2020

Process Report

PROCP – CLIMATE SIMULATION

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Process Report

Contents

Kick-Off and Initial Phase

Task	Estimated time	Assigned to
Project plan - **Introduction** - **Client** - **End-user** - **Team**	2 hours	Whole Team
URS - **Introduction** - **MoSCoW**	2 hours	Whole Team
Plan for iteration 1	1 hour	Whole Team
		Total: 5 hours
Project plan - **Current Situation** - **Product Justification** - **Goal**	1 hours	OPV DKK
URS - **Functional Requirements**	2 hours	BBK
		Total: 3 hours
Project plan - **Deliverables**	1 hours	PZZ
URS - **Non-Functional Requirements**	1 hours	KNL
Plan for iteration 1	1 hour	Whole team
		Total: 3 hours
Project plan - **Constraints**	1 hour	BKK
URS - **Use Case Table**	2 hours	DKK PCL

		Total: 3 hours
Project plan - **Risk Management**	1 hour	KNL
URS - **Use case Descriptions**	2 hours	DKK PCL
		Total: 3 hours
Project plan - **Methodology**	2 hours	PZZ
		Total: 2 hours
Work division Report - **First version**	1.3 hour	KNL
		Total: 1.3 hours

Summary

This phase weighted heavily on group discussions and decision making for future implementation plans, along with respective documentation.

Iteration 1

TASK	Estimate time (hours)	Assigned to
- **URS update** - **Minutes taking** - **Plan for Iteration 2** - **Research on topic of application** - **Algorithm development and implementation** - **Charts code architecture and implementation with algorithm classes** - **Git management** - **Work division report**	40	Borislav Bozhidarov Kiselkov
- **URS update** - **Minutes taking** - **Plan for Iteration 2** - **Research on topic of application** - **Datasets** - **Algorithm development and implementation** - **Work division report** - **Charts implementation with algorithm classes**	40	Daniel Krumov Krumov
– **URS update** – **Minutes taking** – **Plan for Iteration 2** – **Research on topic of application** – **Initial map version** – **Datasets** – **Algorithm development and implementation** – **Work division report** – **Charts implementation with algorithm classes**	40	Ognyan Plamen Vrachanski
– **URS update** – **Minutes taking** – **Plan for Iteration 2** – **Code architecture and implementation for Map** – **Research on topic of application** – **Datasets** – **Work division report**	40	Plamen Zhivkov Zaykov

– **URS update** – **Minutes taking** – **Plan for Iteration 2** – **Research on topic of application** – **Class structure for algorithm in React** – **Algorithm implementation** – **Charts implementation with algorithm classes** – **Work division report**	40	Plamen Chavdarov Lakov
– **URS update** – **Minutes taking** – **Plan for Iteration 2** – **Research on topic of application** – **Algorithm development and implementation** – **Map code architecture and implementation** – **Work division report**	40	Kathy Nicolaidou Louttchenko

Summary

This iteration defined the base of the application as the needed frameworks and repositories were set up and the back-end and front-end development could begin.

The back-end consisted of researching and implementing the main algorithm used to determine our primary unit of interest: CO^2 PPM (Parts Per Million).

The front-end part of the application focused on the formation of charts to represent the data of the algorithm, while also working with a third-party library to implement a map for further ideal data visualization.

Iteration 2

TASK	Estimate time (hours)	Assigned to
– **Terrain map data file creation and configuration** – **3D terrain map creation algorithm** – **Water level visualization** – **Application lifecycle (state)** – **Changing values on run time approach and implementation** – **Code synchronization** – **Line and bar chart visualization** – **Country flags on modal** – **GIT management**	110	Borislav Bozhidarov Kiselkov
– **Minutes taking** – **CSV dataset** – **JSON file customization (country borders)** – **3D map implementation** – **Country borders outlines on the 3D map** – **Trees implementation on the 3D Map (not implemented)**	40	Daniel Krumov Krumov
– **Minutes taking** – **Algorithm idea and implementation** – **CSV datasets** – **Line graph** – **Pause/Resume/Stop** – **Input change for single country** – **Modal design**	65	Ognyan Plamen Vrachanski
– **Minutes taking** – **Algorithm expansion and implementation** – **CSV dataset** – **Line graph** – **Input change for single country** – **Work division report update**	50	Plamen Zhivkov Zaykov
– **Minutes taking** – **Pandemic idea development** – **Pandemic system implementation** – **3D Map development support** – **Overall styling and design** – **Graphs development support**	40	Plamen Chavdarov Lakov

– **Pandemic idea development**
  ○ **Pre-lifecycle design**
– **Pandemic system implementation**
  ○ **Data structure**
  ○ **Algorithm dependencies**
	40	Kathy Nicolaidou Louttchenko

Iteration 3

TASK	Estimate time (hours)	Assigned to
– **Saving simulation** – **Re-run simulation** – **Compare two simulations** – **Start simulation from token** – **Welcome page** – **Dashboard components** – **Account page**	60	Borislav Bozhidarov Kiselkov
– **Account page** – **Unit tests (not implemented)** – **Compare two simulations**	40	Daniel Krumov Krumov
– **Double line chart (not implemented)** – **Compare simulations** – **Dashboard components**	50	Ognyan Plamen Vrachanski
– **Double line chart (not implemented)** – **Authentication** – **Save simulation** – **Re-run Simulation** – **Welcome Page** – **Design Document** – **Start simulation from token**	55	Plamen Zhivkov Zaykov
– **Further pandemic event development** – **Unit tests (not implemented)** – **Compare two simulations**	40	Plamen Chavdarov Lakov
– **Further pandemic event development** – **Welcome page** – **Re-run simulation**	40	Kathy Nicolaidou Louttchenko

Summary

Unfortunately, by the time when we were ready with everything else in iteration two, there was no time left for the unit tests therefore we have decided to leave them for the third iteration. The implementation should have been easy since we tried to write our code in an object-oriented approach, trying our best to stick to SOLID principles, but as the pressure of this semester pushed on us, we could not stick to everything. Therefore, some of the code produced was not that simple to test, at a first glance. Since no one had any experience with this we had to dive into this topic.

Because our application is based mainly on JavaScript there is not enough information or at least we could not find what we were searching for and while we were trying to implement the unit tests

there were constantly new errors. The framework of choice for this was jest, initially even the simplest unit tests such as checking whether a function exists, were not working properly, for some reason this was since classes depend on other classes. At the end we came to the conclusion that we should use mocking of classes in jest in order to simulate an existing object and running tests on it, but due to the nature of our application, and the fact that most of our functions do not return a value, this was really hard for people with no experience at unit testing more so even using a new framework.

That is why we decided not to implement them because this means we should spend a lot of time working on them and probably some refactoring of the code is needed, and we did not have that time.

Mark justification

This kind of project has never been done as a ProCP deliverable. It represents a global problem that must be solved in the near future. We made our best to simulate what could happen if that is not to be done in time. From all the calculations in the core of the application to the graphs and map visualizations, we have created a unique experience for the user. Nevertheless we missed a documentation deadline, we made everything possible to keep our client up to date with the latest changes on the app during the whole developing process. Therefore, we believe that a just evaluation would be a 9.0.

Reflections

Borislav Bozhidarov Kiselkov

ProCP was a challenge from the very beginning. We created our team, knowing each one of us is as motivated for the project as the others. This led to the idea to separate from the predefined projects and concentrate on our own algorithm implementation. We already knew that this meant our own research on the topic as well as on the whole calculations.

After a few days of debating, we decided which frameworks and libraries we were going to use. With this, came another problem – none of us had ever used React. Despite that I consider this as an advantage in our programming education.

The first iteration included intense researching of both the topic and the libraries we chose. This took a lot more time than expected and even doubted our choice of project. Our lack of React knowledge was stopping us from finishing our proof of concept. What is more, we had severe GIT problems that, personally for me, they took a huge amount of time to fix.

The second iteration was the most developing for me. From the beginning we had the idea to simulate water levels on a map. The moment I saw that a terrain map can be made using three.js, I was determined to make it animated and as accurate as possible. This took an immense amount of time, but I was determined to make it. I was not accepting any help from my teammates just to proof myself I can. At the end, though, I was more than happy with the result. We were all concentrated on finishing as much as possible from the code so we can leave mainly back-end implementation for the last iteration. This played a bad role for the documentation as we did not make it for this iteration.

The back-end as well as some final touches were left for the final iteration. We were all familiar to Laravel which made the process way easier.

Strong traits:

- Devoted to the project
- Industrious
- Curious
- Strive to achieve high quality results

Weak traits:

- I usually prefer working on my own and that is why it was a challenge for me to share the working process with my teammates.
- Too directive. Some people are not used with such behavior.

I am more than satisfied with the result of our project. We have done everything that we promised and did so in time. The learning process during ProCP was outstanding and I appreciate every minute of it.

Daniel Krumov Krumov

The whole idea behind the ProCP project fascinated us from the beginning and with great motivation, we decided to come up with our idea on which we would be excited to work. Ever since we have come to the final decision on what we are going to do I knew we were going to push ourselves way out of our comfort zones and the project would be quite a challenge. It became even more challenging when we decided to use React and none of us had any experience with this framework.

Since the idea was unique and we had just a brief knowledge on the topic we spent most of the time doing research and for this reason, we did not manage our time properly and there was a lot of stress and doubt if we are even going to be able to deliver what was promised. Thankfully everyone put a great effort and long hours of work and in the end, we managed to cope.

For the second iteration, we knew we needed a better organization and task division. Since the work was evenly split between three pairs and there were no exams the entire workflow went a lot smoother. All of us were glad about the progress we have managed to make but we were too focused on the technical part and neglected the documentation.

In the third iteration, our focus was to make sure we have all of the needed documents this time and to add final touches to the simulation. Again, we tried to do our best to split the tasks evenly between all teammates. This iteration was again accompanied by exams but this time we were prepared and put an effort to do as much as possible in an earlier stage of the iteration.

Pros and Cons:

In my opinion, the most beneficial thing for me was the fact that diving into this project was proof that you can succeed even when you push yourself out of your comfort zone and without any beforehand preparation just by putting a lot of effort and cooperating well with your teammates. It also was a great exercise to think outside of the box and look at a problem from many different angles.

What I see as a con is that even though the good cooperation in the team and the task division, we have made still some people were putting a lot more than necessary effort and some not enough. Partly because of this and because of the entire situation going on around the world from the second half of the second iteration I had a hard time working on the project, which I willing to count as a con.

In conclusion, I would say I am very happy and proud of how the end product turned out. However, I am not completely satisfied with my performance because I believe I could have been in even better use for the project. Overall, I had a good experience working on this project with these teammates and I will reflect on the aspects that affected my performance during this project, so they do not occur again in another one.

Ognyan Plamen Vrachanski

ProCP was the opportunity for us to broaden our programming expertise, so we decided to do our own idea with the tools that we chose. Most of us decided to write a web application and we wanted to learn something new and we chose React, which none of us knew how to use. I knew with this decision that I would be spending more time than necessary.

The first iteration was the hardest to get through as there were doubts and quarrels between all the members. The dependencies were changing each week and that proved stressful for all of us. The last week of this iteration everything was finalized we just needed to implement it. I believe there was a lot of group effort and everyone put aside their differences to deliver something. This iteration was categorized with chaos and it hardly felt like an Agile development framework. It taught me that it was time to bring some order to the project, so that we would not be depending on individual programming skills.

The second iteration we began on a better note and everything was planned from the beginning and work was split evenly. I put a lot of effort during this iteration as there were no exams coinciding with the delivery date. The expectations were high, and everyone was highly motivated from the beginning. However, some people were delivering less than needed and compromises were made to make everything work. This iteration was way better and there was more team effort. Everyone was happy with the progress, but we did not deliver the needed documents, which made us more cautious about this for the next iteration.

The third iteration we made sure to do all the documentation. This iteration we knew that we had to deliver everything when we had exams, so we began work way earlier. Everything went smoothly, but there was still more effort from certain people and less from others. This iteration taught me to look at a project like a relationship – we had to be understanding of one another and help when needed, instead of saying that something is someone else's job.

In conclusion, I had a way better experience with ProCP than ProP and it showed me that we had grown as individuals and programmers, because I had the same teammates. It felt like a roller coaster with its ups and downs, but it showed me that everything is possible if you tried hard enough.

Plamen Zhivkov Zaykov

At the beginning of the project, I knew that with our unusual idea we were going to need more time for researching and implementation. However, during the whole process, especially in Iteration 2 and 3, the implementation was very hard but at the same time very interesting which made the time fly and work - pleasure.

- *Strong/weak traits that affected the project:*
  + Very good communication between team members which made the whole work easier.
  + Taking the project serious from the very beginning until the very end.
  + The will to finish any task regardless of its difficulty.
  + Helping fellow team members when they are stuck with their task.

  - Focusing too much only on code and forgetting about documentation and other important tasks such as unit tests.

- *Learning moment from the project* – since our project was unique and we used React and Laravel for the implementation, I have learned a lot about coding with the React library which is based on JavaScript and I had 0 experience with JavaScript at the beginning. My communication skills were also developed since the whole COVID-19 situation which will improve my work in the future for a better turn.
- *Improvements for next project* – always check if any other tasks such as documentation need to be delivered at the end of the iteration and as a whole try to have all the deliverables at one place so it would be easy to check if something is missing.

Plamen Chavdarov Lakov

Initially, since we decided to go with an idea of our own posed several obstacles, that were definitely hard to resolve. We all liked the web development courses Fontys provided so far, so the best decision in this case was to base our simulation project on a web application. The beginning was the hardest phase of the project as none of us had experience with the framework of choice – React, additionally we had to come up with an efficient application architecture that works for our own idea, so that we keep the issues we could face to a minimum. Research was another big and challenging part of our project, a part that affected my motivation approach for the project as there was no clear direction where we were going most of the time.

Pros & Cons of the project

I would say that the project was a great example of how an abstract problem would be approached and solved, without having the necessary knowledge beforehand. Another great part of the project was figuring out how to properly use git, helping not only to keep the merge conflicts to a minimal, but resolve them quickly, without much hassle.

As for the cons of the project, I would say the whole quarantine situation affected many aspects of my and some of my teammates' work. This affected the communication a lot as well as the task division, namely sometimes people were working on the same thing without realizing, but that was not a big issue. Another aspect that I would consider as a con was my motivation and the amount of effort I put.

To sum up, I am not pleased with my experience for ProCP but I am pleased of the final product. I've made my conclusions and I'll try my best to take in consideration the things that affected my work and bothered me, in order to have a better experience in the next project I take up.

Kathy Nicolaidou Louttchenko

In my experience with the ProCP course was very helpful for my personal and professional development. Web development was the skill that I needed to refine the most, and through this project I was able to not only refine, but to feel a new level of confidence in the field. Moreover, I got introduced to a popular framework - React, a web browser data visualization library - D3, and improved my familiarity with the Laravel environment.

What plays a major role in the development of any project is the cooperation that must exist within a team in order to bring every functionality seamlessly together. Through this project, I got to work with five motivated members where organization never came as a challenge even through the sudden social-distancing of COVID-19. There was still stern communication leading to robust code adaptation and implementation. During decision-making within the group, there was mutual understanding when it came to the standards of our agreements to ensure a well-rounded functional application.

Overall, I had a balanced experience with gaining new web development knowledge, improving my personal and social professional skills.