CORNICHON GROUP REPORT

Website: https://cornichonrmit.github.io/Assignment-3/

Repository: https://github.com/cornichonrmit/Assignment-3

TEAM MEMBERS:

QUY DAT LE

MICHAEL JURIE

VICTORIA ELLIOT

THOMAS PFUNDT

BRADEN SMITH

FRANKLIN EDYSON

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TEAM PROFILE

Personal Information

Cornichon is a team of 6 students, studying a Bachelor of Information Technology at RMIT University. The team is collaborating on a project aiming to produce a prototype that can be taken into full scale production for a stand-alone plant self-watering system. The Cornichon team members are:

Michael Jurie

Student Number: s3785631

Email: mikejurie27@gmail.com

I was born in Melbourne, Australia and have not lived anywhere else but have travelled frequently with family. I was enrolled in Melbourne Grammar School from the day I started schooling and graduated year 12 in 2018. My interest in IT started at a young age with the family computer, I would always be playing games, then once I got my own personal laptop, I got more interested in the technical side and was introduced to a robotics subject that was available at school. After a year of robotics our school, an inter-school competition was held, and after that my interest in IT related concepts has only grown, moving from robotics to programming and game hacking.

Quy Dat Le

Student Number: s3794387

Email:quydat1711@gmail.com

I'm a first year RMIT student studying the Bachelor of Information technology. I'm from Vietnam and this is my third year living in Melbourne.

I really like the environment and living experience here as well as its people.

I speak several languages including English, Vietnamese, and that's pretty much it. Just enjoy you thinking I'm a genius for a second there :).

Victoria Elliot

Student Number: s3710716

Email: s3710716@student.rmit.edu.au

I am currently studying a bachelor of Information Technology. I have a rabbit named Albert. My interest in IT began at the start of high school in year 7 IT class, where I created my first website using very minimal HTML.

Thomas Pfundt

Student Number: s3724447

Email: thomas.pfundt1@gmail.com

Hi, my name is Tom. I am Australian. I am a mature aged student studying a Bachelor of IT at RMIT University. After I completed year 12, I undertook an Electrical Apprenticeship and worked in various roles in smelting and mine processing operations for the past 12 years. These roles include electrician, Maintenance & Operations Supervisor and Process Control Technician/Engineer.

An interesting fact about myself is that I love travelling. I spent 3 months backpacking around Europe in 2014, multiple trips to New Zealand, South East Asia and North America. I am heading to Fiji for a short break over Easter.

Braden Smith

Student Number: s3787174

Email: s3787174@student.rmit.edu.au

I have come from a small town of Echuca, located on the Murray River, where I attended all of my education, from kindergarten to high school. I am able to ride a Unicycle, I have a cat called Pretzel, I used to play Football, and tend to game quite a bit.

Franklin Edyson

Student Number: s3784440

Email: s3784440@student.rmit.edu.au

I am a motivated Junior Software Development student who can learn quickly and ready to work in projects. I am also an Aviation Enthusiast who enjoys travelling around the world.

Group Processes

Upon reviewing our reflection's with regards to Assignment 2, there were some common themes around what worked well, as well as areas in which we can improve. Many team members commented on how designating tasks early in the assignment was paramount to our success, enabling each member to know their responsibilities. Another positive comment that became apparent was the willingness of individuals to work outside of their scope in order to assist their team mates.

Communication was a key aspect to our success in Assignment 2. Although team members found our communication methods to be effective, we highlighted some areas that we are endeavouring to improve on for assignment 3. The main aspect of this is tracking each other's progress, and any difficulties they are facing throughout the week between classes. To combat this issue, for Assignment 3 we have implemented a work management board through Office365 planner:

https://tasks.office.com/rmiteduau.onmicrosoft.com/en-US/Home/PlanViews/c1QApXWL-EiASdDNSqpIocgAFQ9u?Type=PlanLink&Channel=Link&CreatedTime=636940267009116407

When tasks are grouped by "Assigned To" other team members can navigate through each other's tasks and see where they are up to via the comments we are making throughout our progress. This board has also further enabled individuals to offer assistance outside their personal scope, if they can see that a team mates work load is higher than initially estimated.

Tasks can also be grouped by due date, allowing us a timeline overview of the project, which in turn allows us to monitor each other's progress and offer assistance as required. This has the added benefit of acting similar to a Gantt chart in that tasks are scheduled to start only once other tasks have reached their scheduled completion date, As the team outlines the project timeline, this feature becomes pivotal in our work management process.

Another area that was highlighted as being in need of improvement was our in-class meeting productivity. We had no structure to any discussions that took place, or support for any issues

encountered. To rectify this, in Assignment 3, we have designated the first part of each tutorial to a group discussion in which each member in turn reports on their progress the previous week, and highlights any ongoing issues. We then put a plan in place to combat the ongoing issues so that each team member is on the same page.

Finally, a number of team members expressed issues with using GitHub during Assignment 2. To combat this, the team members who are more experienced in this area are assigned the responsibility of supporting other team members when issues are encountered, as well as managing the artefacts as a whole.

Career Plans

The Cornichon group members have a variety of career aspirations, ranging from Java & .NET Developers, to System Engineer, UX Designer and Business Analyst. There are many common elements between roles, predominantly in the soft skill requirements of the role, although, there are also some common traits between the roles in regards to required hard skills. The area in which the roles differ is in the role specific hard skills. Each of our career plans contain similar elements, and vary mostly on the specific requirements of these elements.

As stated, there is a wide variety of career aspirations across the six team members that make up Cornichon. That being said, three members of Cornichon aspire to become software developers of some description. Whether it be in Java, .NET, or another language as required, all three members have a passion for full stack development. One member of team Cornichon has expressed an interest in the communications hardware and configuration predominant field of System Engineer. One member of the group has a passion for creativity and design, and wishes to design and develop products based on user experience. This particular role is a more client interactive role than those previously mentioned, yet still requires the front-end development skills. Our last member has chosen the role of Business Analyst as their ideal job. This role is centred around knowing and understanding all aspects of the business as a whole, and interacting with both internal and external stakeholders, with less of a focus on the specialty technical skills the other roles have defined.

Our chosen roles each have their own unique hard skill requirement elements, yet many required hard skills are either the same or very similar. For example, four of the six desired roles are development / design roles which require experience in web technologies, with emphasis on at least one form of JavaScript framework / library. Drilling down further, three of those four roles have requirements for experience in a C-based language.

In regards to soft skills, the majority of requirements are common to all roles. Obviously, some experience in the field is a requirement for all roles, as well as teamwork skills being highly regarded in the majority of the ideal job adverts. Communication skills are the next most frequently mentioned requirements. Other common traits required, although expressed in different words across the job adverts, are skills such as the ability and desire to expand one’s knowledge, or to seek and find information.

The area in which our ideal jobs differ is predominantly in the role specific hard skills. Each role has their own specific skill set, depending on the technologies the company uses. Even though two of the ideal jobs have the same job title of Java Developer, their advertised skill requirements vary quite significantly. One focuses on knowledge of specific frameworks, libraries and build tools, whereas the other is more focused on the knowledge of a range of programming languages. All four of the developer /designer roles have requirements regarding JavaScript framework and cloud technologies experience, but the specific frameworks and technologies differ from role to role.

Both the UX Designer role and the Business Analyst role make mention of communication skills, but the differ on who the role is required to communicate with, one dealing with customers, the other with the business as a whole. The most different of all the roles is the Systems Engineer role. All of the technology requirements of this role are unique in the job advertisements, and with the exception of SQL, are in a field of their own, that is networks and communications.

Across the Cornichon group, our career plans are very similar. We all have some base knowledge in our chosen field, which has sparked our interest to further pursue the required knowledge. We all believe the skills we gain throughout our degree, although the skills will vary from person to person, will lay a solid foundation for us to enter the workforce and gain the required work experience to fill our ideal roles.

Some group members have identified steps they will take above and beyond our Degree requirements, to further expand their knowledge base such as undertaking online learning, or getting involved in clubs or group projects outside of University and work. Involvement in clubs and group projects, along with attending networking events have been identified as beneficial in that a wider professional network will provide greater opportunities to gain employment in one of our ideal roles.

TOOLS

A group website has been built, containing all the information presented in this report, and can be accessed by the following link:

https://cornichonrmit.github.io/Assignment-3/

Members of the team contributed to this website via our organisations GitHub repository:

https://github.com/cornichonrmit/Assignment-3

GitHub Repository Commit History

After reviewing our commit history at the end of assignment 2 we found that our method for sharing documents, and our document control in general was not up to standard. Previously we had two team members in charge of document control, which meant the remaining team members weren't getting the exposure to version control that they require.

For Assignment two, we assigned one team member to be in charge of document control, but set up individual branches for each team member and all learnt how to commit our branches ourselves, without affecting the work of others. This made collaboration much more streamline as we weren't having to send each other documents, or collaborate on an un-version-controlled Google document. Towards completion of the assignment, the document controller was tasked with merging all the individual branches into the master copy, and compiling the information into the final report.

We believe the approach we have taken this time around has not only made collaboration much easier, but also the commit history better reflects how well the group collaborated together.

PROJECT DESCRIPTION

Topic

Our aim is to develop and product that will automatically water plants with minimal user interaction, to make it easier for people to grow their own ingredients or just to have plants for aesthetic purposes around the house. Our vision is set on creating something transportable and easy to setup and use. We also think aesthetics are very important, as every home and person are different, our product should have a range of designs that can be chosen from to match the user's style. The device should be ergonomic in shape and have minimal intrusion to its surroundings.

The device will be run from a raspberry pi 3 minicomputer, this will be the brains of the system and is going to regulate the plant and make sure it stays alive and watered. We envision that the product will be a pot plant with variable size options, with the tech embedded in a compartment on one of the pots sides, the device will come with a power cord and instruction manual. A big part of our project is the affordability of the project itself, as the electronics that make up the project cost around $100 in its current state, we would hope that in production, the parts would be purchased in bulk from suppliers which could reduce the cost for consumers.

Motivation

Our motivation for this project is the lack of greenery in the modern home, there are not enough people growing their own food and veg, so we are trying to solve this by incorporating growing into an easy, portable solution that can instantly be setup and used. We find this project interesting as it combines two very different interests into one, to give the user something easy to use and non-intimidating to get started with.

In the current IT Market, a lot of these similar ideas come up, companies are trying to find products that can assist in everyday life with the help of automation / technology, and smart home type appliances are on the uprise like the Amazon Alexa and the Google Hub. We would love our product to fit in with these trends and become one with the technology / smart home landscape. Working on this project, generating plans and hopes, will show future employers that we as a team can put ourselves to a project and develop it into something we believe in and want to create.

Landscape

The landscape for a product like ours is dry, after a while of searching the internet for similar products, there are only a few that have the same sort of idea. Most of the products are external and require the user to plug the water hoses into individual plants to let them drip. Only a handful use electronics, and that's where I see our product coming in. Although these other products are cost effective, our product caters to those who like smart-tech within the household, and those who want something aesthetically pleasing in their homes.

One example that can be used is the Kamoer product linked below. It has phone connectivity and enables the user to redirect water though pipes into multiple pot plants. This product differs from ours as it is more intrusive in the way of aesthetics, the devices many pipes are visible and the watering mechanism is external and needs to be setup by the user. Our product hopes to eliminate the need to setup anything, and make it easy to plug-in and use. The pipes need to be cut manually on the Kamoer and the pump needs to have an external water source. Whereas on our product we hope to implement a water reservoir that is built into the casing that can easily be filled, and is not visible.

Kamoer Watering System:

https://www.aliexpress.com/item/Kamoer-Mobile-Phone-Control-DIY-Automatic-Watering-Device-Water-Pump-Timer-System-Succulents-Plant-Garden-Drip/32838792130.html

Aim

The overall aim of the project is to successfully assemble and operate an Indoor Automatic Plant Watering System (APWS) using Raspberry Pi 3. This aim has been broken down into three sections, or goals, that we have defined to further elaborate on more in-depth aim of the project.

Goal 1: Design the model

It is important that we have the 3D printed parts modelled and measured in software before buying other accessories accordingly. The parts that need to be modelled and printed are: Raspberry Pi and LCD housing, Sensors' housing. Before doing this stage of the project, we will need to sketch out the ideas and the rough design of the casings together before 3D modelling them to save time and effort.

After that, a simple model of the whole system will also be made in 3D so that we can estimate the materials that we need to assemble it.

Goal 2: Write the codes for the software to run on Raspberry Pi 3.

This is a crucial step for the whole model to function as this will be the 'brain' and control other components of the product. At this stage of the project, the program only needs to read the moisture level of the soil and activate the pump accordingly. Moisture levels will be set at different values for different types of plants or according to the user's need.

Goal 3: Acquire all the necessary parts and assemble them.

For this project, we will need to buy several parts that is required for the model to function.

These parts will include a Raspberry Pi 3, 3.5in LCD screen to monitor the system, Packet of GPIO Wires, Soil moisture sensor(s), 8 Channel Relay Module, small water pump, PVC tubes/hoses and drip nozzles for watering the plants, pots, soil, seeds/plants of choice.

Plan & Progress

There was inspiration to build this product because of the difficult nature of growing produce and the limited space people have in their homes. The project was first intended to grow herbs to help increase the life span of them. The project is a domestic watering system contained in a pot that will assist people to either grow their own produce or house plants. It will be made so it is quickly and easily set up to reduce the hassle for the user. The watering system is encased in the pot and it is designed to be a product that is bought off the shelf so the user can just pot their plant of choice. In the prototype's current iteration, moisture is detected by the sensor and this information is passed to the script. If moisture isn't detected, the water pump will water the plant until there is water detected. When this happens, the water pump will be turned off.

The product has been built by following a tutorial online closely but making the appropriate changes that were decided on that would improve the product both aesthetically and functionally. The required parts were bought also following the tutorial. There are still further changes that can be made in building the product, moving away from the original tutorial.

There was a tutorial for a similar self-watering pot system using a Raspberry Pi. It was thought that the product could be improved and made into a more consumer friendly product. There was research completed online on how the project worked and also how the accompanying technology would work with the product.

There was a learning process involved with using the Raspberry Pi with both the wiring and the programming. The OS was installed on the Raspberry Pi and research was conducted on the GPIO pins worked with the different components of the product. The wiring wasn't too difficult to learn, the tutorial was a helpful guide. The process of learning how to program utilising python was difficult, much harder than originally anticipated.

The moisture sensor was set up as a test first – to see if water was present or not. A program was created using Python that detected if the sensor worked giving back a 1 or 0 to the Raspberry Pi on the console window. When the test was found to be successful, the program was changed to be the final product. This was finished in three days, the process taking longer than expected.

The project went smoothly for the most part, there were a couple of minor hiccups. Including a minor electrocution while the product was being made. This was an error by the manufacturer of part that was used and there is no possibility of this happening to the end user.

A 3D printed case to house the electronics of the watering system would be made to help improve the aesthetics of our current prototype. It would be attached to the side of the pot. The case could also be made with an openable lid so the user can adjust and look at the wires / electronics. Another change for aesthetic reasons would be to build the water tubing into the top lip of the pot to hide it.

Another future implementation would be to create an interface so the user can check on their plants remotely. HTML would be the language used to program the interface. There could also be an option to make a web monitoring system, connecting a camera or a webcam so the user can see their plants and not just the water level in the soil.

There are many possible changes for future versions of the product. There could be a version of the pot that has a touch screen on the side of the pot with different options to help the user control and customise the moisture levels of their plants. This customisation would help to increase the range of plants that would be compatible with the pot, not limiting the user to plants that constantly need the soil wet, which is the only option that the water system has at the moment. The screen that would be built into the pot would have to be a small screen, but not too small as it wouldn't be worth having. If the pot was larger to house a larger screen, it would decrease the feasibility of the product appealing to a domestic consumer, which is the target demographic. A bigger screen would also incur a larger price which would increase the end price for the consumer.

There are plans for improving the product including making the software more aware of the amount of liquid that is present in the soil, so the plant receives the amount of water it needs, rather than watering the soil every time the soil is dry. Adding a humidity sensor that is linked to a humidifier would help to understand of the plant needed any moisture regulation.

The product will help with the issue of watering the plant, but the user will have to deal with diseases the plant contracts and the consequences of insects eating their plant. The product doesn't have any plans to prevent these problems.

The reference that was used to help build the product used a different moisture sensor to the one that was used in the project. Research was made to learn the basics of how to connect "things" to the Raspberry Pi which was done by watching multiple videos and looking at other tutorials. From

this information, the way that the GPIO pins worked on the Raspberry Pi. The GPIO pins had been implemented into python code so values could be both read and written from the moisture sensor.

Bought a different one and could change the moisture sensor to detect the percentage of the water moistness. The one in the example had a scale for the moisture level, so it could be accurately measured. It doesn't impact the overall performance of the product; it just isn't as accurate as it could be. This can be changed in the future.

Moisture sensor was originally created to be used in conjunction with the Arduino, there was a possibility to have to buy another model that was compatible with the raspberry pi. Got the moisture sensor to work with the raspberry pi, no documentation available to make it compatible with the raspberry pi. Overcame this problem by spending a week doing research on how the moisture sensor and the raspberry pi worked.

Changes were made in the way the water pumped into the plant with a sprinkler design compared to the reference that was found online. In the tutorial, only a single water outlet was used, there was a modification from this plan, however, to create a sprinkler design so the water could be distributed around the pot and the plant evenly. There is a problem with the water covering a larger area of the pot, the pot will have to be designed so the wiring of the system doesn't come into contact with the water. A possible way to combat this issue would be to put heat shrink on the electrical component of the sensor.

Another change to the product that will help the functionality of the system would be to change the way the water enters the pot. It would be changed to have multiple entry holes around the base of the pot for the water so the plant is evenly watered.

Roles

As per ideal job description in assignment 2 and personal skills set, we decided to assign each member of the group a role in developing this project for better work distribution and management. The roles are as follow:

- Lead Developer: Mike – manages the overall process of the project, keep track of one another's progress.
- Website Developer / Document Controller: Thomas – manages our website and artifacts for the project.
- UI Designer: Victoria – focuses on the Interface design of our software on the Raspberry Pi.
- Model Designer: Dat – 3D models parts of the project and calculate the materials needed
- Software Developer: Braden – focuses on developing the app driving the model
- Testing – Risk manager: Franklin – researches on Regulations, Risks and later tests and fine-tunes the model.

Scope and Limits

The scope of this project is to successfully build a functional Indoor Automatic Plant Watering System with 2 different types of plants which are chili peppers and mint in 2 pots. These plants are easy to grow and only need regular watering so it works the best in our test model. In the given timeframe, we are aiming for the proof of concept and the estimated price of the final product. We understand that this is not new and has been done in different approaches, however, what we are aiming for might set us apart. With the materials that we use, the cost of the product will be kept at minimum and there will be no limitation to what the end user can achieve. This is because our model is modular and can be programmed to work with different types of plants so that it can fit different people's need. That being said, the possibilities are unlimited, but we will limit our project

to only automatic watering the plants based on the soil moisture and optimized for two specific plants that we chose to test in our model.

Tools and Technologies

Software: Since we are programming in Python which can be download (free) from https://www.python.org/, we will need a laptop, a micro-SD card reader to transfer files for the Raspberry Pi to load. Braden and Victoria will be working on this together in order to bring the app that is easy to use and customizable to the users.

The 3D modelling will be done on Autodesk's software and are free to use for current RMIT students. Dat will be working on this as he has experience working with the software.

Hardware: We will need a 3D printer and one of our team members - Michael owns one and already had experience using it. We will also need basic power tools to assemble the model.

Other Tools are listed in the Aim section.

Project Testing

The Automatic Plant Watering System unit will be rigorously tested for any design defects or failures which may impact the operational functions of the device. The planned tests will cover different environments experienced by the device, which may consist of multiple temperature and climate exposure. There will be 10 planned tests to check for software resilience to perform under extreme circumstances.

The extreme weather climate testing will be applied with the static temperature ranging from -18° to 50° Celsius; the aim of this test is to check if the components are performing as expected like during normal conditions. The components that are critical to the success of the test are the auxiliary power unit and sensors are infallible to the climate.

The language used by the software is Python, primarily because Raspberry PI operates through this means of communication and it is relatively simple to code and interact in programming. Our team is proficient of using Python programming language which makes the project easier to fulfil the functional requirements. It is expected that debugging the code will help assess the logical flow of the software, in which amendments could be made before live testing of the product.

Essentially, the software and hardware will undergo stringent testing to fulfil the reliability and operational requirements of the design. For the assurance of reliability and quality, the product is to have 10 continuously successful test results, however if there are any defects found during any stage of the testing, the team will need assess the prototype’s failure and testing will have to restart from the beginning.

If there are any problems revealed during the product testing, the team will revert to design mode and assess the implications caused by the fault. Once the team is satisfied with the rectification of the solution, the product will begin testing with basic systems test and focus more directly to the fix.

BASIC SYSTEMS TEST:

APWS normal operations examination of software and hardware.

DEGRADED SYSTEMS TEST:

Deficiency in system capabilities which is checked for any spectacular failure.

EXTREME SYSTEMS TEST:

Under the most extreme conditions, the test is designed to check the endurance of the product.

Project Timeframe

The project timeframe has been structured into a waterfall plan. This plan has been Gantt charted in the accompanying document "Project Plan Cornichon.pdf". The Gannt chart has clearly defined deadlines for each step of the project so that each team member can track the progress of at each stage of the project to ensure we meet our deadline commitments.

Project Risk Management

The 'Automatic Plant Watering System' (APWS) takes a basic concept and is integrated with a miniature computer to perform the automated function of plant watering. There are specific risks which are associated with the project, in relation to the methodology and equipment reliability to achieve a successful result.

APWS receives input from multiple sensors to function at regulated intervals to maintain the good health and successful growth of the plants. These sensors must be able to fit in a 'compact and aesthetically pleasing' package environment for appeal to customers. This means that any equipment failure may result in degraded system capability to perform its plant watering function. In the most extreme extent is that a single sensor may cause a total systems failure which would render the device as useless.

For the system to persevere and operate, three laws dictate the device functions:

1. Normal (Automatic) Law
2. Alternate Law
3. Manual Law

The Normal Law is for standard operations where the computer determines that all components are fully functional with no degradation in capabilities.

Alternate Law is induced when the system detects degraded functional system failures.

Manual Law is when the user takes full control of the functions.

The device is designed to cope with failures and will degrade to a different state of law. In the instance that the water pump communicates to the computer that it is becoming reliable, the computer will acknowledge and disconnect the pump which will revert to using gravity for the transportation of water from the tank to the plants. The design of the redundancy is based on a modular system which means each individual part is independent of operating from each other in the event of failure.

The light source suggested for APWS is a hydroponic lighting system. The main risk associated with the device is power failure, which would again render the device useless. The design of the APWS suggests for an auxiliary power unit to be installed onboard the hydroponic light which can supply electricity for up to 15 minutes, while the user trouble shoots the problem until mains electricity is reconnected. The APU is an option for the user to install, which is readily accessible for implementation by using Double AA Batteries.

Overall, the APWS' functional design floats above the philosophy of simplicity. This minimises the likelihood and possibilities of multiple failures, thus leading to improved reliability and efficiency of functions.

Group Processes and Communications

At CornichonRMIT, our mission to successfully deliver the project is a top priority which means that communication between team members is an essential aspect of the group's culture. The communication between team members is endorsed with freedom and honesty to minimise the risk of misunderstanding and inadequate information being shared.

Each week during the assigned tutorials, each group member is expected to have reached a checkpoint to prevent rushing and improved task quality. We all have the responsibility to raise concerns and matters regarding the project as soon as possible so that the team's course of action is carefully guided towards the primary goal.

In the event that a team member has not provided any communication during group discussions, the group as a collective will attempt to show empathy and consideration for the team member and their state of wellbeing. This depends on the circumstances imposed that an individual may have become withdrawn from the activities due to personal reasons. If a team member fails to provide a valid reason for being withdrawn from the group, disciplinary action may be requested for the Tutor to help assist in the situation which may lead to disciplinary action.

Outside of class, there are no mandatory meetings required – this is circumstance driven as long as there are no emergencies.

The remote method of communication being used is Facebook Messenger. The software has already proven itself in the live field with millions of users seamlessly communicating with each other, which means that the group has a reliable and practical way to share their ideas in the group chat. Facebook Messenger exists in the form of a mobile application and is also readily accessible via a web version for desktops.

SKILLS & JOBS

Engineer

This role provides the project with the ability to create better products, like making it more compact, faster, or more intuitive. They could also provide innovative thinking, as they have had previous experience working with electronics, and are more creative with ideas than other people. Being an engineer means that you have the creativity, and know-how to put create your ideas, and turn them into a reality, this thinking will be beneficial for the project, as they can come up with as many ideas as possible, and the ability to create logical ways to create the product. With the other team members, they will be able to get information about what features they should implement, how it should look, and how much in demand the product is, before coming up with a permanent plan. For a project to have a successful innovation to work, they have to have an individual that would provide that skill, an Engineer would play a perfect role in the project, as they are able to provide the knowledge of how to design and create the product.

Project Manager

A project manager is most vital for a project to be successful; this will allow an individual to control the direction of the project, and the production rate that the group works in. They also help organise equipment, and if any of the group need specific outside resources that could help them complete the course. Overseeing the job, the project manager will also communicate with the investors to give them the appropriate return. Skills that the project management will need to have Is communication, leadership, financial experience. These skills are important for a project manager, as they are to communicate with each group member, and lead them into what they need to be doing, and when to be done by, maintain finance, for things such as equipment, or and employment. All projects need a project manager, this will help out the project, as they will be able to control, and create more stability to the project in the works, they will implement activities and actions to implement more communications, and allow the investors to also participate with the project. A project manager will also control the money, and/or make sure to outsource things such as an accountant, making sure the project stays on track, and has a layout that fits.

Marketing Manager

For a product to be successful, they have to have good marketing. Being a marketing manager, does not mean that you have to have a team of marketers, there are always the ability to outsource marketing material. However, having a position on the team for a marketing specialist is always beneficial on how well the product and project succeeds. If the marketing is successful, there will be high demands for the product, thus investment, and funding towards the project will increase, as they will want to make it as successful as possible, to gain more sales. A marketing Manager is vital for the group project, as they are able to gain a market for the product. Throughout the development of the project, the marketing manager will be able to give information to the product, on how the potential customers are reacting to certain aspects, certain features might be changed for example, or introduce more adaptivity to the product, improving it as we go on.

Business Analyst

A business analyst is an important aspect for a project, the analyst will be able to determine market value, market demand, and areas of the product that can be improved to suit market needs. They can also analyse the projects progress, and estimate a time of arrival for the product. For a product to have a successful amount of sales, this requires a good business analyst, this will help provide a good business model, and identify problems within the project. A business analyst would be

beneficial for the project, as they can identify the project's direction, and help obscure funding's for the project through more investors.

FEEDBACK

Our individual feedback has been completed via SparkPlus as per assignment specification.

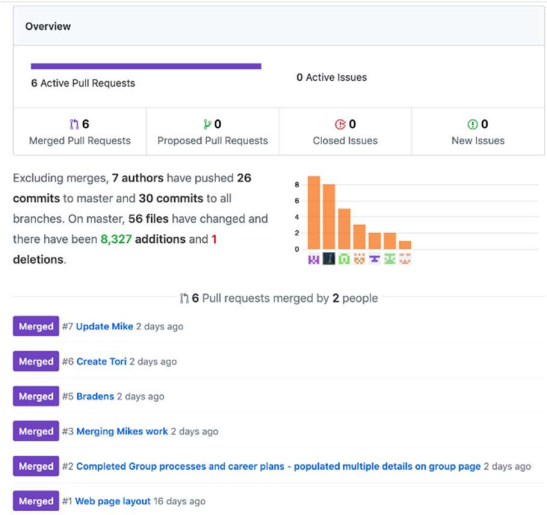
GROUP REFLECTION

Our group "Cornichon," consisting of 6 individuals, created a product that is an automatic plant watering system. Our group started off at an awkward pace, as we all were getting use to both University, and each other. However, as time unfolded, we gained a friendship, that made communication easier, and allowed us to talk to each other with ease, whilst discussing issues and understanding more about the project if needed. This was beneficial for the group as strong communication helped us resolve issues, and make us able to see the progress in each individual, which the group has displayed much of.

Our use of GitHub has improved more than the previous two assignments, however, some are still unsure of how to properly use it, this did prevent more information on our progress, and there were still some individuals who did not arrive to class, however, this was mostly due to health, and thus they were able to catch up on their work, and learn where others are at as well.

What was surprising was how well we were all able to get along, and be able to communicate with everyone seamlessly, and the fact that the project was to run smoothly, and on time, to which we were able to complete the tasks that were needed. Our consultation also was in appraisal on how well composed our group was, as we were able to effectively communicate, and be aware of our progress.

The group has discussed that although individual work was preferred, it was a lot easier to do the assignment as a group, as it allowed each individual to have a good amount of work, meaning they have less to do in total, this also allows individuals who are good at specific tasks, to work on parts of the assignment, that they find easier to do. Group work also helps teach individuals leadership, and initiative, as although everyone's work is equal, sometimes it takes an individual to be a leader to tell other individuals that they need to catch up, or taking initiative and follow up on requests, or gain further information if needed, which has been displayed throughout the project, by each individual.



GitHub was not used much as we would have liked, however, as seen on the graph, there have been individuals using GitHub, and pushing their work to the server. The project consisted of full sections that members were completing individually, and did not consist of many small paragraphs that could be easily pushed without being taken out of context. Nevertheless, the work done by each member was far greater than what is displayed by GitHub.

Personal Reflections

Braden Smith

In the final assignment, it has become apparent that our group has great communication, and are able to easily get along with each other. This was the strong point of our group, as each member was able to discuss their perspective on specific points, and always had input on the outcome of the assignment.

What could be improved, is the use of GitHub, I was able to eventually learn how to use it to a moderate extent, however, through the lack of updates and pushes, it has become apparent that some may not feel the same way, regardless, we were all still able to have the same output as a group, and this GitHub experience would not have affected their capabilities. Shown in the group reflection, the photo shows the little amount of update that we received, it would have been better to get some from every individual.

Being an individual worker, being in a group was not much of a joy, however, throughout the project, I am able to say that group work is very beneficial if all the members get along, and maintain strong communication like our group. Everyone in the group was able to provide high spirits, thus encouraging our will to continue on the project with each other.

When your group members are easy to get along with, and maintain a positive attitude, it makes group work a lot easier, and increases the chances of going to class, and participating in group conversation. By having more group members, you are appointed less work, which can decrease stress that students may get from high workloads from school.

Quy Dat Le

It was a pleasant experience working with Cornichon and I hope to continue working with this group in projects to come. We have managed to finish the tasks on time with decent quality, everyone was happy with how the results turned out and how well the group functioned.

There are things that can be improved on such as using GitHub to manage work progress. During the assignment, our group members tend to construct the draft in their preferred program and push it to GitHub at the last week of the project. This turned out to be alright, but it would have been better if we communicate on GitHub better and constantly upload on GitHub to make the workflow more professional.

What surprised me most is how well the group have performed and the way we chose to function our group worked well. After working with Cornichon, I found that with a group, work can be done much quicker, more efficiently and less stressful. Having the tasks divided among different members makes it easier to concentrate on each section, as a result, we can produce better results with deeper understanding of that section.

Victoria Elliot

All of the group members completed their assigned workload before the due date to a high standard. We should've taken the initiative to create times where we could have worked on the assignment as a group outside of our designated tutorial. Most weeks throughout the project there was one member missing which made it difficult to understand how people were going with the progress of their work. More communication was also needed at the start of the assignment with Mike as we were working on his project and the other members didn't know all of the specifics and intricacies of his project. Working with the group was just as enjoyable as the last assignment. The different personalities of the group made a super interesting dynamic that was fun to work in. These differences actually complementary instead of them clashing with each other. Working out what part of the assignment every member was going to do at the start of the project provided a good foundation of the expectations that we all expected from each other. We decided to do this process again because of the success it brought us with the previous assignment. Overall, this assignment went just as smoothly as the previous assignment did.

Franklin Edyson

I am grateful to be able to work with a highly talented group on this project. The group's culture is fantastic when it comes to work ethics and friendliness, which helps along the way in maintaining a positive environment up to the completion of the project. Each group member has been assigned to certain responsibilities in the project, however when faced with challenging difficulties we are all able to support each other tasks.

An aspect that could be improved within the group is the frequency of checkpoint reports about individual task status, as well as the co-ordination of using 'GitHub site to manage the project resources. Aside from that, the group's performance has been considerably efficient in achieving the required tasks to the highest degree of quality.

One of the surprises that the group experienced is when we actually heard all of our team members reaching the assigned checkpoints by the due dates. It provided some light humour but we always keep on working in a professional manner.

I have learned about working with other people in a team, and collaborating with ideas and making decisions in process as a group. Working together as part of CornichonRMIT increases my junior experience in communication and task management.

GitHub has been used more extensively in Assignment 3 as we become more familiar with its technicalities and conventions, it has become a reliable method of storing resources for the project. The group members have been pushing their documents into the repositories and branches, in which the activity log is monitored for progress more extensively. The group has used GitHub sufficiently for the requirements of achieving the goal of smooth progress.

Michael Jurie

Personally, I think the group worked well together, everyone was connected and pushing to the GitHub regularly with constant communication within the Facebook messenger group. When assigning our roles and which parts of work we will do, there was clear and concise reasoning of why people were doing the work they were assigned, and if help was needed anywhere through the project someone could always jump on. The only thing we could have done better was meet up more outside of class, nobody suggested it, but it may have helped us put work together more efficiently. Looking back at the GitHub trail, everyone pushed their work at an average of 5-day intervals, which I think is great as it let Tom put everything onto the website and gave everyone an idea of how far along, we were as a group. Also, with Tom setting up the Microsoft planner at the start, it gave us feedback and constant updates to where others were within the group. As with the upcoming presentation, we are working collaboratively to get the slides done and currently assigning different slides to each member evenly. Overall, I was really happy with how we went and am hoping our hard work pays off in the end.

Thomas Pfundt

I have found throughout assignment 3 our group has learnt and improved on issues mentioned in our reflections from assignment 2. Although some team members are still learning the skills of collaborating via Git Version Control, there was a vast improvement on assignment 2. For example, in assignment 2, only 2 team members pushed commits to the repository, the rest of the documents were shared via other methods. In this assignment however, all 6 members pushed commits, and only 1 of the 6 committed on fewer than 3 occasions. The team also utilised the branching feature, each having our own individual branches to avoid disrupting one another's work, which were all merged towards completion of the assignment. There was still a bit of uncertainty navigating GitHub branches and directories, but overall, I don't think my fellow members give themselves enough credit.

Another concern mentioned in the reflection of assignment 2 was tutorial attendance, where we had at least one member missing from most tutorials. Throughout assignment 3, we made a conscious effort to improve on this, which we did, however I still feel there is room for further improvement on a project that required face to face collaboration.