Personal Information

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Github repository – https://github.com/maxlullfitz/Assignment-1

Github pages url - https://maxlullfitz.github.io/Assignment-1/

My name is Max, I am an Australian with Irish/Swedish heritage. I was born in Canberra but have spent most of my life in Brisbane, where I have met lifelong friends and one special lady. I am the youngest of two brothers, and I have two nephews who are eight and eleven years old. My mum always wanted a daughter, so she has had to settle for a border collie named Stella.

I have always loved playing music, from the age of 9 I started playing percussion, but I decided to focus on playing the drumkit. After many years of playing drums, I found they were too hard to carry around with me, and I learnt guitar with my best friend. I have been playing ever since, and for the last 5 years I have stepped up and started playing in a heavy metal band called Meliorist. We have released two EPs and two albums so far, and plan on recording the third album in November. Our producer lives in Detroit so covid has put a halt on any plans of us travelling to America or him coming to Brisbane for now, but luckily the recording software Cubase now has a video conferencing feature where you can talk whilst recording as in a recording booth, and both share files and alter the project simultaneously.

Interest in Information Technology

My interest in IT is in the future of the modern world. When I think of the future, I think of holographic images, self-driving cars and smart homes. While technology continues to advance at an exponential rate, so does the risks it poses to humanity. It is important to me that it will continue to aid our lives in a positive manner, and not infringe on our freedoms and privacy.

I have been interested in technology from a young age, growing up with a tech savvy family. Some of my most happy memories growing up include unwrapping of the Nintendo64 on Christmas day, or a new Walkman to listen to after school. Quickly this technology became out of date, but the memories will always remain.

Almost all of the adults in my life were in the Information Technology industry, most were my parents' best friends who all worked in the public service. Now a lot of their friends have also had kids my age, and we are starting our careers in IT. A lot of these people had a fascination with technology, and social events were always spent talking about their roles, and the industry, so it is hard to pinpoint any specific person that piqued my interest.

At school I studied Information Technology but chose to start my career with an apprenticeship in Electronics. My first job was at an intercom company in West End, where we manufactured intercom systems for hospitals, gaols, residential apartments and public spaces to name a few. I used to build these intercoms piece by piece, install the bootloader and firmware programming on the PCA boards, commission and set audio levels, and network card, and then assign static IP addresses. We also used to configure servers to run the intercom software. Here is where I began learning about networking, audio engineering, electrical theory and security principles.

A couple of years after my apprenticeship finished, I went to Europe for 3 months and came back looking for a change.

I then started at my current job, as an AV installation technician. I have the opportunity to put all of my past learnings into practice every day, as well as new disciplines. This role has helped me to realise how quickly such disciplines, which were previously so niche, are being rolled into new standard – largely run on ethernet cabling and being set up by in house IT professionals.

I chose to study with RMIT because of a recommendation by my colleague Ashley Wilke, who has just completed this subject. Over the last year or so I have been inspired to complete higher learning but was unaware of the direction that I would take. I investigated several different areas of study, including an advanced diploma of electronics, undergraduate certificate courses in project management and electrical engineering.

I almost began studying the advanced diploma of electronics, but I found that because it isn't a widely offered subject, night classes would not be available. It would cost almost as much as a bachelor’s degree and I would have to constantly miss out on half days or full days of work.

I started towards getting my AVIXA Certified Technology Specialist certification, and then spoke to Ashley who recommend this degree, RMIT and the night classes.

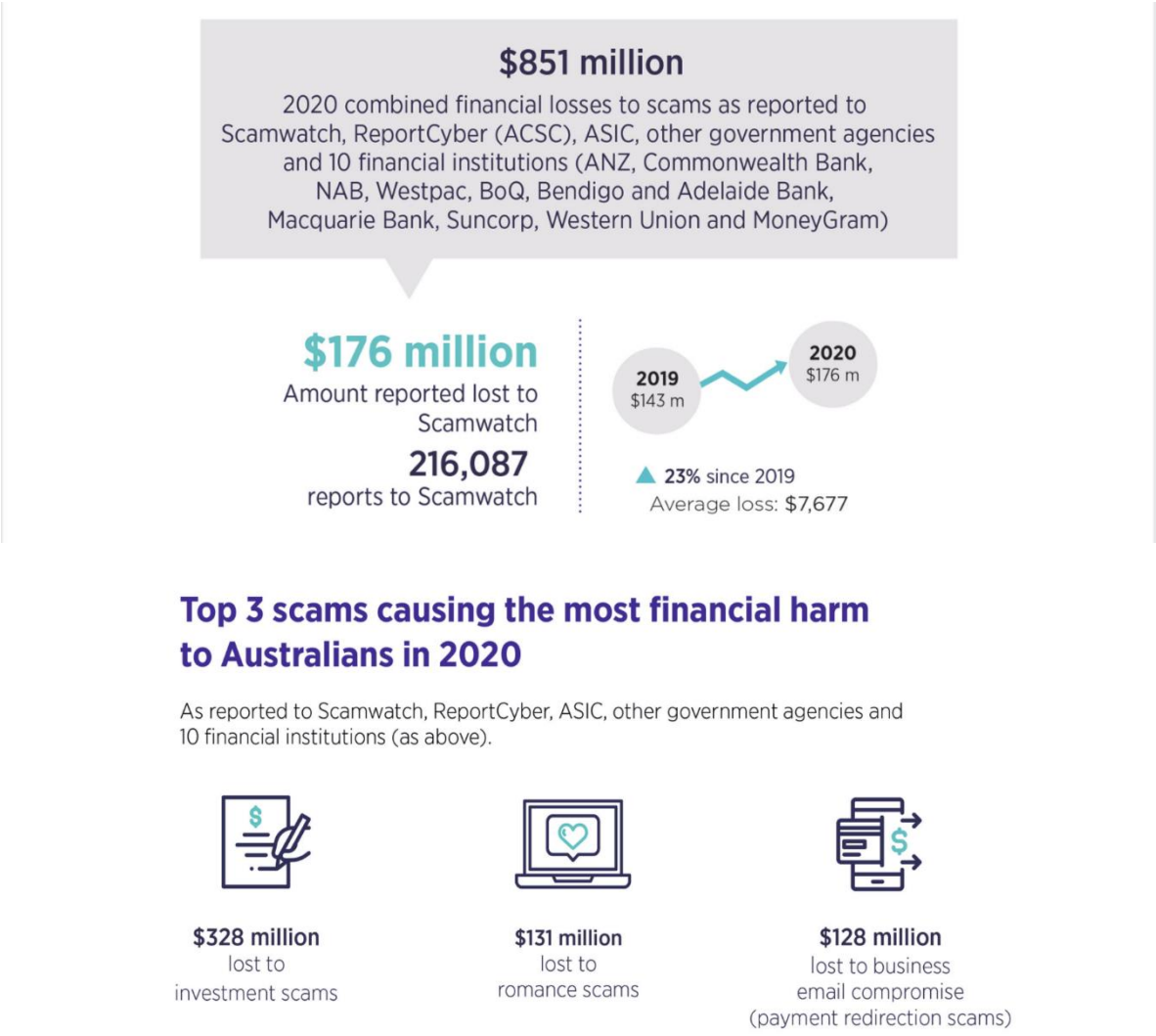
Along my pursuit of higher learning I was constantly stopping at the crossroads, and realising I don't know 100% what I want to study. I hope that this degree will help me further dip my toes in the water of IT and help me make that decision.

Ideal job

My ideal job is to be a cyber security specialist. As stated, whilst discussing my interests in IT, I believe that IT aids my life and those around me in a positive manner. Cyber security is necessary in the modern world to protect against scams, small- and large-scale data breaches, and can even be used to protect against hacks against public networks, potentially resulting in the loss of human life. I would be very content knowing my line of work helps protect people against such attacks.

Here are some examples of cyber-attacks that cyber security specialist help defend people against.

According to the Australian Competition and Consumer Commission, "Australians lost over $851 million to scams in 2020, a record amount, as scammers took advantage of the pandemic to con unsuspecting people, according to the ACCC's latest Targeting Scams report released today." (Australian Competition and Consumer Commission, 2009)



It is the role of cyber security specialists to create awareness, and best practice measures among end users. As stated in this article published by the Edith Cowan University–

"They're responsible for giving out advice on issues such as spam and unwanted malicious emails, as well as providing recommendations on how to avoid future exposure. They may even simulate security attacks to unearth possible threats and vulnerabilities." ("Cyber Security Expert Roles| ECU", year unknown)

Cyber security analysts also play a broader role in terms of creating cyber security awareness and best practice across teams. They're responsible for giving out advice on issues such as spam and unwanted malicious emails, as well as providing recommendations on how to avoid future exposure. They may even simulate security attacks to unearth possible threats and vulnerabilities. It's the job of a cyber security analyst to keep up-to-date with the latest technology. It's also their responsibility to be informed about the new weapons hackers are using to slip in the back door of unsuspecting organisations. Their goal is to prevent sensitive information or confidential data getting into the wrong hands – as in the case of the Under Armour data breach which revealed the details of 150 million accounts on its food and nutrition app, MyFitnessPal.

To be a cyber security specialist, one must have an in-depth knowledge of hardware and software principles, operating systems, and also maintain an up-to-date knowledge on how hackers will attack computer systems. This can sometimes be called 'ethical hacking', where cyber security specialists will hack a company's data or financial information, to help the company strengthen their defences against such future attacks.

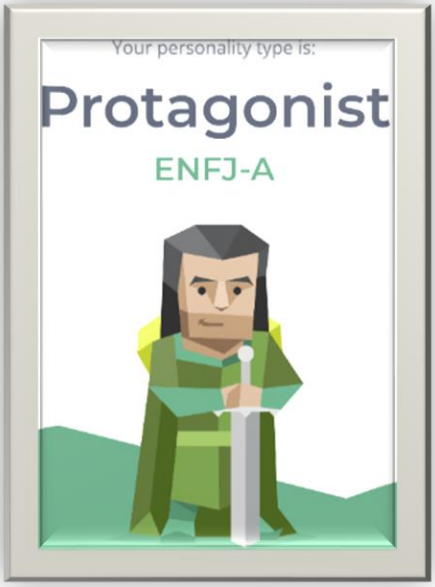
I have a good basis in hardware from my electronics experience, so software and coding experience would be key. I believe that over the next few years with RMIT, I will gain this experience, and certainly learn more about the areas I need to focus on. I would also need to have an in-depth knowledge of security principles and networking principles.

On top of completing my studies with RMIT, where I will study both software and coding, I would like to choose my major in security and cloud computing. Other learning I plan to undertake is the CompTia network + certification, and the CompTia security certification.

Personal profile

I have taken the results from 3 learning tests, to help provide a snapshot of who I am as a person, although one can only read into these results so far.

According to the www.16personalities.com learning test, I am an ENFJ-A type personality, otherwise known as 'The protagonist'. This personality type works well with others and can help in leadership roles.

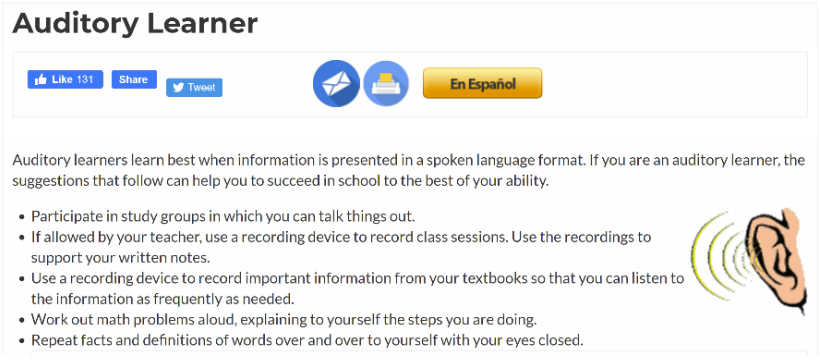


An excerpt from the ENFJ-A results page reads:

"Protagonists are born leaders, which explains why these personalities can be found among many notable politicians, coaches, and teachers. Their passion and charisma allow them to inspire others not just in their careers but in every arena of their lives, including their relationships." (Protagonist Personality, 2011-2021)

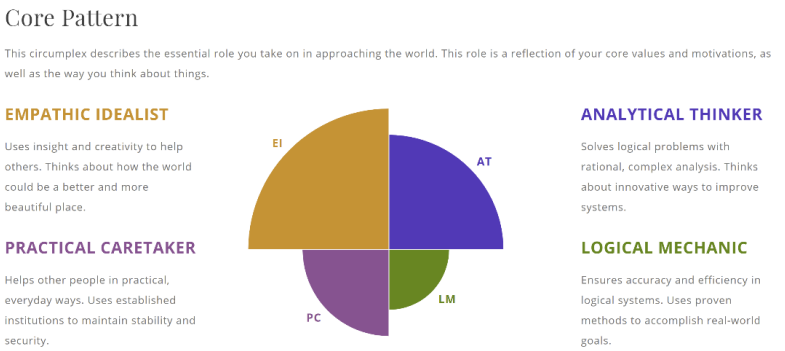
Although I can relate to this summary, I think to feel passionate about a project, I need to be fully invested, whereas I can always be charismatic.

My Determine My Learning Style (how-to-study.com) learning type test results label me as an auditory learner. While I can agree on this somewhat, I believe I am a visual learner. I strongly benefit from drawings and graphs over verbal instructions. I often end up confused with detailed verbal instructions where a diagram will sink in instantly and benefit my understanding on any matter.



The final test I have taken was the big five personality test, from Truity. This test labels me as an empathetic idealist, an analytical thinker a practical caretaker and a logical mechanic.

The Big Five Personality Test | Truity



Whilst I can resonate with some of these results, I think that at certain times of the day I would have answered these questions differently, which could affect the outcome. I believe the learning type test was wrong, as I think learning aurally is one of the least effective ways for me to absorb information. I think these results demonstrate that I will work well in a team setting, as I love working with people and will work hard when invested in a project.

Project Idea

Overview

My project idea is a small form factor Bluetooth tracker, with an in-built piezo buzzer, which is controlled via a simple mobile app. These trackers can be linked to a registered mobile device, and constantly feedback its whereabouts whilst it is in a 100-metre range. If the device moves more than 100 metres away from the tracker, the device will receive a notification, alerting the user to the missing item. Once the user is alerted, he or she can simply walk back into range and activate the onboard piezo buzzer. The software app will give a visual indication as to which physical device the tracker is attached to, which will help the user in their search for the item.

Motivation

I am constantly finding myself misplacing daily household items when I get distracted. This is a particularly major problem while I am working as an audio-visual technician, as I am sometimes carrying tools and equipment valued in the tens of thousands of dollars. I find that the more stressed I become, the more forgetful I become. A simple and well-designed mobile app and a Bluetooth tracker could save me and others tens of thousands of thousands of dollars each year, and surely help with peace of mind and productivity.

This could also be used across a wide variety of different applications and industries. The device would be well suited to people travelling for work or recreationally.

A few years ago, I spent several months travelling through Western Europe and Scandinavia. I lost both my wallet and my camera in two separate circumstances, both whilst travelling across borders. One situation was on a ferry from Denmark to Germany, and the other was on a train from the Netherlands through to Belgium, which made the hopes for finding each item a logistical nightmare. Both situations could have been easily avoidable if I had a simple alert system on my mobile phone and would have made for a much less stressful holiday.

Description

Each tracker will have a small form factor PCA, enclosed in a shock proof case with an IP67 rating. They would then be attached to each item with a small wire, either fitting around the tether point of the tool or secured around the handle or other section of the tools where it cannot fall off. The tracker will be registered via a mobile application, where the user can add a photo of the tool for ease of recognition.

My mobile application would have several different inventories, with a photo or title of each item, and checklist. At the start of each day, each tool with its registered tracker could be checked in to the app whilst it is being loaded onto a trolley or into a tool bag, and this inventory could be saved with a timestamp.

During the day, if the user is working in one area, packs up and moves to another area walking out of range of the tool, the app would send a notification to the user's phone. The user would then know which tool was left behind and was no longer in range of the mobile device, and they would have the opportunity to go back and recover the lost item. Each one of these Bluetooth trackers will be fitted with a small form factor piezo buzzer, which can be activated when the user goes back into the Bluetooth range of the device. The user will then be able to move to their next endeavour with the peace of mind that he or she is not missing any of their valuable hardware.

One further feature that would make these trackers theft proof, is that when an item is declared as missing from its user, other trackers registered to other users within the stolen item's range could update the network, which will notify the user's mobile with its current whereabouts. This is made possible by each user's phone GPS, and a Bluetooth meshed network system. The user could then notify police of the items whereabouts and work towards recovering the stolen item.

I believe this product would be widely adopted by companies with a large revenue base, as they would be able to track the whereabouts of the products and use the app as an asset register. It would also have an added optional calendar feature for test tagging products, as well as other audits as the company may require.

An example of a heavy duty Bluetooth tracker is the [Milwaukee TICK™ Tool and Equipment Tracker ONET-1 | Milwaukee Tool Australia](). It also has a Bluetooth 4.0 mesh network, and has a app to register the device. This product does not have an inbuilt speaker, so once you walk out of range, it will show you the whereabouts of the last paring with your mobile device. This is problematic when you are working across multiple floors of a high-rise building. It is also an issue for smaller tools that can get left inside crawl spaces or above ceilings.

Another example of a similar technology in use today is the [AirTag - Apple (AU)](). This product has a much smaller form factor, so can be paired with smaller devices like car keys, wallets, laptop bags etc. It also has a great app and an inbuilt speaker, which helps immeasurably when finding the device. The app can point you in the direction of the tracker, which is a great function. The differences between this product and my product are that the Airtag uses Ultrawide technology as opposed to Bluetooth and it is not shock resistant.

Tools and Technologies

The hardware included would be a small Arduino board with a Bluetooth chip, and a piezo buzzer, and a flat type 2030 battery. This will fit inside at IP67 rated exterior, which would make the tracker weather resistant. The outer shell of this case will have small hole for a catenary wire to fit through, or a small screw to be attached to the hardware.

The app will be available on android and apple phones, as well as a desktop app for the extra calendar feature.

Hardware	Software
Arduino Nano Every PCA	Swift for Apple iOS
HiLetgo HC-05 Bluetooth 4.0 Module	Swift for MacOS
Piezo Buzzer, 2032 Battery	Java or Kotlin for Android
Custom 3D printed IP67 exterior	Javascript for Windows

Skills required

To make this project a reality, I will need to make the electronic circuit using the Arduino board, battery, piezo controller and a bread board. Then I will need to write the code, with python, and make a basic version of the tracker. After several tests have been run, I will need to design the PCA itself, and make the electronic PCB layouts using a software program called Fusion360.

The software will need to be written in Java for android mobiles and Swift for Apple products. Given that I do not have much experience in this area I would need a development team to help me realise this projects potential. I may also need help in testing the end product so I would hire some electronics engineers that I have worked with in the past and use their experience to help me.

Outcome

The final outcome of this project will be a large-scale development of these trackers, and with enough monthly sales initially to make this technology cheaper and cheaper to produce, by buying in bulk. I would aim to raise on revenue as quickly as possible, and these savings would then lower the cost of the product so that they would become more and more affordable.

This product will not only help me on a personal level, when I travel or am keeping a track of items at work, but it would also help my company. It would in fact, help every company that needs to keep track of high-cost items that are constantly being transported around physical locations, and between workers.

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