

NEWS FROM COMPUTER SCIENCE AND ENGINEERING

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BETA

Free as in speech and our awesome BBQs.

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FEATURED, HISTORY John von Neumann

So, bit of history for you today. I'm going to be talking about American polymath John von Neumann - without him, computer science (along with many other things) might be radically different. So I thought I'd write an article about him.

First, an introduction. He was a Hungarian-born American polymath, living between 1903 and 1957, who made fundamental contributions to mathematics, physics and economics. In fact, he was involved in pretty much every technically complex field. He was a child prodigy; at 6 years old he could divide 8 digit numbers in his head. At 8 years old he was familiar with differential and integral calculus. At 15 years old he entered the tutelage of renowned mathematician Gbor Szeg, who was reduced to tears by Neumann's abilities. Probably like my maths teachers in high school, but for different reasons.

So he clearly had mad skills. But why are we talking about him? Well, aside from all his 1337 maths stuff, he was a founding figure in computer science. In 1945, he described the von Neumann computer architecture, wherein program

instructions and data are contained in a single memory block. This general-purpose, stored-program computer is the basis of modern computing.

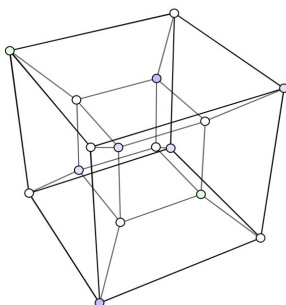


Neumann also, casually, founded the field of game theory. In particular, he came up with the minimax theorem. The minimax theorem establishes an optimal strategy for players in a perfect information zero-sum game (one player's losses equal the other's gains). This strategy allows a player to minimize his maximum loss by considering possible moves by the opponent. For anyone that has done an Artificial Intelligence course where you had to program adversarial games, you can thank John von Neumann.

He also created the field of cellular automata, which have many interesting applications as discrete models. A cellular automaton consists of a grid of cells, which can each be in one of a finite number of states. These cell states evolve according to a rule, which considers each cell state and the state of neighbouring cells.

One popular example amongst computer science students (and others) is Conway's Game of Life. This is a simple cellular automaton involving a two-dimensional grid of cells, which can each be either "alive" or "dead". At each time step, the cells are updated based on a set of exactly 4 simple rules. These rules cause a given cell to be alive or dead in the next time step based on that cell's state and the number of alive neighbours. Despite the simplicity of the rules, many complex patterns can emerge in the game. It is therefore widely used to illustrate that perceived design can emerge spontaneously from simple, deterministic rules. In other words, the principles of emergence and self-organization.

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HISTORY

John von Neumann - contd.

Oh yeah, and Neumann invented merge sort. And made key contributions to linear programming. I could go on, but I think you get the point.

On a more morbid note, however, he was a key figure in the Manhattan Project, the US-led project that developed the atomic bombs in World War II. Having developed an expertise in explosions he was a key figure in the design of the first

atomic bombs. When fellow physicist Robert Oppenheimer declared he and other scientists involved had “known sin”, John von Neumann responded “sometimes someone confesses a sin in order to take credit for it”. So, he was a bit of a tool.

What are the take-away lessons? First, John von Neumann was a beast. We are all the beneficiaries of his insanely broad-ranging and important work. Second,

intellectual brilliance doesn’t imply moral goodness. We tend to afford great thinkers with not only intellectual but moral authority. This blind respect is misplaced and needs to be moderated by the reality. Not all geniuses are top blokes (or top lasses, don’t mean to be heteronormative).

NELSON RIGBY

OPINION

UNRA2: Thinking Fourth Dimensionally

It’s likely that everyone has encountered a work of fiction involving an extra dimension at some point. Be it time travel or trans-dimensional beings, “extra dimensions” is a very popular topic. But what does it actually mean?

Think of the word “dimension” as referring to “a place for a number to go in a coordinate”. That is, to specify a point in a particular space, for each dimension that space has, one must specify one number. To specify a point in a 1-dimensional space, only a single number is required. To imagine a 1D space, think of an infinitely long line. The number specifies how far along the line the point is. Similarly, in a 2D space a point must be specified by a pair of numbers and in a 3D space 3 numbers are required. So what would it mean if we were in a space that required 4 numbers to specify a point?

Analogies

A good way to understand the jump from 3D to 4D is to look at analogs from the jump from 2D to 3D. Suppose some 2D people lived in a 2D world, that unbeknown to them, was just a cross section of some 3D world. If some 3D being was to push a square frustum through the 2D world, what would the 2D people experience? A square frustum is a 3D shape resembling a square prism, with one of the square ends being smaller than the other.

Assuming it was pushed through small end first, the 2D people would see a small square appear, which would then grow larger, and then disappear. A 2D

person who witnessed this could attempt to describe the shape that passed through their world, by thinking of the shapes they saw as 2D slices of some 3D shape, and theoretically reconstruct the 3D shape by “stacking” these slices through some inconceivable 3rd dimension.

What if we - 3D beings - were to experience a similar phenomena but this time with a cube. We could apply the same approach to describe the 4D shape that could have just been pushed through our world. We could think of the shape as represented by a small cube, with lines projected from each vertex through some inconceivable 4th dimension, where they meet the corresponding vertices of a larger cube.

The Tesseract

Take a straight line, and project orthogonally from each end the length of the line, and you get a square. Take the square, and project orthogonally from each vertex the length of one of its sides, and you get a cube. Take the cube, and project orthogonally from each vertex the length of one of its sides, and you get a tesseract. This is a 4D shape with 16 vertices, 32 edges and 24 faces.

Conventionally, when drawn in wireframe using perspective projection, a tesseract resembles a small wireframe cube inside a larger wireframe cube with the corresponding vertices connected with edges. Technically this resemblance is only apparent when then viewed from the correct angle. To understand why it looks the way it does, once again, consider the

3D analog.

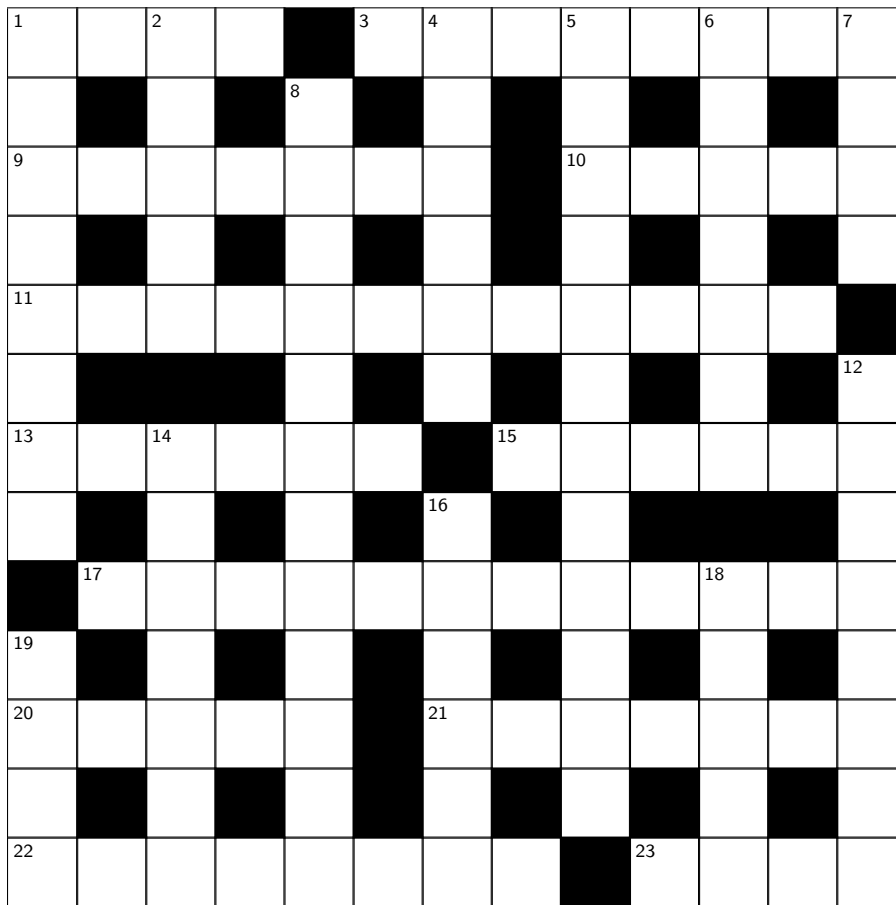
When drawing with perspective projection, things in the distance appear smaller than things in the foreground. Perspective projection requires some concept of an “eye” which represents the point from which the image is being “captured”. Things closer to the eye appear larger than things further from the eye. When taking a cube - a 3D shape - and projecting it onto a 2D sheet of paper, the back of the cube (ie. the face furthest from the eye) appears smaller than the front. One could draw a cube by simply drawing a small square inside a larger square with the corresponding vertices connected.

When taking a tesseract - a 4D shape - and projecting it onto a 2D page, one must first project the 4D shape into a 3D space, and then project the resulting 3D shape onto the page. In the projection from 4D to 3D, the “eye” is a point in 4D space. In the resulting 3D shape, parts of the tesseract that were closer to the eye appear larger. Thinking of a tesseract as a pair of cubes with the corresponding vertices connected by edges of length equal to an edge of one of the cubes, the cube nearer to the eye will appear larger in the projection than the cube further from the eye. Hence the resulting 3D shape resembles a small cube inside a larger cube. This shape is not a tesseract, in the same sense that an image of a cube is not a cube. The resulting 3D shape is then drawn onto the page using regular perspective projection.

STEPHEN SHERRATT

ENTERTAINMENT

Crossword



Down

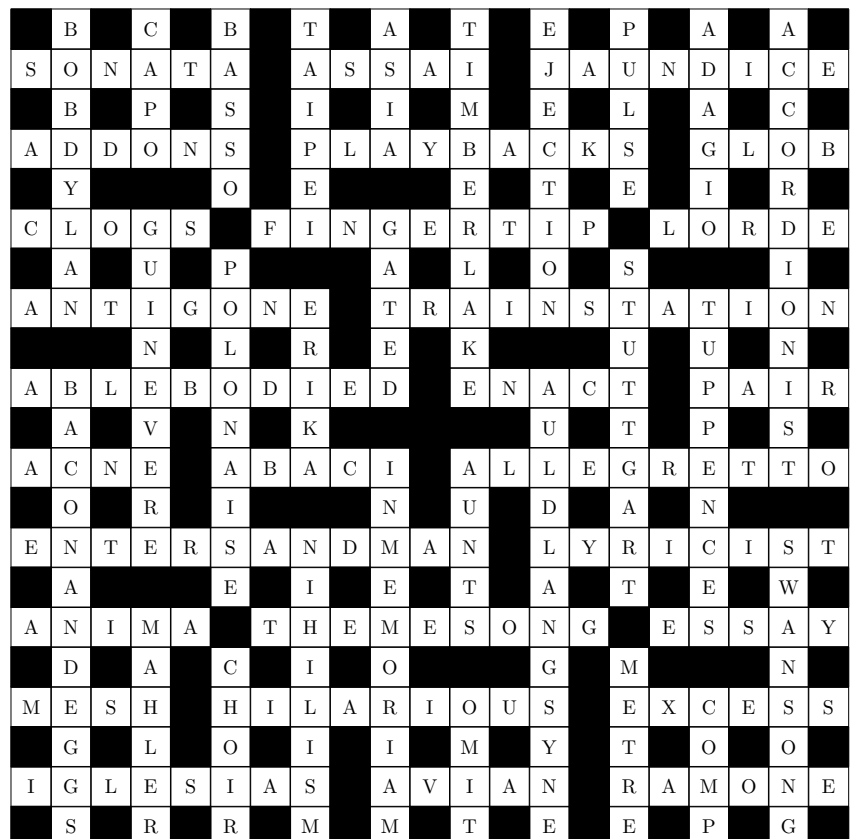
1. Crypto: ??? Curve Cryptography
2. Combination of two sets
4. OO: Data members
5. Estimated based on known data
6. Format converter
7. Ballet skirt
8. Confirmation of identity
12. Computing: User IO side of program (5,3)
14. French mathematician
16. Divide equally in two
18. Indigenous arctic people
19. Island

OSWYN BRENT

Last week's solution:

Across

1. Set of named members
3. Most often
9. Free time
10. Implied
11. Old recording medium for digital information (7,5)
13. Optimisation commonly used for short functions
15. Intense fear
17. Improvement to a program's runtime or memory use
20. Functional, OO programming language
21. Run a program
22. Components of a set
23. Small piece of metal for decoration



CSESoc & SOCIETIES

Its Election Time!

Voting for next year's CSESoc Exec ends tomorrow! Please check out your fellow candidates and vote wisely.

Presidential Candidates:

**Pierre Estephan**

Hey! I'm Pierre Estephan, I'm running for Co President 2013 and I would love the opportunity to leave my impact on CSESoc. After being on the CSE Revue executive team, I have the experience to lead a society. After being Tech Head of CSESoc, I know how the society works and have the contacts and relationships to ensure the job of getting sponsorship significantly easier. And after the last two years that CSESoc have given me, I love the society and want to give back as much as I possibly can. I feel that I am a great candidate for Co President, but so are the other candidates! To learn more about our goals for the society, check out our vote pages! Vote today, don't let your vote go to waste!

Visit my website: <http://www.cse.unsw.edu.au/~pestephan/vote.html>

Robert Newey

CSESoc's most important aspect is its community, and next year without the basement we face a unique challenge to keep our community thriving. This society has helped me meet incredible people, given me opportunities to grow as a person, and made every day in CSE exciting. This makes the prospect of our community suffering deeply troubling to me, and I will not let this happen. I've been active in CSESoc since I got here, helping out at BBQs, events, and taking on the role of secretary this year - making me the only co-president candidate who has been on CSESoc exec.

Visit my website: <http://robertn.web.cse.unsw.edu.au/vote.html>

**Vincent Wong**

I am Vincent Wong, a 3rd year Software Engineering and Finance student. I am a great team leader that aims high and works hard for the greater good of the community. Having been involved in a huge range of societies, I bring together skills and expertise that enable me to take CSESoc's success to another level. My goals for CSESoc is to boost engagement with the greater CSE student body, coordinate intersociety/ interuniversity events, increase sponsorship and form greater and wider industry ties and to foster a supportive learning and social environment. If you believe what I believe in, then I believe I will be the right person for you!

If you have any questions or want more information, feel free to visit my election site or contact me through any possible medium!

Visit my website: <http://vwong.web.cse.unsw.edu.au/>



Treasurer Candidates:

Matt Moss

Hi, I'm Matt, and I'm in the running to be CSESoc's treasurer for 2013.

I'm currently a 3rd year computer science student, and have had the privilege of being soc's dev head for 2013 - giving me experience in how to keep a society running efficiently and for the benefit of all its members. CSESoc plays an important role in the lives of computing students, and I want to enable us run fun events and continue strengthening the CSE community. I think I'll make a reliable and efficient treasurer, and I hope you'll consider voting for me.

Visit my website: <http://www.cse.unsw.edu.au/~mdm/vote.html>

**Vincent Tran**

[Insert Vincent Tran here]

The other candidate for Treasurer is Vincent Tran. His website can be found at: <http://www.cse.unsw.edu.au/~vtra133/vote.html>

CSESOC & SOCIETIES

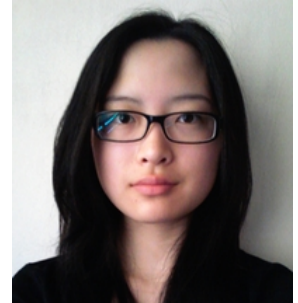
Its Election Time! - contd.

Arc Delegate Candidates:

Lavender Chan

Hey, my name's Lavender Chan and I'm a first year software engineering student. You might recognise me as the yellow wiggle in this years CSE Revue, or perhaps the winner of best female costume at first year camp. Apart from being at lots of CSESoc events, I've devoted my time this year to the CSE Revue Cast, CSESoc Design and CSE Revue Pubs teams. I'm hugely passionate about this society, and I want to contribute as much as I possibly can to it. If I'm Arc Delegate, I can make this become a reality, so make sure you help me out by voting!

Visit my website: <http://www.cse.unsw.edu.au/~lcch165/vote.html>

**Lauren Perlidis**

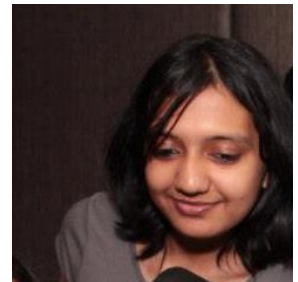
Hey guys, just a final shout out to remind you that the closing date for you to vote for a Fresh Executive Team for CSESoc is fast approaching! I hope you believe that in the short period of time that has been this year I have gained enough experience to live and breathe what it means to be part of the Executive Team, and that growing up in a rural area will contribute a unique perspective that will benefit our society as a whole. Thanks for reading this, and consider putting a "1" in the drop box next to my name for Arc Delegate

Visit my website: <http://www.cse.unsw.edu.au/~lper661/>

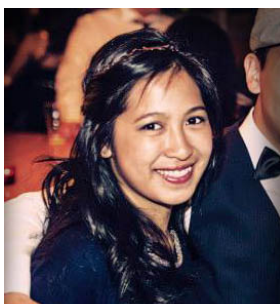
Savinka Wijeyeratne

I am Savinka, a first/second year Computer Science student, and I am running for the role of Arc Delegate for 2013. I have been involved in CSESoc - helping out with barbeques, Beta and trivia night. I also acted in CSE Revue and helped out during Open Day. Other than that, I love paperwork, and my attendance at every single mentoring event last semester shows how dedicated I can be. I would really appreciate the opportunity to contribute more to this great society, so vote for me!

Visit my website: <http://www.cse.unsw.edu.au/~smjw610/vote.html>



Secretary Candidates:

**Caroline Cham**

Hi! My name is Caroline and I would like to be your Secretary for CSESoc next year! CSESoc has been one of the best uni experiences for me from meeting all these great people at First Year Camp, the free weekly BBQs and all the social events. Being a CSESoc member like yourself, I know what the society has to offer, and as Secretary, I can help current members and the next generation of First Years to have the best uni experience possible. With my skills, I can be a great addition to the executive team as Secretary who makes everybody feel welcome in the society. Pop by my vote page to find out more about me :)

Visit my website: <http://www.cse.unsw.edu.au/~ccha436/vote.html>

Evelyn Chensen

My name is Evelyn and I'm a 2nd year Software Engineering student who's enjoyed being part of CSESoc so much in 2013 that I would like to run for Secretary in 2013. Many of you would have met me at First Year Camp and/or running Social events throughout this year. Not to mention cooking all the FREE FOOD at the weekly BBQs!

Being Social Head this year has given me insight into the inner workings of the society and the roles and responsibilities of all those appointed to exec and head positions. As secretary for CSESoc I will be sure to keep EVERYONE in the society up to date with what the exec/heads are up to at all times, as well as keeping the exec/heads up to date with each other.

Visit my website: <http://www.cse.unsw.edu.au/~edch798/vote/>



OPINION

What is Apple going to launch next?

iLounge

A little over a month after Apple's iPhone 5s and 5c debut, another event looms with promises of unveiling everything else: namely, the rest of the Macs and iPads for 2013. The invitation says "we have a lot to cover," and I hope so: after all, there are a lot of unanswered questions about Apple's product lineup this year, and many devices that haven't seen updates since 2012.

Here's what I'd like to see:

A Retina Mini Before anything else, this. The iPad Mini is perfect size-wise, but the lack of a higher-resolution, higher-dpi display stands out against small tablet competitors like the Nexus 7. Finer resolution matters for reading, something the Mini's perfectly suited for. The Nexus 7's display is smaller, but for reading text I prefer it. A Retina Mini is the top product I'd want to buy.

Make 32GB the base storage capacity for the large iPad 16GB is just getting to be too small for most everyday use. I'd prefer 32GB, 64GB, and 128GB as

the three price tiers, especially as flash storage becomes more affordable and the larger iPad becomes a stand-in for a laptop for many people. Yes, this is a wish list: there's already a 128GB iPad, and the odds of adding extra storage to the \$499 model don't feel all that good. But I'd like to see it happen.

Touch ID on all iPads Do we need fingerprint sensors on iPads? Maybe not, but if you use a corporate Exchange-based system like I do that requires a passcode on your device, having a fingerprint touch replace that passcode entry would sure be helpful.

A new Smart Cover keyboard accessory Microsoft's Surface tablets have one big advantage over tablet competitors: a thin, well-designed keyboard and trackpad Type Cover accessory that makes it surprisingly easy to get work done. The iPad's been graced with tons of good keyboard accessories, but Apple hasn't made its own keyboard attachment since the first iPad. Marrying the Smart Cover

with some sort of tactile keyboard seems like a theoretically slam-dunk idea.

A 13-inch Retina MacBook Pro with improved graphics The size and potential power of the Retina MacBook Pro has always appealed to me, but the 13-inch 2012 version had Intel integrated graphics as opposed to dedicated Nvidia or AMD graphics. Intel's newer Haswell processors have better integrated graphics options and Iris Pro, so maybe those could be a solution.

Fusion drives on the Retina MacBooks Paying up for a pure SSD drive can still get expensive above 256GB. I'd love a big 1TB drive, and Apple's Fusion drives marrying 128GB SSD storage and a physical hard drive seem like the perfect answer: but, to date, Fusion drives have been desktop-only.

Fingers crossed its any of these (or all!!) So lets see what Apple has to offer next...

ANJALI THAKUR

OPINION

You know what really gets my bits in bunch?

Excessive DRM.

Oh Digital Rights Management... where do I begin. I mean, it sounds fair enough at first - piracy is considered by some to be one of the more prominent issues in the tech world today, so why not try to battle it with the latest encryption and authentication technologies? Why not wrap that ever so copyable digital media in layers of protection, making it harder for pirates and users alike to access? Yes, big corporations, why not piss off absolutely everyone who is giving you their money and devotion in order to fund whatever creative media it is that you push out to us suckers while doing practically nothing to stop the formidable force that is the collective pirates of the internet?

Well despite how illogical it might seem to anger your customers and achieve absolutely nothing else, it seems to have

been an increasingly common trend over the last couple of years in big name tech companies around the globe. Things started getting serious when Apple began encrypting music and movies on iTunes, making them playable only by their own proprietary media players and making sure that media could be played on a very small amount of different devices.

Matters continued as video game manufacturers began requiring live internet connections during gameplay in order to perpetually verify the legitimacy of the player, even when playing games that were otherwise completely offline. And hordes of Youtubers have been crying their little hearts out as their TV show compilations and fail videos have been pulled off the air for copyright infringement, even if it was just the

background track.

The list goes on, but somehow every year these companies manage to hunt down a group of soulless code monkeys, get them to design and build a sadistic tool to unleash upon the greater public, and there are enough computer illiterate suit-clad monkeys to give it the okay for funding too. What's most alarming about this is that it is an upwards trend - if DRM is to continue becoming increasingly excessive, I truly do worry about what lies on the road ahead. And unfortunately, we might not have to wait for long.

The big scary corporations don't always get their way though. Occasionally, they can hear the outcries and protests of the general public over the sound of themselves splashing about in the rivers

of money streaming through their doors, and they are forced to listen up in order to keep those money streams rolling.

Relatively recently, Microsoft was forced to completely withdraw their new DRM scheme for the Xbox One due to the uproariously negative feedback that they were receiving after the game console's long awaited announcement. They had devised a Digital Rights Management scheme which required, among other things, that users' consoles check-in every

24 hours to authenticate their games, and what's more insulting is that they tried to word it like it was "helping" the users. They soon realised that the general public, despite common belief, is not all that stupid, and soon withdrew the new DRM in favour of the more traditional console game disc system.

So despite the looming risk of DRM potentially bringing an end to all that is good about the wondrous internet, we do have hope. There is a valuable message

here that I think we should all takeaway and let mull around in our minds for a while: If you complain loudly enough, you can achieve anything. So thank you general public, from one overzealous complainer to another, I'd like to say good work, and keep it up.

LUKE TSEKOURAS



EXTERNAL EVENTS

EB Games Expo 2013 Highlights

Australia may not have an exclusive E3 event for gamers galore, but we certainly have the EB Games Expo! The EB Games Expo opened its doors to excited fans on Friday 4th October to Sunday 6th October at the Sydney Olympic Park, running for 3 days to allow gamers ample opportunity to try out new gaming platforms such as the PS4 and Xbox One, and games like Assassin's Creed 4, Kingdom Hearts 1.5 and Call of Duty: Ghost.

After landing an awesome role with Ubisoft as a promoter, I was able to get free access and entry into this all out gaming event, where I spent Friday and Saturday helping people out at The Crew station and talking to them about the game specs and other games Ubisoft was presenting.

The expo was my first time at a gaming convention, and it completely beat my expectations. On display were large maze-esque promotional stands for new games, a cosplay section, Q&A with developers (both mainstream and indie), as well as a mega store, a pirate ship ride, sports cars on display and older console gaming... From the 1970's! With all these tied together, the old and new allowed all gamers a slice of their own action.

In order to bring organisation into the mix, the expo was broken up into two schedules, a daylight and twilight. This allowed EB to better manage the event and gave gamers the option of attending the times that best suited them. This worked out well on Sunday, which catered for mostly families where stalls could better manage the interactions than the largely R18+ or MA15 events.

My Friday started off with my stall - helping set up the game (The Crew) and monitoring gamers. This is a racing game, which Ubisoft aims to release in 2014, presumably on the newer consoles. The game itself can be a single player or MMO which is exciting because it allows gamers to complete Co-Op missions with their friends, as opposed to most MMO racing games.

Surrounding the Ubisoft stall were demo presentations of Watch Dogs with the game's writer Kevin Shortt and a new South Park game, where gamers could ask questions about the game specs and release dates. The biggest attraction at the Ubisoft stall was the Assassin Creed IV section; after braving the long line people could play the demo of the game on the new PS4 console, trying out the ship battles and exploring the new game. For the more active types, Just Dance 4 was blaring away pop music in the background.

After finishing my shift, I got some down time to explore the Community Hub and other areas at the expo. There was a long queue outside COD: Ghost as well as live competitive gaming of Wargaming.net's World of Tanks near the food stall. This added a sense of realism and community emersion into the game.

Aside from the Ubisoft stall, Xbox, PlayStation and Nintendo had their own stalls. The Xbox stall included new game releases, Xbox One and a V8 supercar for the new Forza Motorsport 5. Likewise, Sony had a two level stall and free gaming booths as well as their Playstation 4 and

PSP Vista on display. To promote Gran Turismo a blue LFA was parked next to their stall. These demo cars worked well for both Microsoft and Sony and added to their promotional areas. The Nintendo stall, located towards the centre of the hall had game exhibitions and beanbags to allow people to relax.

Video games weren't just the sole attractions at the expo. Local and international developers had open Q&A with the audience throughout the hall, and presentations were also part of their promotional campaign. Home Grown Gaming allowed local developers to show off their games and interact with their fans, which coupled with the Home Grown Tech Zone and the EB Exhibition Hall meant fans were afforded the luxury to try out new gadgets and meet new local developers.

And where would an expo be without its cosplayers? The cosplay scene was ripe with more and more fans cosplaying as their character - my personal favourite was a person who was dressed as quote: "Any teddy bear/famous bearded character".

All in all the EB games Expo 2013 was an annual event for the Australia/Pacific gaming scene. It featured presentations, demos and exhibitions by many famous developers and companies such as EA, Capcom, Warner Brothers, Disney, Square Enix and so on. It allowed people to test out new games and concepts or even chillax by meeting their favourite overseas developers.

JESSICA MUNIT

News in Brief

WoW!

A man in China has grown so exasperated with his unemployed son spending all his time on World of Warcraft that he's decided to do something about it. Mr Feng hoped that killing his son's character off in the game repeatedly would put him off playing all together, and hired virtual assassins just to do that. Unsurprisingly, the repeated deaths didn't put Xiao Feng off. It eventually ended when one of the assassins admitted his father had taken out the virtual contract. To him, it was just something he could kill time with while he was looking for a new job.

Mascot Mistake

Fukushima Industry said Tuesday it was rethinking its "Fukuppy" mascot, after the international ridicule over the name that recalls the catalogue of mishandling at the Fukushima nuclear power plant.

The Osaka based refrigerator maker, whose name derives from its founder has nothing to do with the area hit by an atomic catastrophe. Fukushima Industries unveiled the name in April, blending the first part of the company name with the English word "happy", saying it represented the corporate philosophy of being a happiness-creating company. However, the mascot reception has been cold among the public.

Gen Y Makes a Sharp Turn Away from Driving

Sydney's 20-somethings are ditching their cars for public transport, a new study has shown, revealing the trend is widespread in the city. Ten years ago, people aged 21 to 30 in Sydney drove themselves on about 53% of all trips on an average weekday. This number has dropped 8% to 45.5% in 2011-2012. Studies have suggested higher

cost of maintaining a car and the use of mobile devices, which are more attractive on public transport, have contributed to driving the change.

Oppan Tourist Safety

South Korea have recently launched their new "Gangnam Style" tourist police force. The force is aimed at protecting tourists from being ripped off during their stay in the South Korean capital. The officers are selected for their language skills, and they can speak a range of languages including English, Japanese and Mandarin. Officers are easily identifiable by their special dark-blue uniform designed by one of the costume designers for "Gangnam Style" star PSY. The new police force will surely allow tourists to happily sing and dance inside knowing they are protected.

PATRICK CHUNG

CSE EVENTS & SOCIETIES

Upcoming Events

CSESoc Trivia Night

Thursday, October 24th, 6.30pm - late

K17 Seminar Room

Think you know it all? Prove it to your colleagues in a night filled with fun, games, food and drink with some awesome prizes to be won. Spaces are limited so make sure you register beforehand at <http://doodle.com/82tg6qv67wrsed3a>

CSESoc Awesome BBQ

Tuesday, October 29th, 11.30am - 12.30pm

Physics Lawn

This will be CSESoc's final BBQ for the year, so we're getting bacon, eggs, corn, and other extra special food (as well as all the

usual stuff). Drinks will also be free!

Soctail Night

Saturday, November 2nd, 7pm - late

Hotel CBD, Club Bar

Cost: \$50, Theme: Moustaches

You are cordially invited to CSESoc's end of year cocktail party. Please attend with your most dapper mo.

Purchase tickets at BBQ/Trivia or online at www.csesoc.unsw.edu.au/soctail/. Available up until 24th October!

EVELYN CHENSON

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