mathNEWS

VOLUME 135 • ISSUE 3

OCTOBER 20, 2017

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mastHEAD

"WHAT ARE YOU MOST SCARED OF THIS HALLOWEEN?"

LOOKS LIKE WE'VE ALL EMBRACED DEATH AND STARTED FEARING OTHER THINGS INSTEAD.

Welcome, everyone, to the last issue of **mathNEWS** before Halloween! I'd call it the spooky issue (as suggested by ExtrovertED), but it's really not much spookier than usual.

There are still some notable exceptions to the lack of spookiness:

- "Making Friends at Uni" strikes fear into hearts by conjuring up the image of actual social interaction with people who you don't already know.
- "Beauty is in the Eye of the Beholder" tells a tale of a robbery gone awry.
- "n Signs You Buy into Toxic Mathculinity". Who isn't terrified of toxic masculinity? Especially when combined with math? Most of the math faculty, apparently, and everyone on r/uwaterloo.
- Humans vs. Zombies' recruitment blurb. It's really fun and you should all take part in this week-long campus-wide battle between humans and zombies. Look out for people in bandannas the week after next!

Anyways, I still have some space to fill. So I'll pose a question regarding pizza choices, and ask you, dear readers, to answer. This is also a chance for me to see if anyone actually reads the **mastHEAD**. In any case, please email all responses and opinions to mathNEWS@gmail.com.

This past production night, seven pizzas were ordered. Three of these pizzas were vegetarian, to accommodate for about 2/7 of the people present who chose not to eat meat. However, many complaints were raised.

First of all, the cheese-atarian pizza was gone within minutes, as it is a popular choice for both meat-eaters and non-meat-eaters. There were also "not enough non-vegetarian pizzas" even though ⁴⁄₇ pizzas ordered that night contained some variety of meat. In addition, those who eat meat can still eat vegetarian pizzas, while the opposite is not true.

So, my question is: do you think vegetarians should be forced to starve at the hands of the meat-eater majority? Just let people eat, seriously.

itorED

CylonSympathiser	Pumpkin Everything. I hate pumpkin.
waldo@<3.LE-GASP.ca	Certain bureaucratic decision … here's hoping they are less scary eventually.
T2lsua	Rabid zombie pumpkin midterms.
Beyond Meta	Getting fired from my job.
me	Korean War II, tariffs placed against Canada, stock market collapse, zika outbreak, solar storm, knockout all tech, bed bugs.
Scary G	I'm not scared of Halloween, Halloween is scared of me.
VICEROY BUTTERFLY	AMERICAN POLITICS.
Zethar	The disappointed mien of a certain Dragonborn queen at the tardiness of a fax code which I am far too busy to properly pen.
s, t $\in$ {2k, k $\in$ Z}, 144	Running out of the pizza I'll eat.
el34n0r_ri5by	Spooky terrorcore Halloween raves.
Herbie	Inevitable job rejections.
ITSH	The inevitable destruction of all we hold sacred.
uncreative	PMATH majors.
Ya boi	Self-doubt.
Teemo	Vegetarian pizza.
Octopodes	The field with 2 elements.
quizED	Missing midterms which I didn't know existed.
ExtrovertED	My boyfriend trying to scare me.
itorED	Forgetting to buy eggs.

ARTICLE OF THE ISSUE

This issue's article of the issue goes to "Hats! Hats! Hats!" by Z. It has certainly been a while since anyone has given a mathematics problem to the readers of **mathNEWS**, which is strange considering that we're called **mathNEWS**. By the logic of decomposing names, it should be half math, and half news. In reality, it seems scarce on both of these ends. Perhaps **mathNEWS** is attempting to add motivation to the problem of improving algorithms for sparse problems, throwing the sparse problem of finding math or news in **mathNEWS** into the mix. Come to the **mathNEWS** office to receive your prize.

quizED (Zishen Qu)

Beware the zombies. They are coming.

MICHELLE ZHU, mathNEWS EDITOR FOR FALL 2017
ALONG WITH SHAUNDALEE CARVALHO, ANGELA LE, ZISHEN QU, CAMERON ROACH AND HEATHER STONEHOUSE

mathASKS 135.3

FEATURING JIM GEELEN

Hi quizED,

These questions show that Math undergrads already know too much about me!

ZETHAR: WHAT WAS THE PAPER THAT YOU WERE "TOO STUPID" TO WRITE WITH PAUL ERDŐS?

In 1992 I spent two hours working with Paul Erdős and Jamie Simpson on problems related to the beautiful Three Gap Theorem. Erdős proposed many interesting conjectures, seemingly off the top of his head, but I was too stupid to prove any of them.

BEYOND META: WHAT IS AN INTERESTING PIECE OF MATH THAT YOU WOULD LIKE TO SHARE?

How about the Three Gap Theorem? Place points $p_1, \ldots, p_n$ on the perimeter of a unit circle each at a clockwise distance of α from the previous one. These points partition the circle into chords, which we refer to as gaps. The Three Gap Theorem asserts that, for given n and α, there are at most three sizes of gaps.

How do you prove that? I'm glad that you asked, because the proof is very nice. Consider the chord obtained by shifting a gap a clockwise distance of α It is typically the case that this chord is again a gap. The only exceptions are when one of the two ends of the gap is p_n and when p_1 lies on the chord. This allows us to partition the gaps into at most three "chains" each containing only gaps of one size.

TOUGH AS NAILS: WHY DID YOU CHOOSE TO WORK IN UWATERLOO?

I already loved combinatorics as an undergrad, so the choice was clear. I only applied to two places for grad school, Waterloo and Curtin University in Western Australia where I completed my undergrad. I also only applied for one faulty position. I was very fortunate to be successful in all three applications; now I'm in combinatorial nerdvana.

PAINTER: WHY DID YOU TRANSFER FROM OPTIMIZATION TO GRAPH THEORY AND MATROID THEORY?

Actually I really transitioned from combinatorial optimization directly to matroid theory, but the matroid theory that I do borrows its ideas from graph theory. This is why I'm now part of the graph theory group in the C&O Department.

I was always a closet combinatorialist at heart. Even when I did combinatorial optimization I spent most of my time working on "unweighted" optimization problems.

WALDO@<3.LE-GASP.CA: WHAT HAVE YOU OPTIMIZED IN YOUR TIME AS A UWATERLOO MATHIE?

Less optimization and more combinatorics. Not that I have anything against optimization; it is a beautiful subject, but its combinatorics that gets my juices flowing.

ERICA: WILL YOU MARRY ME?

I'm not a priest, but I do have a research grant from the Office of Naval Research; perhaps they will let me captain a ship for the purpose. To whom do you wish to be wed?

ITSH: IF YOU COULD DIVIDE BY 0, WOULD YOU?

This is, in effect, the same as the question as to whether I would press a big red button labelled "terminate universe". Of course, I would. Not because I want the universe to end, but curiosity would get the better of me.

ME: WHAT IS THE LIKELIHOOD FUNCTION OF YOUR EXISTENCE?

Without loss of generality, to me, I exist!

SPOOKED BY MATROIDS: WHAT'S YOUR ADVICE FOR MEETING MY WIFE AT PHIL'S?

It is true that I met my darling wife at Phil's while I was a grad student. I would like to claim that it was my good looks, my charm, and my smooth opening line (which, by the way, did include the word "enchanted"). However, by the law of averages, I was always more likely to meet my wife in a bar than at, say, choir practice.

ANONYMOUS: WHAT IS SOMETHING THAT YOU DON'T WANT YOUR GRAD STUDENTS TO FIND OUT?

Jokes about Australians. For example, why do they call their beer xxxx in Australia? Answer: Because they can't spell beer. (I had to use my dictionary in order to type that joke.)

EXTREMELY ANONYMOUS: HOW DO YOU FEEL ABOUT BEING CALLED JIMBABWE?

I will have to wait to see how it feels when you call me that, but it has a nice ring to it; I think that I could get used to it.

MINORAH ENTERING A SALOON: PLEASE PROVIDE A CONSTRUCTIVE PROOF OF THE PANTS EXCHANGE THEOREM?

The pants exchange theorem was just a bad idea from its drunken conception through to its lame execution. It was however preceded by the much more interesting classical Pants Inversion Theorem and the inspired Pants of Hanoi, the latter of which was one of my better ideas under the influence.

The player of Pants of Hanoi is wearing n pairs of pants and has his or her ankles tied; their objective is to rearrange the

pants, all correct side out, but in reverse order (so the pair of pants that was outermost is now innermost, et cetera).

I have two suggestions for prospective players. First, for common decency, don't count your underpants as a pair of pants. Second, for your own dignity, think about the problem before binding your ankles and dropping your pants in public. I have seen more than one person make a faux pas of this second type.

BA BING LAO: WILL THERE EVER BE JUST A COMBINATORICS MAJOR?

That would be a bit difficult. I don't know whether you have noticed, but most of the C&O courses are in optimization. Fortunately many PMath courses are combinatorics in disguise (don't tell them I said that).

THE GHOST OF JAMES F. PAST.: WHY DID YOU CHANGE YOUR AUTHOR NAME FROM JAMES F. GEELEN TO JIM GEELEN?

When I was a pretentious young git (as an undergrad) I went by James, now that I'm a pretentious older git I prefer Jim.

ADAM JOHN MICHAEL BROWN: WHAT'S GOING TO BE ON THE CO442 FINAL? WILL IT BE HARD? DO YOU CURVE?

In the last two offerings of CO442 the final was so easy that I did not need to curve the grades. I think that it is time for a change.

JACK EDMONDS: NP ≠ NP ∩ CONP = P? ALSO, DON'T STEAL MY ROCK!

Well Jack, I think that most of the rational world would agree that $NP \neq P$. As for $P = NP \cap coNP$, I see that as more of a guiding tenet of combinatorial theory than as a statement of fact. Well done you for proposing it.

As for your amazing rock, I have never considered stealing it myself. I may, however, have tried to convince others to steal it and to place it upon my lawn.

HARRY LONGLASTNAME: WHICH MATHEMATICIANS DO YOU LOOK UP TO? (AND NOT BECAUSE THEY ARE TALLER)

That is a long list, but I will prune it down to three who proved results that I would have particularly liked to have proved myself; they are: Paul Seymour, William Tutte, and Carsten Thomassen. By the way, they all have strong Waterloo connections. Tutte, as you know, was one of the founding faculty members of the C&O Department; Thomassen was a C&O grad student; and Seymour was a C&O postdoc.

ZISHEN QU: WHY ARE ALL THE GRAPH THEORISTS AUSTRALIAN?

One could certainly get this impression at Waterloo with Chis Godsil, myself, and Nick Wormald (who recently left Waterloo to return down-under). However, the real question is why are all matroid theorists Australian? This is perhaps not as true now as it once was, with the recent proliferation of New Zealand and Dutch matroid theorists, but there are still a great number of us.

BETTER THAN THE FOUR COLOUR THEOREM

William Tutte spent enormous effort trying to solve the Four Colour Problem. Even after the computer-aided proof of Appel and Haken in 1976, Tutte continued working toward finding a short, human-readable, proof.

Tutte never did succeed, but he came close to achieving his goal on several occasions. For example, Tutte had significant insights into Tait's Conjecture that three-connected cubic planar graphs are Hamiltonian, which Tait had already shown to imply the Four Colour Conjecture. Unfortunately, instead of leading him to a proof, Tutte's insights led him to discover a 46-vertex counter-example to Tait's conjecture. Not long after that, Tutte proved that all four-connected planar graphs are Hamiltonian. While this is agonizingly close to Tait's Conjecture, it does not have any immediate applications to colouring.

Following those attempts, Tutte tried various algebraic approaches; one of these involved the chromatic polynomial of a graph. For a graph G and non-negative integer k, let $\lambda_G(k)$ denote the number of colourings of G with colours $1, \ldots, k$. It is not at all obvious from this definition, but λ_G is a polynomial, which allows us to define it at values other than the positive integers.

The Four Colour Conjecture states that $\lambda_G(4) > 0$ whenever G is planar. If $0 \leq k_1 \leq k_2$ are integers, then any k_1-colouring is a k_2-colouring, and hence $\lambda_G(k_2) \geq \lambda_G(k_1)$. This property does not extend to non-negative real numbers, but it is conjectured that for each real number $x \geq 4$, we have $\lambda_G(x) > 0$ whenever G is planar. Tutte proved the following amazing result which superficially looks stronger than the Four Colour Theorem; in this result τ is the golden ratio, so $\tau+2 = \frac{5+\sqrt{5}}{2} \approx 3.618$.

The 3.618 Colour Theorem. *For each planar graph G, we have $\lambda_G(\tau+2) > 0$.*

This year Gordon Royle proved that, if $x < 4$ is a real number such that $\lambda_G(x) > 0$ for each planar graph G, then $x = \tau+2$. Wow!

How on earth, you may ask, did Tutte come upon his result? It turns out that he came across the idea to try $\tau+2$ by empirical evidence. That evidence takes the form of eight large binders that are stored in the C&O library on the sixth floor of the MC building. Each of these binders contains, at a guess, around 500 pages. The pages alternate between a beautiful hand-drawn picture of a planar graph and a computer print out of the roots of its chromatic polynomial. Tutte enlisted the help of Ruth Bari and Dick Wick Hall to systematically generate the

graphs and the help of Gerry Berman, founder of the C&O Department, to compute the chromatic roots. Nevertheless, it beggars belief to consider the work that Tutte put into drawing each of the graphs by hand and then trawling through these volumes for any patterns that might provide in-roads to the elusive Four Colour Conjecture. In the end he made do with only 3.618 colours.

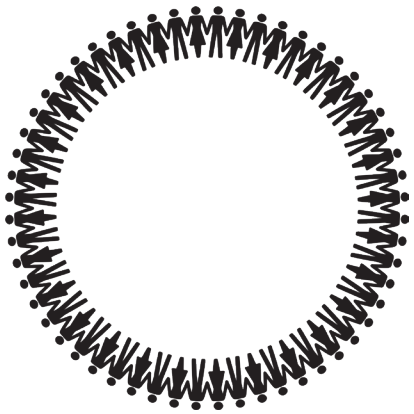
This article is in memory of William T. Tutte, in this the centennial year of his birth. Among other honours, Tutte was a founding member of the C&O Department, a legendary World War II code breaker, and a hugely influential combinatorialist.

Jim Geelen

HATS! HATS! HATS!

Cowboy Hats!

In the Wild West, the sheriff catches countably but infinitely many bank robbers. He asks them to stand on the rational points of the unit circle. Each of them assigned a white or black cowboy hat. No one knows his own hat color but sees the hat colors of all other people. They write supposed color of their hats on a paper and reveal it all at the same time. No talking occurs at all. He tells them that if they will be able to design a strategy which would make sure that for each distribution of hats there are at most finitely many wrong guesses he would let them go with money. Otherwise, they will have to work in for **mathNEWS** for the rest of their lives.



MAKING FRIENDS AT UNI

TOTALLY NOT A mathNEWS *RECRUITMENT ARTICLE*

A lot of people struggle to make friends at University. The following is a guide of things I have found helpful during my university career.

Join a club. If you are thinking that you missed out on club's day and it's too late, know that the vast majority of clubs on campus are drop-in. They usually allow people to show up when they can. The exception to this rule are the clubs that perform and/or compete.

As to what club you should join, it depends on your interest. The purpose of clubs is to allow people with common interests to meet. If you have literally no interests, then join a club anyways and get a hobby.

If you really have no idea what hobby you want, then join **mathNEWS**. You get free pizza for minimal amount of effort. And the people there are awesome! If you have no idea what to write then here are a few ideas:

- n things you didn't understand in your class
- n things you did understand
- Go to some random event or club meaning and write a review about it
- Write about news
- Write about math
- Write about math news. (I know, that's a real stretch, right there)*

If you really don't have any ideas about what to write, you could always help with editing. No actual content creation required! *[Ouch, my editorial feelings! –TunipHeadED]* You could also help write the crossword. Trust me, Zethar would be happy to have a replacement.

Making friends at uni can often seem daunting. Some people think that they missed the boat and it's too late for them. However, there are plenty of interesting events and opportunities to meet people at university. One just has to take the first step and step outside of their room.

One piece of advice I would give is to not expect to become friends with everyone. There will always be people that you connect with better than others. It might take a little bit of time to find your people, but it's well worth the time investment. And who knows you, might also get pizza.

Beyond Meta

*If you want a wonderful topic you could write about Shinichi Mochizuki and his proof of abc conjecture. It's really worth looking into.

Z

profQUOTES

MATH 245: DAVID MCKINNON

❝ [It is now] 10:21. I'm only going to say one more sentence. Actually I'll saw a few. I won't say many more sentences.

❝ And now, an orgy of cancellation.

❝ At least we are not Physics where the electrons go one way and the current goes that [other] way.

❝ [Let's] boil it down to something just average high school science students can do.

❝ In theory, there's no difference between theory and practice.

❝ I don't expect all these quote to appear; just pick the ones that really stand out.

MATH 147: LAURENT MARCOUX

❝ Sorry I went overtime. Don't worry. I'll take the time off your exam.

❝ Mathematical logic is like real life logic. If a gang member comes up to you and accuses you of sleeping with his wife, you can't just say "Assume I didn't sleep with your wife.

❝ Doing math is like marriage, you have to justify everything… Trust me on this one.

❝ [Looking at an expression on the board] Let's take a moment and think about this carefully…[after one second] Ok long enough.

❝ Cauchy sequences are nicer than most sequences. You go out with other sequences but Cauchy sequence is what you take to your mother.

CO 342: MARTIN PEI

❝ Do you remember anything about MATH 135? No? How did you get here? ... Do you know what modulo means?

❝ I'm so excited about next week I can't talk anymore.

❝ Excellent. Your tuition actually paid off.

❝ It appears in a textbook, so I will assume it's correct.

❝ If you look at the place generated by two cycles, it's a bicycle space.

CO 351: MARTIN PEI

❝ Did I scare you already? There's still time to drop the course.

❝ 'Dual', with an 'a', not 'duel' with an 'e', I;'ll die.

❝ I guess in life we want to be non-negative.

❝ I smell food. Do you smell food?

❝ Let's see if we can math this out.

❝ I don't live in real life, apparently, so I don't know if these are real.

❝ Who's a caterer here? No, just me.

❝ So you do a lot of those Pythagoras things.

❝ There are people who spend their lives doing this and I only spent two days.

PMATH 331: ROBERT ANDRE

❝ You don't trust anybody in this world, especially mathematics.

❝ My friend tried to prove the Triangle Inequality for p-norms and he doesn't look so good.

❝ For every different proof there's a story.

❝ If you can live with balls that look like it's square...

❝ I forgot his name. I think it's Anton... Let's call him Anton... That's a nice name to call him.

❝ Then I scream. You don't have to scream; you can just whisper it if you want.

❝ When you invoke a result, make sure it exists, though.

❝ Look at that plane over there." [Fixes mistake in notes.] "Oh, my mistake, there's no plane.

❝ Infinity's a really long time... especially the last part.

CHINA 101R: YAN LI

❝ It means that you have very sharp ears, like a dog.

STAT 341: RYAN BROWNE

❝ All our logs are natural.

❝ Oh yeah, class.

PMATH 453: NICO SPRONK

❝ We'll try it, then hold a little North Korean democracy style vote.

❝ Pardon my excited 'j'.

PMATH 453: MATTHEW KENNEDY

❝ We spent too long debating whether 0 as an algebra is unital. This is where your tax dollars go.

❝ This is far more useful in the real world, where by real world I mean whatever I as a pure mathematician do in my day job.

❝ Sometimes when you're writing, you're thinking the right thing, you're saying the right thing, but getting 3 things right is just too hard.

❝ For any value of infinity—finite or infinite.

❝ If you don't understand what I'm saying, I don't even understand what I'm saying.

PMATH 465: DOUG PARK

❝ I feel like I'm just a middleman between the university and my contractor—the university pays me and I pay the contractor.

MATH 235: WILLIAM SLOFSTRA

❝ You'll find that being able to curve your i's into j's is an essential mathematical skill when indexing sums.

MATH 237: GIUSEPPE SELLAROLI

❝ I will not teach this proof, because it appears in the textbook. Also because the proof in the textbook uses another theorem without proof. So since we aren't proving things anyway, why bother?!

CO 456: GABRIEL GAUTHIER-SHALOM

❝ I wasn't saying it's an especially good answer. It's just the one I was looking for.

❝ Don't forget you're insignificant!

❝ Obviously, you guys aren't used to thinking about this.

❝ Am I being mean today?

PMATH 930: ROSS WILLARD

❝ I'm done composing the assignment. I got some problems that I hope you'll enjoy. [Snickers darkly]

❝ It should be easy to do it, but I'm overpaid, so I shouldn't do it, I suppose.

❝ I hope those are enough examples. I hope you're just like "Oh yeah, direct products, that's just like multiplying numbers!"

❝ How can that not be a homomorphism? That's crazy, like Trump being president of the US. So it must be a homomorphism!

❝ Proof by fiddling with notation. And I'm happy to do it in front of your eyes if [very long pause] you want.

❝ Oh I hate it well actually I love it. I hate it! I love it!

❝ It's not 3:20? Do you want me to tell a joke? The other day, I was in an elevator, and someone was yelling at someone else, which was wrong on so many levels.

IT'S THAT TIME AGAIN

Ready your socks and foam dart propelling devices, because Humans versus Zombies is on the horizon! For the uninitiated, Humans versus Zombies (HvZ for short) is a week long game that runs on campus. A small number of players begin the game as zombies, and their goal is to convert the rest of the players to their team by tagging them. The other players are humans, who can defend themselves from zombies by stunning them temporarily with nerf darts or socks.

HvZ will run from Monday October 30th to Friday November 3, with signups happening the week before. You should sign up, it's a ton of fun[1]

Prepare for the apocalypse!

$s,t \in \{2k, k \in Z\}$, 144

1. This is a completely unbiased opinion from someone that totally isn't a moderator of the game...

N THINGS TO REMEMBER FOR MIDTERMS

- The derivative of a constant is in fact ZERO, no matter what your panic brain makes you believe otherwise
- Pink tie stickers don't exist anymore and calculators cannot be approved as a result, so if you need a pink-tie approved calculator for your exam, you'll likely need to purchase a new already embossed-version (see the Re-Farewell to the pink Tie Sticker article in **mathNEWS** v135i1)
- Breathe and take breaks as you need them
- Sleep is important, but not in the middle of your exam....earlier is better!
- You CAN do this...it may take some time to get used to it all, but this **mathNEWS** writer believes in you! *hugs*

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HOW TO GET A MATH MINOR WHILE IN ENGINEERING

This one goes out to the small proportion of **mathNEWS** readers who are actually in engineering. It is already well-known that engineering schedules are insane. However, it is actually possible to override your schedule enough times to complete the entire Mathematics Minor without taking any additional terms. The information presented has been gathered through personal experience.

The 10 courses Required:

- MATH 106/114/115 (Linear Algebra)
- MATH 116/117/127 (Calculus 1)
- MATH 118/119/128 (Calculus 2)
- STAT 220 (Probability)
- STAT 221 (Statistics)
- CS 115/135/145 (Intro to CS)
- CS 116/136/146 (More CS)
- + 3 Free Slots

[You can technically take STAT 321 or 322 as well. However, STAT 231 is a pre-requisite for both, and Stats advisors are generally uptight about granting overrides]

The first 3 (Calculus + Linear Algebra) courses are often covered as part of an engineering program. Unfortunately, this is not the case if you're in a program that offers specialized courses for your particular program as soon as first year (Biomedical, Civil, Nanotechnology, etc). In that case, you'll probably be able to seek an override for your version of the course to count towards the math minor. Such leniency is unlikely to be granted for the other 7 courses though (Including the stats requirement).

STAT 220/221

It is actually better to take STAT 230 and STAT 231 instead even though they are tougher. There are 2 main reasons for this.

You probably already had to take some Stats course as part of your main engineering courses. You may as well learn something new as STAT 230/231 will have a lot more (and tougher) content to experience than any engineering version of stats. Besides, your academic advisor may have not been so chill about you skipping the engineering stats course to take this route instead. It's okay to just take the engineering stats course as well, since it'll boost your average for the term anyways.

Online versions of these courses exist unlike STAT 220/221. They currently run in the Fall and Winter, making it far easier to actually fulfil this requirement of the minor. Otherwise, you'd have to get extremely lucky that a small gap in your engineering schedule perfectly aligns with the one section of STAT 220/221 that might run that term.

CS 115/116 OR 135/136

As an engineer, you've probably already taken a programming course of some sort in first year (and every other year for some types). Therefore, you'll most likely have an anti-requisite for both CS 115 and 135 (unless you're in Mechanical where they recently switched GENE 121 for ME 101. It teaches the same content, but the CS advisors who decide course requirements haven't caught that yet). You'll need a course override form to get around this as it lets you break the rules. Your own scheduling is more likely going to determine whether you can take 115/116 or 135/136. I would suggest CS 135 (or 145 if you get really lucky in scheduling) if you can as you'll barely learn anything new in CS 115 if you already know programming. You can also fall back to CS 116 this way if that works out magically in your schedule before CS 136 does.

THE 3 FREE SLOTS

This is where things get fun as you can basically take anything in the math faculty (except SE courses) of your choosing. Explore whatever area of mathematics you find the most interesting. Don't be afraid to seek out more override forms as you'll probably need them. These can be either the easiest or toughest courses of the entire minor depending on what path you take.

One route could be to take MATH 135 (Algebra course on how to write proofs properly), MATH 235 (Linear Algebra 2. Yes, there are engineers that actually enjoy linear algebra and wish there were more proofs in their versions of the topic), followed by any PMATH course if pure mathematics interests you (and because the Pure Mathematics Minor makes the Mathematics Minor look easy to schedule in-between an engineering workload).

MATH 239 and CO 250 can be of interest if combinatorics and optimization fascinates you to an extent, but not enough to do the entire CO minor instead.

AMATH courses are interesting too, but you may have to really convince professors to sign nice override forms to let you into the later courses that teach content beyond the math courses your program finishes with (Such as partial differential equations). Some of these may also be featured in your own engineering program already (such as Fluid Mechanics or Control Systems).

OTHER QUICK SCHEDULING TIPS

Online courses are amazing as they never create time conflicts (according to Quest, not your social life)

4th year is the time to get creative with your scheduling in most engineering programs. That's when you're actually supposed to construct your own schedule.

Dan Wolczuk is amazing. Let the Mathematics advisor for people outside of the faculty inspire and motivate you. There's a reason why people crash his classes all the time.

Override forms are your friends. Don't think you can't get into the course just because you literally fall under every conflict on the form (which you probably will just to take MATH 135). They have the power to make crazy magic happen.

You'll always need to override your unit load for any additional course in engineering (Engineering advisors like to keep quiet about how students are forced into the maximum permitted course load by the university or even beyond on some terms).

Generally, keep your grades up in both the math and engineering courses. You may need them to continue being granted so many overrides each term. An 80+ avg is usually the bare requirement, but it isn't exactly overkill to be on the top half of the Dean's List for your program either. Those students still experience difficulty granting overrides even with streaks of 90s on their transcripts. It depends on how chill the academic advisors are.

There you have it! With enough determination, creativity and override forms, you can indeed complete an entire Mathematics Minor while in engineering without taking any additional terms. Very few people do it for a reason. However, it can be done, and it has been done. Good luck!

101!

VIDEO GAMES ARE THE ABSENCE OF HAPPINESS

When I was little, I used to really love any kind of video game placed in front of me. I spent hundreds of hours playing pokemon, and now I can barely get past the first gym in any new game I buy (I played half of Heart Gold, and maybe an eighth of Y). Recently, I started playing Persona 4, and I struggled to finish Yukiko's dungeon (the first one). What's up with this? Why can't I will myself to do something that I used to find so pleasurable?

Lately, I only play video games when I feel too stressed from school, and can't will myself to code for fun or read instead. I have maybe 20 games on the go, and I pick up ones at random. I dreamed a few weeks ago about what I think was FFXV and I couldn't figure out what to do, and in my frustration, I ended up scouring the maps and talking to every NPC to figure out what I needed to do. And in doing that (in my dream, yeesh), I felt that kind of magical exploration that I used to feel when playing games. But whenever I play a game now, even a new game, I enjoy it for maybe an hour or two, until the excitement wears off and I'm just bored.

What's up with this, huh? Am I Just Growing Up™? I keep spending money on video games that I don't even enjoy!

el34n0r_ri5by

SPAMMING ONE LINE ARTICLES INCREASES YOUR CHANCES TO GET THE "ARTICLE OF THE ISSUE" AWARD

I'm not certain if it will work, but hey, I will know when this issue comes out and you will be able to see the results yourself for proof (or disproof). *[I'm tempted to give article of the issue to the person with the fewest articles –quizED]*

CylonSympathiser

N SIGNS YOU BUY INTO TOXIC MATHCULINITY

- You show up to **mathNEWS** production nights just to prove you have the free time
- You got all five of your slide rules pink tie approved
- The word "PMATH" appears anywhere on your schedule, a fact you constantly advertise
- You complain that nobody gets the pi joke you put on your dating profile to filter out people who wouldn't get your pi jokes
- You use calculators as a pocket size metric
- You've never been to office hours, which you'd brag about if anyone actually asked
- You haven't completed your Communication requirements because you don't want Arts courses on your transcript
- No one will ever know you applied to SE

uncreative

N THINGS I'VE FOUND IN LIBRARY BOOKS

- receipts
- dead bugs
- $30 in cash
- a double-sleeved ichor wellspring from magic: the gathering

Check out 1Q84 from the DC library to find at least one of these!

Someone who finally took our their first book from a UW library

ON-CAMPUS SCAMMERS: THE PREMIER STRATEGY GUIDE

Whether it's spring, winter or fall, something that comes along with going to the University of Waterloo are the donation scammers that inevitably appear every term. With their willingness to pursue anyone that remotely looks their way, they're tendency to appear in places you didn't expect and aggressive attitudes, it can turn going to campus into the least enjoyable campaign of Dungeons and Dragon possible, where the entire game involves you just trying to avoid your enemies at every turn.

But like with any round of D&D, a strategy is needed, and though evasion can get you far in this game, eventually an unexpected encounter may be inevitable. So I'm here to present you with the items and tactics you'll need to be one step ahead.

Preparation is often underrated in any campaign, but it's here where you'll get the items to properly deal with your foe. There will be three items I suggest you acquire before you journey outside the safety of your home base, and I'll explain each in detail.

First, you need to acquire the "sunglasses" item. This will allow you enhance your evasion skill by increasing your ability to avoid eye contact with them. But more importantly, it'll give you the option of stating you are blind if they manage to trap you in conversation, playing on your foe's decency stat (you must still pass a high level speech check to convince them however). It should be noted this backup option alone will fail no matter what if their greed attribute is too high, but that is where the others items will come into play.

Second, find every piece of small change you have at your party's disposal. Look in your wallet, look in your bag, look to swapping your GPA for pennies on the dollar with someone else if necessary. Why do all this? With all the coins you've obtained, you're ready to prepare your diversion tool. Prep a small container that you can put the change in and keep it on hand. The goal here is to give as little as possible, trying to keep your foe from getting you to open your "wallet" item by distracting them with something smaller.

If the glasses have failed and you can't find it in yourself to rudely tell the scammer off (perhaps due to your guts stat being to low), open the container and claim that the change is all you have. If the scammer is of the lower level variety (able to detect money on your character but not how much), they'll accept and the battle will end with you free to go with minimal loss to your finances.

Pro tip: Using your diversion tool in combination with your blindness claim can overwhelm even some high level scammer's decency weakness, letting you leave scot free with all your change too!

Finally, we move to your final resort. If evasion, your sunglasses and the distraction tool fail, this is the last weapon of choice. Take out your D20 die you've been keeping by your side, and roll to seduce the scammer. Though this is a risky move, but with a charisma of 6 or higher, getting any double digit number should result in a successful seduction, leaving you with one less scam to deal with and one new relationship in its place. Now, you may hesitate to add this new member to your party, but consider their character traits. With a high determination stat, speciality in willing to do whatever it takes to generate revenue for their current party, as well as a speech skill that won't take no for answer, I think we can both see what they'll add to your team of adventurers going forward.

Happy campaigning, adventurer.

AVL

WASP

Yaboi back at it again with the latest Runescape news.

So a wasp got into my shirt unbeknownst to me and began stringing to it's heart's content. I grabbed the spot on my shirt and squeezed until I heard a dry crunch. Ambiguous bug parts land on the kitchen floor and I pick out a wasp butt among the wreckage. This being the first time I was stung by a wasp I immediately wonder if I'm allergic. I take my shirt off and sit in the living room. My roommate comes home and I ask him to scan for any spontaneous break out of hives. Quickly on my iPad, "How to treat wasp strings". Step one, wash area with soap and water to remove venom. Step two, ice the area to reduce swelling. Step three, keep clean. So I wash the strung area, which was already swelling and applied an ice pack. Later the swelling is gone and to be honest, in reflection the pain of the string was only slightly worst if not equal to a medical needle. Then the next day came. The area became even more swollen and felt itchy borderline painful, 1⁰⁄₁₀ would not recommend. By the way, Runescape is having a charity for mental health. Gooooooooooooooo Runescape.

Yaboi out.

PLEASE WRITE LEGIBLY WHEN SUBMITTING YOUR ASSIGNMENTS

Nothing is more frustrating than having to mark ant-sized font in a blurry crowdmark scan.

A frustrated TA with bad eyesight

N THINGS THAT WILL GUARANTEE YOUR MISERY

Here are some easy to follow tips and tricks to ensure your transition into adult life is as miserable as possible. Follow if you want a depressing experience, avoid if you don't.

1. Never go out of your room. Why would you ever go out, when staying inside your dark bedroom every single day will help you feel lonely, trapped, and depressed?

2. Wait until the last day to start working on assignments. Nothing helps you stress out more than having multiple assignments due tomorrow while you haven't started working on any! Who needs sleep when you have the option to pull consecutive all-nighters in an attempt to do as much as possible of the work due at 8:30 AM. This guarantees failing miserably due to inability to focus. The icing on the depression will be the feeling of defeat as your assignment is handed back with a less-than-50% mark!

3. Your bed is your castle. Make it your place to sleep, work, eat. Any task done sitting down is better done laying down. Why would you ever leave the comfortableness of your mattress when you can spend the entire day there? Sometimes school or work commitments will force you to leave it, but on the weekends this is easier to achieve. Just stay in your bed, order food, and spend your day with as little effort as possible! This helps build up that body fat which will make you feel miserable as you find yourself only fitting into elastic waist pants.

4. Avoid social interactions. Always wear your frowny face and never smile at anyone approaching you (if they dare disturb your loneliness). Don't ever think about joining any kind of club or participate in any event. The less interaction you have with other humans the more likely you are to fall into a dark hole of solitude that you'll never be able to escape.

5. Never clean your personal space. Don't bother with trivial things like putting away pizza boxes, making sure the dirty Kleenex falls inside the garbage bin, or ever emptying your trash. Remember to also preserve all cookie crumbs & yogurt stains on your bedsheets. They make it more personal and reflect your state of self-pity. Also, never air your room. The smell of old pizza mixed with the original flavor of sweat and body odor will make your room the perfect place to make you miserable as soon as you enter it. This comes with the added benefit that no one ever will dare step close to your solitude fortress, helping you fulfill point 4.

6. Eat whatever is available to you. No need to cook healthy and balanced meals. Simply buy frozen food and microwave something everyday! I do not recommend frequent ordering of pizza or any other form of delivery, as that is not financially sustainable long-term.

7. Go to sleep late, wake up late. It's 2am and you just remembered that movie you always planned on watching but never had the chance? Now is definitely the time for it. Your 8:30 class is unimportant anyway. The prof accepts submissions until 13:00 in his office hours; you'll have plenty of time to work on your assignment later. The perfect time to go to sleep is when you feel the sun rising.

CylonSympathiser

RANDOM NOTES I WROTE ONE TIME ABOUT WIND WAKER

Apparently, a while ago, I was really wanting to write something about "The Legend of Zelda: The Wind Waker". It was something about how characters change and grow throughout the game, which, I guess is pretty interesting.

It was mostly inspired by everyone's take that Zelda's princess-revelation was super meaningless and removed all agency and coolness from Tetra. And from my notes...

It seems like what bothered me the most about this is that characters only changed as a result of the player's actions, not really by coming into any form of themselves on their own. Komali finds himself after he's able to get his flying thing from that dragon, Medli and Makar become "important" after Link brings them to those shrines where they discover their destined magical roles, Maggie and Mila swap places after being rescued by the player.

Among all these changes, I wrote a little something about how Link doesn't obviously go through any such changes. Or if he does, when does it happen? As of now, it seems obvious that probably Link's change and growth is something more internal to the player. There are a couple of points where Link is given various titles by others, or saves people, but as a silent protagonist, the point really is the traditional "Link to the player."

It's been a while since I've played a non-VN game where I felt anything about the characters within. Someone might disagree, but I definitely didn't feel like there was any character development or growth of anyone in Breath of the Wild. Oh well!

el34n0r_ri5by

MATH GIRLS

Ladies and gents, mathies and not-so-mathies, today I will be making a gratuitous contribution to what is one of the most overused memes of the decade. Because who else hasn't wondered which programs in the Math faculty would be characters in the most classic film of our time, Mean Girls.

Let's take this apart this piece by piece:

REGINA GEORGE — COMPUTER SCIENCE

The one everyone knows and talks about. The one everyone wants to be (right?). But what dirty little secrets is she hiding? Well, CS students are fake mathies, only needing the bare minimum of the actual Math courses. But shh, no one needs to know… at least, not yet.

CADY HERON — DATA SCIENCE

The new kid on the block, wanting to get a taste of the hyped life. With a solid and humble foundation of statistics courses, Data Science just wants to fit into Math. But what's fitting in without a little taste of the trendy CS squad?

GRETCHEN WEINERS — BUSINESS ADMINISTRATION AND COMPUTER SCIENCE DOUBLE DEGREE

Sure, she's got the CS. But she's also got the business — how posh! A double degree! You can already smell the loads of cash she'll get in the future, but she's constantly being kicked under the bus by envious CS students. She'll also need another year of school — not so fetch, maybe?

KAREN SMITH — ACTUARIAL SCIENCE

Definitely a top dog, but it doesn't come easy. Everyone seems so lost at any given time. Can also shove a semester-full of economics and finance courses into their mouths. Are you guys okay? Is anyone alive?

JANIS IAN — COMBINATORICS AND OPTIMIZATION

One of the coolest programs you'll ever meet. She is quirky and wholesome, but is equally as devious to get what she wants. You won't end this walk without a bit of a headache — but you'll be glad you messed with this one.

DAMIAN — PURE MATHEMATICS

As Vanilla and as innocent as they come. Too pure for this world, too good. (Also extremely happy that Math's colour is pink).

AARON SAMUELS — APPLIED MATHEMATICS

Just a lot of Math. Everywhere. Math no one asked for.

KEVIN GNAPOOR — BUSINESS ADMINISTRATION AND MATHEMATICS DOUBLE DEGREE

Mathlete specialist with a side of sass. An elite with a nerdish charm. The best double D's they've seen is the one printed on their degree — but they pretend otherwise. Loves to see you shakin' that math langue.

I-WISH-THAT-I-COULD-BAKE-A-CAKE-MADE-OUT-OF-RAINBOWS-AND-SMILES-AND-WE'D-ALL-EAT-IT-AND-BE-HAPPY GIRL — SOFTWARE ENGINEERING

Does she even go here?

But alas, the rest are the supporting roles. What, has anyone even heard of Mathematical Economics? Try auditions again next year, until then, the rest are cancelled. #srrynotsrry

Herbie

HELIBORNE

World of Helicopters

There is a tiny game that has just been released on steam, coming from a four person design team (one of which is the community manager) that shows that if you know what you are doing, you can make a good game. This game is Heliborne, an arcade-y game about helicopter combat, which has never been a large genre. It likely will not be winning any rewards, but it looks good, it feels like you are flying a helicopter, and it provides enough of a challenge. As you weave between mountains, evading missiles and anti-air positions, you can drop troops onto objectives, blast advancing enemy tanks, or call down artillery on pesky targets. The game is somewhat lacking in overall content, with only a few maps and ~50 rotary-wing aircraft, but from a small dev team this should be expected while more content will surely come soon.

Soviet Canadian

RE : DIPLOMACY GAME REVIEW

So as the article in the previous issue suggested, I tried to gather some friends to play Diplomacy.

Result: No one accepted my suggestion to play it. We ended up playing Hanabi and ended our friendship that way instead.

CylonSympathiser

BLADERUNNER 2049: AN UNENTHUSIASTIC REVIEW

I'd never seen the original Bladerunner, but my boyfriend made me watch it and then dragged me to go see the new one so here are my lightly edited thoughts. Spoiler warning.

Okay, so what was the actual main conflict in this movie? There were four different sides; Ryan Gosling's boss, who wanted the replicant's kid to die; Jared Leto who wanted to examine it to science it; Gosling, who was just derping around trying to figure out what was going on; and the Underground Replikant Krew who didn't really do anything, other than give Gosling a lift and a pep talk.

But, why did any of them have to work against one another? Gosling's boss is the only one who wanted to maintain the status quo. Leto wanted to render replicants able to reproduce (although how examining the only child of a replicant would help him with that escapes me) and the Replicant Freedom dudes would probably have applauded that goal. It's like the whole stupid scene where he creates and then kills a replicant is there specifically to say "Sure this guy's goals may seem super useful and understandable, but he is actually a Bad Guy who must be defied at all costs". Which is frankly pretty lazy storytelling, in my opinion. Just kill the boss lady—which they did—and everyone can work together on a better world for all. Boom! Sorted.

Man, speaking of the scene where Leto slices some chick open while talking about the beauty of reproduction, I guess they were really trying to recreate the 80s feel by making a film entirely about reproduction without consulting a single woman. Not once, but twice in the movie there are women who are specifically created for a specific man. Not once, but twice in the movie there are women who are fully sentient but unable to physically interact with the world in any meaningful way. And, if you ignore Drax's cameo at the beginning, the only major characters who get killed are—you guessed it—the ladies. Yeah, that's right, I'm calling it. Gosling doesn't die at the end when he lies down on those steps. It's a flesh wound.

And what was up with only the women ever getting naked? My bisexual ass likes naked ladies as much as the next person, but in a movie starring Teen Heartthrob Ryan Gosling and Old Man Heartthrob Han Solo I was disappointed that we didn't get to see so much as a male chest hair. Would it be too much trouble to toss in some male prostitutes in the giant line of prostitutes, or would that ruin the gritty realism of a world where zoning laws haven't shut down an enormous projected naked woman in the sky who hits on passers-by?

To be fair though, the sex scene was pretty neat. All the visuals were worth a watch. But I wouldn't browse /r/ImaginaryCyberpunk for 2h49m. And I really don't think the movie had that much material either. Yeah, nostalgia is fun, but so is taking less than five minutes to deliver a single uninspired line, Jared Leto.

I'd give it a solid $^{meh}/_{10}$, wouldn't watch again.

Viceroy Butterfly

HEY! THAT'S MY FISH.

Recently, I discovered a game called 'Hey! That's MY FISH' in the back-shelf of Mathsoc. I convinced some of my friends to learn it and play together. Contrary to Diplomacy, it was very easy to convince people to play this game, mainly due to the fact that each player gets to control multiple penguins! YES! PENGUINS! ONE OF THE PENGUINS IS A DABBING PENGUIN! Anyway, let's not get off track. In this quick game, each player tries to capture as many fish as they can, while preventing others from doing the same. Despite its simple rules (making it easy to pick up) and laid-back atmosphere, the game requires a lot of thinking to master. This game will be as intense as you want it to be. You can choose to do your own thing, sliding around and eating fish in a chill experience similar to 'Tokaido', or put your mind to the test and try to come up with the perfect moves at every turn, reacting to your opponents and baiting them into greedy plays that ultimately will win you the game.

This game was a fun experience. I highly recommend it to anyone looking for a quick game to pick up, and it only requires as much investment as you're willing to put into it.

CylonSympathiser

PLEASE EXPLAIN WHEN YOU TAKE OFF MARKS

Nothing is more frustrating than a TA taking off marks with no explanations provided and leaving the student confused on what's wrong in their work.

A frustrated student that has to go to office hours to get clarifications

WHY GWENT > HEARTHSTONE, MAGIC, AND ANY OTHER CCG

Just play the goddamn game and you'll notice it immediately.

Q.E.D.
GwentProPlayer

BEAUTY IS IN THE EYE OF THE BEHOLDER

Peering into diamond stores piercing eyes observed
A guy who yelled, “get on all fours!”
With a swift execution he severed the glass
Centre display, and away with the best at last
The ruby that shined unlike all seen before
Truly gave glimmering glimpses of beauties rapport
A hustle you’re knocked by the crowd
Shocked you look around
One hazel eye deadlocked to the ground
One green eye walks towards a distant sound
A sisters call -/- A brothers cry
Around all the corners are new ways to die
You walk to the station
Stumbling speeches and steps
You open the door with what strength you have left
“Justice!” you scream, “Doesn’t trust us!”
It seems like it’s just us, your dream
And your rusted demeanor
Officers shy away desperate not to look
A short power outage was all that it took
“You’re right something’s wrong in the air out tonight.
Something sinister passing preparing for flight.”
Finally allies in these troubling times
Moving freely like structures of rhymes
Time passed -/- the crooked outcast
Caught in alleys draught with sharp glass
Down faster than a shot glass after class
Falls flat on his back beside his backpack
A shadow hangs back til it’s wise to act
A bus passed -/- the shadow snatched
What no glasses could see
The jewels gone, one more mystery
Shake hands with the sheriff
Who thinks it’s job well done
Him and his crew with one hazel eye
Green as pines the other ones
Unmap realities design and flash back to
That moment of time, eyeing a crime
Ten people inside hazel and green eyes a dime
Shake hands with the sheriff
The shadows don’t care if you’re a sinner or seraph
You walk home with a stone to take care of

ITSH

GAMES SEƵ

Come to Games Night , Thursday 6:30 to Midnight, MC CnD!

See ya there!

CylonSympathiser

9TH ARTICLE IN THE SAME ISSUE TO HOPEFULLY BREAK THE RECORD

If all my submissions for this issue get accepted (Including this one), I will officially have broken the previous record of most articles published by a single author in a single Math**NEWS** issue. BANZAIIIIIIIIIIIIIIIIIIIIIIIIIII !

[Huzzah! – TurnipHeadED]

CylonSympathiser

THE ARCHIVES AND ARTIFACTS OF mathNEWS

For most students, just knowing the current state of the faculty of mathematics, and its student societies is enough. But what if you want, or need more?

Well, you could go to a library that has records of old publications, and look through them, or head to the offices of Imprint, and try to find the story you're looking for. But what if you need something from before 1979? Perhaps a more apt question is "why are you looking for something that old?". But if you are, **mathNEWS** keeps records of all its publications since 1973, and as we are the oldest paper on campus, there's quite a lot of history in these volumes.

Along with this basic history kept in volumes of beautifully bound hard cover books, there are artifacts in **mathNEWS**, some examples being:

- A jar of dirt
- A broken lampshade from the Davis Centre
- A vanilla coke cutout
- A stack of punchcards that may or may not be a program
- A piece of the now non-existent Red Room computer room
- Various drink cans

These artifacts cannot tell a story of their own, as they are inanimate and cannot speak.

Anyways, the point is, now that I've cleaned up the office a little, I want people to visit. So come over and visit, see the stuff on the wall, read ancient copies of **mathNEWS** from the red books, look through the **mathNEWS** galleries, which, as one reporter put it, "Visitors to the **mathNEWS** galleries are always welcome and admission is free.".

Sincerely,
quizED (Zishen Qu)

A QUICK GUIDE TO ALL MATH CONTESTS YOU CAN WRITE IN UW

THE PUTNAM:

William Lowell Putnam Mathematical Competition is the most prestigious Math contest for undergrads in all North American universities. The event is usually run on the 1st Sunday of December of every year. It spans over two 3-hour sessions (morning and afternoon). During each session, contestants are provided with 6 problems, ranging from difficult to very difficult. The median score is either 0 or 1 (out of 120 possible points). The answers are fully proof based and often require upper year material, but some can be done with high school level math. The University of Waterloo is among the top participants every year, usually ranking in the top 10. The top 5 contestants each year are declared "Putnam fellows", which is a prestigious title that wouldn't help much on your resume, but will definitely help your chances of making it to a math grad program. Note that each individual is limited to 4 participations during their undergrad career. Registrations need to go through the university coordinator, who is Stephen New in UW.

BIG E / SPECIAL K:

These are yearly organised events by the Math Faculty for First years (Special K) and upper years (Big E). They are also proof based and serve as a good warm-up for the Putnam competition. This year they will be held on November 4th from 10am to 3pm. They consist of 6 problems, solutions are fully proof based and require knowledge of the appropriate level for each. The problems are also more approachable and way easier than the Putnam. Registration needs to also go through Stephen New (by e-mail). There are money prizes as well as free food before, during, and after the competition (or at least that's how it was for the past 2 years, and I'm assuming the tradition will be continued).

SMALL C:

Small c is a entirely Multiple choice contest, open to 1st and 2nd year students near the beginning of the Fall Term. Organised by the Math Faculty and is quicker, more light-hearted. This term's competition already happened on September 22nd, and since I'm no longer a 2nd year or lower, I couldn't make it to give you a good review. It's usually a 20 minute session where you answer increasingly more difficult multiple choice questions. In my 1st year, the organizer claimed the price "Might or Might not be a T-shirt and a water bottle", but as I wasn't among the winners, I will never know what the price actually was.

BERNOULLI TRIALS:

Bernoulli trials is a series of yes/no questions in succession organized by the Math Department each Winter term. Participants are also given a "carefully weighted, fair coin", to help deciding the answer in times of despair. The competition has a great light heartedness to it, and unlike Small c, each question is given its own time, and the leaderboard is updated after each question. It gives a good sense of tension, similar to a race. I definitely encourage you to check it out if you are here during the Winter term. Free food and good prizes are provided.

OVER 9000:

Over 9000 is an event organised by the Pure Math, Applied Math, and Combinatorics & Optimization Club (a.k.a PMC). The spirit is akin to Bernoulli Trials, but instead of Yes/No questions, the participants are given Mathematical expressions, and are asked the question : " Is this expression OVER 9000 , or less than *[or equal to −quizED]* that?". Unlike the other competitions, Over 9000 benefits from being organized by a student group hence has the benefit of being full of memes, more chill and the rules are not strict or are there simply because the organizer thought It'd be funny that "Ties will be decided by the funniest Team name". You also Should have noticed that this competition allows teams instead of requiring individual participation. (For this term, teams can be of arbitrary size, with some constraints, more on that will be explained during sign ups). Sign-ups will happen on the day of the contest, which will probably be Monday October 30th at 6 PM somewhere in MC (definitive date & Location to be announced on posters you will be seeing around MC next week). Free snacks, Pizza, drinks as well as your overdose of memes will be provided. There will also be prizes ! Including but not limited to $$.

INTEGRATION BEE:

A competition where you integrate stuff, also organized by the PMC when someone thought Integration is fun and decided to make a competition out of it. The competition is not happening this term (and if you ask me, hopefully in no future term neither). If you like Integration and think you are up to the task of organizing the event, you can nominate yourself to become the PMC's VP Contests in a future term!

I hope some of these contests interest you! They are all free to write so what better way to spend your boring afternoon other than doing Math!

CylonSympathizer

gridWORD

gridCOMMENT

I hope that you had a great Thanksgiving break since the last time this column was published, and sincerely hope that the crushing proximity of all sorts of middle-of-the-term assessments have yet to reduce the readers of this fine column to a gibbering goop. As students are wont to do, when I checked in but two hours before the submissions were due, there were none; yet in the end there were four submissions. Let's see how well they did; as a reminder, last issue's **gridQUESTION** was "How should one catch a fairy?"

- GwentProPlayer submitted a grid with 60 correct letters and answered, "Freeze it then use a Fairy Ball! Duh!".
- ***e*** submitted a grid with 105 correct letters and answered "Threaten a ring of mushrooms".
- Andrew submitted a grid with 192 correct letters and answered "very carefully please".
- J. Liu and N. Parkanyi submitted a grid with 199 correct letters and answered "There are none", attaching a copy of Sea Sprite (1{U}, Summon Faerie, Flying, protection from red *"No one can catch what won't be caught." —Kakra, Sea Troll*).†

Given that they had submitted the most correct grid, Liu and Parkanyi should come over to the **mathNEWS** office (MC 3038) with some identification and duke it out to determine which one of you actually gets to claim the prize from the poor, poor editors.

As always, submit this issue's grid to the **mathNEWS** office (or electronically via email to the **mathNEWS** email, mathnews@gmail.com) before 1800 hrs on the 30th of October, 2017 for a chance to win a prize that the editors went out and purchased (or so I am informed). In the event of a tie, my favourite answer to this issue's **gridQUESTION** shall be awarded the prize. The **gridQUESTION** is: "What is the most effective midterm lifehack?"

Happy solving!
Zethar

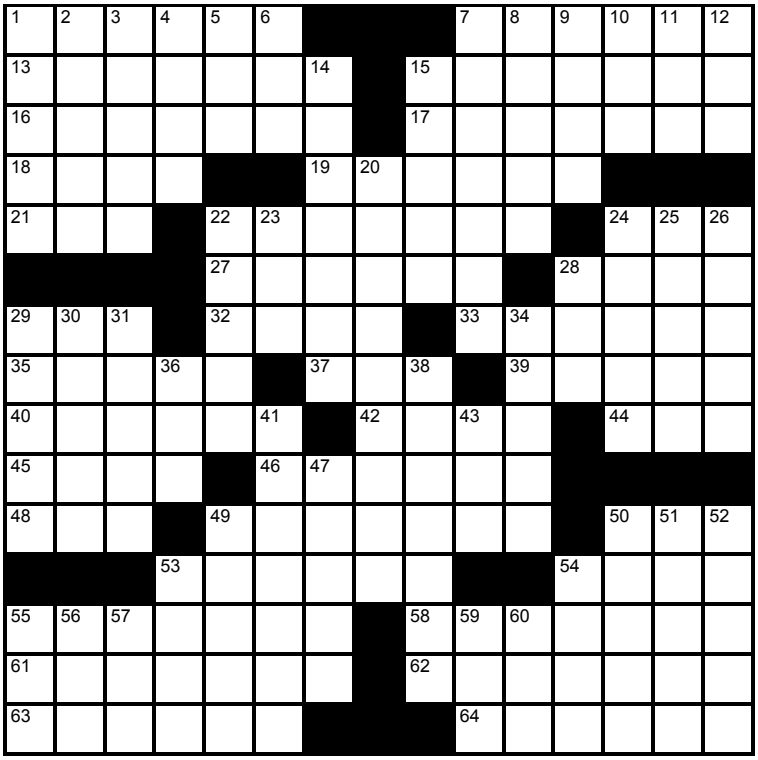
† I'm sure the prisoner that bottle in my lair begs to differ

ACROSS

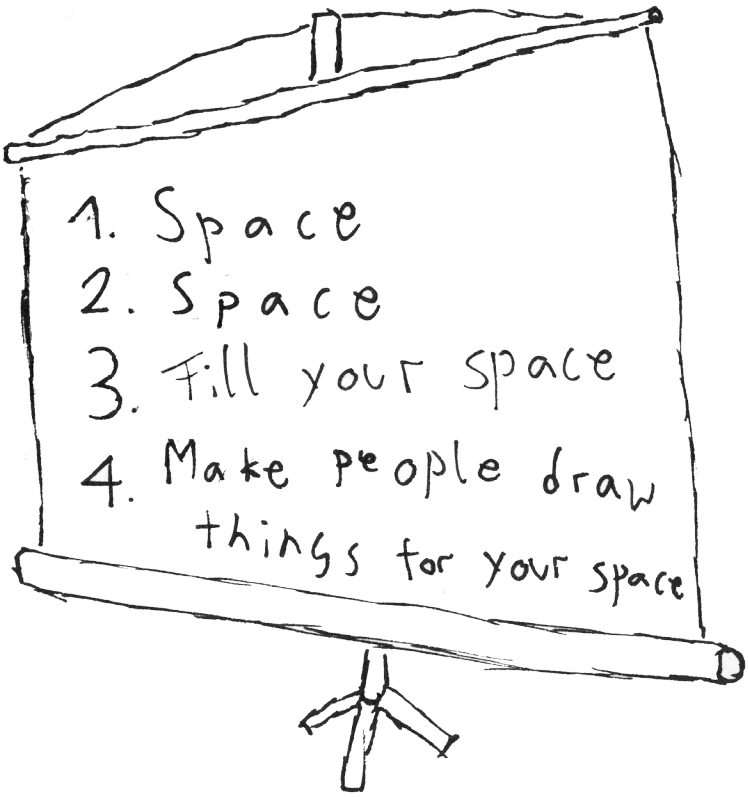
1. Circle, ..., glome
7. Lesbian poet
13. Crane construction?
15. Knave
16. Least element
17. Wide area
18. 5D units
19. Voters' problem
21. Shortly before
22. Distinctive ornaments
24. Asymmetric catalyst derived from proline
27. Reluctant
28. Eastern attire
29. Sacred animal of the Nile
32. Green
33. TF2 class
35. Exit
37. Half of a cosmic whole
39. Exercise with keys
40. Esoteric
42. Underground
44. Number of celestial stems
45. Manner
46. Hidden
48. Stroke
49. Usually lawful evil species
50. Paltry amount
53. Francis and Kevin
54. Meadows
55. Comes in dialects like Valencian
58. Finnish space strategy board game
61. Alacrity
62. Old device
63. Former capital of Dutch Brazil
64. Avoid

DOWN

1. Tank debut battle
2. Yenta
3. Turning-point
4. Auspices: Var.
5. Zodiac animal
6. War bird
7. Flower Power era
8. Part of many stars' names
9. Fair or foul
10. Arcadian god
11. Greetings
12. Wee hour
14. Figures of speech
15. Kine
20. A way of writing a positive integer as the sum of other positive integers
22. Jet flier
23. First mate?
24. Anglo-Saxon estate settlement
25. Old-style plait
26. Melodic creature
28. An IPv6 over IPv4 tunneling protocol (abbr)
29. A voltage limiting electrical circuit
30. Lookout point
31. ⸘
34. Demands
36. Moving option
38. A set of measure zero
41. Casting a fireball, for example
43. Flower garden
47. Hard wood
49. Muslim state head (var.)
50. Nasal dividers
51. Where to find dates?
52. Addicts
53. Java neighbor
54. Racket ancestor
55. "Wheels"
56. Gray
57. Quirk
59. Cygnet's father
60. Put



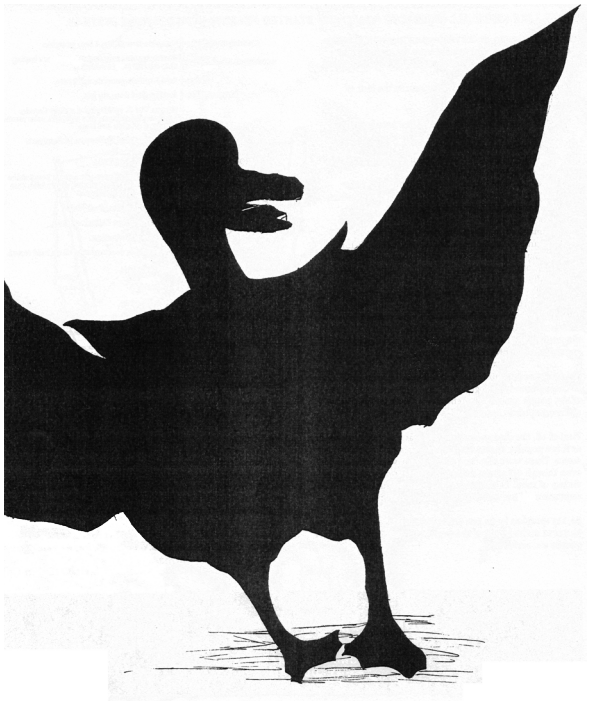
haltingPROBLEMS



LAST WEEK'S gridSOLUTION:

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

WHO'S THAT POKÉMON?



lookAHEAD

SUN OCT 22	MON OCT 23	TUE OCT 24	WED OCT 25	THU OCT 26	FRI OCT 27	SAT OCT 28
	Last day for online students to change their exam location		Deadline for %50 tuition refund	Games Night at 6:30 pm		Day of the Establishment of an Independent Czecho–Slovak State

SUN OCT 29	MON OCT 30	TUE OCT 31	WED NOV 1	THU NOV 2	FRI NOV 3	SAT NOV 4
	mathNEWS Production Night!	Fee arrangement deadline	Main student ranking open 12 pm	Games Night at 6:30 pm	v135i4 of **mathNEWS** comes out. Main student ranking close 2 pm	Special K and Big E competition

MEF SEZ

Math Endowment Fund(MEF) is now accepting funding proposals, and funding council nominations!

Are you in need of funding for an event that benefits students from the Math Faculty? Be sure to apply for funding before the deadline on November 3rd. Like Math Endowment Fund on Facebook to be kept up to date!

If you want to learn how to make a successful pitch and have an impact on what your school funds, you should submit your nomination to MathSoc or email it to mefcom@uwaterloo.ca. The deadline to be part of the funding council is October 27th by midnight.

We will be hosting office hours every Wednesday from 5 PM to 6 PM in MC 3012A, come meet us and we will be happy to answer any question that you have. You can also reach out to us by email on mefcom@uwaterloo.ca or find us on Facebook as Math Endowment Fund!

Andres Garcia Rodriguez
Executive Director
Mathematics Endowment Fund

ISSN 0705-0410

UW'S BASTION OF ERUDITE THOUGHT SINCE 1973

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