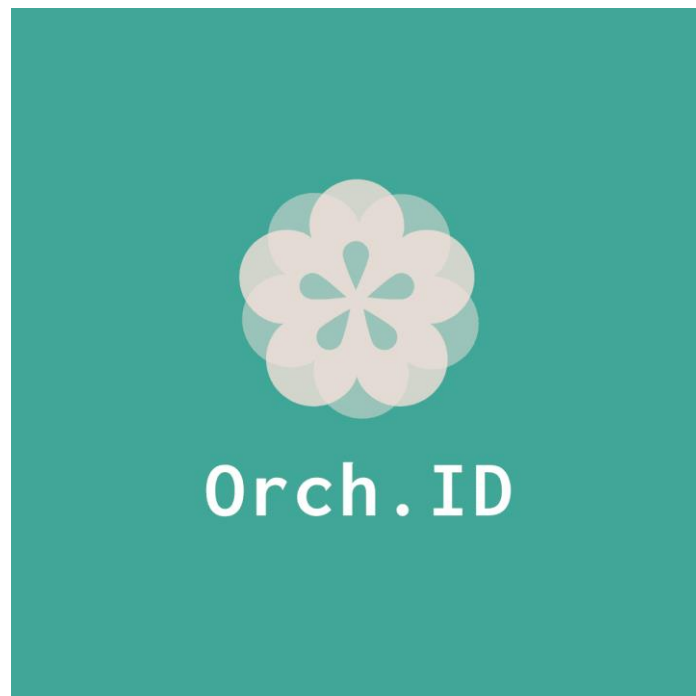




Team Big Potato

Presents World First Orchid Identifier App



COSC2196 Assignment 3

Group 04

Cameron Bell

Dylan Palmer

Kylie Davies

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## Introduction to Team and Profile – Team Big Potato



**We are Team Big Potato:** a team of four RMIT students who have come together to examine some key questions around opportunities and threats in today and the future's IT industry. We have completed studies of facets of the IT industry over the last few weeks including tools, technologies and specific niches within IT including augmented reality, artificial intelligence and machine learning

Together we are developing a Project Idea: to launch an engaging, informative Orchid Identification app, Orch.ID.

This comprehensive report starts with some detail around us. We'll then dive into the nitty gritty of the Orch.ID app including some detail of the features, required technologies and skillsets required for our project idea. Note: To see our individual photos [please visit our website](#).

### Team Members



09:52 AM



**Name:** Kylie Davies

**Student Number:** s3731231

**Email Address:** s3731231@student.rmit.edu.au

**Site Link:** <https://s3731231.github.io/introtolTAssign1/>

Kylie was born in Hong Kong and moved to Sydney, Australia with her family as a young child. She grew up with a variety of outdoor interests but when her Dad brought home a Sinclair ZX81 in 1981 she taught herself to program in Basic. Kylie has worked her way through several IT roles: progressing from first level Helpdesk, to LAN Admin, to Disaster Recovery for Y2K prep, to Technical Process Analyst and PM. Her IT interest lies at the intersection of technology and people and the inherent security challenges and team efficiency opportunities. A move to Queensland in the late 2000s saw her try some work in publishing and marketing. Returning to IT work in 2015, these days Kylie typically project manages small teams on Programs with some sort of transformation such as ERP. She loves bushwalking with her grown up kids.

09:52 AM



**Name:** Dylan Palmer

**Student Number:** s3863801

**Email Address:** s3863801@student.rmit.edu.au

**Site Link:** <https://paddlemate.github.io/Assignment1/>

Dylan was born at Port Macquarie, Australia in 1997. He grew up between New South Wales, Queensland and Papua New Guinea. Most of his time was spent fishing with family or playing any sport I could get my hands on but primarily Soccer and Basketball. As he made his way through highschool he found himself in a trainee / intern program for a local travel company where he started his career working in Payroll and HR helping to manage employees around Australia before finding his next and more permanent position in a Project Development role. He worked at DAE for five years before recently moving across the country to rural South Australia where he now spends his time working Administration and Systems while also undertaking a degree in IT.

## Test Results

Each member of the team also completed a number of personality tests to see how we would work together and develop strategies to enhance our individual attributes.

### Links to Test Result pages

Cameron Bell <https://suzmot.github.io/personality.html>

Dylan Palmer <https://paddlemate.github.io/Assignment1/>

Kylie Davies <https://s3731231.github.io/introITAssign1/myersbriggs.html>

### Team Test Results Discussion

We have a mix of personality types on our team – two of us tend towards Introversion (Cam, Dylan) and only one (Kylie) to Extroversion. This is probably a strength we can leverage from our different approaches.

Cam's DISC results reveal him to be a ready leader and, having completed Assignment 2 together, this is the role he has assumed and our group appears comfortable with that.

Dylan is INTP so will probably prefer to be an independent worker, contributing activity and not needing too much external motivation. This has proven to be the case in our work so far with assigned tasks being completed without much external support required.

Kylie's Myers Briggs results ENTJ-P reveal she may have a tendency to "marshal and direct". This personality trait has been evidenced throughout A2/A3 and Kylie has also again shown these skills towards the end of assignments to assign last minute tasks and close off loose ends.

Having worked together for some time now, it is the group consensus that the personality tests were helpful in determining how a person will work within a group and how to exploit those traits for productivity.

### Group Processes

Our team worked well together in Assignment 2. Despite losing two team members and picking up one replacement, we had good communication and leadership to keep things running smoothly.

Early into our formation we chose to use Microsoft Teams as our main form of communication. Microsoft Teams was already accessible to all of us for free as part of our Microsoft Office account with RMIT and it allowed us to easily chat to each other as a group or individually, have video web meetings as a group, set and assign tasks, and share documents easily between each other.

This worked fairly well; however, we identified a couple of areas for improvement:

### Scheduling

As the team is comprised of mature aged students studying online, it is no surprise that other commitments can get in the way of regular meetings. For this reason, we wanted a more comprehensive way of creating and assigning tasks than the default functionality of Microsoft Teams. As a group we settled on using Trello. Trello is an app that can both be standalone, or added to Teams itself. This was great as it enabled the team to continue to communicate with group/direct messaging in Teams and use Trello for task development.

## Task collaboration

In A2, BigPotato created the tasks in Teams and then assigned the tasks to a team member. When the team member was finished, they would upload a document of their completed work to be added into the final document. However, we felt like this was not giving us the kind of constant collaboration we were looking for. To achieve this constant collaboration in A3, we have added Google Drive/Docs to our tasks. As these docs are stored in the cloud and can be accessed by anyone in the team, we can all work on a document at the same time or help another team member once we finish with our own tasks, or if they are asking for feedback.

Below are some screenshots from Trello that show how tasks were created, assigned and checked off:

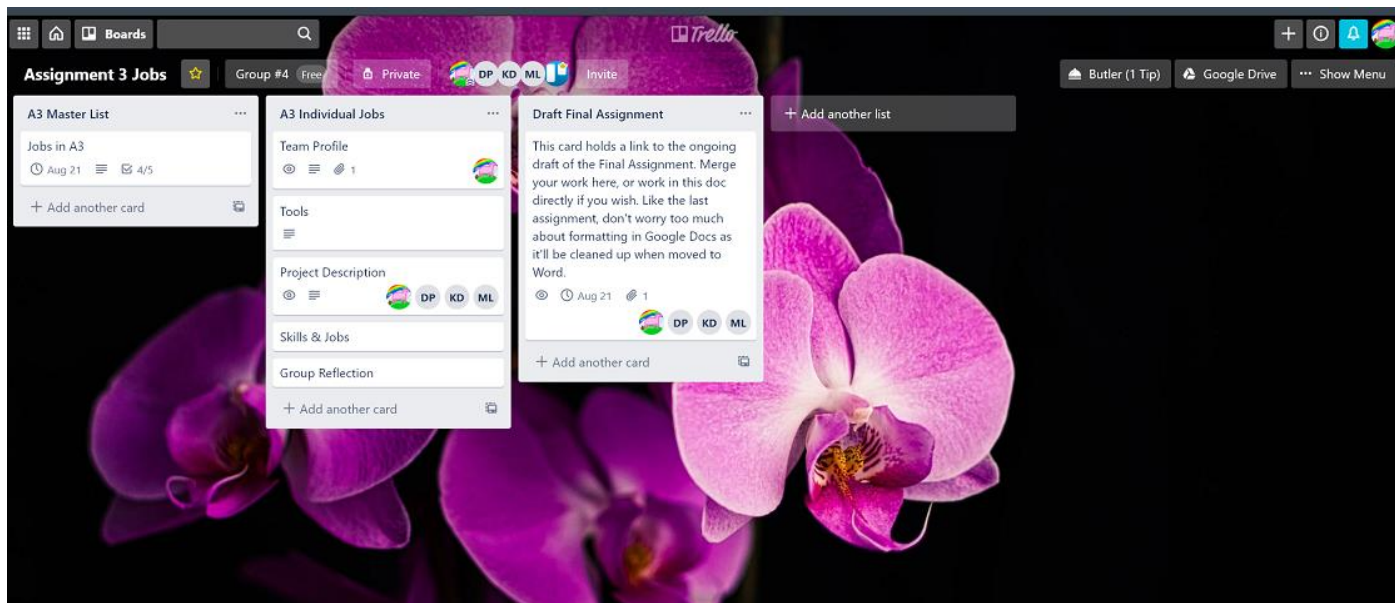


Figure 1 - This is our broader task board. Completed and done tasks are archived and not visible, these are the outstanding tasks.

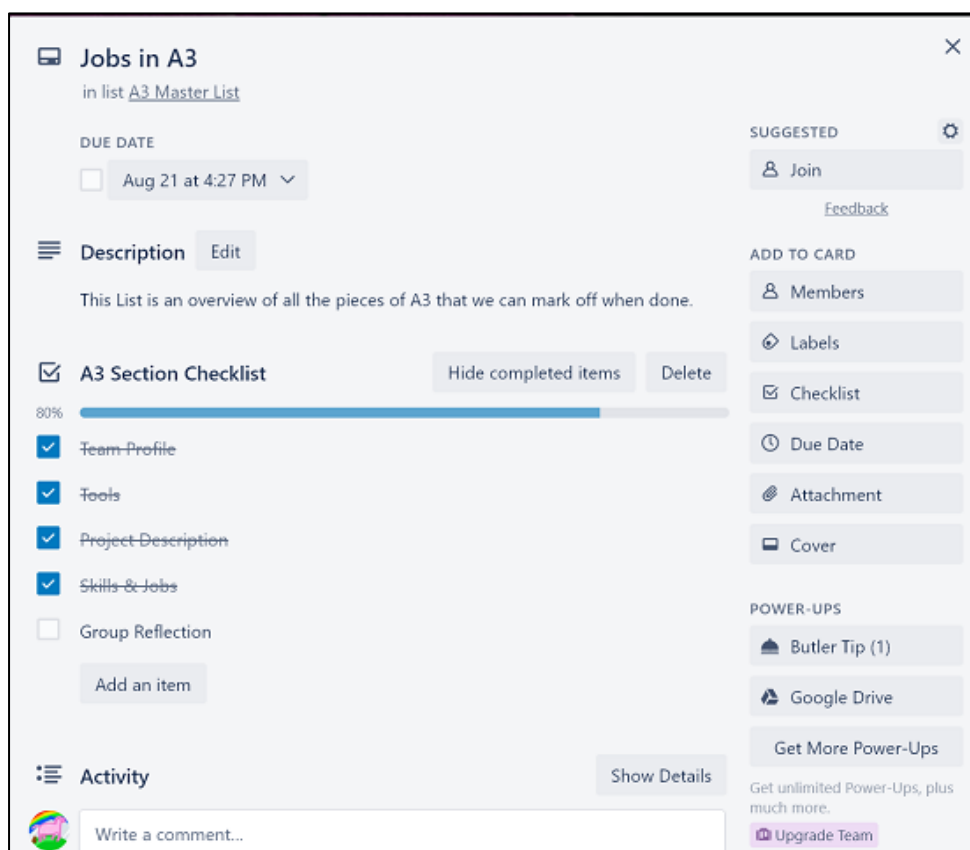


Figure 2 - This is what an individual task in Trello looks like. You can see we check off and add a comment as we compose sections of the Google doc.

## Career Plans

### Ideal Jobs

The ideal jobs each person in our group would like to obtain are:

|                     |   |
|---------------------|---|
| <b>Dylan Palmer</b> | Software Engineer/ Senior Software Engineer |
| <b>Kylie Davies</b> | Security Governance and Assurance Manager   |
| <b>Cameron Bell</b> | Cyberspace Warfare Officer                  |

|                            |
|----------------------------|
| <i>Technically focused</i> |
| <i>Management focused</i>  |

### Common Elements in Career Plans

- Strong analytical and problem-solving skills
- Strong communication skills
- $\frac{2}{3}$  of the ideal jobs are not technical skill heavy
- $\frac{2}{3}$  of the ideal jobs are management roles

### Differences

- Only one person (Dylan) has selected a new tech industry: AI / Machine Learning
- Some require management skills/qualification
- Some internal data management, others managing interface with outside organisations
- Some focussed on data /network security, others general IT

### Ideal Job Breakdown

Please visit each team members individual site to view full specifications:

#### **Dylan:** Software Engineer

- Employer: The Onset
- Focuses on Artificial Intelligence and Machine Learning and Requires strong mathematical skills.

#### **Kylie:** Security Governance and Assurance Manager

- Employer: Transurban Group.
- Covering both Information and Operational Technology.
- Risk assurance and governance and access controls for IT security.

#### **Cameron:** Cyber Warfare Officer

- Requires extensive training e.g. 18 weeks- officer training and 20 weeks for employment training.
- Focus on supporting Air Force operational and strategic information systems.

The team has discussed their career plans to obtain their ideal job, as of course it would be rather difficult to graduate and walk straight into a senior management role.

Kylie has pointed out that she has already been able to successfully implement her new skills in her existing role as Defect Manager by acting as a technical go between, assisting communication between the IT team and the Program Director, with limited IT knowledge. Leveraging these skills further, Kylie imagines being able to progress to more IT focused Project Management roles in her path to Security Governance, or Assurance Manager.

Cameron has a very straightforward, albeit difficult path to his goal to become a Cyber Warfare Officer. The main hurdle is simply joining the military. To this end, Cameron has successfully completed a barrage of testing and been offered a position in the Army Reserves in Hobart. He is due to enlist late August, 2020. Once Cameron has completed his Information Technology degree, he will be able to apply to transition to full time military and apply for roles within the Cyber Warfare division.

Dylan has begun to apply his technical knowledge to his current working position in order to learn as much as he can from the IT industry to better his chances at a role better matched to his goal as a software engineer. On the side, he's begun to learn the fundamentals of Python and Javascript to aid in moving quickly through his university degree to build up a basic portfolio of skills and to learn good programming practice.



## Tools

**Our group website is hosted on GitHub Pages via this URL:**

<https://iit-group-4.github.io/team-site/index.html>

**Our group GitHub Repository can be found via this URL:**

<https://github.com/IIT-Group-4/team-site>

For this assignment, not a lot of changes were necessary to the existing website. Below is a list of the things we did:

- Removed the team members who left the group
- Moved the link to Assignment 2 to the bottom of the page
- Added a link to Assignment 3
- Added a page for Assignment 5's video
- Added links to the wireframe process flow and wireframe demonstration video

As there was not a lot of work needed on the website, the audit trail in the git repository does not accurately reflect the individual work for this assignment. This is better gauged by looking at the tasks in Teams / Trello to see who completed each section.

Something we noticed about the Github audit trail is around the number of commits as a performance metric. For example, take a look at the group contributions graph in Appendix A which covers work done over Assignments 2, 3 and 5. You can see that some people had a lot of commits, but not a correlating amount of additions / deletions. The statistics for each person show the following:

| Student | Commits | Avg Additions per commit |
|---------|---------|--------------------------|
| Cameron | 15      | 102                      |
| Angelyn | 36      | 32                       |
| Kylie   | 25      | 15                       |
| Dylan   | 4       | 7                        |
| Matt    | 31      | 1060                     |

As you can see, the number of commits does not correlate to contributions. This may be because someone prefers to make lots of small commits, versus someone who commits rarely but in more substantial amounts.

Overall, we agreed a better way to gauge productivity is needed when it comes to the workplace.

Besides GitHub, we also frequently used Trello and GoogleDocs. Trello we used to set up and assign tasks, here's a shot of our A3 board in Trello:

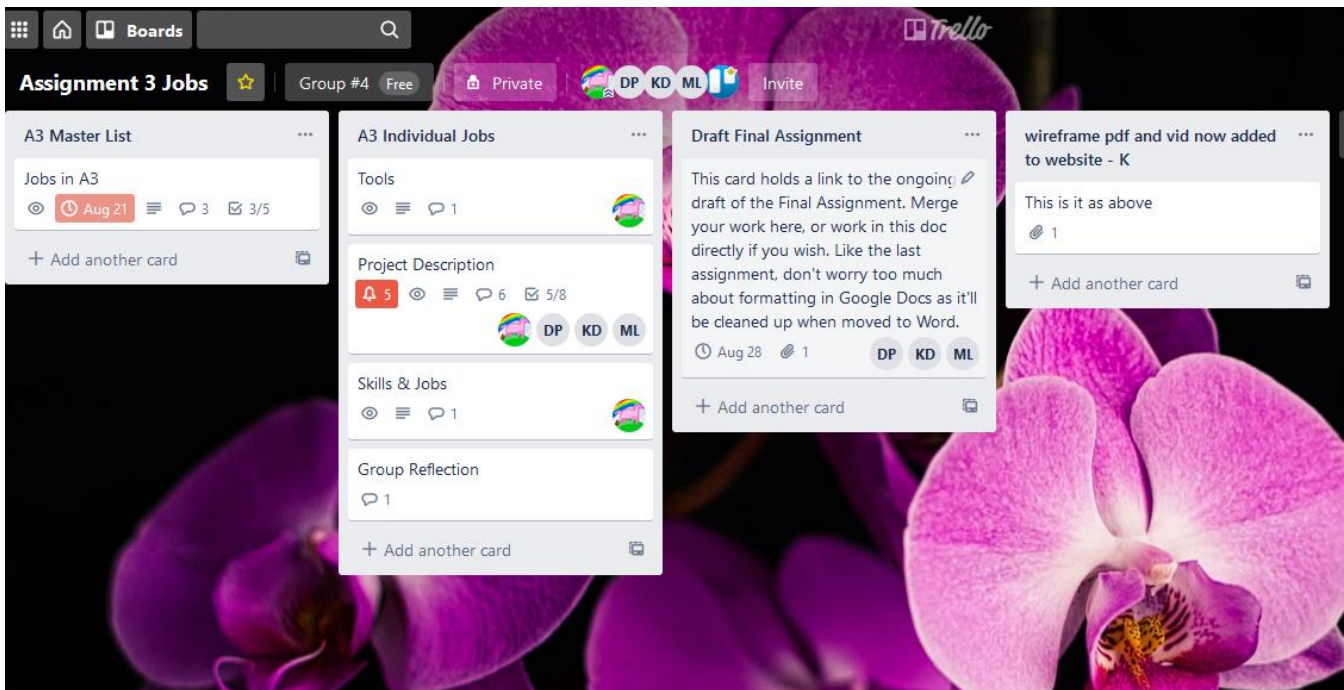


Figure 3 – Trello Board as detailed in Task Collaboration

Trello enables you to create lists with multiple “cards” in them. You can see we broke down the “A3 Individual Jobs” list into smaller pieces by adding a card for each section of the assignment.

Trello also lets you set due dates, assign tasks to people, archive completed lists and lots more. We found Trello very helpful in managing our assignment.

GoogleDocs was used to create a constantly shared, workable document scaffold that we all edited directly as we proceeded through our tasks.

Lastly, we continued our use of Microsoft Teams to discuss issues and arrange meetings / video calls. See Appendix A to view a screenshot of our Teams pages.

# Project – Orch.ID

## Overview

### Topic

We aim to develop a revolutionary mobile application which enables a user to quickly and easily identify an orchid flower.

As there are 30,000 orchid species in the world and 70,000 hybrids, even seasoned orchid enthusiasts can find it difficult to identify an unlabelled or wild orchid. With the amount of man-made (cross-bred) species only growing, for those who are interested in orchids and yet a bit time poor it is only becoming increasingly difficult to try and identify an orchid's genus. It often happens that there are no identifying marks or labels and you must make a guess as to what species you are seeing.

The app will combine modern image identification technology with a social voting based identification method to back it up.

### Motivation

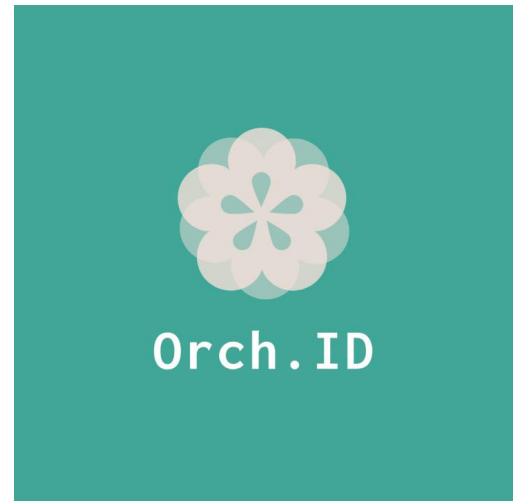
This project is interesting because it combines the potential of a current trend in new technology: Augmented Reality; hooks that via Computer Vision image processing into querying an enormous database, thereby touching on another IT trend: Big Data; all in the format of a smartphone app to ensure wide uptake. Mobile traffic excluding tablets accounted for over 51% of world wide web traffic in 2020, and has been consistently hovering around the 50% mark since 2017 (Clement, 2020). The app also harnesses the passionate enthusiasm of a niche group of people internationally who love orchids and love to learn about new and rare types. It also exploits a universal human motivation that has been clearly revealed by social media: the need to be recognised as knowledgeable on a topic and the need to be admired and for that admiration to be demonstrated in the form of attention. For the Big Potato team, if we can launch Orch.ID we can demonstrate our skills in project management, commercial acuity and of course user centred design and app development.

### Landscape

At least ten apps that identify plants are already available on iOS and Android (You Had Me At Gardening, 2020). They include:

- “Plant Snap by earth.com (claiming 35 million users)
- “Plant Net” by Cirad-France (offers paid Premium)

Our point of difference is that our app focuses purely on orchids. It is doubtful that general plant identification apps could be as accurate on orchids as ours. Not all current offerings offer an AR interface - many allow the user only to photograph a leaf (understandable when focusing across all plant types). Plant Snap has received some poor reviews due to the precise angle and approach needed to scan a leaf and receive an identification and they have improved this (White, 2020). This concerns our team as we may face similar challenges. Advertising: Plant Net has already annoyed users because of their very frequent 30 second long ads and constant upgrade to Premium nagging. We will limit our ads to inoffensive banner style in Release 1.0 and 10 second duration in Release 1.1 (when Premium option will be launched to allow removal of ads). At Big Potato, a great User Experience is our main aim.



## Detailed Description

### Aims

**Our aim for functionality:** is that Orch.ID will enable its user to quickly and easily identify any species of orchid from a photo they take in real time, upload from their device or features they input. Orch.ID will scan the user's photo and compare it with an expansive orchid database to deliver the closest possible match. Orch.ID will also enable users to interact and vote on each others' orchids and further down the track, allow them to trade products on the shopping platform in Release 1.1.

**Our aim for our team, Big Potato's benefit:** within two years we would like this app to have a large (2million+) engaged community of users. We would like to be seeing some growing return on development investment through the shopping tab commissions and advertising, and we would like to seek private equity for our other app ideas based on the demonstrable capability of this first offering.

### Goals - Technical Capabilities:

1. **Obtain and embed the AR scanning capability:** This is key because it brings our app up to the standard of the premium plant identification apps on the market. Anything less than this would not see user uptake. Our initial focus will be on this part of the build to ensure it works smoothly and quickly.
2. **Upload and establish super fast query capability and photo comparison to orchid database (as provided by Jay Phalin):** fast querying and return of suggestions will be essential to retain an enthusiastic user community. We will initially build SQL interfaces into the database and streamline those so that this part of the app does not cause a lag.
3. **Link AR scanning capability to query capability:** This is the moonshot and is essential to give the users that "WOW" factor. When they walk up to an orchid and scan and see the hovering AR panel giving the orchid species candidates they will be amazed.
4. **Robust client and server side data cleansing:** This is essential from the beginning to ensure rogue users do not upload files other than photos and that photos are uploaded to a sandboxed repository that can query the database but has no direct access to the database. This will avoid a disaster like the Slickwraps hack of January 2020 (Gontovnikas, 2020).

### Goals- User Centred Design:

1. **Sleek uncluttered and beautiful User Interface:** At every stage throughout development and particularly from the very beginning the User Experience will be our utmost focus. Before we commence, we will conduct informal surveys of 50 users and observe them using existing plant identification apps. We have co-opted 18 friends and family members each and we are obtaining a Mr Tappy (under \$500 Australian) to help us perform this work (refer image right) by recording user's interactions: where they tap, what their eyes focus on, alongside what they are seeing, in existing plant identification apps. We enjoy a good variety of age ranges and locations within our team. We hope this will facilitate as broad input as possible. After all, we understand as a team that at the heart of any great app is the human community and their user experience.



Figure 4 - Mr Tappy UX Test Tool 1

As Heonsik Joo elaborated in the International Journal of Applied Engineering Research (Joo, 2017):

*"UX's four key axes are Needs, Expectations, Attributes, and Capabilities. Therefore, it recognizes problems with user needs, applies motivation and expectation of users with expectation, and has society, culture, environment, faith and information with user attributes. Capability refers to the limited service, immersion, and time and space margin of a particular user in a particular environment."*

We know our app will compete for attention with dozens of other apps on the screen of smartphone users. Apart from researching interaction, we are working to get to know our market (see Plans and Progress below).

2. **The Social Hook:** We recognise that our app needs to tap into the human need for praise and recognition. This will be the driving force to keep users coming back to Orch.ID. This is an essential goal because we need 2 million engaged users by 2022 to seek private equity.

## Plans and Progress

### Our story

The Orch.ID project began began life in a shortlist of project ideas that included:

- A Cent Auction app
- A platform to connect niche IT professionals with short contracts
- A security system for autonomous vehicles to track and alert for hacking attempts
- Unbeatable tic tac toe app
- Raspberry Pi based animated micro-film festival

This shortlist was whittled down as people left our group, or through group discussions over the viability of each idea.

After much deliberation we decided to go ahead with Kylie's idea of the Orchid Identifier App.

The idea for the orchid identifier came from a personal need of one of our team members who felt frustrated at the lack of easily accessed digital information on orchids. Our team then rallied around that "problem" and developed a method to address it clearly and conveniently.

### Research

We began with research on the orchid appreciation community and existing plant identification apps:

We recognise that orchids represent ten percent of earth's flowering diversity (European Orchid Council, 2020) and we have already described in this report the vast number of species and hybrids. However, as a team we needed to find out our potential market-size: How many people are interested in orchids? We found that difficult to quantify on a global basis so we focused on the United States. The American Orchid Society has 10,000 members; however of this 10,000, 600 are affiliates who head their own orchid societies. We estimated that each of these 600 more local societies could have a minimum of 50 active members each. This gave us a minimum 40,000 registered and active members affiliated with the American Orchid Society. The European Orchid Council is also arranged in member delegate formation. Our own team orchid fan is a keen orchid grower and not yet a member of an orchid society. If we extrapolate this globally we can estimate 10million+ people interested in orchids and if half of those own and operate a smartphone our market size could be a minimum of 5 million+.

In the Landscape section of this report we have described a couple of potential competitors. In general we found that ratings on the App Store and Google Play for plant identification apps are high (4.2 to 5 stars out of 5.) We also found user dissatisfaction with excessive advertising and constant urging to "Go Premium". *This resulted in us adjusting our plans to defer the shopping and video advertising from Release 1.0 to Release 1.1 to enable us to "rust on" our users with a sleek and enjoyable experience.*

Further user research is under way using Mr Tappy as detailed in Goals above and we plan to use this throughout development.



## Ongoing development

Throughout the A2 / A3 / A5 assignments, the vision for Orch.ID has changed and grown. Initially intended to be a scan and identify app in isolation, we added the new feature of community involvement to further improve the successful identification of orchids.

We also added the augmented reality feature in a “Quick Scan” option rather late in the design process however we have already created an initial prototype that you can see in action in our assignment 5 video. A screenshot of this is below:



Figure 5 - Augmented Reality Prototype in action

## Computer Vision Decisions

One of the big decisions that had to be made was around which technology to use to process the scanning and identification of images. Through our research, we identified the below list of possible technologies (Uni-Weimar, 2020):

### **Standard Filter examples from Coding Gestalt**

#### **GPU Filters**

Self-implement filters using OpenGL pixelshaders. Processing comes loaded with a bunch of filters that are commonly used in Image processing programs such as Photoshop or the Gimp. These harness the power of the GPU.

#### **OpenCV Filters**

OpenCV offers all kinds of algorithms from basic image processing to advanced computer vision.

#### **Python ToolsPIL**

The Python Imaging Library provides you with the power to handle and process images.

#### **SciKit-Image**

Scikit-image is a collection of algorithms for image processing.

#### **SimpleCV**

A python wrapper for OpenCV (and a couple of other tools) that makes image processing really easy.

#### **FilterForge**

A commercial application that lets you create filters using a node-based dataflow programming language.

*Figure 6 - Computer Vision (Uni-Weimar, 2020)*

We also observed via Stackshare and other online reviews, the rise of TensorFlow, but it was described as hard to program (see Risks for more information), so as newcomers to app development we quickly ruled that out.

We decided to go with OpenCV. The open nature of the product appeals to us as we don't want to spend too much of our budget on commercial applications. Also, OpenCV appears easy to use and is well documented. There's a risk that it will not be supported in the future, however the community is quite large so we feel that risk is low.

## A Key Functionality Design Decision Validation from an Expert

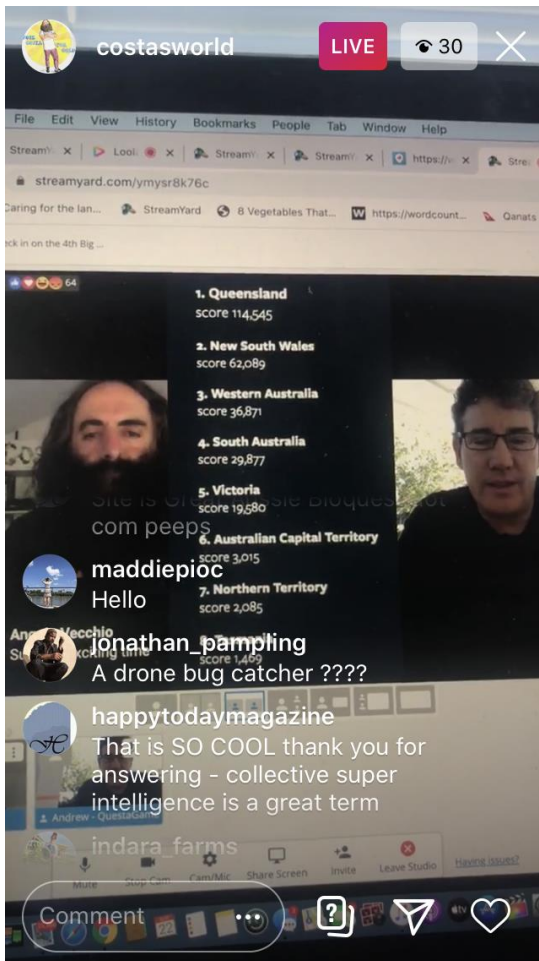


Figure 7 - discussing apps with Questagame

Our project manager, Cameron, made the suggestion that we not only use the Augmented Reality approach, but also allow users of the app to review submitted images for which no orchid species can be determined, and then vote for, or nominate a candidate species. We adopted this approach for further development plans and it is “in scope” for our project. This is a choice that, serendipitously, was validated by an expert as recently as 22/8/2020.

To explain: the week of 15 to 23 August, 2020, is the Great Aussie Bioquest, 2020, an Australian Government Initiative. This citizen science project includes the Questagame app, through which Australian residents can find and upload photos of any small creature in their garden, and if they cannot identify it, the app user cohort and overseeing biology experts will attempt to identify the creature. Several new species of insects have been discovered through this event in past years. On 22 August this year, our app designer, Kylie, attended an Instagram Live event discussing this event and luckily had the opportunity to pose the question via Costa Georgiadis to Andrew from Questagame (pictured at left):

### ***“Does the Questagame app use Machine Learning to improve at identifying creatures?”***

Andrew from Questagame was very animated in response to this question and explained in detail that, while they have Computer Vision in their app (as we will via OpenCV) they find its abilities very limiting so far (“it’s still pretty dumb”), and so they place a lot of value on the collective suggestions of all the participants in the Biodiversity Quest. They continue to work on computer vision and machine learning within the app, but they have been surprised at the power and accuracy of the coming together of a large cohort of interested users and experts who contribute suggestions. He said the results of the latter were incredible and they coined a term for this: **“Collective Super Intelligence”**.

This is a great validation for our team that Cam’s suggestion is essential for going forward.



### Prototype

We used Balsamiq to work together to develop a low fidelity wireframe prototype. This facilitated discussion of features and helped us settle on an approach using optimal feature set and simplicity (see image at right and the full set of wireframes is [available by link from our website](#)). We then strung together our wireframes and recorded a video demonstration of the basic features using Balsamiq's Presentation mode. This forms a clickable prototype. Please view this video also via the [link on our website](#) (<5 mins duration)..

Developing a prototype has allowed us to settle on a common ground to begin with and is a convenient go-to to make adjustments based on our learnings from User Research.

### Human Resource Setbacks

We have lost two key team members on our way to this point in our development. One we expected due to family commitments but the second one was a shock as he was a much valued part of our efforts to reach stage 2 (Assignment 2). We reflected as a team on whether we saw any signs of his impending departure and we cannot identify any. We concluded that changes in team makeup may be more likely with the 2020 challenges of COVID19. At the moment we have split the work of that lost team member amongst us and negotiated further time with our investors. Recruitment of another team member conversant with web and app development would be beneficial for the next stage.

The overall technical and visual design of the app is now complete. Mock-ups and interactive demos of the app are complete and the next stage of the process is to hire extra developers and designers and bring the app to life.



## Roles

The members of our group all have clearly defined roles as shown below:

|              |   |
|--------------|---|
| Cameron Bell | Project Manager                           |
| Kylie Davies | Technical & User Interface Designer       |
| Dylan Palmer | Senior Developer & Database Administrator |

### Cameron

Cameron's role as Project Manager sees him responsible for the following tasks:

- Develop a Project Plan
- Recruitment
- Manage deliverables according to the plan
- Lead and manage the project team
- Determine the methodology used on the project
- Establish a project schedule and determine each phase
- Assign tasks to project team members

### Kylie

Kylie's role as Technical & User Interface designer sees her largely responsible for the design of the Orch.ID app. The user interface, basic function, features and she works collaboratively with the other team members to discuss and refine features while also vetting potential software solutions.

### Dylan

Dylan is the Senior Developer & Database Administrator for the Orch.ID app. Dylan will work closely with Kylie to design and develop the app itself.

As we are a small team, the remaining tasks such as finance, sales & marketing and QA testing are split between the team members as time and competence allows.

As soon as the final framework is in place, we may need to hire an additional developer to work with Dylan.

## Scope and Limits:

### Scope Statement:

---

*'To design an app that will enable its user to quickly and easily identify any species of orchid from a photo they take in real time, upload from their device or features they input. The app will take into account key forms of the orchid, if it is monopodial or sympodial and the colours of the petals; the app will return a shortlist of likely species with corresponding photographs and species' details.*

*To allow community interaction between the users of the app.'*

---

As a team, when we cannot agree as to what micro-features to include, we will revisit the scope statement as well as the detailed scope limits below:

#### In Scope for Release 1.0:

1. Scan live orchid, using AR feature set and compare with database, to return orchid ID candidates.
2. Feature to enable user to use this returned information to photograph and log an orchid, adding name and notes (form interface).
3. Feature to enable user to manually enter details of a found orchid, uploading photos and notes (form interface).
4. Limit orchid logging to 50 per user for Release 1.0 to save on data management and storage costs.
5. People vote feature where user cannot identify orchid and it is also not found in database; user community inputs candidate species for person who logged the orchid find. Simple commentary device.
6. GPS logging of location of user when they upload orchid photo (if they give permission).
7. Capacity for users to browse through other users' orchid collections and like/upvote them.
8. Banner ads, closeable. Free use to all.

#### In Scope for Release 1.1:

1. Increase orchid logging to 200 per user.
2. Orchid Subtype Help. Not in Release 1.0 in order to save development cost and time.
3. Travel page to allow travel companies to advertise trips that may contain an orchid related component (jungle safaris, garden tours etc). This is to be pay per advertisement to return some income to app development.
4. Direct private (to broader community) messaging between users.
5. Shop for users to list their orchids and orchid related products for sale. Maximum 20 listings per user in Release 1.1 (allows us to manage the admin overhead and ensure a wide community of vendors rather than one vendor flooding the page. Big Potato takes 1.5% commission per sale.)
6. Transaction facility for shop to automatically deduct commission then automatically pass along funds.
7. Video ads added, 10 second duration limit so as not to drive away user community.
8. Premium version launched - pay X small fee per month to remove all ads.

#### Out of Scope

Manual listing by Big Potato of any shop items; this is strictly a "user pays, user uploads" facility. If a user is not technically competent to do so we cannot assist.

Telephone support of any kind. We do not have the budget to speak to users.

## Tools and Technologies

### Image Capture:

- ROAR Augmented Reality app to scan orchids with users' smartphones.

### Image Analysis:

- OpenCV - C/C++ or Python skills required; Dylan and Cameron have an intermediate level of experience in C++ and Python
- SciKit-Image - Scikit-image is a collection of algorithms for image processing and can be integrated with OpenCV (Stackshare, 2020).
- Python ToolsPIL - The Python Imaging Library provides you with the power to handle and process images.

We are also reviewing whether to use SimpleCV, a python wrapper for OpenCV (and a couple of other tools) that makes image processing really easy.

### Database of orchid images:

Access to an extensive database of orchid images. Currently the most famous example of this would be Jay Phalin's Orchid Species Photo Encyclopedia (Phalin, J. 2020) - this will be our initial set of data.

### Tools to develop and deploy to Platforms:

#### To build for iOS:

- Apple Xcode 11 for development. (Apple, 2020).
- Swift UI. (Apple, 2020)

#### To build for Android:

- Android Studio. (Android, 2020) The code editor that comes with Android Studio provides code completion for Kotlin, Java, and C/C++ languages so it would be important to be fluent in at least one of these. Kylie is conversant with Java and Dylan and Cameron C++.
- Github.

We are also reviewing whether to use "Multi-OS Engine" to write the code once in Java to work on both iOS and Android platforms. (Medium.com, 2017).

### To Test:

As detailed in Group Processes above, we use Trello for collaboration and will use Jira for test planning, execution and defect management.

### Required Hardware:

As a team we all own high enough spec hardware to communicate as a team and develop the software. We each own a mix of Android and iOS devices on which to test the app. The database may need to be stored on a shared cloud server (such as AWS).

User Experience Testing Device, Mr Tappy, will be used to test user response (detailed above under Goals - User Centred Design).

# Testing

Our project will be tested using a variety of testing methodologies, this will help to ensure our software is able to successfully operate in multiple different environments and platforms. A software testing methodology outlines the approach taken to test something to ensure it works and looks as expected under stress and in different scenarios and environments. This covers everything from back-end (code and functionality) to front-end (user interface, usability).

Testing methods can be split between Functional and Non-Functional.

**Functional testing** generally involves running the application or software against business requirements to ensure all functionality works as expected, in order this might include:

1. **Unit Testing** – The first level of testing completed by our app developer. Ensuring individual aspects of the code function as intended.
2. **Integration Testing** – The combination of individual sections of code to ensure their intended functionality and integration are smooth and error free.
3. **System Testing** – A thorough test which looks to evaluate the system as a whole to ensure it meets scope requirements.
4. **Acceptance Testing** – The final stage of functional testing that asks a simple question – “*Is the software ready for delivery?*” Does the delivery meet the end user’s needs?

Where **Non-Functional testing** focuses more on the operational capability of the software. In order this might include:

1. **Performance Testing** – How will the app behave in different conditions? *E.g. Network, Load, Camera Lighting, Extended Use etc.*
2. **Security Testing** – If we intend to house important information how will it be kept safe?
3. **Usability Testing** – Is the application easy to use from a user’s perspective? What can be changed to better that experience?
4. **Compatibility Testing** – Will the app function the same across Android, IOS? Are there any other platforms we can cater to?

Using the “V-Model” test methodology (pictured at right), we will develop tests and execute them throughout the design and development phases to ensure validation and verification of each component are complete before we are too far along the design phase and will therefore save on our already limited budget.

In Week 10, we will recruit another resource – for the purposes of this report (refer Timeline) we have called that person “Mary” and she will need experience in test development and test management.

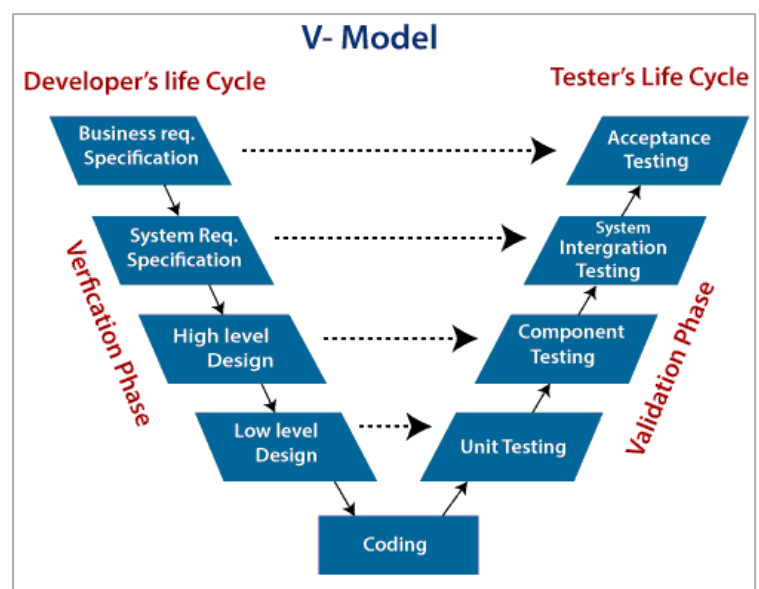


Figure 8 - V-Model for Testing (Javatpoint,2020)

| Timeline                    |   |   |                       |
|-----------------------------|---|---|-----------------------|
| Week                        | What's Happening  | Reason  | Allocated person(s)   |
| Week 1<br>through<br>Week 6 | - Already complete  |   |                       |
| Week 7                      | <ul style="list-style-type: none"> <li>- Final stages of development and planning to be completed</li> <li>- Ensure time, budget and materials are properly catered for the remainder of the predicted timeline</li> <li>- Meeting with all key stakeholders to ensure vision is still headed in the right direction</li> </ul> | <ul style="list-style-type: none"> <li>- This stage is a final check-off before the true development and testing will begin. All logistics and timeframes should be ironed out before proceeding</li> </ul>   | Kylie, Dylan, Cameron |
| Week 8                      | <ul style="list-style-type: none"> <li>- Familiarity with tools and technologies (mainly development platforms)</li> <li>- Application of knowledge of tools and technologies to create a basic structure and framework</li> </ul>  | <ul style="list-style-type: none"> <li>- Gain familiarity and begin development with Xcode/Swift UI for apple deployment</li> <li>- Gain familiarity and begin development with Android Studio/Github for Android deployment</li> <li>- Multi-OS engine (if decided as the best path forward for multi-platform development)</li> </ul> | Dylan, Cameron        |
| Week 9                      | <ul style="list-style-type: none"> <li>- Continue to build out basic structure and framework</li> <li>- Start to build out and train image recognition using OpenCV, Sci-Kit, Python ToolsPIL for image analysis and processing</li> <li>- Begin planning and task delegation for primary development cycle</li> </ul>          | <ul style="list-style-type: none"> <li>- This is the beginning of all core functionality, time spent should result in functional modules</li> </ul>   | Dylan, Cameron        |

| Week    | What's Happening  | Reason  | Allocated person(s)   |
|---------|---|---|-----------------------|
| Week 10 | <ul style="list-style-type: none"> <li>- Continued development of core systems</li> <li>- Some modules and systems working</li> <li>- Testing begins on complete modules</li> <li>- Recruitment for additional system tester / programmer</li> </ul>        | <ul style="list-style-type: none"> <li>- Core development continues</li> <li>- Modules and segments are tested</li> <li>- Changes applied based on initial feedback</li> <li>- Recruitment of "Mary" to aid system case testing and development overflow</li> </ul> | Dylan, Cameron        |
| Week 11 | <ul style="list-style-type: none"> <li>- Continued development of core systems</li> <li>- Modules and systems complete</li> <li>- Continued development and problem solving based on testing feedback</li> </ul>  | <ul style="list-style-type: none"> <li>- This stage of development we should have modules working individually ready to apply wholly to the application</li> <li>- Mary begins case testing (using an application like "Testuff")</li> </ul>                        | Dylan, Cameron, Mary  |
| Week 12 | <ul style="list-style-type: none"> <li>- Core functionality complete</li> <li>- Testing continues, on core system functionalities</li> <li>- Development continues based on internal test feedback</li> </ul>   | <ul style="list-style-type: none"> <li>- Base functionality of the app working in both IOS and Android environments</li> <li>- Mary to continue testing and aiding in basic development tasks</li> </ul>  | Dylan, Cameron, Mary  |
| Week 13 | <ul style="list-style-type: none"> <li>- User interface complete</li> <li>- Testing continues, on core system in the new user interface</li> <li>- Development continues, on both core system and user interface based on internal test feedback</li> </ul> | <ul style="list-style-type: none"> <li>- User interface developed to allow for a beautiful and seamless user interface allowing the end user to successfully and easily complete their task at hand</li> </ul>  | Kylie, Dylan, Cameron |

| Week    | What's Happening   | Reason  | Allocated person(s)   |
|---------|--|---|-----------------------|
| Week 14 | <ul style="list-style-type: none"> <li>- Beta Test released to a closed control group on both Google Play Store and Apple App Store for both Android and IOS devices.</li> <li>- Gather critical information across application including stress testing</li> <li>- Apply fixes and changes based on public feedback from Beta test and stress test results</li> </ul> | <ul style="list-style-type: none"> <li>- This will help to identify and major flaws or obvious improvements to the application.</li> <li>- Apply knowledge based on stress test results to ensure final release runs smoothly and efficiently</li> <li>- Having had a control group properly stress test our systems, screens and processes we are now able to iron out any obvious or major flaws to aid in a smooth final delivery of the application.</li> <li>- Continued development based on incoming feedback during the week</li> </ul> | Kylie, Dylan, Cameron |
| Week 15 | <ul style="list-style-type: none"> <li>- Final write up and checks for report and other supporting documentation</li> </ul>  | <ul style="list-style-type: none"> <li>- Ensure reporting is complete and up to date as the project has evolved over recent weeks</li> </ul>  | Kylie                 |
| Week 16 | <ul style="list-style-type: none"> <li>- Full app release to Google Play Store and Apple App Store for both Android and IOS devices</li> </ul>   | <ul style="list-style-type: none"> <li>- The final release of the application to the public, this marks the release of version 1.0, all changes from this point forward are to apply innovations and keep the application up to date with modern technologies.</li> </ul>   | Kylie, Dylan, Cameron |

The above table lays out our sixteen-week timeline and we have highlighted key milestones in the graphic representation in Figure 9 on the next page.





Figure 9 - Our Timeline Highlights

## Risks:

### 1. OpenCV - has a smaller market share: therefore does it have ongoing viability versus TensorFlow?

We are using OpenCV (CV = computer vision) as the basis of our image recognition and processing feature set. We selected OpenCV because of its positive reviews in the industry (Stackshare, 2020) and from discussing with industry colleagues we believe it is relatively easy to use and we know we can find support documentation and examples to use - hence we feel confident our skill set will be able to get the tool built using this product. Also, it is free to use and open source. However, because OpenCV is currently featured in only 25% of the number of stacks as TensorFlow (Stackshare 2020), there is a risk that we will build our app on a tool that diminishes in market share, risking that support for further development for OpenCV may be withdrawn, resulting in our app being stranded on a peninsula where no further feature development is possible. We plan to review this risk every six months and we use Stackshare as a reference point. At this time the enthusiastic response and commentary on ease of use of OpenCV compared to TensorFlow has us staying with OpenCV – refer to Figure 10 on the next page.

### 2. How annoying will Computer Vision be for the user to interact with?

As explained in the “Landscape” section above, Plantsnap, a potential competitor app for Orch.ID, received negative reviews due to the finicky nature of its computer vision. The plant part must be angled in a certain way and no other items can appear in the photo. Plant Snap have addressed this over the last two years (White, 2020) through providing comprehensive user education. We are certain to share this challenge because Computer Vision algorithms are not intelligent enough yet to be user-friendly, as explained by Andrew from Questagame above in the “Plans and Progress” section. We will include the People Vote feature and may lean heavily on its power for a few years, to mitigate this risk.

### 3. Database Storage and Information Extraction time - can we store enough and ensure a quick response?

With the Orchid Encyclopedia as a starting point, we will already need to store the attributes and images of 50,000 orchids and ensure a fast query return. We have addressed this in Tools and Technologies by nominating cloud storage such as Amazon Web Services to store the database. However we will need to heavily test the query code we develop and the times it takes to return a candidate species after scanning. There are several pieces to string together, from Augmented Reality, to Computer Vision, to SQL, to the database and we must not bore our users by making them wait too long.

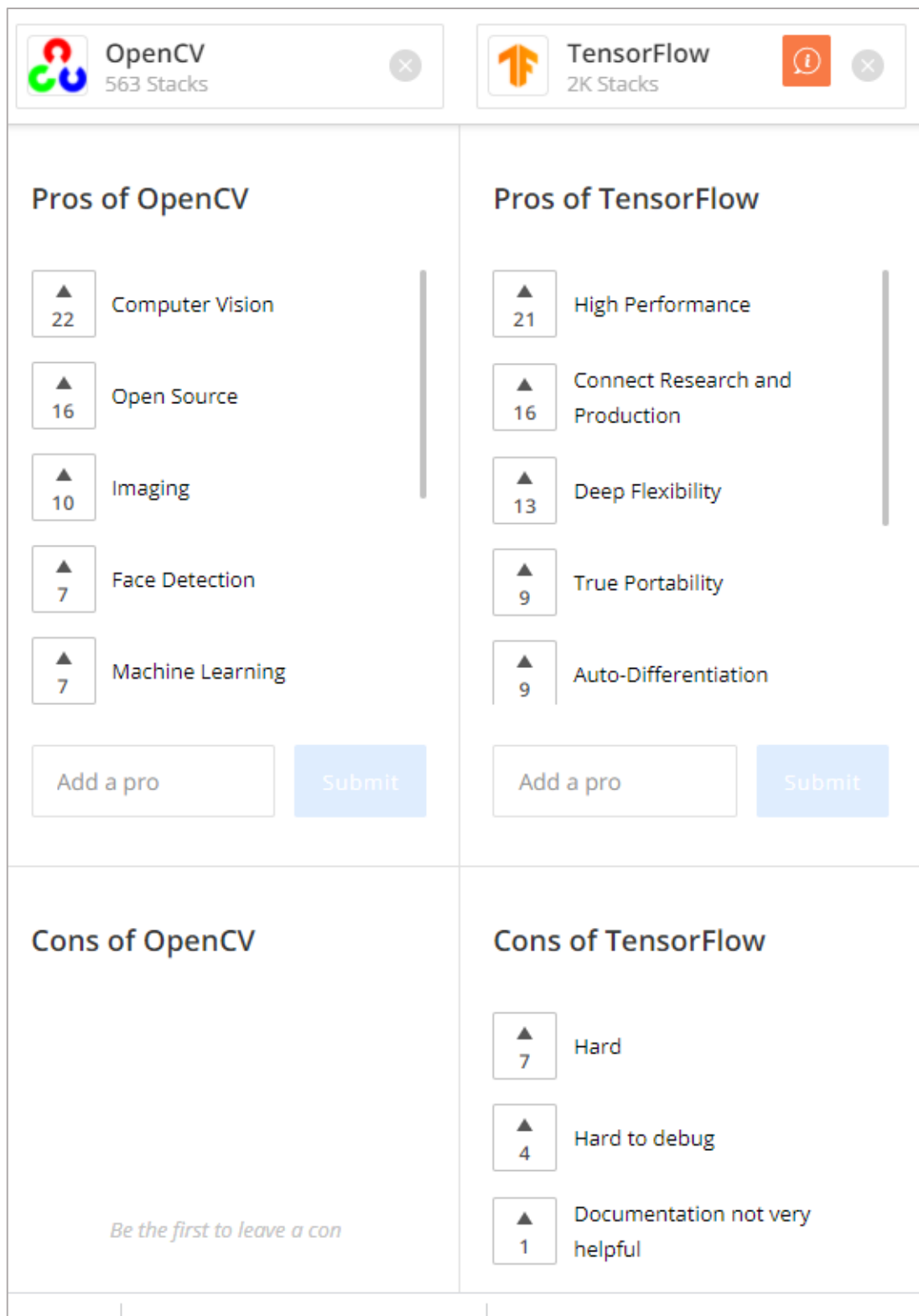


Fig 10 - OpenCV is not as widely adopted as TensorFlow. This could pose a future risk. (Stackshare 2020)

## Group Processes and Communications

During our Group Assignments, our communication process was refined over time. By the end we had twice weekly meetings via Zoom and other communication was carried out through Microsoft Teams & Trello.

Once funding for this project is secured and we are able to hire additional staff and work closer together, we will adopt the Agile methodology. This includes daily scrum meetings and short sprints of work to produce deliverables. We feel that this method of project management and communication is very effective for this type of project and team.

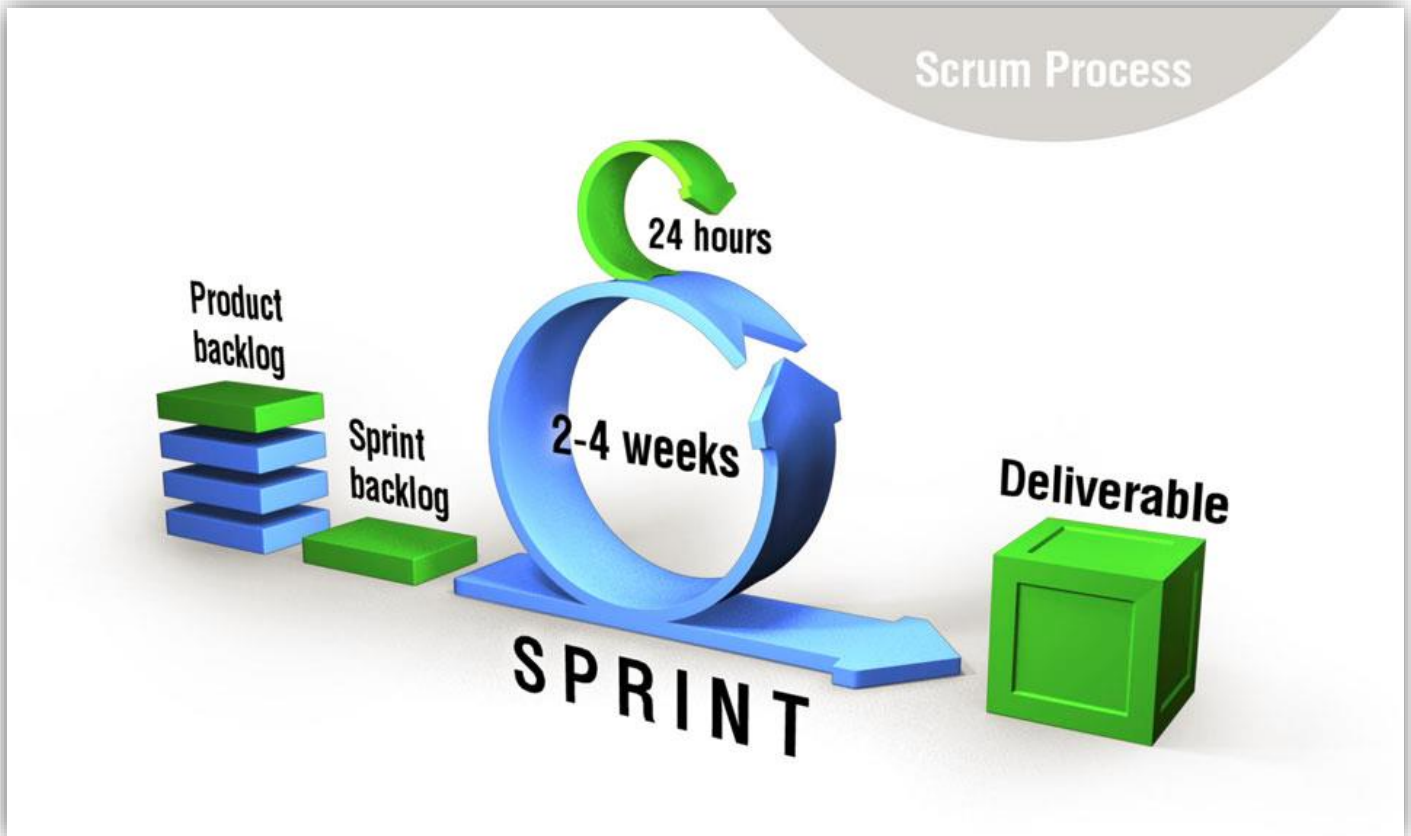


Figure 11 – Agile Methodology (axem.com.au, 2020)

## Skills and Jobs

If funding for this project is approved for the next six months, it is necessary for us to hire additional staff to share the workload and really drive the project forward. Below are four suggested roles we need to hire for and a position description. The position descriptions are short, as each listing will also include this description of BigPotato:



*Have you always wanted to get in on the ground floor of an amazing Start-Up?*

Well, now is your chance. BigPotato is hiring for an exciting new mobile app project that will be used by people around the world: Orch.ID

Orch.ID is a mobile app that allows fans of orchids to quickly and easily identify any orchid they see. Using advanced image identification technology and leveraging the power of the community, no orchid is too rare!

What's on offer?

6 Month Initial Contract

Flexible Working Arrangements

Attractive Pay

Must be Australian Citizen

---

### Position 1: Mobile App Developer

Do you have a passion for developing exciting new apps? Can you develop for both Android and iOS? You might be just what we're looking for!

**About the role:** We are seeking an experienced Mobile App Developer to join our team. You will work collaboratively with our Lead Developer and our Technical Designer, however you will also have a high degree of autonomy in your work. You will be able to work to a roadmap and help deliver and refine our app. The initial design, structure and tools are laid out, we need someone to hit the ground running and help bring this project to market.

#### About You:

Experience developing and delivering mobile applications with the following technologies:

- Python / C++
- OpenCV
- Android/iOS development
- MySQL

- Apple Xcode
- Android Studio

Experience in operating effectively within a small multi-disciplinary team using excellent verbal and written communications skills combined with strong analytical and problem solving skills.

**Desirable skills in the following:** Releasing apps through Apple and Google play stores, GitHub, MYSQL, ROAR, Python ToolsPIL, SciKit-Image, Java

Experience working in an Agile working environment, with an understanding of the Agile frameworks.

If this sounds like you, we'd love to hear from you.

---

## Position 2: Sales & Marketing Manager

As the Sales & Marketing manager you will have broad ownership of the marketing and monetisation of Orch.ID from the ground up. You will be able to:

- Lead the **conception and execution of innovative and compelling** monetisation ideas for the Orch.ID app
- **Refine** BigPotato's positioning, **identify and segment target audiences**, and develop data-led marketing plans with specific objectives across different channels and segments
- Create, maintain, and conduct **analytics reporting** across multiple platforms and extract key insights for future campaign development and **go-to-market strategies**, complete with **formal proposals** and recommendations on tactics
- Build **strategic relationships** and partner with key industry players, agencies and vendors

### About you:

- At least 3 years' experience in digital sales & marketing roles.
- Experience in preparing and managing marketing budgets.
- Experience developing digital marketing campaigns directed at foreign companies and customers, including from Asia, South Asia, USA, UK, Europe, and the Middle East.
- Strong organisational skills, the capacity to successfully manage competing priorities, plan workload, maintain attention to detail and meet deadlines.
- High level written communication skills; ability to prepare, review and edit correspondence and reports in an appropriate style.

You've probably also got a better way of writing the copy of this ad - we'd love to see some samples of your work and get to know you better, so please provide a **cover letter with your application**.

---

### Position 3: Systems Administrator

Do you love networks, storage and being the person behind a product that just makes everything hum? If so, then you sound just like what we're looking for!

You will be responsible for all things network and storage. The Orch.ID application leans heavily on databases and social media as part of its technology. Ensuring we have speedy response times for potentially thousands of concurrent users and constant uptime is very important.

You will work with our existing Senior Developer and Database Administrator and take ownership of the Database yourself. Working from the ground up to build a robust system that will handle the growth of the userbase around the world.

#### About you:

- Experience – Proven experience (3 years) in systems administration within similar environments.
- Technical:
  - Experience with mySQL databases.
  - Experience with Python scripting.
  - Windows experience (some Linux knowledge will be beneficial)
  - Experience using Github as a code repository
  - Web server experience IIS/Apache/Nginx etc
- Scripting / Programming - Experience with automation scripting / programming languages to support network service and best practices (i.e. PowerShell, Python, Bash etc.).
- Training and Certifications in related disciplines highly regarded (VMWare, AWS, Microsoft).
- Troubleshooting - Excellent fault diagnosis and problem-solving skills.
- Teamwork - Ability to work effectively as a member of a team, as well as independently.

If this sounds like you and you're ready for an immediate start on this exciting project, get in touch!

---

### Position 4: Graphic / Interface Designer

BigPotato is looking for a Designer to help design, create and refine our Orch.ID app. With a number of unique features and operating on both iOS and Android, the app needs to be sleek, fresh and grab attention.

We have done a lot of the groundwork with wireframes, storyboards, user flows and basic design and your skills will be used to work in conjunction with our Technical Designer to bring this vision to life.

#### About you:

- You will have 2 years of demonstrated experience in creating and implementing UI Design with a strong portfolio.
- Proficiency in **Photoshop, Illustrator, Axure** or other visual design and wire framing tools.
- Working knowledge of **HTML, CSS and JavaScript**.
- Ability to present your designs and sell your solutions.
- Up to date with the latest **UI trends**, techniques and technologies.
- Experience supporting and participating in user research and service design activities.
- Experience developing **Design Systems or Style guides**.
- Understanding of and experience designing and implementing to meet web accessibility standards.

- Experience with augmented reality highly regarded

If this sounds like you and you'd like to put your personal stamp on a new and innovative product please get in touch with some examples of your work.

---

## Group Reflection

At our final video conference, we had a discussion about how our group performed during Assignment 3 and reflected on a few of the changes we made and challenges faced.

Most notably, we faced the challenge of losing yet another group member. Cameron feels this was especially difficult as the group member did not notify us they were leaving and simply vanished, without responding to communication. Fortunately, after Kylie approached our teachers we were granted a small extension to divide up the remaining tasks and complete Assignment 3.

Kylie pointed out that despite the fact we lost another team member, she feels we worked incredibly well together and was surprised how smoothly things went. She felt that Assignment 3 was smoother than Assignment 2 and wonders if this might be related to the growing familiarity with each other and building a rhythm within the group, or whether it's simply easier to have a smaller group.

To get over the lost team member hurdle, each of the remaining team members were given extra work to do and seamlessly completed their part including Dylan taking over for one of the major speaking roles in our Assignment 5 video after the assigned group member left.

The changes we made for tackling Assignment 3 included moving from using Teams built in project management to Trello, by adding the extension into Teams. We all agreed that we found Trello to be more useful than Teams in terms of creating and assigning tasks for assignments.

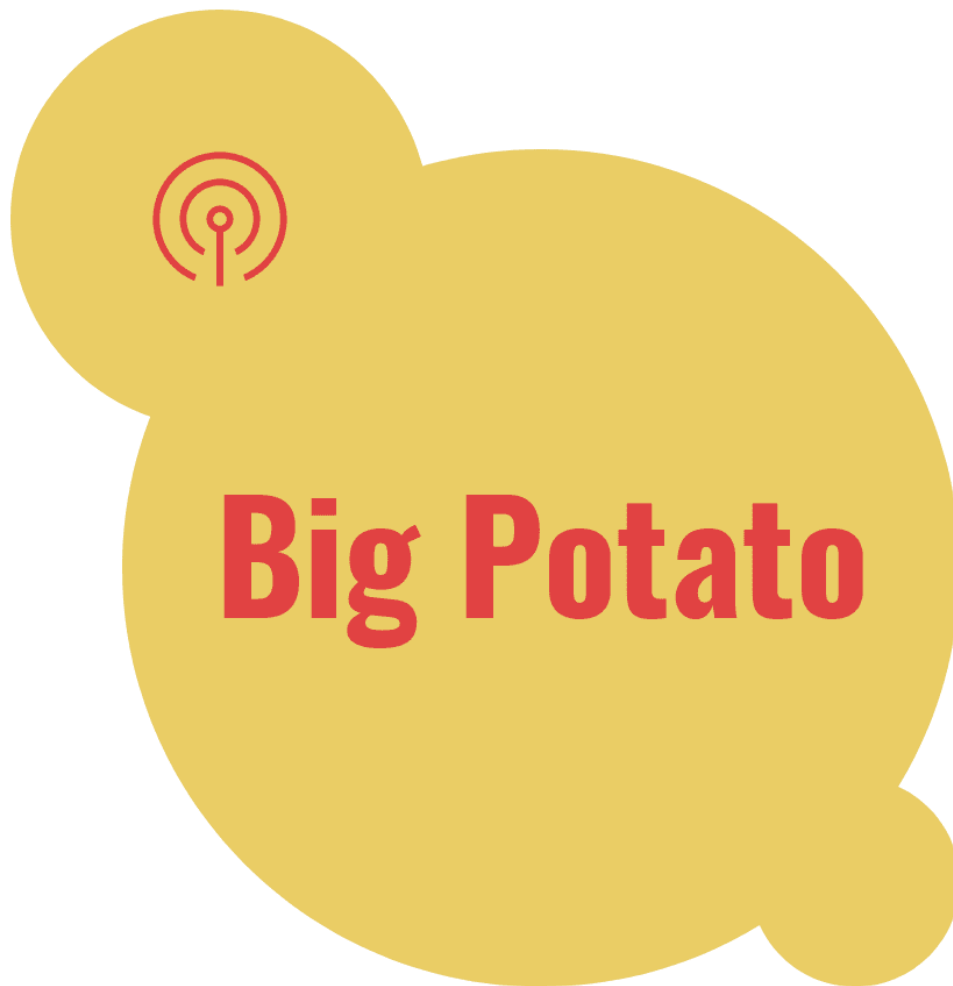
At the end of Assignment 2, Kylie created a shared Google doc for us all to collate our final work. We liked that idea so much that we created a shared Google doc scaffold from the very beginning of A3 and most work on this assignment was added directly to it as we progressed through our tasks. Cameron mentions that he was surprised how well this worked with everyone contributing to a master document. This made helping each other and referencing other parts of the ongoing assignment much easier. Dylan came up with the idea of using different coloured text for all of our contributions so we knew who wrote which parts and could talk to that person if any questions arose.

Overall, we reflected deeply about our specific circumstance of having multiple team members leave and the challenges that caused. We agreed that we were fortunate to have the remaining team members we did as we are all quite conscientious. If we had a low performing team member with us it would have been very difficult to proceed. The team members that remained included those who were naturally inclined to organise, plan and push the team forward and if that guidance was not there, we may not have achieved our goals.



## Conclusion

Team Big Potato is building Orch.ID. We have refined our plans and fleshed out the detail in this report. This is the first of many ideas we have up our sleeves. Although we are now only 3, please continue to: Watch this space.



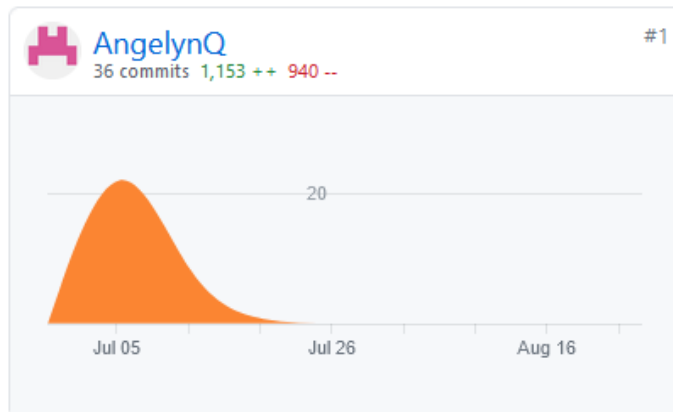
## Appendix A – Log of Group Contribution and Team Process Activity

### GitHub analytics displaying amount of GitHub contributions per contributor

Suzmot - Cameron Bell

s3731231 - Kylie Davies

paddlemate - Dylan Palmer



## Microsoft Teams Used to Meet Face-to-Face, Record Meeting Minutes and Set tasks

KD

Kylie Davies

Yesterday 21:49

Everyone: into the google doc Kylie will share: 1. write 100 to 200 words reflection on how it went. 2. Do an intro paragraph re yourself 3. Look at the roughed out Project idea section of doc and contribute your ideas words if you have them re tools required (this by Wednesday morning). 4. Put your references in the references list (I will take them from references list doc into shared doc) - please have 1, 2 and 4 done by Thursday afternoon (3. by Wed am) so we can talk final details Thursday night

↩ Reply

KD

Kylie Davies

Yesterday 21:50

**Matthew Lomas** 1. add dylan's headshot in to website 2. make a google form for anonymous contribution estimates.

↩ Reply

KD

Kylie Davies

Yesterday 21:52

**Cameron Bell** 1. get your headshot to Matt 2. add in the smarts for app programming languages from your A1 into Orch.ID Project idea and your good idea re peeps voting if scan cannot decide. 3. Do the final review and submit

↩ Reply

KD

Kylie Davies

Yesterday 21:54

Me - 1. get favicon file for Orch.ID to Matt for website 2. make skeleton doc for final assembled doc and put on google drive. 3. Spend Friday reviewing report layout (final secretarial / layout check - table of contents with styles linked to headings, references in alpha order, Exec summary intro and conclusion in place - title page etc and send to Cam.

↩ Reply

## Microsoft Teams used to Share Documents amongst the team

DP

Dylan Palmer

02/07 22:05

Here is a link to the notes I took during that meeting, hope someone finds it of some use 😊  
[https://docs.google.com/document/d/1O8fxFFTA-nYgAKalixBFCSs\\_S9R6OdkgRie9A9-YUaQ/edit?usp=sharing](https://docs.google.com/document/d/1O8fxFFTA-nYgAKalixBFCSs_S9R6OdkgRie9A9-YUaQ/edit?usp=sharing)

▼ Collapse all

HG

Heath Griffiths

02/07 22:07

OMG Dylan. These notes r super-professional! Awesome job 😊

DP

Dylan Palmer

02/07 22:10

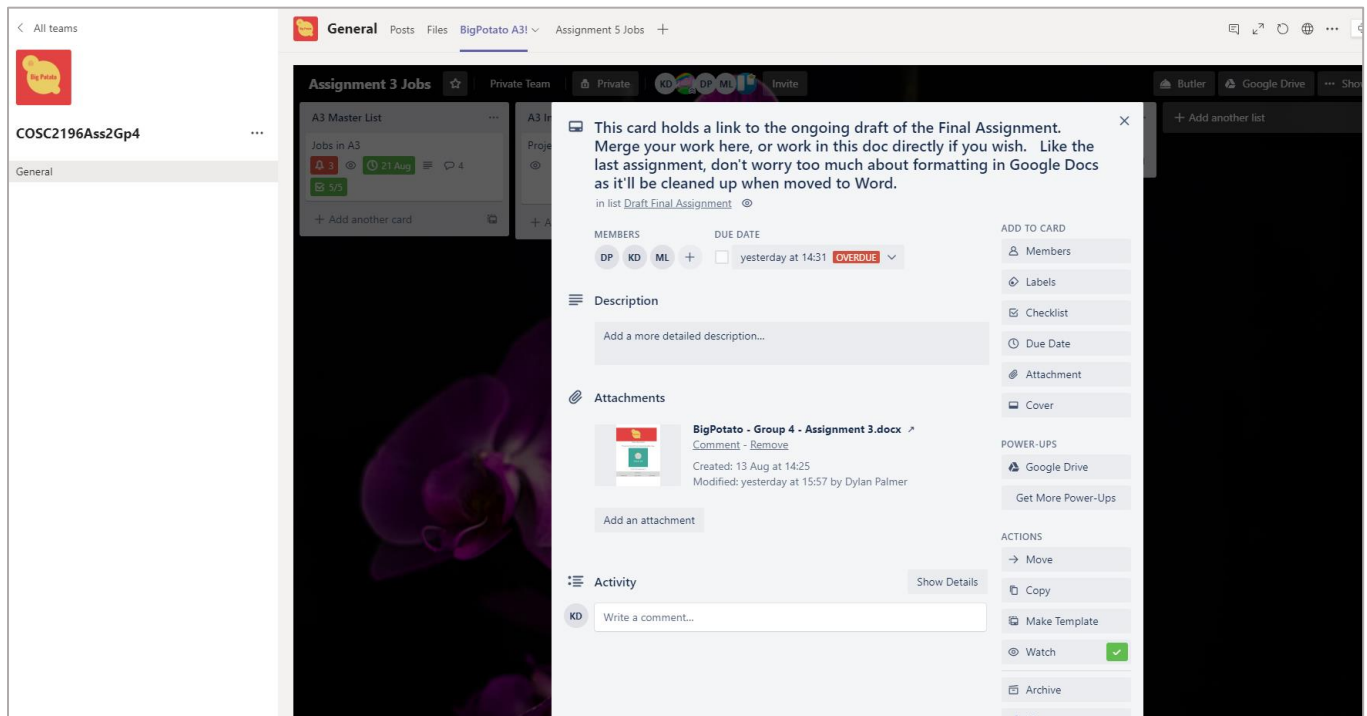
Hopefully my fingers kept up with my ears enough for it to make sense 😊

↩ Reply

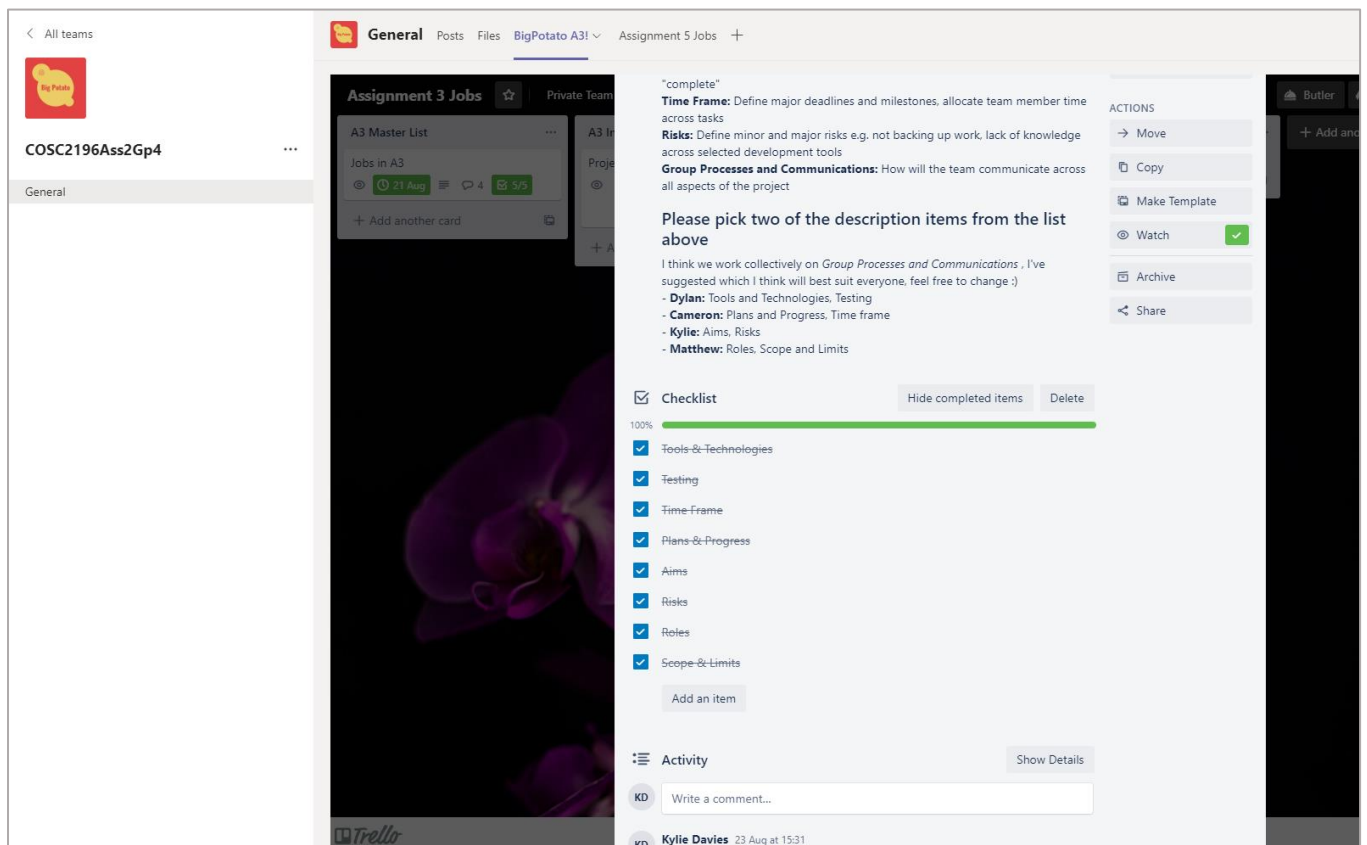
## Balsamiq used to begin some simple wireframes and Hatchful for logos



## Trello Screen Shot showing shared Google Doc Scaffold



## Trello Screen Shot showing tasks allocated and checked off



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