



Assessment Task 2: Team Project

COOL RUNNINGS

COSC2196 – Introduction to Information Technology | 14th April 2019

1. Team Profile

1.1 TEAM NAME

Cool Runnings

1.2 TEAM WEBSITE INFORMATION

Link: <https://sambradburyrmit.github.io/GroupNineteen/>

Repository: <https://github.com/SamBradburyRMIT/GroupNineteen>

1.3 PERSONAL INFORMATION

1.3.1 Glenn

I have lived in Melbourne for almost 3 years having originally moved from Perth.

In Perth I studied a Bachelor of Commerce and have worked in the hospitality industry for almost 10 years - I currently work as a function and event sales coordinator.

I play piano and have been in a number of bands all my life including a 12-piece big band and currently a 5-piece cover band playing all kinds of events and venues.

The industry of IT is constantly evolving and becoming a bigger part of our lives.

We are becoming more reliant on technology to keep us connected, do our jobs and be entertained.

My interest in this field is in the area of security and how we can protect our information from those who want to take advantage of our rising reliance on technology.

I've always been interested in computers and using technology in my own life.

From something as simple as an electronic calendar to building miniature robots (from a step-by-step box!).

I've chosen RMIT because of its great reputation in this field as well as being able to study online – another great aspect of our current age of technology.

From my studies, I expect to learn the fundamentals of the industry to allow me to get a job in my field of interest where I can continue to learn.

1.3.2 Sam B

I am currently completing my Bachelor of Information Technology through RMIT via Open Universities Australia.

I am working full time as a warehouse storeperson for PC Case Gear. Have interests in things such as working with computers (building and upgrading) PC games, tabletop wargames such as Warhammer 40k and also enjoy playing guitar.

In an ideal scenario, I would like to run my own development company, building and maintaining websites and software. This is very idealistic and difficult to achieve, I will need much more knowledge and experience to achieve this and this degree is my beginning to this.

I have always worked in physical roles all my working life and as I start to get older my body is starting to let me down. I have always been a natural when it comes to technology with very little instruction and training. I have always found solutions and pathways where others would not. IT in general interests me a great deal and can see it being a great option for myself to support my family.

Avenues that I would need to take to reach my goals will include working in the industry. Jobs such as Front end developer or Database Administrator are the kinds of jobs that would put me in good stead to gain the knowledge of the industry

Started a degree years ago at a different uni that was a double degree in Game Design and Computer Science.

Had to put that aside to go back to work full time. But I do have experience now in some programming and coding theory.

1.3.3 Cameron

I was born at my home in Buderim in QLD, I have grown up my whole life on the sunshine coast and went to school to both Kuluin state school in Kuluin and also St Johns College in Nambour in which I completed grade 12, over the years I have had many pets, but one of my most favourite is the pet I currently own with my partner as it is a nice big Oscar fish called Wesley which will bite your finger off if you put your finger in his water!

Although my main interest currently is focused on the financial industry, IT does play a large part of how the industry functions, in an expanding and ever growing technological era, knowing how IT affects and promotes not only an individual business but also entire markets is paramount, this is why I have chosen RMIT to study for an IT course, I believe that by the time I finish this course, I will have a much better understanding on how IT can affect my future.

1.3.4 Tim

My interest was first piqued when I was 5, watching my older brother (who was 7) build websites using HTML on a platform called Matmice. From simple beginnings like learning how to hyperlink and setting the favicon, to designing templates in MS Paint and embedding flash games from other websites we both had a lot of fun learning the early web together.

This was not always going to be the case however, as my interest in web development would soon be consumed by sports and music, hence IT was on the backbench. As for the next number of years, when I wasn't playing sport or music, my interest in IT swayed more towards video games and setting up servers from unused PCs for friends to play on (mainly Source Engine games).

Having never delved too much in to the actual code and software side of things, it wasn't until I was in the tail end of my Chemical Engineering degree that I developed an affinity for programming, somehow finding myself in the world of .NET and C#. More recently, my interests have been overtaken by the strange and wacky domain of Bitcoin and Cryptocurrency.

Undertaking a Bachelor of IT felt very natural to me, for a newly kindled interest in IT and programming left me wanting more in terms of an education, and RMIT was a logical choice I was already in my final year of Chemical Engineering with RMIT. My expectations of this course are to hone in on the skills I have taught myself in my spare time, learn what skills I would need to develop

to sustain a career in IT, and to gain the ability to adapt to the ever-changing landscape that is modern software and technology

1.3.5 Austin

My name is Austin, I am 19 years of Age and currently studying a Bachelor of Information Technology to broaden my understanding and add additional documentation to extend my resume, in hopes of expanding my career beyond Desktop Support. I chose RMIT as i see it as a much more reputable university than VU, which i had to move on from as i was offered this permanent position at Western Health and they had no IT related courses that I could take at night or in my spare time Online. I hope in my time in this course i have the ability to learn many Database related systems and that I can expand this into using it in the real world in the workforce.

1.3.6 Sam J

As a team, our personalities are a broad mix, there will be no clashes in the way in which we will learn due to the personality types with Mediator personalities working hand in hand with all other personalities as they have no interest in having power over others, also, the learning styles will fit hand in hand, the majority of the learning styles is tactile learning however there is a few members which are auditory learners, what this means is that whether the task involves sitting down and practically learning or listening while multitasking, there will be a strong amount of people in the group who will pick up on the information and share it accordingly.

The third test that was taken was more so of an extra test, in this test, the creativity and reasoning of each person was tested, in this area it is clear to see that each person is very different, however due to the other personality and learning traits, there will be no problems in people with more expertise and creativity helping those who do not know the way or are struggling to come up with ideas.

1.4 IDEAL JOBS

The ideal jobs of this group are actually quite similar, both Sam J and Glenn have the ideal job of becoming a security analyst and Sam B and Tim both wishing to become stack developers, this is interesting as it shows that these people have a common goal in mind and will essentially work better together as they know what they want, the difference in these two types of jobs however is quite large, a security analyst will look into protecting a company through implementing different types of software which will recognise potentials threat to that business and be able to protect their information whereas a stack developer is somebody who can develop the entire system pipeline, these would include databases, servers and involve system engineering.

There is however over a few outliers of the group, Including Cameron who wishes to become a Financial Planner, this job is in a completely different direction to the other members of the group who wish to pursue a job in the IT industry as it is in the Financial industry and the job focuses on helping people from all different backgrounds reaching their financial goals, however in times where technology is growing at a rapid pace, you need to be able to adapt to any changes otherwise you will be at risk of falling behind the competition who can implement various types of IT to their advantage.

As a whole the group definitely has different pathways which they wish to travel down with completely different industries however the group all has a common interest in understanding and learning more about technology as in today's age, it is very important to keep up.

2. Industry Data

2.1 CYBER SECURITY ANALYST

This job is very high in demand. Over the last few years there has been a 100% increase for these professionals. As of 2019 there is a severe shortage of cyber security analysts opening the way for many potential jobs.

Some of the more important generic skills required for this job include:

- **Communication**

Communication is by far the most important generic skill to have. 1st out of 25.

- **Fast Problem Solving**

This ability ranks as the 2nd most important generic skill to have behind communication

- **Creativity**

Creativity ranks 9th most important out of 25.

- **Up To Date with Industry Trends**

This ranks 10th out of 25th which is surprising to me. I would imagine that within the cyber security world this would be one of the most integral skills as the industry is evolving at a rapid rate.

- **Teamwork**

Teamwork ranks 5th

- **Troubleshooting**

Troubleshooting ranks 6th

- **Detail-Oriented**

Detail-Oriented ranks 7th

- **Research**

Research Ranks 9th

- **Leadership**

Leadership ranks 12th

Some of the more important I.T skills required for this job include:

- **SQL**

SQL is by far the most important I.T skill to have. 1st out of 25. It is fundamental to understand the nuances of databases and SQL is the way to do that.

- **Java Script (JS)**

This ability ranks as the 2nd most important I.T skill to have behind SQL.

- **JAVA**

This ability ranks as the 3rd most important I.T skill to have behind Javascript. It is the one that entices me the most and I am keen to learn more about.

Although you don't have to specifically know all of these skills super sufficiently, it would be beneficial to have a steady foundation in most of them to open up your viability for more job opportunities. Each skill is dependent on which job you are going to fill. Once the specific skill that is required for said job is determined it would be your role to detect any vulnerabilities within this skill.

The three highest ranked General skills that are not in my skill set are:

1. Writing
2. Planning
3. Presentation Skills

After assessing the data

After looking over the burning glass data I was quite surprised to see how much demand there was for a Cyber Security Analyst. I still think it is my ideal job but am keeping myself open for other pathways to take. The more I learn about all the different avenues the easier it will be for me to make a firm decision on which to pursue.

Cool Runnings members consist of a varying list of ideal careers in the Information Technology field. These are listed from A C# developer to even financial planners that rely on I.T to complete their job. The following is a List of our team's ideal jobs. These have been ranked from Most sought after and High demand to least demand according to Burning glass:

Sam B: Full Stack C# Developer

Tim: C# Stack Developer

Austin: Database Administrator/Networking

Glenn: Security Analyst

Sam J: Cyber Security Analyst

Cameron: Financial Planner

A majority of these jobs and careers have similar skills that can correlate to each other. The two most common skills required would be technical understanding with coding languages and communication skills. These skills are IT Specific skills and General skills respectively.

With IT Skills these are typically developed as a self-teaching method or through workplace experience. Through my workplace at Western Health I have been able to develop Customer service, Microsoft office, and Project management skills. I am currently undertaking courses to become

competent in ITIL (Information Technology Infrastructure Library) through my workplace as training for my future career. My project management skills while not being one of a Team Lead and being only through workplace only and no certifications, have developed while being involved in Clinical Grade Networking Upgrades as well as being involved in the technical team for the Go-live of a full Electronic Medical Records system within Western Health.

My general skills consist mainly of those that are heavily based around communication and social skills. Careers as a DBA (Database Administrator) or in Networking require excellent social communication skills as these skills are then used to be able to communicate in meetings or to the end user where you are required to confidently and accurately supply information without being too technical at times to people who have no Networking skills or understanding. These however of course are shadowed still by quick learning and adaptive skills that while apply to day to day life, still are needed in the workplace when adapting to new technologies. An example where this is needed is the move to cloud technology and the use of it in networking. The communication skill is the most sought-after skill by far, being 2.6x more sought after than its closest skill in Problem Solving.

My Current skills that I am not competent in are ones that require an understanding of a new coding language. An example of this would have to be Java scripting, Java and SQL which are the three most requested IT Skills. SQL is the most important one to me if I wish to go down the Database Career path, however while being so highly requested, it is also difficult as to become competent in these languages require a lot of complicated understanding. It is essentially learning a new language.

General skills are ones that can be used outside of a workplace so it is ideal that a person develops these as much as they can, so it is much more difficult to target 3 skills that are not required. However, Being Articulate, mentoring and also Analytical skills are skills that may not be required as such within my chosen careers.

After Viewing Burning glass and other Materials with my team's career paths, it has become more easier to identify what may fit with me as a person with my personality traits and learning curve. While viewing and seeing the demand in Database Administration and SQL, it is much more difficult to grasp an understanding of, and exposure to it within a workplace can be a bit more difficult. However my involvement in Projects like the Clinical networking upgrades have exposed me to the environment of Networking and this still interests me while also being in high demand.

3. IT Work

We interviewed Jesse Millman from PointsBet on his work and what it entails.

Jesse Millman - Head of Technology Systems and Operations at PointsBet

- What kind of work do you do? / What is your main job description?

I'm the head of Technology Systems & Operations at PointsBet. We're the only Australian bookmaker that completely owns and develops all systems in house (App, Website, Trading, etc). My main responsibility is to ensure that we have a stable, secure, and highly performant platform that is able to scale out as we grow globally.

- What kinds of people do you mainly interact with? - (Clients, Investor, General public etc)

Primarily I interact with our internal teams (Development and Operations/Engineering, Site Reliability Engineering (SRE), Trading, Operations, & Management).

- Where do you spend most of your time at work? - (office, home, shared workspace etc)

I spend 50% of my time in our Australian Office, and 50% in our US Office. Generally speaking when I'm home in Australia, I spend 1-2 days per fortnight working from home.

- What aspect of your job is the most challenging?

Definitely scaling out the team as the company grows. As an engineer we get taught a lot about the patterns & principles to making scalable systems, however that doesn't necessarily translate perfectly on how to scale-out a team!

4. IT Technologies

4.1 CLOUDS, SERVICES AND SERVERS

- **What does it Do?**

The cloud or 'cloud computing' & 'internet computing' are simple terms used to describe the use of multiple hosts to provide storage or computational performance over a network, usually the internet.

The hosts can be as simple as mass storage servers that store and backup files for a user that can then in turn add or retrieve files on request, high powered data servers that can process instructions remotely or a mixture of both (HighTechDad, 2008).

The most common types of use of the cloud are services like dropbox or google drive, where the user has an account that lets them store files online that are stored by the hosting company that can be retrieved by the user as required. Another use of cloud is being able to run complex calculations over multiple computers as is common with crypto miners.

A more recent example in cloud usage is being able to play games over a network using the processing power of a hosting company as tried with OnLive in the past and that Nvidia is rolling out today with Geforce Now (Nvidia 2019)

As the technology becomes more powerful, power efficient and costs go down, there are more and more use cases for the Cloud to become a more common implementation in people's personal life and work places. Being able to rely less on physical hardware for storage and system performance and only requiring a steady network connection.

The most simplest conception of a cloud server is a server of multiple hard drives that a subscriber then can access via a network connection. Having a storage allowance to each user.

In practice, there are 2 types of the Cloud. Public Cloud and Private Cloud. The public cloud is a cloud platform that is outside of a Firewall and has an infrastructure controlled and maintained by a Cloud Service Provider. There are many positives to this, some including easy and quick access to files and services from different devices and locations. However there is a security concern also as public servers can become more easily compromised. A private cloud is controlled by a private organization that has it within a Firewall and has control over the security and integrity of the data in the platform as well as monitoring regulatory compliance on the material stored in the private cloud (Vangie Beal 2014).

Many benefits of the Cloud that are described by cloud service providers are as follows;

Low Cost - Outside of the Cloud platform itself, there is very little infrastructure costs compared to having physical hardware for services and storage.

Low Maintenance - Having a more simple infrastructure means less issues with hardware. No failing hard drives or system crashes compromising data. Everything is stored and accessed online.

Scalability and Flexibility - Having no restrictions to the size of your Cloud access means it is simple to expand or reduce your solutions as required. Instead of investing in more and more physical hardware, a Cloud service plan can be increased and decreased as required. If a business needs to downscale quickly, this is more easily achievable in a cloud environment as opposed to having physical hardware (Clarion Tech 2019)

There are of course negatives to the Cloud;

Security, data integrity and regulatory compliance - because the data and services is not local, the user is relying on a 3rd party (unless it's a private cloud) to keep the platform protected from outside threats like viruses and hackers. They will also have certain regulations about the kinds of data that can be stored on their platform (Andrew Larkin 2018)

Possible downtime - if the Cloud Service Provider or the user has any network issues, this can lead to significant downtime in productivity (Sara Angeles 2013)

- **What is the likely impact?**

The future impact of cloud computing is already becoming apparent now. Less and less are companies relying on huge local data centres and opting for turning to cloud services. This has many impacts on the IT industry. More and more smaller companies will be able to function on a global scale. Not being limited to a single location. More and more industries, not just IT focused, to move to using software and storage services over the internet opposed to having physical infrastructure.

Jobs affected directly include System and Database Administrators who previously would be staffed in order to install and maintain the infrastructure in a company. This will be instead change the need from the companies themselves to the data centres owned by the Cloud Service Providers. Companies local Help Desk Support will be reduced as well.

More jobs will be created because of this however. As the digital world moves online more and more, more administrators with the skills in operating and maintaining the cloud will be required. As more services move to a purely online service, this will require new skills that are not available at this time.

With the threat to online data from cyberattacks, more security positions will become in higher demand as well. (Collabera 2019)

- **How will this affect you?**

For myself personally, I have already started getting used to relying on the cloud. Having instant access to my data from any device at any location is incredible compared to the past when I would have to carry around USB drives, rewritable DVDs/CDs all the back to 3 ¼ floppy drives. Not only were these storage mediums limited by the size, but I have had issues in every case with data integrity because a USB fails, a disc gets scratched or floppy gets demagnetized. My information might be out there and not in my direct control, I am confident in companies like google being able to keep it safe (Apple not so much).

In the future I look forward to playing the latest games with the most intensive graphics at the highest resolutions with little more than a PC on a Stick plugged into a monitor or TV. I will miss having my leg warmer next to me with all the RGB and tempered glass I could need, but not having to worry about performance limitations and power bills that come with over the top hardware will be great.

Professionally in the future I will have to learn the skills to work within the cloud environment as that is what everything will essentially be based on, unless you actually work for the Cloud Service Provider themselves.

I can be a little concerned about data security as there will always be another cyber attack and virus that will not be predicted. All that can be done is for people to take precautions with their online footprint (password managers, up to date security software) and be aware that there will always be a threat to their information.

4.2 CYBERSECURITY

- **What does it Do?**

Cybersecurity is the practice of protecting systems, networks and programs from digital attacks (Cisco n.d.).

In today's growing technological environment and our already high reliance on computers for work and everyday tasks, the security of our information is one of the highest priorities of businesses and one that many companies spend a lot of time, money and research on to protect client and company information.

Everyday users rely on cybersecurity to protect their banking information, messages and personal information. Attackers use this information mostly for financial gain by stealing passwords or account details, or by gathering enough personal information to steal a person's identity which can be used to commit to contracts or make purchases.

There are many different types of cyber security attacks that can occur, though some of the most popular attacks that are widely used include:

- **Phishing**

Phishing scams are attempts by scammers to trick you into giving out personal information such as your bank account numbers, passwords and credit card numbers (Scamwatch n.d.).

Phishing attacks work by the scammers pretending to be from a legitimate business, contacting clients either via email, phone or online. They'll ask for personal details such as your date of birth or address, or they could be 'alerting you to suspicious activity on your account'.

Because these attacks seem genuine, people are likely to give out their information which the attacker can use to gain entry into your actual account, be it either your bank or phone account or otherwise.

- **Ransomware**

Ransomware, is a type of malware that prevents users from accessing their system or personal files and demands ransom payment in order to regain access (Malwarebytes 2019)

This type of attack is done by infecting a person's computer with a virus rendering them unable to access their files, the attacker then demands a payment to be sent (usually via cryptocurrency) before they'll release the files back to the user.

- **Social Engineering**

It's often said that the weakest link in a company's security is the people working in it.

Often it is the staff that are tricked into divulging private information to an attacker because they have simply asked, or are impersonating a sub-contractor of the business, or a staff member from a different department.

This is the idea behind Social Engineering - famously used by a hacker named Kevin Mitnick who retrieved the source code for a Motorola mobile phone in 1992 simply by calling the company and acting as though he was from a different department.

- **What is the likely impact?**

Breaches in cyber security can have devastating results for individuals, companies and politicians due to the exposure of data and private information. Though there are many examples of this, a few are noted below.

The 2016 United States Presidential Election is one example as Russia had undermined faith in Hillary Clinton while improving Donald Trump's image.

Russian Intelligence services gained access to Democratic National Committee networks which resulted in the compromise of personal email accounts of Democratic Party officials.

Social Media was also used to influence the election with propaganda, helping to sway voters into voting for Donald Trump (The Washington Post 2017)

This kind of breach in cybersecurity has had huge consequences as it's said to have been able to sway a presidential election.

In 2013 there was one of the biggest data breaches in history. Yahoo had all 3 billion of its users accounts exposed including information on peoples usernames, alternative emails, passwords and other personal information. Many people use the same password across different accounts, creating an escalation in email fraud and account takeovers.

There is also a higher changes of hackers accessing victims bank accounts. A few months after the information was stolen, an Eastern European hacking collective began putting up insider information on Yahoo for sale. This information was sold for \$300,000 to three buyers. Four men were charged with the data breach, two of which were Russian Intelligence officers. The stolen data was used to spy on Russian government officials and business executives. (Nicole Perlroth 2017)

- **How will this affect you?**

Individuals, companies and politicians are changing the way they use technology, or are becoming more aware of the impact it can have. Particularly in social media and the amount of personal information and data that is shared.

A lot of formats now introduce extra measure such as two-factor authentication, giving an extra layer of security for users when logging into their accounts.

Recently there was an article published on ABC about a stalker using social engineering to uncover details about users phone account, such as their phone number, email and home address. They did this using the Optus live chat feature and pretend to have forgotten their login details and not have access to their current email. The stalker used Facebook to create fake profiles and pretend to be different people to trick women into thinking the stalker was someone else.

Lincoln Lewis 'Catfish' stalker used facebook to mentally abuse women. The stalker used social engineering tactics to get personal data from Optus such as account login details and phone numbers that had been previously blocked. he use of online-chat function with Optus allowed a stranger to gain access to a users account details to continue harassing them.

This is an example of the social and mental impact technology can have when a user can use the system to mentally abuse another person. The details that were used by the stalker were all found using social media, such as photos and vacation information (James Oeten 2019)

4.3 BLOCKCHAIN AND CRYPTOCURRENCIES

- **What does it Do?**

To understand what it is that can be achieved by blockchain and cryptocurrencies, it must be first realised that the two are very different things.

Blockchain as it is known, is but the underlying technology adopted by many cryptocurrencies (namely, Bitcoin). Rudimentarily, a block is just an organised data structure that can contain whatever it is one wishes to store. In the application of cryptocurrencies, a block is generally comprised of metadata about the block, commonly known as the block header, followed by a list of digital transactions. Hence a blockchain is a chain of blocks, with each block cryptographically linked to the previous block. As each block is timestamped, the contents of each block can be proven mathematically that it existed at the specified time. Blockchain was originally conceived as a solution to digital media being easily edited (Haber & Stornetta, 1991), but was not notably implemented until its application in Bitcoin.

Cryptocurrency on the other hand, is an implementation of several technologies (often incorporating a blockchain) resulting in a transferable asset, be it money, digital contract, utility token (akin to a movie ticket) or a company security. Digital signatures (cryptography) provide part of the solution (Nakamoto, 2008) when transferring the asset from one party to another, hence the name “crypto” currency.

As each cryptocurrency has an exchange price, it can be assumed that those which represent the “state of the art” are those considered most valuable by the market. Taking the top 5 cryptocurrencies by market cap, we will investigate Bitcoin, Ethereum, XRP, Bitcoin Cash and EOS (CoinMarketCap.com, 2019). Of these 5, Bitcoin and Bitcoin Cash are both shooting for a decentralised store of value and medium of exchange, Ethereum and EOS are decentralised computer systems that execute highly programmable smart contracts and XRP is intended to be an international inter-banking platform like SWIFT. All but XRP utilise blockchain technology, as XRP implements a proprietary ledger.

Considering the application variance amongst the top 5 cryptocurrencies, we will focus on the use of cryptocurrency as a cryptographically secure digital currency. This leaves us with Bitcoin and Bitcoin Cash. Having both share the same fundamental structure and the same ledger up until the split on the 1st of August, development for each has now diverged. The split came about from a community-wide disagreement on how to scale to worldwide usage.

Bitcoin aims to limit the size of block to 1MB, to ensure the entire history of the blockchain is never too cumbersome for anyone to download at home, whilst scaling will come in the form of an “off-chain” technology known as the Lightning Network. The Lightning Network is a network of bi-directional payment channels that enable millisecond secure transactions between two parties. These channels can be “chained” from channel to channel, allowing Alice to pay to Carol through Bob, in which the funds can not be seized by Bob. The Lightning Network was been in development since

2016, and although there is a released version on the Bitcoin network it is not expected to enable worldwide usage anywhere from 3 years to 10 years.

Bitcoin Cash aims to allow the network to determine the acceptable size of a block, letting the size of the blockchain grow proportionally to its usage. Ideally this means that the network supply will always be greater than what the network demands. Currently supporting a throughput of roughly 100 transactions per second, there are still many obstacles faced by developers to enable a throughput that will enable worldwide usage.

- **What is the likely impact?**

A decentralised cryptocurrency enables for the first time in human history, a sound form of money that is not controlled by any one party, that is resistant to inflation, that is accessible worldwide, that is not subject to government spending or printing, is easily transferable from peer to peer.

The immediate impact of the adoption of cryptocurrency as a peer-to-peer electronic cash will likely be that of a societal flip on how money is viewed and accessed around the world. A common mantra of Bitcoin and cryptocurrency is that it enables every individual on the planet to be their own bank, to bank the unbanked whilst un-banking the banked.

As of 2017, roughly one third of the world's population did "not have a bank account or access to a financial institution via a mobile phone or any other device" (Hodgson, 2017). The effect of this situation is that a large portion of the population is not engaging in economic activity with the rest of the world, leaving those without access to a financial institution behind the rest of the world's economic growth.

If we did see worldwide adoption of this technology, it would disrupt many current financial industries, namely banks and national reserve banking. At first it may be believed that upon the establishment of this technology that banks would no longer be necessary however, it is likely there will still be financial institutions responsible for custodianship and lending of the cryptocurrency in question. As for national reserve banking, there would be little to no reason for governments to continue issuance of a national currency if everyone globally were using the same cryptocurrency.

- **How will this affect you?**

The adoption and realisation of this technology would have a great affect on me and my daily life. As a prospective programmer, there would be many new job opportunities for those who have vested interest and skills in learning the workings of the technology behind cryptocurrencies.

As an individual on earth, cryptocurrency would enable open trade between me and anyone else around the planet without the hassle of currency exchange rates or international transfer fees. Without the necessity for a trusted 3rd party to safely and surely execute the transfer of funds, the transaction can be done on our own terms, as we see fit.

The affect this may have on friends and family members is very much the same of the affect it would have on me, however if the technology was implemented with the broader population in mind (those who may not care for many of the additional features a programmable money might provide) there should be no noticeable difference in their current use. For to ensure worldwide adoption can be achieved, it must be accessible and understandable by everyone, not just a select few technologists in the space who understand all the ins and outs.

The main take-away from how cryptocurrency will affect everyone across the globe, is that there is now an option to forego the need of a 3rd party when it comes to transacting on a peer-to-peer basis.

4.4 AUTONOMOUS VEHICLES

- **What does it Do?**

We are about to hit the era that is the Autonomous Vehicle (AV for short)

An Autonomous vehicle is one that can drive itself without human participation. It can sense the environment around it and act accordingly to ensure a safe trip from A to B. They use technologies such as Radar, Sonar and GPS just to name a few to complete their task.

These vehicles are also kitted out with communications technology to allow them to talk to other autonomous vehicles and roadside information providers. This tool will allow them to avoid roadworks and traffic congestion effectively. Regarding the connectivity side of this technology it is believed that in the future traffic lights and stop signs will be replaced with systems that connect and manage the vehicles when going through intersections and other tricky road blocks.

Some of the safety features of these autonomous vehicles are what captures my attention the most. The average reaction time for a human is .215 seconds. The average reaction time for an autonomous vehicle is .001 of a second. It would not only correct itself almost instantaneously but it would do so without the human error. Intense situations like a possible car crash can cloud the judgement of a driver forcing them to make the wrong decision. An autonomous vehicle will make the most logical decision.

In 2016 Uber in Pittsburgh started to have cars running on level three automation that could be called in a similar fashion to Uber to transport you from A to B. Level three automation means there is a man sitting in the driver seat but he does not touch the wheel unless there is a problem.

- In June 2017 the top ten car manufacturers all announced that they would have Autonomous Vehicles ready for the market by 2021.
- In November 2017 Google started to run level four automation cars on a trial basis. Level four automation means there is no one in the car and it is completely self sufficient.
- In 2018 Waymo announced that they would have a fully operational level four Automation Uber service running in the Phoenix area by the end of the year.

Currently LYFT is carrying passengers around San Francisco and Phoenix in autonomous vehicles. While its next competitor UBER is carrying passengers around Pittsburgh under level three automation.

In three years time the rollout of the Autonomous vehicle will have begun. The president of LYFT has predicted that in five years time the majority of rides given through LYFT will be done by autonomous vehicles. The rides at first will be located in limited areas and at low speeds but as the technology grows and updates so to will the reach these cars have on the transportation industry (APNewsNow 2016).

CEO of Ford Mark Fields says "We see the upcoming decade for the automobile really centered around the automation of the automobile. Ford has also promised that they will have a decent

amount of autonomous vehicles on the road. To achieve this they have doubled the amount of people working at their Silicon Valley research center to 300. They have also tripled the amount of cars being tested at said research facility (Alex Davies 2016).

- **What is the likely impact?**

Our cars are parked 95% of the time, creating over 1 to 2 billion parking spots in U.S.A alone. When Autonomous vehicles are prevalent the need for parking will be reduced by 80%. The idea is that the customer would call his/her AV which would then take them to where they need to go. Once it has finished with them it will move onto the next customer. This system keeps the cars constantly moving and working nullifying the need for as many parking spaces. Some of the potential benefits of not needing so much parking are:

- Could build much more densely after all the space has been freed up
- Housing will be much more affordable as there will be a massive influx of new potential homes

Some of the potential negative effects are:

- Property Values will drop due to increase in supply with no shift to demand
- If property value goes down, property tax follows which would result in the community having a smaller budget for infrastructure

Autonomous vehicles are not a transportation Issue, they are a massive innovation for the transportation industry. They will however be an economic issue that will affect everyone on a massive way. Hopefully we are prepared for such a massive change.

- **How will this affect you?**

I believe having autonomous vehicles on the road will affect me and most people in a very positive manner. An influx of driving services should increase productivity and connectivity within the world substantially. I can't see this new technology affecting any of my family and friends in a negative way apart from the fear of the unknown. Yes the prices of houses might drop but for me personally the majority of my friends and family live in country towns on big properties. These properties will most likely be unaffected. I think seeing this technology in effect might scare some of the people I know including me as far as safety goes, both as a passenger and as a pedestrian but in a whole I am very excited to be a witness to the future of transportation as I'm sure most people are.

5. Project Idea

"Raspberry Pi Fridge and Freezer Temperature Monitoring System"

Science laboratories across Australia require equipment to be set at specific temperatures for a whole range of different reasons.

This could be for use in experiments, to store important samples or to keep expensive reagents fresh just to name a few.

Failure to maintain the appropriate temperature can result in failed experiments or the loss of irreplaceable samples. This costs both time and money for the user, the company or university who is relying on the information to be as accurate as possible.

Often warning systems fitted to equipment is rudimentary and can only alert researcher's when they are within earshot of an alarm sound.

This project aims to develop a system using the Raspberry Pi to monitor temperature across multiple pieces of equipment and send an automated alert to researchers currently using the equipment no matter where they - a drastic improvement to the current technology that is in place.

We were approached to address this problem by researchers at Monash University who are currently having issues with their freezers and fridges fluctuating in temperatures and the researches not being notified in time.

Current wireless lab monitoring equipment can cost upwards of \$1,800 for a single monitor, an expense that can prohibit access for smaller laboratories.

The laboratory that we will base our model on requires monitoring for twenty-six temperature sensitive pieces of equipment across seven different lab spaces.

Developing a low-cost solution for temperature monitoring across the lab will safeguard important samples as well as proving a more costly solution to this problem.

The aim of this product is to use a Raspberry Pi to measure the temperatures of a number of different freezers and fridges being used to hold samples of fish being studied at a genetics lab.

Once linked to the onsite equipment the temperatures will be able to be monitored by the user from anywhere using their own interface.

This gives the user real-time information on the fridge temperatures allowing them to make quick and important decisions if there are any errors or issues that suddenly arise.

If the freezer were to dip below a 'danger level' temperature the system will send an alert to the user with the current information.

There is several different equipment that will need to be monitored throughout the project. Including five -80°C freezers, five -20°C freezers, six standard fridges, one walk in fridge and nine warming incubators set between 26-39°C.

Hardware would include a Raspberry Pi 3 (wifi), temperature sensors, resistors, breakout kit, breadboard and breadboard wire.

The use of a number of different software will be important in getting the product to run smoothly as well as make the technology as simple and straightforward as possible for the user.

This can includes a user friendly interface, such as a an app, to allow for readings in real time.

The ability to email and/or phone number for researches for individual pieces of equipment.

An automated messaging system.

The successful implementation of this technology will provide a low cost but effective temperature monitoring system for a working laboratory.

This solution will improve the management of lab equipment and safeguard one-of-a-kind samples from failures that could result in thousands of dollars' worth of experiments being lost.

5. Group Reflection

5.1 WHAT WENT WELL

As a whole the group did well in the organisation, delegation and application of the assignment.

We were all able to make initial contact easily through our student emails before quickly deciding on a platform that worked best for us to continue discussing. For us this was as a group on Discord.

Everyone was able to put forward their own ideas on how to proceed and organise the group.

To keep the group organised and on task we used the online task manager Trello.

The report aspect of the assignment was written with Google Docs as this allowed the group to make edits at one time and see these changes quickly.

5.2 WHAT COULD BE IMPROVED

Getting the entire group together online at once can be a bit difficult but would make for delegating tasks a bit easier. It did come down to messaging and waiting for replies when people logged on. So perhaps having an established time to log on would have benefited greatly.

We did have trouble with one group member who did not respond to emails in the initial formation stage of the group. Anthony was contacted who advised she was still an active student so we continued to try to contact her. She appeared for one day only a couple of days prior to the due date but then we never heard from her again. She unfortunately did not contribute anything to this assignment.

5.3 AT LEAST ONE THING THAT WAS SURPRISING

It was great to see the contrast of the group members. There were some similarities but also some (helpful) differences as each person had their own strengths that were able to be contributed to the group and project as a whole.

It was surprising to see how each person's background and individual experience was able to make valuable contributions to the end result of the project.

5.4 AT LEAST ONE THING LEARNED ABOUT GROUPS

Group work definitely has both its challenges and its rewards. When there is a group of people put together who are able to become organised and put in relevant ideas it can progress a project forward very quickly, giving other members ideas and insights they may not have thought of previously.

Challenges in group work can include motivation, organisation and communication (particularly in an online environment) when not executed properly. Though if all members are willing to work towards the common goal and listen to other ideas and give feedback to each other then group work can be a rewarding process.

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