People packed together like sardines in a tin can. The stranger checked his watch and huffed; he tapped his shoe against the cold grey flooring. The long red second hand of the watch went round and round and round and round.

I pulled out my phone from my pocket and put on my earbuds. Anything to escape from the cacophony of the real world. Anything to not have to think. The first song that came on was a corny pop ballad. *All I want to do/ Is wake up next to you.* I felt a wave of exhaustion ride over me. The interior of the train car darkened as my lids slowly came over my eyes, burdened by what felt like lead weights. *Arriving at Eglinton West. Eglinton West station.*

I felt the heat first before I opened my eyes. A familiar summer warmth of days long past. I awoke, lying face-up in a vast, grassy field. I arose; wildflowers of every type and colour dotted the landscape as far as I could see. An endless, undulating sea of greens, whites, pinks, and yellows in the soft and gentle breeze that whispered through the air. I looked up: the sky, completely cloudless, was richly saturated in with the colour of amber and honey. The fiery sun was halfway down the horizon straight ahead, its golden light pierced through to my core, filling my lungs and my heart, breathing hope and happiness and freedom again into me, things I lost who knew how long ago. Had it been weeks? Months? Even years? Time in the real world had blurred into an amorphous grey mass.

Two forms fluttered across the horizon. A skylark and a ground jay. They danced and chased after one another, unworried and unbothered in their playground in the heavens, as the rays of the setting sun struck their feathers and bathed them in radiant gold. Their birdsong filled the air, sweet, innocent, and spirited. Old boyhood memories arrived in flashes. Making crowns and necklaces out of clovers. Playing tag together in the fields. Savouring the sweet taste of honeysuckle.

I sighed and took a deep breath of the fresh meadow air, closing my eyes. The beautiful sounds of birdsong continued to ring through. Far, far away in the distance, I heard a woman's voice. It was hardly a whisper, too quiet to make out any words; the echo of a single note of a silver flute thousands of miles away, bouncing across the blowing grass. Closer though, I heard the love ballad. The last remnant I had of reality, although the words rang clearly through the air:

*I, I want to wake up with you,*

*Wake up, wake up, wake up, wake up.*

Filled with vigour, I lept up from where I was sitting and began to run towards the setting sun. He was calling out to me from there. All I had to do was meet him at the horizon. In my haste, I trampled over the flowers. The light from the sun was burning my eyes and my skin. The sky was getting darker, turning into shades of purple and black. My legs were hurt and sore. Why was the sun setting so fast? And yet, he kept on calling. I kept on running.

"Jay. Jay..."

Finchey

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## DO YOU GET OSAP, BUT NOT ENOUGH?

I wasn't aware of this source of financial aid before last term and I'm writing this article to introduce it to people that could benefit from it, and aren't aware of it.

1. Go to this page:

<https://uwaterloo.ca/student-awards-financial-aid/uwaterloo-bursaries/full-time-bursary>

2. Print and fill out the "**Full-time bursary application**" and submit it to Needles Hall as soon as you have an OSAP estimate.

And voila! You'll probably get some money 4 weeks into the term. No need to write a letter, or apply to a bunch of specific bursaries!

Jeff Besoz

# HOW TO PROVE A THEOREM

Proofs — math's most impressive and often equally daunting tasks. They play a critical role in the formalism of any discipline, and yet, many of us find them difficult, frustrating, or downright impossible to do properly. To remedy that, here's a (hopefully) helpful guide!

*[Note: this is mostly in the context of schoolwork, but some tips may prove helpful in real world contexts.]*

**Step 0** — In the case of a "prove or disprove" type of situation, try counterexamples. They can be difficult to come up with, but they certainly cut down on your mental effort and/or time when applicable. For a start, try fulfilling the hypotheses but not the conclusion.

**Step 1** — Figure out what it is you're actually trying to prove. Part of the difficulty of proving anything, especially the more abstract it is, is knowing what you have to show. See if you can figure out some sort of equivalent formulation of the statement. One caveat: be careful with your equivalencies. Sometimes what you think is an equivalency is not, in fact, an equivalency. Faulty "if and only if"s can not only lose you marks but also leave you more confused than before. To check your equivalencies, try proving both sides of the implication (using this guide!) or try to find a counterexample.

**Step 2** — Scour your assumptions. You're given those pieces of information for a reason. Even in in-the-wild proof-writing, you still have some base assumptions you can use. Take those assumptions as far as you can; any implication or related theorem/lemma/argument could hold the key to your proof. If the assumptions don't seem to have immediate implications, try to reverse-engineer from a point wherein that fact is useful.

**Step 3** — If possible, work backwards. Regrettably, this cannot be applied in all cases, but with more equation-involved proofs, this can be valuable. Even in cases where you're working with less easy-to-conceptualize things, you can sometimes find the flow of logic easier when working backwards. Just be sure to reverse it when you're done, and make sure the direction of your implications is correct.

**Step 4** — ??? This is the tricky part — finding the inspiration or "leap" of valid but at times unexpected logic that completes or, if you're unlucky, just moves the proof along. Try not to feel bad if you're still stuck in this part of the process. Many monumental and invaluable proofs are the result of years of

work done by many people. Your anguish is part of a proud and time-honoured tradition. You are certainly not alone. Try taking a break and coming back to it later with fresh eyes, doing further research, or bouncing ideas off a friend.

**Step 5** — Revise/check your work. While you may not see faulty logic your first time through a proof, sometimes a second look picks out things you may have missed the first time. True, if you were completely lost from the get-go and/or don't know what you're doing, you probably won't improve your proof with a read-through. However, it just might jog your memory and help you through. If you can, at any point, say "not necessarily," your argument needs work.

**Step 6** — Have a peer (or, better yet, a mentor) look over your work. For the same reasons given above, a second pair of eyes (especially ones that are more experienced) can find the errors and/or non sequiturs in your arguments. Peer review is one of the things that makes scientific and mathematical writing so sound, and getting that for your proof-writing will likely have the same effect (unless, of course, your friends are assholes). After some review, proceed to Step 6 and wash, rinse, repeat until you're either out of time or exhausted.

**Step 7** — Conclude. Even if the interior of your proof is complete horseshit, a strong introduction and a strong conclusion at least give the air of confidence. Will that lose you marks with some profs? Perhaps. However, in the mathematical community, especially on the internet, someone will be sure to correct you. That's what matters, after all—learning and understanding. Finish strong, immediately say "fuck it," and forget all about it.

After all, who needs calculus and its infamous epsilon and delta?

Or linear algebra.

Or pure math.

Or...

permanentpseudonym

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## LEMONPARTY

Last week, my little cousin had his First Communion, and apparently he really likes lemons. So, his mom decided to give his super over-the-top party a lemon theme. I arrived at the lemon party and instead of a piece of paper with my name on it telling me where to sit, there was a lemon with my name painted on it in flawless calligraphy. The menu was adorned with lemons, there were lemon-themed desserts, and far too much flirting for a family gathering. Help.

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

PROF. DAVID JAO

Cave Johnson

# DECLARATION #1: mathNEWS IS NOW A SOVEREIGN NATION

MC 3030 — Due to outrageous Canadian libel laws, the editors have decided to declare **mathNEWS** as an independent nation. This will allow us to slander Imprint as much as we want without worrying about lawsuits.

The first acts of **mathNEWS** follow:

1. Anyone who *reads* Imprint shall be quarantined, for they have contracted MN, a disease you get after reading Imprint. The only exceptions are the following, for which you will not contract MN:
  - a. Getting material to use to slander Imprint;
  - b. If your kink is terrible writing and you need it to get off;
  - c. If reading Imprint is necessary for the health and/or life of a **mathNEWS** citizen.
2. **mathNEWS** is a part of The Commonwealth; we are a democracy and we use Rural-Urban-Proportional for our elections.
3. Harming people is illegal, and the punishment is proportional to how much you harmed them. Murder counts as harming someone a lot.
4. Weed is legal; all other drugs are decriminalized.
5. Construction on M4, M5, M6, M7, M8, M9, M10, M11 shall start immediately.
  - a. M4 houses the Ministry of Health and Human Services.
  - b. M5 houses the Ministry of Oceans and Fisheries.
  - c. M6 houses the Ministry of War, and fighting climate change falls under this Ministry's portfolio.
  - d. M7 houses the Ministry of Magic, also known as the Department of Pure Mathematics.
  - e. M8 houses the Ministry of Faith, which is dedicated to the separation of church and state, and enforces a country-wide ban on religious pamphlets and anti-choice protesters.
  - f. M9 houses the National Parliament, which is called the High Council of Editors.
  - g. M10 is a really big ball pit. It has slides and shit.
  - h. M11 houses the Ministry of Trashing Imprint.
6. Sandwich Expert is the military general, and the director of the Ministry of War.
7. Duncan Donuts is the director of the Ministry of Health and Human Services.
8. Turkey is the director of the Ministry of Trashing Imprint.
9. Nevermind is the director of Oceans and Fisheries.
10. Master Church (MC) Hammer is the director of the Ministry of Faith. His slogan is, "when it comes to the pamphlets, you can't touch this."
11. The Ministry of Magic is run by whichever math professor was most quoted in the last volume of **mathNEWS**.
12. We declare war on Alabama.

*The High Council of Editors*

## THE NICEST THING SOMEONE COMMENTED ABOUT US

I don't quite recall the scene, but it was on campus — perhaps in the CnD, in the hallways, or on those weird couch/table setup in front of the Comfy — either way, it does not matter.

My friend looks at me straight in the eyes, and starts, "This might be a bit of a meme-y question, but .... "

My eyebrow raises up. I am scared. My heart is pounding.

"... why is it that **mathNEWS**, a non-profit student-run newspaper, can proofread better than either I\*\*\*\*\* or the R\*\*\*\*\*? Don't they get paid for the work they do?"

My eyebrow lowers and I start shedding tears that could fill another universe, far in the sky...

We did it!

## profQUOTES 140.2

### CS 458: IAN GOLDBERG

- “ A long time ago, as in a year starting with one...
- “ [CS 452] is a really fun course. I hear it's really easy too.
- “ You shouldn't anthropomorphize computers, they hate that.
- “ As usual, there is an XKCD comic for this.

### CO 351: MARTIN PEI

- “ Ooh music! I like music! Wait no, I don't actually.

### ENGL 294: TRAVIS MORTON

- “ I like food and food is cool.
- “ Shoving your hand into boiling water and scratching cheese for an hour seems really burny, for lack of a better word.
- “ Welcome to university, where we can talk about sex and shit.

- “ That's the first time that phrase has ever been uttered in an academic context, *I hope*.

### MATH 245: BLAKE MADILL

- “ **Prof:** And unfortunately, we proceed by induction...  
**Class:** *groans*  
**Prof:** ... I'm sorry, this is how it has to be done.

- “ An  $E_\mu$  is a large bird.

- “ I'm not gonna call it #8 because I can only count to 7.

### MATH 247: STEPHEN NEW

- “ I'll write down the definition of compactness, just so you'll be stunned that anyone could come up with such a definition.
- “ What is meant by latitude and longitude varies a little bit depending on whether you're in math or engineering or a normal human being.

## INVESTORS BEARISH ON CS DEGREE SECURITIES AFTER REPORT

Analysts at *Bloomberg Businessweek* published their report on the future viability of various postsecondary educational securities last Thursday, and it's shaken investor confidence in CS degree programs.

The report, *Outlook on Post-Secondary Futures in 2019*, and published under the title *Why UWaterloo is an Overrated Scam* in [/r/uwaterloo](#) and the foreign journal [/r/uoft](#), was authored by a widely-respected committee of analysts made up of UW CS co-op rejects and first-year Rotman Finance students who believe the bullish attitudes of their peers, parents, potential employers, and that fucking kid from their grade 12 functions class that was accepted a month ago are "tots wrong".

The report cited fears that CECA will default on their pinky promise that you'll actually get a coop job as a major driver of investor worries, as well as an increase in expected inflationary effects on the program next year after a Reddit report documented an unregulated loophole through the lesser-known LDD (Laurier Double Degree) Index. Large increases in international tuition were highlighted as another point of pain for overseas speculation that could affect the value of UW securities in foreign markets.

After the report dropped, various armchair analysts in the comment section expressed their displeasure with the

securities and the issuing corporation of the University of Waterloo's management, with many vowing to liquidate their stakes in the firm. The was all-around insistence that this action was unrelated to the *Required To Withdraw* positioning that their transcripts held in the market.

Not all parties were as gloomy on the news though, with life satisfaction among newly-admitted investors down only 0.008% to 0.992 of its baseline level (last week), although among the incredibly small minority that read past the headline to see the analysts' methodology, the same metric was up 25 points. Post-first-year investors' attitudes were more resilient to the news, having already regretted ever investing since the historic GPA crash after the Math 135 midterm.

The analysts caution any potential investors from taking rash action, and to consider investing their capital into other post-secondary opportunities while aggressively insisting that their geomatics offer is a sound alternative that remains undervalued by market players.

LazaridisCowboy

## BARTENDING 102: HOW TO MAKE A MR. JÄGERMEISTER

Backstory: I really like Jägermeister, which is an herbal liqueur with a past. Jäger has its roots with some German dude in the 20<sup>th</sup> century named Curt Mast who wanted to make a post-dinner digestif for blue-collar workers. After a while, some Americans in Germany realized you could drink a *lot* of Jäger and puke very little — the rest is history. Jäger is synonymous with partying and college-level debauchery, but this drink is an attempt to bring out the rich and velvety flavours in it and celebrate responsible drinking.

Ingredients:

- 1 shot Jägermeister, preferably chilled
- ½ cup plain club soda; I use an entire one of those cute small cans
- Lime/lemon: I've never bought fresh fruit (I just use the bottled one)
- A shit ton of ice and a glass of some sort.

Preparation:

1. Fill the glass with a shit ton of ice. I like doing this first because it's a set up for a nice visual preparation
2. Pour as much club soda as you want.
3. If you want the drink to look C O O L, squirt a bit of your lime juice up to a point where you can taste it pretty prominently and then pour in your shot of Jäger. There's this cool cascading effect that happens. The downside is that you probably undershot/overshot the lime/lemon.
4. If you want the drink to taste P E R F E C T, pour the shot of Jäger first and then add lime/lemon to taste.

Note: I like the acidity of lime/lemon because it balances the sweet, smooth taste of Jäger. If you don't like that shit, don't do it.

not\_a\_rhymer

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## MATH/CS PICK UP LINES

Please don't.

Narayan

## HOW I GOT A BUTT PLUG

Me: *Attended Sex Toy Bingo during Feds Welcome Week*

Host: We need volunteers for the next mini game! The game involves the participants going around the audience in order to collect 5 pieces of clothing from people that are **not** from your table! Get ready. Get set. GO!

Me: *Runs to multiple tables and collects 3 pieces of clothing*

Also Me: *Returns to the front of the stage holding a sock, a jacket and a bra*

Host: You over there, are you holding a girl's bra?

Me: I...I think so?

Host: Is that....is that your bra?

Me: *pats my flat chest bro I wish*

The host then rewarded the girl who gave me the bra and I a prize for adding some *sexual tension* to the event.

If only getting a job was as easy as this.

*I can't odd*



# CLICKER GAMES

In the winter of grade 8, my class became obsessed with Cookie Clicker, then they got themselves addicted to Make It Rain. Early in high school, there was a Tap Titans craze, and sometime later came a short burst of interest in Universal Paperclips.

Clicker games are arguably some of the lowest gaming content there is, yet they still manage to bring satisfaction to countless players, time and time again. It's a very simple genre. Your power level grows exponential-ishly (like  $e^x$ ), and the amount of power required to reach your next objective grows even *more* exponential-ishly (like  $\pi^x$ ). You climb until eventually the curves intersect, where the numbers no longer mean anything. Then, there's usually some reset button that gets you special points that you can use to multiply your power level. Now that your power level is  $k \times e^x$ , the two exponential-ish curves intersect a bit later. For all that work, you experience "progress" and the sense of achievement.

Throw in some combination of RNG, multiplayer, in-game currency, graphics, and lore, and you have the components to make a great clicker game. But, go out into the world and you'll find many awful clickers. In a genre where every game of the competition is a bunch of rehashes of itself, the smallest design details make or break the players' experiences and ultimately decide the game's success. Getting the right "clicker feel" is as much an art as having an exciting cutscene.

Good clicker games fool you into believing you are the boss, not the worker. They challenge you to macromanage. What's the fastest way to keep moving up along that power curve? What kind of multipliers to get? How much can be automated? Super-exploitable mechanics are a feature, not a weakness, because they massively reward and motivate whoever is invested enough to find them. The best clicker games have entire subreddits dedicated to debating the effectiveness of various strategies. Community heroes are celebrated for building sprawling spreadsheets that calculate which multipliers to chase. Developers are chastised, not only for changes that make the game too hard, but also for changes that make the game too easy: not because the players are hate themselves, but because easy progress doesn't feel as rewarding.

In that way, a clicker game done well is like a drug: a cheap trick to make you feel good after doing nothing good. Fortunately, it's pretty hard to develop a dangerous addiction to clickers. The most dedicated folk I've heard of leave the

game running on their phone at work and check on it every few minutes (If you do that, please don't). Quite conveniently, the shame of playing a lowly clicker game will make it hard for it to take over anything beyond the private life.

Like any reward feedback loop, eventually you develop a tolerance (boredom) and find that the objectives you seek are no longer coming as fast as you'd like, or you've simply beaten the game. Once the suspension of disbelief dries up, there is very little that can fool a player back out of the realization that they are essentially simulating a job. And so, you move on. At this point, someone might argue that all the progress was for nothing but it wasn't: it was progress for progress' sake.

It is an art to turn a player's pure work and decision-making into some addictive satisfaction — and that is the beauty of clicker games. No matter what you do while playing, you are always marching onward toward that next big desirable bonus, placed tantalizingly just out of reach by the mastermind behind the game. Once you get there, there's another one just a few more steps down the road. Man, does that road get steep quick. You look back and see the trivial, you look forward and see the impossible. But surely, the first step is within reach...

A pair of carefully tuned curves, dancing in the night.

water

## N WAYS TO END YOUR MATH PROOFS

- QED for *Quot Erat Demonstratum*, "that which is to be proved".
- Octothorpe.
- Square.
- Blacksquare.
- **B** square.
- Tianamen Square.
- Floss aggressively to assert dominance over your marker.
- "gg"
- QED for *Question Effing Done*.
- "Can I haz a cookie?"
- "As required."
- "By the property of transitivity, Fermat's Last Theorem, the Poincaré conjecture, and this proof of P=NP that is too big to fit within the margins of this paper, we are done."
- QED for *Quixotic dreams of Existence of counter-examples Destroyed*.
- A passive aggressive note suggesting that research funding *may* be withheld should the proof not be graded perfect.

I put this here just so I could fill this column.

A TIRED mathNEWS EDITOR

## HOW I GOT FREE PIZZA

Me: Attends mathNEWS production night

Also Me: Writes an article

Me As Well: Eats Pizza

Me Additionally: Writes another article

Me Encore: Eats more Pizza

If only getting a job was as easy as this.

*I can't odd*

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## PD 11 - MAKING SURE YOUR POST IS ACTUALLY THERE

For a moment I thought I was dead,  
Because a quick check on Learn said:  
That I missed the deadline,  
But turns out I'm fine!  
I was filtering posts by unread.

water

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## UPDATE FROM THE TRENCHES OF ALABAMA

Maycomb, AL.

May 30, 2019

To the High Council of Editors,

The war in Alabama is going well, since our declaration of independence and our amphibious liberation of the aircraft carrier on the beaches of Alabama yesterday. Since then, we have advanced on Alabama. Due to the third-world conditions of this state and their stick weapons, victory has been easy. It also helps that nobody wants to live in Alabama, and everyone surrendered with no resistance. The only casualty was Doug Jones; he fell on his stick and it went through this eyeball.

General Sandwich Expert

## SHEEP

Sheep are ruminants, which means that they ferment their food in a special stomach before they digest it. This involves regurgitating the swallowed "cud" back to the mouth so it can be chewed again. If you've ever used the word "ruminant" to mean "to ponder thoughtfully over something", this is where it comes from. The thought is stewing in your mind like half-digested plant-based proteins travelling gently up the esophagus of a fluffy ungulate. Ungulates, roughly, are things that have hooves, and sheep are even-toed ungulates, which means that they bear weight equally on their third and fourth toes. Even-toed ungulates include many animals of great dietary importance, such as cows, pigs, goats, deer, and for particularly daring gastronomers, giraffes, alpacas, and hippopotamuses as well. In contrast, odd-toed ungulates bear weight mostly on their third toe. These include animals such as horses, zebras, rhinos, and tapirs. Sheep are part of the kingdom Animalia ("soul-having"), phylum Chordata ("tail-cord-having"), class Mammalia ("breast-having"), order Artiodactyla ("even-fingered"), family Bovidae ("oxen"), subfamily Caprinae ("goat-antelopes"), making them soul-having tail-cord-having breast-having even-fingered oxen-goat-antelopes, which is something you can call a sheep but not your mother-in-law. But the most important scientific fact about sheep is that they look like Clouds, and are Totes Adorbs™.

sillycone

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UW'S BASTION OF ERUDITE THOUGHT SINCE 1973

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# gridCOMMENT 140.2

As we are hurling into the future with the undying arrow of time marching ceaselessly onward, it is always a good to look behind us (or in the unlikely situation you're an Aymara speaker, in front of us) into the past and reflect upon ourselves as to how we have gotten here. Thousands of years of history, of an unbroken chain of ancestors traced back to the heartland of Africa, all of this is accumulated into this: you, sitting down and reading this very **gridCOMMENT**. Are you not proud of your achievements?

Speaking of achievements, sillycone has submitted the only, and thus, by default, the most correct submission to last issue's **gridWORD**, and had answered the previous issue's **gridQUESTION**, "What would you give as an offering to pacify a dragon?" with the answer "**profQUOTES**". I must say, surely a dragon could be pacified with **profQUOTES**; woe betide the time when such a plan would fail. Please drop by the **mathNEWS** office in MC 3030 when the editors are around to pick up whatever prize they have prepared. I promise it's not a honey badger, I swear.

For this issue, the procedure is the same: submit your answer into the **BLACK BOX** or by email to [mathnews@gmail.com](mailto:mathnews@gmail.com) with your name and optionally an alias, and the most correct answer will be eligible for a prize. In the event of a tie for most correct, the tiebreaker is my favourite answer to this issue's **gridQUESTION**, which is "If you needed to give an over-the-top Oscars-esque thank-you speech for something, what are some unexpected recipients of your thanks?"

The deadline for submissions this issue is 6:30PM on Monday, June 10<sup>th</sup>, 2019. As usual, late submissions will be derided as a stereotypical case of being incapable of following directions and thus would be automatically disqualified from any prize-considering and must satisfy oneself with the knowledge of a crossword well-done.

Happy Solving,

Zethar

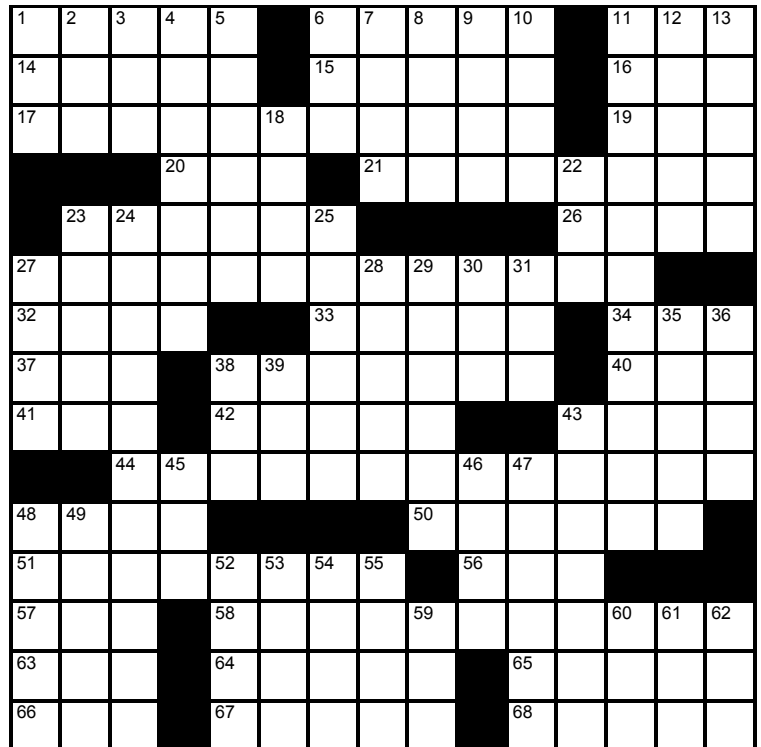
## ACROSS

1. Goose parts
6. Noodles
11. Hyperbola part
14. Muscat resident
15. Blood of 23A
16. A note to follow so
17. Basic
19. η
20. Currently we're -4 to it
21. Decorative vines
23. Goddess of wisdom
26. Battering wind
27. Attawandaron
32. Bungles
33. Carthaginian
34. Hellish city
37. Victory
38. It's changing
40. Retrovirus component
41. Contains elements
42. Discussion group
43. Comes in bags in Ontario
44. Another name for the Iroquois
48. Zoomed
50. Gravy ingredient
51. Well-read people
56. Everything
57. It's a wrap
58. The other group which UW is in the traditional territory on
63. Scarlet
64. Marker
65. Thane
66. Pub quaff
67. Personnel person
68. Bar

## DOWN

1. P↓Q
2. Big bird
3. Our dollar, for short

4. 4.
5. Stew
6. Hold down
7. "Hamlet" has five
8. Ersatz
9. Rings
10. Substituent derived from an aromatic ring
11. French poem style
12. Mellivora
13. Pursue
18. Sicilian peak
22. Back then
23. Falcon's home
24. Stage a comeback (3 words)
25. A large tree growing on high mountains
27. Something we have very little of despite our name
28. Spirit
29. Kind of recording
30. Songbird
31. Curling surface
35. Coastal feature
36. Rice wine
38. PC "brain"
39. Boy
43.  $14A + 51A = 43D$
45. Leave speechless
46. Jane in Wales
47. Vaporize
48. Plants
49. Actionable words
52. Impulsive
53. Against
54. Class
55. Part of an archipelago
59. Part of H.R.H.
60. Wager
61. Sense of self
62. Econ. figure



Being a mathematician  
requires imagination.

PROF. BARBARA CSIMA



## THE COIN SUPERPOSITION CONUNDRUM

haltingCOMMENT 140.2

You have before you a strange, cylindrical box. It is smooth and featureless on all sides except for its top. Its top contains 4 opaque compartments, each taking up 1 quadrant of the box, with a lid on top, and in the centre of these compartments is a small lightbulb. Within each quadrant is a single quarter, randomly set to be either heads or tails up. You have no way of knowing the exact initial state of the quarters in the box. What you do know is that when all 4 quarters are heads or all 4 quarters are tails, the light bulb will glow.

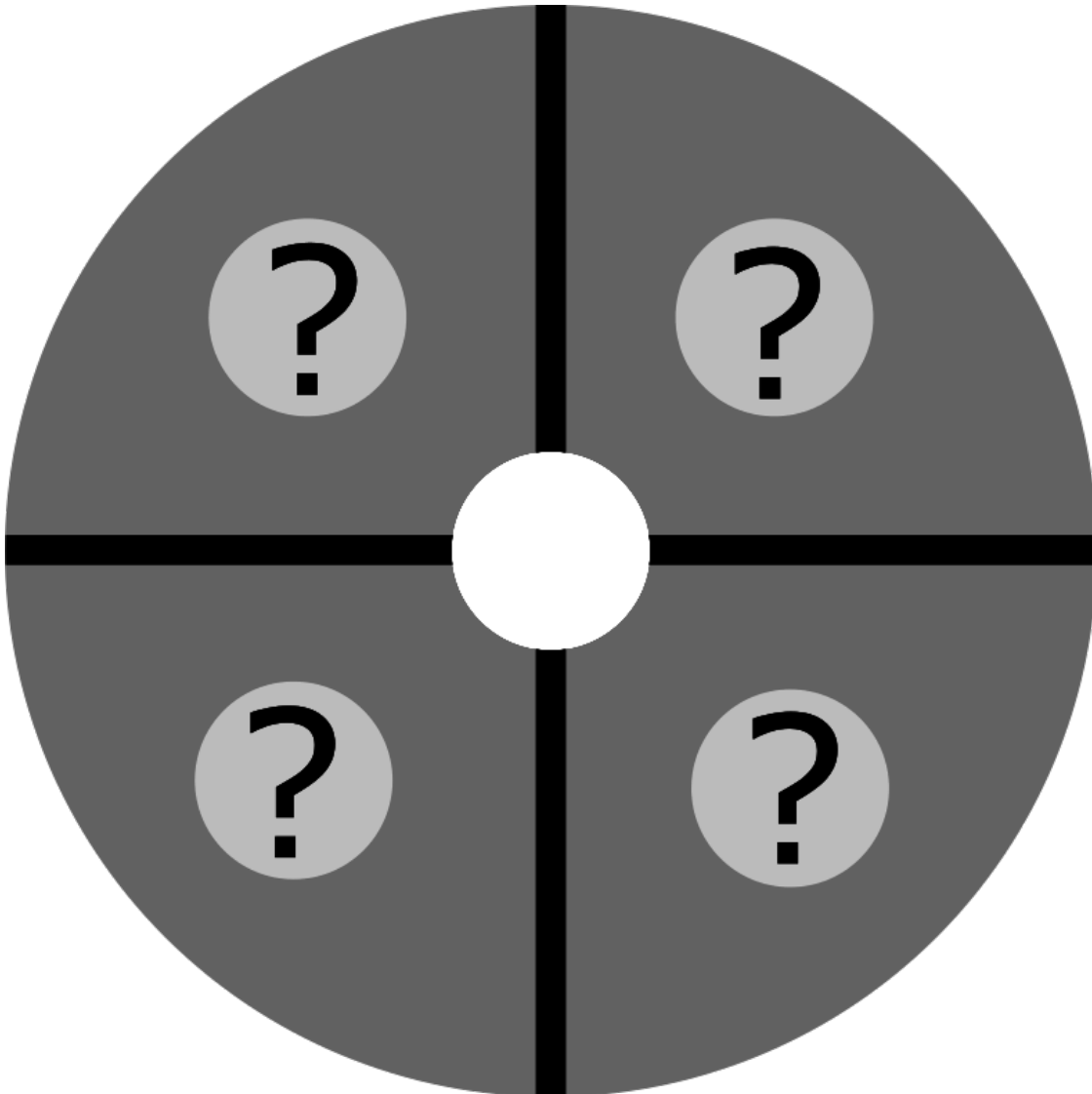
You may open any two compartments on the box. You must always open exactly two, but they can be any two you like. Once the compartments are open, you're free to do almost anything you like to the quarters short of removing them; you can observe them, flip one, flip both, etc etc. When you're finished, you close both lids, and the box will spin so rapidly

that it is impossible for you to keep up. No coin will leave its compartment, and the compartments will not swap around, but their rotation will be randomized and is impossible to predict. This set of actions: open, interact, close, and then spin- is one round.

Your challenge is so: within 5 rounds or less, you must completely guarantee that the light is on. That is all 4 coins are heads or all 4 coins are tails.

This puzzle is brought to you by the UW Puzzles & Brainteasers club, who meet every Friday at 6 p.m. in QNC 1507.

UW Puzzle Club



HINT: YOU CAN FLIP ONE COIN, OBSERVE IF THE STATE CHANGES, AND THEN DECIDE TO FLIP ANOTHER

# lookAHEAD

SUN JUNE 2

MON JUNE 3

TUE JUNE 4

WED JUNE 5

THU JUNE 6

FRI JUNE 7

SAT JUNE 8

Last day to start a spring work term and meet requirements

The 30<sup>th</sup> anniversary of [CENSORED]

SUN JUNE 9

MON JUNE 10

TUE JUNE 11

WED JUNE 12

THU JUNE 13

FRI JUNE 14

SAT JUNE 15

mathNEWS 140.2 production night

First day of Convocation

mathNEWS 140.2 published

Last day of Convocation

## LAST WEEK'S gridSOLUTION

S	W	E	E	P	E	T	A	L	T	H	E	N					
E	A	G	E	R	C	E	D	I	R	O	D	E					
E	N	G	L	I	S	H	L	A	N	G	U	A	G	E			
R	E	S	O	H	O	R	E	L	A	X	E	D					
				A	R	M			M	E	N						
		N	A	T	I	O	N	A	L	A	N	T	H	E	M		
T	A	R	O	T	I	C	O	N			A	Y	E				
E	N	E	M	Y	T	I	T			U	N	L	I	T			
A	C	T				R	E	N	T		N	O	L	N	E		
R	E	E	X	P	E	R	I	E	N	C	I	N	G				
					A	R	P			I	L	L					
D	E	A	N	E	R	Y		A	G	O			M	A	O		
E	S	C	A	P	E	M	E	C	H	A	N	I	S	M			
S	A	I	D		S	C	O	T		K	A	K	I	S			
K	U	D	U		S	A	N	S					S	N	E	A	K

## HOLY SHIT, MATHSOC FINALLY UPGRADED THEIR WEBSITE!

Let me be the first person to say: welcome to 2010, MathSoc! You finally have a website that isn't broken on mobile.

Axel

Very good-looking!  
Contribute articles!  
Email [mathnews@gmail.com](mailto:mathnews@gmail.com)



otherNEWS is made technically possible by club executives of the Math Faculty.

I say "technically" because if they had sent us more news this week, this box wouldn't be here.

THE mathNEWS EDITOR WHO PUTS THE "NEWS" IN mathNEWS