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SEP4 Process Report

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SEP4

4th Semester

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1 Introduction

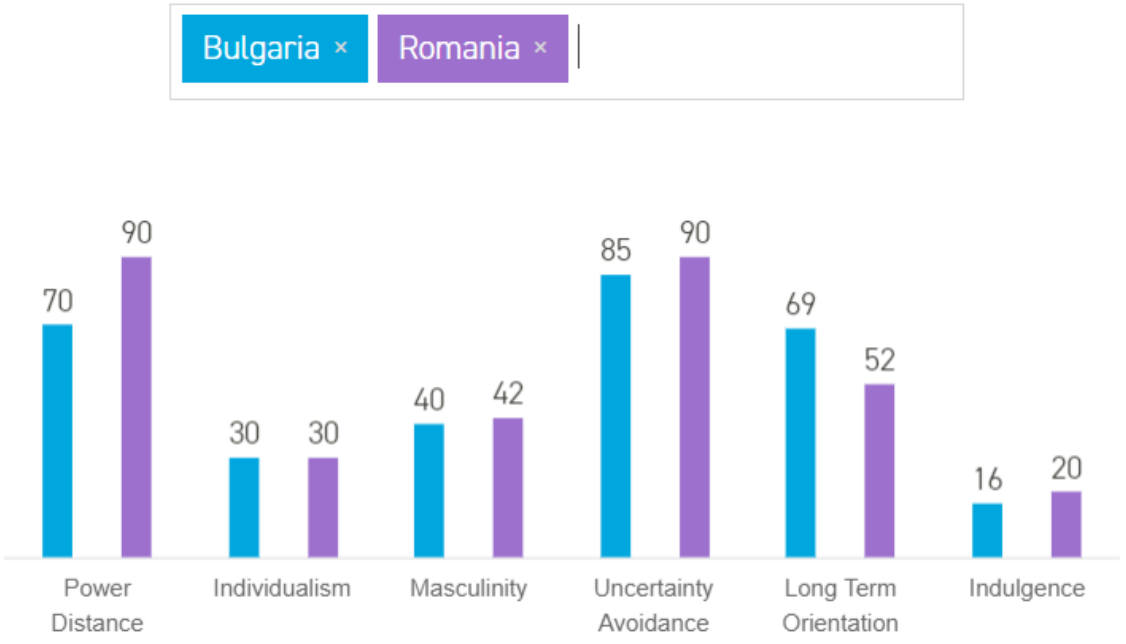
When working in big groups, it is important that all members agree on the system that they are going to work on. In order to have a good work flow it is also necessary to follow proper development frameworks - the development frameworks followed are AUP and Scrum.

This project is based on monitoring the external conditions of a plant and controlling them remotely through a system of sensors and an android app that notifies the user about the current status of the plant.

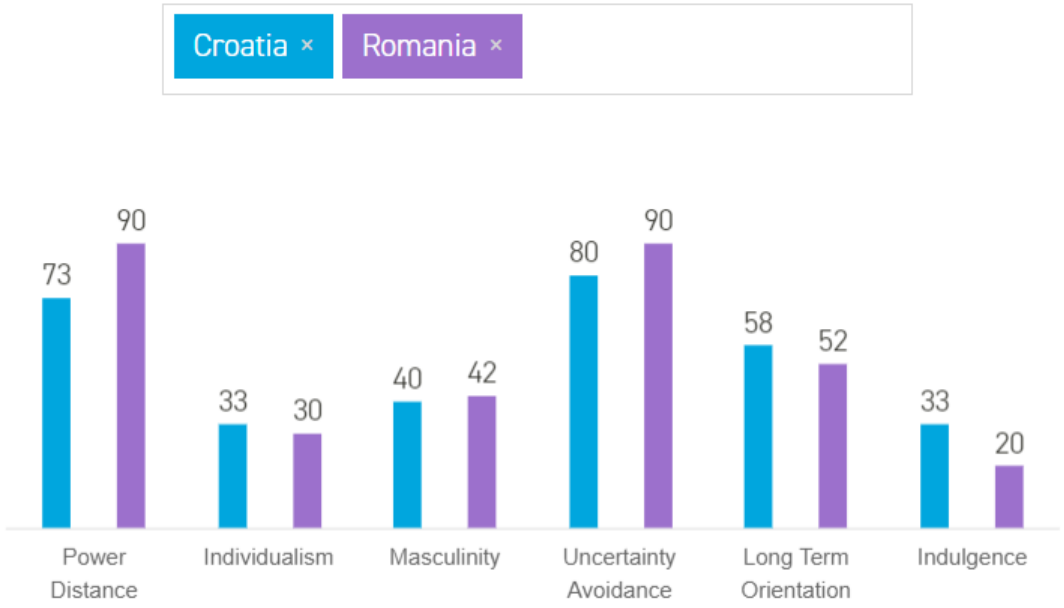
2 Group Description

The group is comprised of ten group members: Eduard, Erika, Ionel and Mihai from Romania; Angel from Bulgaria; Josipa from Croatia; Diyar from Syria; Christian and Kenneth from Denmark and Remedios from Spain. It is been the first time, for all the group members, to be working in such a big group. Some of the members worked together in previous Semester Projects but in general the group was new-formed.

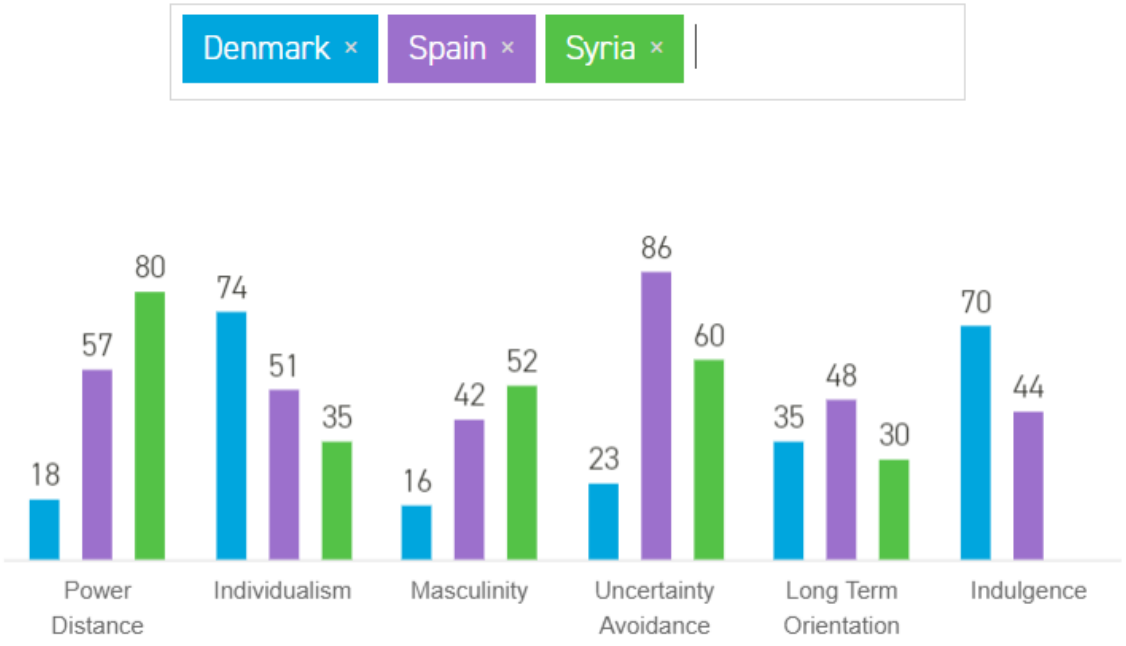
On one hand, we had the Android group formed by Angel, Erika and Ionel. As it is shown in the graphic below, the nationalities from the members are quite similar in the masculinity or the individualism aspects. The group did not have big cultural differences which facilitate the understanding between the members.



The Data group was formed by Eduard, Josipa and Mihai. As it is shown in the graphic below, the nationalities from the members are slightly different in the power distance or in the uncertainty avoidance aspects. These differences did not affect on the workload of the group.



The last sub-group, Iot, was composed by Christian, Diyar, Kenneth and Remedios. The members from this group have completely different cultural backgrounds. Anyway, the group worked properly and gained a wide cultural knowledge.



The specialities of every group member come into play when working together. In this case, we undertook the Belbin Team Role Inventory Test (Studienet, 2017), afterwards, we took the data and compared it to how we behaved in regards to our self-preparation, studies in class and the way we handled group work and its distribution.

Member	Test Result Belbin Role	Belbin Role Envision
Angel	Team Worker, Implementer, Coordinator, Shaper	Team Worker, Implementer, Coordinator, Shaper
Christian	Resource Investigator, Implementer, Coordinator, Team Worker	Coordinator, Resource Investigator, Monitor Evaluator, Team Worker
Diyar	Resource Investigator,	Coordinator, Resource

	Implementer, Coordinator, Team Worker	Investigator, Monitor Evaluator, Team Worker
Eduard	Resource Investigator, Implementer, Coordinator, Team Worker	Coordinator, Resource Investigator, Monitor Evaluator, Team Worker
Erika	Specialist, Implementer, Monitor Evaluator, Resource Investigator	Monitor Evaluator, Resource Investigator Plant, Specialist, Implementer, Monitor Evaluator
Ionel	Specialist, Implementer, Monitor Evaluator, Resource Investigator	Team Worker, Implementer, Coordinator, Shaper
Josipa	Specialist, Implementer, Monitor Evaluator, Resource Investigator	Monitor Evaluator, Resource Investigator Plant, Specialist, Implementer, Monitor Evaluator
Kenneth	Specialist, Complete Finisher, Coordinator, Shaper	Implementer, Specialist, Completer Finisher, Shaper
Mihai	Specialist, Complete Finisher, Coordinator, Shaper	Team Worker, Implementer, Coordinator, Shaper
Remedios	Resource Investigator, Implementer, Coordinator, Team Worker	Coordinator, Resource Investigator, Monitor Evaluator, Team Worker

During the inception phase, a decision was made for which roles would go to which member based on the personalities and Belbin roles. For Scrum, a Scrum master had to be chosen. The candidates that were appealing for this role were Angel and Kenneth since both had prior experience with using Scrum and had the right characteristics

based on the Belbin Team Roles such as a Resource Investigator and Team Worker. Based on a unanimous vote by all group members, Angel was selected as Scrum master and Kenneth was selected as the Product Owner whilst the others were assigned as being team members.

Member	Role
Angel	Scrum Master
Christian	Team Member
Diyar	Team Member
Eduard	Team Member
Erika	Team Member
Ionel	Team Member
Josipa	Team Member
Kenneth	Product Owner
Mihai	Team Member
Remedios	Team Member

3 Considerations before the project

Ionut-Cristinel Putinica

I am going into SEP4 with a small dose of pendency, the reason for this being the hefty amount of new tasks, but also the scale of the project that my group has to develop. My main goal is to fully dedicate myself on the work related to the project, until the point that me and the other members of the group consider that our expectations regarding the final product that we have in mind will be met. I am certain that the work process will be full of challenges and problems, due to all the new things that we will have to implement, but I am looking forward to all of them, since I find that solving a problem, "getting your hands dirty", is the best way to learn something new.

Erika Szasz

SEP3 was a big challenge for me as I had just transferred from Mechanical Engineering and was new to the world of Software Engineering. But that experience taught me a lot and made me eager to see what SEP4 was all about. Admittingly, at first it seemed a bit overwhelming from all points of view. It seemed to be a very complex project that requires a large amount of specialized knowledge and dealing with a team of 10 people also presented itself to be a challenge. My goal at the beginning of the semester was to absorb as much information as I can about the technologies we would have to use and do my best regarding my part in the group.

Angel Petrov

As far as I can see, we are going to work in a different structure this semester. My previous experience was working in 4 man groups. I like the fact that the teachers are trying to test us in every possible way. This prepares an individual for real life challenges after they finish with university. The disadvantages to such a massive team would be coordination and communication. Teams would need to collaborate at certain

times between each other so that they are able to create a final working product as well as meet. Again, communication is key and with the right set of coordination, unity will make strength in the group.

Remedios Pastor Molines

The first thing that we knew about this SEP is that it was going to be huge: not only in the number of members that the group was composed of but also by the fact that we needed to combine three different aspects of the Software Engineering in one project. To be honest, I was afraid about this fact but at the same time excited. I already knew most of the group members which was something that reassured me. Summing up, I was excited to face this hard-work challenge.

Kenneth Petersen

I expected that the project was going to be difficult to organize. Working together 10 people is very different from any of the previous semester projects. I was very confused about exactly what we were supposed to achieve when project started and, opposed to the previous projects, I did not initially have a good idea about how the project was to be implemented. I was concerned that there were going to be a lot of problems with the project.

Josipa Babic

Firstly, I would like to mention that this semester project is organize differently compared to previous one. I hope I will gain a lot of experience working on this semester project. The tasks are looking a bit challenging, because no one had experience working in this data filed before. However, challenges make you improve and grow. I am a bit scared because we are ten people in the group and from my perspective that is too much. I truly believe that each of us is going to give as much as possible to make this project successful. I am glad because I got chance to be in the data team. That is the field that I am the most passionate about.

Eduard Costea

For me SEP4 is going to be a huge project with many people involved, different cultures and different teams, each of them cooperating. I am really curious how everything is going to work as this is the first time we'll work in sub-teams. I am looking forward myself, too see how I going to help us grow our ability of adapting to new technologies, learn how to use them properly and meet the requirements in time.I think the first problem that we'll encounter will be the the communication between teams as each of us will focus more on its team rather than on the whole project,I think this is manageable as long as there are constant updates between each of the 3 sub-teams of this Semester Project.
I am really curious how this process will end and how everything is going to look in the final.

Mihai Tirtara

This project seems like it is going to be an interesting experience, being part of a 10 persons team and working with 3 different sub domains of Software Engineering it will be really challenging. My goal is to improve my skills in Data Engineering and to learn new technologies.

Christian Schou Sørensen

I don't really know what to expect here before the project. It seems interesting that we have to do large project in its entirety instead of system chunks. Also that we have to divide the parts of the system between us and we will get a responsibly for making that specific part work instead of the entire system.
With that says I see the possibility for the project to become a mess because, we are going to be 10 people who have to agreeing on a lot of design and the project management choices.

4 Project Initiation

Personal events

Personal affairs can differ from person to person inside the group, taking into consideration the fact that the group consists of ten members, which leads to a very high probability of personal events emerging as a problem. Job calls, extracurricular activities, travelling and a lot of other factors can interrupt or delay a meeting or an assigned task. Eight out of ten members are not from Denmark, thus, the workflow of the team can slow down during the holiday periods, as a direct aftereffect of travelling. Exams, family and spouses also have a high chance of delaying the work on the project.

Solution:

As a precaution, work will begin earlier than as planned on the time-schedule, in order to mitigate any complications, as the likelihood of the above mentioned risk to happen is extremely high. In the case that a group member cannot fulfil one of his tasks on time, and that interferes with the workflow, that task will be split amongst others as to not keep the project behind.

Lack of Constant Verification

The lack of regular endorsement and check-ups from the supervisors, and also the struggle to always find them available, it will easily make the team feel more hesitant and unsure about certain aspects and specifications of the project, which can lead to delays in the workflow of the team. There is also a probability that the team won't understand correctly the feedback and indications from the supervisors, which can lead to frustration and resentment.

Solution:

If a certain task or an exception is considered a set-back for the project, that certain problem is put aside, and an attempt to replace that feature with a simpler implementation is

made, and the workflow will be moved to another task until a proper solution for the problem is found.

Time Schedule

A time schedule has the main purpose of improving the work of any group. The problem is when a wrong time schedule is put to use, which creates the possibility that work on the project will be delayed too much, which can lead to consequences such as missing a deadline. There is also a chance that, even if the group has the perfect time schedule, they might not follow it accordingly, which, once again, can lead to postponement. It is of great importance that the time schedule is checked-up constantly, so that the team knows if they have enough time to finish what they decided to do regarding the project.

Solution:

The group should swallow their pride and accept that cuts to the requirements shall be done and all low priority system features shall be removed.

The following table has also been created to showcase different risks, their likelihood to emerge, their severity, and some ways to prevent and fix the problems in case they appear.

4.1 Risk Assessment

Risk	Description	Likelihood (Scale 1-10)	Severity (Scale 1-10)	Product of likelihood and severity	Risk mitigation	Identifiers	Responsible
1	Delay	4	5	10	Check schedule regularly, make sure	Missing the deadlines for the scrum sprints	Remedios

					the time is enough		
2	Illness	2	4	4	Make sure both physical and mental condition are favorable	Missing meetings and slowing the development of the project	Christian
3	Lack of necessary professional knowledge	4	3	6	Search online for information or seek help from the supervisors.	Facing difficulties when designing and implementing the project.	Ionel
4	Failure of hardware	2	5	5	Proper using and well maintaining of the equipment	Faulty sensors,boards etc.	Kenneth
5	Loss of information	2	5	5	Use clouding services such as GitHub and Google Drive to store all project work	Missing information, code, documents, etc..	Mihai
6	Failure of Database	2	4	4	Use of backup for databases	Unable to retrieve or load information from the database	Josipa
7	Synchronization between teams	4	5	10	Constant communication between groups	The project development is slowed	Erika
8	Group member not participating or not commited	6	6	6	Give warnings in case of such events	The project development is slowed, the team is demotivated	Angel

4.2 Version Control and File Management

Because of the scale of the project, the need for version control management became obvious from the beginning of the project. Numerous other websites and applications have also been used for file sharing and communication within the group, as to better organize meetings and remote work.

Version Control

For version control, the team decided to use three secondary repositories, where each sub-group will submit their work regarding coding, and a main repository, where the team submitted in the first stages of the project documentation, and later, all the software was put together in this repository. GitHub, as the industry's standard was used by the group to create and manage their repositories. GitHub was used as the hosting service for all the group's files, offering all of the distributed version control and source control management functionality of Git, as well as adding its own featured. It provided access control and several collaboration features such as bug tracking, feature requests, task management, and a wiki for the project. As for the backend of version control, Git Bash and GitKraken have been used as the main tools to track changes in the computer files and coordinating the work on those files among the group's members.

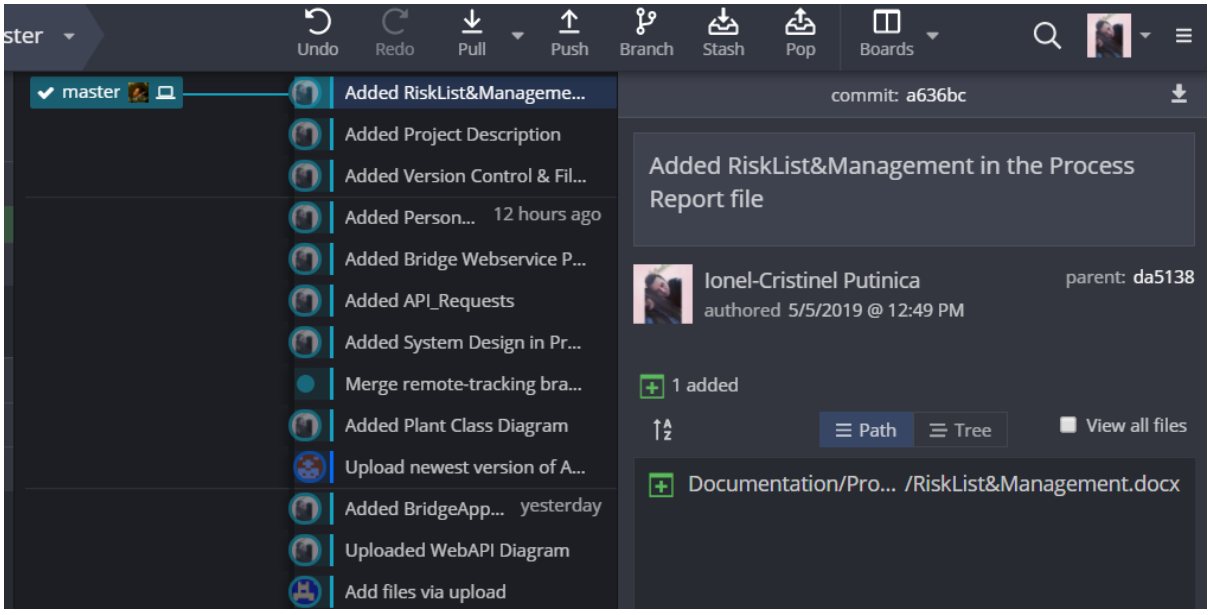


Figure 1 Dashboard of the main repository in the early stages of the documentation

File Sharing Management

Different tools were used for sharing files between members of the group, the main one being Slack, a cloud-based software, based on team collaboration tools and services, where the team uploaded different parts of documentation, such as writing or diagrams. Other tools have also been used such as Dropbox and Google Drive, and, on a small scale Facebook as well.

Communication and Planning

As far as communication and planning went, the main tools that the team has made use of were Slack and Facebook, because of the ease that they offer regarding this services.

5 Project Description

The project description was our first interaction with the issues that our system is trying to solve. We had to thoughtfully research our problem and for this reason we used the internet to look up resources. We carefully analyzed the requirements of the semester project and did the necessary research to make sure we have all the needed information in order to develop a good and viable project.

The first step was discovering the main problems that people who own indoor plants experience. The main issue that the group decided to point out was how to make it easier for plant owner to take care of them and ensure a longer lifespan.

The delimitations of the system arose from the fact that this is a fairly complex project that requires quite some time and extensive knowledge.

For the choice of models and methods the team had chosen Scrum and AUP. By using Scrum each member of team had been assigned one of the three roles: Product Owner, Scrum Master or Team Worker. Furthermore, by creating the product backlog the workload has been divided into sprints, which will be explained in detail in the project execution.

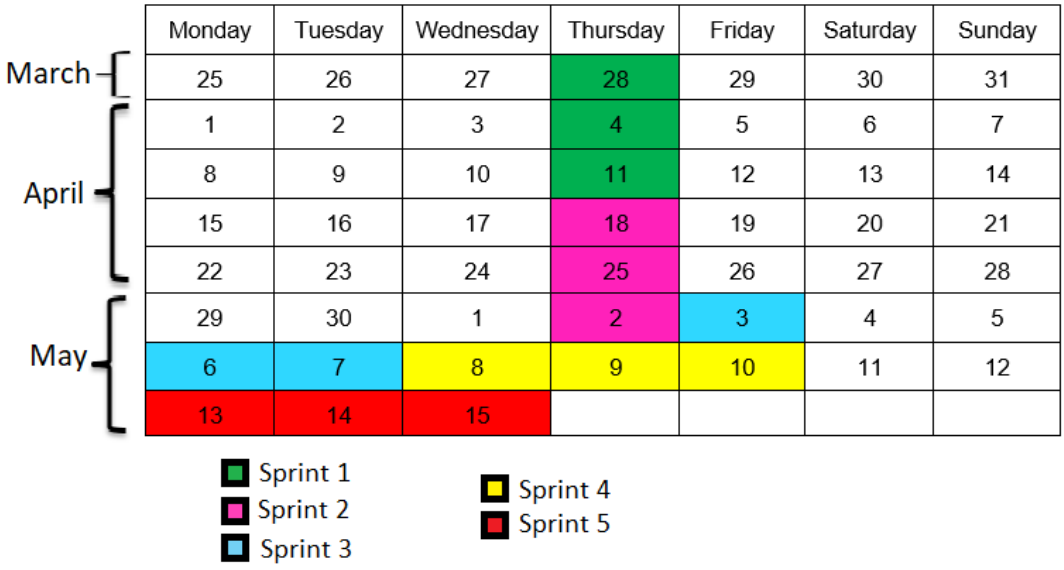
6 Project Execution

We based the work methodology of our project following Scrum and UP.

Our inception phase, following AUP, lasted from the 7th of February until the 21st of March. After this date, we started the sprint-period the 28th of April.

Each sprint was composed of three working days. As shown in the picture below, the group worked each Thursday during six weeks which composed the first and second sprint. Once the semester project full period started, the group was working every week days.

The final version of the sprints is the shown below:



Sprint 1

Sprint planning:

The first sprint started on the 28th of March and ended on the 11th of April. The sprint consisted of fourteen workdays, with 2 meetings per week.

The team started the work on the user interface of the app, as well as designing the system architecture.

Sprint backlog:

Task	Task category	Status	Responsible
Android: Create Login and Register Activities	System UI	DONE	Angel Petrov, Ionel-Cristinel Putinica
Android: Design system architecture concept	Documentation	DONE	Angel Petrov, Erika Szasz,

			Ionel-Cristinel Putinica
Android: Create main activity layout	System UI	DONE	Erika Szasz
Android: Create fragment - ModifyAccount	System UI	DONE	Erika Szasz
Android: Create fragment - AddPlantFragment	System UI	DONE	Erika Szasz
Android: Create LoginViewModel	System development	DONE	Angel Petrov
Android: Create RegisterViewModel	System development	DONE	Angel Petrov
IoT: Design System Architecture concept.	Documentation	DONE	Christian, Diyar, Kenneth, Remedios.
IoT: Implement webservice socket connector.	System Development	DONE	Christian, Diyar, Kenneth, Remedios
IoT: Create database handler.	System Development	DONE	Christian, Diyar, Kenneth, Remedios.
Data: Create EER diagram	Documentation	DONE	Mihai Tirtara, Eduardo Costea, Josipa Babic
Data: Create Mongo DB model	System development	DONE	Mihai Tirtara, Eduardo Costea, Josipa Babic
Data: Connect MongoDB and SQL Server	System development	DONE	Mihai Tirtara
Data: Implement source database	System development	DONE	Mihai Tirtara
Data: Test source database	System development	DONE	Mihai Tirtara

Sprint Review:

The sprint started on the 28th of March, 2019 and ended on the 11th of April. A total of 19 tasks were done for all three group divisions. During this sprint an emphasis was put on setting fundamentals, such as creating the layout for the Android application, creating a socket connection for the IoT part and make a source database done by the data team.

Sprint 2

Sprint planning:

The second sprint started on the 18th of April until the 2nd of May and focus was on the system development.

Sprint Backlog:

Task	Task category	Status	Responsible
Android: Create DTO objects	System Development	DONE	Angel Petrov
Android: Create fragment – ModifyPlantProfile	System UI	DONE	Angel Petrov, Erika Szasz
Android: Style Create/Modify and ViewPlant profiles	System UI	DONE	Ionut-Cristinel Putinica
Android: Create Plants & User Repositories	System development	DONE	Angel Petrov
Android: Create RecyclerView in MainActivity	System UI	DONE	Angel Petrov, Ionel-Cristinel Putinica

Android: Create ListAdapter	System development	DONE	Angel Petrov
Android: Define RetrofitAPI requests	System development	DONE	Angel Petrov
IoT: Secure Server Socket.	System development	DONE	Christian, Diyar, Kenneth, Remedios.
IoT: Implement Bridge Socket Protocol.	System development	DONE	Christian, Diyar, Kenneth, Remedios.
IoT: Connect bridge Application to real database.	System development	DONE	Kenneth
Data: Implement WEB API	System development	DONE	Eduardo Costea
Data: Transfer data from MongoDB to SQL	System development	DONE	Mihai Tirtara
Data: Connecting MongoDB with Web API	System development	DONE	Josipa Babic

Sprint Review:

The sprint started on the 28th of March, 2019 and ended on the 11th of April. A total of 18 tasks were done for all three group divisions. An emphasis was put on making the UI elements in the Android application, implementing a bridge socket protocol and making the connections between MongoDB > SQL and to the Web API as well as some documentation.

Sprint 3

Sprint planning:

The third sprint started on the 3rd of May until the 7th of May.

Sprint backlog:

Task	Task category	Status	Responsible
Android: Create Add Plant Delete Plant, GetAll Requests for Networking	System Development	DONE	Angel Petrov, Erika Szasz, Ionel-Cristinel Putinica
IoT: Test Main Bridge Application.	System development	DONE	Kenneth
IoT: Servomotor wiring	System development	DONE	Christian, Diyar, Kenneth, Remedios.
IoT: Implement CO2 sensor	System development	DONE	Christian, Diyar, Kenneth, Remedios.
IoT: Implement light sensor	System development	DONE	Christian, Diyar, Kenneth, Remedios.
Data: Implement staging area	System development	DONE	Mihai Tirtara, Josipa Babic
Data: Test staging area	System development	DONE	Mihai Tirtara, Josipa Babic
Data: Creating model for data warehouse	System development	DONE	Mihai Tirtara
Data: Implementing data warehouse	System development	DONE	Mihai Tirtara

Data: Expose web service for Android application	System development	DONE	Josipa Babic

Sprint Review:

The sprint started on the 28th of March, 2019 and ended on the 11th of April. A total of 10 tasks were done for all three group divisions. An emphasis was put on developing the networking for the Android application, implementation of sensor functionality for IoT and exposing the web service for the Android Application by the data team.

Sprint 4

Sprint planning:

The fourth sprint started on the 8th of May until the 10th of May.

Sprint backlog:

Task	Task category	Status	Responsible
Android: Add icon to application launcher	System UI	DONE	Ionel-Cristinel Putinica, Angel Petrov
Android: Created mock Water Plant Feature	System development	DONE	Angel Petrov, Erika Szasz, Ionel-Cristinel Putinica
IoT: Connect LoRA and get HWEUI.	System development	DONE	Christian, Diyar, Kenneth, Remedios.
IoT: Semaphore for the LoRA.	System development	DONE	Kenneth, Remedios.
IoT: Set servomotor.	System development	DONE	Christian, Kenneth
IoT: Connect the bridge application with the lora server.	System development	DONE	Kenneth
IoT: Document Sprint.	System development	DONE	Christian, Diyar, Remedios

Data: Expose web service for Android application	System development	DONE	Eduardo Costea
Data: Update mongoDB to sql server	System development	DONE	Mihai Tirtara
Data: Test socket connection	System development	DONE	Josipa Babic
Data: SQL server schedule job	System development	DONE	Josipa Babic, Mihai Tirtara
Data: Update ETL diagram	Documentation	DONE	Josipa Babic, Mihai Tirtara, Eduardo Costea
Data: Update data warehouse	System development	DONE	Josipa Babic, Mihai Tirtara, Eduardo Costea
Data: Test data warehouse	System development	DONE	Josipa Babic, Mihai Tirtara, Eduardo Costea

Sprint Review:

The sprint started on the 8th of May, 2019 and ended on the 10th of May. A total of 18 tasks were done for all three group divisions. An emphasis was put on refining the Android application, connecting the bridge application to the loraWAN server by the Android team and working on the data warehouse by the data team

Sprint 5

Sprint planning:

The fifth sprint started on the 13th of May until the 15th of May.

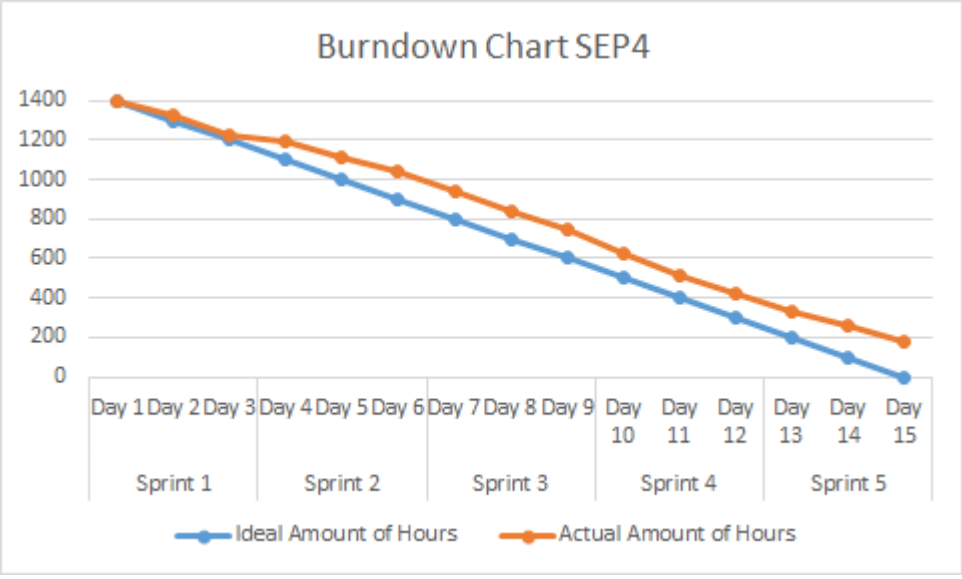
Sprint backlog:

Task	Task category	Status	Responsible
Android: Black box testing the system	System Testing	DONE	Angel Petrov, Erika Szasz, Ionel-Cristinel Putinica
Data: Incremental load	System development	DONE	Josipa Babic, Mihai Tirtara, Eduardo Costea
Documentation & Diagram Updating	Documentation	DONE	Josipa Babic, Eduard Nicolae Costea, Diyar Hussein Hussein, Remedios Pastor Molines, Kenneth Ulrik Petersen, Angel Iliyanov Petrov, Ionel-Cristinel Putinica, Erika Monica Szasz, Christian Schou Sørensen, Mihai Tirtara

Sprint Review:

The sprint started on the 11th of May, 2019 and ended on the 15th of May. A total of 3 tasks were done for all three group divisions. An emphasis was put on making writing the documentation for the Process and the Project Report. The last changes were made in the project. The same way, the video required for the hand-in was recorded.

Burndown Chart:



A burndown chart shows the ideal flow of work compared to how to team actually worked. When moving horizontally on the chart you see the time that has passed. And when moving vertically you see the amount of work being finished. The red line symbolizes the “ideal” flow, while the blue line is the groups flow. The red line is really unrealistic since it shows that you finish a task as soon as you start it. Therefore, the blue line will always stay above in the beginning. And often end up crossing the red line before the end. However, as shown below this is not the case in this project. There are many things planned, which did not get to be implemented. Which results in the blue line you see below.

7 Considerations after the project

Angel Petrov

As a rule, I tend to do what is the utmost best from start to finish for me and my group. This semester, I pushed myself and my limits even further than before. When a person pushes themselves, they realize that they are investing in themselves and this will be a huge plus for me as I have done so. In regards to my group, I might have had too high expectations that are unrealistic. A person's’ actions define that person. For myself, I know that I will always be proactive and disciplined. In regards to the Domain Model, I think that we did a tragic job and this halted progress down to a snail's pace. For my upcoming internship, I have learned from SEP4 that I have to adapt to many different people and cope with whatever I have. A person who can make a rocketship from a figure is a one that can truly cope with whatever is thrown at them. In whichever project, I will mobilize whatever resources I have and direct them towards the problem. I am grateful to the teachers that were there for me to assist me with any questions I had and provide me with moral support until the end. I hope that they read this. In the end I am glad that I got to experience all the pros and cons of this project and learn to move forward.

Ionut-Cristinel Putinica

As an overall experience, for me, SEP4 was an important step for my engineering career. The most interesting experience was working in a group with this many members, and being split into sub-groups that work on different tiers of the application. Every single thing that I have worked on during this project has improved my knowledge, being it code implementation, testing, academic writing, working on diagrams, version control and time management. This project was also a re-assurance for me that it is way easier to work on something as being part of a group, rather than doing it by yourself, feedback and help being really valuable tools when working on a project, especially one of this scale.

Erika Szasz

I must admit that at first, I did not think an Internet of Things project will be very appealing to me, simply because I am more interested in other areas of Software Engineering. But having gone through the process of developing this project with my team, I must say it is was definitely a demanding experience that lead to a very interesting final product. There were some situations and tasks that taught me new skills and made me think outside of my usual pattern. Before the team was split in three subgroups, dealing with a team of 10 people, each with different ideas and visions, seemed a bit chaotic to me. But as we split, things became clearer and any conflicts dissipated. All in all, I feel I gained valuable experience from this both in terms of knowledge and human interaction.

Remedios Pastor Molines

SEP4 has been a completely new experience. It is been the first time that I have been working in such a big group with that many kind of personalities and different cultural backgrounds. I also found challenging the fact that three sub-groups could merge in

one unique project. I was in the Embedded group and even though it was hard, we manage to work and success. I am happy I had the chance of getting more familiar with C. My sub-group mates helped me a lot in order to understand the work that we needed to do. I am satisfied with the result that 10 people come up with even though the communication could have been better. To sum up, I consider this experience as a small training for the real life in which I have learnt that the communication and the organization between group members is really important in order to end with a common result.

Josipa Babic

We signed the contract and we were following the rules that we set at the begging of the semester. We discussed every tiny detail, before implementation. Everyone had chance to say his or her opinion or propose something that was suiting the requirements more. We had meetings on Thursdays following the schedule of university. We were meeting during the weekends when we it was necessary. Everyone has responsibility for specific tasks and we manage to complete them on the time. Secondly, as always working in a team has some disadvantages. Sometimes was hard to differentiate between what is more important what is less important. We spend some time discussing the things that were irrelevant from my point of view. We worked on specific tasks that we divided between us. If someone had difficulties or troubles with something, we were all there trying to fix it. We followed Scrum framework to organize our work. We had five sprints, each sprint had tasks that we needed to complete. We had sprint meetings after each sprint to sum up how it was and what we should improve in the next one. Meeting were very motivational and supportive. Overall, the system is functional and documented. I improved my programming skills as well as personal. I learned a lot working with this people and enjoyed it. We had a lot of fun combined with hard work.

Eduard Costea

As a sum up for this semester I'd like to say that it was such a nice experience to be part of the Data Warehouse Team. Mihai and Josipa are also my good friends and everything went smoothly in the whole process. At first, everything seemed quite challenging and so it was because we found ourselves in some difficult situations as we had to work with new technologies like MongoDB,but everything got well in the final and we managed to fix everything. As a conclusion I think this SEP was my best one so

far, I would say that I didn't even feel it that hard pressing it on my schedule or making me occupied 24/7/. I really enjoyed working with my teammates and I think I discovered once again, that I am more into backend than anything else because I couldn't see the hours spent passing and it made me passionate and proud of myself.

Mihai Tirtara

This semester I could say that it was different because we had to work in 10 persons team in this way making it harder to synced our workload between the different subgroups. Being part of the Data Warehouse team, the development of the project went smoothly even with many refactorings that we have gone through. It was an interesting experience and I can tell that there countless lessons that I learned during this period. For example by working in team with the size close to a small company, it was a demanding experience keeping in touch with everybody and taking decisions together regarding the system design. This semester we also had to work with new technologies such as MongoDB which at the first sight it seemed challenging but until the end we managed to work it out. I enjoyed working on this project especially being part of the data team because it is the area that I would also like to work in the future.

Kenneth Petersen

It was very interesting to get to work with C on an embedded system and to make a system with so many different connections and forms of communication. The project contained a lot of elements, that we had not previously worked with, which made a very good learning experience.

The idea of the 10 people team, separated into sub-groups, made sense as a way to more closely simulate a real work environment. However, in practice the project was very chaotic and negatively affected by its lack of actual management. It is almost impossible to properly organize anything when every decision has to be made democratically across different teams and with no leader or manager to make decision. A team so large becomes dysfunctional without management. The project, and the quality of our final product, was definitely obstructed by a lack of communication and organization.

In my opinion, there is an unsatisfactory mismatch between the actual final system and the design agreed upon in the analysis phase, as well as between the individual parts of the system made by each group. This is in part due to a lack of clarity in regard to requirements and possibilities with new technologies, and in part due to poor cooperation and communication between the groups.
There seemed be confusion, even among supervisors, about what exactly the project entailed, which also contributed to the lack of clarity.

Diyar Hussein

The idea of working in a large group was exciting as I could learn how the work can be divided among different teams to build a big project. However, the communication among the different teams was poor to an extent, which affected the quality of the project and made the work harder.
Being a part of the IOT team was not my first priority as I preferred to work with the Data, which already had enough members. Though, I enjoyed working with the IOT team as I learnt a lot about designing and building this kind of embedded systems.
The system could have always been better, but my overall reflection is positive as the last result was not too much under expectations.

Christian Schou Sørensen

The project went well and I am really satisfied with the final system. the process of the project has been up and down. The preparation phase was kind of a mess. It took much more time compare to what we expected. We all had different opinions about how things should be done and how the system should be design. This lead to a lot of misunderstanding and which lead to a design mistake in the final system in the web api. I believe it would have been easier if we had a project manager or someone to make the final decisions.

I am satisfied with my own effort. I have been doing a lot of programming and design with the group in this project, and I have a really good understanding of the system.

Supervision

The members of the group were satisfied with the cooperation with the supervisors – in most cases they got the answers they needed. The group used supervision whenever they reached a setback during the project, and the only inconvenient they had regarding to supervision is that in some cases the supervisors were hard to find, but most of the times the encountered problems have also been solved via an email.

8 Conclusion

The overall feeling regarding the project is satisfaction - the group is happy with the final result, and all the group members state that is was a positive experience for them, in many regards. Everyone is pleased with the new technologies, frameworks and programming languages they have learned, and, furthermore, delighted by the fact that they had the opportunity to put all these new skills to test in a project of this scale. Working on a project of this magnitude, with this amount of people - from different cultures, a good amount of requirements and a limited work-time was in no regards an easy task, and it was one that requiered a lot of patience and organisation, but with the great cooperation from all group members and the extensive help from the supervisors, the final product is one that, for the group members feels as a gratifying one - in no regards the perfect project, but the combined work of a group that aimed to green mark as many tasks as possible.

9 Sources of Information

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