**Meeting One**

**Date, Time & Venue**

15th January, 11am, Room 4510, Kydd Building, Abertay University

**Attended By**

Dorota Marczak, Nader Sobhi & Scott Allan

**Absences & Apologies**

N/A

**Review Previous Minutes**

N/A

**Topics of Discussion**

The team discussed and formulated the functional and non-functional requirements of the project. These were then paired with the features the project should have in order to ensure the maximum potential of the project could be achieved within the set timescale. These features were then divided into those necessary for the project to be realised and those which are desireable. These were features that, if not developed, would not impact the basic operation and success of the project but were deemed as something that would increase the overall functionality of the device.

Preliminary research into current technologies to meet the requirements set out was also undertaken, with the main focus being on how to turn the sensor data into visually attractive and intuitive graphs.

**Challenges**

The team was challenged by the sheer amount of options at their disposal. Whilst determining the features that the project should contain was relatively straightforward, the options to realise these features was rather overwhelming and required more in-depth research. Overall, the team were excited to begin development pf the project after a relaxing Christmas break.

**Actions for Next Meeting & Details**

The task for the next meeting was to settle on which technologies to use, as well as draw up paper prototypes for the website.

Meeting to be held 22nd January, 11am, Room 4510, Kydd Building, Abertay University

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**Meeting Two**

**Date, Time & Venue**

22nd January, 11am, Room 4510, Kydd Building, Abertay University

**Attended By**

Dorota Marczak, Naber Sobhi & Scott Allan

**Absences & Apologies**

N/A

**Review Previous Minutes**

The previous meeting consisted of formulating the requirements of the project, turning them into specific features, separating these feature into those that were deemed absolutely necessary and those that were desireable if time was left and a discussion of the technologies available to complete the project.

**Topics of Discussion**

This week, the team settled on which technologies to use with back up technologies listed in case system integration was unsuccessful or problematic. Paper prototypes of the website had also been developed. The team then split into two sub teams: Dorota would begin development of the website while Nader and Scott began development of the hardware device. Dorota planned to develop three digital prototype of the website to see which features worked best. Nader and Scott began developing the hardware by ensuring that the Arduino and WeMos boards could communicate with each other. Circuit diagrams were drawn up to keep track of wiring connections using Fritzing.

**Challenges**

There were no real challenges this week as development had just begun and as such it was too early for real problems to arise. The team were confident that the technologies they had chosen were fit for purpose, now it was a case of implementing them correctly.

**Actions for Next Meeting & Details**

Complete digital prototypes of website, eveluate them, extract the best features and combine them into a final prototype to test usability and responsiveness.

Ensure that the Arduino and WeMos can communicate over a sustained period of time without faults or errors appearing.

Meeting to be held 29th January, 11am, Room 4510, Kydd Building, Abertay University

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**Meeting Three**

**Date, Time & Venue**

29th January, 11am, Room 4510, Kydd Building, Abertay University

**Attended By**

Dorota Marczak, Naber Sobhi & Scott Allan

**Absences & Apologies**

N/A

**Review Previous Minutes**

The previous meeting consisted of agreeing which technologies to use and drawing up a list of alternatives should they be required. The team then split in two so that work on the website and hardware device could begin concurrently.

**Topics of Discussion**

This week, the team evaluated the different prototypes Dorota had created and selected the best features from each. These would then be integrated into a final prototype. Also looked at was which sensors to use to collect data on the plant. Scott already had a DHT11 sensor that could detect temperature and humidity levels and it was agreed this was a good starting point to test integration. Sensors to monitor light and moisture level were also selected and purchased.

Dorota began developing the final website prototype, while Scott and Nader integrated the DHT11 sensor with the device and tested whether the data returned was useful.

**Challenges**

The team spent some time going over the digital prototypes of the website and selecting the best features. However, everyone’s idea of ‘best’ was slightly different, leading to quite a heated discussion. Each feature was then put to a vote, with a feature requiring at least two votes to be selected. This was quite a simple but effective solution.

Scott and Nader had slight difficulties integrating the DHT11 sensor with the Arduino, but upon realising that it required its own library to operate, this problem was resolved.

**Actions for Next Meeting & Details**

Complete development of functionality of website prototype and integrate all sensors with Arduino. Look at database solutions and how to store data.

Meeting to be held 5th February, 11am, Room 4510, Kydd Building, Abertay University

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**Meeting Four**

**Date, Time & Venue**

5th February, 11am, Room 4510, Kydd Building, Abertay University

**Attended By**

Dorota Marczak, Naber Sobhi & Scott Allan

**Absences & Apologies**

N/A

**Review Previous Minutes**

The previous meeting consisted of extracting the best features from three separate digital prototypes and integrating them into one prototype.

The hardware device also gained its first sensor and was tested to ensure correct integration.

**Topics of Discussion**

This weeks meeting was brief, with the team going over what they had achieved at the last meeting before continuing development on the website and hardware device.

**Challenges**

Dorota reported no challenges from the website development, while Nader and Scott had some difficulties integrating all the peripherals with the chosen Arduino board. The team discussed dropping a component from the hardware device, but it was agreed this would have a major impact on the success of the project and the usefulness of the device. Instead, the team decided to use a slightly more powerful Arduino board which Scott owned and would bring for next time.

**Actions for Next Meeting & Details**

Continue website development

Scott to bring Arduino Mega 2560 to replace Arduino Uno

Meeting to be held 12th February, 11am, Room 4510, Kydd Building, Abertay University

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**Meeting Five**

**Date, Time & Venue**

12th February, 11am, Room 4510, Kydd Building, Abertay University

**Attended By**

Dorota Marczak, Naber Sobhi & Scott Allan

**Absences & Apologies**

N/A

**Review Previous Minutes**

The previous meeting minutes were reviewed before the team convened this weeks meeting

**Topics of Discussion**

The team took some time to consider what they had achieved so far and what still needed to be done. It was found that development of the website was progressing at a steady rate while the hardware side had fallen behind schedule. It was agreed this was due to unforeseen difficulties integrating all the components with an Arduino Uno and, provided the Mega 2560 proved to be a better option, the project could get back on track without much trouble.

Fortunately, this proved to be the case and thanks to the circuit diagrams that had been kept for the Uno, integrating the Mega 2560 and sensors into the system proved rather trivial. The device was tested by returning values to the the Serial Monitor, after which a database was set up in order to retain this data.

**Challenges**

The main challenge this week was for Nader and Scott to get back on track with the hardware device. Dorota was nearing the point where she was ready to begin developing the graphs that would inform the user of the plants status. Without data to power these, she would have to rely on dummy data that may not be representative of the returned data from the sensors. However, Nader and Scott successfully got the hardware device to a basic operational state and had begun sending recorded data to the database which Dorota could use to power the graphs/charts on the website.

**Actions for Next Meeting & Details**

Record large amount of information from sensors for website

Identify best format for displaying this data

Reassess how to store the data efficiently in the database

Meeting to be held 19th February, 11am, Room 4510, Kydd Building, Abertay University

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**Meeting Six**

**Date, Time & Venue**

19th February, 11am, Room 4510, Kydd Building, Abertay University

**Attended By**

Dorota Marczak, Naber Sobhi & Scott Allan

**Absences & Apologies**

N/A

**Review Previous Minutes**

Upon review of the previous minutes, it was agreed the project was proceeding to schedule after a small bump in the road regarding the Arduino board.

**Topics of Discussion**

After setting up the database last week, it was decided that the manner in which the data was being stored was not as efficient as it could be. Alternative methods were looked at before settling on trying to append the sensor data into a JSON string which then would be sent to the database, reducing the amount of columns required. This would also make it easier for Dorota to parse the data on the website side.

Dorota was concerned that the technology used to create the graphs was not accurate enough and indicated that she would attempt to integrate different software to power the graphs, hopefully leading to more accurate representations.

**Challenges**

The challenges facing the team this week were refining the design already in place to make it more efficient and accurate. Initially the team felt that this might set them back, but after discussion and consideration, it was decided that any potential set back was outweighed by the advantage of being able to reflect on aspects of the project that could be improved before development had reached a stage of completion.

**Actions for Next Meeting & Details**

Dorota to implement different graph visualisation software

Nader and Scott to construct function to create JSON string, append data and send to database

Meeting to be held 26th February, 11am, Room 4510, Kydd Building, Abertay University

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**Meeting Seven**

**Date, Time & Venue**

26th February, 11am, Room 4510, Kydd Building, Abertay University

**Attended By**

Dorota Marczak, Naber Sobhi & Scott Allan

**Absences & Apologies**

N/A

**Review Previous Minutes**

The team spent some time reflecting on the decisions made last week and agreed that it was worthwhile reviewing the status of the project and make improvements and refining what was already in place.

**Topics of Discussion**

Dorota felt more comfortable with the new software chosen to power the graphs as the code was easier to work with and provided more fine control on how to visualise the data.

Scott and Nader were having trouble appending all the data to the JSON string without errors occurring. It was clear this needed more work, but the data being sent to the database currently was enough for Dorota to work with in the mean time.

**Challenges**

The main challenge this week was trying to figure out why the JSON string was only willing to accept certain data. This lead to some frustration for Scott and Nader as the nature of programming Arduino boards means there is no debugging feature to provide assistance. This frustration also bled into Dorota as she wanted more data to work with in order to produce more elaborate graphs. However, during a coffee break this frustration was smoothed over as stepping away from the project allowed the team to conduct some ‘out of the box’ thinking in order to create ideas and plans to tackle the problem.

**Actions for Next Meeting & Details**

Solve the JSON string problem

Meeting to be held 5th March, 11am, Room 4510, Kydd Building, Abertay University

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**Meeting Eight**

**Date, Time & Venue**

5th March, 11am, Room 4510, Kydd Building, Abertay University

**Attended By**

Dorota Marczak, Naber Sobhi & Scott Allan

**Absences & Apologies**

N/A

**Review Previous Minutes**

Reviewing the minutes from last week, the team all agreed that stepping away from the project to talk things over led to valuable insights and allowed team members to postulate solutions that, while perhaps not entirely accurate, held the seed of an idea that could be developed into negating the problem. The team agreed that a short break while attempting to solve any future problems would be healthy and lead to a more collaborative and engaging experience for all those involved. The team also agreed they should have came to this conclusion earlier in the project.

**Topics of Discussion**

The team came to a conclusion of the best way to visualise the data by splitting it into day, week and monthly views. This would provide the users with large amounts of data to formulate informed decisions. Dorota began developing this with the data already recorded, while Scott and Nader tried to solve the JSON string problem using the ideas formulated at the last meeting.

**Challenges**

The team had to stay positive in order to solve the JSON string problem. Whilst it would be easy to quarrel and get downbeat, each team member had a role to play in motivating the others and ensuring that no one felt overwhelmed or under too much pressure.

This lead to the JSON string problem being solved by the end of the meeting, which meant that the core functionality of the project was now complete and had only to be refined, refactored and polished to ensure a professional level result.

**Actions for Next Meeting & Details**

Review the project as a whole, suggest improvements where necessary and refactor the codebase so that it is simple as possible.

Meeting to be held 12th March, 11am, Room 4510, Kydd Building, Abertay University

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**Meeting Nine**

**Date, Time & Venue**

12th March, 11am, Room 4510, Kydd Building, Abertay University

**Attended By**

Dorota Marczak, Naber Sobhi & Scott Allan

**Absences & Apologies**

N/A

**Review Previous Minutes**

After the success of last week, it was important the team kept their feet on the ground. Whilst the project was nearing completion, it was agreed it was important to use the time remaining to improve the project where possible.

**Topics of Discussion**

The team discussed potential improvements and listed them in order of importance.

**Challenges**

Dorota stated she was having some issues displaying the data in the manner she wished. Nader agreed to work with her to solve the issue, while Scott began refactoring the code and looked at improvements to the wiring schematic.

**Actions for Next Meeting & Details**

Refactor current code base

Implement any improvements deemed feasible in the time left

Solve data display issues

Meeting to be held 19th March, 11am, Room 4510, Kydd Building, Abertay University

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**Meeting Ten**

**Date, Time & Venue**

19th March, 11am, Room 4510, Kydd Building, Abertay University

**Attended By**

Dorota Marczak, Naber Sobhi & Scott Allan

**Absences & Apologies**

N/A

**Review Previous Minutes**

The team reviewed the list of improvements suggested last week and decided to implement a screen that would convey real time data to the user.

**Topics of Discussion**

The team spent a short time talking over which display to use and what data it should show. This fed into a discussion about graphs on the website, after which it was concluded the website should show as much useful information as possible without being overly obtuse and the display device should show only current data.

**Challenges**

The challenge facing the team this week was deciding what data should be shown on the website and the display device. After reaching an agreement, Dorota and Nader worked on the website data visualisations while Scott worked on integrating the display peripheral without disrupting the flow of data in the system.

**Actions for Next Meeting & Details**

Refine data visualisations

Complete integration of display peripheral

Meeting to be held 26th March, 11am, Room 4510, Kydd Building, Abertay University

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**Meeting Eleven**

**Date, Time & Venue**

26th March, 11am, Room 4510, Kydd Building, Abertay University

**Attended By**

Dorota Marczak, Naber Sobhi & Scott Allan

**Absences & Apologies**

N/A

**Review Previous Minutes**

The team spend sometime reviewing last weeks minutes as well as the project as a whole.

**Topics of Discussion**

The team discussed how happy they were with the project up until this point. No one raised any concerns and it was agreed that the project had developed well, despite a few challenging weeks over the duration. With the Easter break approaching, the team concluded that the website and device were essentially complete and the break could be used to spend some time individually reflecting on the project as a whole.

**Challenges**

The team all felt positive regarding the outcome of the project up to this point. The challenge was ensuring that the website and device were as complete as could be expected before the Easter break, after which the team would begin work on the White Paper.

**Actions for Next Meeting & Details**

Meeting to be held 16th April, 11am, Room 4510, Kydd Building, Abertay University

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**Meeting Twelve**

**Date, Time & Venue**

16th April, 11am, Room 4510, Kydd Building, Abertay University

**Attended By**

Dorota Marczak, Naber Sobhi & Scott Allan

**Absences & Apologies**

N/A

**Review Previous Minutes**

The team welcomed each other back after the Easter Break and reviewed the project as a whole.

**Topics of Discussion**

With the website and device complete, the team discussed the White Paper and divided the work accordingly.

**Challenges**

With three people writing the White Paper concurrently, it was essential the tone and flow of the report was similar to ensure that it was easy to read and follow. Dorota and Nader raised some concerns that as non-Native English speakers, their sections may suffer. Scott reassured them that their language skills were better than they gave themselves credit for and reminded them that the team would all read over the White Paper together before submission so that anything that seemed lacking could be altered or added.

**Actions for Next Meeting & Details**

Keep working on White Paper and highlight any areas that may require assistance in completing.

Meeting to be held 23rd April, 11am, Room 4510, Kydd Building, Abertay University

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**Meeting Thirteen**

**Date, Time & Venue**

23rd April, 11am, Room 4510, Kydd Building, Abertay University

**Attended By**

Dorota Marczak, Naber Sobhi & Scott Allan

**Absences & Apologies**

**N/A**

**Review Previous Minutes**

Last weeks minutes were looked at before work on finalising the White Paper was undertaken.

**Topics of Discussion**

With the project submission due at the end of the day, the team reviewed the White Paper and suggested alterations where required.

**Challenges**

The team faced the challenge of ensuring the length of the White Paper met the word count stipulated. The team agreed not to be overly precious if the section they worked on had to be heavily altered as the result affected each team member equally and not individually.

**Actions for Next Meeting & Details**

N/A