Group #7 - Assessment 2

# Team Profile

### Team Name UMI 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 TBD!!!

#### 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

The test outcomes for each person in the team (all 3 tests), and your understanding of how this information may be helpful to the group. You should do this as soon as your group is formed. You will have a chance to reflect on how well the group has worked later.

#### 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 -** online at<http://www.educationplanner.org>.The results of the test say that I’m a 50% tactile learner.

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

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 team mates 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.

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#### 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 (ENFP-A)**

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 (Cd/I 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 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.

The test deemed my behavioral 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 (Pioneer, Connector)**

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 Test Result - ISTP (Introversion, Sensing, Thinking, Perceiving)

Learning Styles Test Result - Visual Learner

OSPP 4 Temperament Test - Phlegmatic

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)**

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)**

AK Type Two - My results show a multimodal inclination towards auditory and kinesthetic 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. Kinesthetic 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)**

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 Personality Test - INFJ**

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**

**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 indicates 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 Job

Job title + 5 or so core skills required. Compare and contrast the ideal jobs for each person in the group. What common elements are there, if any? What differentiates each position from the others, if anything? How similar or different are your career plans across the group? A concise coverage/analysis/conclusion covering all would be good. Strongly recommend a table presentation of comparison data.

Daniel Blake  
**Strategic Technology Lead, Operations Transformation at Woodside Energy** 1. 10+ Years of Leadership experience  
2. Experience with design and deliver of complex platforms  
3. Knowledge of systems architecture and cloud computing  
4. Ability to communicate.   
5. Analytical and strategic thinking

Nicholas Drinkwater  
**Software Engineer at SpaceX**  
1. 2+ years of software engineering experience.  
2. Experience with Python and other software/scripting languages such as Java.  
3. Interacting with end users and interfacing with cross-functional teams.  
4. Experience in operations and/or support.   
5. Analysing test results and troubleshooting systems.

Abby Durbridge

**Chief Technology Officer at Xplor Technologies**

1. Business and stakeholder management;
2. Well-honed leadership skills;
3. Emotionally Intelligent;
4. Hands-on;
5. Logical and Sharp communication skills.

Mathew Dwyer

**Automation Software Engineer**

1. Programming language skills (several languages like Java, C++, C#, and possibly PHP, SQL, and Javascript)
2. Cybersecurity expertise
3. Electrical Hardware Knowledge would be extremely helpful
4. Creative Problem Solving Skills
5. Agile Development skills

Erin Paton  
[**Project Manager at Minty Art**](https://cryptojobslist.com/jobs/project-manager-web3-marketplace-at-minty-art-remote)

1. Communication
2. Leadership
3. Critical Thinking
4. Crypto knowledge & understanding
5. Project planning & management skills

Harrison Tang

App Developer at Nightlife Music

1. Programming language knowledge (Java, C++)
2. Communication and Documentation Skills
3. Product/Applications Design
4. Industry Knowledge/Experience
5. Research Skills

* Communication in one form or another is the one defining trait across all six of our ideal jobs

Three of our ideal jobs are for positions of leadership or seniority

# Tools

The link to your group’s website

The link to your group’s Git repository (GitHub)  
[github.com/blakey83/Intro-to-IT---assignment-2](https://github.com/blakey83/Intro-to-IT---assignment-2)

Links to each individual website on the group website.

s3910930.github.io/erinpaton/home.html  
[aabbayy.github.io/space-junk/](https://aabbayy.github.io/space-junk/)  
[harrisontang.github.io/Assignment1MyProfile/](https://harrisontang.github.io/Assignment1MyProfile/)  
[drinkwatern.github.io/IIT/index.html](https://drinkwatern.github.io/IIT/index.html)  
[matdwyer94.github.io/COSC2196-Assignment-1/](https://matdwyer94.github.io/COSC2196-Assignment-1/)  
blakey83.github.io/

Include a brief description of what you have done.

From the outset of our assignment, we wanted to ensure that we were able to track and maintain all of our objectives and the output that was produced. We therefore set up a group GitHub to house all artifacts created, such as our report and website. For the report, so that that team could collaboratively work on their own parts of the assignment, such as the Personal Profile and IT Technologies, we decided to use Google Docs which enabled us to see changes made in real time and easily enable us to work on this assignment. This solution was put in place so that instead of having a word file that we would need to download and then upload to GitHub each time, we could easily make changes whenever needed. To track the changes in this Google Doc, we have uploaded a word file of this to GitHub every couple of days.

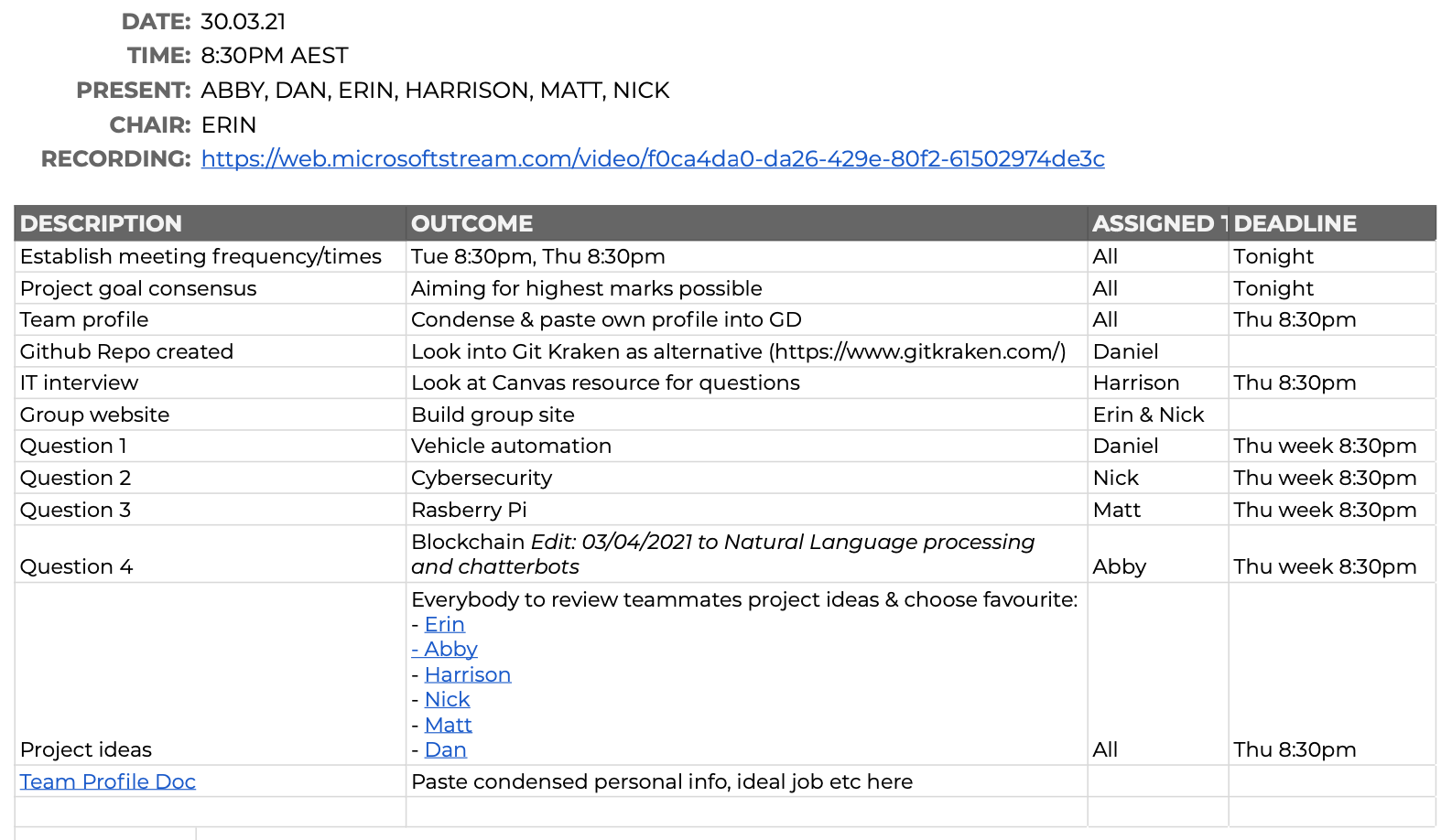
We have also extensively used Microsoft Teams for all of our group communication and meetings and have decided to use Trello to track each individual's work. Trello is a collaboration tool that manages project tasks into a board; in our case, a kanban board. This meant that we were able to set appropriate deadlines for each task to be completed and then as a group know when an individual was happy with the work that they have produced, so that it can be committed to the website. Additionally, UMI utilises Miro, an online collaborative whiteboard, to facilitate brainstorming for our project idea.

Your comments on how well the audit trail on the Git repository reflects your group’s work. You will presumably only be able to do this close to the time of submission.

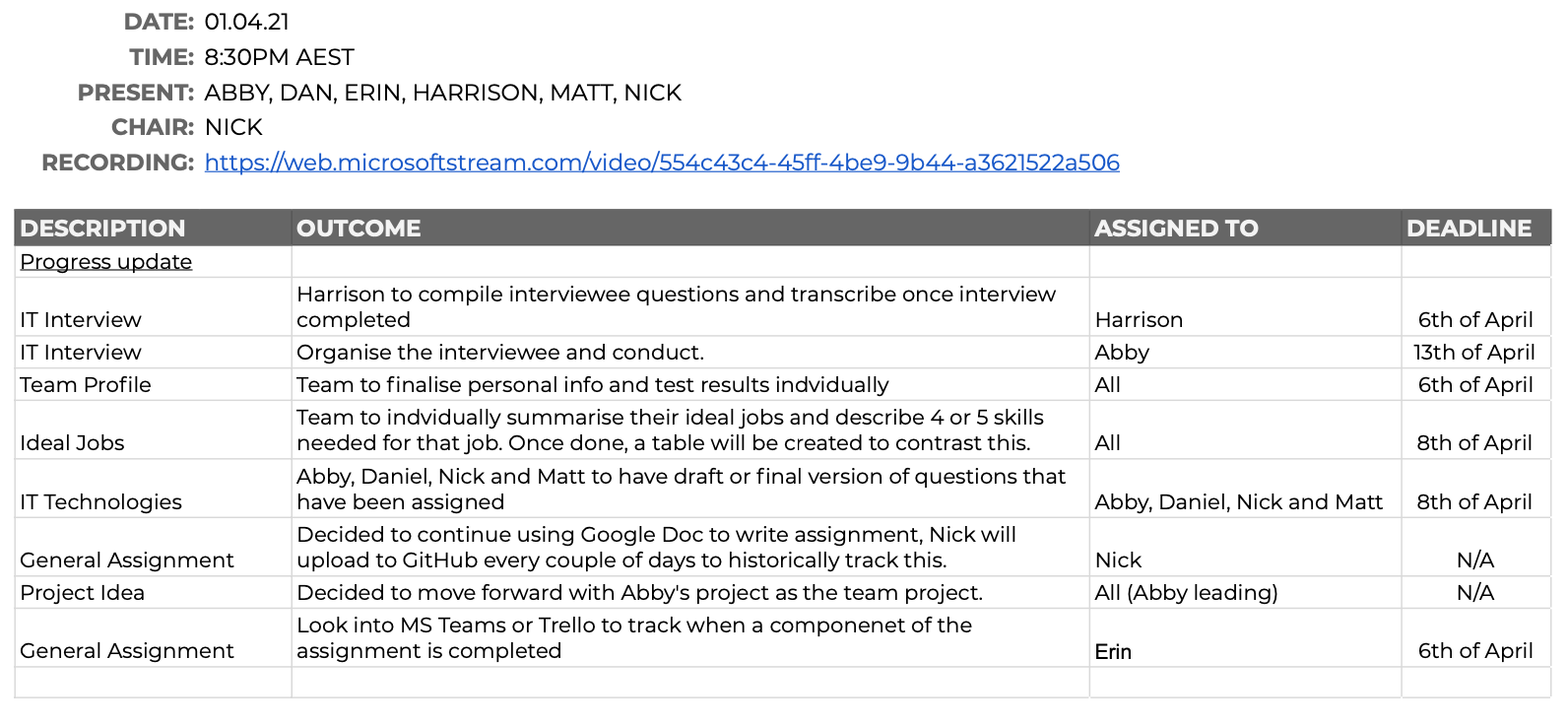
MS Teams information, meetings, notes, and links (etc.) should be included in this section too

**Meeting 1**

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

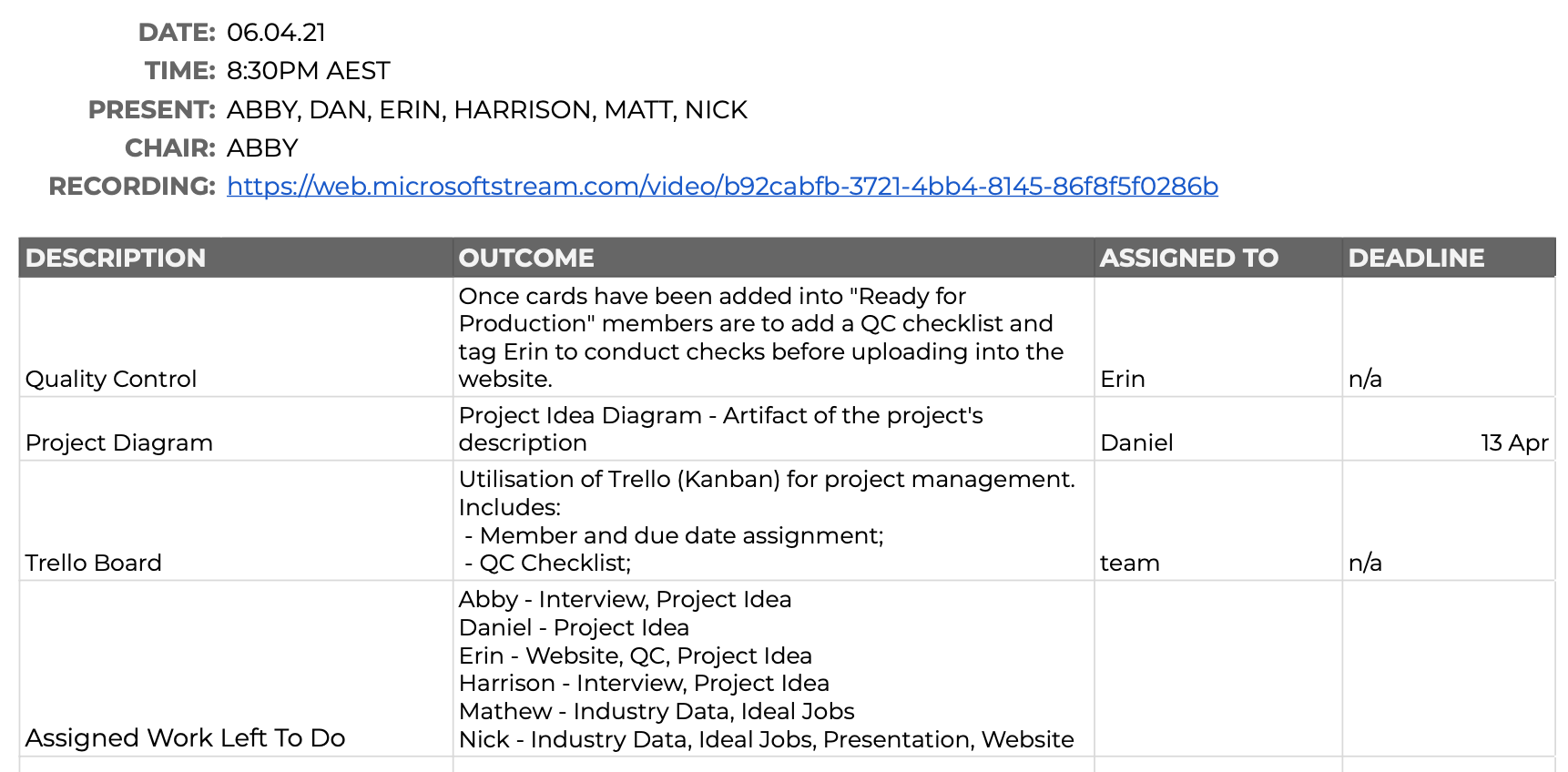


**Meeting 2**

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

**Meeting 3**

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



# Industry Data

In Canvas on the Assignment 2 page, you will find a link to some industry data supplied by Burning Glass. You should use this (as well as any other data you may be able to find) to answer the following questions. If you’re to be looking outside of the IT field, find similar data for your specific Industry.

What are the Job Titles for your group's ideal jobs? How do each of these rank in terms of demand from employers?

Our six job titles cover a wide range of different occupations within the IT field, each requiring a unique set 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 second highest in demand occupation. This means that three out of six of our ideal jobs, which represents half, are within the highest in demand occupations which presents a great opportunity for half of our team to find roles within this field due to the demand of these .

With three of our ideal jobs remaining, the next highest in demand is IT Manager which covers two of the remaining ideal jobs (Project Manager and Chief Technology Officer). This occupation ranks 10th of the list which is quite a shift

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

From your group's ideal jobs, identify a set of skills required for these jobs (we will refer to this as your group's

required skill set). These can be divided into general skills (communication, problem solving, writing etc) and IT-specific skills (Javascript, SQL, etc).

Due to half of our teams ideal jobs being software engineers/app developers, our required skill set rank highly in demand. A recurring skill that all three of these jobs requires is Java, which ranks the 3rd most in demand.

Across all six of our ideal jobs, a consistent requirement is great communication skills and it is evident that this is the most consistent theme across all six of our ideal jobs as it is the the most highly in demand skill by a long shot.

How do the IT-specific skills in your required skill set rank in terms of demand from employers? How do the general skills in your required skill set rank in terms of demand from employers?

What are the three highest ranked IT-specific skills which are not in your required skill set?

What are the three highest ranked general skills which are not in your required skill set?

As our team has an eclectic set of ideal jobs, a lot of the highest in demand general skills are covered at least once. As a few of our required skills for our ideal jobs are quite broad and ambiguous at times, it can be hard to discern whether a general skill is within our required skill set, such as Organisation skills potentially being covered by needing leadership experience. Whilst organisation skills are definitely required to be in a position of leadership to gain said experience, it definitely lends itself to the role and would be considered by most an essential skill for leadership.

Regardless, the three highest ranked general skills which are not explicitly mentioned as required skills in our ideal jobs are:

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

After reviewing the Burning Glass data, the team believes that

# IT Work Include raw transcripts / recordings in appendix to support your written component. You should answer the following questions. - What kind of work is done by the IT professional? - What kinds of people does the IT professional interact with? Are they other IT professionals? Clients? Investors? The general public? - Where does the IT professional spend most of their time? - What aspect of their position is most challenging?

Interviewee name:

Company/Organisation:

Position:

Rubric in red

* Tell us about the company you work for?
* What is your position in the company?
* How long have you been in the industry?
* Tell us about the industry you work in?

(You have clearly described the kind of work done.)

* Tell us about your IT work. What exactly do you do?
  + Who/What are you responsible for?
  + What knowledge is required for your role?
  + What resources/technologies (if any) do you use to carry out your work?
  + How does your work contribute to the greater whole of the company/organisation?
  + What are the biggest challenges? (You have succinctly included the challenging aspects of this work.)
  + Do you perform other roles within your organisation?

(You have described how most time is spent with a high standard of narrative flow)

* Describe a typical day in your role.
  + Overall, rank your major tasks from most difficult to most manageable
  + Why is it most difficult?
  + What takes highest priority?
  + What aspect of your work do you spend the most time on? Why?
  + Are there busier periods than others throughout the year? (You have succinctly included the challenging aspects of this work.)

(You have described and explored all of the interactions with other people.)

* Who do you meet/interact with during your day-to-day duties?
  + Describe interactions with other IT professionals?
  + Describe interactions with clients/investors?
  + How do you interact with co-workers/clients? (technologies/email?)
  + Challenges? (You have succinctly included the challenging aspects of this work.)

(Developing a section substantially beyond the question set.)

* How did you arrive at this role?
  + What prior knowledge did you have before being in this role?
  + Did you study for qualifications/tertiary education?
  + Why did you pursue a role in your industry? (IT/Engineering)
  + What is exciting about your work/industry? (Short/medium/long term)
  + How do you describe work life balance?

**AUTONOMOUS VEHICLES**

**What does it do?**

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).

**What is 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 will it affect you?**

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 firsthand. 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.

**References**

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# **Blockchain and Cryptocurrencies** What does it do? (600 words) What is the state of the art of this new technology? What can be done now? What is likely to be able to do be done soon (say in the next 3 years)? What technological or other developments make this possible?

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.

What is the likely impact? (300 words) What is the potential impact of this development? What is likely to change? Which people will be most affected and how? Will this create, replace or make redundant any current jobs or technologies?

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 upsurging 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.

How will this affect you? (300 words) In your daily life, how will this affect you? What will be different for you? How might this affect members of your family or your friends?  
  
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 inevitabile 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.

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**Natural Language Processing and Chatterbots - Abby [WIP]**

**Natural Language Processing** (NLP) facilitates human-to-machine communication without the user requiring knowledge of programming languages. NLP allows machines to obtain and process information from written or verbal user inputs and convert it into meaningful structured data machines can understand (Barbora Jassova 2020). **Chatbots** are conversational simulations that can understand human language through algorithms and interact back with humans while performing specific tasks (Great Learning Team 2020). Developed in 1966, ELIZA was the ﬁrst chatbot created after Alan Turing’s 1950 game “imitation” sort to determine whether a computer could imitate human behaviour (Ebtesam Almansor & Farookh Khadeer Hussain 2020). Since then, there are many types of chatbots available, a few of them can be majorly classified as follows:

* Text-based chatbot: In a text-based chatbot, a bot answers the user’s questions via a text interface.
* Voice-based chatbot: In a voice/speech-based chatbot, a bot answers the user’s questions via a human voice interface (Great Learning Team 2020).

Human language is unstructured in nature compared to that of the programming languages machine’s use to process data. As such, Chatbots use NLP to convert the human language input into structured language computers can interpret. Through the use of algorithms, the machine can get meaning and context from every sentence to collate useful data. This process is called **natural language understanding** (NLU), and it’s a subset of natural language processing (Aarushi Ramesh 2019).

There are two main approaches used in the design of chatbots. The **rule-based approach**, where a bot answers questions based on rules, varying from very simple to very complex, which it has been trained and programmed. However, where these bots can handle simple queries, will fail to manage complex ones. This is where self-learningbotsfill the demand; they use **machine learning-based approaches** and are more efficient than rule-based bots. Human experience with chatbots can be further enhanced with the development of the chatbot persona and constant reference to the history of dialogue while also storing the chat experience to a knowledge repository (Medium 2019).

Chatbots can be further classified into two types: Retrieval Based or Generative (Great Learning Team 2020).

**Retrieval-based** chatbots operate on the principle of graphs or directed flows. This means the responses are based on existing information as the chatbots are trained usings techniques like keywords matching, machine learning or deep learning to identify the most appropriate response possible. Regardless of the technique, these chatbots provide only predefined responses and do not generate new output (Medium 2019).

Unlike retrieval-based systems, which are limited to predefined responses, **generative chatbots** use a combination of supervised learning, unsupervised learning, reinforcement learning, and adversarial learning for multi-step training to generate new dialogue based on large amounts of conversational training data (Medium 2019).

Amongst creating intelligent chatbots, **natural language processing** has helped improve human user of technology through:

* Automatic summarization (intelligently shortening long pieces of text)
* Automatic suggestions (used to speed up writing of emails, messages, and other texts)
* Translation (translating phrases and ideas instead of word for word)
* Named entity recognition (used to locate and classify named entities in unstructured natural languages into predefined categories such as the organizations; person names; locations; codes; quantities; price; time; percentages)
* Speech recognition (enables computers to recognize and transform spoken language into text – dictation – and, if programmed, act upon that recognition – e.g. in case of assistants like Google Assistant Cortana or Apple’s Siri)

(Barbora Jassova 2020)

Examples of NLP technology integration:

* Email filters;
* Smart Assistants;
* Search Results;
* Predictive Text;
* Language Translation;
* Digital phone calls;
* Data analysis;
* Text analytics.

From 2019 to 2020, chatbots saw a 92% increase in use making it the brand communication channel with the largest growth (Kilens 2020). It has been forecasted that by 2022, 70% of white-collar workers will engage with chatbots daily (Goasduff 2019) and 75-90% of queries are expected to be handled by chatbots (Woodford 2020). With these predictions in mind, further investment into the accessibility of chatbots for the small and medium-sized enterprises (SMEs) through user interface (UI) development such as Dialogue Flow integration removed a barrier for chatbot implementation (Barbora Jassova 2020). Additionally, as there is further growth into the space, we find a need for a standard framework to measure the quality and ethics of the chatbot.

What is the likely impact?

**Raspberry Pi’s - Mathew**

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# Project Idea

There is no set length for this section, but it is difficult to see how a description of less than 1500 words would be adequate.

Expand the Overview, Motivation, Description, Tools + Tech, Skills, Outcome items from Assignment 1.

Adapt it using the feedback received and the developments/suggestions from your group members. Put weight behind innovative components and ensure the project is feasible [no sci-fi / pie-in-the-sky] to make steps beyond a simple proposal/plan. Perhaps look towards identifying niche/markets/needs, and the more detailed mechanics of the project.

[original project idea below]

Language barriers have been a focus of mine since studying Korean and Japanese at Monash University. There are many language learning and translation applications on the market that are making learning a language or getting by in a foreign country earlier for the end-user. However, I see a gap in the ease of learning a language for the unmotivated end-user, those who do not have access to learning resources or those who believe it is just “too hard”. There are many scenarios where better human connections can be made and perspectives gained however are hindered by a language barrier.

My project aim is to alleviate the stress and hassle of language differences between the specific above demographic through the medium of NFC technology to facilitate ease of communication.

NFC technology allows you to encode preferred personal data that can be received by an array of other clientele. Using an app on the sender’s phone, they would encode in their native language what they wanted to say and choose the language they want to communicate in. The app using advanced translation software like Mirai Translate that leverages deep learning technology would be used to translate the input. The medium of NFC technology coming from the user’s device or external hardware can be tapped on the receiver’s mobile device or corresponding NFC hardware. Proceeding this, a link to the output will be available to the receiver to listen to or read the sender’s message.

I envision the obstacles in producing the project would be the following:

* Conveying cultural nuances and context to each speaking party;
* The communication at this stage is mostly one-way;
* Using NFC hardware would have a negative environmental impact if not produce sustainably;
* This may deter user’s from being motivated to learn about other cultures through language due to the lack of need.

To create my project I would need to:

* Develop an App using MIT App Inventor;
* Embed specific translating software into the app;
* Build the corresponding website the receiver would access;
* The hardware option for those who cannot use their mobile device.

Not having the experience in any of the above is challenging however, I can outsource most of the more technologically difficult aspects with funding. The NFC hardware can be sourced from Tappy Tech and use of existing translation software such as Google Translate and Mirai Translate can be used in the preliminary and beta-releases.

As my targeted market audience are those who do not have the access to language learning resources or do not have the motivation for language learning however, have the need to communicate in another language; I believe there is a use case for my project to be created. The barrier created by language differences can be broken through this method and despite the user’s intentions, creates the opportunity for future desire to learn and deepen the brief connection made through dialogue.

My final food for thought as a part of my project pitch is a study I came across regarding the impact of a language barrier in the delivery of high-quality medical care. In this study, patients who spoke a language not as common or the translation resources weren’t available were less satisfied with their health care treatment. (Al Shamsi, Almutairi, Al Mashrafi & Al Kalbani 2021) Additionally, the effect of less satisfied patients correlated to workplace stress for health professionals (Al Shamsi, et. all 2021).

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# Feedback

You **do not** need to include any information about the feedback you receive, the markers will however, check that **each** person in the group has contributed via SparkPLUS, and the marks for this section will only be awarded if **all** group members have contributed in an appropriate manner by the assignment deadline.

# Group Reflection

You should reflect as a group on how well you think you have performed in this assignment. You should include whatever evidence you may have about the groups processes (such as commit trails from GitHub, or project meeting minutes). Each member of the group should contribute up to 200 words about their own perception of the group, and the group as a whole should contribute around 400 words. This should include the following attributes.

• What went well

• What could be improved

• At least one thing that was surprising

• At least one thing that you have learned about groups

• Remember to include in your section on Tools how well you think your Github log of activity reflects your group’s work on

this assignment.

Daniel Blake

Nicholas Drinkwater

Abby Durbridge

Mathew Dwyer

Erin Paton

Harrison Tang

#### 