βeta

– news from computer science and engineering –

the tropical paradise of **first year camp**

page 3–4

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and...

security news:
the equation group

page 5

check out
upcoming events

page 6

brain-bending
puzzles

page 7

catch up on
technology news

page 8

don't forget: sturep surveys close 10 april

issue 104 — 30 March 2015 — 15s1 week 5

βeta

About CSESoc βeta

CSESoc **βeta** is published fortnightly
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2015 issue 104

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In This Issue

Editorial

Hello, hello, and welcome to another week's Beta.

Moving up in the team this week is the multi-talented TEXnician, Emily Saunders Walmsley, who has braved the horrors within the CSESoc **βeta** build and styles, and survived. This bodes poorly for the future of my job.

And finally shamed into contributing is Tim Humphries, who is demonstrating by example that you don't even have to be in the country to write for us.

As ever, if you've stumbled on anything interesting, or you're keen to get involved, join the team via the CSESoc website.

Enjoy!

■ *Jashank Jeremy*

Stureps News

Congratulations to your new student representatives for 2015:

First Year
Alex Linker Leon Nguyen

Second Year
Kitty Lee

Third Year
Oliver Tan John Wiseheart

Fourth Year and Above
Vincent Tran Andrew Bennett

Stureps are currently running this session's survey for the CSE faculty, and for all CSE courses. This is your chance to have a say in how CSE is going, or how your courses are running. The feedback goes into creating a report which we discuss with the head of school, and from that we look to improve anything that needs to be improved.

There are two surveys: a faculty survey, and a per-course survey. Head to the survey links on the CSESoc Facebook group to fill them out.

First Year Camp

A blow-by-blow account of CSESoc's First Year Camp

Friday

So… it was time for First Year Camp. I could feel the excitement buzzing in the air as we waited around (in the rain, no less) to get on the busses to Camp Wombaroo. The camp was something that everyone was looking forward too, and we were all eager to get started.

When we arrived, we sat in the hall and got to meet our camp leaders, who all graced us with an "interesting" fact about themselves—this was where we first learned about Jake and Nick's undying love, something which was to become a theme over the next few days. We then got started with the name games where, to be honest, I promptly forgot everyone's names within five minutes. The game of murder was explained, and we were handed a slip containing the name of our victim, as well as the required location and murder weapon. As we slowly shuffled into the dining room, I started to feel on edge: I take murder very seriously.

After a delicious dinner, and getting our incredibly awesome camp T-shirts, we got right into the trivia game. It was a load of fun (and the free drinks didn't hurt), especially the Chinese Charades round (where Harris' apology was duly noted, although that didn't stop us making fun of him for the rest of camp). The sports round was totally biased in Jake's favour (who else in CSE would care about… sport?) but my team, Table 6 (we were originally designated table number seven) did really well, coming in second. We were the best at the tech round, and surprisingly, geography.

Once the trivia was over, the night wound down to the majority of us playing card and board games (mostly supplied by Matt, who earned his title of Card Shark). For me, these game sessions throughout the weekend were where I really made new friends. I was really enjoying my night, and was a little disappointed when we were told that it was time to go to bed; but, admittedly, it was past 2 am, and I've heard rumours that the camp leaders aren't actually all robots and they do need to sleep too (I'm still not sure though).

Saturday

We woke up at some ungodly hour—like, 8—and were shepherded to the hall again (after breakfast, where Harris was literally dragged outside onto a grassy area so Charlotte could stab him with an umbrella) for an activity mysteriously titled in our guide "Newspaper Fun!" (Seriously, who reads actual newspapers now in this digital age?) Admittedly, it was quite fun, and very hilarious, as we tried to create a shelter using only newspapers. There were also two side challenges—to make a funny story by cutting out words from headlines, and to place as many pictures of Tony Abbott and/or cats on the outside of the shelter as possible for bonus points.

Whilst there were many better (and longer) stories than ours (which simply read "Porn Stars Really Care About Your Child's Education"), our team won overall, fitting many (8?) people inside and not really standing up to the tests provided by the leaders. I wouldn't have used it as an actual shelter, but at least we managed to carry it outside and fit people under it before it broke apart. (Well, maybe we did pilfer some extra poles when the team next to us' shelter collapsed.)

We had an amazing lunch of burgers, where I noticed my target (for murder) had disappeared, and went searching for her in her cabin (I'm not creepy, but I had to kill her in a cabin). I (stupidly) wasn't worried about my own safety, as some (not so subtle) reconning had lead me to believe I'd be killed outside a bathroom (rookie mistake). When I got to her cabin and realised she wasn't there, I decided to go up to my room to put away the water bottles that I'd been carrying around all day in preparation. At this point, some random guy (seriously, I still can't remember his name) burst open the door, an umbrella outstretched like a sword and came

charging at me (okay maybe he simply walked in the door and tapped me with the umbrella (I totally did not jump and curse), but it sounded more dramatic). I hadn't even really lasted a day, and yet I was vanquished – the guy who killed me ended up coming second overall in the competition.

After the meal, we were deceitfully (thanks Steven) split up into groups of about ten for the scavenger hunt. Each group was given a pineapple (we named ours Geoffrey, and managed to lose him twice throughout the afternoon), and a bunch of challenges to complete (during which I failed miserably), some involving physical skill (again, why? This is CSE) and others mental acuity (also handcuffs and blindfolds).

My team did quite well, although we somehow forgot that blindfolded people do know what a hoop looks like and know how step around it if we tell them it's right in front of them (and someone lost their paperclip). We were, however, awesome at thong flipping, and our breaking of the watermelon for the watermelon eating challenge looked awesome (even if we lost most of the watermelon to the ground).

After we finally got back to the end, Steven killed Geoffrey (the pineapple), and told us to create something from his innards, as well as use a single sheet of paper to explain why our team should win. Whilst one half of the team decorated our pineapple's guts, I helped transcribe some (pretty terrible tbh) song parodies about the death of our dear friend the pineapple.

Once we were done, we got back to playing some games (Cards against Humanity FTW) until it was time for the pineapples to be showcased. There were some great displays, (including a "life-size" replica of Jake's penis) and some even greater speeches (thanks Harris), but in the end a winner was decided, to be announced the next day at the closing ceremony (seriously, what a letdown).

Finally, it was dinner time, which lead up to the most important event of the camp – the party. We got kicked out for an hour so they could set up, and the three people who'd bothered coming up with costumes (the theme was tropical) got changed whilst we played Egyptian Snap.

The party itself though, was fantastic. Admittedly, I'm not a fan of loud music and party lights, but the atmosphere was great (again, free alcohol helped). A few of us who weren't really into the dancing and loud music thing decided to go outside and play board games (again, thanks Matt), where I was thoroughly beaten (by my own mistakes) in Robo Rally (okay, maybe I rage-quit halfway through because it's too hard to play when everyone else is sober). At some point, a large portion of the camp ended up wandering outside to enjoy the fresh air (and relative quiet), so I also managed to meet someone who's doing the same degree as me (Biomedical and Computer Engineering, there's three of us that I'm aware of), and totally forget his name the next morning (seriously dude, add me on Facebook or something). At midnight, everyone was kicked out of the party, but a few of us were told of a secret room where we could go and play our games of CaH and Mafia (without the leaders having to watch us, meaning they could go sleep). I played CaH, which was really awesome – we played for so long that we literally ran out of white cards. By this point it was 3:30, so it was mutually decided that it was time to go to bed.

Sunday

By this breakfast, pretty much everyone was exhausted, walking around like zombies. Before we could leave though, there was the award ceremony. Everyone had voted during breakfast on various awards such as Biggest Fail and Secret Stripper—I was quite upset we couldn't nominate leaders, Oliver Tan had my vote for both categories of Best Costume. After another hour of card games, the winners of these, and the numerous group challenges that had occurred throughout the camp, were announced. You could hear the tiredness of everyone in the room as they laughed at the ironic prizes, al just secretly waiting to get home and sleep.

We waited for the bus in groups (holding hands as directed, I think it gave Steven some kind of perverse pleasure) and my group shuffled to the back where we lead a rowdy game of Mafia. I died both times (although the second time I lasted to the final five, and they killed me off even after I revealed that I was the doctor), but it kept me awake and (somewhat) alert, enough that I wasn't nodding off.

Finally, we arrived back at uni. We were all sad to say goodbye (even though we knew we'd see each other in class the next day, but it wasn't the same). This camp is definitely going to be one of the highlights of my uni experience – I made many friends and had a lot of fun.

Whilst I joke about them a lot, none of this would have been possible without Steven and Jake, so on behalf of everyone who attended, thanks so much for an amazing weekend! To the rest of the camp team, you guys were fantastic and camp wouldn't have been the same without you.

■ *Alex Linker*

Exciting Security News™

In this new column, we look at what has gone wrong with information security in the real world.

Today on Exciting Security News™, we look at how the NSA have, once again, secretly taken over the world; this time, through undetectable malware on hard drive firmware.

It sounds pretty crazy, but strangely enough, this sort of thing is actually possible. Researchers at Kaspersky Labs discovered some interesting viruses that they hadn't seen before, which could do a lot of powerful and scary things. As their investigations unfolded, they discovered that the scope of the situation was a lot greater than they'd first suspected—this was one of the most "sophisticated cyber attacks" they'd ever encountered. They dubbed the group behind this malware the "Equation Group", due to their use of complex encryption algorithms.

Stux In The Mud

The general pattern of these viruses followed one similar to that seen in Stuxnet, a carefully targeted piece of malware aimed at air-gapped nuclear fuel refinement systems in the Middle-East, and one that is already strongly suspected to have originated in the US NSA.

In fact, the Kaspersky team had uncovered a new family of viruses that not only predated Stuxnet by a significant time, but which utilised the same attack vectors as Stuxnet did.

Stuxnet, and the newly-discovered Equation Group family, both tapped into the vast reservoir of attacks based on security vulnerabilities that were, at the time of their discovery, otherwise unknown and unfixed. These attacks, dubbed 0-day attacks, are an incredibly potent threat to just about all software, because the vulnerabilities they leverage cannot be rectified until developers are aware of them. A black market exists in 0-day vulnerabilities, and good examples are often able to fetch a hefty sum of money.

Is This Just Fantasy?

There's lots of different pieces to the puzzle—the various viruses can chain on top of each other, depending on what they're trying to do. There's an initial virus, dubbed "DoubleFantasy", which creates a backdoor in a target's computer, at which point they determine whether the victim is "interesting". If they are, they carry out further attacks.

The next step is "EquationDrug", "TripleFantasy", or "GrayFish", which are a series of malware platforms designed for having complete control over a victim's computer. EquationDrug and TripleFantasy are scary enough, with their ability to completely control a computer remotely; but the last of these, GrayFish, is about as scary as it gets.

Go Fish

GrayFish is an almost completely undetectable virus, which becomes the puppet-master of the operating system, effectively taking over how the entire system works, dictating how every step is taken, and making malicious changes wherever it sees fit. It's practically impossible to detect, since it controls how the entire OS is run, and hence it can just hide the fact that it's doing anything at all if you're trying to detect it.

It gets scarier, though. It's also able to infect the firmware of a hard drive—the piece of software that runs on the hard drive at the lowest level and tells the computer how to read the data from the disk itself. Being able to infect this is Very Bad News. Once the firmware of the hard drive is infected, it's pretty much game over. The firmware tells the operating system about how to access the data from the disk, and so it can just skip over what it tells the OS to selectively hide whatever it wants to. To make things worse, while you can change a hard drive's firmware, there's no easy way to read the firmware back, so you can't even tell whether the firmware has been messed with. In other words, the NSA are literally hiding inside hard drives, in a way that's nearly impossible to detect.

Conceptually similar attacks also work not only against conventional spinning-rust hard disks, but also solid-state drives, and flash memory in general, which tend to maintain software-managed "bad block" tables. So, although it hasn't yet been seen there, mobile phones and tablets are just as vulnerable, too.

Safe?

Of course, it hasn't been officially confirmed that the NSA are behind this—they wouldn't want to own up to such a thing. But there have been strong suspicions from various security researchers, as well as ex-NSA employees confirming the source.

As for the implications for us—well, there's *some* good news. While these viruses are extremely powerful, stealthy, and dangerous, they don't seem to be targeting the average computer user. So, unless you've pissed the NSA off in a pretty big way, your hard drives and operating systems are probably safe.

For now.

■ *Andrew Bennett*

Join us for our next episode of Exciting Security News™, where we look at how leaving off curly-brackets from single line `if` *statements can turn into a global security crisis.*

If you're interested in more information about this article, including sources and further reading, head to `news.andyc.at/nsa`

Upcoming Events

every Monday CSESoc's Weekly Barbecue — social
1–2p, Physics Lawn

Come on down to the Physics Lawn for your weekly dose of free barbecue! Don't forget to pick up your copy of CSESoc βeta, and make some new friends!

31 March Publicity Team Meetup — tech
1.30–2p, K17 room 302

CSESoc's Publicity team is having a meetup! Here we'll also be setting up a roster for event publicity during the semester—come and find out what we're all about! Or even just come to enjoy the free snacks and drinks provided. If you'd like to call shotgun for making publicity for an event in advance, send an email to `csesoc.publicity.head@cse.unsw.edu.au`

For more details, head to
`csesoc.unsw.edu.au/blog/publicity-team-meetup`

2 April Palantir Information Session — tech
4p, K17 Seminar Room

From discovering fraudulent activity in healthcare data to finding better ways to find housing for the homeless, join us to learn how Palantir Technologies is revolutionising the analysis of hard and important problems that face our world today.

For more details, head to
`csesoc.unsw.edu.au/blog/palantir-info-session`

10 April Site Visit Day — tech
all day, Sydney CBD

On the Friday of mid-semester break, CSESoc will be visiting the offices of three of our sponsors in the Sydney CBD: Google, Atlassian, and Freelancer. Lunch will be provided at Google. We will be walking and using public transport to get between destinations.

For more details, head to
`csesoc.unsw.edu.au/blog/site-visit-day`

18–19 April Facebook University Hackathon — tech
registrations close 9 April

Join Facebook for our very first hack in Sydney! Join us as we stay up all night hacking, learning and having a some fun! Start brainstorming ideas & forming teams (of up to 4 people). We'll supply the food, fun diversions, prizes, and some expert guidance in the form of our engineers. We'll also provide reimbursement for public transportation. You bring your laptop, appetite, skills and ideas.

For more details, head to
`csesoc.unsw.edu.au/blog/facebook-university-hackathon-comes-to-syd`

15 May Applications Close: — news
Google Anita Borg Memorial Scholarship 2015

Dr. Anita Borg (1949–2003) devoted her life to revolutionizing the way we think about technology and dismantling the barriers that keep minorities and women from entering the computing and technology fields.

As part of Google's ongoing commitment to furthering Anita's vision, the Google Anita Borg Memorial Scholarship 2015: Asia-Pacific (APAC) has been announced; its aim is to encourage women to excel in computing and technology, and become active role models and leaders.

For more details, head to
`csesoc.unsw.edu.au/blog/google-anita-borg-scholarship`

CSE Revue News

Are you wondering what there is to do with your life? Been bored and tired of uni work for the last few weeks? Well CSE Revue is here for you! For those of you who *still* don't know what CSE Revue is—come on, it's week 5 already—we're a live sketch comedy show entirely created, produced and performed by members from the society.

Whether you just want to escape the monotony of uni work or you want to try out something new, our upcoming events have a little something for everyone!

You can sign up and register your interest for teams now at www.cserevue.org.au!

Upcoming Events

31 March *Game of Codes* Screening
6–9p, K17 Seminar Room

A DVD screening of the 2014 CSE Revue: Game of Codes. A night of food, drink and entertainment.

1 April Socials and Promos Meetup
4–6p, Drawing Room, Roundhouse

A social gathering of the CSE Revue socials and promos team members, with food and games. Everyone is welcome to join!

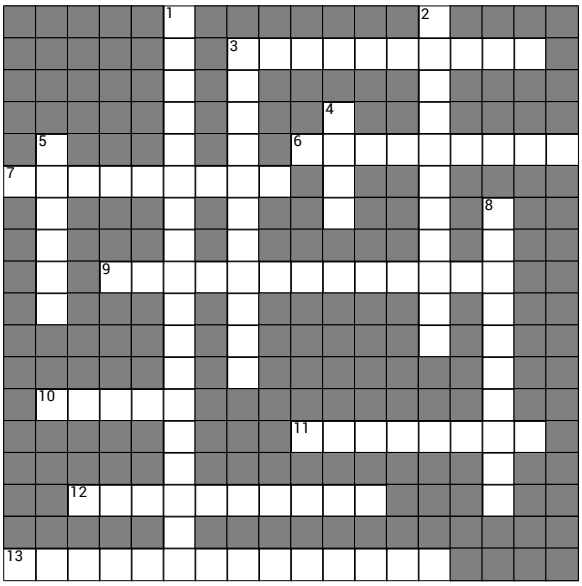
3 April Scripts Block
6p onwards, K17 L3 Meeting Room

Want to show off your writing skills? Or just want to have a night of laughs? Come have a great time at our weekly scripts block.

■ *CSE Revue Producers*

Puzzles

Crossword



Across. **3** P and NP classes (no comment on equality) **6** $1, 1, 2, 3, 5, 8, \ldots$ **7** Faster, less memory, more efficient **9** Non-ecclesiastical hypothetical computer **10** Above and below **11** An island with all cities seen once; roads travelled insignificant **12** Seven bridges, a topological nightmare **13** e.g. Knuth-Morris-Pratt

Down. **1** Made from recursively overlapping subproblems **2** Rabbit breeding **3** Only total if termination occurs. Partial is still pretty useful though] **4** Complexity notation, not little **5** Lacking infrastructure, not dense **7** Like code, but more fake

Brain Teasers

A. You have a biased coin which lands heads with some probability p, and tails with some probability $1 - p$. It's approaching midsem, and you need to find a fair way to decide who has to write the unit tests for your pair project. How can you do this using only that coin?

B. You have attained a highly coveted job wherein you spend your days being given little pieces of paper with numbers on them by a hovering, mysterious benefactor. The pieces of paper are being handed to you quickly, thus you must not spend more than $\log_2 n$ operations putting them in front of you. Furthermore, your mysterious benefactor asks you at random points for the median of all the numbers on all the pieces of paper you've been given thus far. This benefactor is impatient, so you want to deliver the answer as fast as possible (i.e., in constant time) to avoid reprimand. How do you go about this?

Takuzu

The goal of this problem is to fill the grid with 1 and 0. The rules of the game are:

1. each line has the same number of 1s and 0s;
2. no more than two consecutive cells may contain the same digit; and
3. each row and each column have to be unique.

	1			0		0			
			1				1		0
0			1				1		
	0							0	
	1	1		1	1			0	0
						1			0
	1			1					
		0			0		1	1	
	1					0			1
	0	0		0	0			1	1

Issue 103 Solutions

Brain Teasers

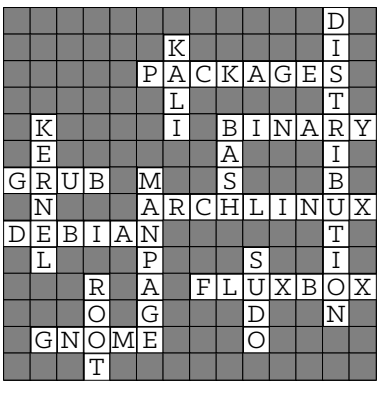
B. Many solutions exist; a divide and conquer approach works best.

C. 2 units^2

Takuzu

0	1	1	0	0	1	1	0	0	1
0	1	1	0	1	0	0	1	1	0
1	0	0	1	0	1	1	0	1	0
1	0	0	1	1	0	0	1	0	1
0	1	1	0	0	1	0	1	1	0
1	0	0	1	1	0	1	0	0	1
0	1	0	0	1	0	1	0	1	1
1	0	1	1	0	1	0	1	0	0
1	1	0	0	1	0	1	0	0	1
0	0	1	1	0	1	0	1	1	0

Crossword



■ *Emily Saunders Walmsley*

The News

Metadata State Customer metadata will be stored for at least two years by Australia's telcos and ISPs, after the Government's data retention laws made it through the Senate with full Labor support. Amendments requiring the destruction of data after two years failed to carry. The scheme kicks off in 18 months, and provides little protection for journalists and whistle-blowers.

The Rentiers Advance The Federal Government has introduced a bill allowing rights-holders to block websites that facilitate copyright infringement. A single successful application could block any number of sites, with a best-effort attempt to notify the site administrators. CSE students will find the blocks trivila to bypass, and few will be surprised to see this Government side with foreign rentiers over the policy.

TLS Vulnerability Two attacks targeting the RC4 stream cipher, part of TLS, have been published. RC4 encrypts about one-third of the Internet's TLS traffic. While the attacks are unfeasible for ordinary attackers, users and TLS implementers are urged to disable RC4.

Slack Hack Slack, a colourful and browserified workplace IRC service, has reported a significant breach. The company believes no financial information, nor any conversations, were accessed, though a database of login credentials, Skype names, and hashed passwords should be considered fully compromised. The firm recommends two-factor authentication, and changing your passwords.

Github DDoS Github has been under DDoS attack for days, after China's Great Firewall injected JavaScript into the browsers of Baidu users. The script instructs browsers to connect to two subversive Github projects, CN-NYTimes and Greatfire, every two seconds. Github is still generally available.

Technicalities A San Francisco court has thrown out claims of gender discrimination brought by Reddit CEO Ellen Pao against her former venture capital employers, Kleiner-Perkins. Despite the verdict, few would consider this a win for the company, as Pao and her lawyers detailed a series of disgraceful internal practices.

Safari Users Free to Sue GOOG Safari users in the UK are free to sue Google over tracking cookies. Apple's browser can reject cookies for passive visits, accepting only when the user interacts with the page. Google had faked a form submission on every Safari hit to bypass the feature. The Court of Appeal of England and Wales ruled the matter was within the jurisdiction of the British courts.

SSD Density on the Rise Intel and Micron have announced new manufacturing techniques that will triple NAND density. 3D NAND involves stacking flash cells vertically in 32 layers, permitting SSDs with up to 10 TB capacity in the current 2.5" form factor.

Hotel Wi-Fi Very, Very Bad Security researches Cylance have filed CVE-2015-0932, identifying an unsecured `rsync(1)` daemon running on the AntLabs InnGate wireless gateway. This device is extremely common at hotels and convention centres, and the vulnerability permits remote code execution. Port 873, for the curious. Travelling without a VPN remains a remarkably bad idea.

Windows Update Strikes Windosw Update has conspired to relegate a second-division pro basketball team in Germany. A laptop intended to control the scoreboard delayed a Paderborn Baskets home game by updating without prompt for 17 minutes, inviting league penalties, and inspiring the world to connect all of their household appliances to the Internet.

■ *Timothy Humphries*

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