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| TechstraOne |
| Assessment 3: Our IT Project |
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| **Timothy James Hall S3851553**  **Benjamin McDonald S3851983**  **Andrew Wendt S3858515**  **Rebecca Barnett S3856827** |
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| TechstraOne is a group of like-minded students from RMIT coming together with the goal of producing a project with real world purpose and to demonstrate our commitment to developing the necessary skills required for the Information Technology industry in the 2020’s. |

**29-Apr-20**

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# 1. Introduction

The TechstraOne team was formed by students from RMIT who shared an interest in creating a project that would allow us to develop and demonstrate skills relevant to our interests in Information Technology. The students met during the Introduction to Information Technology course as part of the Bachelor of Information Technology offered by RMIT.

In the following report, we will discuss in detail our project plan for a collectables trading app and discuss the prototype we are creating. Our project aims to develop our desired skillsets and target industry trends.

# 2. Team Profile

## 2.1 Team Introduction

#### Timothy Hall S3851553

Tim has always had an interest in IT from a very young age and continued to follow this interest by pursuing a role in IT in the Navy.

Completing 15 years of service following this interest he has found his passion for IT revolves around networking. Tim has continued to follow his passion by completing his CISCO CCNA qualification and continues to educate himself. With his 15 years of experience in the Navy, Tim brings project and team management skills as well as a raft of IT knowledge to TechstraOne to help see the goals of the company come to life.

During his spare time Tim is an amateur home chef and loves to go to the gym and rock climbing with his partner Tiffany.

#### Benjamin McDonald S3851983

Ben is a student at RMIT studying a Bachelor of Information Technology. Prior to beginning his degree, Ben had pursued a career as an audio visual technician working for companies in Canada and Australia.

Working in the AV industry for seven years helped Ben develop his knowledge of networking as well as hardware and software. This led to an interest in IT and AI (Artificial Intelligence) and the possibilities of what AI could hold not only for the AV industry but for every industry.

Ben strives to work as an AI developer, working with the top teams on creating sentient AI, as well as working on smaller AI inclined projects. Ben is semi-fluent in HTML, CSS, and is currently learning java script and python which will all be of benefit to the TechstraOne team.

#### Andrew Wendt S3858515

Andrew’s career started out at a data centre, where he administrated the facilities access control and building management systems.

He successfully completed a certificate 4 in IT networking and a certificate 3 in electronics, he applied the knowledge he learnt by becoming a technical specialist for an electronic security company. He has worked in the field for 5 years, with his responsibilities and experience including fitting off field devices, running cables to programming advance access control systems, IP CCTV, biometrics and intercom systems.

One of Andrew’s goals is to further his knowledge with cyber security - a career in cyber security is very interesting to him. Andrew brings an array of technical knowledge to TechstraOne, including IT networking, electronics and hardware, Linux based operating systems, SQL database management and cisco routing and switching.

#### Rebecca Barnett S3856827

Rebecca has been interested in Software & Website Development for many years, teaching herself how to code HTML in high school before choosing to commence a Bachelor of Technology degree after graduating.

Although her life took a different career path early on - working as a retail manager for fifteen years, Rebecca has always had a passion for technology and is excited to pursue new opportunities in Information Technology, hoping to work as part of a Software Development team in the future.

Rebecca enjoys the problem solving aspects of Information Technology and loves pursuing the “ah-ha!” moment of getting something difficult to work. Rebecca loves to break down problems into manageable parts and can spend endless time perfecting her work whether it is when coding or writing documentation.

Rebecca brings some project management and Java development experience to TechstraOne, which she acquired whilst studying for her Diploma of Information Technology and from a six month industry based scheduling software project. She considers herself excellent at documentation and enjoys producing reports and experimenting with data to create graphs and charts.

In her spare time Rebecca enjoys strategy games, reading and going for long drives with her husband David.

## 2.2 Group Processes

In our first assignment together, the TechstraOne team collaborated via Microsoft Teams to produce a report and website based around our project. Weekly meetings were held and we communicated daily via chat. In addition to Microsoft Teams we also used a GitHub repository for sharing code and a master version of our report file.

Overall the team was mostly happy with the quality of work we produced for Assignment 2. For Assignment 3, we plan to better utilise our limited time together by introducing deadlines for all deliverables so we can better target areas that need further attention earlier.

We also plan to better use our repository on GitHub and ensure that all team members are comfortable with pulling the repository and pushing updates.

## 2.3 Team Career Plans

### 2.3.1 Ideal Jobs

The Ideal jobs of the group have vast differences and contrast amongst each team member. Most members have chosen a career that can be achieved sometime in the near future following the end of their bachelor’s degree or soon after. These positions would be a great start to anyone’s career in the extensive world of Information Technology.

#### Timothy Hall – Senior Network Engineer

Timothy’s Ideal job for the future would be a Senior Network Engineer at Fujitsu Located in Sydney. The job includes becoming a manager and become part of a group of network engineers to design and develop various network designs to meet the constraints of the employer. This would also entail passing on valuable knowledge to the team via mentoring and guiding and providing the team with seamless opportunity for professional development. This position will require prior experience such as

* CISCO CCNP Enterprise/Security, CISCO CCDE, CISCO VOIP services.
* 3-4 years working in ISP or corporate level network engineer roles in a various amount of positions.
* The ability to produce a variety of documents from high level technical documentation as well as more simple operating practices for users on various network topics.
* Understanding of virtualisation with Microsoft Hyper-V or VMware.
* High understanding of routing concepts including BGP and OSPF.
* Certification in current ITIL practices.
* Knowledge of satellite and cellular technologies.

A position like this is of high importance to the fundamentals of a workplace. This job can be very attractive to those who are looking to take charge of team and guide them in a direction toward success. This jobs wage is also around a median of $106k in the state of Victoria.

#### Benjamin McDonald – Artificial Intelligence Architect/Software Engineer

#### Benjamin’s Ideal job is to become a Software Engineer – Java Developer at VROC. This job involves plenty of teamwork working with a vast team of developers to improve their data processing framework to make use of the latest data programmes and technologies. This position would help the employee on how to overall improve extensive AI Technologies and would present great opportunity to develop and work with AI technology. The skills and prerequisites needed for this position are quite extensive in terms of experience and would be needed prior to applying for this job. These would include:

• Moderate skill and experience with JavaScript, TypeScript, REST, API design, Grafana Plugin Development as well as Angualr.js

• Past experiences in coding and creating prototypes for different projects

• Working in a fast-paced environment.

• Have a decent understanding of current and upcoming trends across new fields for technology solutions in the big data and AI industries.

#### Benjamin McDonald (Continued)

#### This job can be appealing to a person who is looking to get into a very unique field of IT. This can keep the person very interested and engaged by learning the behaviour of AI and developing and maintaining certain projects. The salary included in this type of position is quite sustainable and appealing averaging at a median of $78k-$111k in and around Australia.

#### Andrew Wendt – Network Security Engineer

Andrew’s ideal job would be a Network Security Engineer, working on the design of large networks with security as the priority. Andrew already possesses some Networking and Cisco qualifications and has some exposure to small and large infrastructure. A Network security position that Andrew is interested lists the following required skill set:

* Network Security
* Palo Alto Certification
* Linux Based Operating Systems
* Python for networks
* Virtualisation
* SQL Database Administration
* Azure applications
* Cloud based technologies

#### Rebecca Barnett – Software Developer

Rebecca’s ideal job would be a full-time position on the Gold Coast. It would be to develop software for a company called In the Code Pty Ltd. They are offering a position for junior to intermediate software developers with ideally some experience in a MEAN stack development. However, this is not all necessary. This position will also require a great attitude with willingness to learn and develop your own skills as well. The skills and experience that would be needed for this position include:

* MEAN stack (JavaScript & Java)
* Native iOS (Objective C)
* Native Android (Java)
* Effective problem-solving skills.
* A great attitude towards tasks provided.
* A willingness to co-operate, listen and learn.

This position has its responsibilities such as completing tasks withing a time frame and sticking to specific deadlines, further testing on the existing projects and the ability to start on completely new range of projects also with respective due dates. This job may be very appealing to Rebecca because it could be both challenging and rewarding to be able to solve problems withing the set task. Also, the company In the Code Pty Ltd claims to be a relaxed and flexible work environment which can be essential when looking for a new job in the workforce. The salary of this position can also be appealing, its average being around $100k per year being the most common salary in the state of Queensland in Australia.

### 2.3.2 Overview of required skills

The ideal jobs among our group have plenty of similarities in the way that most of these positions require prior knowledge and high skill in coding such as JavaScript and CSS. Rebecca and Benjamin would both need to know the fundamentals of coding including the ability to comprehend and write the respective coding language to a high standard. All Ideal jobs have a similar pay grade the average being around the $90-$110k margin. Also, all jobs are to include the trait of good communication practices and the ability to work within a positive team-based environment.

There is plenty of difference in the jobs our group members are striving towards. This would include Benjamin’s deep interest in Artificial Intelligence and the measurement of its behaviour. Tim’s is interested in gaining a Senior Network management position and Andrew is interested in Network Security. These jobs are quite different to Rebecca’s interest in a software development position.

Overall, the careers of our group members are quite vast with some choosing to focus on web development and others preferring the development of software. Developing moderate to high skill in coding languages would be ideal for most employers in the Information Technology industry.

With the team having different passions for specialties such as the extensive and growing mystery behind Artificial intelligence, Networking and Security, Developing software or landing a management position shows just how vast the Information Technology sector is and the possibilities of career advancement is endless.

### 2.3.3 Career Plans

The ideal job of each team member spans multiple fields of interest in information technology. Where Andrew and Timothy will require specialised certifications and qualifications in Networking such as CISCO recognition and Palo Alto certification for networking hardware and telecommunications equipment, Rebecca and Benjamin will need to focus on Software Development technologies and programming languages such as learning Java, Python as well as database languages such as SQL.

Many members of TechstraOne plan to learn the required skills for their ideal jobs during the course of the Bachelor of Information Technology degree studies.

Tim already has a lot of experience in many of his fields of interest, and is now seeking formal qualifications to solidify his knowledge and develop new skills.

Ben plans on perusing a Master’s degree in Artificial Intelligence after completing his Bachelors.

Andrew intends to do work experience or an internship in Cyber Security after completing his Bachelor’s in order to gain relevant experience.

Rebecca plans on continuing the build her project portfolio whilst completing her Bachelors and may look for relevant work experience when confident in her abilities.

All team members hope to learn something relevant to their ideal careers during their project work with TechstraOne.

# 3. Project Tools

#### Team Website

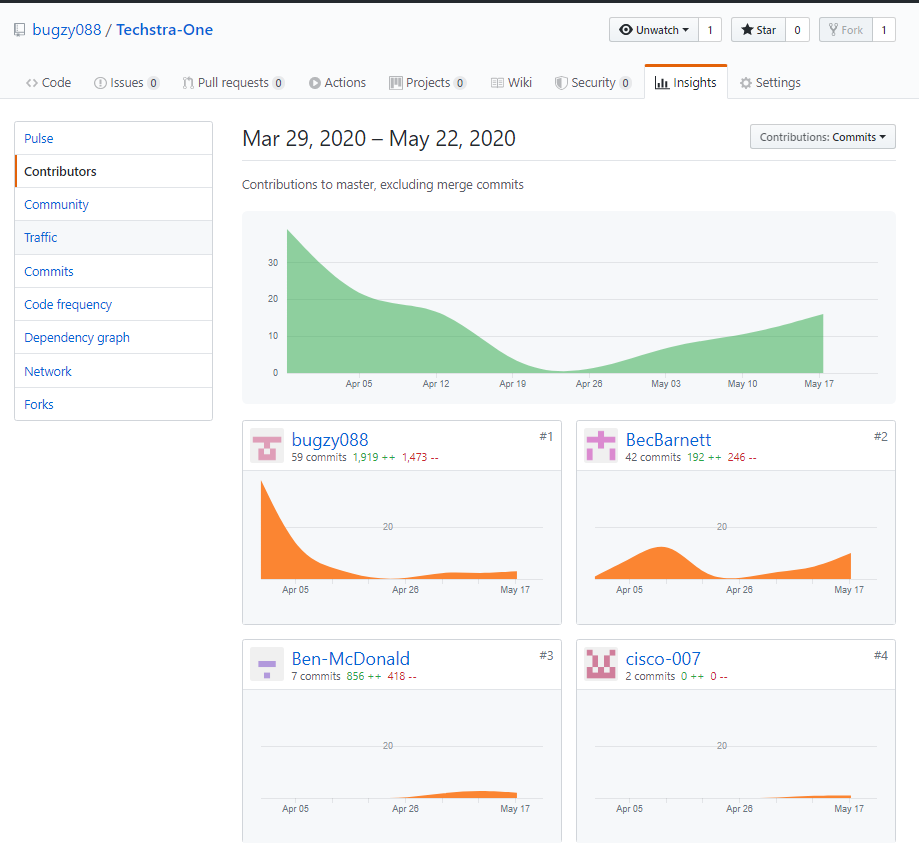
Techstra One’s webpage is hosted on GitHub pages and can be found [here](https://bugzy088.github.io/Techstra-One/). This page will be the main front of the project which is developing our collectable trading software. At present it has a basic breakdown of what the project is as well as a profile page of all the members who make up part of the Techstra One team along with their individual webpages.

#### GitHub

To host the website files and pages GitHub was chosen to be our repository, which can be found [here](https://github.com/bugzy088/Techstra-One). As it has inherent integration with GitHub Pages and the fact that it was a simple and easy product for the team to use.

After completing Assessment 2 the team decided to move our file sharing and version control from Microsoft Teams to GitHub. We did this as the version control and audit features of GitHub were far superior than Microsoft Teams. As you can see in the image (figure 3.2.1.1) below the entire team used GitHub not just the few members previously. However, in moving to GitHub we did encounter a problem where GitHub didn’t resolve document conflict and we had to manage this ourselves.

*Figure 3.2.1.1. GitHub Commits*

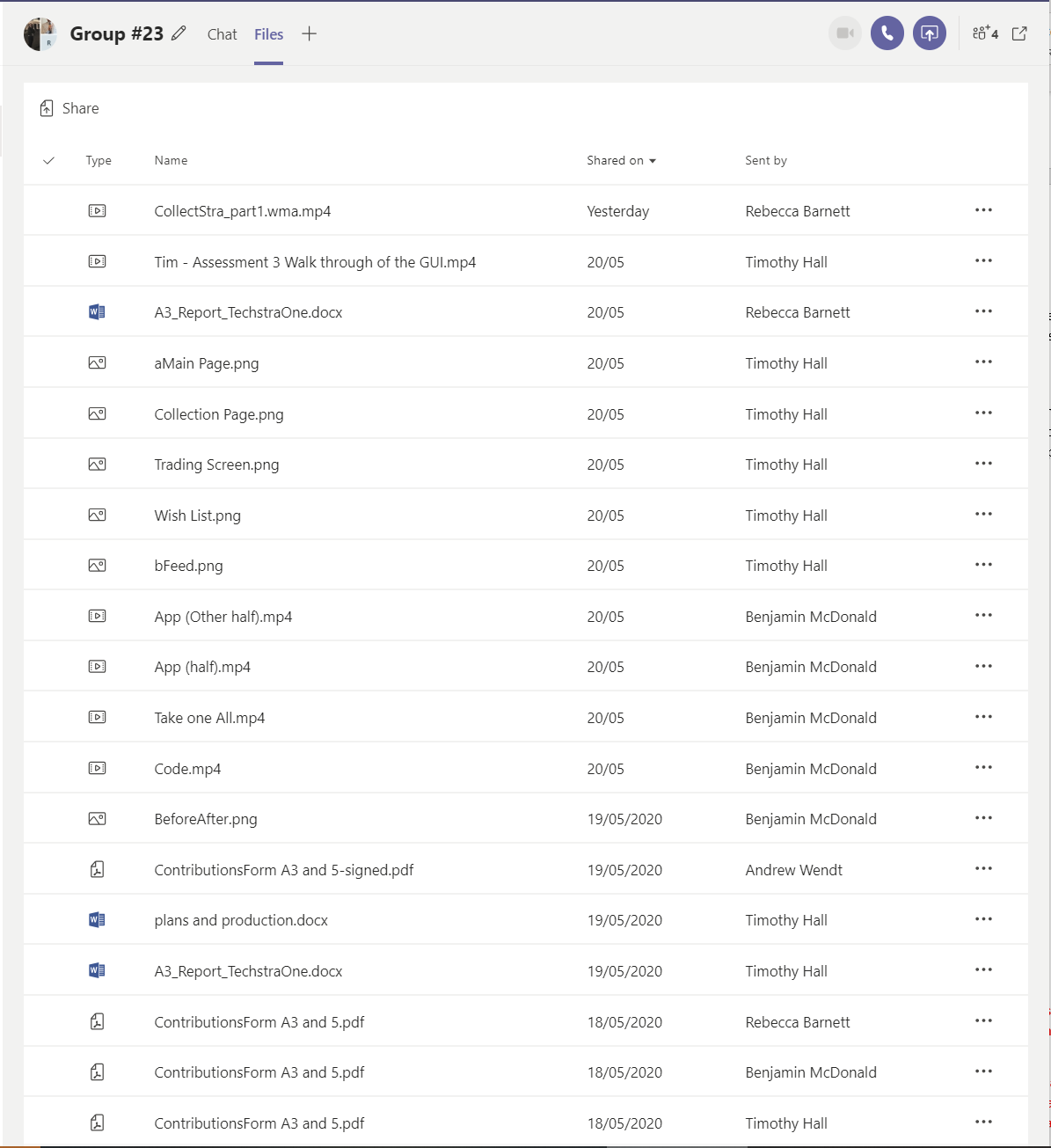


#### Canvas

While the team did have Canvas to use, we chose not to use it once again. This is due to Canvas’ limited communication features and file sharing the team decided to move to Microsoft Teams for communications and GitHub repository for file sharing for this project.

#### Microsoft Teams

Microsoft Teams was our primary collaboration tool. We used it extensively for its chat and conferencing features. Most of the discussion was done in the ‘Chat’ feature with individual posting their own files (seen in figure 3.3.1.1) for the A3 Report and A5 video as required depending on what we were discussing or sharing. The other bonus of Microsoft Teams is that it is part of the Office 365 suite, so we have full access to whole office suite.



*Figure 3.3.1.1. Microsoft Teams File additions*

#### Overview of Project Tools

Looking over the past 5 weeks with how the group has interacted with each other using the various tools mentioned above, we have improved on how we as a team interact with each and share files. While there has been an improvement overall there are still some areas where we can improve going forward.

Moving on with the lessons learnt from Assessment 2 the decision to move away from Microsoft Teams for file sharing to using GitHub to host our files was a plus. It enables us to constantly know whether or not we were using the most up to date version of the files as we could just pull the origin files from GitHub and know it is the correct version.  
  
The other lesson we learnt was to use one parent document and just update that as required. Doing this made less work for the group as we didn’t have to merge individual files to make the main document.

The things we have done well were allocating the tasks evenly as well as set deadlines which we kept to. By doing this it enabled us to make sure we were on schedule and it helped us stick to it. The other benefit of doing this we were able to support each other better as once the due dates came we could assist those that needed help.

As a team moving forward on future work, we need to consolidate what we have learnt to ensure that we continue to operate in a way that benefit the team as whole. Also, we need to make a decision about how will fix the document conflicts we have been encountering within GitHub to make the process easier.

# 4. Team Project – CollectStra

## 4.1 Project Overview

Our platform, CollectStra, will add popular social media-like connectivity to a hobby enjoyed by many people; collecting trading cards, comic books and other kinds of media. We intend to make CollectStra an easy and fun way to manage someone’s collection and to help them connect with other users with similar interests.

By utilising available online databases we intend to have accurate, up-to-date information about each item. By connecting to other service’s API’s we aim to provide utility to each user, allowing them to easily view information on price and availability about the items they hold or wish to acquire.

Finally, we want to add life to the collectables market. We intend to make it easy for users to find out what niche events are on in their local area that they may be interested in and help them to meet other people who are as excited as they are about their collections.

## 4.2 Project Motivations

Our main motivation for this project is to create something useful for a hobby that many of the team find interesting and have taken part of in the past. It is our belief that the collectables industry is under represented by the app market and that there is demand for a social media-like platform where multiple categories of collections could be represented together.

Adding social media elements to existing platforms is certainly a popular trend in the IT industry at the moment with many websites adding enhanced user experiences by offering interactions between its users and connectivity to external social media sites.

The TechstraOne team is hopeful that this project will test their existing capabilities and enable them to develop new skills which will be of benefit for future projects.

## 4.3 Current Landscape

#### The Competition

TechstraOne has conducted research into similar trading applications and have found some worthy competitors. TechstraOne continues to develop ideas that go beyond the boundaries of our competitors. Here is a list of some of the following marketplace-based collecting applications.

* eBay.
* Colliibo.
* Unboxed.
* Gemr.
* Retro Game Collector.
* Key Collector Comics App.

#### How is our application different?

Our application is more than just a selling platform for traders alike, the application is suitable for all ages and different gaming and trading memorabilia types. The social aspect of the application intends to captivate users with selling incentives and a points reward system.

The application will have an inbuilt trading feed, displaying recent transactions. The application also looks to partner with Comic Con and other conventions. The features include:

* **Social Aspect -** TechstraOne believe that this application is more than a marketplace to sell and buy from. TechstraOne is very motivated to create a safe and interesting social aspect, allowing likeminded individuals to communicate with each other. Users can view profile feeds, view listed items and the ability to follow and message.
* **The feed** – A display of recent transactions, with users linking their profiles to the feed so other users can look at the type of items they sell.
* **Rewards systems -** When a trader sells or trades an item, they will be rated with a rewards system. This system will allow buyers to rate and review sellers’ profiles, traders and sellers will also be able to review their customer’s profiles. The intention of this system is to create a trustworthy selling platform for both traders and consumers.
* **Events Calendar** - In this feature TechstraOne will display upcoming events and provide information about locations and areas for other users to trade their memorabilia.
* **Connectivity** - The application will be accessible from a web page browser and Android devices. Mobile devices can use in-app cameras to upload the sellable items
* **Application -** The application will have a variety of features, these will include searching for a specific item, filtering by price, location and quality
* **Transactions -** The transactions can be delivered both in local currency online and in some types of crypto-currencies.

The application will also use data analytics from other sales platforms such as eBay, gumtree and others to gain better information on price and availability. In order to achieve this TechstraOne wishes to partner with these companies, keeping in mind the possibilities of legal agreements and other regulations.

## 4.4 Project Aims

The aim of this project is:

***“To create an easy and fun platform in which a user can manage their collections in a highly social environment*.”**

This means we want to make it possible for collectors of all types to come together and celebrate their unique items as well as meet others who share their passions.

*Figure 4.4.1. A Pokémon card.*

This will involve the following goals:

* **Create an easy to use Graphical User Interface (GUI).**

An attractive, intuitive GUI will help attract and retain users and allow them to make the most of the platform’s functionalities.

* **Connecting to third-party marketplace API’s and databases to get item information.**

By utilising third-party data our platform will be able to provide accurate, up to date information about items to our users as well as display market price fluctuations on collectables.

* **Allowing users to connect with their friends.**

By enabling our collectors to share their collections with each other we can help users connect with like-minded people and add an extra level of excitement to acquiring new items.

* **Suggesting items and events that users may find interesting.**

Utilising existing databases and identifying what is missing from user’s collections we plan to be able to provide personalised recommendations to each user on items they may be interested in as well as suggesting events that they may wish to attend.

* **Partner with conventions and publishers**

Creating partnerships with publishers and event organisers will allow us to better promote our platform and offer exclusive benefits to our users such as early access to products and exclusive updates.

* **Establish market dominance.**

We plan to attract users by making our platform intuitive to use and by utilising the most up to date data available from publishers and developers. By adding social media elements to the platform and rewarding users for increasing their collections we hope that the platform will have a fun factor which will make us stand above our competitors.

## 4.5 Project Plans and Progress

### 4.5.1 Project Conception

This project was originally an idea for simple collection catalogue by former TechstraOne team member, Adrian Ferrara, where a user could store information on the collectables they own. It would consist of two lists, one that would contain the catalogue of items and one that would contain the items the user would like to trade. These two lists would be handy as they would allow the user to search for a particular item without having to sift through their entire collection to see if they own it. The team believed this idea would be a great product and very simple to design.

### 4.5.2 Planned Features

After a number of discussions amongst the team in regards to the possibility of creating other features to expand on the idea of the product, the team decided to make the simple collectible catalogue more of a social media platform where collectors could view other user’s collectables, see what they are willing to trade and organise the trading of items.

The program would also feature a news feed containing information posted by contacts, a market place where you could post items to trade, a calendar with information about upcoming events such as the Comicon or Armageddon conventions, a database of products from the likes of Pokémon, Yugi-oh and Magic the Gathering using the publishers existing databases, and finally a video chat, player-versus-player platform where users could have card battles online.

### 4.5.3 Planned Features Implementation

With a solid idea of what the basic program needed, the team began designing the program. The program and interface would be written using Java, and the database would use SQL.

A screenshot of a social media post

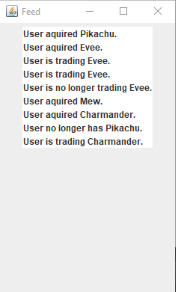
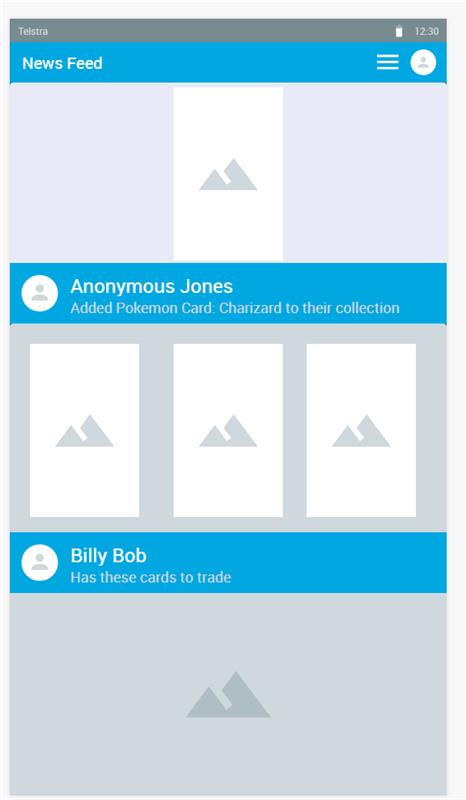
Description automatically generated

*Figure 4.5.1. The Java GUI.*

#### Java Application

As mentioned earlier, the basic layout of the main application would be a user interface (*figure 4.5.1*) consisting of two lists using JList from Java swing class. One list would be for the users collection catalogue and the other containing all of the items the user desires to trade. Each list will have a text field also from the swing class. The text field on the collection side would be used to add to and search for items in the collection list. The text field on the trade side would be used for the soul purpose of searching for items in the trade list. Items would be loaded from the collection list to the trade list by selecting the item then pressing the trade button on the trade side of the interface. The final feature of the basic lay out would be a delete button above each list that would allow the user to remove items from the lists if the item had been sold, traded, or simply lost.

Next would be to create the news feed. The base news feed updates whenever a user trades an item letting the users connections see what is being traded. This will be a great feature as it will give users the ability to see what is for trade and stream line the process by allowing users to organize the trade over the application.

Though this feature is only in the early stages of development in the future the team will complete this feature and add it to the finished product making trading items a lot simpler. Here is an example of what the news feed will look like once it is completed. As you can see the news feed has similar look to Facebook or Instagram. The team at TechstraOne believe this is the best way to present the app to users as most will already be familiar with operating Facebook. TechstraOne would like to make this application as user friendly as possible.

*Figure 4.5.2. Feed Prototype in Java.*

*Figure 4.5.3. Feed Concept designed by Tim hall.*

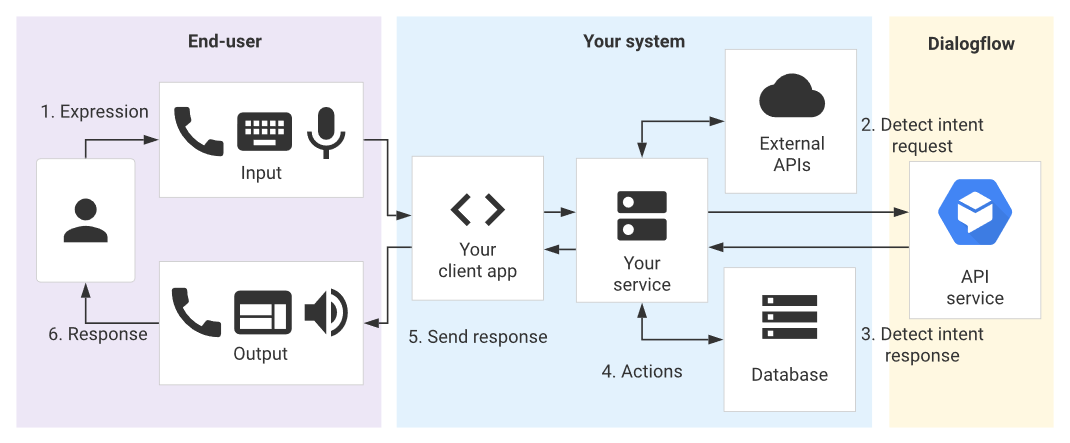
#### SQL Database

On the internet pre-existing databases from brands such as Pokémon and Magic are available to developers to access catalogue information. In CollectStra, the touch of a button will allow you to see the title, picture, rarity and the stats of any trading card in a collection. This would give the user the ability to see what card they would like to acquire, what cards are available and cards that would work best with their personal battle style. This will be an invaluable tool for any die-hard Trader.

We believe it will be possible to retrieve all this information by utilising each publishers API, a set of tools released to allow a developer to access catalogue information. We plan to then store this information in our own SQL database as our users add items to their portfolios. The details of the database are as follows.

**Database Connection Method**

The CollectStra database will use the JDBC driver connection method, below are some steps on how to achieve this. The CollectStra application will connect to a SQL Database using the JDBC driver API (Application Programming Interface.) This connection method is the most preferred for the connection to Java based applications. The intention is for the application to operate smoothly and provide ease of administration for system administrators and developers. TechstraOne have decided that these connection methods and operating systems are most suited to the needs of the application.

Initially CollectStra will use the express version of SQL, this version is limited to 10Gb in storage. TechstraOne will use data growth analysis from Alpha and Beta testing, the data captured in the analysis will indicate how the databases will behave, this information will provide insight into upgrading licensing and databases. The SQL databases will store encrypted user-based data, photos of card holders, and trading repositories.

**The API**

*Figure 4.5.4. Connection Flowchart.*

The JDBC driver is free software that enables a Java application to interact with SQL Databases, the API is a set of classes that implement JDBC interfaces to process JDBC calls and return sets to a Java application. The database stores the data retrieved by the application using the JDBC Driver.

In the future TechstraOne will also investigate the possibility of connecting CollectStra databases into third-party databases (pending legal rights and third-party agreements.) TechstraOne will use the data obtained from third parties’ databases to provide up to date and accurate pricing for sales and trading information.

Techstra have envisioned a timeline for the application and what the application may be able to do in the future. TechstraOne would like to incorporate database automation, machine learning and potentially using Artificial Intelligence (AI) for uploading cards, or the possibility to have in app games or “battles”. TechstraOne have acknowledged the importance of streamlined and effective business practices, we believe that with automation, machine learning and AI we can increase overall productivity and promote positive end user feedback.

**Connection Process**

In this paragraph TechstraOne will provide some basic code and procedures followed by some photos for reference on how TechstraOne connects its application to databases. (Screenshots will be gathered using TechstraOne’s database administrators’ virtual machines)

* Loading and registering the JDBC Driver into the application using Java, this is loaded into the memory at runtime.
* Oracle drive – class.forName(“oracle.jdbc.driver.OracleDriver”);
* DriverManager.registerDrive() this class is inbuilt as a static member; the below code is used to register the Oracle driver.

(DriverManager.registerDriver(new oracle.jdbc.driver.oracleDriver())

* Connecting to the database

Connection con = (String url = “ jdbc:sql:thin:@localhost:1521:ams”)

* Defining a statement, this line of code will define the methods of communication between the application and the SQL.

Statement st = con.createStatement();

* Executing the query, query for retrieving data and query for updating/ inserting table in a database.

int m = st.executeUpdate(sql);

if (m==1)

System.out.println("inserted successfully : "+sql);

else

System.out.println("insertion failed");

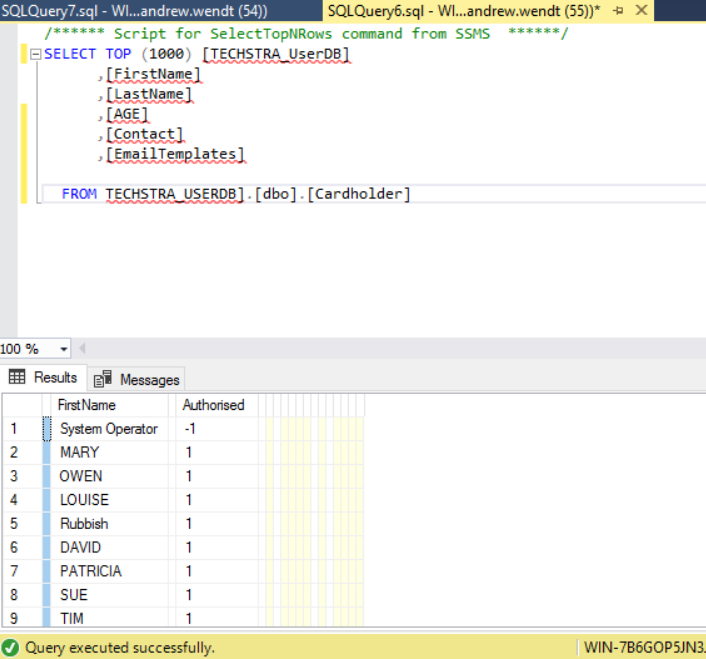


*Figure 4.5.5. Summarised Connection Steps.*

In figure 4.5.6 code for the database connection process is shown.



*Figure 4.5.6. Database Connection Process.*

Below (*figure 4.5.7*) is an example of our database, this table below displays users that have connected to the database, this is where their information is saved.

*Figure 4.5.7. Connected Users Table.*

### 4.5.4 Project Leads

The following leads were pursued during early development however it has been decided that more time will be required to develop these functionalities.

#### News Feed

This section of the project turned out to be a bigger task than we had hoped, unfortunately due to time constraints the team had to focus on tasks that were more important to the completion of the project and we did not have enough time to get the news feed off the ground. The team did manage to create a prototype but without a user account system in place the news feed only provided anonymous item movement details.

#### Database

The team members responsible for the Java application determined that more time will be required to bring in full database functionality. A database has been prototype has been designed but at this stage of development, no item or user information is being stored in our database. Over the coming weeks once hosting has been sorted for the project, the team is confident they will be able to begin creating database records.

#### Connection to existing publisher databases via API

Utilising trial and error, the team was able to access the Magic the Gathering API (Magic the Gathering Developers, 2020) to access information on cards and sets however more time will be required to develop the code to then store the necessary information in the CollectStra database. Via the Magic the Gathering Developers website, software development kits in multiple languages are available and the team was able to utilise the Java SDK. Once the Java SDK is imported, the following picture (*figure 4.5.8*) shows code that can be used to retrieve a card if the card’s “multiverse ID” is known and from there all details of the item can be accessed.

https://i.gyazo.com/f947f85a01552ed17f880543316c698d.png

*Figure 4.5.8. Get method to retrieve card information.*

### 4.5.5 Future Features

#### Database

The database will grow and become more refined in later updates. Once the code is developed to store items in the CollectStra database, any publisher with an online database and API will be utilised by the team to expand what we can offer our users. We would like to one day be able to cover the majority of the collectables market.

#### User Accounts

Once the user accounts feature is added, we will be able to create timelines and feeds to enhance the user’s experience. This will require considerable research into creating secure user accounts and database encryption so that we can safely store any personal information.

#### Social Media

The Graphical User Interface, or GUI for short, is one of the most vital parts of the application. This is the first pint of contact for all users. With that in mind, the team at TechstraOne wanted to make sure it was as user friendly as possible. Many social media users are more than a little bit familiar with operating websites and applications like Facebook and Instagram. Therefore the team decided to design the user interface in a way that would look and work similar to these social media platforms.

#### Website & Further Device Support

Once the Java application is up and running on android the team will seek to accommodate other devices and create a fully functioning website version of the application.

#### Calendar

A calendar feature is planned for the future so that users can be alerted to upcoming events nearby. This will most likely use the Facebook API to access event information.

#### Rewards System

A rewards system is in the works for CollectStra with the finer details still being discussed. At the moment we plan on having a points system where users can earn points for completing tasks such as adding to their collection, referring friends or trading items. However we have not yet worked out how these points will be redeemed.

### 4.5.6 Project Feasibility

In conclusion, the team at TechstraOne have the blueprints of a great trading program. There are many features in development that will help make CollectStra the number one application for trader’s worldwide. Although we are in the early stages of development, we have managed to create a working prototype that includes basic features such as the collecting and displaying trade items and a basic model of the news feed. This prototype will be featured in the video presentation and the source code can be available upon request.

## 4.6 Project Roles

With regards to the roles for the Techstra One team we have not defined roles to anyone. We went assigned tasks based off what needed to be done for the assessments and who was comfortable with doing certain parts based on any previous experience. Noting the tasks that we have individually taken on the following are the roles we could be assigned based on these.

Rebecca has taken on the role as the Project Manager along with some App development work. Rebecca is the mastermind behind our reports layout and ensuring we are meeting our set deadlines. She is also assisting in the development of our App with the feed feature.

Benjamin has taken on the role as Application Developer and is developing the application in Java. He is ensuring that we can have basic functionality for viewing in Assessment 5.

Andrew has some SQL database experience, so he is working on integrating that into our application to manage our user, collection, and trade databases. Additionally, he is working on getting API working to pull data from 3rd party source into our app with regard to certain collectibles.

Tim has become the team’s Web Developer and has actively updated Techstra One’s webpage when required. He is also the team’s application GUI designer. Using online tools to create the basic layout of the application for the purpose of demonstrating how it will look like.

On top of what is mentioned above everyone in the team has been actively involved with this report. No one was assigned the role of making this report on their own. Everyone took individual segments and we combined them to make this one report.

## 4.7 Project Scope and Limits

For the first phase of this project ending on the 24/05/2020 the following deliverables with the listed functionalities are planned:

* Mock Graphical User Interface design
* Java Application with the following functionalities:
  + Ability to add and remove users
  + Ability to add and remove items
  + Ability for users to add and remove items to their profile
  + Ability to search and view items
  + Chat functionality between users
  + Ability to connect to a collectables’ API in order to retrieve item details
  + A “feed” of information displayed on the main screen of the GUI

For future phases of the project the following functionalities are planned:

* Calendar functionality to show upcoming events
* Location Services for notifying users of upcoming events and similar nearby users
* Ability to trade & buy items
* Functioning Website version of the application
* Ability to upload pictures via phone camera access
* Ability to identify items via image recognition
* Rewards System

## 4.8 Project Tools and Technologies

The following software and tools would be required for CollectStra to come to life.

#### Software

**Eclipse IDE 2019 version 12** – Eclipse IDE is a free open source integrated development environment that we are using to develop our app using the Java programming language. It has the ability to add in extensible plugins to add extra functionality as required. Eclipse IDE uses an Eclipse Public Licence (EPL) 2.0 that is free for everyone to use and is business-friendly as it has weaker copyleft provisions than previous versions of Eclipse which used their EPL 1.0 which has stricter copyleft provisions. EPL and copyleft means that any changes and additions to original work must be licensed under the same terms and conditions of the EPL, which includes the requirement to make source code available.

**SQL 2014 Express** – Microsoft SQL 2014 Express was the software chosen to host our databases which will contain all of our user and collection data. This version of SQL enables us to have one database and a maximum of 10GB. Once some analysis is done we will move to Azure SQL which does require a licence to use and the licence cost is incorporated into the price of Azure SQL hosting.

**FluidUI** – FluidUI is an online Application GUI designer. This application was used extensively to create the mock-up of how the CollectStra application will look like once it is developed. This app is free to use however, it does have a paid option which provides greater options in the design phase but it was not required for the CollectStra design.

#### Hardware

**Microsoft Azure** – Using cloud computing means we do not need to have any physical equipment to get our application up and running. With the expandability of what cloud computing brings means we can start off with a small footprint and then expand as required to meet our business requirements based off our number of users.

Using the Microsoft Azure SaaS calculator, the most basic plan available (A1v2) which has 1 CPU Core, 2GB of RAM and 10GB of storage would cost ~$76.2 per month and we could use this as a test to see how the app goes. If required we can get a memory intensive SaaS which is for large databases. The minimum level to start with costs ~$349.8 per month which has 490GB of storage, 14GB of RAM and 2 CPU Cores.

On top of this is the requirement for us to have an SQL server to host our databases. Again using Microsoft’s Azure cloud infrastructure the cheapest option would cost ~$363 per month which provides 2 VCores, 10.2GB of RAM but we will have to purchase storage with the minimum being 5GB costing ~$1 per month. All of this can scale up easily depending on what our requirements are.

#### Previous Experience

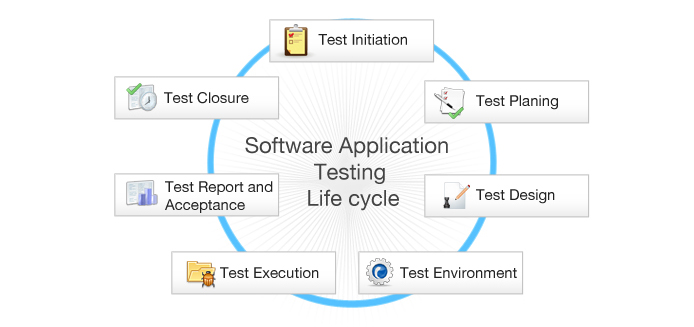
The team has had some minor experience in the past with SQL and Java. Benjamin and Rebecca both have previous experience using Java as a coding language. Benjamin is currently conducting Introduction to Programming which is working in Java and Rebecca has worked with Java previously when she was completing her Diploma in IT a few years ago. With both members having some Java knowledge is one of the reasons we chose Java and because it is popular in the application development space.

In Andrew’s current job he has experience with SQL particularly with SQL queries and database administration tasks. So using his knowledge we have decided to use SQL as our database software of choice.

## 4.9 Project Testing

Project testing sequence, extensive testing and development will be crucial to the success of our application. To ensure that all issues are settled before deployment here are some procedures that we will be implementing throughout testing and development phases.

*Figure 4.9.1. Testing Phase.*



*Figure 4.9.1. Testing Life Cycle*

Initiation

In this stage of testing, TechstraOne will conduct a project management plan, ensuring that all potential risks and issues can be addressed during these stages. It is important that during this stage of the project everyone who needs to be involved is properly engaged to ensure continuity for further stages.

Test Planning

Planning on how and what we will test to ensure that all parts of the application are covered, ensuring that potential issues or concerns can be addressed and rectified in the development stage of the project.

Test Design

A test design document will ensure that all elements of the application are tested, and peer reviewed for quality assurance (QA).

Test Environment

In this stage of testing, our system administrators will set up a Development Environment (DEV) this environment will be hosted by VMware using virtual machines, TechstraOne have decided that a virtual environment both in testing and production is crucial to the development and success of the application.

The virtual environment will include application servers, database servers and backup servers. Our system administrators will test server load, database connections and backup capabilities. Our application developers will test functional testing in the source code, using ‘black-box’ testing for software. These testing methods will operate in parallel with our testing procedures and design.

Test Execution

Executing the code in the DEV environment in the Alpha stage of testing TechstraOne will follow our strict ‘Test Design’ document ensuring that all elements are tested, documenting each change and ensuring that all issues are captured before the Beta stages of our application.

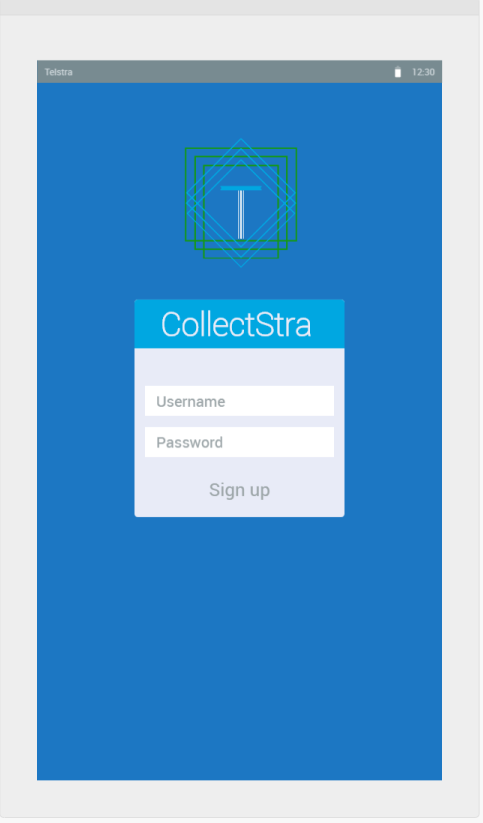
Test Report and Acceptance

In this phase our developers will assess the results and use the data captured from the Alpha phases to continue the next stage of our design. The acceptance phase of testing is to ensure that all data has been reviewed and assessed by all the appropriate stages. Using the test report and data obtained by the testing phase TechstraOne will be able to move forward to ensure that all elements will work correctly.

Test Closure

At the end of the acceptance phase Developers alongside with system administrators and project managers will review and assess the data that was captured during the Alpha stages. The project managers will explain lessons learnt, and this information will assist the Beta stage of testing.

TechstraOne have designed our testing procedures for both Alpha and Beta testing phases. The Beta testing phase will be used to assess the operational functions of the application. TechstraOne will select end users that operate android mobile devices. In this phase TechstraOne will assess user data, obtain customer feedback and initiate extensive load testing for further developments.



*Figure 4.9.2. Application Login Screen*

#### Roadmap

The application is currently designed to operate in Java, but TechstraOne are looking to accommodate all operating systems, including Apple based operating systems. TechstraOne plan to use Complier software that will compile Java code to Objective-C code.

After the Beta stage TechstraOne will make the application available for download on the Google-play store, the application will then go into an operational phase and will be tested and subject to review asking for feedback for future research and development.

TechstraOne are producing a future business case, using the potential success of the application at its foundation, TechstraOne hopes that it may be a lucrative business opportunity for larger companies to partner up and promote their brand through this app.



*Figure 4.9.3. TechstraOne Roadmap*

## 4.10 Timeframe

|  |  |  |  |
| --- | --- | --- | --- |
| Week | Schedule | Team Members | |
| 1 | * Team meeting: Finishing touches on Assignment 2 | | All |
| * Work on Project Plan and Details | | All |
| * Completion of Assignment 2 | | All |
| 2 | * Team meeting to discuss tools and technologies moving forward | | All |
| * Assignment requirements review | | All |
| * Project implementation brainstorming | | All |
| 3 | * Team meeting: Project breakdown and team member assignments | | All |
| * Scope and Project Timeframe | | Rebecca |
| * Team meeting: Project Plans and Progress section discussion | | All |
| 4 | * Team meeting: Discuss progress | | All |
| * Project Landscape | | Andrew |
| * Project Plan Outline | | Benjamin |
| * Project Testing Plan | | Andrew |
| * Group Processes and Communications | | Rebecca |
| * Skills and Jobs | | Timothy |
| * Video Storyboard | | Ben & Tim |
| * Java application classes and methods defined | | Benjamin |
| * SQL database populated via API integration | | Andrew |
| 5 | * Team meeting: Discuss progress and identify shortfalls | | All |
| * Mock GUI completed | | Timothy |
| * Plans and Progress Report | | Benjamin |
| * Define Roles for future project development | | Timothy |
| * Tools and Technologies required for project Report | | Timothy |
| * Project Risks Report | | Rebecca |
| * Java application 1.0 | | Benjamin & Rebecca |
| * Team website updated | | Timothy |
| * Report Finalised | | All |
| 6 | * Team meeting: Finalising Submission, Discuss video demonstration of project progress | | All |
| * Record video of project | | All |
| * Project Testing | | All |
| * Assignment 3 Submission | | All |
| * Assignment 5 Submission | | All |
| 7 | * Team meeting: Develop project plan for further feature implementation | | All |
| * Project plan report | | All |
| * Feasibility study of further functionalities | | All |
| 8 | * Team meeting: Team member assignments | | All |
| * Implementation of Calendar feature | | Benjamin & Rebecca |
| * Website design | | Timothy |
| * Java GUI design | | Benjamin |
| Week | **Schedule** | | **Team Member** |
| 9 | * Team meeting: Discuss progress | | All |
| * Implementation of advanced item feature: Buy & Trade | | Benjamin & Rebecca |
| * Website phase one functionalities implemented | | Timothy & Andrew |
| 10 | * Team meeting: Discuss progress | | All |
| * Implementation of picture upload functionality within Java application. | | Benjamin & Rebecca |
|  | * Website buy & trade functionality added | | All |
|  | * Project Testing | | Andrew |
| 11 | * Team meeting: Discuss progress. Brainstorm rewards system. | | All |
| * Implementation of rewards system on Java app | | Benjamin & Rebecca |
| 12 | * Team meeting: Discuss progress | | All |
| * Implementation of rewards system on website | | Timothy & Andrew |
| 13 | * Team meeting: Discuss progress | | All |
| * User testing & feedback | | All |
| 14 | * Team meeting: Discuss progress. Research Advanced Feature: Location Services | | All |
| * Project plan: User feedback & improvements | | All |
| 15 | * Team meeting: Discuss progress. Research Advanced Feature: Image Recognition | | All |
| * Implementation of user feedback suggestions | | All |

## 4.11 Project Risks

The following risks have been identified for the project:

#### External databases might fail

Due to the extensive amount of categories and individual items we would like to include in CollectStra during our first phase we will be relying on external sources, databases and the use of each platforms API to populate CollectStra’s database. If an external source becomes offline or unavailable there is a risk CollectStra may not be able to access this data. Poor bandwidth and a slow connection could also leave the CollectStra platform running sub-optimally. Ideally to manage this, the team would like to store as much data as possible in our own database on our own servers.

#### The CollectStra server might fail

The server on which CollectStra and its database is stored also risks unforeseen downtime and connection issues. When pulling data from external sources, data transfers could be interrupted and database records corrupted. To minimise this the TechstraOne team plans on only using well regarded hosting services such as Amazon’s web services or Google Cloud.

#### Inaccurate data from external sources

Relying on external sources for our data may leave us with inaccurate information on items in our database. To minimise this risk regular audits and reviews will be necessary to ensure data is accurate and complete.

#### Failure to access data via Application Programming Interfaces (API)

As the TechstraOne team has limited experience using API’s and as there is a large amounts of different syntaxes, languages and standards used by different publishers to access their data there is a risk we may not be able to access the information we require.

#### Lack of accessible Databases & API’s

There may be no way to access some publisher’s libraries and databases if they are not available online or require payment to access. Similarly, there may not be API’s available for every database we would like to incorporate and so alternative methods to access these databases would be required – for example importing CSV (comma separated value) files, which may or may not work.

#### Lack of required skill set

As the TechstraOne team is relatively inexperienced with developing a project of this scale, it may take longer than anticipated or may not be possible to develop the required skill set to complete this project. As a contingency plan the team may be required to seek help from others with more experience which could impact the development schedule.

#### CollectStra may not run on all platforms

During development extensive testing will be performed on PC and Mac devices to guarantee performance however it is beyond TechstraOne’s ability to guarantee the CollectStra platform will work on all devices.

#### Unexpected issues and security vulnerabilities

Even with thorough testing in place there is a risk that CollectStra could be deployed with unresolved bugs and issues. This could potentially be problematic coupled with our intentions of offering a secure payment gateway to users in order to buy and sell items. To minimise this risk it will be preferable to utilise third party platforms from a reputable source for any exchange of payment and data encryption for any personal information stored in our own databases.

#### Distributed Denial of Service Attacks

A large amount of connections being attempted at the same time could overwhelm our servers and bring the platform offline and could come from a malicious source, a compromised system or unintentionally if too many of our users try to connect at once. To minimise this risk, stress testing should be scheduled before launch and our servers should have an appropriate amount of bandwidth available.

#### Poor uptake

The more people using CollectStra the better the experience will be for all of them. Without a significant amount of people being involved from launch day users may not get to appreciate the full range of features available and user retention might suffer as a result. This is why it will be important to heavily promote CollectStra prior to launch and offer incentives to get users to sign up.

## 4.12 Group Processes and Communications

The TechstraOne team will hold a compulsory weekly team meeting on Monday nights at 7:30pm via Microsoft Teams. Depending on the workload for the week an additional meeting will be held on Wednesday nights at 7:30 as needed but will not be compulsory.

Regular communication amongst the team will be via Microsoft Teams text-based chat and team members are encouraged to share their progress and comment on other team member’s submissions via Teams. Team members are expected to upload their work weekly via GitHub or Microsoft Teams file share.

If a team member is unable to attend a compulsory team meeting they are expected to provide advanced notice. If a team member fails to communicate with the team for longer than one week the team will be forced to notify the course coordinators about their absence.

## 4.13 Skills and Jobs

If we were to have four additional people working on the project to take it further whilst aligning with our future features, we would hire a Mobile Application Developer, Mobile Application Marketing Manager, Database Engineer and Security Specialist. Having these 4 specialists would enable us to move forward whilst having the right skills to pursue a vision of where this app can go.

#### Mobile Application Developer

The App Developer will be required to be able to continue with the code we have already started in Java and then continually add what is required to meet our future features. They must be proficient in the use of Eclipse IDE as well as be able to migrate the App over to iOS to ensure that we cover all mobile devices. They should also have an understanding on how to integrate new features like online payment, Camera Access and Biometric logging in.

#### Mobile Application Marketing Manager

The Mobile Application Marketing Manager will be responsible for creating and managing all marketing aspects of CollectStra. They will liaise with collectable industry partners to organise events and opportunities to provide benefits for people to use CollectStra as their collecting application of choice. The Marketing Manager will provide insight into how to make the application profitable whether that is through adding advertising or though adding a management fee to trades.

#### Database Engineer

The Database Engineer will be required to develop, manage and maintain all of our databases in relation to user account data and the collection aspect of CollectStra. They will be required to manage SQL databases on Azure cloud infrastructure and assist the App Developer with integration between SQL and the App. Also, they will work with the Security Specialist to ensure that the data within the database is secured and protected from any threat.

#### Security Specialist

The Security Specialist is vital to ensure that CollectStra data is secure and meets industry best practices when it comes to managing people’s personal data that give to us. They will be required to have knowledge on how to work with Microsoft Azure cloud infrastructure along with Android and iOS App security and have experience with directing best practices with the Mobile App Developer to ensure that the security of user data is at the forefront as well as working with marketing to ensure our customers know that their data and accounts are secure.

# 5. Conclusions

After analysing the personalities, desired skills and career plan of each team member we are confident that producing a project such as this is an excellent platform to begin to acquire the skills and knowledge we will require in the future and in our early development works this has been the case.

In the first six weeks of development we have been able to produce a working prototype and have identified plenty of leads to follow in future development phases. Our project will offer unique features that will set it apart from other available apps and we are confident that we can develop or acquire the skillset required to see its success.

By utilising each other’s existing skillsets and focusing on technologies that are of interest to us and developing areas where we fall short, we plan on coming away from this project with a tangible asset to add to our portfolios and ideally a successful trading application.

# 6. Reflection

## 6.1 Individual Reflections

#### Timothy Hall

Reflecting on how the group has performed over the course of Assignment 3 and 5 we have definitely improved over Assignment 2. We took the parts we poorly (task assignment and due dates) and made sure we divided up the tasks fairly and set deadlines for everything.

During these 2 Assignments we had two members who stopped communicating and contributing to the team. After multiple attempts at re-establishing communication with them the team decided to continue without. While this wasn’t a difficult process the problem was that we had all this extra work that needed to be completed so that provided extra stress on the team and this was evident as the deadlines for some tasks started to slide.

Many members of the team were studying other subjects at the same time or had work commitments which mean which meant their time was not focused on this one assignment. Other points could be that we as a team set our bar to high and the amount of time we had to work on our project and what we wanted to produce were out of range with the short amount of time we had to work on this project. But, with none of us having experience in this field it has been a major learning point for all of us should any of us plan on developing an app later on.

During this unit I have enjoyed working with Group #23 and look forward to working with any of them in future units with the IT degree.

#### Benjamin McDonald

Continuing work with the team at TechstraOne on the CollectStra program has been great. The team really pulled together to get this assignment done, despite losing two members. With this assignment the team was much more prepared, and we set a timeline for each element that had to be completed. This helped keep the team on track throughout the assignment. All set deadlines were met and every member of the team did their part to bring this project together. Designing the program was the high point for me. I had a chance to explore Java programming in a more creative way and create a working prototype. It is a shame that we were not able to finish the program however the team provided a plethora of ideas that will be interesting to implement further down the track. Working in a team environment such as this has made me look forward to the teams I will work with in future endeavours. I believe this program has potential and I would like to see how far we could take it once we have a little more knowledge about programming and SQL. This is a project I plan to continue working on in the future.

#### Andrew Wendt

When it comes to group project work most people are somewhat hesitant to work with complete strangers especially completing this task online and not meeting anyone in person. Having worked with the group online now for a couple of months we as a team and as individuals have clearly grown.

Reflecting on the team effort in assignment 2 it was good to use our feedback and to understand that we were on the right path. I believe that the team took the feedback into consideration because the delivery and quality of work increased.

During the third assignment the team faced some issues with member contributions, having two unresponsive members the team was faced with the difficult task of letting the unresponsive team members go. I believe that the current members remaining in the team carried the workload without complaints and provided equal contribution. I believe everyone in the team put all the effort in that they could and given the circumstances that the world is facing it is very impressive. I would happily undertake further progress with these individuals and would be great to meet them all one day.

#### Rebecca Barnett

The work that the team put in before beginning the development phase really helped to identify each team member’s strengths and weaknesses which translated into working really well together during this stage. After losing two group members early in this phase of development, the remaining team members completed their work before all deadlines and each team member made themselves available whenever another member requested it.

Rebecca believes that the prototypes developed really shows great potential and that if the team continue to develop and implement the planned future features it really could be a popular platform.

As this was our second project working together, Rebecca believes that we really improved our processes around sharing documents and utilising GitHub. Our regular meetings were also more focussed versus our first group project, leading to us being able to accomplish more in less time.

Rebecca enjoyed the challenge of working remotely with a group of like-minded students and believes that she has learned valuable skills from her time working on this project, such as the use of API’s to interact with external resources. Rebecca hopes to work again with the members of TechstraOne on future projects.

## 6.2 Group Reflection

#### What went well?

Working together we believe that overall we came up with some really good ideas on how to approach the given tasks. During team meetings we would brainstorm together when trying to come up with ideas and we would regularly seek clarifications from our tutor during the weekly collaboration session. Our communication was excellent and we provided each other with multiple updates each week on how we were progressing and also sought help from each other when we were uncertain. We improved our processes for sharing files and editing the same documents which made it easier for each team member to review others work. The team was able to identify early on that we had group members that were not participating and through communicating with our teachers, were able to rectify the issue before it became a problem.

#### What could have been improved?

The team could probably benefit from ensuring they are up to date with each other’s writings and research before proceeding with their own work as occasionally team members would write similar information or take a slightly different stance on what the essential features of our application was to be. This was not much of a problem but could have potentially saved time, however additional research only improved our understanding on the project. By making sure we are familiar with each other’s latest work it could help to focus our efforts better and allow us to be on the same page.

The team could also benefit from a better document version control process as we discovered that GitHub didn’t automatically resolve document conflicts which became a problem if two people were working on the report at the same time.

#### What was surprising?

Some surprising things we learnt about each other during the course of the project include that Timothy has a flair for GUI design and made an excellent artists impression of what our app could look like. Ben amazed the team with the work he put into creating a functional java prototype and the speed at which he learnt new programming concepts. It was discovered that Andrew was way more advanced at SQL than anticipated and was able to develop a database structure for the project well before the application was up and running. Rebecca surprised the team with her ability to seamlessly work on any part of the project where required.

The team was surprised with how much progress they were able to make in developing a functioning prototype and that the skills they were able to cultivate to make it happen.

#### What have we learned about group work?

Working together as a group has proven that as a team we can achieve more than the sum of our own individual contributions. By utilising the strengths and knowledge of each other we have been able to produce something that would be significantly harder to create on our own. It has also highlighted the importance of accountability and not letting those who are relying on you down as the team is depending on each member to pull their weight, in some cases by delaying in completing your own work it can hold back other tasks from moving forward.

It has been interesting to get to know the team members and see what we can learn from each other. We can hold ourselves to a higher standard after seeing how each other member approaches tasks by taking on board the best ways to complete objectives.

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