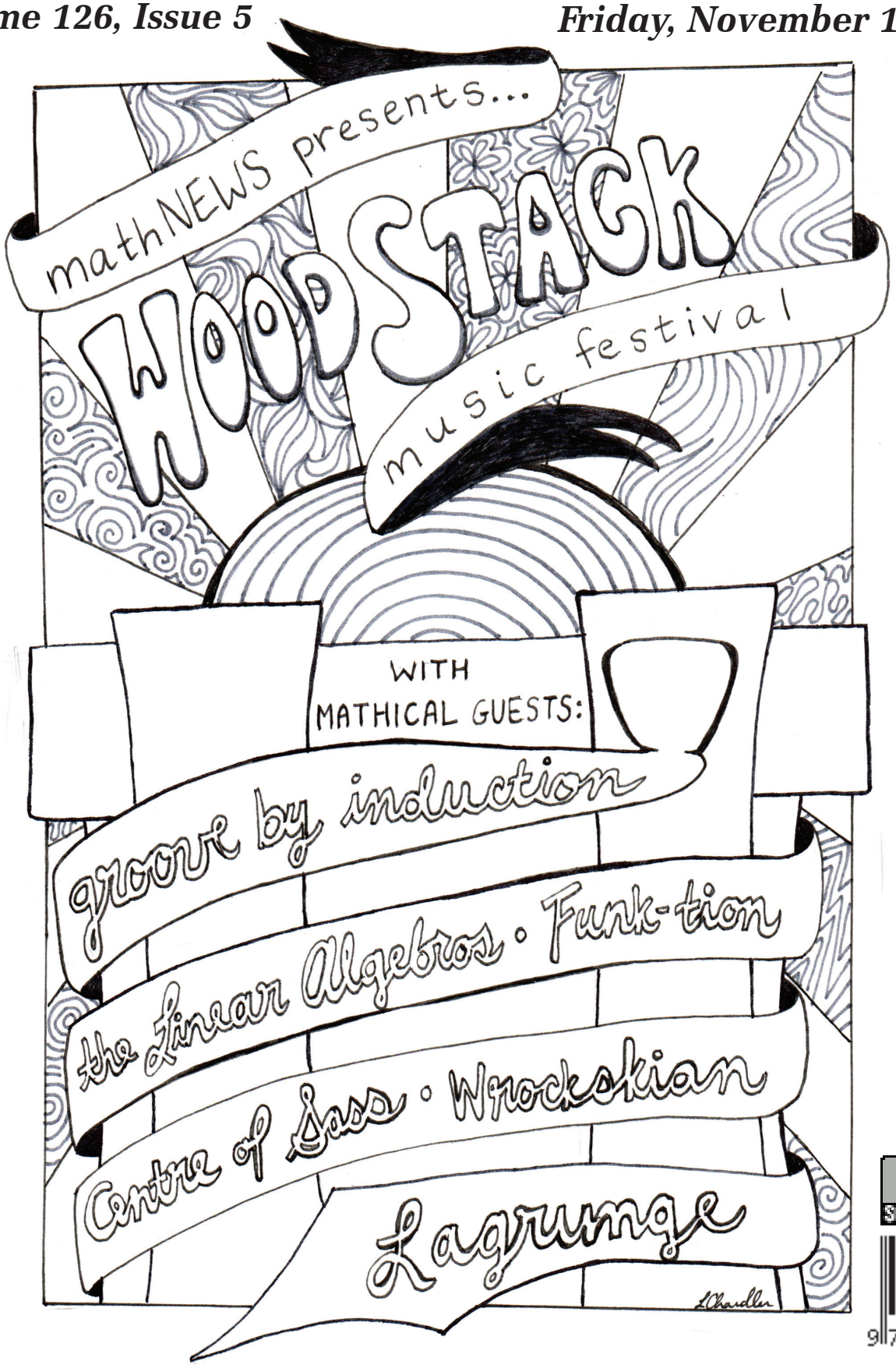
mathNEWS

Volume 126, Issue 5

Friday, November 14th, 2014



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*look*AHEAD

***math*NEWS**	
November 14	Issue 5 braces the cold outdoors
November 24	Writers put on a scarf and boots to rake the leaves outside
November 28	Issue 6 cozies up in front of the fire with a mug of hot chocolate

MathSoc	
November 18	General Meeting
November 26–27	Vote for MathSoc Council

University	
November 14	Drop, penalty 1 period ends
November 15	Drop, penalty 2 period begins

Miscellaneous	
November 14–20	Trans Awareness Week
November 15	Clean Your Refrigerator Day
November 16	Kitchener Santa Claus Parade
November 16	Have a Party With Your Bear Day
November 17	Homemade Bread Day
November 20	Transgender Day of Remembrance
November 21	World Hello Day
November 23	Eat a Cranberry Day
November 27	American Thanksgiving

fig. Topological buns.

ISSN 0705—0410

Founded 1973

*math***NEWS** 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. *math***NEWS** is editorially independent of MathSoc. Content is the responsibility of the *math***NEWS** editors; however, any opinions expressed herein are those of the authors and not necessarily those of MathSoc or *math***NEWS**. Current and back issues of *math***NEWS** will eventually be available electronically via the World Wide Web at `http://www.mathNEWS.uwaterloo.ca/`. Even Thomas Baxter doesn't read this ISSN, so it's pointless to update it. What do you think? Send your correspondence to: *math***NEWS**, MC3030, University of Waterloo, 200 University Ave. W., Waterloo, Ontario, Canada, N2L 3G1 or to `mathNEWS@gmail.com` on the Internet.

Amy Li (Miho Nosaka), Elizabeth Liu (Yugi Mutou), Katherine Tu (Bandit Keith), Rachel Wiens (Seto Kaiba), Jose-Miguel Velasco (Yami)

*mast*HEAD

As an exec member of several clubs around campus, I can confirm what we all know: having money makes life easier. I don't even expect inordinate amounts of money, but sometimes you can't do the things you want to do because there simply isn't enough cash. Then the question becomes: do we charge more for membership? We don't want to discourage new members from joining though. We could ask for more money, but then what if we're denied? And we can't ask for too much money without being scrutinized, and no one wants that to happen. All we want to do is to host decent events for our members! Is that too much to ask? But with *math***NEWS**, money is never a concern. So blessed. Thanks to all for your very welcome contributions. We hope you are getting your money's worth by reading every *math***NEWS** issue every term.

In fact, *math***NEWS** is currently running a surplus. So we decided to ask our writers for ideas: "If you were *math***NEWS**, what would you spend our surplus money on?"

MuffinED ("Ice cream every day."); lp0onfire ("Replacing all professors with costumed small animals."); bunniED ("Breed infinitely compressible and infinitely stretchable bunnies."); xoxo ("Open up a penguin habitat"); Algoweird ("Better editors"); Beyond Meta ("A 4th wall for the office, to later be destroyed"); Zethar ("Liquidate to precious metals, hoard."); VPEd ("More free pie"); DictatED ("Give it all to BIC. I dictate it."); himynameis ("End world hunger"); arabesque ("Make *math***NEWS** a peer reviewed journal of combinatorics"); urstruly ("A cruise trip around the world"); quiz ("A new set of servers for math research"); Ice Nine ("Full quality colour printing"); Soviet Canadian ("Making more surplus money"); TRK ("Raising unicorns!");

wibblED ("guacamole errday").

MathSoc's General Meeting

Hello Mathies!

MathSoc's termly General Meeting will be happening on Tuesday, November 18th, 2014 at 4:45 PM in the MC Comfy Lounge. Come out to discuss several important issues. See below for the entire agenda or `mathsoc.ca` for the text of all the motions being put forward.

Agenda:

1. Executive Reports
2. Other Reports
   a. Office Services Manager Report
   b. Executive Evaluation Committee Report
3. Approval of Council Seat Allocation for 2015
4. General Meeting Notice Bylaw Change
5. Executive Honorarium Bylaw and Policy Changes

There will be lots of free pizza. See you all there!

Lauren Hurley
MathSoc President

MEF Sez

I feel so well-endowed right now.

The Math Endowment Fund (MEF) has a message for mathies:

Funding Proposals

The Math Endowment Fund (MEF) is currently looking for funding proposals for the Fall 2014 Term! The deadline for submitting a funding proposal this term is midnight on Thursday, November 20th, 2014. Please submit a proposal either to the MEF Office located in M3 1004, or preferably through email. Copies of the funding proposal are also available at `www.student.math.uwaterloo.ca/~mefcom/forms/` for download in .pdf and .doc. You can also find a hard copy of the form at the MEF Office.

Funding Council Positions

There are also student positions available on the Funding Council. The student positions are voting members of the Funding Council and only need to attend one meeting this term, which will be **November 25th 5:30 PM – 9:00 PM**. At the meeting, the Funding Council listens to presentations by and critiques the proposals of the groups requesting funding. Afterwards, the Funding Council votes on how much funding should be allocated to each proposal. Dinner and refreshments are provided.

Funding Council nomination forms can be found on the website as well, in .pdf and .doc formats, and are due by midnight on **Thursday, November 20th, 2014** to the MEF Office. This is a great opportunity to help manage a $5+ million endowment fund, with the possibility of more involvement in the future (as Director, see announcement below, or as a member of the Board of Directors). You can also find a hard copy of the form at the MEF Office and outside the MathSoc Office.

MEF Director Spring 2015

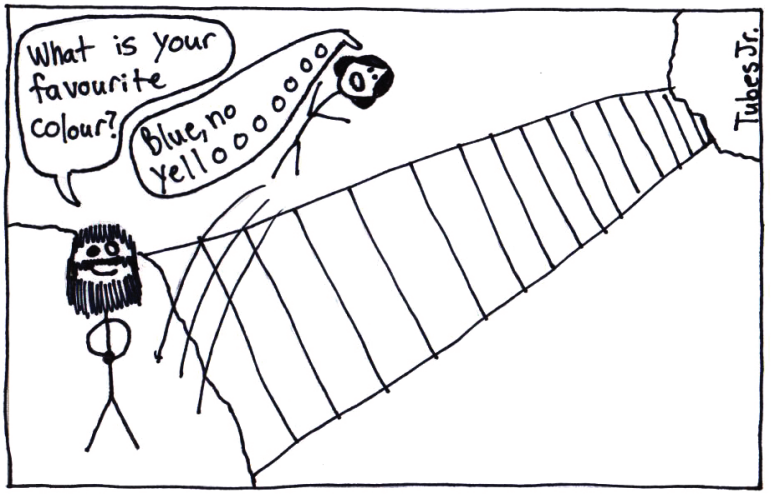
MEF is currently looking for their Director for Spring 2015! Nomination forms can be found online at `http://www.student.math.uwaterloo.ca/~mefcom/forms` and are due by midnight on Monday December 1st, 2014.If you are interested in being on the Funding Council or if you have any questions, please feel free to email the MEF Director at `mefcom@student.math.uwaterloo.ca`.

Jazbel Wang
MEF Director Fall 2014

Monty Python in Python

The Bridge of Death

```
def canCross(yourName, yourFavColour):
    print "Stop! Who would cross the Bridge of
Death must answer me these questions 3, 'ere the
other side he see."
    answer = (raw_input("What is your name? "))
    if answer == yourName:
        answer = (raw_input("What is your
                  quest? "))
        if answer == "To seek the Holy Grail":
            answer = (raw_input("What is your
                      favourite colour? "))
            if answer == yourFavColour:
                print "Right. Off you go."
                return True
            else:
                print "ARRRGH!"
                return False
        else:
                print "ARRRGH!"
                return False
    else:
            print "ARRRGH!"
            return False
```



Council Elections

Hello, Mathies!

It's that time again for MathSoc council elections. If you're interested in representing your views on council or becoming an executive, get a nomination form immediately outside the MathSoc office. These nomination forms are due in the CRO mailbox in the MathSoc office by 4:30 PM.

Here are all the dates for the election this term:

- **Nominations:** November 12th–November 19th
- **Campaigning:** November 17th–November 25th
- **Voting:** November 26th and November 27th

Thanks,
Keegan Parker
Chief Returning Officer

Next week is Transgender Awareness Week! See `glaad.org/transweek` for more information.

Analytics for Mathematicians

Mathemetrics! Anyone? No? D'aw…

The year is 2014, and we've been studying baseball through the lens of tru—I mean, sabermetrics—for over 40 years; basketball has had so-called APBRmetrics for over 15 years, and even hockey analytics have grown more popular as of late. With Rogers hoarding the Canadian broadcast rights of every NHL game for the next 12 years and clubs hiring the analysts, two problems will have arisen. One is Rogers will not attempt to improve the intellectual aspect of their broadcast in favour of being 'cool'—and also in favour of being misogynist, as their broadcast team is 3/43 female. The other is that, due to confidentiality agreements, people will not being writing publicly about analytics, therefore slowing down the growth of the field.

The obvious next step is to have analytics for mathematicians! Here are some example metrics, together with some analysis and discussion on the merit of the metric:

- **PP = Papers Published.** For the professional mathematician, one obvious thing to track is the number of papers published in refereed journals. This is the classical metric of choice, but it is a mere counting stat, and favours mathematicians who have been around for a while and have had more opportunities to publish. It also doesn't take into account the reputability of the journals in which the mathematician has published, and it is not even a good indicator of how productive a mathematician has been recently, as some journals (e.g. ArsCombinatoria) have five-year backlogs right now. This is not a quality metric.
- **Put = Putnam Score.** A staple of undergraduate bragging, this is a metric for distinguishing those who are contest-math savvy from those who aren't. It only works for those who are in the upper-echelon of spontaneous problem solving skill: the median score tends to be 0. While it can be a good indicator of research potential, it's not a necessary skill.
- **A = Age.** You can only win the Fields Medal if you're under 40. Admittedly, tenure is scarce enough now… This and Putnam Score are a portion of an analogous quantity to "Black Ink", a metric used on Baseball-Reference to indicate worthiness of all-time greatness (i.e. the Hall of Fame); this is not strictly necessary, but helpful.
- **ECT = Editions of Calculus Textbook.** If you publish an undergraduate-level calculus textbook, it is an industry expectation that you release a new edition of the textbook every three years at the least and, at the most, every year. This way, you can maximize profit by forcing students and universities to perpetuate the vicious edition cycle: buy textbook, use textbook, textbook becomes outdated and 'obsolete'. Oh, hey, maybe I can put this problem in Chapter 5…
- **EN = Erdös Number:** Enough said. My number will be 3 if the paper I submitted is accepted and published. A more advanced stat, which is rare and not well-studied, is the number of distinct collaboration paths from you to Erdos. This makes a difference in that a mathematician may write a bunch of papers with the same person who collaborated with Erdös and thus has EN = 2, but a different mathematician may have co-authored papers with five or six authors, all of whom have EN = 1, which yields more distinct paths. Generalizations abound, of course. (In particular, the Erdös-Bacon-Sabbath number is fun, if mostly kind of useless.) [1]
- **$/App = Dollars per Application:** Universities like it when their researchers pull in huge grants. Tracking one's dollar value per application is one way to pick out researchers who will bring in top dollar with minimal time lost (hopefully) from their other duties, such as teaching and supervising student.
- **MAR = Math Above Replacement.** All of these are pieces of the puzzle, but how can we put them all together? As in any good piece of statistical reporting, the answer is always linear weights! However, the formula is too long to write in these pages, since there are so many terms to consider. (**AFP,** "Ability to Fermat a Proof", is indeed one of them, though it doesn't have a high correlation with, well, much of anything…)

Those are just a few of the stats which we could begin to study, in this brand-new field. Maybe now we can use analytics to compare ourselves instead of relying on marks or co-op successes. Right?

Scythe Marshall

[1]: See also: `http://www.oakland.edu/enp/trivia/`

Desert Bus for Hope!

Always Turning a Little to the Right

This Friday, November 14th (the day this issue comes out) at 12:00 PM EST, Desert Bus for Hope 8 will begin. What is Desert Bus? It is an charity event run by the crew of Loading Ready Run, a sketch comedy group over in Victoria, where they livestream the worst game in existence Desert Bus, as well as improv skits, jokes, interviews with various celebrities (which you may or may not know), other games (difficult D&D dungeons being a recurring thing), and various competitions and auctions. As money is raised, the event lasts longer, which has caused previous Desert Buses to last nearly a week. That is a week of 24/7 streaming, with funny and interesting things happening rather regularly.

If you would like to donate some money to charity, or simply watch funny people being funny, tune in at `desertbus.org` today!

Soviet Canadian

H.M.S. Pinafore

Hello Opera lovers and Simpsons fans!

As some of you may know, the University of Toronto will be performing Gilbert and Sullivan's H.M.S. Pinafore at the end of this month. Composed by Arthur Sullivan and librettist William S. Gilbert, the opera takes place aboard a British naval ship of the same namesake. It is a delightful light comic opera in two acts, and yes, the lyrics are in English.

For those of you old enough to remember those early episodes of the Simpsons, Sideshow Bob once sang the entirety of the opera to Bart while on a boat. It was that glorious episode where Bart tricked Bob to sing before he kills him. "For he himself has said it, and it's greatly to his credit, that he is an English man, he remains an E-e-e-e-e-e-e-e-eng-lish maaaaaan!"

If you're interested in the plot, you can search it up on Wikipedia. I don't want to spoil it here.

The opera will be performed from November 27th to 30th at MacMillan theatre in Toronto. Tickets are $10 for students, but they're going fast.

arabesque

Solar Flare Destroyed Humanity Yesterday

Yesterday, a large and damaging solar flare completely obliterated all of humanity on Earth as we knew it. The gigantic flare caused a massive widespread cancer that was immediately terminal for everyone involved. It is unknown how this is being reported, and our best guess is that *math*NEWS is beyond the realm of physical existence. In other words, *math*NEWS is math.

There are no people to interview for eyewitnesses.

quiz

One-Third French

The other day, I was at a bar with some friends. During our conversation, we pondered a deep philosophical question: could a person be exactly one-third French? One would think that the answer would be no, as the number of ancestors would always be expressed as a power of two.

However, as one progresses further up the family tree, there's bound to be overlap between ancestors. If you decide to not double count repeated ancestors, then it would be possible to have a number of ancestors divisible by three.

The best answer we found for our problem is that, if a person is quarter French and had an organ transplant for one-twelfth of their body from a French guy, then they would be exactly one-third French.

Beyond Meta

An Open Letter to Midterms

From your secret detractor

Dear midterms,

It's time to celebrate, because by the time you read this, my midterms will have officially ended! For students who still have hell to suffer through, I send my deepest condolences (and maybe a fruit basket, if I really like them).

Don't think you're off the hook, though, midterms. Oh, do I have a bone to pick with you. First of all, don't try to hide behind the word "midterm". You shouldn't qualify as a "midterm" if a) there is more than one of you per course and b) you don't occur in the middle of the term. Such false advertising is deeply traumatizing for students, who must write one "midterm", only to realize that they must go through the hell of another after a month. We can't even refer to "midterm season" anymore, because you descend on us in the first month of school and persist for the entire term. It may be far more accurate to call you "That-Which-Must-Not-Be-Named", "[Inarticulate Groaning]", or "*#&*@%*@!".

Second, why must you be so stressful? It's not like we don't have enough to worry about, with lectures, assignments, JobMine, the next person to die on Game of Thrones, and a social life that was last active during the Cold War. With great periods of high stress also come periods of the deepest apathy, and so the stress readings of students throughout the semester read like seismometer readings during an earthquake.

Finally, try not to be so demanding. "Explain." "Prove the following." "Find the equation of the asymptote." What are you, a whiny ex? Face it, buddy; I don't care how close you two got, but you and your asymptote are never, ever getting back together. Asking us to dig up its "equation" for you is desperate and embarrassing. We're not here to be your wingman; we have our own love lives (or lack thereof) to worry about.

Midterms, do you even understand the effect you have on us? Too many students have been driven to caffeine addictions because of you! You have caused a ridiculous number of nervous breakdowns at 4AM! You are only remembered with a slew of profanities preceding your name! Like a bad breakup, you haunt our sleepless nights and we would rather never think of you again. Tales of you are used to terrify children. In Waterloo, you just might be a bigger horror story than the geese. Is this really what you want your legacy to be, midterms? You have some serious soul-searching to do.

While you do that, I'm going to bask in my newly found freedom. I might actually have the time and energy to cook actual meals! Think of everything I could do without having to worry about you! After all, finals season doesn't start for another… two weeks. Oh. Well, shit.

Sincerely,
A student who has suffered through far too many midterms

How To Stop Procrastinating – Part 1

Or how to do that computing side project without getting side-tracked

Often times in computing, when we wish to do actual work on a computer, the computer itself becomes a source of distraction. With email, social media, videos, etc., people are often told they need to shut off the computer and get away from it in order to be productive in their work. Unfortunately, this option is not available to people in the computational realm. In addition, while fixed assignments and small projects with abrupt deadlines have a concrete set of tasks and due dates to work back from, an open-ended side project has no such constraints. Therefore, for those who wish to excel, this becomes the worst possible combination of scenarios. So what is to be done?

First, make sure the project you're undertaking is sufficiently challenging—but not excessively difficult—so as to keep you interested. Conduct an honest assessment of your abilities to determine if you have the necessary skill level to perform the tasks for the project, or else you will feel overwhelmed. In this case, you might wish to adjust the nature of the project, or acquire the level of skill required. Once you undertake a project of an appropriate challenge level, you will be in a position to be able to achieve what is known as "flow," or to be in "the zone."

There are many tasks to accomplish on any given project, so you have to prioritize. Break down the project into chunks, and then break those down into tasks. Prioritize the tasks that have to be done in the project first, then those that should be done, and finally follow this list with the tasks which would be nice to have done. Estimate the amount of time of all the tasks required in the project to yield an overall time to completion. Now double it. This is what you are looking at in terms of an internal deadline for your project.

An open-ended project is different than your other projects or assignments in that you do not have guidelines, a fixed schedule, list of things to do, or perhaps even an idea of what to accomplish. Nor do you have any sort of required reading or prerequisites to do in order to be prepared for whatever tasks are to be accomplished as part of the project. Therefore, you will need to make it a task of the project to look up, research, and learn whatever it is that needs to be understood in order to move forward in the project and be productive. However, learning and reading can easily slide into informative entertainment, and thus procrastination.

You have to be honest with yourself and prioritize your research inquiries, then only read and learn of those things which you need to know in the present in order to advance your immediate goals in the project. Other things you find potentially useful in the course of your research for the project can then be placed on a reading list of useful things to read at a later time. Similarly, those things you find only tangentially related to your project, or perhaps only for info-entertainment, can be placed on a list of things to read or consume—for pleasure. There you have it: three lists again, though this time for items to learn or read, or just "consume." To yield extra benefit from the knowledge gained from each resource you consume, you should write a one or two sentence summary of what you have learned from each web page you read or online resource/tutorial you learn from. Stay tuned for part two!

TRK

*math*NEWS Article Process

*Now you too can make a math**NEWS** article!*

If you ever wanted to eat free pizza, and write about something you care about, you can use the following writing process:

1. Do not prepare anything ahead of time.
2. Try to ignore varied and interesting topics being discussed around you.
3. Fail to ignore discussions.
4. Discuss many things.
5. Fall out of the conversations long enough to write half of an article.
6. Pizza arrives.
7. Eat all the food.
8. Go home.
9. Go to sleep.
10. Hurriedly finish article on the following morning.
11. Hope it makes it into the issue.

If you use the above process, you should have an article in *math***NEWS**. Congratulations!

Soviet Canadian

Self-Referential List of Criticism

1. The dates are wrong. In the last issue of *math***NEWS**, It gave November 11th as the meeting for production night. Monday is November 10th. [*No. You're wrong—DictatED*]
2. There are too many lists in *math***NEWS**. Even this article is a list.
3. Using colour when we print in black and white seems very strange. Seriously.
4. More ads. Especially ads with pornography.
6. There needs to be more ASCII art in this. \/_ . It's a dog.
7. How do you write fractions? The best I can do is a/b. I'd rather $ \dfrac{a}{b} $. Also other math notation. This is *math***NEWS**, dammit.
8. Lists need to be properly numbered.

quiz

Haiku

lost: mathsoc's money
if found please return to us
pi day is not free

Algoweird

Scheduling Algorithms (Continued)

Recall from last article the purpose of a *scheduling algorithm* (or policy) is to find an assignment of *jobs* to *resources*. A job cannot be started before its *release time*, must be completed by its *deadline*, and requires a certain *execution time*. Jobs may be preempted—that is, the execution of a job may be interrupted so another job can execute instead.

Typically, scheduling algorithms are discussed in the context of operating systems, so jobs are processes assigned to processors. As a more concrete example, we could consider a student trying to decide which assignment to work on next.

Before the last article got preempted, we were discussing the Earliest Deadline First (EDF) algorithm, which, true to its name, chooses the job with the earliest deadline.

Fact. EDF is an optimal scheduling algorithm. In other words, EDF will generate an optimal schedule, if one exists. (Note that multiple optimal schedules may exist.)

Proof idea. We can use an "exchange proof" that converts any (feasible) schedule into an EDF schedule. We basically swap jobs around. Furthermore, we use preemption to break jobs up so they can be swapped.

Fact. Without preemption, EDF is not optimal.

To demonstrate non-optimality, we must come up with some (feasible) schedule, and then show that EDF will result in missed deadlines.

Example. Job 1 is released at time 0, takes 5 units to complete, and its deadline is at time 10. Job 2 is released at time 3, takes 2 units to complete, and its deadline is at time 5.

Without preemption, EDF would choose Job 1 first and execute until it finishes at time 5. Then Job 2 will miss its deadline. However, a feasible schedule exists. Idle until time 3, then start Job 2. Execute to completion, which is time 5. Then start Job 1 and execute to completion, which is time 10. Both jobs meet their deadlines.

Fact. On a two-processor machine, EDF is not optimal.

Finding an example is left as an exercise to the reader.

Before moving on, let us conclude our discussion of EDF with one final fact (without proof).

Fact. If no feasible schedule exists, attempting to use EDF will, in the worst case, result in all deadlines being missed.

Now, let us briefly consider two other optimal algorithms.

Definition. Latest Release Time (LRT) is an optimal algorithm that acts as one would expect. In a sense, it is "EDF backwards," pushing jobs as far back as possible.

Definition. Least Slack Time First (LST) is an optimal algorithm that chooses the job with the smallest slack. If a job starts executing at the earliest possible time, the slack is the amount of time between its completion and its deadline.

An interesting observation is that LRT requires a very precise analysis of the exact execution times and deadlines. So using LRT for your assignments might not be a very good idea (though we all do it in the form of procrastination).

Now that we've covered definitions, examples, and examples of non-optimality, I'd like to discuss a scheduling algorithm I have recently devised.

Definition. Most Fun Assignment First (MFAF) is an algorithm that chooses the most fun assignment first.

Example. As a grad student, I'm taking two courses this term, both of which have assignments (but no exams! Take that, you undergrads!). The assignments for one course are interesting, but often tedious and time-consuming. The assignments for the other course are also time-consuming, but they're so fun that the assignments never feel like work. Obviously, those are the assignments I always work on first, even if the other course has earlier deadlines.

Fact. MFAF is not optimal.

Example. Job 1 is released at time 0, takes 5 units to complete, has a deadline is at time 10, and has the highest "fun" value of 10. Job 2 is released at time 0, takes 5 units to complete, has a deadline at time 5, and has the lowest "fun" value of 0.

Using MFAF, we select Job 1 first. We finish it at time 5. But now Job 2 will miss its deadline. However, a feasible schedule exists: choose Job 2 first, finish it by time 5, and then choose Job 1.

I hope this article has been a good introduction to scheduling algorithms. Now you can create your own algorithms and prove that they are non-optimal!

notbob

Co-op students:
Remember to join Co-op Connection if your next co-op is in Toronto, Ottawa, Calgary, or Vancouver so you can participate in all their fun social events!

profQUOTES

"First rule of teaching: when you make a mistake in front of the class, use it as a learning experience."

Buss, CS 245

"The only reason why mutation is in a language is to give headaches to compiler writers. There is no other reason."

Buss, CS 245

"If you can't calculate the area of a square or triangle, something's wrong."

Liu, NE 352

"If we illegally download a car and send it to a 3D printer, we'd probably want to print some wheels, too, so we can actually drive it."

Roegiest, CS 246

"I suppose you could say that geese at Waterloo is a 'has-a' relationship. However, this isn't a good example because there are certain times when they exhibit an 'owns-a' relationship, in which the geese own Waterloo. It's called nesting season."

Roegiest, CS 246

[*Around the beginning of class.*] "By 'small', I mean it will take up the rest of the lecture."

Roegiest, CS 246

"Hey, that's exactly the line we have over there! Damn, that's convenient."

Roegiest, CS 246

"You can basically use the same Makefile for all your projects. Damn, that's convenient."

Roegiest, CS 246

"There are lots of other things you can do with UML, but we're not going to talk about them because no one really cares."

Roegiest, CS 246

"Yes, we've just made a Double-Double in less time than it takes Tim Hortons to make one."

Roegiest, CS 246

"I have aged dramatically while waiting for coffee at the SLC Tim Hortons."

Roegiest, CS 246

"You'll notice sometimes I put brackets, sometimes I don't. My lawyer says it's okay, and so does every book in functional analysis."

Marcoux, PMATH 453

"Why is it called the parallelogram law? Well, because it was proven by Joe Parallelogram."

Marcoux, PMATH 453

"Now, let's prove that this vector is unique. Well, I guess every vector is unique in its own way."

Marcoux, PMATH 453

"This [statement] is less obvious. Why is it less obvious? Because it's false."

Marcoux, PMATH 453

"For each $N >= 1$ … actually let's use lowercase n, no sense wasting an uppercase N on this."

Marcoux, PMATH 453

[*Proving Bessel's Inequality.*] "Normally, we want to try to eliminate inequality in the world, but not in this case."

Marcoux, PMATH 453

"When life gives you lemons, you make proofs!"

Marcoux, PMATH 453

"It's true because it's written. And it's written because it's true."

Marcoux, PMATH 453

"Now we're going to talk about the Minkowski functional; it's a great name because it's not a functional. Come to think of it, it's not Minkowski either."

Marcoux, PMATH 453

"After five weeks of using the whiteboard, I feel like I'm cheating on it by using a blackboard. But it's a good feeling."

Marcoux, PMATH 453

"So we can find an open, convex neighbourhood. I could have made it balanced, but I didn't want to show off."

Marcoux, PMATH 453

"This is child's play. It's not easy for us, but if we had a really bright child, it would be child's play."

Marcoux, PMATH 453

[*After telling a joke.*] "If you think I'm good now, you should see me when I'm sober."

Marcoux, PMATH 453

"If $p = 0$, then it goes without saying that p is continuous. But I just said it!"

Marcoux, PMATH 453

"I don't usually brag about myself. I let my legions of fans do that."

Marcoux, PMATH 453

"This theorem is always referred to as the Hahn-Banach Theorem, but there are multiple versions of it and you have to know which one is being used from the context. [*A bit later.*] This is how powerful the Hahn-Banach Theorem is! You can use the Hahn-Banach Theorem to prove the Hahn-Banach Theorem."

Marcoux, PMATH 453

"Witness the awesome power of the Hahn-Banach Theorem! I think Marvel should make a movie about the Hahn-Banach Theorem."

Marcoux, PMATH 453

[*During a proof.*] "What can I do here? Well, I can congratulate myself and watch the hockey game. But that won't solve the problem."

Marcoux, PMATH 453

[*Using two different definitions of integrable.*] "A smooth distribution is integrable if and only if it is integrable. This statement is not difficult to remember."

Charbonneau, PMATH 465

"Suppose you are going to prison for 20 years unless you say something interesting about x right now. What would you say? [*Class remains silent.*] Oh no, you are all going to jail."

Willard, PMATH 347

"I will tell you the truth. Some pure math profs are evil. Fortunately, I'm not one of them."

Willard, PMATH 347

[*Before proving a hard theorem.*] "I did this proof as a student. Look where I ended up."

Willard, PMATH 347

[*Skipping a part of a proof.*] "Life is too short to do this proof—for me. You are young, so I'll put it on your next assignment."

Willard, PMATH 347

"By tomorrow, we will either be fully understand or fully sick of induced representations."

Willard, PMATH 745

"There are multiple problems with this some. One of them is that it looks awful."

Willard, PMATH 745

"So to deal with the first problem… Well, the second problem. The first problem is that it looks ugly. [*After reducing it.*] It still looks ugly!"

Willard, PMATH 745

"Another application of dimensional analysis is to judge the quality of recipe books. You can show that the optimal cooking time for turkey is proportional to mass$^{2/3}$, so if your recipe book gives you a linear or quadratic relation, it's wrong."

Waite, AMATH 271

"I wrote 'wow!' in my notes. You can decide whether to copy it down."

Waite, AMATH 271

"Some people need to solve systems of DEs with thousands of equations. They just set things randomly equal to zero and get things that are totally meaningless."

Sivaloganathan, AMATH 351

"Part of my life I don't like to talk about: I used to look for prime numbers. Like really, really large prime numbers. I used to run it on multiple machines for days and days to get really large primes."

Buhr, CS 343

"My supervisor named their interpreter ABSITY: A Better Semantic Interpreter Than Yours."

DiMarco, CS 486

"It is surprisingly hard to write real sentences."

Purbhoo, CO 330

"Let's forget this case. We don't like it and remember we forgot it."

Purbhoo, CO 330

"I am putting an exclamation mark so you understand that redoing this problem is not boring; it's fun!"

Purbhoo, CO 330

"This can save you hours of agony. Okay, only minutes of agony can be saved."

Purbhoo, CO 330

"When you ask a survey some times people lie for example have you taken cocaine. Not everyone is as honest as the mayor of Toronto."

Liang, STAT 332

Prof: "Since the midterm average is very low, I will decrease the total marks of the test."
Class: [Silent]
Prof: "Why aren't you excited?!"

Kou, CS 430

Send us your articles, *prof*QUOTES, grid solutions, and questions to the Dean to `mathnews@gmail.com`. or to the BLACK BOX on the third floor of the MC!

*horror***SCOPES**

Special Text Adventure Edition

West of House
You are standing in an open field west of a white house, with a plain front door. There is a small mailbox here.

ActSci> `HIT MAILBOX WITH ACTUARIAL TABLE.`

You hit the mailbox. The mailbox cannot pay the deductible! The mailbox is destroyed!
There is a pile of wood chips and a large brass key here.

AHS> `GET KEY. EAST. ENTER HOUSE.`

You lift the key with relative ease thanks to your large muscles.

Outside the House
This old wooden abode looks like it hasn't been inhabited in years.

[first unlocking the door with the brass key]
Inside the House
Chairs and tables lie here in disuse, covered in dust. There is a trophy case against the wall opposite the entrance, with a small iron pole inside it. There is a large weight suspended from the ceiling by a steel cable.

AMath> `USE POLE WITH WEIGHT. PUSH WEIGHT.`

[first taking the pole]
You carefully place the pole in the right-half plane. The weight seems to be unstable.
You give the weight a gentle tap. The weight swings violently and rips the cable out of the ceiling, then crashes through the floor! There are some stairs leading down here.

Arts> `TAKE SELFIE. WAIT. DOWN.`

Proud of your accomplishment, you manage to take a decent selfie next to the stairs and post it to Twitter.
Time passes. You see several retweets here.

Basement
You are in a maze of twisty little passages, all alike.

Architecture> `USE PEN WITH BLANK MAP.`

[rolling Knowledge: Dungeoneering...success]
After a while you manage to sketch out a rough map of the basement and return to your starting point. The only interesting feature is a large bridge over an underground chasm, the other side of which you did not explore.

Combinatorics & Optimization> `GO TO BRIDGE. CROSS BRIDGE.`

You quickly find the shortest path and retrace your steps to the bridge.
Something climbs out of the chasm. A huge green fierce snake bars the way!

CS> `/usr/bin/python3`

The snake recognizes you as its friend and uncoils to reveal a tin wand.

Double Degree> `GET WAND. CROSS BRIDGE.` WAVE WAND.

Far Side of the Bridge
You are in a smooth-walled stone cavern with a low tunnel to the south. The entrance to the tunnel is blocked by boulders. There is a vending machine here with a neon sign which reads "Nutri-Vend".

You wave the wand. Money appears out of thin air! A hand reaches out of the vending machine and scoops up the money. The display on the vending machine reads "$2.50 credit".

Engineering> `PUSH "FERTILIZER" BUTTON. DROP FERTILIZER. USE BATTERY WITH FERTILIZER.`

You push the button. A large bag of fertilizer is dispensed with a dull thud.
[first taking the fertilizer]
You drop the fertilizer. It lands with a dull thud near the boulders.You drop the battery into the fertilizer and run to a safe distance. There is a loud explosion and a bright flash of light! You blink a few times and your eyes clear. There is a pile of rubble and a large pool of battery acid here.

Environment> `DROP BAKING SODA. ENTER TUNNEL.`

You neutralize the stray battery acid in a safe and responsible manner, making it possible to proceed.
You crawl through the tunnel on your hands and knees.

Troll Gambling Hall
Around you, many shady characters are playing cards and calling out bets. Occasionally you hear the sound of coins falling out of slot machines. There is a large tunnel to the north. There is a professor here. The professor seems to be getting angrier!

Grad> `GIVE THESIS TO PROFESSOR.`

The professor seems to calm down for a moment, but suddenly attacks! The professor becomes hostile! You realize too late that the thesis contradicts the professor's work in the field. The TA becomes hostile! The lab assistant becomes hostile! The TA hits! The TA hits! The lab assistant curses. You are confused! The professor fires an arrow!

Knowledge Integration> `CURSE.`

You are confused! You curse in all languages simultaneously. The professor is confused! The TA is confused! The lab assistant is

confused! The lab assistant hits the TA. The TA howls in pain! The TA flees in terror! The TA is confused! There is a wall in the way! The professor is confused! The professor hits the TA. The TA is slain! The TA vanishes in a cloud of greasy black smoke.

MathBus> ENTER BUS. NORTH.

You enter the Math Bus and sit in the driver's seat. You are no longer confused. The lab assistant is confused! The lab assistant throws a potion. The potion bounces off the Math Bus. The potion hits the lab assistant. It was a good hit! The lab assistant is dissolved! You drive the bus through the tunnel to the north. The professor jumps out of the way!

Hot Room
You are in a large cavern with many stalactites hanging from the ceiling. On the far side of the room you see the form of a large red dragon. The dragon glares intensely at you, licking its large, scaled lips.

MathPhys> USE BRICK WITH PLATE.

You construct a model of dragon-flight using the bricks and plates. The model seems to be unstable. The model shatters! The dragon vanishes in a puff of logic! There is a stone staircase leading to a trap door. There is a set of all sets that do not contain themselves here. Inside the set is a set of all sets that do not contain themselves.

PMath> TAKE SET. EXIT TRAP DOOR.

You can't see that here!

Burnt Forest
Around you stand the blackened bodies of charred trees. There is a trap door (open) leading into the ground here. You hear the sound of footsteps.

Science> USE CATALYST WITH SEEDS.

A large tree springs from the ground! The footsteps are getting closer.

SoftEng> ROTATE TREE. CLIMB TREE.

You perform a binary tree rotation and lower the branches of the tree to a height you can reach. You pull yourself up into the tree and balance on a limb. You can see many apples here. The professor crawls out of the trap door! The professor throws a knife!

Stats> SET SIGMA = 9. THROW APPLE AT PROFESSOR.

You increase your standard deviation. Your evasion has increased! The professor throws a knife, but misses. The professor summons ancient graduate students! You throw the apple. It was a good hit! The professor is stunned!

Teaching Option> LECTURE ON GRAVITY. EAT APPLE.

You lecture about Newtonian gravity, using the apple as a prop. The graduate student invokes special relativity. You are confused! The graduate student invokes quantum gravity. You are more confused! You stumble and fall out of the tree. You are confused! You hit yourself with the apple. The professor is no longer stunned. The professor hits!

Undeclared> TAKE DEGREE.

Which do you mean, the AHS Degree, the Arts Degree, the Engineering Degree, the Environment Degree, the Mathematics Degree, or the Science Degree? The graduate student curses furiously. The graduate student mutters a spell. The professor starts moving faster! The professor hits! The professor hits!
*** LOW HITPOINT WARNING!!! ***
The professor hits! You die…

In that game, your unlucky number was 41 points out of a possible 250, earning you the rank of "Fledgling Research Assistant".

lp0onfire

Parade Announcement

The Lions Club of Kitchener Annual Santa Claus Parade will be on Saturday, November 15th at 10 AM.The route starts at King and Bridgeport in Waterloo and runs to King and Cedar in Kitchener.

If you live by there, you're going to be woken up anyway so you might as well wake up early and head out to watch. If you're not close, take a trip down anyway. It'll be good fun and you'll be able to support the University of Waterloo participants.

Last Week's *grid*SOLUTION

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

GRIDXGRID

*grid*COMMENTS

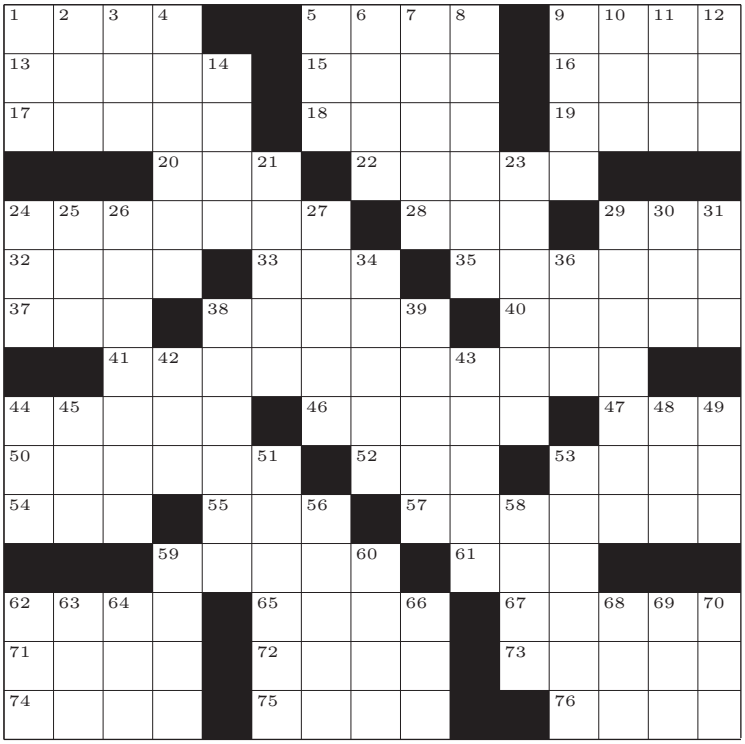
Tear-filled suncup

All five submissions were perfect. Still on the hunt for my keys, I might take some of your suggested answers to last issue's *grid***QUESTION** ("Where are my keys?") seriously. Ramesh said "they're always in the last place you look"; alas, they're not there. Travis ("~/.ssh/id_rsa"): not those keys! Rob thought they were on my piano, but I don't have one. Kevin cleverly proposed "the belly of a mountain whale", incorporating a translation of last issue's grid title. But I can't help but select Visiting Dad's answer, "South of the Everglades, swarming with Parrotheads" simply because he is just someone's dad who does my crosswords. So congratulations, Visiting Dad! You may pick up your prize at MathSoc (next time you visit)!

Submit your solutions to the **BLACK BOX** (by the Comfy Lounge on floor 3 of MC) by 6:30 PM on Monday, November 24th. Include your name and your answer to this issue's *grid***QUESvvTION**—the funniest one decides the winner (of a $5 C&D gift card) in the event of a tie: "What should you not do with snow?"

Cheers,
unit

This Week's Grid:



*grid*CLUES

Across:

1. Hillside shelter
5. Colourful computer
9. A Black Swan?
13. Twisted to death
15. Japanese fashion subculture
16. Sour solution
17. Potato pancake
18. Backwards tool?
19. Approach a limit
20. Bagel topping
22. Fire on a stick
24. Fast felid
28. (Unkind) coat kind
29. e.g. 24A
32. Iron oxide
33. Marge
35. Jungle journey
37. Not "nope"
38. Ellen Ripley's enemy
40. Sibling's daughter
41. They cannot guess the beauty been
44. Dog's dearest
46. Take to the _____!
47. Utilize
50. Epicure
52. Over the hill
53. Realm of Sohcahtoa
54. ___ Aviv
55. "Foul!" crier
57. Cactus gigantea
59. Fire fragment
61. Bagel topping
62. Downhill from here?
65. Folio
67. Talks over a faulty phone?
71. Tofu bean
72. In the Devil
73. Spanish sauce
74. Words arrangèd
75. Paper covered in food
76. Hop(s-drying) house

Down:

1. Hole-poker
2. Undergarment
3. Humdrum habit
4. Common printer
5. Not very well
6. Up in the air
7. Distant
8. Rueful angiosperm?
9. The art of giving the same name to different things
10. Soon to coat our roads
11. Water at a waterfall's feet
12. Tot
14. e.g. Beowulf
21. Canadian tree
23. Construction site sights
24. Weep
25. Colour without tint or shade
26. Spanish "Spanish"
27. Presumptive or apparent
29. Poetic pause
30. Piece of a curve
31. Adds notes
34. Sticky lizard
36. Christmas tree tree, maybe
38. Heart room
39. Combed out of wool before spinning
42. (FBI) agent
43. Molded metal disk
44. Not seldom
45. ___ is me
48. English honorific
49. Psyche construct
51. The cross, to sacrifice
53. Dinner jacket
56. An annoying pet?
58. Painter with a lonely dog?
59. Brumal test
60. Cloud tears
62. Poor venomous fool
63. Fecal matter
64. Ocellus
66. ___ shot
68. Long Mauna
69. Pounds
70. Hiccuper, maybe