

# COSC2196 - Introduction to Information Technology

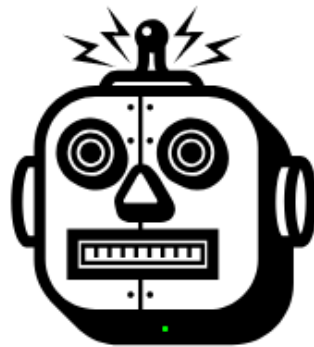
ASSESSMENT 2 : TEAM PROJECT

GROUP NUMBER : 17

## Section 1 | Team Profiles

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Team Name
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# 6TECH INDUSTRIES

## Team Members

### Lewis Martin | s3775633



After completing a Certificate IV in Programming Lewis set out to challenge himself further by starting his journey studying a Bachelor of Information Technology via RMIT, when he isn't studying he enjoys going for runs, watching rugby league, hanging out with friends and family, playing a round or two of golf and tinkering with computers or playing video games. His interest in the IT industry started at a very young age, being born in the 90's he saw how the industry evolved overtime and knew that when he was older he wanted to be a part of it. He has plenty of experience fixing, setting up and building devices such as computers and has experience creating applications with Java and C#, he is considered as tech guy by his friends and family.

### Duy Diep | s3793504



Since completing a Diploma in Information Technology Duy decided to push himself and enrol into a Bachelor of Information Technology, he has a passion for programming and hopes to one day land a career within the discipline. He loves playing video games and building computers in his spare time. Duy's interest in IT began back in elementary school, after learning how to use MS-DOS he was amazed what could be achieved just using a command. Duy currently has no industry experience within the IT sector but does have experience building computers and developing websites.

### Joshua Barton | s3793503



Joshua has been living with technology throughout his entire life, his family owned a computer store where he spent much of his childhood. When he grew older he left school and joined the army, after 6 years stint within the army he decided that he needed a change, returning to the family business. Joshua enjoys spending time with his son in his free time. Joshua's interests in IT began at the computer store with his dad, from a young age his dad would give him jobs to do which sparked his curiosity. Joshua's work within the family computer store has given him two years of IT experience.

**Zac Gearing | s3795070**



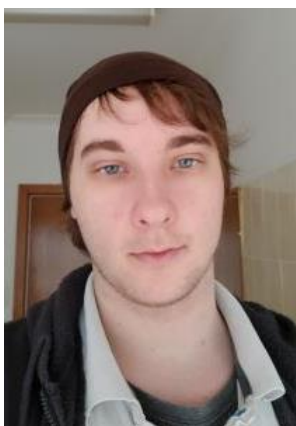
Zac is an outgoing person with a passion for IT, he currently holds a Certificate II in Information Technology and has since enrolled in a Bachelor of Information Technology through RMIT, he is currently working a government job and hopes that this study will be a stepping stone towards a larger career in IT. When Zac has spare time he enjoys, Binging tv series, Gaming and reading fantasy fiction. Zac's fascination with IT began when he convinced his parents to buy him his first computer, he found his first computer to be an entire new world that he could explore, his Interest in IT grew when he worked for 1-Stop as part of their service desk team, Zac became increasingly curious with all the underlying IT aspects of the job. Since Zac's completion of his Certificate II in Information Technology he has worked several IT related jobs including; computer repair and specialising in the technical division.

**Jeremy Miller | s3791007**



Jeremy is a Canberran who like most Canberrans works for the government, he recently enrolled into a Bachelor of Information Technology to pursue his dream of becoming a software developer. Jeremy likes to play footy on weekends when he isn't working or studying. Jeremy's Interest in IT cannot really put it down to one situation or scenario, he has always been fascinated by the rate at which the IT industry has evolved throughout his life and how it always has the ability to remain interesting and relevant regardless of time. Jeremy is considered as the go to 'IT guy' for his family and work which has given him a lot of experience helping others with their tech issues.

**Orion Lane | s3775597**



Orion Lane or 'Oreo' for short is a half Aussie half Kiwi with a growing interest in IT, he grew up with IT around him, his parents were both tech-savvy so throughout his childhood he learnt much about IT. Oreo hopes to one day become an Indie game developer and already has experience with creating mods and console applications using C++ and the Unreal engine. Oreo's hobbies include playing videogames, emulating videogames, and figuring out how videogames work behind the scenes. Oreo's interest in IT began through gaming and ever since he first got his hands on a PlayStation controller he knew he wanted to create his own videogames. Oreo currently possesses a basic level of IT knowledge and programming which involves making mods in Minecraft as a kid and messing around with his computer from time to time.

## Team member's test results

Team member	Myers-Briggs Test	Learning Style Test	Other Test
Lewis Martin	<b><u>ENTJ - Commander</u></b> <ul style="list-style-type: none"> <li>Extroversion</li> <li>Intuitive</li> <li>Thinking</li> <li>Judging</li> </ul>	<b><u>Visual Learner</u></b> <ul style="list-style-type: none"> <li>Auditory – 20%</li> <li>Visual – 45%</li> <li>Tactile – 35%</li> </ul>	<b>Big 5 Personality Test</b>
			<ul style="list-style-type: none"> <li>Extroversion – 66%</li> <li>Emotional stability – 5%</li> <li>Agreeableness – 27%</li> <li>Conscientiousness – 59%</li> <li>Intellect/imagination – 22%</li> </ul>
Duy Diep	<b><u>ISFJ - Defender</u></b> <ul style="list-style-type: none"> <li>Introversion</li> <li>Sensing</li> <li>Feeling</li> <li>Judging</li> </ul>	<b><u>Visual Learner</u></b> <ul style="list-style-type: none"> <li>Auditory – 35%</li> <li>Visual – 45%</li> <li>Tactile – 20%</li> </ul>	<b>Mechanical Aptitude Test</b>
			9/10
Orion Lane	<b><u>ISFJ - Defender</u></b> <ul style="list-style-type: none"> <li>Introversion</li> <li>Sensing</li> <li>Feeling</li> <li>Judging</li> </ul>	<b><u>Visual Learner</u></b> <ul style="list-style-type: none"> <li>Auditory – 30%</li> <li>Visual – 55%</li> <li>Tactile – 15%</li> </ul>	<b>Big 5 Personality Test</b>
			<ul style="list-style-type: none"> <li>Extroversion – 3%</li> <li>Emotional stability – 16%</li> <li>Agreeableness – 17%</li> <li>Conscientiousness – 80%</li> <li>Intellect/imagination – 65%</li> </ul>
Zac Gearing	<b><u>ESTP - Entrepreneur</u></b> <ul style="list-style-type: none"> <li>Extroversion</li> <li>Sensing</li> <li>Thinking</li> <li>Perception</li> </ul>	<b><u>Visual Learner</u></b> <ul style="list-style-type: none"> <li>Auditory – 35%</li> <li>Visual – 40%</li> <li>Tactile – 25%</li> </ul>	<b>Emotional Intelligence Test</b>
			15/20
Jeremy Miller	<b><u>INTP - Logician</u></b> <ul style="list-style-type: none"> <li>Introversion</li> <li>Intuitive</li> <li>Thinking</li> <li>Perception</li> </ul>	<b><u>Tactile Learner</u></b> <ul style="list-style-type: none"> <li>Auditory – 20%</li> <li>Visual – 35%</li> <li>Tactile – 45%</li> </ul>	<b>Creativity Test</b>
			Creativity score of 47.21
Joshua Barton	<b><u>ENTP - Debater</u></b> <ul style="list-style-type: none"> <li>Extroversion</li> <li>Intuitive</li> <li>Thinking</li> <li>Perception</li> </ul>	<b><u>Tactile Learner</u></b> <ul style="list-style-type: none"> <li>Auditory – 15%</li> <li>Visual – 30%</li> <li>Tactile – 55%</li> </ul>	<b>Big 5 Personality Test</b>
			<ul style="list-style-type: none"> <li>Extroversion – 78%</li> <li>Emotional stability – 87%</li> <li>Agreeableness – 45%</li> <li>Conscientiousness – 52%</li> <li>Intellect/imagination – 34%</li> </ul>

### What the Myers-Briggs Tests tell us.

The Myer-Briggs test shows that the group has a mixture of both 'introverted' and 'extroverted' people, this information allows the group to understand each member's openness and which team members may need more encouragement when it comes to certain tasks.

The group also has a mixture of people with an 'intuitive' and 'sensing' personality, this information tells the group that we have a mixture of people who both like to learn best by visually seeing and

people who learn by using thinking of a problem instead, this tells us that certain tasks may be delegated to suit each person's strengths in this category.

The group has a mixture of 'thinking' and 'feeling' people, thinking people generally conclude or solve a problem based on logic where feeling people conclude based on what best for the group overall. This mixture of people can help the group come to multiple solutions to one given problem with extra thought for the overall harmony of the group.

There is also a mixture of people with a 'judging' and 'perceiving' nature, judging people prefer a planned and controlled way of life whereas someone with a perceiving nature prefers to be more flexible and spontaneous, this mixture of people could help the group to insure that there is no conflict whilst delegating tasks, a judging person may take on tasks that they want to do themselves while a perceiving person will be flexible and take left over tasks without strife.

### **What the Learning Styles Test tells us.**

The overall results of the learning styles test tell the group that a majority of the group are visual learners while a couple of the group members are tactile learners, A 'visual learner' utilizes diagrams and other visual data representations to take in information while a 'tactile learner' learns by doing. These results can help the group delegate tasks based on what would be best suited for each group member, for example, a 'visual learner' may be given the task to analyse a spreadsheet with graphs and tables to retrieve information and a 'tactile learner' might create a physical prototype for the group project or do some field work relevant to the project. The group has no members that are predominately an 'auditory learner', people who learning by listening. This is a disadvantage to the group as whenever auditory learning is required the information gathering will be less efficient.

### **What the Other Tests tell us.**

The Big 5 Personality Test was chosen by three group members; Lewis Martin, Orion Lane and Joshua Barton. The results of the Big 5 Personality test further described the personality of all three members, this overall helps with many factors relating to team work. The results of a big 5 personality test can help a team by:

- Knowing whether someone is introvert or extrovert will tell a group who may need more encouragement with certain tasks.
- Knowing the emotional stability of a person will help to manage team members work loads and stress.
- Knowing the agreeableness of team members will help to decide important aspect of a group much faster allowing for more time spent on the project itself.
- Knowing the conscientiousness of group members will give an indication of how invested a group member is with the group work they produce.
- Knowing the intellect/imagination of group members allows the group to get an indication if a group member is conventional or imaginative.

Duy Diep chose to do a mechanical aptitude test. A mechanical aptitude test is a test that measures a person's ability to solve mechanical based problems under the pressure of time. Duy scored a 9/10 which is considered a high score. Duy's test results makes him a value asset to the team when it comes to mechanical aspects of the project, for example, prototype building or testing.

Zac Gearing chose to do an emotional intelligence test, this test is used to tell how well you read another person's facial expressions and how well you can link it to an emotion. Zac scored a 15/20,

this result means that he was able to identify a person's emotion in 15 out of 20 scenarios. This test result tells the group that Zac would have the ability to gauge team members' emotions to help better understand how they are feeling about certain aspects of the group work, thus being able to improve the harmony within the group.

Jeremy decided to undertake a creativity test, a creativity can be used to determine an individual's ability to be creative. The results from a creativity test would be helpful when delegating jobs within a group, a person with a higher creativity score would be given tasks that required a large amount of creativity and thinking outside the box to complete.

## Team member's Ideal Jobs

### **Lewis Martin – Software Developer.**

Lewis hopes to one day land a job that involves some form of software development, he hopes to predominately develop applications, websites and create/manage databases using full stack development tools.

### **Orion Lane – Indie videogame developer.**

Orion hopes to become an indie videogame developer, this involves working either solo or in a small team to develop and produce videogames on PC, console or mobile.

### **Zac Gearing – Security Engineer.**

Zac hopes to become a security engineer in the future, this involves working on the security aspects of systems to be able to deal with disruption from cyber-attacks or natural disasters.

### **Jeremy Miller – Software Engineer/Developer.**

Jeremy plans to one day become a software engineer, this involves designing, testing, maintaining and evaluating computer software.

### **Duy Diep – Data Analyst.**

Duy hopes to one day become a data analyst, this role involves building and maintaining databases for an organisation and extracting and interpreting that data to assist an organisation.

### **Josh Barton – Migration specialist.**

Josh hopes to continue his role within the family business as a migration specialist and one day manage the entire business, a migration specialist's role involves migrating clients onto a certain platform and providing support to clients after migration has occurred.

## Ideal Job Comparisons

Half of the team members chose similar career paths within the software development sector of the IT industry which involves creating applications, websites and databases, while the other members have chosen roles within the security sector, the data analysis sector and data migration sector of the IT industry.

While all the software development roles have comparisons such as creating new applications and websites the other job roles have a loose comparison of the rest if none at all.

A security engineer would help to introduce security measures to an application or website that a software developer may make, they would need to have a high level of software development understanding to implement these measures.

A data analyst would be analysing and extracting data for a business, they would be using some sort of database management application such as MySQL or SQL server, a software developer may also need to use these such applications throughout their career.

A data migration specialist transfers data from one system to another, this involves working with both hardware and software. A data migration specialist may have to transfer data within applications such as a database server.

Overall a range of roles were chosen by each team member that touch many different aspects within the IT industry, half of the group chose to pursue a career path within software development while other members decided to choose career paths in other sections of IT, security, data analysis and data migration. While all these careers have small similarities regarding the sorts of tools that may be used and skills required they are also very different and require different fields of knowledge in order to be successful within the role.



## Section 2 | Tools

Team website	<a href="https://duykhuongdiep.github.io/TeamAssessment2/">https://duykhuongdiep.github.io/TeamAssessment2/</a>
GitHub repository	<a href="https://github.com/duykhuongdiep/TeamAssessment2">https://github.com/duykhuongdiep/TeamAssessment2</a>

The team use GitHub as the primary repository for the project and team website. Each team member responsible for their appointed section and expected to update regularly to GitHub. When all the works finished, the final report and group website will be generating base on all information collected. Since some members encounter difficulties to use GitHub, we additionally use Discord to contribute to the project. As a result, the GitHub log does not correctly reflect individual contribution. We suppose in time the issue will improve.

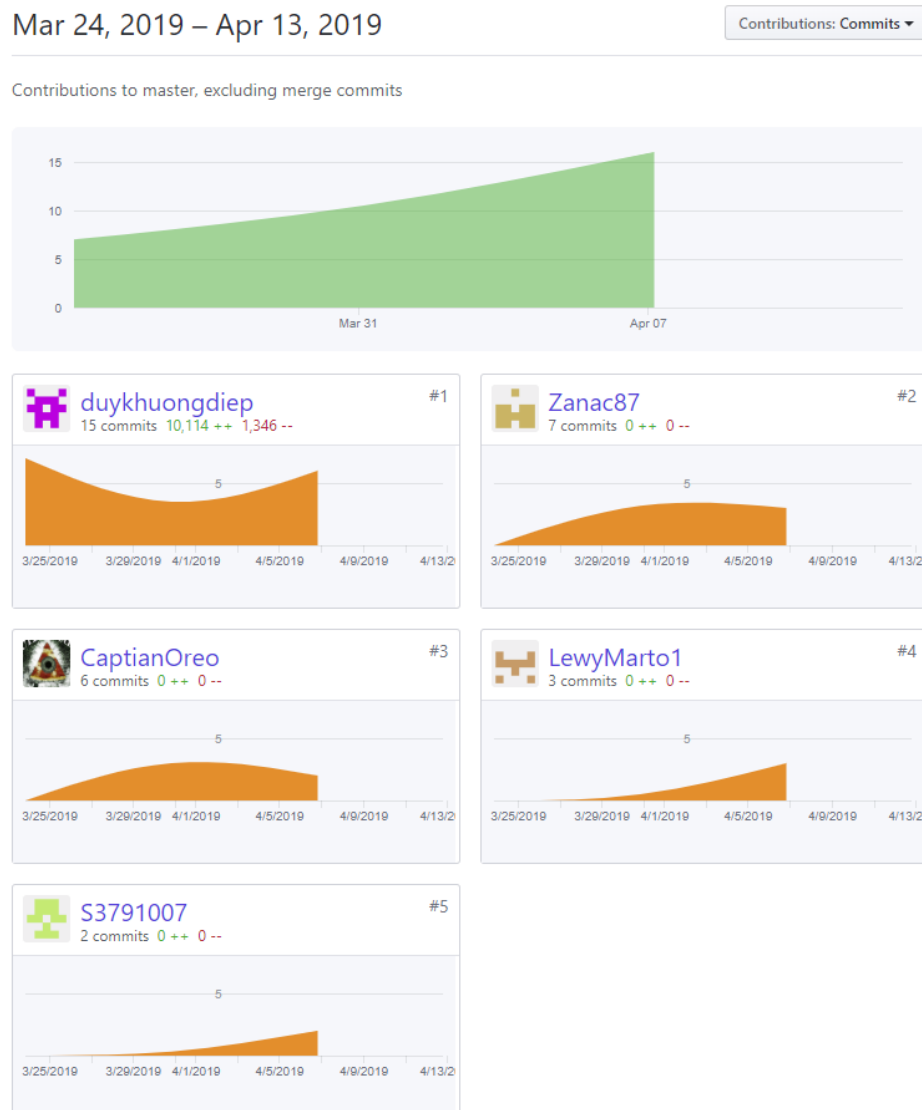


Figure 1 - Commit trail as of 13/04/2019

## Section 3 | Industry Data

### Ideal Job Titles – Ranked by demand from employers

*(Listings from the Burning Glass data Mar.01 2017 – Feb.28 2018)*

Group Member	Job Title	Demand from employers
Jeremy	Software Engineer*	539
Lewis	Software Developer	337
Orion	Software Developer	337
Duy	Systems Analyst**	221
Zac	Security Engineer	70
Joshua	Technical Support Specialist**	53

\*Jeremy's Ideal Job is listed as Software 'Engineer / Developer', so I chose to use Software Engineer for this part.

\*\*Duy & Joshua's Ideal Jobs 'Data Analyst / Modeller' and 'Support & Migration Specialist' aren't listed in the Burning Glass data, so I used the closest jobs I could find in the data.

For the rest of Industry Data, everyone's Ideal Jobs are used as listed on their websites from Assessment 1.

### Ideal Job Skillsets

*(Ranked by number of I Listings from the Burning Glass data Mar.01 2017 – Feb.28 2018)*

Group Member	Ideal Job	IT Skillset - Rank	General Skillset - Rank
Joshua	Support & Migration Specialist	VMWare – 281 Technical Support – 8,700	Communication Skills – 44,367 Problem Solving – 16,445 Data Migration – 1,271
Duy	Data Analyst / Modeller	SQL – 17,570 Business Analysis – 4,572	Presentation Skills – 3,716 Data Modelling – 1,439
Zac	Security Engineer	Information Security – 2,420 Network Security – 1,393	Communication Skills – 44,367 Problem Solving – 16,445
Orion	Software Developer (videogames)	Adobe Photoshop – 3,565 C++ - 2,938	Problem Solving – 16,445 Project Management – 8,504 Creativity – 7,475

Lewis	Software Developer	JavaScript – 15,368 Microsoft C# - 8,734 .NET – 6,838 SQL Server – 5,400	Database Design – 1,629
Jeremy	Software Engineer	Data Management – 3,199 User Interface (UI) Design – 1,998	Communication Skills – 44,367 Problem Solving – 16,445 Project Management – 8,504 Visual Design – 1,028

### **Highest Ranked Skills Outside the Group Skillset**

The three highest ranked IT -Specific skills outside of the Group Skillset are:

- Microsoft Windows – 13,083 Listings
- JAVA – 12,228 Listings
- LINUX – 8,164 Listings

The three highest ranked General skills outside of the Group Skillset are:

- Organisational Skills – 15,844 Listings
- Writing – 15,590 Listings
- Team Work / Collaboration – 14,364 Listings

### **Having looked at the Burning Glass data, has your opinion of your ideal job changed? Why or why not?**

#### **❖ Joshua**

After looking at the burning glass data I have not changed my opinion of my ideal job as I am already working in the job. Being a part of a small business means that you have to be a generalist and not specialising in a particular field. Being a generalist means that most days are different keeping it interesting.

#### **❖ Duy**

After considering the data at Burning Glass, my ideal job as a Data Analyst still stay relevant as it is a step up from Data Administration, which currently is in high demand. Furthermore, based on the data, with my current skill set and the one that I am working up to, most of it is in high demand, I believe I am on the correct career track.

#### **❖ Zac**

Has my opinion on my ideal job changed? No. The term 'ideal job' implies that it is a job that is equal parts interesting and rewarding. The reason I chose my ideal job is because it is something I'm interested in, not necessarily a job type with the highest job market availability.

❖ **Orion**

After looking at the Burning Glass data my opinion of my Ideal Job hasn't changed at all. Developing videogames and other software has always been my ideal job and it's what I've been planning for my future. Even if I can't build a career out of it in the end, I could just make it into a hobby. Besides, it's too late to get a refund now.

❖ **Lewis**

After looking at the Burning Glass data my ideal job has not changed, I chose my ideal job as it appeals to me and I believe that I will get the most enjoyment and sense of accomplishment within the role, if anything the data has cemented my ideal job choice as the skills within my chosen ideal job closely match the skills in greatest demand.

❖ **Jeremy**

My ideal job as a software developer hasn't changed upon reviewing the burning glass data. There is significant demand in the area, and room for progression.

The skillsets listed in data are areas I'm interested in and has given me key areas to focus on with my learnings.

## Section 4 | IT Work

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### **IT Professional Interview**

*"A day in the life of an IT Professional"*

Interview Questions for **Stephen Simpson** from **Thales Australia**

**1. What kind of work is done by the IT professional?**

I am a team lead of a team of highly skilled network engineers. The team consists of contractors and permanent staff. I manage them from a planning and work load perspective. I manage the permanent team members career and development, plus I do scheduling, project management, planning and provide support to other teams within our business.

**2. What kinds of people does the IT professional interact with? Are there other IT professionals? Clients? Investors? The general public?**

Other IT professionals ranging from design, support / troubleshooting, technical team members, systems engineers, planners, project managers, senior management.

I have occasional exposure to the client and end user, but it is not common.

**3. Where does the IT professional spend most of their time?**

It can vary. No two days are the same. I can be in meetings, with the team, at my desk. I do spend a lot of my time liaising with managers of other teams too.

It depends on what is happening at a given time

**4. What aspect of their position is most challenging?**

We are working in a complex project environment, so priorities can change quickly. It can be hard to keep up with an ever-evolving new list of priorities.

People management is also an eternally challenging part of being a manager.

**5. What are your main responsibilities as a...?**

I am responsible for managing the work load for my team of 9. We need to deliver to our own objectives, while making sure we are responsive and reactive to work that comes in from other teams, plus priority support work.

I perform scheduling to make sure we align with the wider program priorities

I liaise with other managers to make sure the teams work cohesively, and any interdependencies are fully understood

I work with our security team to make sure we are always security compliant (not optional)

I manage up and ensure our reporting is up to date

**6. What is a typical day (or week) like for you?**

No two days are the same, but every day is chaotic due to the nature of our environment

**7. What do you like most about your work?**

It is fulfilling work and we are delivering a solution that our end user (and many others) will benefit from. It will improve the lives of our end users whilst delivering meaningful and cutting-edge solutions.

**8. What do you like least about your work?**

The never-ending priority shifts.

**9. What kinds of problems do you deal with?**

Complex engineering problems for a highly specialist product, using very niche pieces of software and tools.

Integration of these various pieces can be very challenging.

As a people manager, I deal with different personalities and people every day.

**10. How does your position fit within the organization/career field/industry?**

I am a frontline manager within my organisation, so am at the coalface of delivery.

**11. How does your job affect your general lifestyle?**

I have a fairly demanding job and I do have to dedicate a component of my personal life to ensure that I am always on top of what is occurring. I do log on most nights and work late a lot to ensure that I am always across what is happening.

**12. What are some common career paths in this field?**

The field is very broad, and my workplace employs people from entry level techs, systems administrators, mid-level engineers and all the way up to specialist SME's that are the very best in their field. We employ IT architects and managers at all levels.

In this market there are opportunities for people work full time for an organisation or as a contractor.

**13. What kinds of accomplishments tend to be valued and rewarded in this field?**

It would depend on the industry, but there are many technical certifications that can be attained, depending on what products you are working with. Technical certifications are always valuable.

There are ITIL certifications that are valued

As a manager, I value anyone who is competent and approachable. Someone who is willing and able to perform a task is a valuable asset in any business.

**14. How did you become interested in this field?**

I have always had an interest in technology and computers and was always fairly component. When it came to be getting a job one thing led to another and it just sort of happened.

**15. How did you begin your career?**

I got a job in IT working for a very small company with about 10 users. As the company grew, I became exposed to more technology and eventually moved from doing level 1 helpdesk to

workstation builds, to windows server builds, to managing an exchange environment, AD, a citrix farm and then eventually project work.

**16. How do most people get into this field? What are common entry-level jobs?**

In my experience, most people start on a service desk and move up from there

**17. What steps would you recommend I take to prepare to enter this field?**

A basic understanding of computers and technology, combined with an entry level certification, like a cert 4 in IT would be a great starting point, or a degree in a related field is very common.

For me, a willingness and a drive are two very important things I would look for in a team member

**18. What kind of education, training, or background does your job require?**

I was a tech in the hardware and infrastructure field and managed the acquisition, build and installation of several data centres. I started as a network team lead as it was similar to the work that I was doing, so my background was similar from a technical perspective, but I did not have any management experience.

Usually people go from being technical leads to managers, but this is a big step.

I would recommend some kind of management training before taking a team lead role.

A tech could work their way up through the ranks of a service desk, or study at TAFE or Uni to get exposure in their field.

**19. How relevant to your work is your post graduate degree?**

My post graduate degree has no relevance to my work.

The person who hired me was impressed by my masters degree from Sydney Uni, even though it had nothing to do with my field.

## Section 5 | IT Technologies

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### AUTONOMOUS VEHICLES

*Author: Zac Gearing*

#### What does it do?

##### ***What is the state of the art of this tech?***

Research into autonomous cars is currently being undertaken by a large number of manufacturers but mostly is still only in the testing phase.

Tesla is a perfect example of one of these companies and they're striving to develop and roll out fully autonomous driving capabilities with all of their vehicles however full autonomy will not be rolled out until the laws concerning self-driving vehicles have been put in place.

Einride a Swedish company and is another example of a company trying to develop their own autonomous vehicle except this company is focussing on a truck.

The "T-Pod" is being tested as an all-electric self-driving truck capable of carrying 15 pallets of goods almost 200km while producing zero emissions.

##### ***What can be done now?***

Tesla vehicles are manufactured with all the sensors they will need to facilitate fully autonomous driving however more testing a legal regulation are required before Tesla can start sending out the updates OTA.

At present, Tesla vehicles are only capable of semi-autonomous driving and only when their 'Enhanced Autopilot' update has been purchased.

The additional features you get once EA has been updated are as follows:

1. Having the Tesla match speed to the car in front
2. It will keep the car within a lane
3. It can change from one lane to another without requiring any driver input
4. The system can exit the highway you're driving on when you start to approach your destination
5. It can also self-park itself (which many other cars can already do)
6. There's also "Summon". This allows it to go in/out of a garage or parking spot while you're not even in the car



***What is likely to be able to be done soon? (say in the next 3 years)***

Once the testing is complete and the laws are in place, we should see fully automated vehicles on the road shortly after. Primarily they will be used for highway driving, for both commercial and private use.

***What technological or other developments make this possible?***

Among the mountain of tech that make self-driving cars possible is a complex mixture of sensors and actuators, highly sophisticated algorithms, and powerful processors used to execute software.

The sensors and actuators in an autonomous vehicle fall into three broad categories:

1. Navigation and Guidance (Where you are, where you want to be, how to get there)
2. Driving and Safety (Directing the vehicle, making sure it vehicle acts properly under all circumstances, and follows the rules of the road)
3. Performance (Managing the car's basic internal systems)

**What is the likely impact?*****What is the potential impact of this development?***

Autonomous vehicles will bring enormous benefits to anyone trying to get from A to B.

For example, you're in your self-driving car on the way to work and you wanted to get a head start on the day. While your vehicle takes care of all of the work of getting you into the office on time, you could check your emails, draft reports and perform some of your normal duties. It would allow you to turn the hassle of peak hour traffic into a more productive use of your time.

Autonomous trucks would also bring a benefit to the supply chain industry, as it would eliminate driver fatigue related deaths.

***What is likely to change?***

With autonomous vehicles having a faster reaction time than humans, plus are not affected by lapses in concentration, there would be a significant reduction on vehicle related accidents.

***Which people will be affected and how?***

Basically, anyone who currently uses cars to get from one place to another would benefit from autonomous vehicles, it would increase their safety and increase their potential productivity, depending on if the drive was for business or pleasure.

Will this create, replace or make redundant any current jobs or tech?

Once full autonomy hits, there will be a reduction of jobs in the supply chain industry, especially if all of the trucks on the road are replaced with/given self-driving capabilities.

There will conversely be an increase in tech jobs, as autonomous vehicles would require specialised maintenance and repairs compared to a regular human driven vehicle.

### **How will this affect me?**

#### ***In my daily life, how will this affect me?***

As a savvy, up and coming IT executive, having an autonomous vehicle would be a fairly substantial boost to my productivity. It would allow me to use the hour or so of travel time to and from work each day as a distraction free environment, I would be able to check my calendar, send emails, draft reports, initialise performance management proceedings for underperforming colleagues, the sky's the limit!

#### ***What will be different for me?***

Once I'm hooked up with an autonomous vehicle and have the correct laws regulating its use on the road, I'll be able to direct the energy and concentration I put into driving into something more productive. Whether it's sending emails, running reports or working on documentation while I am driven to or from work or sending texts, confirming plans or watching Netflix on my phone while I'm driving on the weekend, my self-driving car will help me make the most of my transit time.

#### ***How will this affect members of your family or your friends?***

My friends and family will also share the benefits of autonomous vehicle travel, as they too will be able to maximise their productivity during their travel time.

Parent friends of mine will also have the added advantage of being able to take care of their child's needs while they are being driven to their destination, whether it's wiping up baby spew, disciplining a naughty toddler or breaking up a fight between sisters, a self-driving vehicle will give them the opportunity to be the best parent they can be.

# Machine Learning

*Author: Duy Diep*

## **What does it do?**

In 1938, when Konrad Zuse built Z1, the very first programmable computer, he effectively created the computer era which arguably is one of the main factors to shape the modern world we are living today. Compared to humans, computers are unquestionably fast at calculational and repetitive tasks. Since then, computer programs may have evolved greatly but shared the same basic principle: generating result following a set of instructions.

With the modern computer world continuing developing, the amount of data generated, therefore, growing at an astonishing level. According to Domo.com (2019) latest report, the world creates 2.5 quintillion bytes of data, that is equivalent to 3.3 billion of CDs, every day. More significantly, the last two years alone has contributed 90 per cent to the total amount of data (IFLScience, 2019). The exponential growth in data generated far surpassed human ability to comprehend. The answer to that problem, hence called big data, lies in a new field of computer science, namely, machine learning. As the terminology implies, machine learning is a technique of using program algorithms to make a computer predict results without a specific set of instructions. By using its power to apply complex mathematical calculations to big data, computers can learn from the information and spotting specific patterns rather than depending on human instructions. As a result, this technology unlocks many possibilities for the future.

Machine learning is, in fact, not a new terminology to the computer word. In 1950, Alan Turing saw the capability of computer learning by itself, created the famous Turing Test in which if a computer can pass the test, it can be indistinguishable with a human. The first learnable computer program is a checker game written by Arthur Samuel in 1952, which continues improved the more it played. He also came up with the name machine learning.

The technology was nothing but a curiosity, thus did not have much progress until the start of the 21st century. With the advent of big data mining, businesses realised the potential of machine learning, therefore heavily invested in the technology to stay ahead. The technology has been researched more heavily than ever before and evolved into many new categories, for instance, artificial intelligence, data mining, deep learning. Large organisations beginning to build their machine learning platforms such as GoogleBrain, DeepMind by Google, DeepFace by Facebook, and OpenAI by Elon Musk.

Although machine learning has been around for decades, with the recently attained popularity and massively invested by large enterprises, the future of machine learning will be one of the important parts to modern technology.

## **What is the likely impact?**

Machine learning technology has already been subtly taking over the modern world. With help from corporations, machine learning integrated itself into many aspects of our society.

Businesses and retail industry are arguably the major benefiter from machine learning. Using algorithms to analyse customer data, retailers can set prices based on supply and demand, giving

purchase recommendations or showing personalised advertisements. Overall this will increase customer experience.

Banks and financial services use machine learning to quickly and accurately calculate consumer credit scores, loan interest or to identify fraud. Data mining can be utilised to identify investment opportunities or help in predicting the market. Insurance companies also rely on machine learning to generate insurance premiums.

Health care industry can also get the benefits from the new field. By taking data from patients with wearable devices and sensors, medical experts can utilise algorithms to identify conditions and deliver diagnosis more accurately.

Some governments have started to incorporate facial recognition algorithms along with surveillance devices to detect and identify crime to improve public safety. Although it is questionable in legality and ethicality, machine learning technology can indeed impact on society.

### **How will this affect you?**

Transportation aspect will be faster and safer. With artificial intelligent, car manufacturers can research automotive that can operate without human intervention. Equips with advanced sensors and cameras, they can detect hazards and make critical decisions many times faster than the human eyes. In the sky, aeroplanes using automation systems to guide themselves when in cruise mode, saving pilots time to more critical tasks such as take-off and landing.

Everyday living elements can also be more convenient. Retailers can utilise customer data to provide more personal experience, giving purchase suggestions or integrate machine learning into logistics and distribution to improve delivery speed. Digital personal assistants in smart devices are proving their effectiveness in assisting daily tasks faster and more intuitive.

Moreover, healthcare with aids from machine learning allowing researchers to understand and predict genetic diseases, doctors can treat patients with more accuracy. Overall making people have a healthier life.

In conclusion, machine learning technology although still in controversial, it helps to pave the way toward many technological breakthroughs. Some may say the new industrial revolution lies in artificial intelligence.

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# Future of Robotics

*Author: Lewis Martin*

## What does it do?

Robots are quickly becoming a huge part of how society functions throughout their day to day life. For decades, the age of the robot has been predicted with the term 'robot' first used to mean automated labour and the term becoming popularised through science fiction films since the 1920's (The One Brief n.d.). While the introduction of robots has had mostly positive impacts on society there is also some concern about what the future of robotics will look like.

Robots are designed to aid people in doing tasks that are either not suitable or too dangerous for humans, tasks that are far too repetitive and dull for humans (Mendes 2014) or tasks that require more precision than human error cannot provide, Mendes (2014) states that robots are suitable for these kinds of jobs as they lack emotional feeling, meaning any adverse emotional effects that these kinds of jobs may have on humans do not apply.

In today's world the most current state of the art development in robotics is humanoid robots, these humanoid robots are being developed to walk, talk, act and even look just like us. Dang (2019) states that humanoid robotic technology was originally used for research purposes, being used to develop better prosthetics for humans but the technology has been shifted to develop and create humanoid automatons. In the future humanoid robots in combination with artificial technology are intended to be used as companions or assist humans in daily life and act as helpers in time of disaster (Humanoid n.d.). While considerable progress has been made in the field of robotics there is still a long way to go, before we can expect a humanoid robot in our own home.

Robots have allowed us to develop our knowledge of differing fields by aiding us in some way, All On robots (n.d.) states that there are many possible ways to define different types of robots. Industrial robots have allowed us to produce products in large scale with robots being designed to weld, paint and handle different materials to build things such as cars or electronics, All On robots (n.d.). Medical Robots have been developed to undertake precise surgical procedures or even help ease a patient's recovery, All On robots (n.d.). Military robots have been developed and used to carry out different tasks required on the battle field, from disposing bombs to being used to scout enemy locations via drones, All On robots (n.d.). Space robots have been used to journey throughout our solar system to explore regions of our solar system that would not be feasible for humans, All On robots (n.d.). These are just a handful of current services that robots can provide society, with their ability growing every day.

Robots are continuously developing; they are becoming more intelligent and efficient with each passing day. There is plenty of progress happening within the robotics industry currently and we can expect to see the resulting development over the next few years. FutureForAll.org (n.d.) State that the next generation of robots is being designed to look feel and act more human, work is being done to create socially acceptable robots, creating realistic looking hair and skin and even going so far as to designing eyes that move and blink, a moving chest to simulate breathing and incorporating different facial expressions.

As more work gets put into artificial intelligence, we will start seeing robots that begin to act like real humans and think and learn for themselves. Techopedia (n.d.) defines artificial intelligence as the 'area of computer science that emphasizes the creation of intelligent machines that work and react like humans.'. The continued development and improvement to AI will help produce robots with more human like abilities and will lead to robots being developed for more and more job types,

Martin (2014) states that jobs such as; lab technicians and scientists, teachers and lecturers, pharmacists and airplane pilots could be taken by automatons in the near future. For these reasons the development of AI has become the most controversial topic of discussion within the field of robotics (Harris n.d.).

### **What is the likely impact?**

In terms of the labour market, as robots advance beyond human capabilities more and more jobs will be carried out by automatons, Harris 2018 suggests that by 2034 it is predicted that 35% of jobs that are done in the United Kingdom will be done by robots instead, this would lead to mass unemployment within the nation. Throughout recent history there have been many examples of machines taking jobs. In the past jobs like, a lift operator or a film projectionist were taken over by machines and even in more recent times machines have taken over jobs such as a bridge toll collector or check-out cashier, Harris (2018). As robots and AI evolve this trend of machines taking jobs that has been evident throughout the past to the current day and is set to become an even bigger issue as time progresses.

While robots will take many jobs in the future it is predicted that 133 million jobs will be created compared to the 75 million jobs that will disappear all coinciding with the introduction of advanced robots, The Guardian (n.d.). While robots are expected to take over more physical jobs as well as many office-work positions, the evolving technology will create more jobs within the technology sector revolving around robotics as well as the technology sector in general. With the retraining of current employees to accommodate these future job roles, the introduction of more robot workers could potentially only have small adverse impacts.

Regarding robotic impact on society the introduction of more robots in everyday life will lead to more efficient living, research according to London (2018) states that 60% of British people believe that there will be a robot in every home within 50-years' time. These robots would provide general help to their owners with mundane tasks allowing for more free time. Robots can even be used to provide their owner with companionship, 13% of people believe the introduction of a robot in their life would mean they would never feel lonely again (London 2018).

### **How will this affect you?**

As the development of robotics continues, we will begin to see the changes to our society and personal lives. I believe that my day to day routine will be simplified, the addition of a companion robot or such would give myself more time to do other important tasks and more free time for leisure. Overall the implementation of automatons would make the personal lives of myself and society much more efficient and enjoyable in the long run.

As robots advance, they will gain the functionality to take a wider array of jobs, while jobs within the technology field will still be in high demand for the future, more physical and office-based jobs will become more accessible for robots and AI. The employment of robots to our workforce will result in the elimination of human error, while some other potential errors could be introduced such as breakdown or malfunction this elimination of human error would result in society becoming more efficient. My future career path involves working within the IT sector, so the introduction of more advanced robots will not be an issue for myself, whereas some of my friends or members of my family may need to be retrained or reskilled in order to join the workforce again.

To conclude, the age of the robot is coming and while it may be a scary to some, it is inevitable. The addition of automatons with advanced AI will require a big transition to current everyday life, many people will need to change careers or be reskilled in order to remain relevant within the future robotic age. While robots will take a range of jobs, they will also provide a wide range of new jobs within the technology sector and provide support to humans to improve their quality of life overall.

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# Blockchain and cryptocurrencies

*Author: Jeremy Miller*

## What does it do?

Blockchain is a decentralized, incorruptible public ledger or also known as distributed ledger technology (DLT). In 2008 a person or persons known as the pseudonym Satoshi Nakamoto released a whitepaper called “Bitcoin: A Peer-to-Peer Electronic Cash System”. Cryptocurrencies are a by-product of the blockchain, with Bitcoin being the first mainstream use case.

The current state of blockchain and cryptocurrencies is very much in its infancy. As mentioned earlier Bitcoin is the first real use of blockchain technology. Bitcoin is a currency and payment system which is not issued by a central authority, instead it is a distributed network that maintains the public ledger. There is a limit of 21 million Bitcoin with just over 17 million in circulation. There are a number of things that can be done with Bitcoin:

- **Mining** - Anyone has the ability to mine Bitcoin as long as they have the appropriate hardware. Mining Bitcoin is the process of adding a block to the blockchain, with each block being a transaction in the Bitcoin network. Computers will be used to solve numeric puzzles, the first to do so win the block reward. Miners can operate solo, or they can join mining pools which will split rewards amongst all participants.
- **Trading** – you can trade bitcoin for other alternate cryptocurrencies or standard currencies such as USD, AUD, etc. With high volatility, trading can be quite profitable for those with trading knowledge. There are hundreds of exchanges available for cryptocurrency trading.
- **Investing** - You can buy cryptocurrencies and hold onto it. Some predict that bitcoin’s value will continue to rise long-term.
- **Buying** - It can be used to pay for goods or services. There is an increasing number of businesses which accept bitcoin (and other alternate cryptocurrencies) as payments. Worldwide, cryptocurrencies can be used to buy houses, and even pay taxes.

Blockchain doesn’t really require any particular technical advancements to work, its peer to peer decentralized network structure means it can run on anyone’s device. However, the emergence of blockchain has made cryptocurrencies possible and depending on the consensus mechanism used could depend on the hardware required to encrypt and process new blocks. With higher hash rates, GPU sales have increased substantially since cryptocurrencies emerged.

## What is the likely impact?

The possible impact of the blockchain is vast, it has the potential to disrupt many sectors, such as:

- **Finance sector** – With a faster and cheaper way of transferring money/assets. Blockchain is also a more secure way of storing transactional data through the decentralization provided by blockchain. There are dozens of cryptocurrencies that have been created for payment services, the leaders in this field are:



- Bitcoin
- Dash
- Litecoin
- Monero
- **Real Estate** – Buying and renting a home involves lots of documentation and can be an expensive process when engaging lawyers, property managers, etc. Blockchain could be used to simplify the process by using smart contracts which execute when the criteria are met. There are a number of projects that are looking to digitize rental assets, giving anyone the opportunity to own an investment project anywhere in the world. They also give potential developers to raise funds. Current real estate projects:
  - Brickblock
  - Propy
  - Rentberry
- **Voting** – Having an electronic decentralized incorruptible platform makes blockchain seemingly the perfect solution for voting. Using verification systems for voters, the blockchain would ensure that all voting is above board. Having votes digitized, voting could be done with extreme efficiency, while keeping costs down, whilst remaining secured by blockchain. Current projects of this nature:
  - ClearPoll
  - Horizon State
  - Vote Coin

With its security and transparency blockchain technology is often referred to as the new internet, so it has the potential to affect anyone who uses an internet connected device. On the face of it, the everyday user may not realize the impact of the blockchain, however it has the capacity to make processes more efficient and services cheaper having an impact on everyone.

Blockchain effectively cuts out the middleman, so any manual processing could become redundant. Blockchain will also result in job creation, as there will be a larger need for blockchain engineers, smart contract developers, and general blockchain expertise.

### **How will this affect you?**

I've hardly scratched the surface of the industries blockchain could disrupt. The biggest impact it could have on me could be due to the transparent nature of blockchain could make governments and organizations more accountable. Decisions would be made based on what's best for the public, rather than driving personal agendas. Organizations will offer cheaper and faster solutions, resulting in better and more value for money products and services.

With the emergence of cryptocurrencies fiat currencies could be digitized. If a cryptocurrency such as bitcoin became a worldwide currency it would eliminate conversion fees, remove inflation as there is a maximum supply of 21 million, and essentially remove the stranglehold banks have on society.

## Section 6 | Project Idea

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### Baby Sleep Trainer Project Idea

#### Issues/Positives Discussion

##### Expanding on ideas

The idea of having a child sleep program training aid could improve the health of the family. According to Krader & Honaker (2018) sleep is vital for both the health and development of children. Infants sleep patterns are mostly determined by parent involvement and how the parent trains the infant to sleep (Sadeh, Tikotzky & Scher 2010). Issues with infants sleep can cause health and mood issues in parents. The aid could eliminate child sleep apnoea to go on for long periods of time allowing for a healthier family.

##### Problems that need to be solved

Having children can be time consuming and full of issues that need to be solved. An issue that many parents face is training their babies to sleep through the night and part of this is training the parent in what to do. After conducting an interview with a mother of a 10-month-old baby with sleep issues we came up with the below issues;

- There are many sleep programs to choose from which can be daunting and expensive.
- Some of the sleep programs can be emotionally draining i.e. Hearing baby cry can be emotional on the parent.
- Programs that do not have an expert to listen and coach the parents can lead to the parents having doubt in their ability to successfully carry out the program.
- New parents might not have money to buy an expensive device.

##### Possible solutions to solve above issues

**Issue** - There are many sleep programs to choose from which can be daunting and expensive.

**Solution** - By having a device that can choose a certain sleep program depending on the child's current sleep pattern and change the sleep program along the way as the child's sleep pattern changes it can take the decision away from the parent.

**Issue** - Some of the sleep programs can be emotionally draining i.e. Hearing baby cry can be emotional on the parent.

**Solution** - Having an option on how intensive the sleep program should be could ease parents into the sleep program. Some parents get emotionally drained from hearing their child cry so they could

have a mild sleep program, however other parents may want an intensive program that progresses quicker.

**Issue** - Programs that do not have an expert to listen and coach the parents can lead to the parents having doubt in their ability to successfully carry out the program.

**Solution** – By having a device that can record the babies sleep pattern and then display it to an expert, advice could be given to the parent. Another option could be if the device was connected to an external source advice could be given by an expert to the parent while the parent is following the program.

**Issue** - New parents might not have money to buy an expensive device.

**Solution** - The device could be an application run on a spare tablet or smart phone. By having an application, the parent could just use a spare device eliminating purchasing another device and reducing the overall cost.

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