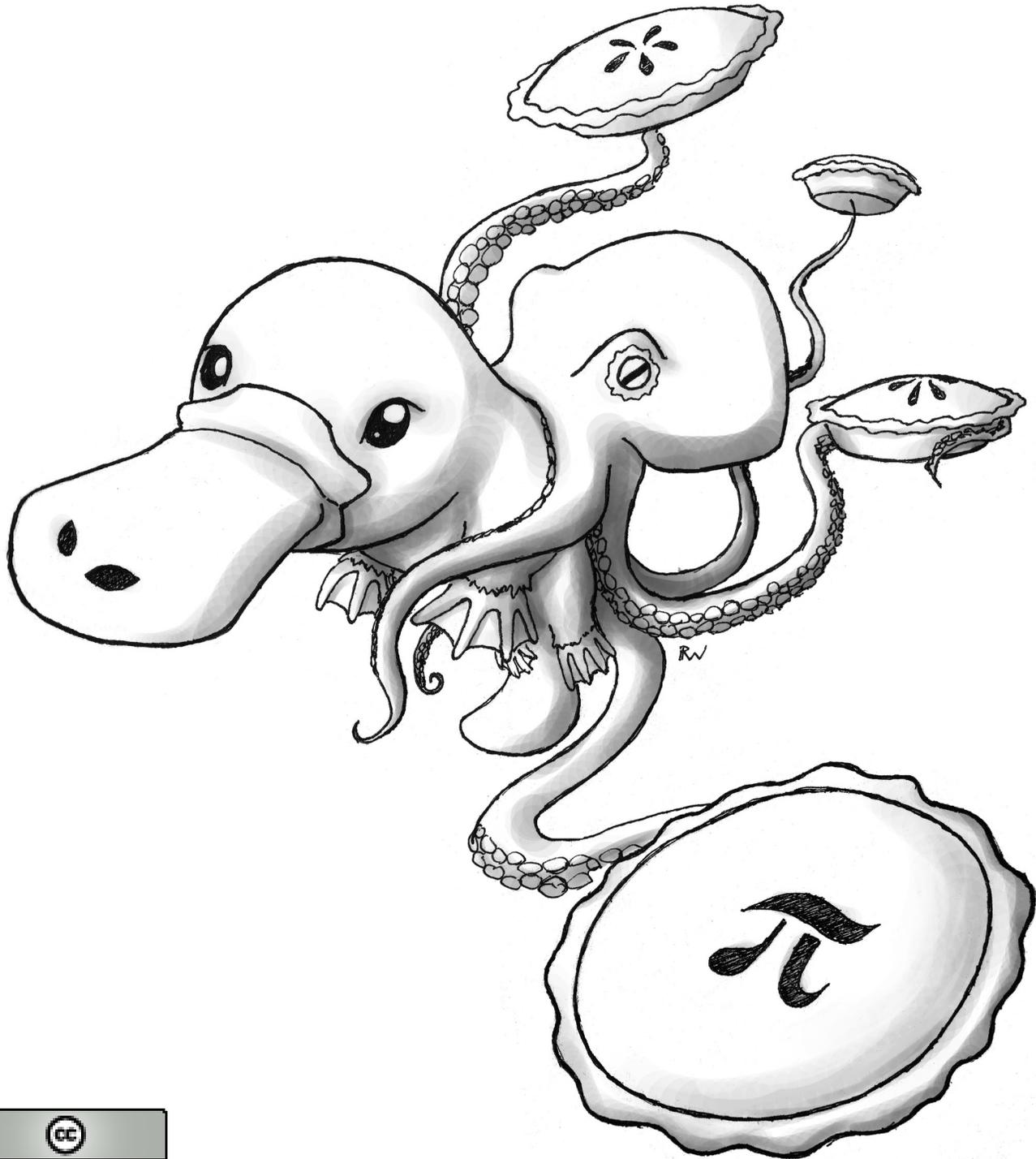


math

NEWS

Volume 124, Issue 5

Friday, March 14th, 2014



Octoplatypie



lookAHEAD

mathNEWS

March 14	Issue 5 wakes up from hibernation
March 24	Issue 6 gathers nutrients from the soil
March 28	Issue 6 begins sprouting

MathSoc

March 14	Pi Day
March 18	Pints with Profs 4 PM
March 26	MathSoc General Meeting 4:45 PM

CECA

Ongoing	Interviews, Continuous round
---------	------------------------------

Feds

March 24	Feds General Meeting 11 AM
----------	----------------------------

University

March 21	Drop, penalty 1 period ends
March 22	Drop, penalty period 2 period begins
April 4	Last day of classes

mastHEAD

Help was needed here.
Time to earn my free pizza.
Type up the mastHEAD.

This week we asked the writers, "If you weren't studying math, what would you be studying?"

Grumpy Old Fart ("The same thing as the last person."); Beyond Meta ("42"); xoxo ("The mating habits of ActSci majors."); AddictedGmr ("Physics."); Soviet Canadian ("How to overthrow the bourgeois (also Novan History)"); The Depressimist ("Something bleak, hopeless, and unforgiving. I'd be studying humanity."); Stubbs ("Pink fluffy unicorns dancing on rainbows."); unit ("What else is there?"); Radical Rick ("I'm not studying math."); Wibz ("Bartending."); MuffinED ("Alchemy."); himynameis ("Fucking shit up."); Pizza Freeloader Kid ("I'd probably try writing, painting, or music. Definitely something in art."); Ice Nice ("Insert last week's answer here (editors actually do this)"); Zethar ("The magic of multitasking means that I would study everything."); boxwhatbox ("I'm not studying math, I'm studying biology."); GingerbrED ("Underwater basket weaving."); Scythe Marshall ("...");

Thank you, March Open House volunteers!

We had over 100 Math Faculty students volunteering on March 1st. That's the best turnout in years! A big thank you to all of you for your participation and enthusiasm. You were amazing! We really enjoyed working with all of you and look forward to doing it again in the future!

Gayle Goodfellow and Hiba Amin

ZOMG FREE PIE!!!

With Pi Day around the bend, numbers and pie are on my brain!

In case you weren't already aware, there will be free pie available for the taking outside the MathSoc Office (MC 3038) on Friday, March 14 beginning at 1:59 pm in honour of Pi Day! There may be long lineups ahead, but I am glad knowing that I can go to a place and find some kind of pie to satiate my sweetness/sugar-cravings at least on this one day of the year. ZOMG FREE PIE AHHHH I AM THE EXCITES AAAAHHHHH SWEET AWESOME RUSH OF PASTRY AHHHHHHHHHHHHHAHAHAH-HAHHHAHHHAHHHAHHHAHHHAHHHAHHHAHHHAHAHA <3

Wait a minute... I'm on co-op and not in Waterloo/anywhere near MathSoc.

Wait another minute... IT'S TODAY?!?!?!?

DANGNABBIT!!!!

SOMEBODY BETTER EXPRESS-MAIL ME SOME PIE AND/OR SAVE A PIECE FOR ME!

That Sugar-High MathSoc Patron
(who likely won't get any free pie)



ISSN 0705—0410

Founded 1973

mathNEWS is normally a fortnightly publication funded by and responsible to the undergraduate math students of the University of Waterloo, as represented by the Mathematics Society of the University of Waterloo, hereafter referred to as MathSoc. *mathNEWS* is editorially independent of MathSoc. Content is the responsibility of the *mathNEWS* editors; however, any opinions expressed herein are those of the authors and not necessarily those of MathSoc or *mathNEWS*. Current and back issues of *mathNEWS* are available electronically via the World Wide Web at <http://www.mathNEWS.uwaterloo.ca/>. Send your correspondence to: *mathNEWS*, MC3030, University of Waterloo, 200 University Ave. W., Waterloo, Ontario, Canada, N2L 3G1, or to userid.mathNEWS@gmail.com on the Internet.

This work is licensed under the Creative Commons Attribution-Noncommercial-No Derivative Works 2.5 Canada License. To view a copy of this license, visit <http://creativecommons.org/licenses/by-nc-nd/2.5/ca/> or send a letter to Creative Commons, 559 Nathan Abbott Way, Stanford, California 94305, USA. Terms may be renegotiated by contacting the editor(s).

Blossom (Rachel Wiens), Bubbles (Murphy Berzish), Buttercup (Julie Sturgeon)

Meet the Exec: VPO

Ty Rozak
Vice President, Operations
vpo@mathsoc.uwaterloo.ca

The Vice President, Operations (VPO) of MathSoc is responsible for the day-to-day operations of the Society. They oversee the MathSoc website, the MathSoc Office (including novelties), and student space such as the Comfy and the C&D.

Ty started out in MathSoc under the Novelties Portfolio, as a board member and later as Novelties Director. For the following year, he was a Computer Science Representative on MathSoc Council and then started to transition into an Executive role. He has served MathSoc as VP Events for 3 terms spanning Winter 2012 to Fall 2013 and currently serves as the VP Operations during the Winter/Fall 2014 terms.

The MathSoc VP Operations should be someone who is extremely organized, professional and has great communication skills. The MathSoc experience can be very rewarding. Ty gets the opportunity to meet new people, both in and out of the Faculty of Mathematics. He is constantly improving his leadership, teamwork, organization, and communication skills. Getting involved early is very important, so check out the MathSoc website (mathsoc.ca) to see how you can get involved today!



Hiba Amin

Stéphane Sez

Come out to the Feds General Meeting. It is on March 24th at 11 AM in the SLC Great Hall.

We will be discussing important issues and electing the board of directors for the following year.

For more information check out www.feds.ca.

Pints with Profs March 18th at 4PM in The Bomber.

The MathSoc General Meeting is March 26th at 4:45PM in the Comfy Lounge.

It's also Pi Day today. You should come out to on the 3rd floor of MC at 1:59PM.

I hope to see you at all of these events and meetings,

Stéphane Hamade
VP, Academic

I would also like to wish MuffinED a happy birthday.
[Merci -MuffinED]

Success Coaching

Where? Math Tutorial Centre

When? Tuesdays 11AM-Noon

What? You can drop by and talk with me about things like:

- Effective problem solving and study methods
- Time management
- Test preparation and test anxiety
- Note taking and reading skills
- Goal setting
- Procrastination

Melissa McNown-Smith
Success Coach

melissa.mcnown-smith@uwaterloo.ca

+ * + * + \ (^ o ^) / + * + * +

Sweet and Sour: Your Circle

Math students have a reputation for being... [gasp!] introverts.

Even though we are well known for being loners, your time at university is the perfect opportunity for you to meet and develop friendships with like-minded peers. At UW you spend every day with others who love math as much as you and this is an opportunity you shouldn't pass up. A friend can be your lifeline when things are rough, an aid to help you with math problems, a person to talk to and laugh with.

- Join a club in math! There are plan-specific math clubs that you can find through the MathSoc Office, MC 3038.
- Sign up for a competition! Not only will you be able to show your super skills, you will have the chance to make friends with fellow mathies.
- Volunteer for something. Math is always in need of people to help with Open House, U@Waterloo day, MathSoc and Orientation events.

You will be able to share your love of math with up and coming math students.

Often the students we see in the advising office have for one reason or another isolated themselves from the general population. If you feel like you are isolating yourself, reach out and make a friend. Say hi to the person handing in their assignment next to you. Smile and say hello to the one next to you in class. Even the smallest effort can lead to meaningful friendships. If things are really bad, see a counsellor: <https://uwaterloo.ca/counselling-services/>

Either way, making friends can help you SOAR!

Riley Metzger and Nancy Orvis-Korn
mathadvisors@uwaterloo.ca

Category Theory: Abstracting the Abstract

Or, Why mlbaker Was Right All Along

This term, in my Graduate Algebra course at UVic, we've been learning a bunch of commutative algebra, including modules, tensor products (legitimate abstract tensor products, not the "they're, like, vector spaces but different; just roll with it" approach one sees in applied math courses), wedge products (quotient of a tensor product by a specific submodule), etc. While it's possible to study each of these things by themselves, and prove properties about them in (sometimes) straightforward ways, this ignores the fact there are underlying similarities not just between these concepts, but between these and other mathematical ideas.

Hence, the course began with two weeks of studying the area of mathematics known as "Category Theory". I suppose I might have my Pure Mathematician's license taken away if I didn't provide a definition, but first I want to provide a little bit of motivation *for* the definition. Often in mathematics, we study a certain collection of things, and special maps between said things. For example, we study vector spaces over a fixed field F and their linear maps, groups and group homomorphisms, etc. We can generalize this concept of "things and maps", and, by taking a more abstract view of the situation, we can prove things in great generality, and moreover make connections between things that previously seemed quite different. With that out of the way, now's a good time for the definition.

Def: A *category* C consists of:

1. A class (see below) of *objects*, $\text{Ob}(C)$, and
2. Sets of *morphisms* $\text{Mor}(A,B)$, one for each A, B in $\text{Ob}(C)$, and a 'composition' between morphisms (think composition of functions), such that the morphism sets $\text{Mor}(A,B)$, $\text{Mor}(A',B')$ do not intersect each other unless $A=A'$ and $B=B'$, the composition of morphisms is associative, and there is an identity morphism id_A for each object A .

Examples of categories include the two above (Vec_F and Grp , with script letters), the category of sets with set maps, Set (observe that the set of all sets doesn't exist, so we need a larger thing to contain all the sets, and a class does the job just fine); the category of topological spaces with continuous functions (Top); and if R is a ring, the category of free, finite-rank R -modules with module homomorphisms, sometimes denoted FFMod_R . There are many, many others.

A note about the definition: observe that nowhere do we mention elements of anything. For example, when defining a group, we say it's a set together with a binary operation that has a bunch of properties, and we usually refer to elements of the set because we have to say that for all elements a of the group, $a * e = e * a = a$, where e is the identity element of the group. This proves to be quite useful. Indeed, it seems as though all we have are objects and 'arrows', that is, maps between objects. This abstractness allows us to do things like, rather wantonly, just flipping all the arrows around. If you've ever heard anyone talk about $__$ and $\text{co-}__$, well, this is where that comes from.

Okay, so now we know the definition; what can we do with it?

Well, one of the first things one might wish to discuss is the notion of sticking two objects together, in some fashion. Intuitively, we're looking for some kind of "product" structure, perhaps like the so-called Cartesian product of two sets. In category theory, there are a number of ways to do this, depending on the specific category at hand, but the two general ideas for this are the product and the co-product. They have fundamentally different properties; in particular, in a Set , the product is the Cartesian product that you already know, but the co-product is called the "disjoint union". Moreover, when we talk about co/products, we not only have to specify the object, but there are morphisms to go along with the object, which do the main lifting of spelling out the given properties.

"What *are* those properties?" one might ask. Indeed, this is a good question, for category theory affords us the notion of stating so-called universal properties in a clear and concise way, usually via commutative diagrams. Universal properties completely characterize the object (and morphisms involved), and if two 'things' satisfy the same universal property, then one can say that they are essentially the same, that is, isomorphic. In most circumstances, drawing the commutative diagrams allows one to better understand the situation and universal property involved, and clears up any confusion as to what exactly needs proving. Typically, anyways.

We can also define limits and co-limits, which allow us to investigate initially absurd concepts like "the limit of a sequence of abelian groups" that turn out to play a vital role in higher-level mathematics. (This particular example lets us define invariants for topological dynamical systems.) Moreover, it turns out that products and co-products are special instances of limits and co-limits, defined in suitable categories. Wheee! All the fun.

So, has anyone actually used this stuff to *create*, as opposed to just *describe*? Well, category theory was used to define the notion of a scheme in algebraic geometry (though I know nothing else about it). The so-called Snake Lemma was also used to construct things in co/homology theory. These are all very, very important mathematical ideas that you should feel completely and utterly ashamed not to know! Cough. Cough. ...S

O Compost, Where Art Thou?

The University of Waterloo has a reputation as a progressive, tech-oriented University. There's a large Faculty of Environment with over 11,000 graduates. The university is home to Canada's first-ever Master's of Climate Change. The campus even has a number of student sustainability groups. Located in the Region of Waterloo, home to the first ever bluebox recycling program, and more recently, a green bin program to collect at the curbside compostable items from homes.

Imagine my surprise then, when I learned that of the two universities in the Region, University of Waterloo was the one which did not have a compost program. Laurier University started its compost program in 2010 which sees the removal of compostable material by the company Waste Management. Impressively, Laurier removed all single trash cans, and replaced them with recycling, compost, and garbage bins.

Not surprisingly, nearby University of Guelph has been composting for even longer. The program started ten years ago with OPIRG, a student sustainability initiative, and currently consists of a small scale collection program with on-campus composting. Collected waste is used processed, and the results are used on campus.

UW lacks any compost program, and in fact, has fairly limited recycling options (most garbage cans are stand alone, with no recycle bins in sight). This might all be about to change, however. UW has been studying the feasibility of a compost program since 1990, with additional studies done in at least 1994 and 2004.

Early pilot programs involved composting in Minota Hagey (now Velocity), Environment Science Coffee Shop, and a vermicomposting program in WIRPIG. The 1994 feasibility study discussed several problems with the composting programs including capacity and freezing in winter. Since then, there has been little progress.

September 2012 saw the creation of the University of Waterloo Composting Coalition (UWCC) by president of the Environment Student Society, Joshua Jodoin. The project sought to create a student-run program to compost organic waste on campus (similar to Guelph). The composted material can then be used on campus, reducing costs. Additionally, because there is no collection and transportation of waste, there is zero carbon cost to the program.

The project received \$15,000 in funding from Waterloo Environment Student Endowment Fund (WESEF). UWCC got buy in from the Faculty of Environment, and then petitioned Plant Ops for approval to implement the program.

That was in early 2013. Now, approval has been granted, and a pilot program is set to start in Spring 2014. The pilot study will include 5 bins in 3 of the environment buildings and UWCC is currently seeking volunteers. See their Facebook page for more information.

dbro

Going Paperless this Term

I've always felt that I learn and remember things better when I actually write things out. This is why I've always been taking notes the old-fashioned way, with pencil and paper, instead of typing my notes out.

However, things changed this term. I now have a tablet with a stylus, and can take electronic notes. No need to carry around all my notebooks, when I can write on my tablet, sync it to the cloud, and download my notes whenever I need them.

But theory and practice are different. Instead of saving weight from not carrying binders around, my backpack is heavier because of the tablet and its charger. I still need to haul my laptop and its charger around, because I can't code on my tablet. My tablet's battery isn't enough to last for six hours of classes, so I have to scramble to charge it at lunch.

(There was also an incident early in the term, when my tablet randomly refused to negotiate for an IP address and then got blacklisted. Imagine the confusion IST and I had when my tablet worked in some buildings on campus but not others. So if you're having really random connection issues, try talking to IST. Maybe you got blacklisted.)

There are also many situations where I can't go completely paperless. Every now and then, professors have handouts, or require assignments to be submitted in physical dropboxes. Midterms are returned as physical pages. On the first day of class, I had a meeting with a professor but forgot my tablet. I walked out of the office with a post-it note. So much for going completely paperless on the first day.

My stylus is really nice, but writing on glass still isn't the same as writing on paper. The texture and friction are completely wrong, and the stylus has far less precision than a mechanical pencil. As a result, my writing becomes much larger and sloppier.

There are also other annoyances. With physical pages, it's far easier to flip between pages to find what I need. It's also nice to be able to spread everything out. With my tablet, I'm limited to a page (maybe two, if I do a split) on a single screen. Reading on paper is also far better on my eyes than reading on a backlit screen. And being able to see how many pages I have left to read is far nicer than scrolling down a seemingly infinite page.

Overall, I'm not sure if going paperless has been the best choice. I do love having digital notes and backups, and being able to share notes as needed. But it's a lot of weight to carry around, there are still many benefits of using paper, and it's impossible to go completely paperless.

Maybe I'm just not used to it, but seeing as this is my last term, it probably doesn't matter.

!bob

Words, Words, Words

Sometimes I wonder if I'm too sensitive about words. After all, they are just words—and, as they say, “Though sticks and stones may break my bones, words will never hurt me.” Of course, whatever their identity, “they” have probably never been verbally bullied. There are a few words that make me uncomfortable, most of which are aimed to belittle a minority group by turning their identity into an insult. Particularly awful bullies of our childhood use people's names as synonyms for “stupid” or other pejoratives, and this is not so different from doing the same thing with the name of a minority.

“Dumb” and “lame” have nearly lost their original meaning, and “gay” and “retarded” have all but joined them. “Dumb” originally meant mute or silent, and “lame” meant physically disabled, especially in the legs. Although they are dissociated from their original definitions, the derogatory use of these words began as insults to the minorities which they identified. Now we have more politically correct terms for mute, physically disabled, homosexual, and intellectually disabled people, since as a society we decided that the other terms should be used to deride and ridicule.

As someone who suffers from mental illness, I have a knee-jerk reaction to people using mental illnesses or disabilities as adjectives associated with their symptoms, like “OCD” to mean picky, “ADD” to mean easily distracted, or “retarded” as a general insult. Mental disabilities can all be extremely debilitating, and it is incredibly unfair to trivialise them by claiming that wanting to keep your house neat is “totally OCD”.

My best friend was recently diagnosed with autism. Though she has lived her whole life with a developmental disability—a type of mental retardation—contrary to the derogatory use of the word today, she is one of the most intelligent people I have ever had the honour of knowing. Most notably, she struggles with social cues and, at the same time, is considerate and compassionate.

(Mis)Adventures In Depression, Part II

(A two-part adventure. Part I can be found in Issue 124 Volume 4, page 8.)

Even though it shouldn't have, it came as a surprise to me when I received my rejection letters from the University of Waterloo in twelfth grade. I opened them after writing my final IB exam. Seeing me sitting alone in the hallway, my English teacher approached me. She asked me why I wasn't celebrating the end of high school with the others. I told her about the rejections, and she informed me that I could do well in first year and transfer.

This became my goal for the next year. At university, I convinced myself that my depression was something that could be controlled if I was strong enough. I managed to go three months without major mishap, before waning and doing poorly on my exams. In the winter semester, I stopped going to classes for two months straight, only leaving my room to buy convenience store food or to hand in assignments.

By some miracle, I did manage to transfer to the University of Waterloo. When I did, I was far happier than I had been in

These things are not contradictory. Disabilities might affect, but do not define, the type of person that you are. Disabilities are not deficiencies.

What bothers perhaps even more than all of the above, however, is equivocating sexual assault (“rape”) to doing poorly on an exam or having trouble in a class. Using the word trivially is awful enough, but some people enjoy describing the manner in which an exam or a class performs this sexual assault. And this is



There are probably a lot of people who think I'm being over-sensitive about words, but those people are likely not part of these minorities; it is not their names that are being used as insults. As a *mathNEWS* writer, I think it is very important to ensure that our words do not harm groups that are already disadvantaged. I think that it's also important, as a person, to always keep in mind that your words have an effect on the people around you.

k!

years because of the people here. I finally sought professional help. My new medication made me feel less fatigued, but I still had a major relapse about every three weeks, for a week at a time. For about two years, I repeatedly took and withdrew from courses, and by the end of those two years I had earned about one semester worth of credits. I took the spring semester off from school, and when I came back I convinced myself I was on the upward hill to recovery.

It has been an upward hill – for some slope $\epsilon > 0$ and some periodic oscillations. I have come such a long way from the person who excused themselves from class to cry in the hallway. I relapse less frequently and for shorter periods of time, and sometimes my thoughts are weak enough that I can ignore them. I am making slow but sure progress, and even though I often question whether I deserve to be here, I love learning mathematics and I am trying my best. For now, that's the most I can do.

a subpar cat

How do you even lose data when using git?

It's 18:00 on a Saturday night, and you see your friend Joseph force push to your git repo for compilers. Six minutes later, a commit is added to that repo: "Joseph is an idiot." What on earth happened, and how can you prevent this catastrophe from afflicting your group?

Root cause analysis determined the cause of this particular disaster to be "Untracked files". How? `git status` lists files that haven't been committed to the repository under the heading "Untracked files". However, if having "Untracked files" is the normal state for your repository, then you'll have to manually sift through the output of `git status` to realize you forget to commit a file you actually want to keep around for later. The chances of you doing that for each commit you make the night before the deadline? Nil. So you'll lose the files once you `git checkout` another branch... and once you realize, it's too late, and you'll have to recreate the files from memory. The loss of precious minutes when you least have them to spare!

How can you protect you code and your loved ones from this disaster? It's easy! You simply need to make judicious use of `.gitignore`. Create a file named `.gitignore` in your repository and commit it; each line that doesn't start with a `#` contains a pattern matching files that git shouldn't track or add to the repository. Chances are, you won't even have to write the file yourself — you can probably concatenate together the files for your two or three favourite programming languages and editors (say, `Go.gitignore`, `Erlang.gitignore`, and `Global/Kate.gitignore`) from the collection at <https://github.com/github/gitignore>.

"But I use LaTeX," you might protest, "and I also need to commit `.log` files generated by my code!" I do agree, that `TeX`.

The World is a Happy Place

Hit enter to start the build. The computer starts whirring and the information from the build-system starts flowing. 10% complete, all green so far. The lines keep flowing by and all is good in the world. 20% complete, some blue warnings but all is good in the world. At this point I'm surprised because I made some pretty hefty changes and was expecting a build error pretty early on. 45% complete. It's been 5 minutes so I decide to go get coffee. 70%. Back from getting coffee, sweet nectar of the gods, to find the computer has turned into a jet engine, running loud and hot, with the build is still going. 85%, I'm starting to get my hopes up. Maybe the changes were in fact good. Maybe it will actually run. 100%, the jet engine has taken off as the compiling as finished and the linking has begun. It will work, it will work, it work!

Error.

At this point I find myself crying into my coffee, which is fine since coffee tastes better when made with tears.

But I remind myself as I start looking trough the few hundred lines of linker error: The world is a happy place and the code will eventually work.

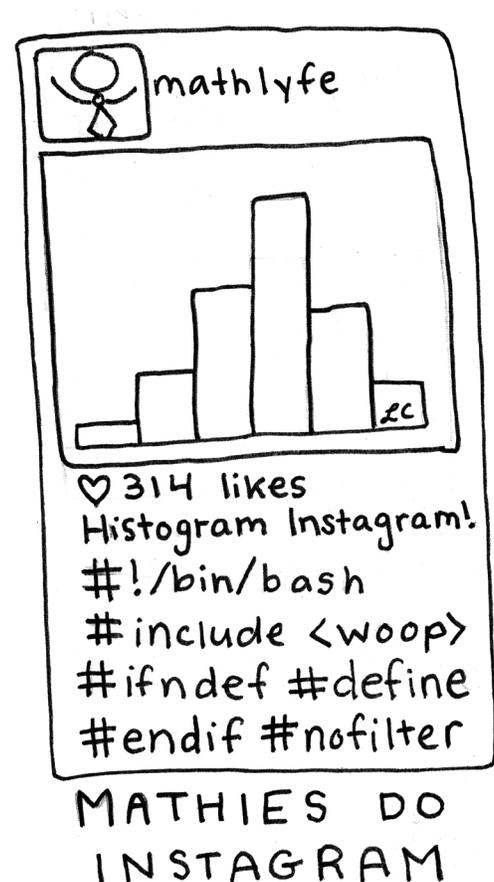
`gitignore` (<https://github.com/github/gitignore/blob/master/TeX.gitignore>) contains some rather sweeping patterns, such as `*.log` and `*.out`. There's a simple pattern to handle this too: I create a directory named `latex` or `report` in the top of my repository, place my `.tex` files in it, as well as a copy of `TeX.gitignore` named `.gitignore`. Since the rules in `latex/.gitignore` only affect files stored under `latex/`, you're free to add `.log` and `.out` files anywhere else in the tree.

In fact, I've got a bit of a pattern going now with how I start my assignments:

```
se465 (folder so I can tell each "a1" repo apart)
a1 (this is a git repo)
  .gitignore
  latex
    .gitignore
    Makefile
    a1_sub.tex
  q1
    q1.java
  ...
```

Now if only I had figured this out in first year. But now that I have, you don't have to!

Just take a little bit of time when you start your next CS assignment, and make sure git tells you about only the Untracked files you care about!



!able

Running Over the Same Old Ground

The crackle at the other end of the line
told me that he was still there,
despite the dead silence.
The click at the back of his teeth,
and the sudden sharp uncontrolled intake of breath,
Impatient at the rising pitch of my voice,
wavering perilously close to tears.
Tremulous and shaky,
for the third phone call this month.
I am stricken by the irritation in his voice,
and struggle to make amends.
I apologize for being irritable,
for being a bore, for being predictable
and for the lack of sparkle in our conversation.
I dredge out the same dull things each time.
The worry in my thoughts
translate to a crease in between my eyebrows,
turning into a ceaseless litany of woe on the phone.
I can imagine the mouse
hovering over a link in red
and the impatience perched at the corner of his absent smile.
I hang up feeling stupid.
That evening sitting with work,
with cats lolling on the floor,
and stray roommates behind closed doors,
I remember my grandmother,
and us children rolling our eyes, every time her voice would
start to rise
about my dead grandfather,
about money, and the servants.

The crack was coming, we knew it
because it came so often.
Impatience, and irritation.
'I love her, but why can't she just keep her misery to herself?'
I did not think those thoughts,
I did not vocalize them,
not even to myself.
Am I a bad person,
I wonder.
Don't think so much,
a friend told me over the phone.
Isn't it exhausting,
she asked, bewildered, frustrated.
Yes, I said.
But not giving shape to the thought in your head,
doesn't un-make it.
But I am a fool,
who thinks too much, and sleeps too little, and gets confused,
and cries on the phone.
Offering apologies, swallowing the knot in my stomach.
So I keep my feelings to myself,
and try to take up littler space.
I will not intrude in your world.
I will back away one half footfall at a time,
and you will not hear me leave.
You will not care.
And I will make a mental note to myself,
to be kinder to my grandmother
when she tries not to cry.

boxwhatbox

The Tale of John Edensor Littlewood

In an attempt to supplement the fine eloquence of the *math-NEWS*, here is a biographical sketch of someone who, though you do not know him and never will meet him, was probably a better mathematician than you. I say this not because you are unintelligent, but rather because he was a member of the Royal Society of London and I hardly believe you have quite come so far as of yet. Speaking of which, it turns out that the London Mathematical Society has put together its prize committee for the 2005 awarding of the Polya Prize, the Senior Whitehead Prize, the Berwick Prize and a few others. Interestingly, four of the eight committee members are named David. Coincidence? I think not! I took the liberty of preparing and sending mock nominations for Andrew and Wes. In the "Case for Award" field, I noted that Wes displays a "thoroughly entertaining passion for the Poincare-Hopf Theorem, as well as excellent usage of fruit and coloured chalk to illustrate certain geometrical properties."

Now, Littlewood was, in fact, little. He was slightly under the average height for a man, but he was very fit and involved in a lot of sports including swimming and rock climbing. He also loved music and dance. Born in 1885, he lived 92 years, and after his first 30, he was already quite successful. He received some education in South Africa, and returned to his birth country, England, to eventually wind up at Trinity College, Cambridge (Newton went there, too)! Littlewood was working under the

tutorage of E W Barnes, who decided that since his student had so quickly solved his first research problem, his second would be: "Solve the Riemann hypothesis." I need not inform you that he didn't quite finish that one. Barnes' assignments remind me of MATH 217. But Littlewood contributed to RH research – working closely with Hardy – and to other areas of science as well. He helped to refine calculations for trajectory paths in WW1; however, most of his work was done in analysis.

Littlewood was an honored mathematician, receiving multiple awards for his work. He was elected a fellow of the Royal Society in 1915, and became the Cambridge Rouse Ball professor of mathematics in 1928. He certainly seemed to have a very involved personal life, and clinical depression, which also affected Riemann (as well as 25% of the North American population, by the way). According to Hardy, Littlewood is the finest mathematician he knew, with gifts of mathematical "insight, technique and power." According to Hugh Montgomery: "He tried to persuade me to take snuff."

So if you ever find yourself in analysis, studying Littlewood's Three Principles, at least you'll know a bit more behind the name... other than the obvious pun.

Michelle Ashburner

C++ Column: Unspecified behaviour

This is a column where I write about random C++ topics. I make no guarantees on whether these topics are useful, funny, or just plain crazy.

This issue, we'll be taking a look at some unspecified behaviour. It's the sibling of implementation-defined behaviour, which we visited last time. This article should be somewhat useful — you should be aware of what we'll be discussing.

So what is unspecified behaviour? The C++ Standard^[1] defines it as “behaviour ... that depends on the implementation”. However, this behaviour does not need to be documented. (For implementation-defined behaviour, the standard requires documentation.)

You may already know that the order of evaluation of function arguments is unspecified. Consider the following example program:

```
#include <cstdio>
int a() {
    printf("a");
    return 1;
}
int b() {
    printf("b");
    return 2;
}
int sum(int a, int b){
    printf(" sum");
    return a + b;
}
int main(){
    sum(a(), b());
}
```

The output could either be “ab sum” or “ba sum”. It is specified that the arguments are evaluated before entering the function, but the order of the arguments is not specified. Different compilers may do different things here. In fact, I got gcc and msvc to say “ba sum” and clang to say “ab sum”.

Technically, you could get different results by compiling for different architectures, changing the optimization level, or doing nothing and just compiling again. But I didn't observe this in my experiments. (I didn't even bother compiling for different architectures.)

OK, so argument evaluation order is unspecified. How about subexpressions?

```
#include <cstdio>
int a() {
    printf("a");
    return 1;
}
int b() {
    printf("b");
    return 2;
}
int c(){
```

```
    printf("c");
    return 3;
}
int main(){
    int foo = a() + b() + c();
}
```

Left-to-right, so we should see “abc”, right? Nope, it's also unspecified. (Even though I got “abc” on all three compilers.) Even if we apply associativity and get ‘(a() + b()) + c()’, the evaluation order is still unspecified.

One last trick. The standard guarantees left-to-right evaluation of the logical AND operator ‘&&’, the logical OR operator ‘||’, the ternary conditional operator ‘?:’, and the comma operator ‘,’.

But! If you overload the logical AND operator, the logical OR operator, or the comma operator and call them, they become ordinary function calls, so the evaluation order is unspecified.

For more information and details, you can consult the C++ standard^[1], but [cppreference.com](http://en.cppreference.com/w/cpp/language/eval_order)^[2] also has a nice summary.

Next time, we'll look at the scary older sibling of implementation-defined and unspecified behaviour: undefined behaviour.

notbob

[1] <http://isocpp.org/files/papers/N3797.pdf>

[2] http://en.cppreference.com/w/cpp/language/eval_order

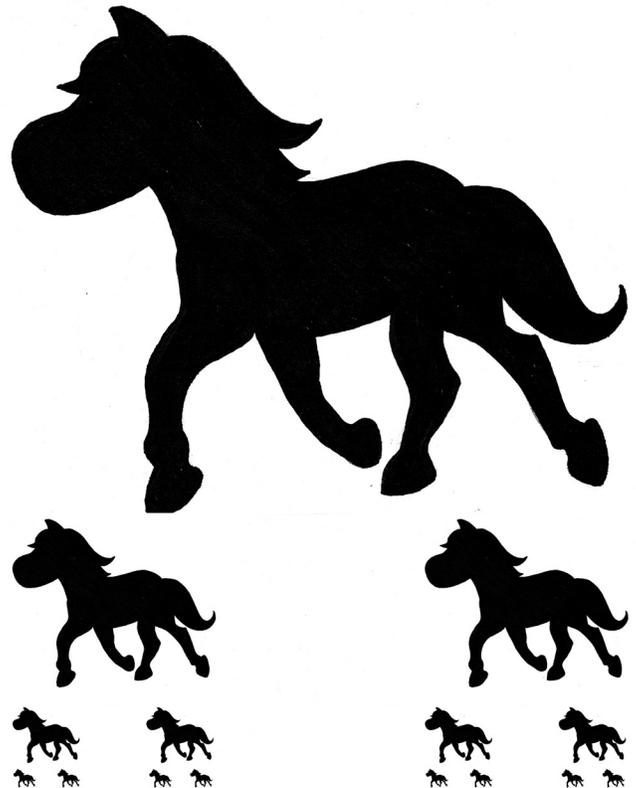


fig 4. Canter Set.

Thief Review

Recently, the new Thief was released, and since then I've been playing it whenever I have the chance. Overall, the game is pretty fantastic, and I would say that anyone who has been craving a proper stealth game should definitely pick this game up.

The graphics aren't too impressive, but the game definitely doesn't look old. I've never notice any pop-ins, and the darkness of the game helps hide any eyesores that might be present. I did find some issue with the lighting effects; in particular, a glowing line that was supposed to appear on a medallion in the game did not light up correctly to line up a series of symbols. This might have been because I've been playing on a laptop that can definitely play the game but not at its higher detail levels. I still managed to get through by looking at the medallion's symbols by eye, but they were pretty hard to make out and I definitely strained my eyes. Other people didn't seem to run into this problem, though, and thankfully you only have to use the medallion once (twice if you want a collectible).

What makes this game so amazing is the gameplay. Some people have commented that there is no gameplay besides QTE's (quick time events), which are a little nuisance during the game, but I think that the game is not to be found in the QTE's or creeping around the city. It is found in planning your moves to remain unseen, and executing your plan perfectly or imperfectly. The act of avoiding guards, and sneaking around to remain hidden is what this game is about, and it feels amazing. From the way Garret's breath is audible while crouched, to the swoop sound effects, the whole game feels amazing when you're creeping amidst the shadows. In fact, I spent most of the game crouched, and peeking around every corner, simply because I just didn't want to be discovered. When I was, I tried to eliminate my attackers as quickly as possible, lest they attract the attention of more guards. It was an exhilarating experience.

If you think that the game isn't hard enough for you on one of the default difficulty levels, you can also create and play a customized difficulty level. The game definitely allows you to tailor the difficulty level to your experience with stealth games. The game length is also fairly decent; it took me about 12 hours on normal difficulty, with a couple retries for certain levels, to beat the main story. I skipped over most of the side quests for the sake of finishing the game, but I'll definitely be going back to complete them as they were very interesting.

Now, no game is perfect, although I do think that Thief is probably the best stealth game that has been released in a while. Thief is designed and built up around the idea that it is best if you stay hidden, and avoid engaging enemies. However, many areas are fairly small and closed in. There are definitely a lot of alternate paths to complete your objective, but there is usually one really good approach, which makes it feel like there aren't very many options for you to explore. Even when there are multiple paths to your objective they will often converge before you reach your destination. It would have been nice for each path to have a unique experience, where each was a viable route to your target.

Audio also has its issues in Thief. While the musical score is amazing, some of the in game NPC conversations seem to ignore walls at times. This can be pretty immersion breaking, but something that should be easily fixed and a lot less game-breaking than other games I've seen lately at launch (I'm looking at you, Warner!).

Overall, I definitely recommend that you pick up this great game. I know that even after beating the game, I'll be spending more time with it simply because I enjoyed it so much.

AddictedGmr

Cosmos 2: Cosmos Harder

The first episode of the new Cosmos series featuring Neil DeGrasse Tyson aired last Sunday. It's the spiritual successor to Carl Sagan's original Cosmos series from 30 years ago, and, while I enjoyed it, I did have some complaints.

1. The graphics. This series has a far larger graphics budget than the original, and it shows. This episode had so much stuff that I had seen before in science fiction however, that I started to get quite bored. It was not to be unexpected, considering it was directed by Brannon Braga, cowriter of Star Trek First Contact, known for being a rather flashy movie with not as much philosophy. The parts of the original Cosmos series that I enjoyed the most were Carl exploring real world locations while talking about things, and that also happened to be my favourite part of this; Neil going through the notebooks at the beach was touching.
2. Scales. When showing the asteroid belt, they show hundreds of rocks on screen at once. There should be a more empty space, a lot more. While it is emphasized later when discussing the Oort cloud, this is meant (I assume) to be an educational program, not just sci-tainment. I understand

there are limitations and some artistic license must be taken, but I feel that it went too far.

3. The story of Bruno. Focussing on Bruno as a martyr of science seems to be a bit misjudged, though it has been noted to me by others that Hypatia got a similar focus for a bit in the original series, as a martyr of free thought. I did enjoy the animation from this segment, save for the way that the inquisition and the priests were portrayed: they too are human, not monsters, and it would serve well as a reminder that people are not evil through and through just because they follow religion. In the literature it is heavily disputed about what was the predominant reason for his execution: I have a feeling it was likely his rejection of the trinity and supposed works of magic that were the bigger issue than the plurality of worlds.

Overall, I do think it was better than most things I've seen on television lately, and I will likely reserve judgement until more of the series has been released and I have rewatched the original.

Ice Nine

Oven Woes

If you're reading this, I invite you to go look at your oven. Yes, you heard me right. Go look at your oven. Notice how many racks there are inside. Two? Yeah, that sounds about right. Do they slide in and out? Good, that's how ovens are supposed to work.

My oven, on the other hand, is possessed by the devil. There is no way to put in two racks without having both of them slanting down. You can still bake things like chicken nuggets, or even muffins if you don't mind them looking a tad lopsided. The day I tried to bake peanut butter cookies, however, was the day I discovered the strange slanted nature of my oven racks.

I put the two trays of cookies in, and within 5 minutes (about half the time it takes to bake cookies normally), I began to smell smoke. At this point, I rushed in and pulled my cookies out. My carefully placed balls of cookie dough had all slid to one end of the cookie sheet, bringing them way too close to the heat. While the tops of the cookies were still raw dough, the bottoms were burnt black.

Naturally, I was pretty upset, as my cookies were ruined. And judging by how the cookie dough had tasted, those would've been some darn good cookies. After some maneuvering with the oven racks however, I realized there was no way to really rectify the situation. The only way I could have a rack lie horizontal was to have one single rack a little too close to the heat.

Ladies and gentlemen, I have baked like this for two months and it is a wonder I am still sane. Cakes and brownies start charring at the bottom before the tops are fully cooked. Recipe baking times are inaccurate because I always smell smoke before things are supposed to be done. If you don't have to deal with this problem—and believe me, it is a problem—then you have something to feel lucky about today.

wibz

Early Access Epidemic

In the PC gaming community an ugly trend is slowly pushing its way into the norm. Lately, over the past few months, more and more game developers—big, small, old, and new—have been pushing their games onto the main stage while they are still in the developing stages. This, in essence, means you get to pay the price of a fully complete and furbished game for a game that may not be even halfway completed. I personally think that it is ridiculous that you are paying to beta test a game for someone who says they will complete the game. What incentive do they really have once they already have all your money? One good example of this is Star Citizen, which has already pulled in over 40 million dollars. There is not even a playable demo yet, excluding the garage function where you can modify your ships to a slight degree. Yes, some of these games are crowd-funded, but there has to be a line drawn on money supplied vs. content produced/released. That's what I have to say about that.

RadicalRick

How to Survive

In life, there are many things that can end it. To survive, one must take measures and precautions.

Let's go over the basics first:

1. Breathe. Breathing causes your body to oxidize. When metal oxidizes it rusts. Therefore breathing causes you to rust. Try not to breath too much or else you will become a Robax commercial.
2. Eat. Food is fuel for the liver. Fuel with an incorrect amount of octane can damage engines. Therefore you need a balanced diet. Make sure to drink a cup of high octane fuel every morning to help keep your liver from deteriorating.
3. Move. Years of studying military tactics has indicated that targets that stand still get hit more often. Things like cities are easy to hit, as opposed to geese. Therefore you should stay moving by tying yourself to a goose.
4. Think. Thinkers have marble statues made of them. These statues have out survived the people they are of. Unless, of course, the thinkers thought themselves to stone. Therefore think about being marble.
5. Sleep. Just kidding, this is optional. Just ask any student.

Now for the more dangerous challenges to survival

1. Animals. You can't avoid them, they are everywhere. Just stay away from the most dangerous ones. The two animals responsible for the most death on Earth are Homo sapiens, followed closely by Branta canadensis. Maybe rethink the aforementioned point 3. Therefore you must live alone on a mountainside amongst safer animals like Ursus arctos.
2. Disease. In the case of an epidemic, deadly diseases will destroy society and an apocalyptic scenario will quickly develop. When newly infected people can no longer get treatment, then death tolls will rise. Therefore, the next time there is an outbreak, be one of the first to contract it so that you can get the treatment and build up an immunity.
3. Time. Are you currently alive? Yes. Will you be alive forever? No. Therefore time is the number one challenge to survival. If you can make it always be now, then you will always be alive! If you figure out how to do this, call me: 1-800-118-0000.

If you make it through to next issue, congratulations.

Element 118

Surprise *prof*QUOTE!

Prof: So when you do laundry, you put your first load in washer, go on Facebook, wait until it's done, put it in dryer, watch a cute cat video, take it out from dryer and put a second load into the washer... Does anyone have a better way to do laundry? [*Some students raise hand.*] So you go home and give your laundry to your mom?

Student: I just forget about it.

Prof: Don't do that.

Mann, CS 251

In-Show Rule 34

I want to start by saying that I'm a true fan of anime. I know every last detail about the mighty samurai Naruto and his life and times as a highschooler alternating between fighting demons with his death note and fighting aliens in his giant genetic mecha-robot-suit-thingy. But as I watch more and more anime, I'm noticing a rather annoying trend. For example, I tried watching High School of the Dead (I only watched a little, mainly because I dislike even remotely scary things). Now some parts of the situation are understandable, yes, I suppose there's no reason a normal school uniform for girls can't include a skirt, and yes, if she wants to kick a zombie in the face, she's going to lift that skirt a little, and yes, from the right angle you could see right up it. What I don't understand, is why then did the camera angle have to be perfect for looking up her skirt?

It's not that I have something against sexuality, but I just think that I should be able to watch anime outside of my room without having to look over my shoulder and hide the screen all the time just so people don't glance over and assume I'm watching hentai. This is a big problem for me because when I start watching a new anime I have to finish it before I can manage to be productive again, so not being able to watch in public really wastes my time, because what else am I supposed to do in class? Even in my room I sometimes make sure the door is locked because, seriously, a little fanservice might be acceptable, but if you wanted to demonstrate that this ten year old girl is gullible, you had a million other choices than "trick her into stripping naked and running outside", and pretty much any of them would have been better.

Although maybe you've all already noticed this and I'm the last one to learn that anime is little more than softcore porn. That might explain the ridiculous plots.

TheNotChosenOne

N Anticipations about the End of the Winter Term

Waldo's finding herself feeling kind of anxious.

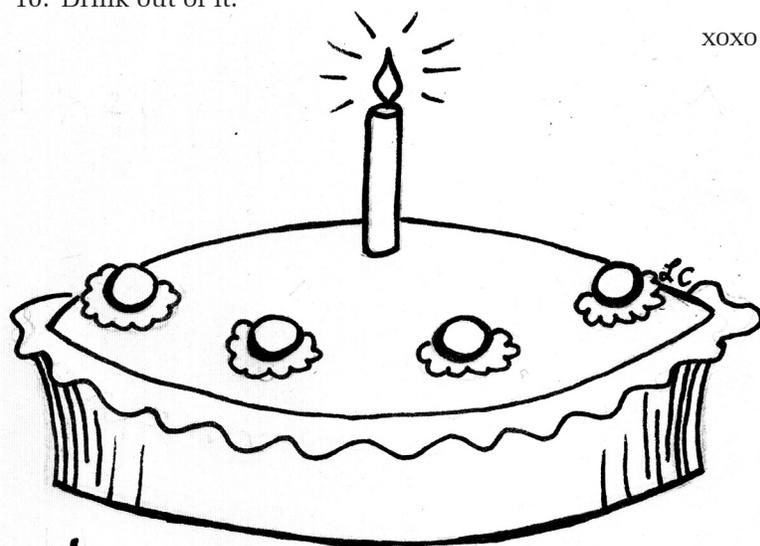
- The co-op term in Toronto will end and school will become a thing again (I am NOT looking forward to adjusting to studying again, or for the exams)
- The weather is likely going to include rather extreme heat and we will likely end up reminiscing about the good ol' days of polar vortexes (I'm still looking forward to slightly warmer weather though, this winter has just REALLY dragged on!)
- ZOMG! Anime North is coming up at the end of May! I AM EXCITE!
- All the end of term things are happening; I hope I can attend some of them (especially the A Cappella EOT on March 28-29)!
- A number of friends are starting to graduate...I forgot for a moment that that was a thing that happens!

waldo@<3.LE-GASP.ca

N Things I Can Do With My New Travel Mug

I know absolutely nothing about St. Patrick's Day apart from the fact that there is a lot of green and alcohol (sometimes even green alcohol), so I'm going to write about my shiny new travel mug. It is green, which makes this article somewhat relevant.

1. Fill it with hot water in the morning, promptly forget about it for the rest of the day, and find the water still hot when I check it at midnight.
2. Use it as a projectile.
3. Admire how stainless the steel is.
4. Feel super grown-up as I walk around with it in my hand.
5. Present it as a peace offering to the geese. Hopefully their lack of thumbs will be such a big obstacle as they try to open it that they'll forget to come after me.
6. Infiltrate the environment faculty. "Look at my water bottle! It's green! And eco-friendly!"
7. Lure unsuspecting people to their demise (yes, admire the shininess of the bottle and walk toward me).
8. Keep it filled with confetti in case of impromptu excitement.
9. Take over the world (not giving away the details, but the plan involves my travel mug, 3.5 steamrollers, and an army of dust bunnies).
10. Drink out of it.



XOXO

the π is a lie
 the π is a lie

Monty Pi-thon in Pi-thon – The Monks

```
import math

funeralMass1 = "e Iesu Domina. "
funeralMass2 = "Dona Eis Requiem."
headHit = "\n*bonk*\n"
pi = str(math.pi);

for i in range(0,3):
    if (i == 0):
        print pi + funeralMass1 + funeralMass2
+ headHit
    else:
        print pi + funeralMass1 + headHit +
funeralMass2 + headHit
```

TubesJr



**Follow us
on Facebook (MathNEWS),
or Twitter (@UWmathNEWS)!**

Hawken vs MWO

Giant Stomping Robots ensue

If you like giant bipedal war-machines stomping across the landscape, destroying everything in their path, including each other, then you might enjoy these free games. But which one is for you? In both Hawken and MechWarrior Online (MWO), you can choose a mech, and customize it over time to become the massive weapon of destruction that you have always wanted. Hawken is simple, with 2 weapons on every mech, and a number of slots to fit upgrades and deployable items. Meanwhile, MWO has many more options, with up to a dozen weapons mounted onto each mech, along with the need to store ammunition, heat distribution systems, and more into your mech. It even lets you choose how much armour you want on different parts of the mech.

These differences between the two games reflect their gameplay. Hawken is a game of quick fights in small arenas, with

A collection of words with sporadic grammar

A Conspiracy Theory

Food Services and the Faculty of Mathematics are facing off in a life and death contest. Not life and death for them, but for you. Food Services thinks it can kill more students via malnourishment and scurvy, and the Faculty takes the position that it can make more students succumb to Ricketts and sleep deprivation. No clear winner has yet emerged.

Misdirected Mail

Dear /dev/null,
How are you today? No response? Well, you never were very talkative. I'm doing fine myself. I went to *mathNEWS* production night, not sure why I keep doing that since they're all terrible company and keep distracting me from assignments. The pizza is nice, but that's about it. You don't try to start conversations while I'm working, that's what I like about you. They've got a horrible sense of appropriate volume too. Jerks. Anyway, I need to go, but I'll redirect to you later.

Grumpy Old Fart



fig 5. Viol(integral).

everyone dying within 10-12 seconds of incoming fire. Meanwhile, MWO is a game of slower fights that take place in larger arenas, with slow and methodical battles that wear down enemy mechs, destroying weapons and armour before taking down the entire machine. Both are team-based games, with numbers and positioning being important. In MWO a team that does not work together, and communicate well will ruin a match, but in Hawken (with its respawning and general quickness) a bad team can be overcome through general hit and run tactics and playing follow-the-leader to lend numbers to your attacks.

Which is better? I cannot say. Both are mech games, but one is an arena shooter and another is a battle simulator. If you want to decide which is better, go to playhawken.com and mwomercs.com to get your fix of giant robot fights.

Soviet Canadian

horrorSCOPES

ActSci: There is simply too much pressure in your life. You have to maintain a high average, take impossibly hard courses, study for the exams, and apply to jobs! You get invited to a party, and laugh in their faces.

Your unlucky number is: 0 nights off.

AHS: Final projects are due, so it's time to hit the books. You needed a new punching bag anyway.

Your unlucky number is: 24 repetitions.

AMATH: Winter is still lingering around, but you think that you've found the solution for spring!

Your unlucky number is: $V = 2\pi^2 n R r^2$

ARTS: Your paper on satanic symbols used in interactive media in the 1980's is almost complete! Now to find a way to add "Castlevania" to your bibliography without your prof noticing...

Your unlucky number is: 74 vampires slain.

C&O: Your friends recently got you into League of Legends, and you're shocked at how inefficiently they play. Why bother going around the map to get to the other side when you can go straight through? You make a rush through.

Your unlucky number is: 5 seconds before a turret blasts you to smithereens.

CS: You have a Real-Time assignment, Graphics project, and HCI presentation all due this week. You hide in the lab until it's all complete, and when you emerge your skin is deathly pale.

Your unlucky number is: 4 fingers broken due to excessive typing and rickets.

CM: Despite what the editor thinks, there are other people who do read the CM **horrorSCOPE**. You write in letters to the **BLACK BOX** to let her know that she's not alone.

Your unlucky number is: 1 lonely GingerbrED left in the program.

Double Degree: All of your friends are planning their grad trips for the summer, but you can't tag along because you finish in the spring term. You resign yourself to living vicariously through them instead.

Your unlucky number is: 300 hours browsing Facebook pictures.

ENG: Your 4th year design project is finally complete! The day before the big presentation, however, some agents in suits show up and confiscate your work, for "national security reasons".

Your unlucky number is: 3 terms of work lost.

ENV: Annoyed that no one believes you about global warming, you grab a can of aerosol to speed up the process. Unfortunately, you didn't read the label and sprayed your house with Agent Orange.

Your unlucky number is: 8 civilian casualties.

General Math: Faced with too much time on your hands, you decide to try solving an Honours Math assignment for fun. You do really well on it, but you're still not allowed to take the course.

Your unlucky number is: 9 hours wasted.

Grad: Your supervisor is retiring, so you go shopping around for a new one. Unfortunately, everyone you talk to doesn't have enough funding to take on another grad student. You get stuck doing odd jobs in order to convince them of your worth.

Your unlucky number is: 12 years a Masters.

KI: The monster exhibit in the museum has come to life, with Dracula taking up residence in the awnings and the zombies knocking everything over.

Your unlucky number is: 40 hours over the next 24 hours to rebuild your exhibit.

MATH PHYS: Sick and tired of being called weak and scrawny, you create a Higgs Boson manipulator. Now friends will be impressed when you say that you've put on weight!

Your unlucky number is: 14 limbs broken under excessive stress.

PMATH: You want to talk to your prof about your recent assignment mark, but their office is up on the 6th floor. You grab your ball of thread and head upstairs.

Your unlucky number is: 2 puncture wounds.

SCI: Bored while waiting for your cell culture to grow, you start fooling around in the lab. How many Erlenmeyer flasks do you think that you can juggle?

Your unlucky number is: 15 shards on the floor.

Soft Eng: Your 4th year design project has become sentient, and sort of malevolent. You decide to go ahead with the presentation anyway, thinking that a self-aware minesweeper should be harmless.

Your unlucky number is: 1 click, one bomb. Forever!

Stats: Stranded at the bus stop, you try to use your knowledge of statistics to calculate how long you'll have to wait for the next bus. Modelling it with a poisson distribution, you eventually come to the conclusion that it's only 8 minutes.

Your unlucky number is: 5 buses pass you during your math.

Teaching Option: Despite all of your theoretical education on how to teach, you find that you actually have no practical idea on how to get your students' attention. You decide to bribe them with promises of alcohol.

Your unlucky number is: 23 drunk teenagers.

Undeclared: You don't know whether you should read your **horrorSCOPE**, or finish your assignment. By the time you get to this sentence, it is too late.

Your unlucky number is: 0/20 this week.

!bar

Surprise profQUOTE 2.0!

[*Describing a painting.*] "Je ne sais pas ce qu'il a fumé. Ne me demande pas."

[*Translation:* "I don't know what he was smoking. Don't ask me." -MuffinED]

profQUOTES

“Eternity is a very long time, especially the last part.”
André, MATH 136

“You are not responsible for this proof, but if you have trouble sleeping at night, you can read it.”
Qin, STAT 450/850

[Writes a result on the board.] “You can check this. Every time I tell you you can check, it means you have to check.”
Qin, STAT 450/850

“I hate it when my students get grades.”
Ray, PHIL 110A

[Talking about pipeline computer requiring data not yet computed.] “You need a psychic computer for that!”
Mann, CS 251

“I made a change in the instructor note to remind me not to tell the same lame joke I’ve been telling for 20 terms.”
Mann, CS 251

“When I need to program something bigger, I use the GS programming environment, where I specify the program at a high level and I get back the result a few days later. Does anyone know what GS stands for? [Pause.] ‘Graduate Student.’ [Laughter.] No, no, it’s not actually that bad.”
Menezes, CO 487

“Now, at the beginning of the semester, someone asked why we’re concerned about quotient spaces. And I haven’t forgotten. I’m not doing it now, I’m just saying I haven’t forgotten...”
Marcoux, MATH 146

“Just kidding... I’ll do it now.”
Marcoux, MATH 146

“We were looking at homogeneous Banach spaces over T... or over coffee, it doesn’t matter”
Marcoux, PMATH 450

“All models are wrong, some models are useful.”
Zhu, Stat 331

“When we do Residue Theorem, which is Cauchy’s Theorem on steroids...”
Rubinstein, PMATH 332

“I have to add up more [terms] because they’re smaller now, but I have an infinite number of them, so I don’t care.”
Scott, MATH 138

“This thing is important for assignments and exams, but in real life, nobody cares.”
Scott, MATH 138

“Because we defined it as my friend, it has access to ALL my private parts”
Lushman, CS 246

“It’s like a family tree where you reproduce asexually; like engineering students.”
Katz, MATH 239

“I will talk to my can of Dr. Pepper. It tells me it’s happy. It always is.”
Katz, MATH 239

“Nerd reference! You are supposed to laugh.”
Katz, MATH 239

“Why do you always look confused, whether I say something simple or complicated?”
Purbhoo, MATH 249

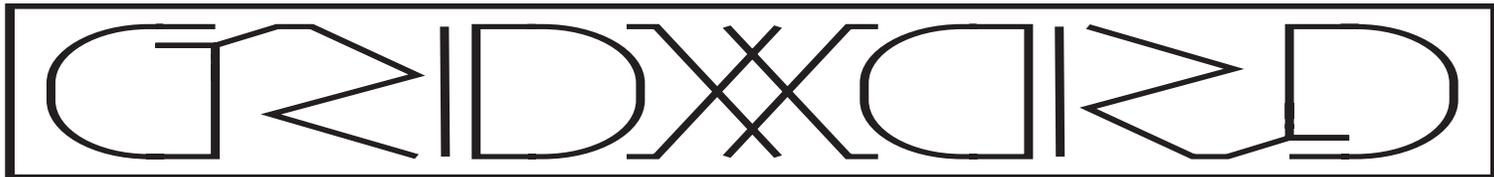
“The practical application of this [concept] is to give you assignment and assign you marks. Other application will come later.”
Purbhoo, MATH 249

“This stuff you learned while you were still in diapers, and by diapers I mean high school.”
Purbhoo, MATH 249

“I always come up with good ideas while driving, instead of showering like normal people.”
Naeem, CS 241

Last Week's Solutions:

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



gridCOMMENTS

Lá Fhéile Pádraig

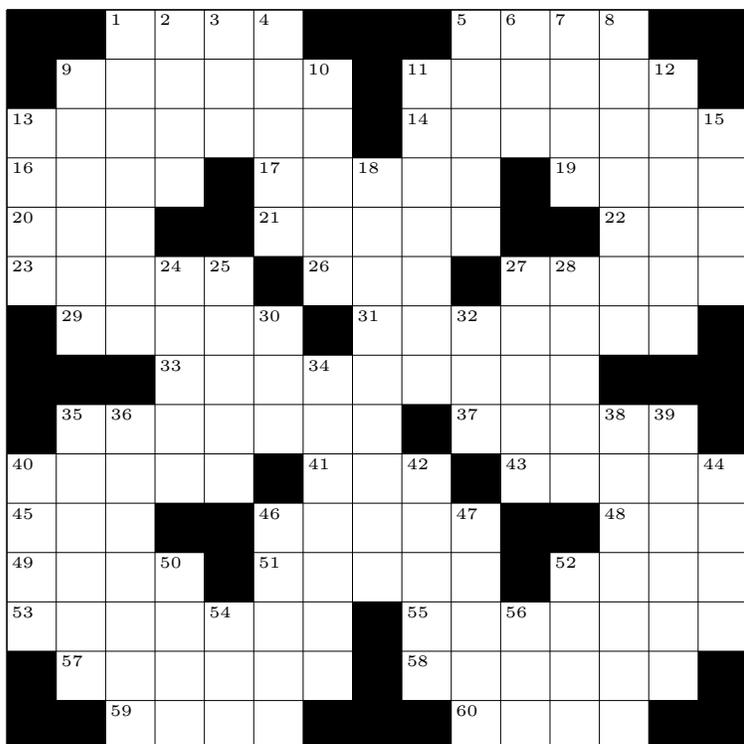
For the longest time I thought today was going to be Saint Patrick's Day so I made the grid a four-leaf clover and threw in some Irish words. But today is π day, and the four-leaf clover is not the symbol of Ireland (see 18D). At least all my squares are checked!

Half the four submissions were perfect—sorry Ramesh and David. Last issue's *gridQUESTION* ("What should next issue's *gridQUESTION* be?") invited an answer I did not foresee: Katie's "What should next issue's *gridQUESTION* be?". Though Chris's answer ("What's the difference between a duck?") was funny, Katie's kindles some mayhem. So congratulations, Katie! You may pick up your prize at MathSoc.

Submit your grids to the **BLACK BOX** (by the Comfy Lounge on MC 3rd floor) by 18:30 on Monday March 24th. Include your name and your answer to this issue's *gridQUESTION*—the best answer decides the winner (of a \$5 C&D gift card) in the event of a tie: "What should next issue's *gridQUESTION* be?" Note, however, that next issue is the last issue of the term, so there will be no *gridQUESTION*.

Cheers,
unit

This Week's Grid:



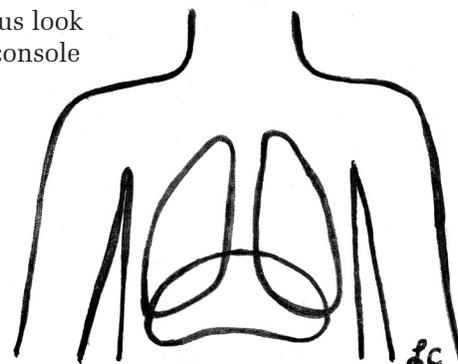
gridWord Clues

Across:

1. Iced ____
5. Quick pic
9. Baile Átha Cliath
11. Chicken butt
13. Water electrolysis gas
14. Pee post
16. Irish given name
17. Shoemaker's awl
19. What monks do
20. Lightweight longboard
21. Actress Lindsay (of Irish descent!)
22. Quill liquid
23. Small diving ducks
26. Gran
27. Grammaticalization of temporal distance
29. Bloviate
31. Moses' Mount
33. Fun five-liners
35. Captive's cry
37. Whistling hares
40. Scatterbrained
41. Obsessive-compulsive disorder
43. "Synchronization" abbreviation
45. ð
46. Digs
48. "pre"fix
49. ____ go Bragh
51. Scored alternative
52. High-schooler
53. Tell
55. Enthroned
57. Talks back
58. ____ go Brách
59. Lascivious look
60. Sonic's console

Down:

1. Hug lover
2. Psi Pokémon
3. Guarantees blackboard immortality
4. Picture element
5. Irish surname
6. Servile telepaths
7. Rain shield
8. Vessel flute
9. DC generator
10. Synthetic silk
11. Tuscan wine
12. Trickster spider
13. ____ and haws
15. Tot
18. Not to be confused with four-leaf clovers
24. Triple-time tune
25. Stump
27. Short totems
28. Hold as a thing sainted
30. Scottish uncle
32. Secure copy
34. Swellheads
35. Cubic decimetres
36. Mindful of right and wrong
38. Sense appendage
39. Big and silver
40. Antlered animals
42. Rid of rime
44. Female 40D
46. Subject of solitude
47. Indian dresses
50. Cyrano's curse
52. Terminal branch
54. What's the ____?
56. Cinnabar to mercury, e.g.



VENN DIAPHRAGM