

HB products mobile app

Process Report

Version history

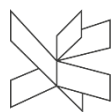
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Supervisor: Poul Væggemose



VIA University
College

VIA University College



26.181 Characters with Spaces

ICT Engineering

7th semester

19 December 2019

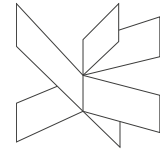
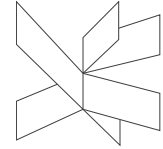


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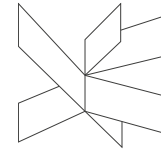
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1 Introduction

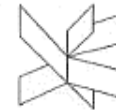
This report is part of a bachelor's project given by HB Products A/S. In the report we focus mostly on the process of how the project is being developed in a 5-month period. It examines how the team handled the project planning and its execution. Throughout the project planning phase our team had several meetings with the project's stakeholders and our supervisor which really helped us to choose the correct development method and gave us a good overview of the potential risks that can emerge and how they can be avoided.

The project was carried out using Kanban as a process managing. Personal SWOT analysis also assisted the team to distribute the roles correctly.



2 Group Description

2.1 Group Contract



Multigroup Group Contract – VIA ICT Engineering

Group Contract

Group Name: **Multigroup** Date: **03.09.2019**

These are the terms of group conduct and cooperation that we agree on as a team.

Participation: We agree to....

1. To participate equally.

2. Share the workload in a fair manner.

3. Help a team member if he is struggling with a task.

Communication: We agree to...

1. Stay in touch.

2. Share our ideas and opinions about others work

Meetings: We agree to....

1. Be on time.

2. Always have an agenda.

3. Come to the meetings prepared.

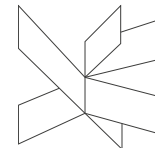
Conflict: We agree to....

1. Solve the problems together.

2. Listen to each other and avoid conflicts.

Deadlines: We agree to....

1. Do our best to finish before the deadline period.






Multigroup Group Contract – VIA ICT Engineering



Other Issues:

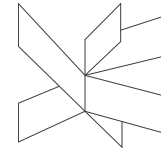
It's always possible to have personal or health issues. The group will try to handle the issue internally, otherwise it will contact the supervisor for advice.

Group member's name	Student number	Signature
Konstantin Ralev	253640	
Hristo Stoyanov	253911	
Mariyan Deligalabov	253896	

2.2 Group Members

2.2.1 Konstantin Ralev (253640)

Is a 22-year-old ICT Engineering student at VIA University College. He specializes in Cross-Media (Game Development, Mobile Development, Web Development). He has prior experience working on semester projects and a six-month internship at Siemens AG. During his internship he worked with C and C++ and got a better understanding of how to develop software on a lower level.



Team Role: Chairperson

The chairperson has a strong coordinating role. With an emphasis on procedures, the chairperson will try to bring and keep the team together. He or she is communicative and deals with the members of the team in a respectful and open-minded way.

(123test, 2019)



Belbin Test Results - Konstantin

SWOT

S: has developed mobile software before, diversity of experience, adaptive

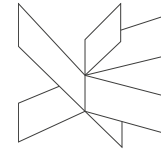
W: bad time-management, procrastination, not enough experience in database systems

O: to gain experience in database systems, to work with a real company, eventually to be offered a job at the company, to work with technologies I haven't worked with before

T: I'm having other classes and assignments in the project period, having to work a part-time job, Possibility of not passing a degree.

2.2.2 Hristo Stoyanov (253911)

Hristo is a 7th and last semester student at VIA University College, Horsens. He specializes in Cross-Media, meaning that he has experience with implementing software for different platforms such as Windows and Android, as well as Web and mobile applications. His experience is mainly in the field of mobile applications since he has been working on a mobile application during his internship, also on personal mobile applications in his free time.



Team Role: Expert

The expert has skills and expertise required for the specific task at hand. He has a strong focus on the task and may get defensive when others interfere with his work.

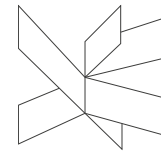
The expert prefers to work alone, and team members often have a great deal of trust and confidence in him. (123test, 2019)



Belbin Test Results - Hristo

SWOT

- S:**
- Has experience in developing mobile applications connected to APIs;
 - Takes responsibility; Reliable
- W:**
- Gets easily affected by others procrastinating;
 - Inexperienced in database and API implementation;
- O:**
- Experience in a group long-term project;
 - Gain knowledge about API and database implementation;
 - Work with new technologies;
- T:**
- Working on assignments for other classes;
 - Part-time job;
 - Health or personal issues that require attention;



2.2.3 Mariyan Deligalabov (253896)

Is a student at VIA University College on his last semester. His specialization is Data Engineering (Database Design and Implementation, Data Warehousing and ETL). Up till now he has worked on various IT projects and as a working experience, he has been working at ScaleFocus. During the working experience the main tools that he used were Oracle, PL/SQL and Informatica Power Center, which developed his knowledge in this field.

Team Role: Driver

The driver is generally very ambitious and energetic. He may appear as impatient and impulsive. The driver is a strong motivator and will challenge others at crucial times. Although the actions of the driver may sometimes seem somewhat emotional, they do play a crucial role in pushing the team forward to succeed. (123test, 2019)



Belbin Test Results - Mariyan

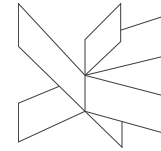
SWOT

S: has designed and implemented databases, strict and meets deadlines.

W: inexperienced in mobile app development, dislikes people's laziness

O: group work experience on a long project, acquire mobile app development skills, possible future job position in the company for which the team is developing the project

T: having to do university assignments during the bachelor project period, unexpected situations that require me to go back to my country and part-time work.



3 Project Initiation

This phase of the project started in 6th semester with the bachelor's project preparation course. This course focused on the process of project initiation from getting the idea and setting the group, through writing a project description and finalized with writing some of the project's requirements using the IEEE 830 - Software Requirements Specifications (Institute of Electrical and Electronics Engineers, 1998), which helped to set the project's boundaries and have a really quick start in the actual project period which started in the beginning of 7th semester.

In the end of this preparation period we also had our initial meeting with our product owner (HB Products A/S), we brainstormed some ideas and prioritized them into a list, which helped us get a better idea of what exactly they need.

We started the 7th semester with a meeting with the product owner and presented our ideas and how we are going to approach some of the problems that they presented to us. After that we also had a meeting with our supervisor. He advised us how to begin the Analysis phase and provided us with very helpful documentation that resulted in us generating the final requirements and getting them approved by the company. At this stage we were also able to issue a timeline with goals and estimated span of each of the phases. During the phases the tasks were distributed to the members and managed via Kanban. Kanban was chosen as an agile development method because of the small group size. Using SCRUM in a such a small team is an overkill since we had to document a lot of stuff that could be otherwise discussed in a short meeting.

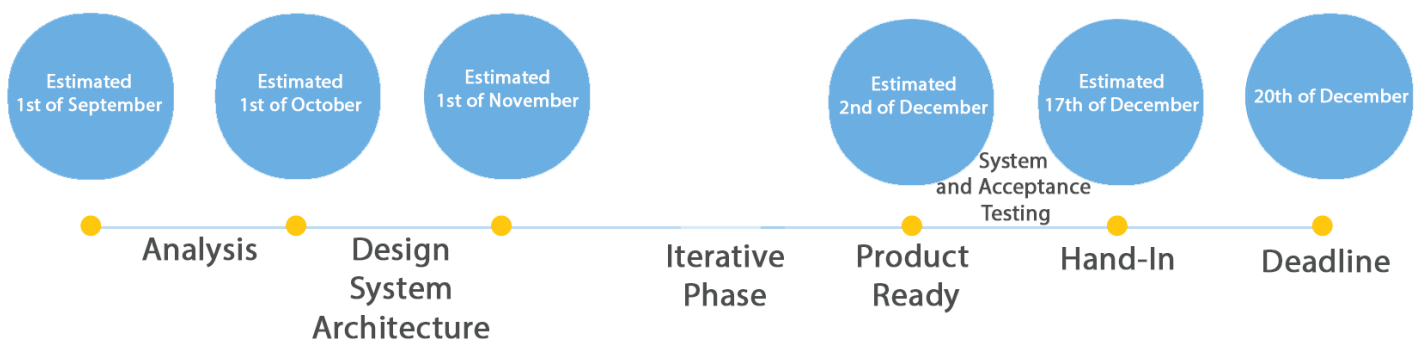
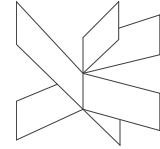


Figure 1 - Initial timeline



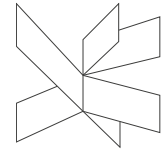
4 Project Description

We had started researching and brainstorming a long time prior to the actual start of the project since we had a good understanding of what we were going to develop. After a few weeks of analyzing and conceptualizing we had to write a project description.

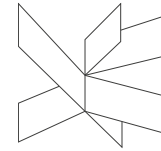
During this period, we had (BPR1) and the group was also able to discuss how and when are we going to meet. We created a Group Contract to which all the group members contributed, signed and accepted it. In the initial meeting with the company some of the requirements for the project were set and this helped us with writing a project description that matched the final project. While writing the Project Description the aim of the project was identified, and soon after, the main objective of the project was found.

In the beginning of the project period we had another meeting with HB products which helped in clearing some of the requirements based on the knowledge that we had accumulated during the preparation period. At this point in time one of our main goals was to manage our time and workload very precisely because all of us had classes and part-time jobs. Based on the results we think that we were able to do that. At the beginning of the project we set a lot of requirements and we thought that it would take a long time to develop those but after a few weeks in the project we felt confident with what we were doing. After that, we were already half-way through the Analysis phase, we had another meeting with the company and talked about adding some more features because we felt that what we were doing wasn't going to be enough for the project's goal. After this meeting the final requirements were set, and we were able to define the final goal.

Based on the requirements and the complexity of the tasks they were distributed evenly between the team members based on their knowledge and background.



The goal that we set for this project in the beginning seemed too easy, too small of a task for three-person team and for a bachelor's project. After revising the requirements, the goal was changed. Then we were supposed to develop a cross-platform application, that needed to have a QR code scanner, 3D Model Viewer, a list of Products connected to a database for scalability of the project, a tab with Frequently Asked Questions, Chat Functionality, Email Service that can send emails to the Support and Push Notifications. We think that the set goal was perfectly realistic based on the time that we had. All of us had to attend classes and had a part-time job.



5 Project Execution

For the project's scheduling, time tracking, and task assignment Kanban was used. In the beginning of the project we separated the whole project to 4 phases (Analysis, Design, Implementation, Testing). We set a time estimation when each of the phases should end (See *Figure 2*).

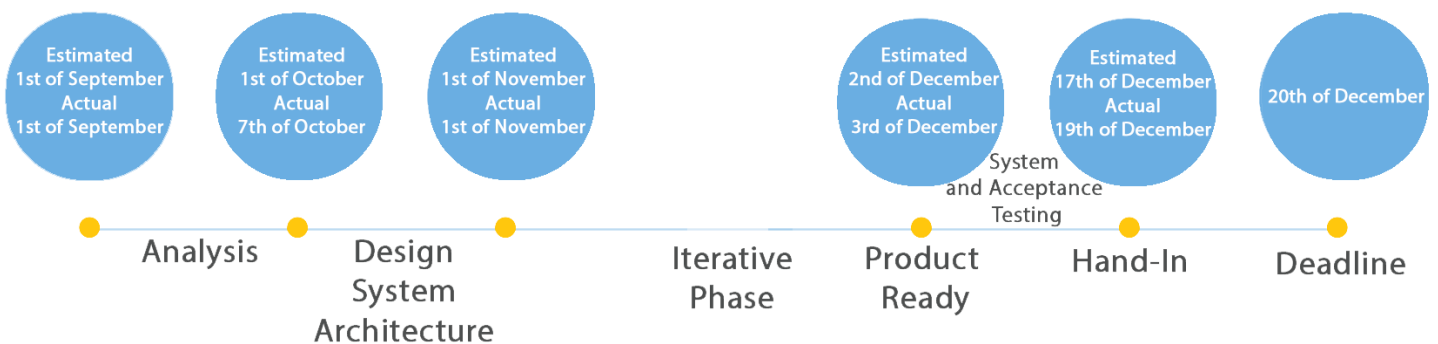
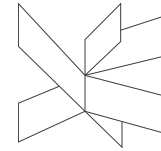


Figure 2 - Final timeline

We were supposed to finish the project on the 16th of December. By planning the end date, a week before the hand-in we predicted that there may be some challenges that will slow us down and we left some time that will compensate if there were some delays.

For backup and version control of the code GitHub was used. We needed to use a platform that all of the team members were familiar with and because one of the team members had a Pro membership, we were able to create a repository and set it to private. The repository needed to be set to private because this project is executed in collaboration with HB products and after the end of the project all of the code will be handed in to them. HB Products may decide to use the code in a real product in the future, so the code had to stay exclusive to us.

All group members worked in the same repository. When a group member finished his task, he always committed his work to the repository with a detailed description so that the other team members can keep track of the changes that were made. For keeping



up all of the team members up to date with the documentation. OneDrive was used as a cloud storage for the reports, daily logs and diagrams. One Drive supports real-time multiple user's editing and version control of all Microsoft products that we used (Word, Excel, etc.) Using those features every single group member would review what the other one's wrote and either approve it or rephrase it. By doing that we were able to collect all the viewpoints of the project and make the documentation as detailed as possible. All progress was tracked by using Kanban Flow which is an online Kanban board, to which all of us had access to and everybody was responsible of updating the status of the task he was working on (See *figure 3*). For better quality image please check Appendix A.

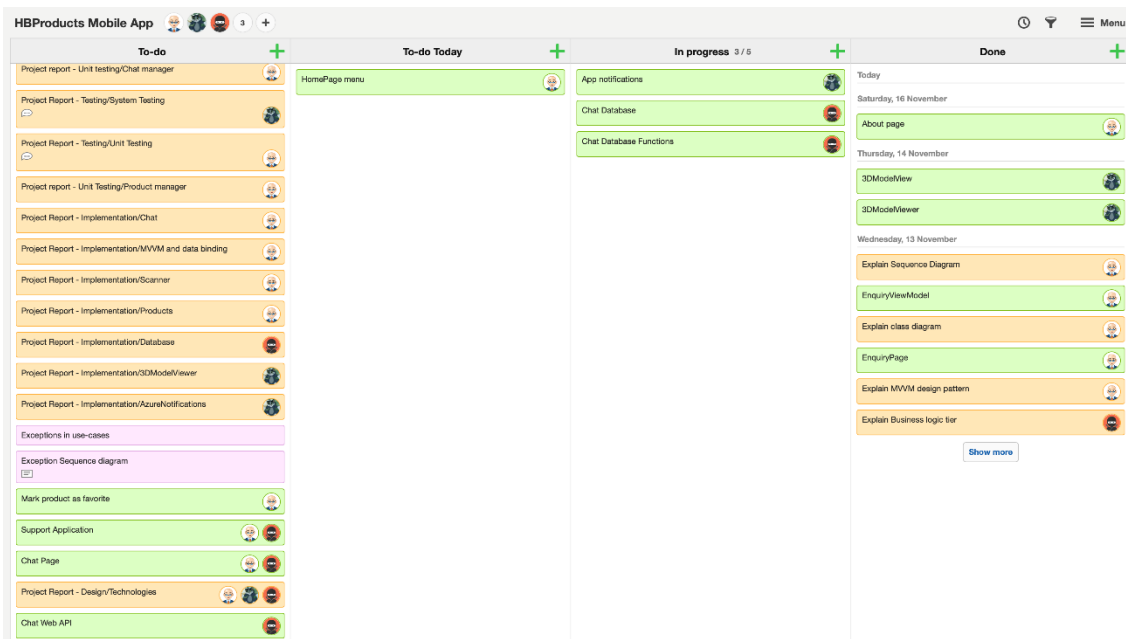
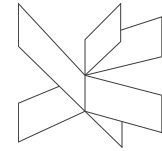


Figure 3 - Kanban board in progress 18-Nov



During the project the team met at least three times a week. All team members made their schedules around the project and were always available to meet at least three times per week. The rest of the time each of the team members worked on a task that was assigned to him.

In the beginning of the project we set a time schedule that shows when the different phases of the project should finish. We tried to follow that plan perfectly, but because we wanted to get a better understanding of the technologies that we worked with or inspect the requirements thoroughly we went over the expected time in the few of the phases.

We have accounted for a situation like that in the initial plan by planning to hand-in the project early (see *figure 2*) so in the end we were able to finish the testing on time, revise the reports and still hand in before the end of the project period with only a few days of delay. If we have started now, we probably would have provided more time for research in the initial planning otherwise the final plan would look the same.

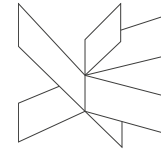
The project's results were satisfactory as we were able to meet all requirements and achieve the initial goal of the project. All the tests went great and the project was accepted and approved by our product owner.

NOTE: For more detailed representation of the task assignment and process please check Appendix B - Kanban Board Final and Appendix C – Bachelor Project Timetable.

6 Personal Reflections

6.1.1 Personal Reflections – Konstantin

In general, during the whole project all of the group members followed the group contract. We always tried to separate the tasks equally and give the appropriate task to the appropriate person. During the whole time we helped each other, an example that I can give is that I had problems with the multi-touch zooming of the 3D object in the 3D model viewer I asked for help and the other group members responded we gathered up and solve the problem really quick.

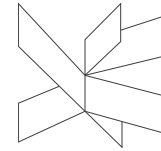


I was responsible for the prototyping of the Scan Page, choosing the correct technology for the 3D engine and developing it, researching Microsoft Azure and setting a demo app service and database in the design phase, implementing the Push Notifications on both platforms, setting up the email service and writing some part of the reports. One of my most important tasks I think was the choice of the technology for the representation of the 3D model. We went through a lot of technologies with this part of the project at one point we even thought of developing two apps with different technologies and the one app was supposed to forward the used to the other app to see the 3D representation of the sensor which in my opinion was not the perfect solution. So I have tested Unity, OpenGL, different implementations of UrhoSharp which were supposed to support “.obj” file natively but unfortunately they weren’t and at the end I decided to stick with the native UrhoSharp and convert the models to “.mdl” and implement the 3D engine like that.

For me personally the most important part of the group contract that helped us is to always be in contact and to always help each other. At one point of the project one of the group members had to go to his country because he had personal matters that could not wait. Even though this member wasn’t here with us we continued to be in contact constantly. Here OneDrive’s was a really good companion because we were able to see what he wrote in the reports in real time and give him feedback over a text message which worked perfectly in the few days that he was away.

In my opinion all of the group members have contributed to the project evenly and the outcome of that was more than satisfactory since we were able to implement all the features and do that on time. I was good that we had a data specialization student in our group. I think that simplified that data storing part of the project because if it wasn’t for him, we would have spent more time on that.

The good thing about our group was that we were all from the same nationality and we were friends outside group which in my opinion helped us with the work process because there wasn’t an adaptation period when people need to get to know each



other. Finally, I would not have changed a single thing about my group, the time schedule or the task separation since it was excellent all of us acknowledged our personal tasks and did not let them ruin our project. We had a part-time job during the project period, in times we had course assignments which took a lot of our time, but we were still able to finish the project in time while covering the requirements and even adding on top of them.

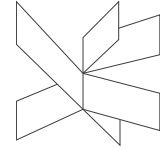
6.1.2 Personal Reflections – Hristo

The group contract that the team agreed on was made so that we make sure that every member works in cooperation with the other group members and does not stay away from the group. For the most part the contract was followed with the exception of the time management part in which we had problems.

To give an example of how the group contract helped us was that we were always helping each other when someone was having hard time performing the assigned task. For a future group contract, I would put a new rule for the time management which would make the team member put in extra work for the time that he was late for a meeting.

Furthermore, to give better impression on my role in the project I would like to say that I felt very responsible for the implementation of the mobile applications as I carried out the application system architecture, subsystem design and performed all of the coding except the 3D renderer, push notifications and chat functionality. The class and sequence diagrams were also something that I had to provide. For the chat functionality it should be mentioned that we were in a pair programming team of two consisting of me and one of my groupmates.

The group was able to meet all of the existing requirements placed from the product owner which is an indication of good group work. For the most part we were able to work well but sometimes I felt slacking from some of the group members as they were getting easily distracted or sometimes even the whole group.



I would say that each group member did the part that he is most sufficient. We were a group of Cross-media and data students which really helped us in cooperating well.

Succession at a hard for us task that we were challenged with was a really good motivator for the group. A good example of that would be the 3D model and the chat functionalities. On the other side, I was demotivated when I saw that a group member is slacking and not working on the tasks they had while I am doing so.

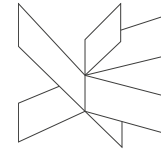
Based upon my experience from this project, the next time that I have a group project I will try to work harder in the analysis phase so that the requirements are set faster.

Working in a group has many positive sides which contribute to the project being successfully finished. The main perk of working in a group is the diversity in knowledge that we have.

6.1.3 Personal Reflections – Mariyan

One of the first things that was done in the group was the Group Contract, which had all the rules that the group made for participation, meetings, communication, conflicts and deadlines. During the project period the team members were following the contract strictly with some minor exceptions, which in my opinion were acceptable. Something that the group contract helped us was that when someone of the group members had a problem with the assigned task, the other members were helping him until the problem was fix and the task finished. As an improvement of the contract I will suggest that next time we should add a term that, if someone from the group is late for the meeting, he should do some additional tasks.

Being in a group with Data and Cross-media engineers is a benefit, because the project was covering both fields. My specialization is Data engineering and I took the responsibility for making the database and the Web API servers. In addition, I wanted to develop my skills and helped in developing some of the mobile application parts like



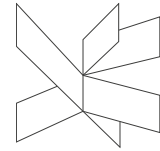
the chat functionality, which was a positive experience as I learned how the mobile application is binding the information and how the view are changed.

The thing that was motivating the group was seeing that every new implementation is working after performing the tests, especially after having a problem with a certain functionality. As an example, we had a problem to call a Web API POST method from the application and every time we tested it the result was not good. After many attempts one of the group member thought of an idea how we can see the request send by the application, which showed us that the problem was in the way that the object was serialized using the JSON serialization method. Fixing this problem was a big relief for the team and motivated us that even if we didn't have previous experience in a given field, we can put efforts together make it work. But let's not forget about the demotivation, which exists almost always. For me a demotivating moment was when I was seeing a group member getting easily distracted or not working on the assigned tasks for him.

Working in a group is always an opportunity to see how others are performing a task and share experience when developing a product. This project period had a positive influence on me, since it helped me develop my skills in the mobile application development field. Going back through the whole project and thinking what could have been done different, in my opinion, we should have given more time for analyses, because setting good analyses is in the base of making an excellent project.

7 Supervision

During the project we had Poul Væggemose (POV) as our supervisor. We had several meetings during the project, the cooperation and communication between us was excellent. He always responded to our emails and phone calls and fulfilled our meeting requirements because we had to meet in between classes, working on the project and



working our part-time jobs. Overall having Poul as our supervisor was a good experience. He always helped us when we needed something for the project. An example for that was acquiring a Macbook for the development of the application under iOS. After that he, also helped us by acquiring an Apple Developer Account. Finally, what helped us the most was his perfect knowledge of the process of developing a product, the feedback that he was always available to give us and point us in the right direction.

7.1 Supervision Meetings

23 Sep 2019 – Initial Supervision Meeting

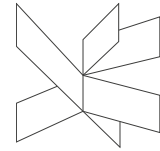
We discussed our progress so far. Talked about how we should handle the project from now on. Poul told us what steps we should take so that we can have a successful Analysis phase. Review on the initial project report.

31 Oct 2019 – Review meeting with Poul

We had a meeting with Poul. The meeting went great and we got professional advice on our problems and the priorities adjusted. Poul granted us access to Apple developer account which we need for the Notifications on apple devices. We made a short demo of our current product, while explaining how the system works in the background and what the user does not get to see.

Poul advised us to make Exception sequence diagrams for the top 3 most fatal exceptions which show how we handle them and that we also think about error handling inside of the system.

18 Nov – Meeting for documentation review with the supervisor



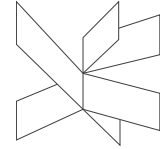
We had a meeting with our supervisor Poul. He had the current state of our documentation and had some comments about what we should rephrase and what are we missing. We had to include error handling in our project with some Sequence diagrams.

09 Dec – Supervision meeting

In the morning we had a meeting with Poul where he gave us feedback on our current documentation structure and some missing parts. We met after the meeting and started working on the parts which Poul critiqued us on.

16 Dec – Final supervision meeting

Our supervisor was mostly happy about our documentation, but there were still things to refine in the documentation. He pointed a lot of minor details that need to be polished or added in the documentation. This meeting was helpful because otherwise we were going to miss some small, but important details. The team met after the meeting and worked on finalizing the documents.

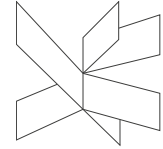


8 Conclusion

This was definitely one of the biggest challenges and project that we as individuals and as a group have been working on so far. It was quite the challenge, but we still managed to do it. In the beginning we had a quick start from both the company part and our supervisor. In our opinion, it is very important for a project to have a well-defined goal and its requirements to be clear and detailed. This was the group's main goal in the beginning. We were able to establish a good foundation on which we can develop.

On a group meeting the researching was started with how exactly we should approach the different parts of the project and distributed the task evenly and based on the persons background which, in our opinion, was one of our best decisions. Some milestones were set based on the project's time frame and we made some estimations. The estimations that were made were mainly focused towards having more time for analyzing and making the system design. This ensured that we make a good plan of how the system will work before starting the design and implementation of the smaller system parts (units, subsystems).

Finally, we were not able to meet all of our estimations but following our initial plan we were able to carry out all of our requirements and deliver a working product. We reached the goal that was set in the beginning. We believe that overall this project was an immense accomplishment and a foundation in our carriers as future software engineers.



9 References

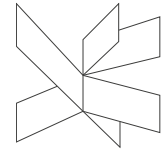
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Appendices

Appendix A – Kanban board

Appendix B - Kanban Board Final

Appendix C – Bachelor Project Timetable