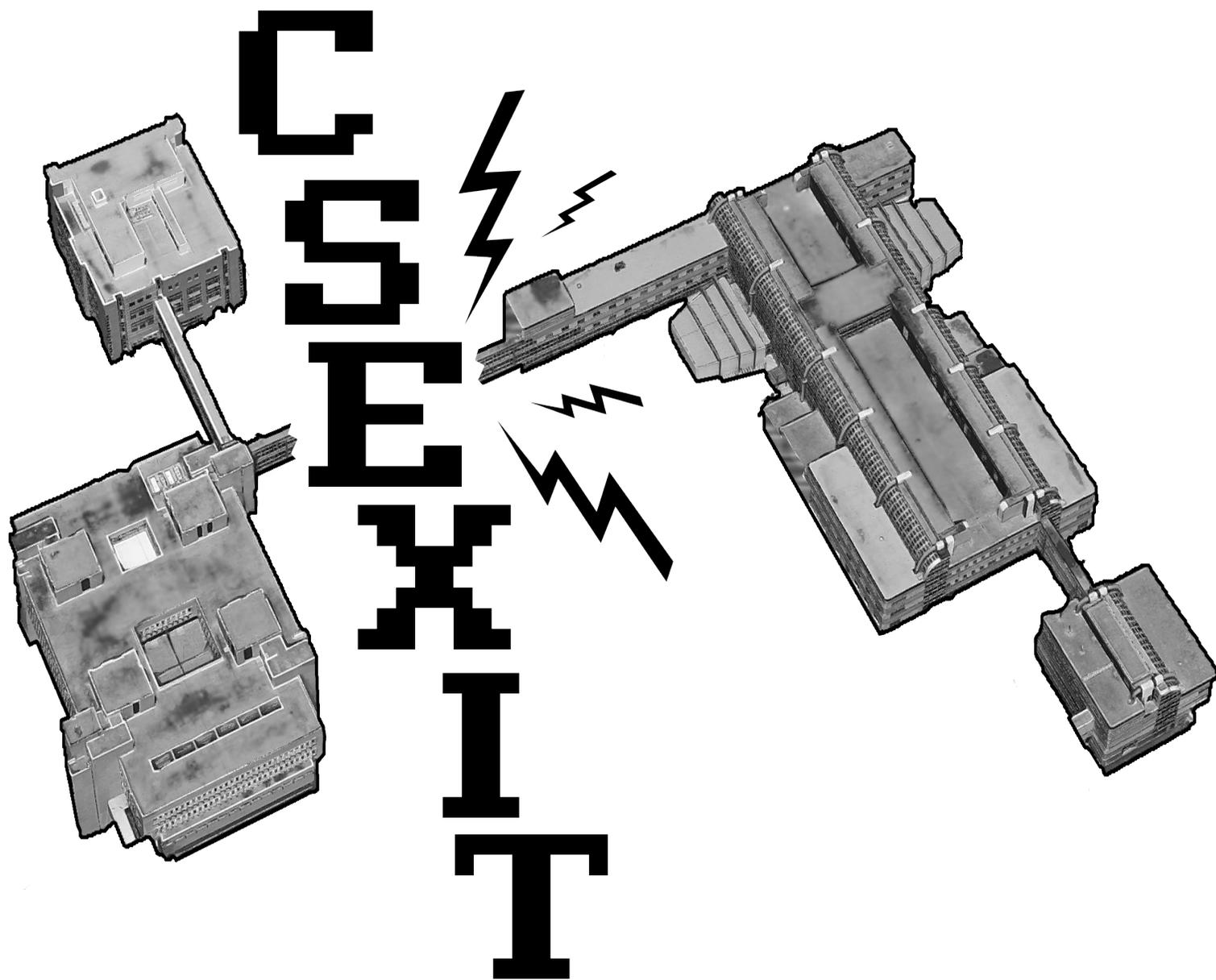


math NEWS

Volume 131, Issue 5

Friday, July 8th, 2016



Find Out what CSEWIT Means for You!

lookAHEAD**mathNEWS**

July 8	Issue 5 enters campaign period
July 18	Writers gather to vote on Issue 6
July 22	Issue 6 votes to exit the <i>mathNEWS</i> Office

MathSoc

July 7	Games with Profs, which was advertised two days before the event
July 15	Pints with Profs
July 16	Beach Day
July 21	General Meeting in Comfy, 5 pm
July 22	Pi Day

University

July 8	Drop, penalty 1 period ends
July 9	Drop, penalty 2 period begins
July 25	Make-up day (Monday schedule)
July 26	Make-up day (Friday schedule)
July 26	Last day of lectures
August 12–14	Computational Rhetoric Workshop

Miscellaneous

July 3–9	Summer Games Done Quick
July 8	Video Games Day
July 8	National Blueberry Day
July 10	Don't Step On A Bee Day
July 17	National Ice Cream Day

VPO Sez

As I am writing this, there are sour jelly beans available in the MathSoc office. (As you are reading this, there may or may not be any left.)

That is all.

VPO

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Zishen Qu ()
Shaundalee Carvalho ()

mastHEAD

This week's *mastHEAD* is written by the same guy as last week. I never have been or will be an editor and I have no clue what I'm doing. Oh well.

This past week's big news is CSEXIT. The CS referendum to leave the Faculty of Mathematics and found their own Faculty of Computer Science passed by a small margin. *mathNEWS* has been desperately trying to get a comment from the Dean of Mathematics, Stephen Watt, but he has been too busy dealing with the CSEXIT fallout. At least he has the fortitude to stand and deal with it instead of running away with his porker in a pig like a British politician.

In other news, I would like to give a warm welcome our new editor: Shaundalee Carvalho AKA undecided! Shaundalee has worked diligently on every aspect of this issue with varying degrees of success. (Still better than quizED, who is too lazy to write this, [*I'm delegating!*—*quizED*] and no this doesn't count as delegation. [*Damn.*—*quizED*]) My condolences congratulations!

We needed this *mastHEAD* to be three lines longer. [*This was only two lines. Did you want one more? —bunniED*] Here, have our secret layout methods, imprint.

Uncreatively, this week's *mastHEAD* asks our *mathNEWS* writers: "How do you feel about CSEXIT?"

BeyondMeta ("Existential Angst"); Me ("WTF is happening?"); TheUndecided ("Plz don't leave :("); Element ("I'm finally part of something!"); Diminutive Rex ("I'd let them back in ;)"); HatOfChocolate ("When in doubt, run in circles, scream and shout."); Shay Blair ("#overlylonghashtagtoexpressmysupportforthiscause"); Courtside reporter ("CSTAY"); waldo@<3.LE-GASP.ca ("Unsurprised... and sad... and now frustrated as to what this may mean for my CS minor."); Zethar ("えっ?なにこれ?あつ、意見なし."); LF ("Math can CSUCKIT");

aN0rMalWr1tEr("I'm feeling free and CSEXY!")

Article of the Issue

The Article of the Issue for v13i15 goes to Ender Dragon for the "CSEXIT Prediction Markets". This is probably as close to any real researched math we're going to get in *mathNEWS*, and your powers of prediction paid off in the form of a gift card! To be honest though, the International CS tuition will still probably double within the next 5 years even without the CSEXIT.

The Editors

**Submit your articles in the
BLACK BOX outside the
MC Comfy or email them to
[mathNEWS@gmail.com!](mailto:mathNEWS@gmail.com)**

An Ode To The Horde

The zombie horde descends upon our school.
Sign up today to join in all the hype.
Find your bandanna. Read up on the rules.
Prepare your weapons, nerf and sock alike.

I know, you'll say you don't have the free time
Assignments dragging you back down to earth
Piles of work you have short weeks to climb
I'm telling you - you know it will be worth.

'Cause something special happens in this match.
Friendships forged on trust and brotherhood
There's glory in the clever plans you hatch
You'll do things that you never thought you could.

And though I never say this when it ends,
I know I'll always do it all again.

Signups today by Math C&D and POETS!
Diminutive Rex

Arbital

Have you ever had a concept in one of your courses whose explanation given to you by the prof just didn't make sense?

There's a new Wiki out there that I'm contributing to called Arbital, which is a project to provide intuitive explanations for mathematical concepts. We're currently in the process of building a basic corpus of concepts to introduce, but we'd like to have some people check us out, maybe contribute some explanations of their own, possibly even edit existing ones for clarity, or comment on their effectiveness. Here's the link, if you're interested: <https://arbital.com/>.

In particular, to see a demo of what their full explanatory process would be like, visit their page on Bayes' Rule: https://arbital.com/p/bayes_rule_guide/.

Ender Dragon

Humans VS Zombies Sez

Have you always dreamed of killing zombies... in tune? Do you yearn to hide behind bushes and kill humans... with a sick backbeat? Maybe you want to samba out a sock battle, or practice your ballet while trapped in a bathroom. All of these experiences and more are available to you in Humans VS Zombies Spring 2016: Crypt of the NecroDancer!

It's happening next week, July 11th-15th! You can sign up today from 10-5 in our booths by Math C&D and POETS. If you can't make it, but still want to sign up, email the mod team at uwhumansvszombies@gmail.com.

Make sure you get buried in your best dancing shoes. We'll see you on the floor Monday.

Call for Math Spirit Songs

In order to inspire and motivate us, to bring us together, or just to annoy everybody on road trips (or during Orientation Week), we recently had the following idea: we could take popular songs and invent cool math-related lyrics for them!

As an example, we thought of the following text for the song "Edelweiss":

Metric space, metric space,
Sets defined with a distance
Open balls, Cauchy nets,
Compact sets that complete me
...

If you have any interesting lyrics, you can inspire everybody by writing them on the walls of MC with your own blood! For extra accessibility, you can alternatively submit them to **mathNEWS!**

kartoffel & spargel

Adventures in Depression

Or One Very Long Adventure in Depression

I have had clinical depression for almost a decade now. I probably had it before then, too, but about a decade ago is when it was severe enough to be noticed and diagnosed.

Since then, nothing has really been easy for me. For most people, high school was a breeze, but I struggled through it--I struggled to get into UWaterloo, I am struggling through undergrad, and when I finally graduate, I will certainly continue to struggle. I often wonder if I deserve to graduate; I certainly would not be graduating if it were not for the myriad of petitions I have submitted throughout my undergraduate career. Even more than that, I wonder if I deserve to be here at all. Like with undergrad, I made it through unconventional means (by transferring). If school is already such a struggle, what am I going to do when I finally enter the "real world"?

My depression has been worse in the past few months than it has been in years. Every week or two, I get a day where I do not want to die. I have made half-hearted attempts at getting help. Counselling does less than nothing, and leaving the country for a month did not change things. Even following the unsolicited advice given to me, like acting happy because (à la Aristotle) "you become what you do", has not helped. Life was difficult enough when I was not in this state almost every single day, and the prospect of entering the "real world" is multitudes more distressing knowing that it could take years to recover.

a subpar cat

**Follow us on Facebook
(*mathNEWS*),
or in person (MC 3030)!**

The Essential Spectrum

A somewhat bitter exposition on Operator Theory

Let T be a bounded operator on a complex Banach space X . The spectrum of T , denoted $\sigma(T)$, is the collection of complex numbers λ such that $\lambda I - T$ is not invertible. That is, either it doesn't have an inverse at all, or its inverse is not a bounded operator on (all of) X . The Open Mapping Theorem produces a corollary that says that if a bounded linear map between Banach spaces is bijective, then it must have a bounded inverse. Hence the ways $\lambda I - T$ can fail to be invertible are summed up by saying that it is not injective, or it is not surjective:

- The kernel of $\lambda I - T$ is non-trivial;
- The image of $\lambda I - T$ is not dense in X ;
- The image of $\lambda I - T$ is not closed.

The different ways this can happen (combinations thereof, etc.) produce a partition of the spectrum into parts called the point spectrum, the residual spectrum, and the continuous spectrum (not respectively). The first two split into further parts. You can see that vectors in the kernel of $\lambda I - T$ are eigenvalues of T corresponding to λ ; the spectrum is the natural generalization of the eigenvalues for a matrix. The point spectrum is those values in the spectrum satisfying the first condition above; these are exactly the eigenvalues of T .

Of course, matrices have finitely many eigenvalues, and each of them have a finite multiplicity (i.e. dimension of the generalized eigenspace). Unlike matrices, however, general bounded operators on Banach spaces can have much more terrible spectra. For example, an operator can have no eigenvalues; its spectrum can be just the value 0; its spectrum can be the entire closed unit disk; eigenvalues can have infinite multiplicity, etc. So it becomes useful to be able to tell which of the values in the spectrum are "nice", in the sense that maybe they're eigenvalues with finite multiplicity, and such that $\lambda I - T$ is otherwise well-behaved. The rest of the spectrum is then called the essential spectrum. This is where the information about the nasty parts of the operator lives.

Notice that we didn't give a precise definition. This is because there are literally five nonequivalent definitions of the essential spectrum. Each one has a slightly different definition of what's "nice". Amusingly, all of the definitions coincide when you restrict to the case of self-adjoint operators on a Hilbert space, and if we define the essential spectral radius to be the supremum of the modulus of values in the essential spectrum, this number is the same for all of the definitions. Great going.

Moreover, in ergodic theory it is common to want to show that an operator is quasi-compact, which basically means there is a gap between the spectral radius and the essential spectral radius; there are some "nice" spectral values that give you some information, instead of hiding everything in the essential spectrum. The essential spectrum shows up in a slightly different form, here, too; it then falls to the reader to check if this other definition of the essential spectrum (i.e. the intersection of the spectrum with the closed ball of radius equal to the essential spectral radius). Turns out it's not; consider a projection P onto

a finite codimension subspace of a Hilbert space. Its spectrum is $\{0,1\}$ (by the Spectral Mapping Theorem), but the only element in the essential spectrum is 1 (since 0 is an eigenvalue of finite multiplicity). Could this be an artifact of this projection being equal to $I - Q$, where Q is the projection onto the finite dimensional space? Perhaps; note that the spectrum of $\mu I - T$ is equal to the spectrum of T translated by μ , for any complex number μ . This makes the notion of spectral radii somewhat finicky, now, doesn't it?

The moral of the story should be reasonably clear, at this point: literature searches and reviews are incredibly important. Otherwise, different things will be given the same name repeatedly, and poor unsuspecting and unknowledgeable graduate students will lose days of their lives trying to figure out what the hell is going on. The alternative moral of this story is that disciplines of math should probably make more of an effort to make their terminology not vague or confusing.

The alternative alternative moral of this story is that maybe Scythe Marshall should pick up a "good" textbook on this stuff, and stop complaining about stuff he doesn't really know. Also maybe he should listen a bit less to people who say "reading papers is the best way to jump into learning things," because sometimes people write textbooks for the explicit purpose of helping you obtain a solid knowledge base for something; you just have to find the right textbook.

Like I said, somewhat bitter...

Scythe Marshall

Writer too Brain Dead to Write Original Article

This past Monday production night, Beyond Meta attempted to write an article that had the potential for substance. This was not successful as the writer was so severely brain dead that the only thing they were capable to write was a self indulgent meta article. There was insufficient content in their mind for it to go into a *mathNEWS* article. Some people would say that this is indistinguishable from normal *math-NEWS*; these people also don't read *mathNEWS*. They aren't familiar enough with the content to notice the considerable difference. Hopefully Beyond Meta will recover the capacity for interesting thought for next issue. For now they will now rest.

Beyond Meta

Submit your articles, *prof*QUOTES, to mathNEWS@gmail.com or the BLACK BOX near the MC Comfy Lounge.

CSEXIT Prediction Markets

Now that the Faculty of Computer Science has separated from the Faculty of Mathematics, a wide range of betting markets have sprung up furiously almost overnight, as people put money on predicting what they think will happen in the aftermath. Here is a glimpse of the current outstanding betting offers on the popular betting exchange website Mathbook.com, as of market close on July 4th, 2016:

Prediction	BACK LAY					
The Math faculty will crumble without CS to support it	6.35 \$20	6.5 \$874	6.7 \$160	6.8 \$256	7.1 \$220	7.21 \$10
The CS faculty will crumble without Math to support it	6.8 \$85	7.3 \$150	7.5 \$324	7.7 \$75	7.78 \$20	7.8 \$100
Mathematics will be reabsorbed into the Faculty of Arts	1.58 \$1,586	1.59 \$2,504	1.6 \$2,157	1.62 \$3,004	1.65 \$211	1.675 \$150
International CS tuition fees will double in the next five years	1.08 \$639	1.1 \$1,405	1.12 \$2,752	1.18 \$465	1.2 \$1,107	1.21 \$1,536
The Dean of Mathematics will resign	4.2 \$108	4.7 \$65	4.9 \$70	5.2 \$48	5.4 \$89	5.43 \$20
CS courses will no longer count as math courses for BMath degrees	—	2.1 \$25	3.7 \$30	7.9 \$15	1000.99 \$10	—
Non-CS majors will no longer be allowed to take lower-year CS courses	3.8 \$16	7.9 \$30	11.6 \$15	15.8 \$25	35.0 \$8	1000.99 \$10
The Faculty of Mathematics will start offering its own CS courses	—	—	14.7 \$5	17.3 \$6	1000.99 \$10	—
The CS faculty will split into its own campus elsewhere	100 \$10	180 \$5	240.5 \$8	1000.99 \$10	—	—
At least one CSEXIT-related article will get over 2,000 upvotes on /r/uwaterloo	—	1.005 \$200	1.008 \$125	1.01 \$10,734	1.013 \$150	1.016 \$2,500
HeForShe will finally equalize gender representation in the Faculty of CS	750 \$12	800 \$16	1000.99 \$10	—	—	—

How to read bets:

The bold numbers are the odds being wagered. Mathbook.com uses decimal odds, which is the decimal multiplier that the backer of the bet receives if that particular bet is successful. For example, if somebody bets that Barcelona will win with 5.1 odds, this means their total earnings will be multiplied by 5.1 if the bet resolves in their favour, including their original stake. If they backed \$100, they would win \$410 plus their original stake of \$100, for a total of \$510.

The amount of money shown on the bottom is the total amount of outstanding backed money (or money to be backed in the case of a laid bet) wagered on those odds. So in order to lay a \$100 bet at 5.1 odds, the layer must stake a total of \$410 of their own money, or 4.1 times the bet amount.

Ender Dragon

RegreCSEXIT

With CS deciding to withdraw from the Math Faculty, there are already people feeling the impact. After the referendum on June 23rd, many people are claiming they only expected a protest vote, and many others are claiming they had not even heard of this. As Google trends show, waves of people were looking up "What is the Math Faculty?" only after the vote. Questions also exist about those who didn't vote; the majority of CS students that didn't vote were in the 18–24 range, raising questions about what the youth vote would have changed. Calls exist to rollback the vote or to restore a backup of the Faculty to before the referendum. The unexpected result has led to a large rise in the value of pink ties; upset investors have destabilized portions of the broader campus black market. Supporters for CSEXIT have campaigned on the promise that this will result in long term benefits. Based on the initial results, it appears that benefits will indeed be far on the horizon. For now we are only seeing lots of regret.

Pockets

I'M COMFY
WHERE I AM

CS Faculty Budget Woes

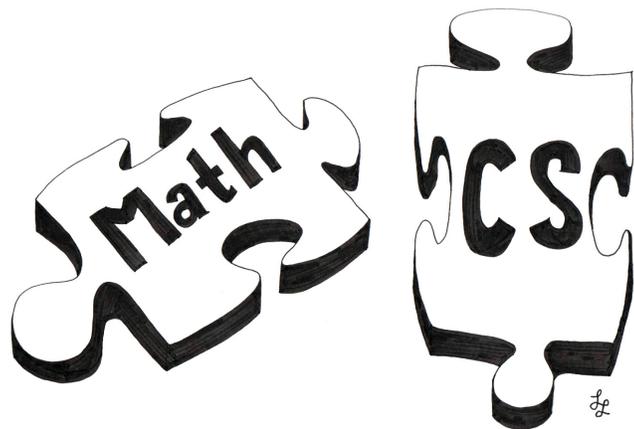
Ever since CSEXIT went through, the CS Faculty has been struggling to pay for several increased and essential lines on its balance sheet.

"Ballmer Peak" is 5 times higher than it used to be and "Student Interaction" costs have doubled. The cause came as a surprise: CSEXIT's passing resulted in CS students and staff being barred from Pints with Profs, which used to provide students with the interaction they needed and profs with the coping devices to handle those interactions.

"Trees - misc." has tripled, with no explanation. Nobody is sure what that line represents and the explanations of Binary and Red-Black have been woefully insufficient.

"Student Space" is a new one. Without the C&D, Comfy, and MC labs, CS students no longer have anywhere to play LoL. The quantity of loud, toxic students in the DC library has skyrocketed and new tables are being added to the DC hallways near the SoftEng Lab.

CSEX-IT specialist



CSEXIT: Ducks to a Pond

The vote has been cast; CSEXIT is done.

The CS majors are in complete turmoil with the DC/MC bridge being severed. Trying to get past the ION construction was bad enough, and now this? Have they made a mistake? Was it all worth it?

We must consider what CS is to Math, and vice-versa. Math has an interesting relationship with CS. Math 'has-a' CS, but now CS is independent.

CS majors have lives outside of Math of course, just like a pond has ducks. And of course, the ducks indeed have lives outside of ponds. Ducks must be free to waddle away from the pond; they are not tied to the pond. One might even say that CS is a free duck, ready to waddle away at any time. Such is life of a UW duck; such is life of a UW CS major.

An ode to ECE 457A

DJ

How you make us wail tears over that midterm
And how we gnash our teeth in rage over the assignments

Retroactive revision of grading schemes is all that saved us
While pushed back deadlines are gleefully rejoiced over

Now we frantically try to understand
Not just concepts but also the prof

As we wind towards the final we are left with questions
With browser tabs open to Minimax and Tabu Search algorithms

Even all the algorithms we learnt can't help us
Answer our most important question:

Prof, if it takes you 80 minutes to do the paper yourself,
Give us at least double? Please?

TL;DR - ECE457A: Would not recommend.

Disclaimer: I'm in ECE, be happy I didn't use LaTeX

N Bizarre Victorian Parlour Games For Your Next Party

- **Marriages and Divorces:** You sit down and write yourself what amounts to a Tinder bio, and then are paired up with someone of the opposite gender and have the judge decide if you are to be married or not based on your bio.
- **The Tidy Parlour Maids:** Two girls have feather dusters and they go around feather dusting all the guys in the room.
- **Bullet Pudding:** You fill a bowl with a two foot high pile of flour, and rest a bullet on top. Everyone, in turns, pokes at the flour to make little flour avalanches. The person who eventually makes the bullet fall has to shove their face in the flour to retrieve the bullet, and try not to laugh too much so they don't breathe in too much flour and actually die. Waste of flour, in my opinion.
- **Hot Cockles:** Someone sits in a chair, and someone else lays their head in their lap. Everyone one-by-one kicks the person lying down. If that person correctly guesses who kicked them, they swap places with that kicker. (I'm not sure why the head-in-the-lap part is necessary.)
- **Kiss Your Shadow:** A girl bends down and attempts to kiss her shadow on the ground, and a guy sneaks around and stands behind her. (Scandal~!)
- **Feeding The Baby:** A guy is wrapped up in a sheet in the middle of the room, and three women feed him custard, tea, and wine in tea spoons while saying 'Sweet baby'. (Actually.)

I hope your next party is totally normal and lots of fun!

Diminutive Rex

The Issue of the Article

Articles have lots of issues. One of the worst ones, though, is knowing what they refer to. English has a definite article and the indefinite article. Those were backwards. Some of you may not know what this refers to.

If so, you will not be enlightened. As I said, this article has issues. One of the issues is that it refuses to say what it's about, much like the inarticulate articles defined above.

Really, the only purpose of this article is to have a long shot at winning the article of the issue award, resulting in the phrase "the article of the issue is the issue of the article." Now that phrase exists, and this article has no further point.

tesseract

*myth*NEWS

A human skeleton covered in wax and feathers has been found in the Aegean sea. A team of angel investors has plans to raise his body and attach a fleet of quadcopters to it to allow him to complete his journey, 2500 years later. This is in no way a metaphor.

HoC

tesseract

Youtube Is A Bully

I have a beef with Youtube.

Were I to direct my (justifiable) fury to this entity, I am sure they would reply with an advertisement for burgers, spare ribs, or more likely, something completely unrelated, like razor blades... or diapers.

You see, according to Youtube, I am a middle-aged mother of three, seeking the cure for wrinkles and a swift yet natural hair-do. ("Hair as natural as you are"—thanks, I'm as natural as a mass-produced tube full of chemicals, I'm touched.) Which, I suppose, is not unreasonable given my musical tastes (THERE IS NOTHING WRONG WITH OBSESSIVELY LISTENING TO SAPPY BRITISH ARTISTS BEMOANING A LOST LOVE. I AM SANE). Normally I would not be particularly offended by a machine-learning algorithm that insists on subtly insulting me every time I play a video. It's a machine. I'm sentient. Joke's on you, dumb computer. Ha ha.

But... *The Pampers Ad*.

If I have to watch one more baby toddling around in a diaper ad, I will scream.

Don't you dare tell me babies are adorable. If I wanted one, I'd go get one. (Presumably, from a stork if cartoons are to be believed, which they totally are. Bugs Bunny never led me wrong. Asides aside...) Unfortunately, overpopulation is a thing, and another thing is that I don't want one.

So, when I'm happily entrenched in my daily dose of self-pity and love songs, I do not feel like being rudely jerked out of my indulgent bingeing on mopey melodies by a stupid "dancing" baby who's diaper is sagging. That kid is not dancing; that kid is plotting your murder, the innocence is a FACADE.

Besides, if I don't have kids, I don't need diapers. Unless Youtube thinks I need diapers—adding insult to injury.

You can imagine my sheer joy when I discovered a little button that said something along the lines of "Is this ad irrelevant?" at the bottom of a video. I did a little dance. I held an impromptu party with my imaginary friend. Then I clicked it.

And. The next day. I saw. The ad. Again.

And the day after that... And so on.

The button is gone too now.

There are alternatives, of course. I could pay. But I'm cheap and yet simultaneously broke. Also, if I did, that would be a victory to Youtube. I will never let the evil marketing overlords win this war. And believe me, it is war.

WAR!

N Reasons I Hate this Summer Term

This season is not up to snuff at all.

- The weather can be too much to bear (mathies are CLEARLY not used to the sunlight)
- Awful people making me feel awful for no reason
- Too much going on personally to list in one point in an "N Things" article
- MATH 239 (Brace yourselves...the final is coming....)
- Stupid arithmetic and calculation errors
- Lack of punctuality at all the important things one needs to do
- Decreased motivation to DO all the things one needs to do
- Too much to do (do you KNOW how much is going on in KW this summer? A LOT...)
- Too much going on in the world that just makes life seem terrible
- Other commitments keeping me from coming to production nights and writing *mathNEWS* articles that help relieve stress (I've missed this crazy group)

This Mathie Needs a Vacation

Computing Figures Figuring Computers II A Workshop in Computational Rhetoric

Details and registration: ComputationalRhetoricWorkshop.uwaterloo.ca/

Inquiries: rhetfig.uwaterloo@gmail.com

\$80, Regular Faculty and Salaried Employees

\$50, Students, Contract Faculty, and Contract Employees



Talks by and discussion with

• **Chris Reed**, University of Dundee • **Chrysanne DiMarco**, University of Waterloo • **Daniel Devatman Hromada**, Slovak University of Technology and University Paris 8 • **Ying Yuan**, Soochow University • **Randy Allen Harris**, University of Waterloo • **Jelena Mitrović**, University of Belgrade • **Ashley Kelly**, University of Waterloo • **Cliff O'Reilly**, Anglia Ruskin University • **Marie Dubremetz**, Uppsala University • **Michael Ulyot**, University of Calgary •

12-14 August 2016

The University of Waterloo
Waterloo ON Canada



horrorSCOPES

ActSci: Based on the aftermath of the Brexit vote, you begin to extrapolate actuarial mortality tables from people to countries, and it doesn't look good.

Your unlucky number is: Citizenship in 0 countries.

AHS: You don't know much about this whole Brexit thing, but you know Donald Trump went to a golf course and got made fun of. Clearly, they wouldn't have laughed if he had been better at golfing.

Your unlucky number is: (18+A) holes.

AMATH: Since immigration was a major issue in the Brexit campaign, you decide to model the flux of people across national boundaries.

Your unlucky number is: 4 flux given, corresponding to the divergence within the boundary.

Arts: You heard about Scotland's plan to have a second referendum to reverse Brexit. The psychology department, which was on the verge of becoming a science, may do the same thing.

Your unlucky number is: 180 degrees of psychology.

Bioinformatics: Your allegiances lie with CS and biology so the CSEXIT aftermath doesn't concern you. Unfortunately, the Bioinformatics Club has been booted out of MC and your new office isn't quite so well located.

Your unlucky number is: 1 computer lab exchanged for 2 aerobic biodegradation labs.

C&O: Since no one else is doing anything to help, you begin considering stable matchings between individual countries and multinational blocs.

Your unlucky number is: 1 shapely solution, conveniently a world hegemony.

CS: You boldly voted to leave Math, in the hopes of avoiding Calc 2 and STAT 231. The Math Faculty decides that the degree requirements only change for new incoming students and, additionally, that CS students now need to pay a separate Math tuition.

Your unlucky number is: \$6000 short of paying for next term.

Double Degree (Math): Business as usual for you, although some of your peers seem overly stressed.

Your lucky number is: 20% fewer students in your linear algebra class.

Double Degree (CS): As a dual citizen, you are stuck in the middle, and now have to pass border controls to get into Calc every day. Your Math Double Degree classmate at Laurier don't understand what the big deal is.

Your unlucky number is: 82 extra minutes of daily commuting.

ENG: Import taxes on beer become too expensive to pay, so with your enterprising spirit you make your own. Unfortunately, all of the fermenting equipment is similarly impossible to obtain.

Your unlucky number is: 2 tons of rotting barley on your dorm room floor.

ENV: The breakdown in international trade is great! Everybody is eating more local produce, everybody is planning potlucks, and your co-workers no longer look mock your bad gardening skills.

Your lucky number is: 12 months of bland British food.

KI: Your integrated knowledge gives you unsurpassed ability to understand all the arguments in the Brexit debate, but no one ever listens to you because they have no idea what your program is.

Your unlucky number is: 14 reasons falling on deaf ears.

MathPhys: You use the principle of least action to model the career trajectories of British politicians. All your calculations turn out to be remarkably simple.

Your unlucky number is: -9.8 meters per second squared.

PMATH: Since you are a good student of Gödel, and the EU is no longer complete, you begin to wonder if it can be proven to be consistent.

Your unlucky number is: 2^{27} pages of impenetrable legislation to formalize.

SoftEng: You were prepared for all eventualities. You easily weathered CSEXIT since you housed yourselves in DC and kept backups of Britain. You grab the latest British backup tape and perform a restore.

Your unlucky number is: 1 very upset William Lyon Mackenzie King, because you didn't realize it was the last *Canadian* backup.

Stats: Polling has once again let you down. You decide to conduct more polls to precisely assess the perceived accuracy of polling.

Your unlucky number is: 19 times out of 19 times out of 20 polling polls fail to pull poll results.

Teaching: You realize that the largely unintended results of this referendum create a perfect teachable moment. You stage a referendum on students coming to class.

Your unlucky number is: 34 really awkward absences you have to explain to your boss.

Undecided: By abstaining from voting, you recognize that you were part of the problem. In frustration, you decide to punch a wall, but you can't decide which hand to use and end up going for both.

Your lucky number is: 2 broken arms."

**"Don't feed bubble wrap to puppies."
– Steven Furino, Associate Dean of Mathematics**

profQUOTES

- "If you find yourself in the ditch because you've forgotten how to walk, just stop and remind yourself, 'They're just polynomials.'" Pei, MATH 239
 McKinnon, PMATH 347
- "If I = (0), we're done. And I mean for this proof, not that we're roast beef." Pei, MATH 239
 McKinnon, PMATH 347
- "Some days you've got the Midas touch. Everything you touch turns to mufflers." Avery, CS 349
 McKinnon, PMATH 347
- Prof: "Does anyone know the first 20 elements of the periodic table?" Avery, CS 349
 Student: "Is this going to be on the exam?"
 Prof: "It's a good thing to have on a distributed systems exam!"
 Daudjee, CS 454
- Prof: "How do we prevent deadlocks?" Avery, CS 349
 Student: "Hire a UWaterloo grad to write a program that prevents deadlocks."
 Prof: "Is there anyone here like that?"
 Daudjee, CS 454
- "How many of you agree? This also tells me how many are paying attention." Stinson, CS 458/658
 Weddell, CS 348
- "The TAs said you all did too well on the midterm. I'm sure it's because of the amazing teaching." Stinson, CS 458/658
 Weddell, CS 348
- "The midterm average was a little lower than I wanted. I was expecting a 100." Banerjee, STAT 231
 Weddell, CS 348
- "One of our exams was stolen last term so everything's out there now... except integrity." Seeds, PSYCH 211
 Pei, MATH 239
- "Make sure you pronounce my name correctly. If you call me 'pi', you automatically fail." Momani, PSCI 257
 Pei, MATH 239
- "Don't write this on the exam. You'll lose marks. Unless you *want* to lose marks...then by all means!" Momani, PSCI 257
 Pei, MATH 239
- "I'm a little sick so my brain isn't working very well. Then again, people say that *any* day." Unal, PSCI 257
 Pei, MATH 239
- "Democracy is a dangerous thing in math... and especially in the USA!" Unal, PSCI 257
 Pei, MATH 239
- "Let's draw a graph where nothing touches each other....story of my life." Unal, PSCI 257
 Pei, MATH 239
- "You know Euler? From Edmonton?" Unal, PSCI 257
- Student: "What's the answer to the most difficult question [on the midterm]?"
 Prof: "3... don't quote me on that." Unal, PSCI 257
- "We're going to use precise terms like 'fairly low'." Unal, PSCI 257
- "[Steve Jobs said,] 'Nobody wants a stylus', except Apple who now wants you to buy one." Unal, PSCI 257
- "As Steve Jobs would have said, 'Who needs a keyboard?'" Unal, PSCI 257
- "[Prof's phone rings.] I only get calls in this class. Really." Unal, PSCI 257
- "No caller ID. They can go to wasteland." Unal, PSCI 257
- "Unlike 99% of what you would see in a movie, this was fairly realistic." Unal, PSCI 257
- "The slides say that Mallory is a man-in-the-middle, but Mallory is a female name, in case you're wondering." Unal, PSCI 257
- "The plural of anecdote is not data." Unal, PSCI 257
- "Reddit is a website, right?" Unal, PSCI 257
- "An academic solution in the real world is basically bullshit." Unal, PSCI 257
- "On a lighter note, let's go back to Iran!" Unal, PSCI 257
- "My children are over 30, but I love 'em anyways!" Unal, PSCI 257
- "I'm bad at numbers, that's why I became a diplomat." Unal, PSCI 257

N Things That Could Take the Soon-to-be-Vacated Slot in the EU

- Canada!
- France 2: The Francening
- A large collection of children in an England-shaped trenchcoat
- The moon
- Atlantis
- Your mother

no signature

connectTheDotCOMMENTS

Hi! I felt that the puzzles in *mathNEWS* were approaching unsolvable levels, insolvent even. As *mathNEWS* is highly solvent, a simpler puzzle was introduced: connect-the-dots. Unfortunately, it seems that this is also too difficult.

I would like to honour the only submitter, despite her inability to understand that connect-the-dots puzzles have a rule where lines must be connecting dots. Mathematically speaking: the challenge is to create a visually appealing planar graph from the vertices presented by adding edges. Here is a non-euclidian planar cat, courtesy of some Reila, Z. Reila, you can pick up your prize* of artistic fame right here.

**Prize has no monetary value and cannot be exchanged.*

Since the last puzzle was too difficult, here is a simpler one: **Connect the dots to form a planar bi-partite graph with a 3-cycle..**



Artillery of the Issue

This week's artillery of the issue is the Swedish and Norwegian developed Archer Artillery System - FH77BW L52. A truly cool looking bombardment platform. The designers can pick up their prize of a \$25 conestoga mall gift at the *mathNEWS* office in MC 3030. We are also looking for co-op placements.

Image by Ibaril - Own work, CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=7017423>



gridCOMMENTS

Hello everyone. I would first like to apologize to the people who couldn't find the instructions to the previous easy puzzle and the fact that I made the hard (crossword) puzzle really hard. As an apology, please accept this issue's perfectly normal crossword puzzle for all you crossword lovers.

The second apology that I would like to make is that I apparently made a copy-and-paste error in my puzzle: I misspelled "Asgard" as "Asgaod" in the puzzle. I do apologize, although that didn't stop anyone from correctly solving the puzzle.

The following people gave the correct answer "large fronds" to the puzzle in issue 4, along with their answers to the *gridQUESTION* of last issue, "How does one stop a rampaging monster?"

- Jasper: "" (Alternatively, ε)
- David: "I dunno. I'm busy with my thesis and this is not my area of research"
- l3france: "admire it's muscles until it flexes out of the room."
- Marc: "Vote for Clinton"
- Reila: "Build a wall & make Mexico pay for it!"
- Joseph: "with a larg hammer, potion, and so ther people in monster Hunter" (Sorry, I can't read your handwriting)

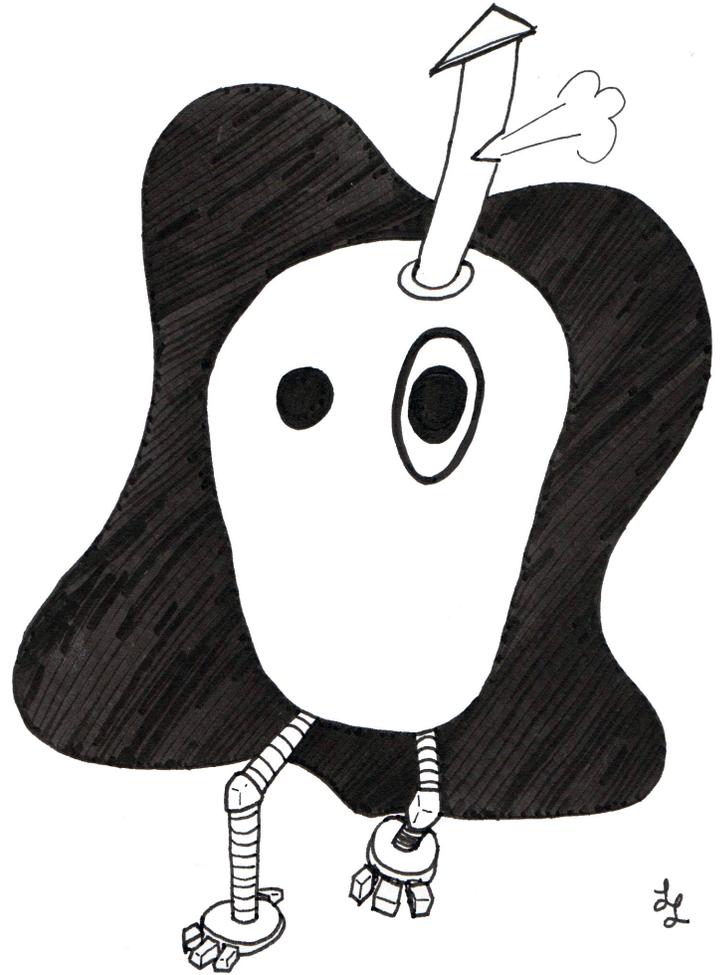
Personally, I think such political jokes have gotten a bit stale (or depressing, depending on how one views the shitshow just across the border), and neither really captures the je ne sais quoi of being able to stop a rampaging monster. David gets a nod from me to his honesty regarding the solution, and under no good incentive system I am allowed to let the empty string win, even if it turns out to be a very reasonable answer.

This leaves with the two video game references, one to Undertale and Monster Hunter. I suppose that they'll do, errors and all, since I'm pretty sure I've collected a surplus of ungiven prizes with all the hard puzzles that I've made. So, l3france and Joseph, please come drop by the *mathNEWS* office (MC 3030) sometime during the afternoon and should you find an editor, they should be able to locate your prize in this mess of an office, probably. Thank you all the same if you submitted, or found it fun.

This issue, it's pretty straightforward, as mentioned. The clues with a † are cryptic clues, (see issue 3 for the debacle about that) since they were fun to write. This issue's *gridQUESTION* is "What would you select as a champion for your cause?"

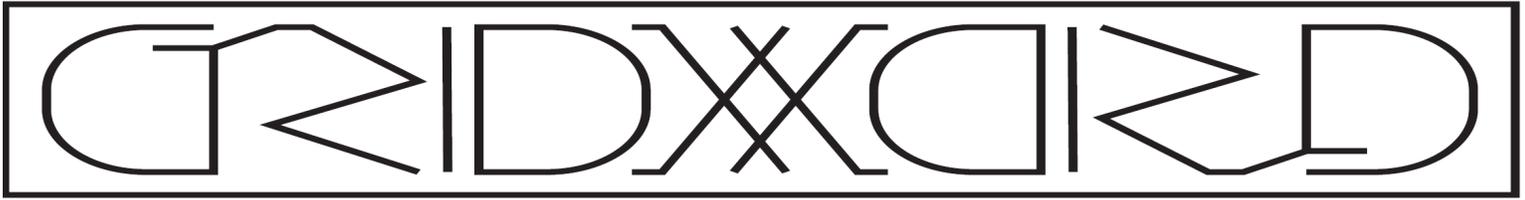
As always, please submit your solution to the *gridWORD* as well as your answer to the *gridQUESTION* either electronically or physically to the **BLACK BOX** found between the MC comfy and the glass case with the ties before 6:30pm on Monday, July 18th. As always, my favorite answer to the *gridQUESTION* shall be the tiebreaker should a tie for most correct solution occur.

Zethar



Last Issue's *gridWORD*

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



gridCLUES

Across

1. This African capital is named for the antelope which used to roam the hills nearby
8. This act of destruction was made an international crime in 2010
15. This adjective describes Sacajawea, Ezra Pound, and Sarah Palin
16. Series of prayers, usually for renewal, held over nine days
17. Crowds
18. Passage, such as that of being in front of something larger
19. This river which originates outside Dijon boasts 201 crossings (as of printing)
20. Sköll or Hati
22. Rubbish!
23. If you had another of the vase bearing the name of this city, they would be technically these
24. Moisten
25. This 19th century Norwegian mathematician work plays a role in modern quantum mechanics
26. This term is only correctly applied to women
27. Eden
28. † Me and alien collide
29. Flavourings
31. Perhaps the ancestor of the elves at Christmas, these gnome-like figures may serve as guardians of the farmstead
32. An iron and coal rich region which was integral to great strife
33. Instead of being composed of 11-Down, these are divided into fils, which serve the same purpose.

35. The endpoints of the major axis, these help ameliorate the cold of Winter and the heat of summer in the Northern Hemisphere.
38. There are plenty of societies in the present who try and do this to the past
42. In Scotland, this might be described as a "strath"
43. God of the rains
45. A Canadian tank used in the Second World War
46. They traditionally come in red and blue varieties
47. Angiotensinogenase
48. Applied to wattle
49. Either temples or stews
51. The quantity of effort put into this clue
52. This with its successor, gives first-years nightmares
53. The traditional fare to cross is an obol
55. hematoma of tissue
57. It's flowing with the wind
58. Opposite of 40-Down
59. Mexican rectangular woven blankets
60. 3,4-Methylenedioxy-methamphetamine

11. The country 1-Across is in discontinued these in 2013, while 56-Across still uses them
12. † foot liners in before flatfish
13. Flowers which traditionally represents innocence, purity, or simplicity
14. One who believes that art should be for art's sake
21. Performs arithmetic
24. He goes with Messrs Gödel and Escher
27. This e-mail and news client was originally released in 1987
28. 1/3 of a league
30. This lake was likened to a cat, for its unpredictable nature
31. An ultra-violent 1988 arcade game which was later given a remake in 2005
33. † Can be depended on to upset Blair Lee
34. Greek image, arrogated by the modern world to something not as lofty
35. † A start to five such letters heard in confessions
36. One of the "holy grails" for alchemists of yore
37. Originally meant "to slide", this word today can also be used to mean "to glide"

Down

1. It is said that they grow additional tails after a hundred years
2. † Sticks notices around this place
3. Members of this US branch are "always faithful", as per thier motto
4. Loudness levels; a negative score on this would be inaudable
5. Prime
6. Something a bad player might blame thier loss upon
7. You, provided that you submit this puzzle
8. Depending on where you are, this could be the main thing, or the thing just before it
9. Legend has it that these dogs were once the steeds of the fae
10. e.g. Advent Children, Hellsing Ultimate
11. The country 1-Across is in discontinued these in 2013, while 56-Across still uses them
12. † foot liners in before flatfish
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35. † A start to five such letters heard in confessions
36. One of the "holy grails" for alchemists of yore
37. Originally meant "to slide", this word today can also be used to mean "to glide"
38. What too many *mathNEWS* writers do in lieu of satire
39. This body of water used to have over a thousand islands which dot its interior, of which it was once named
40. About 62.8?
41. After Hong Kong was returned to China, many countries simply renamed these to "consolates"
43. The first (practical) electronic amplifier, its invention allowed for amplified radio technology
44. Freetown money
48. Follower of the Chinese Church of Virtue
50. Bristle
52. Simon and Robin; Batman and Garfunkel
54. You might be on your way to 53-Across after this
56. A large bird

This week's grid:

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

The Issue of the Tissue

Seriously, why do muscle, fat, diaphanous wrapping paper, nerve matter, and paper we wipe our noses with all have the same name? This is unacceptable.