Bring ideas to life
VIA University College

FLIGHT DATA COLLECTOR

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27209 Characters

ICT Engineering – IT-SEP4D-S18
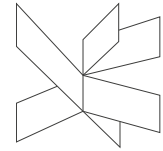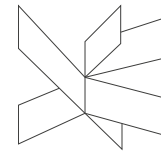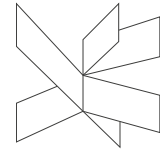
4th semester – Data Engineering

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**Appendices:**

Scrum daily meetings

1   Introduction

The project consisted in developing a solution that allows to a glider's pilot find thermals from information in previous flights and matching the thermals with the weather during that day. The project included a Data warehouse, business logic to find the thermals and a visualization to display the results in a map.

The Unified process was used to keep track of the project's progress together the SCRUM framework. The cycles in the unified process were divided into sprints that corresponded to the SCRUM sprints.

We as a group had SCRUM meetings every day, which played an important role in our progress, because they motivated us to keep working on the project. We had a short meeting every morning before starting to work on our own tasks where we answered three simple questions: "What did we do last time?", "What impediments did we have?" and "What are we going to do today?". This way, we could permanently keep track on each other's accomplishments and a good overview of the workload remaining. Also, the SCRUM Master took into consideration the team's impediments and tried to find solutions. The logs for the SCRUM meetings, sprints and tasks done are presented in this report.

During the elaboration of the project we had a few meetings with the supervisor Bo to make sure that we were following the right objectives and to get his feedback. We also discussed our difficulties and asked for advice from the supervisor.
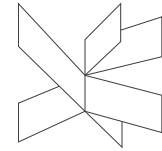
2 Group Description

The group for this project consisted on four members: Maja Petrusic, Maria Jose Ferreira, Sara Nunes and Krzysztof Majcher. All of us are ICT students within the data engineering specialization.

Our goal was to work on the project in a way that every one of us could have individual tasks where we could apply the knowledge learned in the classes, but also make the tasks flexible so that that we could be able to finish them. We divided the work in a way that we could feel the most confident and motivated about with the tasks that each member had. In that way everybody had to make a similar amount of work and we could learn from each other's work.

2.1 Scrum roles

Product Owner: Krzysztof, the success of the project is on his shoulders. He leads the development effort and is responsible for conveying his vision of the system to the team. It is also his responsibility to assess which pieces of the product backlog will be the most valuable. This means he decides which features should be developed and at what time during the project period.

Scrum Master: Maria Jose, the scrum master is the one responsible for the project's management. She must make sure that the team lives by the values and practices of the Scrum methodology. By conducting daily Scrum meetings to ask the team:

• What did they do yesterday?
• What will they be doing today?
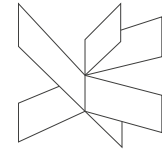
• Is there anything that it can be done better, or are there any obstacles in the way?

That way, we will be able, as a team, to express how we are performing, what is in our way and what our concerns are. This will help us notice and solve complicated challenges. As a scrum master, she should also help the team perform at their highest level to reach the goal of each sprint. If needed she should remove any impediments for the team to progress. She must make sure by discussing with the product owner that the product backlog is in a good shape. She should try to encourage the team to focus only on the present task, so that they will all work together and produce excellent work.

Scrum Team: Maja, Sara, Maria and Krzysztof. As a scrum team we will do the actual work of delivering the final product and they must make sure we all have the necessary skills to do so. After the product owner makes an ordered list with all the client needs, the team members will estimate how many efforts points each task has. After estimation, they can plan accordingly. The team members decide which one does what task, to produce the new product increment.

2.2 Product Backlog:

The following product backlog contains the user stories that we decided to have to complete the project. The story points represent the expected hours to work on each user story.

User Stories	Priority	Story points	Status
As a database administrator, I want a documented data warehouse to support end-users queries	8	20	Done
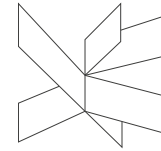
|			
As a database administrator, I want to see the converted log files in the database	10	10	Done
As a database administrator, I want to extract data from new logs, transform them and load them in a data warehouse	9	15	Done
As a user, I want to have a mechanism to find the thermal locations	7	12	Done
As a administrator, I want to store the thermals in the database	3	15	Done
As a administrator, I want to see the converted weather files in the database	5	10	Done
As a user I want to visualize the results	2	10	Done
As a user I want to read about the project	1	20	Done

2.3 Sprints:

The user stories from the product backlog were divided into 7 sprints. Each sprint consisted in 1-2 user stories, depending on their points (hours). The user stories were divided into smaller tasks to complete in each sprint.

2.3.1 Sprint 1 – 18th of May:

Planning: We decided that to make the first user story (the data warehouse), we needed to see the log files converted into readable information and store them in a database (second user story). We divided the sprint into the following tasks:

User Story	Status
As a database administrator, I want to see the converted log files in the database	**Done**
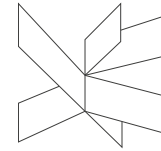
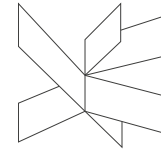|	
Plan meetings	Done
Make the flight log table design	Done
Implement the flight log table	Done
Implement a program that reads the log files	Done
Connect the program to the database	Done
Populate the database with the information	Done
Test	Done
Document sprint	Done

Sprint review: All the objectives for this sprint were done, the team is ready to take the next functionalities from the product backlog and put them into the next sprint.

Sprint retrospective: The team worked together, we divided the tasks and completed the sprint.

2.3.2 Sprint 2 – 21st of May:

Planning: Now that we had the information from the flight's logs in our database, we thought we could procedure to make the data warehouse, but we realized that to make the data warehouse we will also need the weather files, so we chose the user story that gets the converted weather files and stores them in the database. We divided that user story into the following tasks:

User Stories	Status
As an administrator, I want to see the converted weather files in the database	**Not done**
Make the weather log table design	Done

|	
Implement the weather log table	Done
Implement a program that reads the log files	Done
Connect the program to the database	Done
Populate the database with the weather log information	Not Done
Test	Done
Document sprint	Done

Sprint review: We couldn't finish populating the database table with the weather information, we included this task in the following sprint because the product owner said it was necessary.

Sprint retrospective: The team worked together to divide the tasks and tried to finish on time, we proposed ourselves to finish what we couldn't and keep the track of the project.

2.3.3 Sprint 3 – 24th of May:

Planning: We took and finished the task from the previous sprint and we divided the tasks for this sprint.

User Stories	Status
As an administrator, I want to see the converted weather files in the database	**Done**
As a user, I want to have a mechanism to find the thermal locations	**Done**
Populate the database with the weather log information	Done
Test the weather log converter	Done
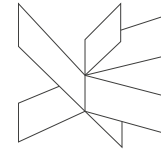
|	
Read the flight logs from database with a program to find thermals in a flight	Done
Make an algorithm that allocates thermals locations in the flights	Done
Test	Done
Document sprint	Done

Sprint review: All the objectives for this sprint were done, the team is ready to take the next functionalities from the product backlog and put them into the next sprint.

Sprint retrospective: The team worked together, we divided the tasks and completed the sprint.

2.3.4 Sprint 4 – 27th of May:

Planning: we chose two user stories, we decided that it was time to start with the data warehouse and we also chose to store the thermals in the database since it didn't take much time and it was a continuation of the previous sprint.

User Stories	Status
As a database administrator, I want a documented data warehouse to support end-users queries	**Not Done**
As an administrator, I want to store the thermals in the database	**Done**
Design and implement a table to store the thermals found by the program	Done
Insert the thermals found by the program into the database	Done
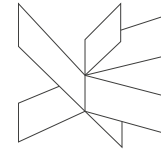
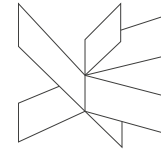|	
Improve the dimensional model from DWH course with the thermal, flight and weather data	Not Done
Implement a final dimensional model based on the one from the DWH course	Not Done
Test	Done
Document sprint	Done

Sprint review: We couldn't finish deciding how the new dimensional model will be, we included this task in the following sprint because the product owner said it was necessary and it is needed for the data warehouse to keep track of the thermals over time.

Sprint retrospective: We worked as much as we could together to divide the tasks and tried to finish on time, we proposed ourselves to finish what we couldn't and keep the track of the project. We also decided to set a meeting with the supervisor to solve our doubts.

2.3.5 Sprint 5 – 30th of May:

Planning: from a meeting with the supervisor Bo we had the final idea on how to make the dimensional model. Therefore, we finished the undone tasks from the previous sprint and we decided to go ahead with the user story about the ETL. We divided the user story into the following tasks:

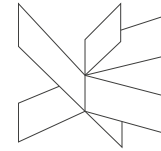| User Stories	Status
As a database administrator, I want a documented data warehouse to support end-users queries	**Done**

As a database administrator, I want to extract data from new logs, transform them and load them in a data warehouse	Not done
Improve the dimensional model from DWH course with the thermal, flight and weather data	Done
Implement a final dimensional model based on the one from the DWH course	Done
Implement the ETL for the weather	Not done
Implement the ETL for the thermal	Not done
Implement a way to populate the grids	Done
Implement D_FLIGHT population	Done
Populate the date dimension	Done
Test	Done
Document Sprint	Done

Sprint review: We couldn't finish the ETL's, we included this tasks in the following sprint because the product owner said it was necessary and it is needed for the data warehouse to keep track of the thermals over time.

Sprint retrospective: We worked as much as we could together to divide the tasks and tried to finish on time, we proposed ourselves to finish what we couldn't and keep the track of the project.

2.3.6 Sprint 6 – 2nd of June:

Planning: We included the ETL for this following sprint and we took a new user story which is the visualization of the results. We divided the user story into tasks:

| User Stories	Status
As a user I want to visualize the results	**Done**
As a database administrator, I want to extract data from new logs, transform them and load them in a data warehouse	**Done**
Implement weather ETL	Done
Implement thermal ETL	Done
Implement view for Power BI	Done
Test	Done
Document Sprint	Done

Sprint review: All the objectives for this sprint were done, the team is ready to take the next functionalities from the product backlog and put them into the next sprint.

Sprint retrospective: The team worked together, we divided the tasks and completed the sprint.

2.3.7 Sprint 7 – 5th of June:

Planning: We took the last user story which was about the documentation and divide it into tasks:

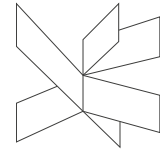| User Stories	Status
As a user I want to read about the project	**Done**
Make project report	Done
Make process report	Done
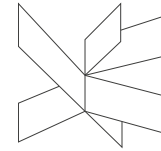
Sprint review: All the objectives for this sprint were done, all the user stories from the product backlog were taken on time.

Sprint retrospective: The team worked together, we completed all the sprints.

2.4 Burndown Chart:

The following chart compares our work, represented with an orange line, with the expected work burned, represented with a blue line.
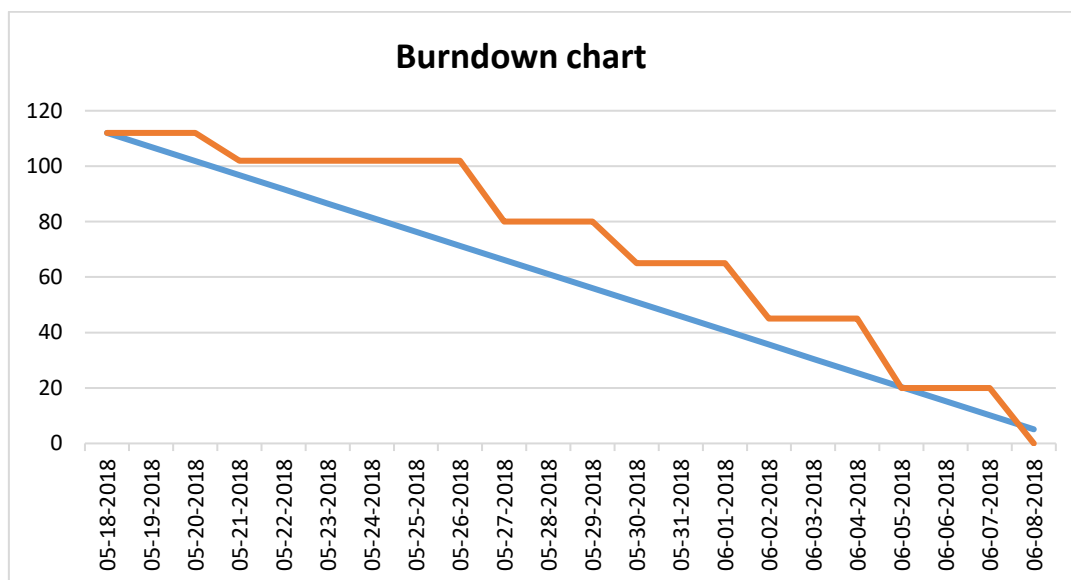
3   Project Initiation

1. **Why did you select the topic?**

   We got the project topic from our professor's.
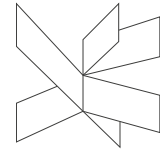
2. **How was the group formed?**

   The froup was formed in the class same day when we got the project topic.

3. **How successful was your planning?**

   At the beginning it was hard to plan but after making it, we did not have any major problems with following it.

4. **What kind of project planning tools did you use?**

   We used SCRUM as a planning tool.

4   Project Description

1. How did you define your problem?

We end up defining our problem from the analysis of the background description.

The project focus is to gather information about the location of thermals that happened during flights and the weather information during the flight. It is necessary to build the required data structures and processes to acquire, store and process data from flight recorders with an aim of analyzing flight data to identify thermal hotspots in Denmark.

We also defined the following questions to be answered:

● How to store the flight and weather data so that it becomes readable and accessible?
● How to find thermals within the flight data?
● How to get the thermal location?
● How to match the flight data with the weather data?
● How to make an average of locations and thermals
● How to analyze the data over time?
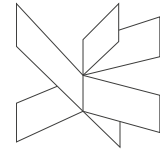● How to present the data?

2. Did you set up a realistic goal?

We managed to finish our project on time without any special difficulties, so we can conclude that we set up realistic goal. The time organization, good communication and   dividing tasks between team members helped us to achieve the goal.
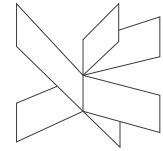
3. What did you want to achieve?

We wanted to identify thermal hotspots in Denmark to help the pilot have a longer flight duration.

5   Project Execution

Methods:

1. How did you follow up on your plan for the project?

At the beginning we had problems with organizing time and making the plan but once we made it, we did not have any big problems following it. There were minor changes to the plan but nothing which would have a major impact of the project.

2. Which methods did you use and were they successful?

We used data bases, data warehouse, business visualization tools and object-oriented programming. All methods which we used were successful.
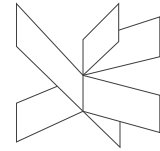
3. Would you use have used other methods, if starting the project today?

Based on the results, we would use same methods if we were starting project today.

Project results:

1. In what way are you satisfied with the project results?

We are in general satisfied with project results. We finished before the deadline all we have planned to do. All requirements are met, and program is working and has a great visualization that makes us even more proud because
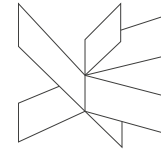
we can see our program actually working and interact with it. Work ethic of the group members was excellent, and we had a nice time working on this project.

2. **What kind of project risks did you identify and how did you monitor and handle the risks?**

The risks we identified were: not enough data, imprecise analysis weather/flight data and factors. By doing the project we were always aware of these risks and we have made the most out of the data we had

3. **What was less successful? Explain why?**

Finding a very precise thermal location, because we used grids to divide the map to calculate a custom area for each thermal.
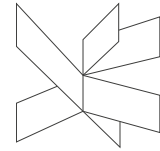
6   Personal Reflections

6.1   Krzysztof:

So far it was the best group that I had chance to work with and working on this project was a great pressure for me. As a product owner a had a great opportunity to have a strong impact on project result and work flow and I hope that I claimed my role well. As a group our idea was to work that way that everybody has a chance to participate in every task and I think we manage to archive it.

The cooperation between group members went very smoothly and luckily, we didn't have to use our group contract for or against anybody. Whenever we got stack at some difficult problem or felt demotivated or just needed some time to thing we took a short break to go to supermarket and buy some ice-creams. From our multicultural squad I learn not only a few new words in different languages curiosities about other countries but also, I learnt about many important aspects of cooperation like how to let everybody chance to tell an opinion, how to quickly solve conflicts or avoid them in the first place and last but not least how to appreciate other cultures the same way that as your own.

If I would have to do the project again I would just change some of steps in implementing part because, when I now know an exact result by using backward engineering I would skip some unnecessary data transfers or features. In the project subject I epically like a real-life aspect of it. I think that feeling that we are doing something that can actually make sense and could be used. In the conclusion this project for me was a great pleasure and chance to develop both my It and social skills.
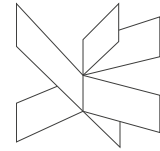
6.2 Maria José:

Group Work: The group contract talks mostly about the attendance and equal participation from all the members and that everyone is responsible to finish their own tasks. As a group, we have achieved almost everything that was in the contract, I cannot complain about anything.

I felt that I had equal responsibility as the rest of the team members, we divided the tasks for each sprint equally, so each member had tasks that were vital for finalizing each sprint and therefore, the project. The tasks that I was given, for example, were ETL queries for some dimensions and facts, populate dimensions queries, explaining and help the other team members how to use PowerBI and make the visualization using that tool.

The group contract has had a success impact in the group cooperation because we made the meetings and we tried to do all the work during the meetings, so everyone was updated with all the progress that each member had done, and we could talk with the members of the group if we had difficulties or a doubt regarding the work that another member made.

All the team members participated in the elaboration of the project, so we can say that the whole group work together. As mentioned before, we tried to divide the tasks so that each member had the same amount of work and when it was possible we tried to assign the tasks that the member was comfortable with, for example, I preferred to do ETL's and help with the visualization rather than to implement thermal search calculations in java programs.

I think each member did the most as they could and we all used other member's work to do complete our own tasks, so we did use each member's knowledge and best skills.
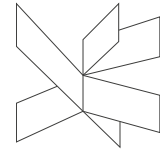
In the beginning we were not sure about which tools to use, where to start and the steps to make to achieve the result but the supervisor and scrum meetings allowed us to get in the right track. We got motivated every time we put our work together because we could see that we were making progress and we were closer to the result.

The motivation decreased when we had work for many hours on the same day or if we had gotten stuck, but we could always ask the supervisor for help. We had funny moments due to our different and friendly personalities which helped us keep the motivation and the group collaboration. We also had many good different opinions and ideas that we took into consideration in the project. It was a challenge to discard an opinion from a member when we had many, but we solved it by asking all the members what was be the best opinion or path to consider.

I improved my team communication and organizational skills. I also learned to listen, respect and put in practice other opinions. But the best part was getting a good result and having fun while working together.

I will try to be more involved in the beginning of the project and organize my time better because I couldn't attend all the meetings due to work, and assignments for other subjects.

Project organized studies and problem-based learning: Working in groups helps each member to learn and get experience from an important project without

doing everything by him/herself and it improves the teamwork skills. The problem-based learning also gives experience to the members because we are given a challenge where we need to put in practice the knowledge we acquired in class. It makes us learn more because we must think what fits best to get to the solution.
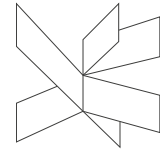
Group work may cause conflicts within the members if they have different opinions or knowledge, there could also be people that work more than other people so not all the members might end with the same experience and knowledge. I only see a problem with problem-based learning and it is if the members do not have enough knowledge about the subject they need to work on, but they might get the knowledge while solving the problem.

The pro on creating a problem formulation is that we get a better understanding about the project because need to analyze it to get to the problem formulation. The con is that we might have a different idea or understanding about what the project is about and we might start thinking about solutions that are not relevant.

The pro on creating a project description is that we can analyze and think better about what we need to do and the possible steps and methods that we will use to get to the solution. The con is that we start with documentation and that can unmotivated the team.

6.3   Sara's Reflections

Group work: The group contract consisted on setting the basic rules to cooperate as a team easily. These basic rules included participating in all meetings and in case someone didn't comply with that, they had to explain the reason and catch up on what they missed, and we accomplished this but, in my
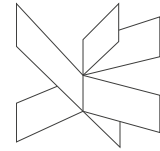
opinion, it would have been better to meet in person every time. We divided the works in tasks and distributed it to the team. This was proven to be a success since everyone could work on their tasks without much difficulty and it also allowed us to work on the parts we feel most comfortable.

During the project, I have always offered to help and assist my colleagues, also to hear everyone's ideas and points of view to make sure we agree and come up with the best solution possible. Our communication improved a lot during the period.

Project organized studies and problem-based learning: The project benefited all of us since we had the opportunity to work on different and learn multiple things. For example, I was coding the java program that converts the log files and inserts them in the database. I have also been involved in developing the ETL for the fact weather. This has made me have a good insight on Data Warehousing concepts and implementations as well as parsing files and connecting it to a database.

If I could re-do the project I would be more organized with my time better to be able to dedicate more to the project. Since I have a student job at the side, this was sometimes hard to do and stressful.

Overall, I enjoyed working on the case that was provided to us. Before I started this project, I didn't have much knowledge of the gliders and thermals territory, so it was definitely interesting to learn about this topic. The use of problem-based learning shows how a real-life project will look like and this approach will definitely be useful on our future career.

6.4   Maja Petrusic

Group work:

- We made group contract as a set of the rules for the attendance, participation and dividing task equally on each member of the group. In my opinion we as a group did good following group contract.

- I felt that we divided tasks equally during the whole project and all sprints. We all work on the approximately same number of tasks and assisting each other if necessary.

- We always had meetings at the time we agree to have them, and we tried to achieve everything planed for that meeting, so we are ongoing with the work of other members.

- I don't have any adjustments for the next group contract, I like this one.

- In general, I can say that it was nice group work that we had working on this project. I had some problems with the health, and I appreciate that my group understood what I'm going through and was not making any problems about me missing two meetings.

- I think each member did the most they could, and we utilize each other's expertise.

- At the beginning we had some problems with motivation because we were a bit confused about how to organize, how to start and which tools to use in order to finish project. But after organizing scrum and meeting with supervisor we were back on track again. We got motivated every time we saw that we achieved some task.

- We had fun working on the project together, and we easily went through all difficulties.

- I improved my communication, listening and organizational skills. I also found it fun working with my group.
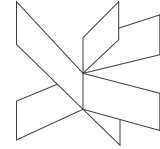
- Next time I will try to do more for my group, because this time I feel like I could have done more.

Project organized studies and problem-based learning:

- I think that group work helps to improve social and communicational skills, also helps to learn more because of sharing knowledge among group members.

  Problem-based learning is also gives good experience to the group members because we are using our knowledge from the classes in practical way, and we have to think out the box to find the best solution.

- Disadvantages of group work: possibility of conflicts, easy to get unmotivated if group is bad, some members doing more than others.

  Disadvantages of problem-based learning: less of knowledge about subject, lack of motivation.

- Pros of creating a problem formulation: detailed analyzation of the project, easier to work on project with problem formulation done.
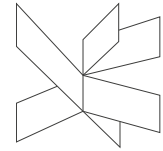
  Cons of creating a problem formulation: wrongly understanding of the project, ending up on different track.

- Pros of creating a project description: analyzing and understanding project completely

 Cons of creating a project description: no cons.

7   Supervision

We had several meetings during the project development. We held the first meeting because we had doubts regarding our dimensional model and the way we found the thermal location, and another meeting almost at the end of the project to get feedback from the teacher, this last meeting was actually useful
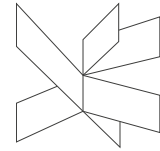
because we were showing all the thermals found, not only the one that are constantly in a place, and he made us realize that so we had time fix it and fit the project requirements.

The meetings with the supervisor allowed us to keep the right track on the project. The supervisor Bo also gave us advices and some hints so that we were able to continue the development and to make our own decisions. The supervisor also answered the questions that all the team members had.
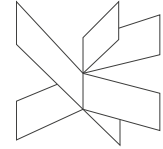
8   Conclusions

The group achieved the project's result by dividing the work between the members and by keeping a good and respectful communication. The supervisor meetings were essential to clarify doubts and make sure we were in the right track. The project allowed us to get experience and put our knowledge into practice.

Appendices

SCRUM Daily Meetings:

18-05-2018 –Friday | duration: 20 min

- We were introduced to the project by our supervisors and made the project description.

Tasks:

a) Make the product backlog.

b) Decide which user stories to take for the first sprint.

Deadline: 20.05.2018

20-05-2018 –Saturday | duration: 20 min

- We made the product backlog
- We chose the first two user stories to make in the first sprint
- We divided the sprint in smaller tasks.
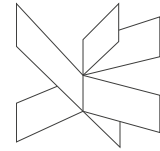- We started the first tasks for the first sprint

Tasks:

a) Implement a program to extract information from the log files

b) Store the information extracted in the database

c) Finish the tasks for the sprint

d)Document the sprint

Deadline: 21.05.2018

21-05-2018 –Monday | duration: 20 min

- We extracted the log files

- We implemented a program to convert the extracted files into the desired format information
- We stored the converted files into a local database

Tasks:

a) Select the user stories that we will use in the second sprint

b) Divide the user stories into smaller tasks

Deadline: 22.05.2018

22-05-2018 –Tuesday | duration: 20 min

- We started the second sprint
- We divided and started the tasks
- We started making a program to read the weather files

Tasks:

a) Make a table in the database to store the weather logs

b) Populate the table with the weather logs

Deadline: 23.05.2018

23-05-2018 –Wednesday | duration: 20 min

- We finished the program that reads the weather logs
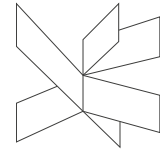- We made the weather table in the database

Tasks:

a) Populate the weather table in the database.

b) Start 3rd sprint.

Deadline: 24/05/2018

24-05-2018 –Thursday | duration: 20 min

- We populated the weather table in the database
- We divided the tasks for the third sprint

- we started a Java program that reads the flight table from the database

Tasks:

a) Calculate the thermal's location for the flights.

Deadline: 25/05/2018

25-05-2018 –Friday | duration: 20 min

- We finished the Java program that reads the flight table from the database
- We calculated the thermal's location.

Tasks:

c) Start next sprint

Deadline: 27/05/2018

27-05-2018 –Sunday | duration: 20 min

- We took another user story and divided it into tasks
- We designed a table to store the thermals found by the program in the database.

Tasks:

a) Implement the table to store the thermals.

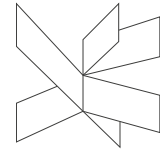b) Make the dimensional model based on the one from the DWH project.

Deadline: 28/05/2018

27-05-2018 –Sunday | duration: 20 min

- We made a sketch of the dimensional model.
- We tried to implement the dimensional model, but we had many doubts.
- we set a supervisor meeting.

Tasks:

a) Get answers from the supervisor to continue the dimensional model.

Deadline: 29/05/2018

29-05-2018 –Tuesday | duration: 20 min

- We had a meeting with the supervisor Bo who clarify what could be facts and dimensions regarding the weather, thermal and their locations.
- We started making the dimensional model.

Tasks:

a) Finish the dimensional model.
b) implement the dimensional model in the database.
c) Start 5th sprint.

Deadline: 30/05/2018

30-05-2018 –Wednesday | duration: 20 min

- We finished the dimensional model.
- We made the DDL for the tables in the dimensional model.
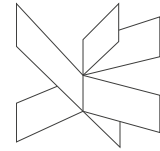- We divided the tasks for this sprint

Tasks:

a) Make an ETL for weather
b) Make an ETL for the thermal
c) Implement a way to populate the grid dimension.
d) Populate the flight dimension.
e) Populate the date dimension.

Deadline: 02/06/2018

31-05-2018 –Thursday | duration: 20 min

- We populated the date dimension.

- We populated the flight dimension.
- We started implementing a way to populate the grid

Tasks:

a) Make an ETL for weather
b) Make an ETL for the thermal

Deadline: 02/06/2018

1-06-2018 –Friday | duration: 20 min

- We populated the grid dimension.
- We started the weather ETL.

Tasks:

a) Finish the ETL for weather.
b) Make an ETL for the thermal

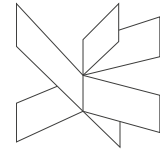Deadline: 02/06/2018

02-06-2018 –Saturday | duration: 20 min

- We finished the ETL for weather.
- we divided the tasks for the 6th sprint
- We started the ETL for thermal

Tasks:

a) Finish the ETL for the thermal.
b) Make a view for PowerBI.
c) test the results shown in PowerBI.

Deadline: 05/06/2018

04-06-2018 –Monday | duration: 20 min

- We finished the ETL for the thermal.
- We made the view for PowerBI
- We tested the results with the website that reads the flight's logs.

Tasks:

a) Start the 7th sprint.

Deadline: 05/06/2018

05-06-2018 –Tuesday | duration: 20 min

- We divided the tasks for the 7th sprint.
- We set a meeting with the supervisor to make sure we had good results.
- We started the process report.

Tasks:

a) Finish the process report.
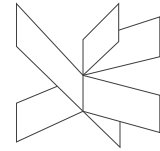b) Make the project report.
c) Get Bo's feedback.

Deadline: 08/06/2018

06-06-2018 –Wednesday | duration: 20 min

- We had a meeting with Bo and he told us that our result shows all the thermals and not the ones that appear constantly.
- We fixed the PowerBI view to get only the thermals that appear constantly.
- We continued the process report.
- We started the project report.

Tasks:

a) Finish the process report.
b) Make the project report.

c) Finish documentation and hand-in.

Deadline: 08/06/2018

07-06-2018 –Wednesday | duration: 20 min

- We finished the process report.
- We continued the project report and the rest of the documentation.

Tasks:

d) Finish the project report.
e) Finish the rest of the documentation and hand-in.

Deadline: 08/06/2018

08-06-2018 –Wednesday | duration: 20 min

- We finished the project report.
- We finished the rest of the documentation.
- We handed-in