DECEMBER 19, 2018

PROCESS REPORT
A SEP3 PROCESS REPORT

Students

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Ionel-Cristinel Putinica, 266123
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Supervisors

Christian Flinker Sandbeck
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1. Group Contract

Date:
09/09/2018

We agree as a team on these terms of group conduct and cooperation.

We agree to:

- Have every person in the group participate equally
- Give each other feedback and always share our opinions no matter how silly we thing they are
- Have occasional meetings and give each other a heads up if we are late or unable to attend a meeting
- Respect one another and listen to each other's opinions
- Solve our issues by having a mature discussion
- Respect the deadlines and communicate if we encounter any obstacles

Group Member's Name	Student Number
Christian Sørensen	267142
Cristian Guba	254104
Flemming Vindelev	251398
Ionel-Cristinel Putinica	266123
Mihail Rumenov Kanchev	266106

2. Group Description

Christian Sørensen

My name is Christian Sørensen and I come from Denmark. I am always open-minded for working together with new people and love to learn something new. I prefer to work in groups because I believe that it gives the best result in the end. I love to hear other people's opinions on how to do things, even though I do not always agree on what they are saying. However, it never something a small discussion can solve. I prefer to go small and simple compared to large and complicated, but still enough to be a challenge. I know from previous experience that I have a tendency to worry too much about details that does not matter in the end. This is something I am working on.

Cristian Guba

I usually feel very enthusiastic when I get to something new. I can generate a bunch of ideas without estimating how much time we need to implement everything. My motivation is really high especially at the beginning, if I miss the "moment", there is a chance that to get back to work could be very hard. I'm very productive at first and usually is hard to keep the mood like that the whole time. I'm trying to fight this vice by pushing myself harder. I like the work in the group, two heads are way better than one, especially when it is related to coding. Coding is a way of creating art and a new view of thinking is never the best one, you just can take some ideas from other people, so you can develop your skills better. The most important thing for me when you work in a group is communication, doing your task is a good thing but you have to share everything, so the goal is achieved.

Flemming Vindelev

Hello there! My name is Flemming Vindelev. I am a 22-year-old Dane, who wants to become a software engineer someday. I usually describe myself as straight-forward, I do what I'm told to do and treat people like they treat me. I like working in a group and generally just enjoy teamwork. However, when I have a simple task at hand I tend to work "better" or at least more concentrated when I'm alone. I dislike aiming too big, since that often can bring disappointment over satisfaction. It is about knowing your limits and slowly pushing these limits over time to better yourself as a person.

Ionel-Cristinel Putinica

I consider myself as an open-minded person that is always open to suggestions and any kind of feedback, because I am fully aware that I have a lot more to learn about everything, and I consider that criticism is the best way to better yourself. Most of the times, when I want to do something, if I consider that something as being important for me, I will fully commit myself. Usually spending as much time as needed to get to a result that is as good as it can be, and I consider this as being a quality but also as being a defect, because a lot of times I spend too much on details just to perfect them. I am more of a group-work person, because, when I do something, I usually want the feedback from at least another person as well, just so I can make sure that the product of my work is one of high-quality.

Mihail Rumenov Kanchev

I am a natural leader. Although I don't find enjoyment in the responsibilities coming with the leadership role I tend to take control over chaotic situations. I am a visual learner and although I come from a mainly high-context culture, my character had developed into a low-context communicator. I am direct, strict and disciplined. I trust team members and expect the same trust in return. I take every new presented idea as an opportunity of improvement. Creativity is my main trait, that is why I tend to focus more on the technical roles in order to gain more experience overall.

3. Considerations before the Project

Christian Sørensen

At first, the project seemed to be mainly based on the implementation and the designing of the system. It did not seem that where would anything any new methodologies to be learned and change the ways of working. That was kind a relief for me because I wanted to learn from my mistakes from last semester from doing scrum.

The introduction and requirements for the three tier, heterogeneous system seems doable, even though I basically have no knowledge about the C# language.

Cristian Guba

The most related to the market semester project gives me high expectations to develop my skills and find out how hard is to make a software which people could really use in their daily routine. Using C#,Java and Sql languages for a fully working product sounds as a hard task and a really interesting one. I hope that we will complete the most of our goals in this project so we can deeply understand how such a big project has to be done. We didn't have experience with C# until the beginning of this project, I expect to improve my knowledge in C# and add it to my list of known languages. I expect a comfortable cooperation between members of the group.

Flemming Vindelev

My first thoughts about SEP3 before going into it, is that it seems like it will give us much more "real life experience". It's no longer just about coding, but about planning and being able to make things work together even though it can seem like a difficult task. Personally I don't have a specific goal in mind going into this project. For now I just want to focus on getting better at everything, and take in everything this project has to offer.

Ionel-Cristinel Putinica

I am going into SEP3 with a small dose of pendency, the reason for this being the hefty amount of new things that we are going to learn in this new semester, which will have to be implemented in the project. My main goal is to fully dedicate myself on the work for the project, until the point that me and my group consider that our expectations. I am sure of the fact that the work process will be full of challenges and problems, due to all the new things that have to be implemented, but I am looking forward to all of them, since I find that solving a problem is the best way to learn something new.

Mihail Rumenov Kanchev

This time being the very first moment I get to create a multi tiered and heterogeneous system, I have my hopes raised high. Personally I expect to facilitate and expand my knowledge in system security by designing and implementing everything learned through NES. Designing the system would be a challenge as it is my first time diving in these particular waters, but after I analyze the topic I expect to have a general overview of all methodologies addressing system design. Last but not least I hope to learn more libraries in C# as well as how to built socket protocols. Aside from building on top of all semester topics, I assume I would be able to put everything learned into designing new and creative system features.

4. Unified Process

4.1. Inception

Every project starts with inception where everyone starts by finding the threads that tie a product together. Presenting ideas to other members of the group helps to generate goals for the project based on the concept of the project. Risks must be discussed form the beginning, so team members understand overall picture, to decide if this idea worth to be implemented.

Our idea is already on the market, but all of them focus just on getting the profit from customers. We want to focus on making people's way to work a little bit easier, so we can spend the big amount of free space in every car more optimized. By giving the opportunity to drivers to spend less money on maintenance their car, and people who do not own a car to get to work cheaper and faster.

A very important part is story mapping based on user stories, where adding the most important and relevant activity a customer can do with our product. Prioritizing activities as High/Medium/Low so we know on what to focus our attention first of all. So, at the end even not all activities are implemented the system satisfy the most relevant requirements.

Estimation and prioritization help to work on project more efficiently, because the system gets the most valuable features from the beginning and everyone has nearly an idea how much they have to spend on every task.

Finishing all the tasks listed above we can start working on the project in a harmonic and organized way. So everyone is able to complete a task and know how much he needs to complete the task.

4.2. Artefacts

4.2.1. Supplementary Specifications

In this part the final iteration of the non-functional requirements are listed, these are requirements which are not system-related, but more *how* the system is made. One could call them limitations instead of requirements.

Non-Functional Requirements

1. The system will be heterogeneous
2. The system will use 3-tier architecture
3. The system will be coded in Java, C#, SQL, HTML and CSS
4. The system will use a socket connection
5. The system connection will be local

4.2.2. Risk List & Management

Personal events

Personal affairs can differ from person to person inside the group, taking into consideration the fact that the group consists of five members, which leads to a high probability of personal events being a problem. Job calls, extracurricular activities, traveling and a lot of other factors can interrupt or delay a meeting, or an assigned task. Three out of five members are not from Denmark, thus the workflow of the team can slow down during the holiday periods, as a direct aftereffect of traveling. 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 case chance of occurring is imminent and it interferes with the workflow, the tasks of the "burdened" member will be equally split amongst others and extra work will be put from the rest of the members.

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 conundrum, the problem is put aside, replaced by a simpler solution and the focus of the workflow will be redirected to another requirement until a solution to the problem is executed.

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 the 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 sallow their pride and accept that cuts to the requirements shall be done and all low priority system features shall be removed.

4.3. Elaboration

Based on materials which we achieved during inception we are able to design our use case diagrams and description assigned to them. Thereupon we create domain model after we can start creating our system which is basically a skeleton which contain the most basic features. So we have now also a visual interpretation of our system.

5. Scrum

5.1. Burn-down Chart

A burn-down 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.
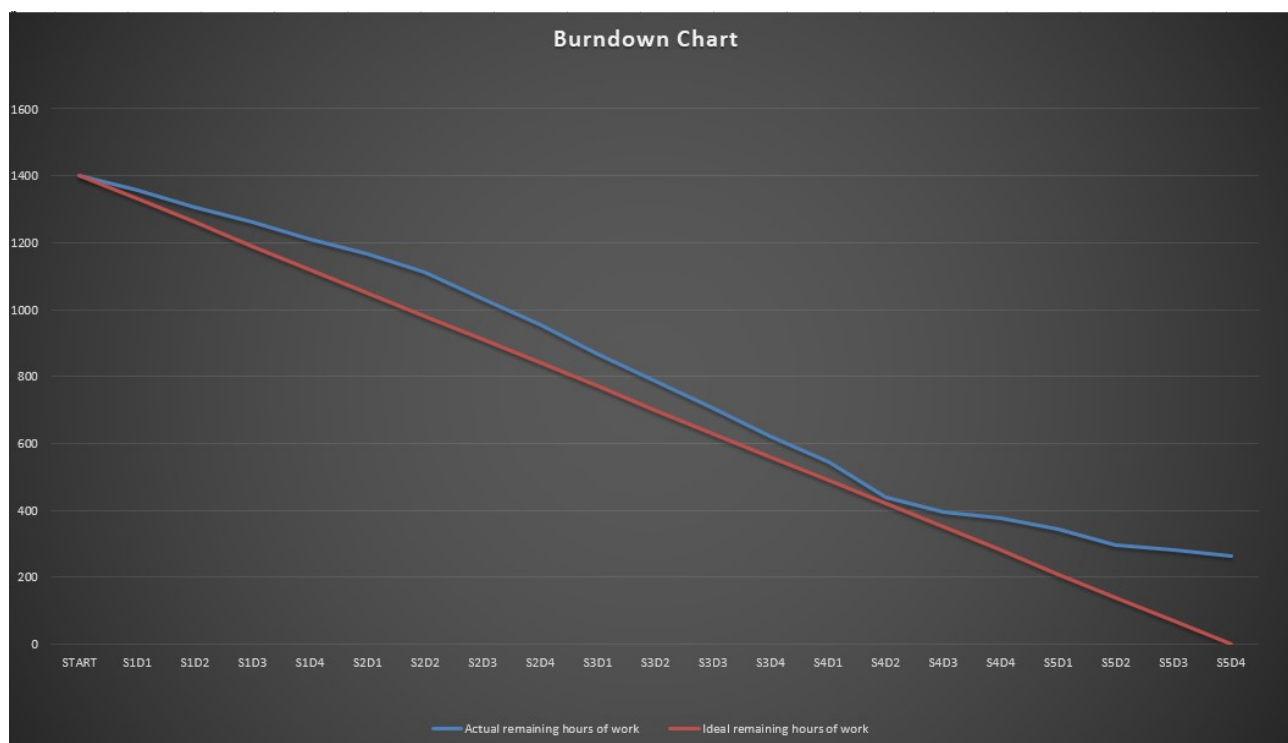
5.2. Roles

Product Owner

The job of the product owner is to make sure the best/correct features make it into the Product Backlog. He prioritizes the items of the Product Backlog and plays an active role in the Sprint Review meetings while also having to communicate the requirements to the team.

In this project, Mihail was chosen to be the product owner. This decision was based on his Belbin roles, which is plant and coordinator. As the product owner Mihail got to take on somewhat of a leadership role, which he enjoys. In addition, since there is no official customer he could decide on many things by himself. This gave him somewhat of a leader role, without the responsibility which he dislikes. Mihail has this to say about himself:

> "
>
> *Coordinator: When taking on a challenge, I tend to visualize (by time schedules or graphs) all the goals on the way. I never start a task without having a visual plan of what I need to do.*
>
> *Plant: When encountering a problem, I tend to think outside the box and solve the problem quickly and efficiently. If a logical problem in my code occurs, I break focus and change my way of thought, which makes finding a solution easier.*
>
> "

Scrum Master

In our Scrum team, the purpose of the Scrum Master was to facilitate the work flow, ensuring that the sprints go exactly as planned, and as well as providing all the necessary tools for the every single member so he can achieve his tasks. He also schedules meetings and helped the Product Owner into making the Product Backlog.

In the Scrum Team, Ionut has been given the role of Scrum Master, and it can be seen from his Belbin Roles that he is suitable for this position. Ionut has the following to say about himself:

> "
>
> *Specialist: I like to motivate the others and myself and, when working on a project, I always come with an overwhelming amount of ideas.*
>
> *Implementer: When working on a plan, I carefully thing about it, and I prefer following it as much as possible.*
>
> "

Scrum Team

The scrum team drives the plan for each sprint, they approximate how much work they believe could be done in every sprint. Constantly estimation on how much work could be done in each sprint gives the development team important feedback on their estimation, which over time increase their forecasts accurate. The scrum team also takes the responsibility to fulfill the requirements. The scrum team consists of: Christian Sørensen, Cristian Guba and Flemming Vindelev.

"Strong scrum teams approach their project with a strong "we" attitude."

5.3. Ceremonies

Sprint Planning

Spring Planning were the meetings where the Product Owner, Scrum Master and the team discussed the top-priority features, to determine what has to go into the next Sprint, the output of one of these meetings being a Sprint Backlog.

At the beginning of every sprint, our Scrum Group gathered along with the Scrum Master and the Product Owner then discussed the Product backlog. Features from the backlog were chosen by the Product Owner, with their priority and time estimate taken in consideration .The group discussed the chosen features and decided on how they are going to design and implement responsibilities and potential problems). Ultimately, the sprint was further discussed as a reassurance that every Scrum team member envisions it the same way .The group effectively used planning to cover the different weaknesses of its group members and predict complications in the sprint progress.

Sprint Reviews

In the Sprint Review, the team showcased the work to the Product Owner and also decided on what to do next, thus providing valuable input for the next Sprint Planning.

Sprint review was done at the end of every sprint, where the implemented features were presented to the whole team in a form of a visualized Demo/Increment (sometimes taking the form of a test). After the presentation, the whole Scrum team decides if the completed features of the Sprint fit, he expected criteria and ultimately the Product owner makes the final call.

Sprint Retrospective

The Sprint Retrospectives were an opportunity for the team to gather up and discuss what went well in the Sprint, what could have been improved and how the next Sprint can be revamped.

At the end of the final sprint, the group gathered and along with the Scrum Master discussed their reflections on the working process and overall Scrum effectiveness. Every member expressed his opinion on the methods used for problem solving, types of communication, the sprint time schedule structure and how he/she thinks the team can improve with the next Sprint. For our group specifically it was decided that more emphasis should be put on testing and lesser emphasis on implementation, as well as better alternatives for communication should be used.

Daily scrum meetings

All members of the team gatherd up in time-boxed 15 minute meetings in which took turns and talked about what worked they've completed since the last daily meeting, what they were planning to do next and also if there are going to be any issues in accomplishing their next tasks.

The group held daily Scrum meetings and used them as a method to communicate and follow each others progress. Each member explained the work he did the day before, the complications he had with it and their potential solutions. After the Scrum Master made sure that everybody progresses effectively, the Scrum Group decides on and splits the daily responsibilities to its members. After the group has a clear goal, they begin working on their personally assigned tasks.

If any impediments arose, they were the Scrum Master's responsability to resolve them as quickly as possible, to ensure a good work flow.

6. Version Control & File Sharing Management

Because of the scale of this project, the need of version control management became more and more obvious for the group. Different software and websites have also been used for file sharing, communicating with the group during remote work and also for planning.

Git & Github – Version Control

Git and GitHub, as the industry's standard were used by the group for version-control. 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 features. It provided access control and several collaboration features such as bug tracking, feature requests, task management, and a wiki for the project. Git itself was used as the back-end for GitHub, to track changes in the computer files and coordinating the work on those files among the group's members.

Slack – File Sharing and Communication

Slack is a cloud-based software, based on team collaboration tools and services, which the group has used as the main file sharing option, uploading different parts of documentation, such as diagrams, writing and so on. Slack was also used on a small scale for messaging and planning.

Dropbox – File Sharing

Dropbox, another file hosting service, has been used in the project as a backup for Slack, different iterations of diagrams and reports being stored here.

Facebook – Communication

Facebook was used by the group as the main communication and planning tool, and has also been used on a small scale as a file sharing service.

7. Prologue

In the prologue, the group describes what they did before they started any sprint, this is also referred to as the elaboration phase. In this part the group decides on what kind of project they want to do and gets familiar with the system requirements. Lastly, the group does a little bit of analysis and design so they all get a feel of where the project is going. All of the things made in the prologue were subject to change, so everything shown in this chapter is here to show the constant change and evolution of the project.

7.1. Analysis

The group came up with some user stories, which they made into a product backlog. This backlog were to be used later on to create sprint backlogs, this way the group knew what to work on throughout the project. At this point, the group also made a conceptual domain model, which were to be updated along with the system. The group also made a use case diagram, from which they formulated use case descriptions. Below you can see examples of some of these documents, however if you would like to see the full thing please see the project description or appendices.

**Conceptual Domain Model**
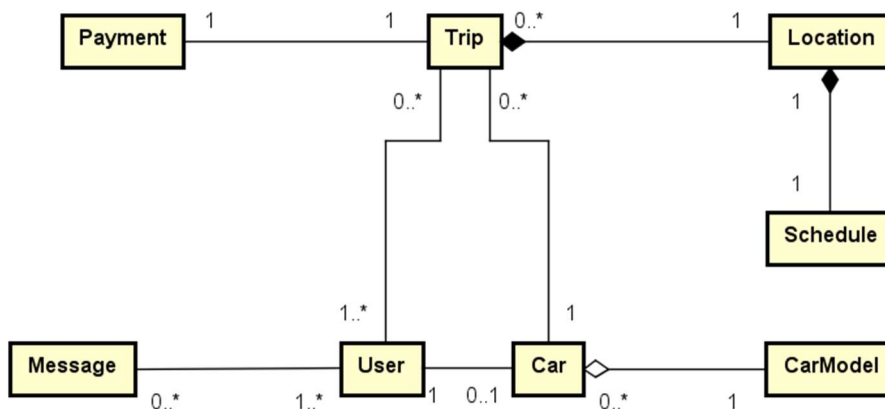
7.2. Design

In the design part of the elaboration phase, the group created a diagram, which shows the architecture the system would be, build around. The group also designed an EER diagram for the database, as well as a system sequence diagram. The following diagrams gives a rough overview of what the group had planned. All of these diagrams also ended up changing through the project, to be more specific to the evolving system.

Product Backlog:

| Priority	ID	User Story	Time Estimate (Days)
Critical	1	As a user I want to create an account in the system	5
Critical	2	As a user I want to offer a ride to other people	4
Critical	3	As a user I want to join and leave a ride	2
High	4	As a user I want to delete/cancel a ride	2
High	5	As a user I want my account to be secure	3
High	6	As a user I want to be able to edit my profile	1
Medium	7	As a user I want the system to be reliable	5
Low	8	As an admin I want to edit/delete user profiles	1
Low	9	As an admin I want to monitor the system	4

Architecture Diagram
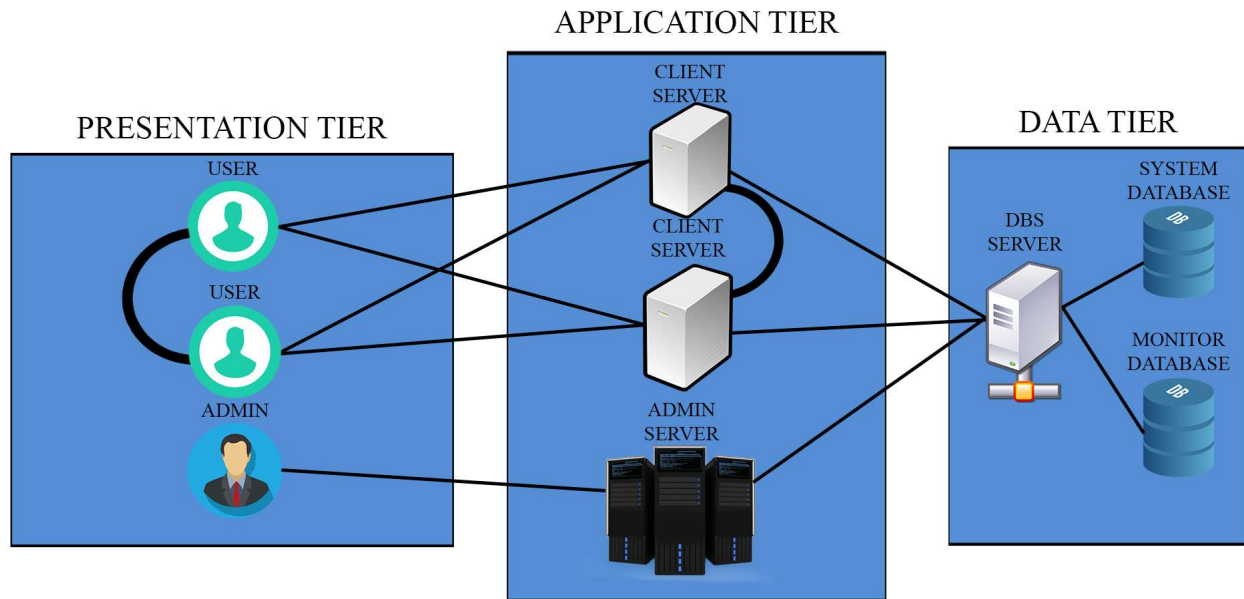
EER Diagram
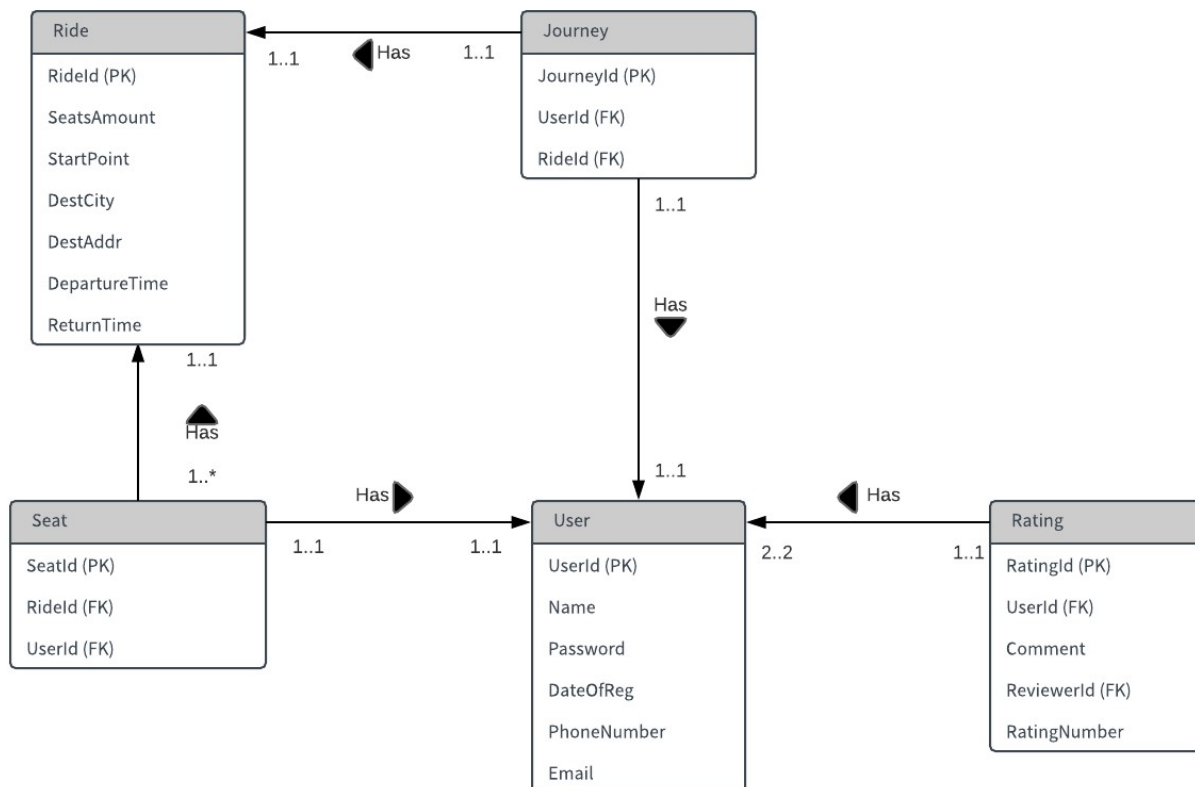
System Sequence Diagram
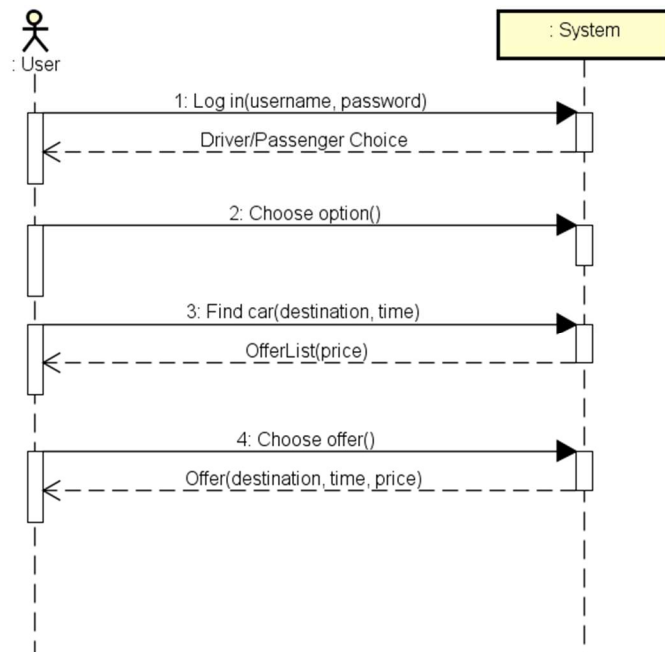
8. Sprint 1

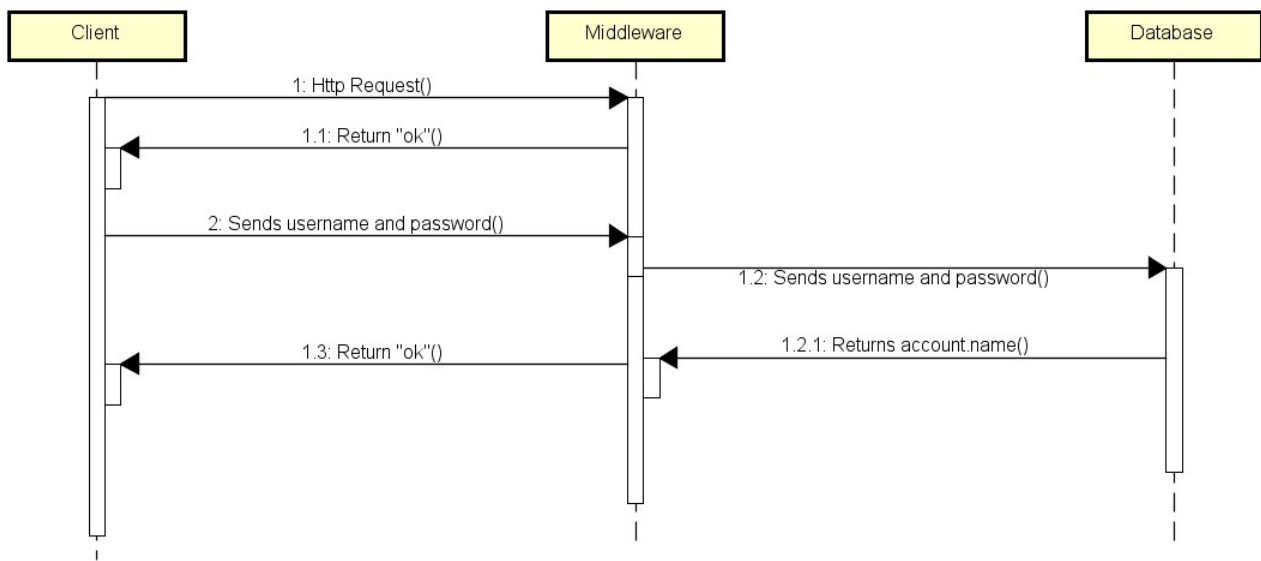| Sprint 1			
PB-ID	**Sprint ID**	**Task Title**	**Estimate Hours**
7	**1**	Proof of concept finished. System is set and ready to be worked on.	**24**
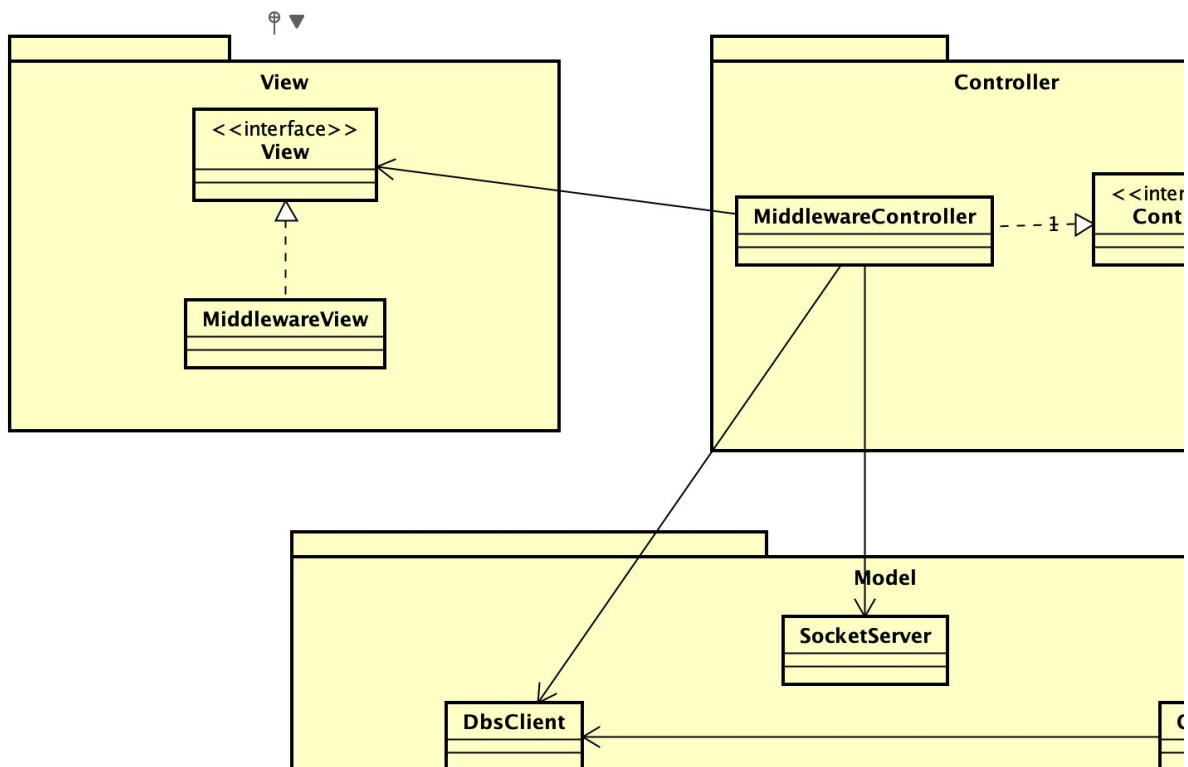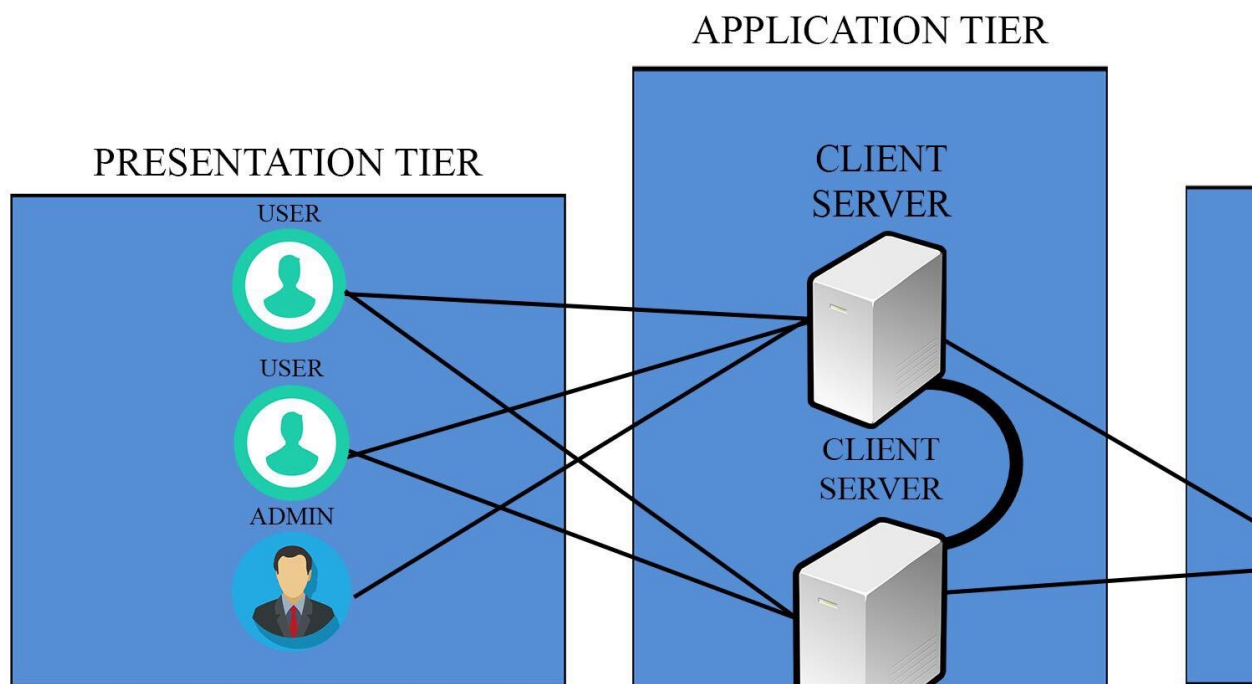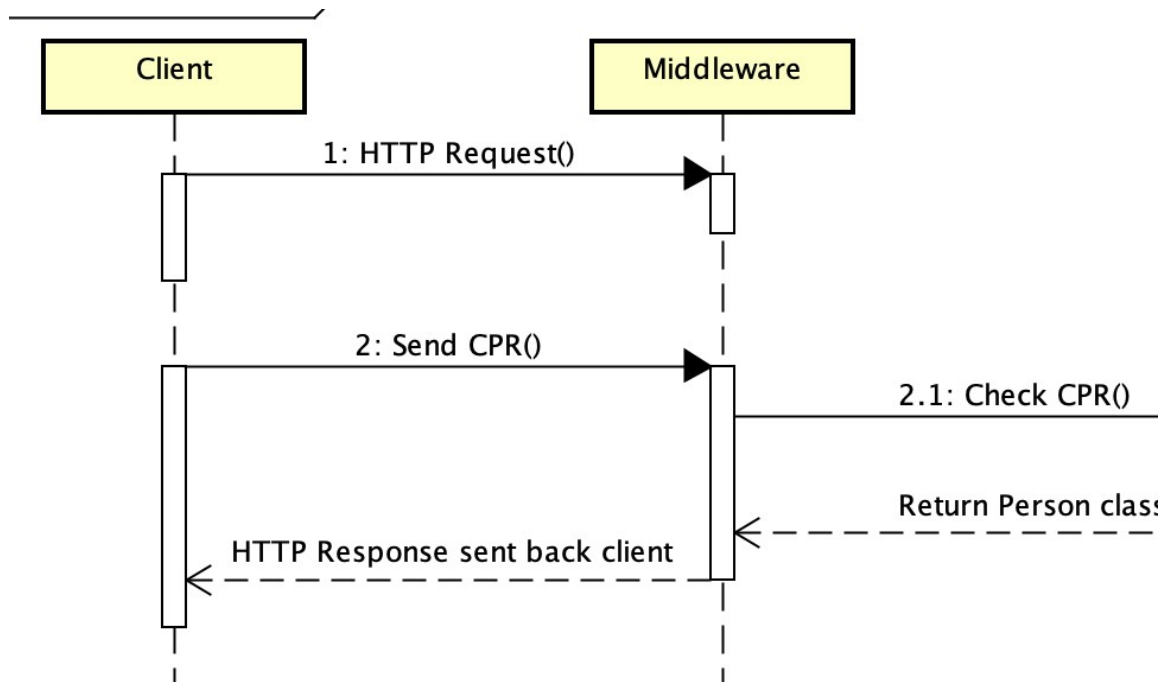
8.1. Sprint Review

The plan for the first sprint was to implement the structure of the model and establish connection between the 3-tier of the system. The group estimated that there would not be enough time in the sprint to fulfill any of the user stories and it would be necessary to have to basic system to be able to begin to fulfill any of them.

The overall structure of the system was restructured several times doing the sprint, mainly because the group came up with superior design patterns, which would make it easier of us to implement and improve the system. The restructuring of the system did not set back the group compared to what the time scheduled.

The amount of work estimated for the first sprint was fitting in comparison of what was planned. The group managed to finish what they settled for and was not done before time. The plan for the next sprint is to tackle the user stories that involving the login system, the registration and creating a ride.

9. Sprint 2

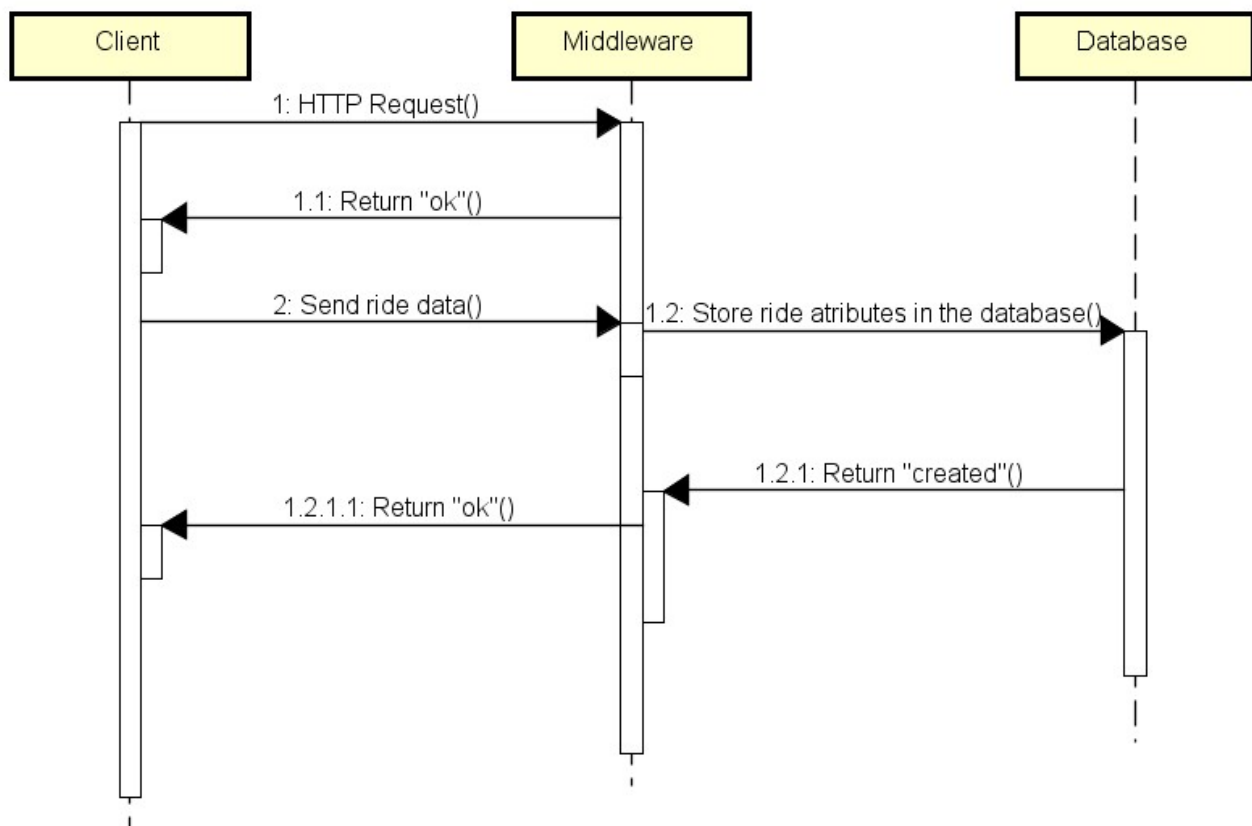| Sprint 2			
PB-ID	**Sprint ID**	**Task Title**	**Estimate Hours**
5	1	Cookie policy implemented.	6
5	2	Account/Log-in system implemented.	**12**
1	3	Socket protocols are under development.	8
1	4	In-between tier communication improved.	**10**

9.1. Sprint Review

The plan for the second sprint was to some essential parts of the system. Which would turn out to be the login feature, and general work on the connections between the tiers. Before the tasks could be implemented, the system had to be designed. This was done in a group meeting where one was making the class diagram while the rest of the group gave inputs to how the problem could be solved. When the group settled on a design the implementation could begin.

To be able to be five people working one the same task at once we decided to spilt the tasks between the tiers, so 1-2 group members are working on the functionality for each tier, this basically meant that every-body was working on the same time. The functionality was added to the system skeleton from the last sprint.

The group managed to fulfill user story doing the sprint even though it took longer than we expected. The common opinion in the group is that the amount of work for the sprint was fitting, even though no time was spared. The group is settled on finishing the next critical user story and start working on the system GUI design framework.

10. Sprint 3

Sprint 3			
PB-ID	**Sprint ID**	**Task Title**	**Estimate Hours**
2	1	Create a ride functionality implemented.	12
2	2	List of all rides displayed on main page.	8
2	3	System GUI design framework added.	8
7	4	Socket protocols final design finished.	4
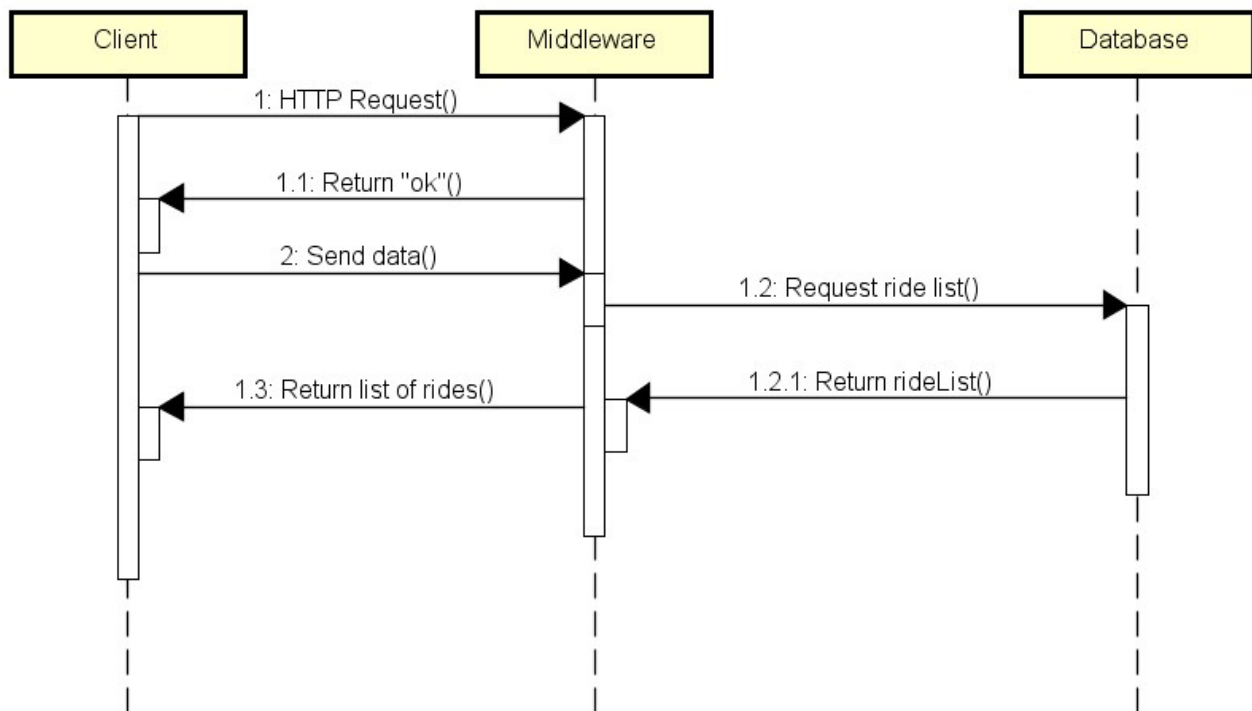
10.1. Sprint Review

The major user story that was picked for this sprint was "As a user I want to offer a ride to other people" together with some work on the GUI and sockets. The group expected to be able to finish all of these tasks in this sprint even though it was expected to take longer that the tasks from the previous sprint. The overall feeling in the group was that each member knew the system better than previously and for that reason would not encounter as many holdups as encountered in sprint 2.

To be able to implement these functionalities, we had to design this part of the system. That was done with the same procedure as the previous sprints, by having a group meeting and then settle on a design. The implementation and documentation were also similar to previous sprints. 1-2 members had a tier which they had to implement and make documentation for and 1 member did the cookies. If any major problems were encountered about the design or implementation, a group meeting was held to solve it.

The group managed to implement and make documentation for most of the tasks before the end of the sprint. This meant that the group would have some extra work for the next sprint. The overall opinion about the amount of work for the sprint, is that it was fitting. Everyone has always had something to do. The plan for the next sprint is to make it possible for a user to join a ride and manage their own ride postings.

11. Sprint 4

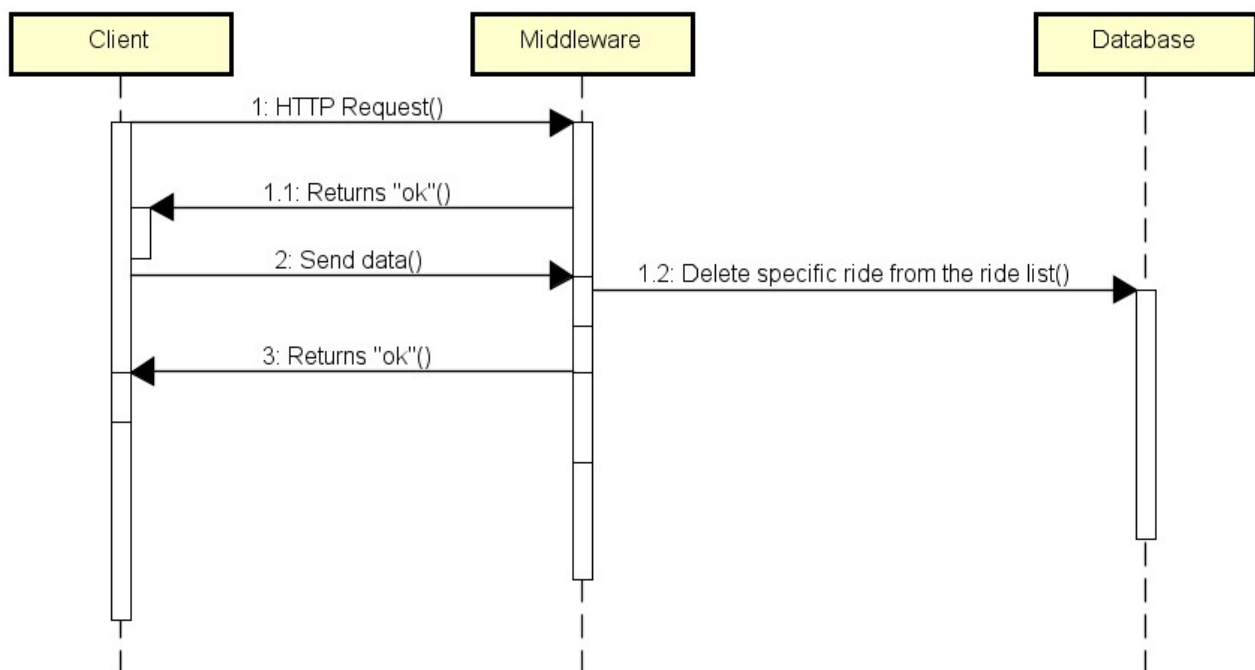| Sprint 4			
PB-ID	**Sprint ID**	**Task Title**	**Estimate Hours**
3	1	Join a ride function implemented.	12
3	2	Leave a ride function implemented.	8
7	3	Added validation of information before any changes to the database tables are attempted.	10
7	4	Added input validation to any client pages that require user input.	8
7	5	Created and joined rides are displayed on account page.	8
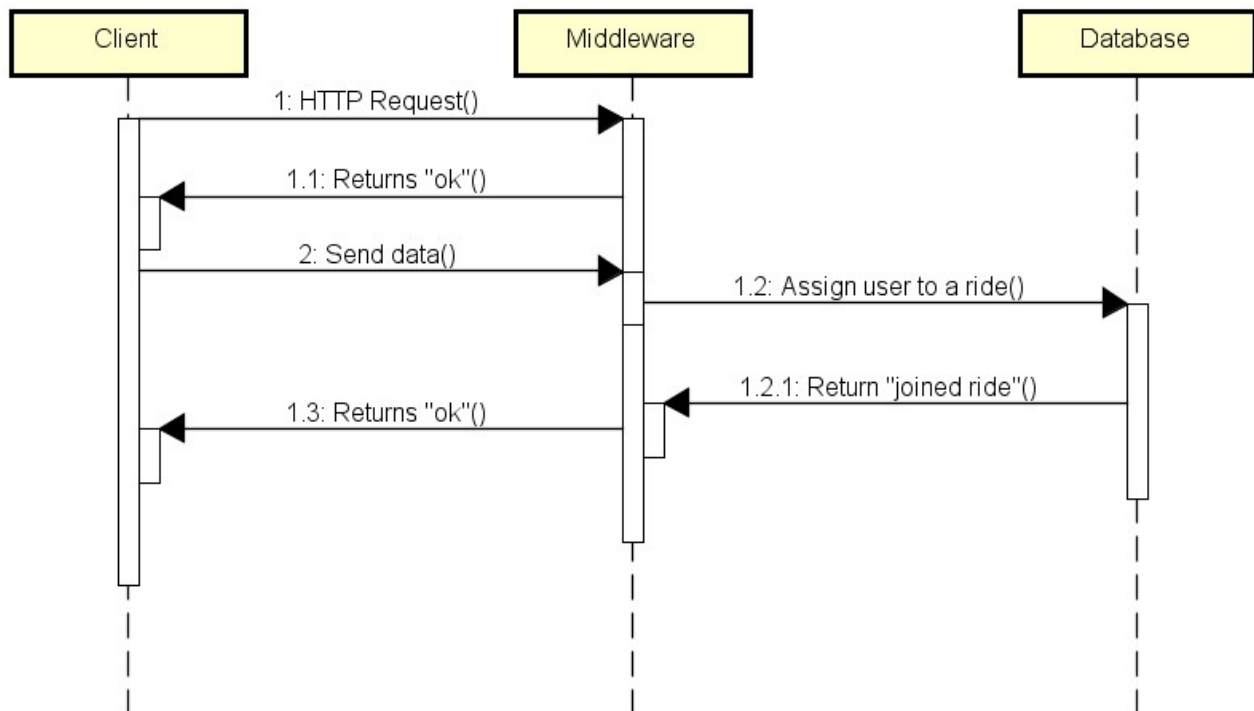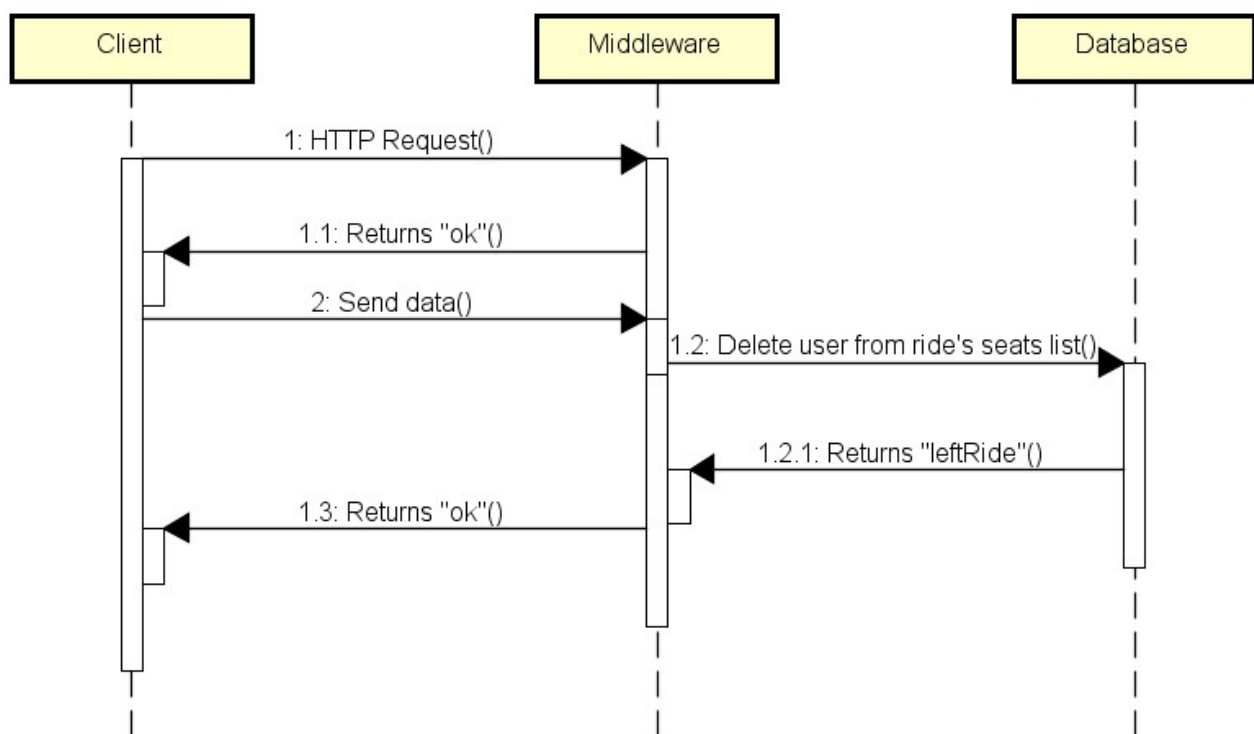
11.1. Sprint Review

The goal for sprint 4 was to complete the unfinished work from the previous sprint. As well as to fulfill the user storie "As a user I want to join and leave a ride", which is the last critical user story. Other than this the group would work on some security aspects of the system, and continue to make it user friendly. At this point the schedule slowly became a mess. Because of the unfinished work from the last sprint, the group started feeling the pressure with the deadline slowly coming up.

The work was split up differently compared to the last sprint. One of the major things that were lacking from the previous sprint was documentation. Therefore, the majority of the group worked on the reports, while the minority continued work on the system. However, this ended up causing the group to fall even further behind schedule. Midway through the sprint the group agreed to finish up as many features as possible, so the last sprint could be used to get control over the situation.

In the end the sprint the group regained control over the situation, a managed to implement the user stories they had planned to do.

12. Sprint 5

Sprint 5			
PB-ID	**Sprint ID**	**Task Title**	**Estimate Hours**
4	1	Delete ride implemented.	4
5	2	Authorization implemented.	12
8	3	Implement admin account.	12
5	4	Implement password hashing.	10
6 & 8	5	Edit account information function implemented.	10
7	6	Optimized the code.	10
7	7	Finalized tier communication.	8
7	8	Add comments.	6

12.1. Sprint Review

The group started this sprint by reassessing their work flow, before planning and designing the last features they had time to implement. This sprint came and went very fast, but by the end the group managed to have a system with all must-have features implemented and documented. There are many nice-to-have features that were left out. But some sacrifices had to be made, for the system to be functioning in the end. And the group is happy with the result they ended up with.

13. Considerations after the Project

Christian Sørensen

I have learned a lot by working through the project. The focus has been mainly on the designing and implementation of the system. We have had to collect a lot of knowledge about the different language and IDEs to be able accomplice the goal of the project. I has defiantly been a lot more difficult compared to what I first anticipated. The sprints and the planning were a lot better planned compared to last time. That has made the entire process more enjoyable.

Cristian Guba

Every semester our project just gets more and more interesting, the amount of work gets bigger but still everything is done in the same amount of time. That shows that we really improve and get to know better how to code and document our work. This project 2 programming languages which was a totally new experience, a very interesting one which helps us to understand that coding is not bounded by a single language, you can combine them in different ways. It had a big impact on me and just motivated me more to improve in this bachelor degree. Difference between semester project from first and second semester is that things just got harder because you don't have just to keep to java library, using dotnet was a real challenge, everything is not so easy as it was in java. I am happy that we realized such a interesting project.

Flemming Vindelev

After finishing the project I can say that my suspicions was right. The SEP3 project did indeed fell more like it was making us into "software engineers" instead of "programmers". Overall I have gained a lot of experience during this project. Right from having to design the 3-tier architecture to (finally) start using proper version control with git. This semester has really gotten me excited for the upcoming semesters.

Ionel-Cristinel Putinica

As an overall experience, for me, SEP3 was an important step in my engineering career. I consider this as being the first "real-scale" project that I worked on. Every single thing that I worked on during this project has improved my knowledge, being it code implementation, academic writing, working on diagrams, time management, version control, etc. The project was also a re-assurance for me that it is way easier to achieve something in a group, rather than walking alone, feedback and help being really valuable when working on something.

Mihail Rumenov Kanchev

My expectation proved to be surprisingly accurate. I learned about the different types of security and how to implement them using C# and Java. I had the chance to develop a socket protocol and understand its core concepts. Using Razor Pages proved itself extremely useful as I learned all about Security libraries in .NET as well as input validation and serialization. Building the middleware taught me valuable lessons about creating the system model and transferring data throughout the tiers. Ultimately, implementing the Database taught me how to make use of LINQ and Entity Framework, built upon my experience with web services and help me grasp the concept of migrations better. The gained knowledge is immeasurable and I assume I cannot include everything within a couple of lines. All I have learned is written in our project report. Overall I am extremely happy with the outcome as now I have the confidence to start again or move from what I already have and build something much better for lesser time. The outcome of our project could not be better.

14. Sources of Information

https://www.google.dk/publicdata/explore?ds=z5567oe244g0ot_&met_y=population&hl=en&dl=en#!ctype=l&strail=false&bcs=d&nselm=h&met_y=population&scale_y=lin&ind_y=false&rdim=area&idim=city_proper:014250&ifdim=area&hl=en_US&dl=en&ind=false [Accessed September 20, 2018]

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