Assignment 2   
Introduction to Information Technology

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Personal Information —  
  
Daniel Blake  
I’m Daniel Blake (s3910924) of UMI. I’m from an English background but moved to Australia at a young age. I love AFL and the west coast Eagles. I also spend a lot of time camping, fishing, and at the beach. My professional background is in Operational Technology and Vehicle Automation specific to the resources sector. My interest in IT is to expand my knowledge and career opportunities in mining or other industrial technology fields. Go UMI!!!

Nicholas Drinkwater   
Hey! I’m Nick Drinkwater (s3508178) of UMI. I was born in Sydney but grew up in Melbourne. Whilst I don’t have any formal IT experience, I actually previously started this degree back in 2015. After completing half a year, I left to go traveling, spending 2 years living in Edinburgh, Scotland.

With Coronavirus and being unable to travel, I decided to use this time to return and finish my degree! I love traveling, film, and baseball. My interests in IT include programming, building IT systems, and hardware. I hope to learn the necessary skills and knowledge to help me enter the IT industry in my career, as well as exposure to inspiring topics and fields of IT that I haven’t seen or encountered before.

Abby Durbridge  
I’m Abby Durbridge (s3794613) of UMI– a Melbourne resident living in the heart of Southbank and loving every moment.  My passions lie in creative arts and languages and use most of my spare time growing my skills in each. Historically, I’ve worked with an Engineering firm before transitioning into a SaaS company within the Childcare Industry. A hefty lockdown saw me trying to develop new skills and interests and evidently picking up another degree. My interest in IT hasn’t been at the forefront of my life but rather a natural necessity, and it wasn’t until I began to think of developing my own software or being able to work remotely for any company that I pursued IT professionally.

Mathew Dwyer  
My name is Mathew Dwyer (sS3807459) of UMI. I’m 27 years old and based in Newcastle, NSW. English is my primary language, however I’m in the process of learning German. Previously, I’ve completed 3 semesters of a Bachelor of Communications at University of Newcastle, as well as partially completed a video game course through TAFE. I love playing with electronics and am currently expanding my skills with 3D printing, 3D modelling and CAD to facilitate the printing of miniatures and terrain for my DnD games.

My experience in IT is specific to web development and electronics, having played an integral role in the development and ongoing maintenance of the website of a retail store I worked for. Additionally, I’ve had involvement in video game development and have created several small games for various competitions. Software development, automation and cybersecurity are all areas I’d like to explore during the course of my education and career.

Erin Paton

I’m Erin (s3910930) of UMI. Originally from Sydney, I relocated to Byron Bay for a change of pace and to get closer to nature - most of my weekends are now spent hiking, exploring waterfalls, or at the beach. Currently, I’m fluent in English but I have a passion for French culture and intend to study the language up to C-level (only after I’ve knocked over a few programming languages!).

My experience with IT is specific to marketing technology, and the software used to implement it. Art, Design, Psychology, Health & Wellness, and Sexual Education are all areas that are important to me and while I don’t have plans to further my education in these fields, the possibility of exploring their convergence with emerging technologies is something that excites me. I’d love to play a role in increasing the accessibility and interoperability of these spaces in some way throughout the course of my career.

Harrison Tang  
My name is Harrison Tang, s3908223 of Team UMI. Born to migrant Chinese parents, I am a second-generation Australian and denizen of Brisbane Town/Meanjin. Whilst not possessing an extensive background in IT, I grew up in the 1990’s and 2000’s playing video games and exploring the internet. Eventually, technologies would play a crucial part in my life in staying connected with friends and family, discovering art and music, educating and expressing myself, and seeking new employment and career opportunities. Recent work performing administration and data collection for an infrastructure company prompted an exploration into avenues in programming, cloud services, and app and web design leading to pursuing a formal education in IT. Currently, I play guitar as part of the ‘strings’ section in a ten-member pop-punk cover band/orchestra and occasionally travel interstate to perform.

Team Profile —

Daniel Blake  
**Myers-Briggs**Results show I’m an INTJ-A, an Assertive Architect. This means, for me, that I can use rational thought and ingenuity to bring a project to fruition.

**Learning Styles test**Found online at [http://www.educationplanner.org](http://www.educationplanner.org/).The results of the test say that I’m a 50% tactile learner.

**Productivity Test**   
Found at<https://hbr.org/2018/08/assessment-how-productive-are-you>. The results show that I am 95% productive.

**Discussion**

In a group environment, being a productive member is incredibly important to me as demonstrated by by 95% productive result. Being able to be relied on by my teammates is something that I would pride myself on and I hope that this level of productivity is emulated by my team. The key to success for me would be by effectively organising communications and assigning tasks efficiently and productively, through my rational thought and ingenuity, which would provide an easier road to success.

When forming a team, it’s best to find people who are also organised and productive. I think trying to maintain a high level of organisation with someone who works in an ad-hoc manner would be frustrating and would lead to friction within the group.

Nicholas Drinkwater   
**Myers-Briggs**

My Myers-Briggs test indicated that I’m an INFP-T, which is a Turbulent Mediator. This means that I am thoughtful, open-minded and empathetic but can also overly self-critical and idealistic.

**Honey and Mumford**

My Honey and Mumford score indicated that I have a Reflector learning style, which is someone who learns by observing and considering what happened and someone who likes to consider all the possibilities and implications.

**Big 5 Personality Test**

My third test was the Big 5 Personality test that indicated that I am primarily good natured, courteous and supportive but I can also be shy and tend to worry about things.

**Discussion**I believe that these test results put me in a really good position for working within a team! My strengths will mesh really well within a team as I'm always respectful and open to any ideas that my teammates may have! My results show I’m passionate, generous and dedicated which I will use to ensure that I fit in and work well within the team.

Abby Durbridge  
**Myers-Briggs**

As an ENFP-A (Extraverted, Intuitive, Feeling, Perceiving), I bring a warm and inviting energy to any team through my charisma and abundance of people skills. I have the ability to adapt seamlessly to change-making me a superb choice for roles within dynamic, stimulating environments.

**DISC**

The test states my adapted behavioural style is a mixture of the Conscientious and Dominance style while my natural behavioural style is very skewed towards the Influence style. What I find interesting about the DISC test is that it is that you can set your focus thus the report was geared towards my working style within a workplace environment, while also providing insight into your natural style and comparing the two.. The test deemed my behavioural style as the Networker often meaning I have great verbal skills, well-networked, and high levels of energy in social settings. In organisations, I have the ability to find the right person for the job through my wide net of connections and ease into group collaborative work effortlessly.

**5 Voices**

As a Pioneer - Connector, I love to dream big and share those ideas with people. I find myself to be multi-talented, very resourceful and love challenges. I do challenge the status quo which can be confronting to some people and may be intimidating. I believe I can be a great addition to an organisation who gives me autonomy and believes in me, my capabilities and my vision.

Mathew Dwyer

**Myers-Briggs**

ISTP (Introversion, Sensing, Thinking, Perceiving)

**Learning Styles Test**

Visual Learner

**Myers-Briggs**

OSPP 4 Temperament Test - Phlegmatic

**Discussion**

Together, these results seem to indicate I am someone who stops to think before making decisions. I am also quite introverted and not particularly social. It also indicates that I am someone who learns more through seeing something be done rather than being instructed.

They help to point that in a group, I am better at being a decision maker because I will carefully consider all options before coming to a conclusion. But it also says that I will not likely speak up very much due to my introverted nature.

This should be taken into account when forming a team by considering what the other members advantages and disadvantages within their personality are and using them to decide what roles within the group suit each member the best.

Erin Paton

**Myers-Briggs**

INFP - My results indicate introversion, an intuitive information-gathering style, emotion-based decision making, and a preference for structure and organisation in my environment. Dubbed “The Advocate”, 16 Personalities describes individuals of this combination as creative problem-solvers with the ability to accurately read people’s true feelings through compassion and keen intuition. Advocates are inspiring communicators who speak and write with a conviction that can be quite persuasive. They prefer to succeed to the benefit of those around them, never to the detriment of others. Some weaknesses of the Advocate profile are a sensitivity to criticism, difficulty opening up and asking for help, and a sometimes-debilitating perfectionism.

**VARK**

AK Type Two - My results show a multimodal inclination towards auditory and kinaesthetic learning styles. Auditory learners digest information that is heard or spoken with a preference for group discussions, lectures, talking things over, as well as some informal writing methods that are formatted colloquially. Kinaesthetic learners value implementation that is connected to reality, favouring demonstrations and simulations. VARK Type Two individuals work best when they’ve gathered information from both of their preferred learning modalities and often take more time exploring subject matter which can appear as procrastination or inefficiency but generally leads to a more in-depth comprehension of the material.

**DISC**

Type S - My results indicate a strong egalitarian inclination and a desire to cultivate a supportive, inclusive environment for teammates to flourish in. Type S individuals are dependable, reliable, strong communicators who utilise compassion and diplomacy in adversity and prefer to diffuse conflict with patience and understanding. They’re natural collaborators and strive for the overall success of the team rather than advancing their individual endeavours. These types can be indecisive and over-accommodating, often to their own and the team’s detriment, which can ultimately have the opposite effect of their intentions if not kept in check. Being extremely empathetic people, they often gloss over problems and avoid calling out the inadequacies of their colleagues in an attempt to keep the peace, leading to setbacks down the line.

Harrison Tang

**Myer-Briggs**

My scores on this test returned an INFJ result. Referred to as ‘The Advocate’, ‘16Personalities.com’ describe this personality type as principled in nature, empathetically sensitive and altruistically driven with a strong sense of egalitarianism. However, this idealism can evoke perfectionist and reserved tendencies in Advocates, exacerbated by a lack of self-care and often leading to burnout.

**Learning Styles Test**

Auditory, Kinaesthetic, Interpersonal **-** Results from this test suggested an aptitude for physical, aural, and social learning. These types of learners typically benefit most from hands-on group activities and discussion through problems. Physical and aural learners absorb information through sensory experiences, such as touch and rhythm, while social learners excel through interaction and feedback.

**Big Five Personality Test**

The Big Five Personality Test measures five major dimensions of personality: Openness, Conscientiousness, Extraversion, Agreeableness and Neuroticism (OCEAN). According to results, I possess an accent towards Openness and Agreeableness while Neuroticism scored lowest. Many aspects of this summation mirror certain characteristics of the Advocate personality type, such as a tendency towards helping others, collaboration, emotional intuition, and an aversion towards following traditional paths.

**Discussion**

The depths of these varying results indicate that people of various personality types share certain characteristics that express themselves in a variety of ways. For example, the concept of ‘leadership’ does not necessarily require an extraverted personality, but rather an observance of a particular leadership style that is comfortable and productive for a team as a whole. These test results suggest I am strongly capable of collaboration and productive in environments aimed towards helping others, benefiting greatly through physical and social experiences. I aim to always be respectful, positive, committed and inclusive, as I typically learn more through active discussion and debate about ideas and solutions.

Ideal Jobs —

Tools —

**Group Website  
ADD IN LINK**

**Group GitHub Repository**  
github.com/blakey83/Intro-to-IT---assignment-2

**Individual Websites**

s3910930.github.io/erinpaton/home.html  
aabbayy.github.io/space-junk/  
harrisontang.github.io/Assignment1MyProfile/  
drinkwatern.github.io/IIT/index.html  
matdwyer94.github.io/COSC2196-Assignment-1/  
blakey83.github.io/

**What We’ve Done**

From the outset of our assignment, we wanted to ensure that we could track and maintain all of our objectives and the output that was produced. We therefore set up a group GitHub to house all artefacts created, such as our report and website. We opted to use Google Docs to work on our report, which enabled us to work collaboratively and monitor contributions in real-time. Using a collaborative platform rather than a Word file removed the need to continually download documents and upload them to GitHub whenever changes were made. To track these changes, we uploaded a Word file version of the Google Doc to GitHub periodically.

We used Microsoft Teams extensively for all of our group communication and meetings. Kanban was chosen as the most effective collaborative framework to track each individual's work and we opted for Trello to effectuate this, which has proven invaluable for our team, particularly due to its integration with MS Teams. Trello is a workflow tool that manages project tasks into a visual board. This enabled us to set appropriate deadlines for each job to be completed with transparency around each team members progress. Our workflow, broken down into columns, transpired as follows; To-Do, In Progress, Staging, Ready for Production, Completed. Each task had a designated card that was assigned an owner. The card would then visibly make its way through the workflow in real-time. Once a card reached completion, its content was committed to the website and the final report.

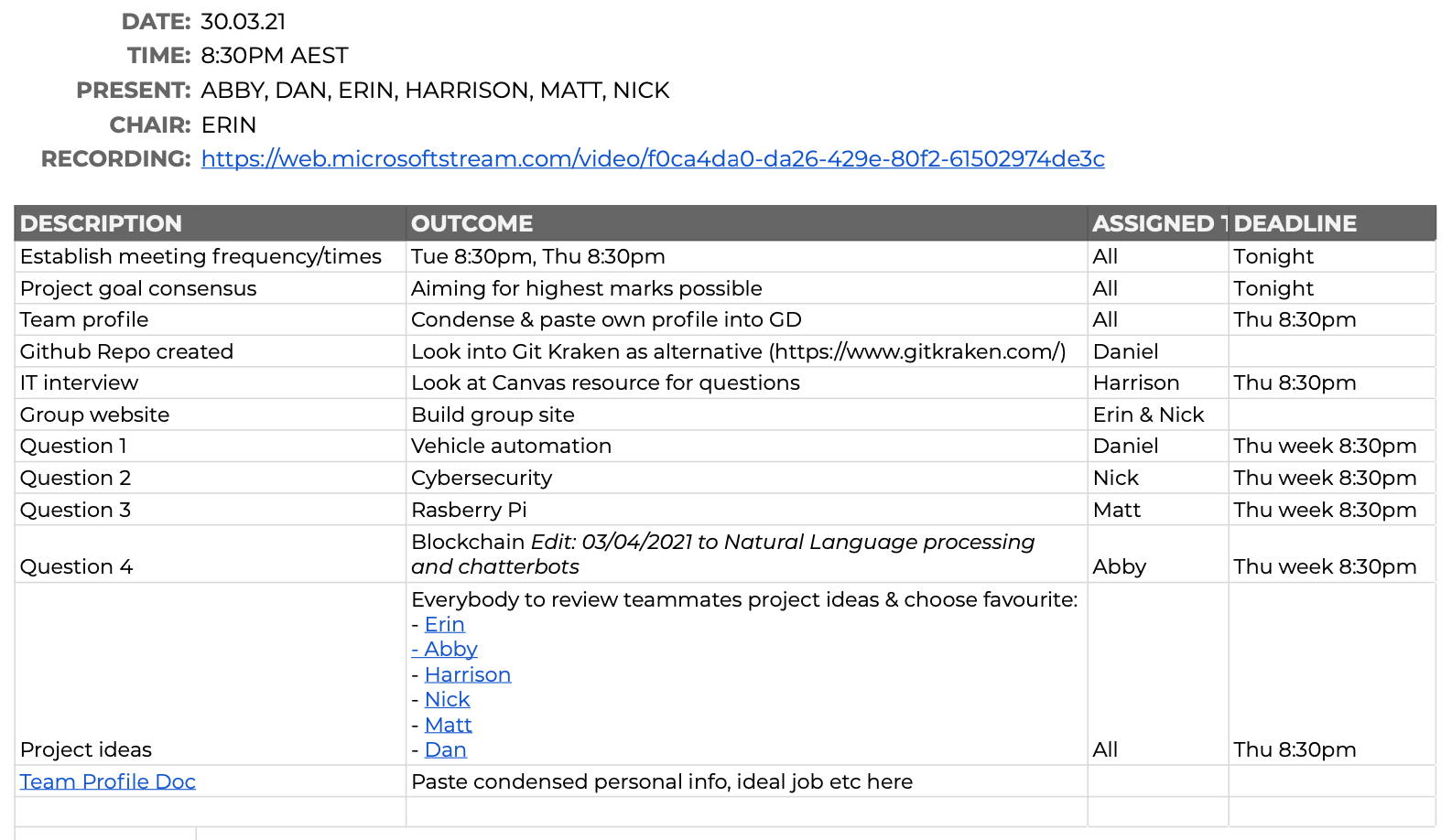
Additionally, UMI utilised Miro, an online collaborative whiteboard, to facilitate brainstorming for our project idea.

**GitHub Audit Trail Discussion**  
Due to the extensive use of Google Docs, Trello and MS Teams, our GitHub practice did tend to fall by the wayside for most of the assignment. GitHub became more of a backup and place for safekeeping of the work. The team relied on the applications mentioned above and technologies where we could see iterative and evolving changes. With that being said, reviewing the insights of our GitHub usage shows that we only had 2 authors on the GitHub page, who have pushed 16 commits to main and 16 commits to all branches. 12 files have changed throughout our assignment, and there have been 738 additions and 127 deletions, with the main bulk of these additions and deletions related to the HTML, CSS and JavaScript used in our group website.

As we have continually updated changes that we have made in the Google Doc in addition to the website code to GitHub, we do approach an accurate portrayal and journey of the work completed by the team. However, due to only have two authors, there is room for the team to improve in the usage of GitHub.

**MS Teams Information**

**Meeting 1**web.microsoftstream.com/video/f0ca4da0-da26-429e-80f2-61502974de3c



**Meeting 2**

web.microsoftstream.com/video/554c43c4-45ff-4be9-9b44-a3621522a506

Graphical user interface, text, application, email

Description automatically generated

**Meeting 3**

web.microsoftstream.com/video/b92cabfb-3721-4bb4-8145-86f8f5f0286b

Graphical user interface, text, application

Description automatically generated

**Meeting 4**

**Meeting 5**

Industry Data —  
**Our Ideal Jobs**

Our six job titles cover a wide range of different occupations within the IT field, encompassing different sets of skills and experience. Our six job titles are:

* Strategic Technology Lead
* Software Engineer
* Chief Technology Officer
* Automation Software Engineer
* Project Manager
* App Developer

Using the data provided of the top occupations, software engineers and developers are the most highly in demand, with this demand more than double the following position. This data illustrates that three out of six of our ideal jobs, which represents half, are within the highest in-demand occupations, which presents an excellent opportunity for half of our team to find roles within this field due to the demand in this sector.

With three of our ideal jobs remaining, the next highest in-demand is the IT Manager role which covers two of the remaining ideal jobs (Project Manager and Chief Technology Officer). Rankings 10th, these roles still represent substantial opportunities being in the top 50% of in-demand roles.

Our last ideal job ranks 16th as Technology Consultant, which encapsulates Strategic Technology Lead.

**Skills Required**

With half of our team's ideal jobs being software engineers/developers and the other half of our team being positions of leadership and seniority, our required skill set ranks highly in demand for our IT-specific skills and general skills. Below, we’ve identified a set of skills required for all six of our ideal jobs divided accordingly:

General Skills

* Communication - The highest in demand and the foremost reoccurring requirement across all six positions.
* Problem-solving - The second highest in demand skill, required across all positions.
* Organisational skills - The third highest in demand, required in particular for the project manager and leadership roles.
* Teamwork/Collaboration - The fifth highest in demand and very closely tied to communication skills, every job that we’ve selected requires the ability to work in a team and collaborate effectively.
* Troubleshooting - The sixth highest in demand, crucial for people in engineering/development roles.
* Planning - The seventh highest in demand. Tied to organisational skills, this ability is essential in project lead and leadership roles.

IT Specific Skills

* JavaScript - The second highest IT-specific skill and programming language, only one ideal job specifically mentions this language.
* Java - The third highest in demand and the only programming language encompassed in all three of our ideal jobs related to software engineering.
* Project Management - The fifth highest in demand and the one IT-specific skill applicable to all positions with aspects of project management applied in most IT jobs.
* Business Management - The seventh highest in demand, this IT-specific skill is important for our ideal jobs that are related to positions of leadership and management.
* Technical Support - The eleventh highest in demand, this is the broadest of the IT-specific skills that relate to our ideal jobs.
* Software Engineering - The fifteenth highest in demand, at least half of our ideal jobs contain aspects of software engineering as a core requirement.

**Skills Ranking**

UMI's IT-specific and general skills rank highly in demand as a whole across all six of our ideal jobs. As three of these positions are focused on software engineering and development, the IT-specific skills related to these jobs were highly ranked, such as JavaScript, Java and Technical Support. The three remaining jobs were leadership and management positions and therefore required project management and business management skills; these too ranked highly in terms of industry demand.

**General Skills Not in Required Skill Set**

As our team has an eclectic set of ideal jobs, many of the highest in-demand skills of a general nature are covered at least once. With some of the remaining required skills being quite broad and ambiguous, it can be hard to discern whether a general skill is within our required skill set. For example, leadership skills would likely encapsulate organisational skills.

The three highest-ranked general skills that the burning glass data does not explicitly mention are organisational skills, writing, and detail-oriented skills.

**IT-Specific Skills Not in Required Skill Set**

Contrary to general skills, which can be broad and ambiguous, the IT-specific skills are much more specific and technical, meaning it’s easier to identify the three highest-ranked IT skills that are not a requirement for UMI's ideal jobs. These skills are SQL, which ranks as the highest in-demand skill; Microsoft Windows, which can be considered an essential skill in this day and age but not required for our listed jobs; and SAP, which ranks as the sixth most in-demand skill not needed in any of our ideal jobs.

**Opinion**

After reviewing the Burning Glass data, it’s been both surprising and welcoming seeing all six of our ideal jobs ranking highly in demand in multiple different skills, both in the IT-specific category as well as the general skills category. This data has served to fortify our original decisions and inspire confidence to continue to strive towards attaining these positions in the future.

IT Work —

IT Technologies —

Autonomous Vehicles  
 Daniel Blake

**What It Does**

Self-evidently, autonomous vehicles (AVs) are automobiles and machines that are able to operate without human control. Although we are yet to see these on the roads of our cities, AVs are a reality in the resources industry, with Rio Tinto alone operating over 130 autonomous trucks in Western Australia’s Pilbara region (Frangoul 2020). Presently, simple haulage of mining dirt can be carried out by level 5 AVs (Truecar Adviser 2018), which are designed to operate synchronously alongside other manned vehicles such as mobile mining equipment and light vehicles, however, only in the highly controlled mining environment at present. (need more info here - only in the mining space for what reason?) All vehicles that enter the operations zone are able to be located by the AVs while undertaking autonomous operations with each vehicle in the area fitted with specialised communications and GPS equipment (Departments of mines and petroleum 2015).

While the current technology is impressive, it is still relatively rudimentary in terms of artificial intelligence (AI). The action an AV takes from a digger or loader to a dump area or crusher is determined and mapped by a manned vehicle, with the AV simply following the designated path. In the future, AI combined with automation in the mining environment will afford the ability for command-and-control systems to determine the safest and most efficient path without the need for a manned forerunner. Early iterations of this technology are already being piloted in Australia with Roy Hill Holdings implementing Automation Solutions Inc's 'Mobius Command & Control' on their Pilbara sites, representing a significant leap in the development of vehicle automation, not only in a mining context but for the future of AVs as a whole (ASI n.d.) (Canadian Mining Journal Staff 2020).

It's no surprise that the mining industry has led the technological charge on vehicle automation use cases, made accessible by astronomical capital expenditure budgets, particularly in the Iron Ore subsector (Peters 2019). With companies like ASI Robotics driving the development of AI & AV technology forward (ASI n.d.) and industry of this magnitude spearheading the application of these technologies, it's not implausible to surmise that we'll have the resources sector to thank for the driverless cars that inevitably find their way onto public roads (Peters 2019).

The technology underpinning AVs in the resources sector today is a convergence of Information technology and electronic/electrical engineering. For a truck to operate autonomously, multitudes of computations need to take place at rapid speeds, all occurring from within a control unit using a processor, memory, I/O cards, and more. The Vehicle control unit also acts as an intermediary with a series of microcontrollers ensuring drive by wire operations and a wireless network router, usually either Wi-Fi or 4G LTE (ASI robots n.d).

Advancements within telecommunications have played a key role in the ability to operate an AV. Fundamentally, AHS trucks need to determine 3 core particulars in order to perform safely.

1. The AV’s current location

2. The path to the AV’s required endpoint

3. The whereabouts of surrounding vehicles & equipment

Wi-Fi or Long-Term Evolution (LTE) coverage is essential in order for a control and communication network to function (Ayres 2017). Developments in Wireless data transfer in the 1990s allowed for the first Wi-Fi standard, 802.11 protocol, to come into existence in 1997 (cablefree 2017). The release of the 802.11g protocol in 2003 allowed the average throughput of 22Mb/s at the 2.4 GHz band, enabling the adoption of Automated Haulage inside a mine site. Recent trends in favour of LTE technology have facilitated greater data throughput, enabled valuable additions such as camera feed, as well as making the algorithms used for handover between cells more productive (Bonilla & Navarez 2018).

**The Likely Impact**

The impact of AVs on mine sites is significant, the foremost being increased productivity, safety, and decreased human resource expenditure. In any environment, people by nature are vulnerable to human error and risk, and this is especially so on the mining site. A large mining organisation may use as many as 70 trucks during any given shift, requiring 70 individual drivers, each with their own set of possible vulnerabilities and risk factors from health concerns, to emotional distractions, to their level of experience or expertise. Consider then the ceaseless nature of mining operations with 2 x 12-hour shifts being carried out daily, meaning a mine could need as many as 280 drivers in its employ. With this in mind, it’s no surprise that large mining companies are investing heavily in the adoption of state-of-the-art technologies.

Rio Tinto, Australia’s largest mining corporation and iron ore manufacturer, spent over $2 billion on automation projects prior to 2017. Between 2014 and 2017, the Company saw an enormous 37% increase in per-person productivity on their sites (Francis 2018). Further to increased productivity, additional benefits such as improved fuel efficiency and decreased wear on engines have been observed whilst implementing AVs in lieu of manned vehicles on mining sites (Miller 2019).

Arguably the most important impact is that of the safety of mining personnel. In 2018, a 28-year-old Haul truck driver at Rio Tinto’s Chennar mine tragically lost his life when his truck veered off a road during a night shift (Newell 2018). Sadly, incidents in which personnel are injured or killed driving haul trucks on mining sites are not uncommon. By eliminating the driver, mining companies significantly reduce the risk of these occurrences.

On the reverse side, the adoption of automation across the mining industry will naturally come at the expense of existing skilled workers. By 2030, up to an estimated 77,000 frontline jobs are expected to be lost to automation the mining industry, however, an initial offset of 44,000 new roles will be created to support the technological shift, in addition to around 63,000 new jobs in the supply chain to operate advanced equipment, administer software, and manage other capital goods to support mining automation (Nera & Mets Ingited 2018).

**How It Affects Me**

Being an Automation Project Specialist in the mining industry, this technology has affected me significantly. At present, my position requires me to play an integral role in upgrading Roy Hill mine's manned fleet of 77 trucks to a fully autonomous fleet, meaning I'm experiencing and delivering AV technology first hand. Without a push into the automated space, I'd likely have difficulty finding work in the industry as I have no driving or civil engineering experience. The enormity of Australia's mining industry means we're pioneering the real-world application of automation, creating more opportunities for me to work with state-of-the-art AV and AI technologies.

For my friends and family, the advent of Automation has been a mixed blessing. My brother lost his job in the mines during the recent downturn and returned to work in Perth. As an experienced Haul Truck operator, he would have easily found work when the industry picked up, however, due to AHS it took him substantially longer to find work than expected. Beyond this example, most other people I know have been positively impacted by automation in the mining industry. Having been a Navy employee for a number of years, I'm aware of a number of technicians that have been able to transition back into civilian jobs concurrent with emergent AV adoption. Automation provides opportunities to people traditionally skilled outside of the mining industry in the community. Mature-aged drivers are afforded opportunities as pit controllers in the city enabling them to return home each night instead of spending a large portion of their time away from family and friends. I strongly believe that automation will continue to have a primarily positive impact in the community within the mining industry and beyond.

Cryptocurrency and Blockchain  
 Nicholas Drinkwater

**What It Does**

Blockchain and cryptocurrency are some of the newest and most exciting developments that we’ve seen in the IT world. These technologies have the capacity to (and have already begun to) transform how data is stored, how currency is traded and how transactions are made online. The earliest and still most prominent cryptocurrency is Bitcoin, which has taken off in the last couple of years as the first true digital-only currency. Most cryptocurrencies, including Bitcoin are completely decentralised meaning that they’re not backed or secured by any financial institution or government. Due to cryptocurrency's storage being distributed and not being secured against any single physical item, it has experienced a juxtaposition of being seen both as a fad and also as the future of money (Hatzis 2019). As a result of this dual view of cryptocurrency, Bitcoin and cryptocurrency as a whole have suffered ongoing volatility and continues to ride waves, surging in both popularity and value for it then to suddenly come crashing down; often referred to as the ‘bubble bursting’. Bitcoin in particular has the tendency to rise sharply to new heights months later, seemingly for no clear reason beyond speculation with ‘Bitcoin’s value almost entirely defined by perceptions’ (Partington 2021, para. 11).

Whilst many critics lament this volatility and lack of inherent value (Boukhalfa 2019), many proponents continue to herald cryptocurrency as the future of money, pointing to cryptocurrency’s ability to allow funds to be transferred between two parties or purchases  to be made without having to go through a third party, such as a bank. This helps diminish fees, provides users with autonomy, discretion with payments and much faster processing times when making transfers (Reiff 2019).

To enable cryptocurrency to become the first digital only currency, it has been built on and made possible thanks to blockchain. Fundamentally, the blockchain facilitates data storage using a series of 'blocks' that are linked together in a series. In the case of Bitcoin, each block contains the time, date, quantity, origin, and destination of the Bitcoin/s being transferred.

Once data is recorded in a blockchain, it's extremely difficult to change it thanks to the use of cryptographic hashes, which can be compared to a fingerprint in that a hash is always unique and is used to identify the respective block.  Each block in a series contains its own hash as well as the hash of the previous block. This means that if any changes occur, the hash will also change, creating a knock-on effect that renders the following blocks invalid as the hash no longer matches.

The security of blockchain is further increased by the peer-to-peer sharing, with copies of the blockchain ledger being sent to each user within the distributed network. If a block is tampered with, it will not pass the verification process which requires all block information within the network to reflect the original ledger. Any blocks that don't match are not authenticated and deemed invalid, making it virtually impossible for a block to be tampered with successfully.

Owing to the inherent security mentioned above, the possible use cases and possibilities of blockchain reach far beyond cryptocurrency with many industries finding invaluable applications for the technology Zile & Strazdiņa 2018. One example is IBM’s Food Trust blockchain, developed to help trace and provide transparency of food products at every step of their journey from origin to destination. By utilising blockchain’s distributed ledger to store important information across the value chain, IBM has decreased the risk of information being tampered with, as well as enabled key stakeholders to accurately trace issues such as contamination back to the source and adequately mitigate the impact of such an event (IBM n.d).

Due to these technologies still relatively in their infancy, these technologies are more exciting than ever, with much speculation as to how they will continue to evolve and converge with existing business practices.  With the rapid growth of blockchain and cryptocurrency comes far reaching implications, examined in greater detail below.

**The Likely Impact**

With an ever-increasing number of use cases and applications, it's difficult to imagine a future in which most individuals and businesses won't be impacted by these two technologies. Beyond the very real possibility that cryptocurrency will entirely replace fiat money, which refers to government- issued currency, blockchain's fundamental data storage protocols make it an intrinsically secure means to manage sensitive data from medical records to functioning as a unique digital identifier for people online. The possibilities are endless, with employment growth seen in these fields rising by 300 percent between 2018 and 2019 for blockchain related jobs (Zhao 2018).

Concurrent with the rising popularity of blockchain and cryptocurrency, so too the significant downsides that arise from their use, especially the environmental ramifications that are associated with powering these technologies.

The computational power and resources required to 'mine' new cryptocurrencies are astronomical, and the associated carbon footprint can only increase alongside soaring cryptocurrency prices until such a time where renewable energy sources are mandated in the mining of Bitcoin and other cryptocurrencies. 'Mining' refers to the process of generating each individual currency, an exercise that requires exceptionally complex mathematical equations to be solved, possible only with the help of powerful computers that utilise top-of-the-line graphics cards. As the number of Bitcoin is finite, these equations become increasingly difficult to solve, demanding evermore resources and thus higher consumption of energy. Recently, the amount of energy consumed by users mining Bitcoin has exceeded the amount of energy used by entire nations, such as Argentina, Serbia, and Ireland (Aratani 2021). Whilst the energy to mine bitcoin can come from renewable sources, regulations and mandates are a long way from being implemented(de Vries 2020), a fact that has led to mining operations moving to countries where energy is cheaper, with four out of the five largest Bitcoin mining farms being found in China (Williams 2018).

This energy consumption is expected to contribute to grave environmental projections in a time when many scientists fear a climate change tipping point is soon to be breached, if not already surpassed. (Climate Council 2018).

Whilst the benefits of these technologies are numerous, the negatives continue to weigh heavily. With no solution yet devised for excessive energy use and no regulation on the horizon for the use of renewable energy, these technologies will continue to churn through resources at an unsustainable rate, which has the potential to contribute to and affect everyone through climate change.

**What It Does**

Due to the ubiquity of these technologies, I stand to personally be affected by these in much the same way that others will be impacted. On the positive side, cryptocurrency has the potential to be the premier way that I use money and make transactions in the future. Whilst I don’t currently use any form of cryptocurrency, the appeal of a decentralised digital-only currency does continue to grow. As more and more entities adopt cryptocurrency, it does seem to be an inevitability that I’ll be using cryptocurrency in the near future. It also seems to be a very real possibility that my entire identity could one day exist within the blockchain, an all-in-one solution to uniquely and securely identify myself digitally. Indirectly, blockchain will impact me through applications outside of cryptocurrency, as demonstrated by IBM's Food Trust. Although I most likely won’t ever see this blockchain working or fully feel its effects, I could easily still benefit from food items that I’ve purchased having passed through the Food Trust.

Additionally, these technologies present very real opportunities for me to enter the IT field and find a career, with job growth in this sector growing exponentially in the last couple of years. Due to the high demand of engineers, careers in this field also tend to be very lucrative and whilst money is not the be-all and end-all, it is definitely something to consider when finding a career path after university.

Most prominently, I, as well as my family and friends stand to be impacted by the environmental ramifications of crypto mining and its contributions towards climate change. With humanity on the precipice of passing the point of no return, the threat of climate change is arguably the most serious issue we'll face in our lifetimes, with studies finding that ‘Generation Z fear climate change more than anything else’ (Barbiroglio 2019, para 1).

Whilst blockchain and cryptocurrency are not wholly responsible for climate change, their rising popularity demonstrates humanity’s disregard for the wealth of evidence concerning the threat of climate change in favour of exciting and lucrative technology, with the environmental impacts seemingly an afterthought. This issue paints a troubling picture for the future of these technologies and their inevitable growth. For blockchain and cryptocurrency to continue to grow and become a part of our lives, it will require more and more resources to sustain itself, which will only make the situation worse if a solution cannot be found (Rogers 2017).

While there are both positives and negatives associated with cryptocurrency and blockchain, both of these technologies have an aura of the future attached to them. As with any emergent technology, there will be numerous challenges to overcome, but the potential for these technologies to usher in a new way of life is unquestionable and it is going to be exciting to witness the impacts that these will have to our lives.

Natural Language Processing  
 Abby Durbridge

**What It Does**

The depths

**The Likely Impact**

The depths

**How It Affects Me**

The depths

Raspberry Pi’s   
 Mathew Dwyer

**What It Does**

These technologies boil down to three main categories that build upon each other: Microprocessors, Microcontrollers, and Microcomputers.

Microprocessors are defined as “any type of miniature electronic device that contains the arithmetic, logic, and control circuitry necessary to perform the functions of a digital computer’s central processing unit. In effect, this kind of integrated circuit can interpret and execute program instructions as well as handle arithmetic operations.” and are present in almost all modern technology in some form (Encyclopedia Britannica. 2021). Quite often, they are known as Central Processing Units or CPUs.

Microcontrollers are the middle ground between a microcontroller and a microcomputer. A microcontroller usually contains a microprocessor. However, while by itself a microprocessor won’t do anything besides just process data, a microcontroller then adds the ability to control data and peripherals (Jaycon Systems, 2021). Products like Arduinos are examples of beginner and user-friendly microcontrollers. Notably, the actual microcontroller on an Arduino is not the board itself, but the large chip or IC mounted on it. Overall, the board makes accessing the In/Out (I/O) portions, memory, storage, and other microcontroller functions much more straightforward (Teja, 2021).

Just as microcontrollers contain microprocessors, microcomputers contain microcontrollers. Simply put, a microcomputer is very much like a regular computer but with a much smaller footprint, usually existing entirely on a small circuit board. They take advantage of the extremely small size of microcontrollers to be able to accomplish this.

Overall these technologies are still relatively recent and developing. They are already quite pervasive in almost every industry. Hardware like Raspberry Pi’s and Arduinos are more suited and more widely used within smaller scale, hobbyist applications. However, they are beginning to be used more and more within more significant industries due to their small size, low price, and ease of access.

Some of the most prominent applications of these items are 3D printers, robotics, and general IoT (Internet of Things) applications. They are also extremely helpful in introducing people to the world of programming and electronics, who ordinarily would not have exposure to such items. In some cases, Raspberry Pi’s are replacing full-sized laptops or desktops, favoured for cost-effectiveness, their small physical footprint, low energy requirements and ability to complete most basic computing functions.

Most of this technology relies on the capability of electronics to become smaller and more cost and energy efficient. More and more advancements come as the capability of microelectronics improves.

**The Likely Impact**

The most significant impacts of this technology come from large scale automation and accessibility of electronics for learning. Due to the low cost of these items, they are being used much more by educators to teach basic coding and electronics skills to people at a younger age. This application is extremely valuable as these skills become more sought after in today's job climate, especially as more jobs become automated.

The automation of jobs will have both a negative and positive impact on employment. While it will eliminate certain positions and significantly reduce and even eliminate the need for specific skills, it will create an enormous need for people who can build, repair, operate and maintain these machines. This impact will primarily affect people with simple repetitive jobs, as those will be the easiest to automate (Rs-online.com. 2021). So far, the technology does still have its limits.

Another prominent effect will be on the manufacturing sector. The ability to rapidly prototype and experiment makes designing a new product much simpler and quicker (IoT Industrial Devices. 2021). 3D printers, which almost totally rely on an Arduino-based motherboard, have made it extremely easy to test products for physical design flaws without wasting time and expensive materials on creating full-scale prototypes.

**How It Affects Me**  
These applications have influenced my education and career trajectory, and I have invested time into learning and understanding 3D printing technologies and Arduinos out of curiosity and improving my career prospects.   
  
While I don't see these technologies impacting my family directly, they currently use items such as Google Hub and Chromecast on an almost daily basis. This observation leads me to believe that the general consumer is well on the way to using smart home automations routinely in the near future. Being an electrician, my father may be affected by these technologies in that requirements could increase to such a point that personnel in this field will need to know how these items work in order to install them into smart homes.  
  
My friends will likely be affected quite a lot more due to them being in a wide variety of industries. In fact, the current global pandemic may expedite these impacts. I have friends who work in healthcare who have observed these technologies adopted to mitigate the lack of medical equipment designed to handle this situation. Some examples of these applications are cheap and easily made automatic ventilators, 3D printers to create face masks, and other exceedingly helpful equipment.

Project —  
Reflection —

Daniel Blake  
As this is my first attempt at studying for many years, I was dreading the group work part of the assessment. Being an online and a predominately mature-aged University (OUA), I suspected that most course participants would have enrolled on a whim, only to drop out after the first assignment upon realising the demand of the work. I must say, I was very pleasantly surprised. Not only did all six team members participate, but all members also demonstrated aptitude and dedication throughout. I think the team has come together so well; everyone has contributed beautifully in developing ideas and contribution of work.

I think the best aspect is being part of a team that has produced a body of work that I, along with everyone else, can be proud. I think the most significant improvement that we could make would be to have sharper deadlines. This project was very fragmented, and the work completed in any order. Moving forward, I believe more cross-pollination of roles and tasks is pertinent to achieve the best outcome. This approach would mean that leaving work until the last minute is not feasible if other team members and tasks rely on the material.

The most surprising part is how well we worked together. Everyone added value to the project from ideation to completion without discouraging others or anyone feeling that they couldn’t contribute. Ideas were welcomed, and everyone was treated with respect.

I've learned that I need to chill out! I have spent over 12 years of my working life in the military, where all teamwork was highly regimented. This team worked well because everyone could contribute as themselves, where they feel the most comfortable, and that was a real strength of this group.

Nicholas Drinkwater  
Coming into this assignment, I was a little apprehensive of group work due to the horror stories you hear of work falling solely on one or two people in the group. This team, however, has surpassed my expectations, and I am grateful that I’ve had the opportunity to work with them! Primarily, what went well for me was the initiative and ownership that my teammates took when deciding what work was to be done and then completing said work. Knowing that I could rely on any of my teammates wholeheartedly to complete their assigned work or be there to help when needed was a great assurance of working in a team.

Going forward, I believe that the best thing that we could improve on is setting deadlines throughout the assignment so that we have key markers of the work that we have already completed and clear progression, instead of having just bits and pieces of the assignment completed in no clear order or timeframe, bar the assignment deadline.

What surprised me most about working in a team and this assignment was the ebb and flow of the work that we needed to complete. As the work was filtered throughout the team, it felt at times that we had a mountain of work in front of us. Other times, it seemed we had ample time and hardly any tasks to work through, only to be blindsided by the mountain returning.

Through working in this group, I have learned that it’s okay to ask for help when needed and take a step back; to not burden myself with all the work that needs to be done and instead rely on and trust my teammates to collaboratively complete the required work.

Abby Durbridge  
Coming into

Mathew Dwyer  
Coming into

Erin Paton  
Being very familiar with team-based environments, I was impressed by how quickly the team adopted the organisational tools and software we decided to use and settled into the workflows. At no point did an individual team member need prompting to complete their assigned tasks–every member self-started and completed jobs efficiently.

I feel that UMI’s strengths are strong communication and organisation skills and a consistently positive work ethic. Each member’s disposition towards the tasks was motivated and proactive, and most of the team were willing to help others manage their load alongside fluctuating schedules.

Each meeting felt well-organised and productive, with pre-written agendas and minutes recorded during each session.

Areas for improvement are to take steps to mitigate the double handling of tasks moving forward. Part of my role within the group was to quality control all written content, website design, functionality, and UX. Despite ordinarily being averse to double handling of work, I found that it was unavoidable in this context to achieve a desirable outcome. Occasionally, I was required to re-write entire reports to ensure they passed spelling and grammar checks, were free of unintentional plagiarism and met word count and rubric requirements. Additionally, I needed to ensure the content was palatable for readers of all technical abilities. In the future, I intend to provide my colleagues with the tools and resources necessary to meet these prerequisites prior to submission to QC. This will reduce the time spent reworking content and free up the quality controller's time for more technical tasks. In saying this, I should mention that in cases where the writing needed reworking, the technical understanding of the writer was considerably greater than my own comprehension and, therefore, the technical level of the content was not something I would have been anywhere near able to produce.

Something that surprised me was the consistency in participation from all team members. In my experience, aligning multiple schedules for regular meetings can be like herding cats. Still, I found that each team member went above and beyond to attend and contribute to every meeting despite some very hectic schedules and unexpected hindrances.  
  
Understanding that the amalgamation of each individual’s strengths is key to achieving a nuanced and robust outcome, I learned that distilling and applying those strengths isn’t always as simple as one individual ultimately owning any given task. This experience has demonstrated that a more granular approach to collaboration is sometimes required to achieve the highest quality result with two or more members working synchronously on some tasks.

Harrison Tang  
As this is my first group assignment in tertiary education, I was initially anxious to meet and work with my team members. Adding to this anxiety was the nature of studying online and communicating through unfamiliar technologies such as Microsoft Teams. I was relieved to learn that my team members are highly motivated and capable students eager to achieve the highest result attainable. Each of us was able to contribute something unique to the project relating to our past experiences with work and knowledge while supporting each other in areas of individual growth.

My struggle with understanding the applications used for managing this project was alleviated by the excellent guidance and open nature of communications between team members. Now I completely embrace the use of project management tools such as Microsoft Teams and Trello, as they provide an overview of project progression and immediate tasks.

To improve, harder deadlines for each necessary stage of the project would smoothen out the process, allowing a greater overview of assignment progress and ability to assist and collaborate across the different tasks. I was surprised to learn of the vast IT background possessed by my illustrious teammates and the depths of knowledge they were able to draw upon.

Group  
Understanding that

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**Project**