Airport Traffic Simulator

[Process report]

Teacher: Chung Kuah

ProCP

19/02/2018

Developers: Yoanna Borisova, Teodor Genov, Vladimir Katrandzhiev, Monika Kerulyte, Ignas Kybransas, Rostislav Tinchev

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# Preface

The process report shows a series of actions which are carried out each week in order to achieve the particular wanted results for the ProCp project during the study weeks, together with the problems and challenges faced during that period.

# Process of every week

## Week 1

05/02/2018 – 11/02/2018

**Planned activities**

1. Read course overview and get informed about the general idea about the project
2. Prepare questions for the customer
3. Teambuilding
4. Brainstorm ideas for the simulation.

**Performed and completed activities**

1. Meeting with mentor
2. Create Project Plan
3. Build a conceptual model of the solution

**Agreements**

1. Decided which idea we are going to use for the simulation.
2. Pick roles and contributions
3. Group meeting with a tutor: 19-02-2018, 13:45).

**Table with activities and hours spent per group member**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Monika** | **Ignas** | **Yoanna** | **Teodor** | **Vladimir** | **Rostislav** |
| **30min** – looking for ideas for the simulation.  **30min –** reading workbook. | **30min** – looking for ideas for the simulation.  **30min –** reading workbook. | **30min** – getting familiar with the workbook **1hr** – gathering ideas for the project | **20min** – ideas for benchmarking, simulation.  **30min –** reading workbook. | **20min** – ideas for a simulation.  **30min –** reading workbook. | **30min** – ideas for a simulation **1hr** – familiarizing with the workbook |

**Total hours worked per group member this week**

* Monika: 1hr.
* Ignas: 1hr.
* Yoanna: 1hr 30min.
* Teodor: 50min.
* Vladimir: 50min.
* Rostislav: 1hr 30min.

## Week 2

19/02/2018 – 25/02/2018

**Planned activities**

1. Research domain based on information obtained
2. Working on the Project Plan

**Performed and completed activities**

1. Meeting with mentor.
2. Research about the subject.
3. Brainstorming the tasks.
4. Working on final version of the project plan.

**Agreements**

1. Pick roles and contributions
2. Group meeting with a tutor: 26-02-2018, 13:45).

**Table with activities and hours spent per group member**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Monika** | **Ignas** | **Yoanna** | **Teodor** | **Vladimir** | **Rostislav** |
| **1hr** – checking Project Plan, making some minor changes, filling in risks table. | **2hr** – working on   project plan | **1hr** – checking Project Plan, minor changes | **1hr –** working on project plan, minor changes | **2hr** – working on   project plan | **2hr** – working on   project plan |

**Total hours worked per group member this week**

* Monika: 1hr.
* Ignas: 2hr.
* Yoanna: 1hr.
* Teodor: 1hr.
* Vladimir: 2hr.
* Rostislav: 2hr.

## Week 3

26/02/2018 – 04/03/2018

**Planned activities**

1. Update project plan.
2. Discuss project plan.
3. Create concept version of plan for iteration 1.
4. Create URS.

**Performed and completed activities**

1. Updating project plan.

**Agreements**

1. Pick roles and contributions
2. Group meeting with a tutor: 05-03-2018, 13:45).

**Table with activities and hours spent per group member**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Monika** | **Ignas** | **Yoanna** | **Teodor** | **Vladimir** | **Rostislav** |
| **1hr** – meeting with a group: discussing Project Plan, making some minor changes in the Project Plan. | **1hr** – meeting with a group: discussing Project Plan, making some minor changes in the Project Plan.  **1hr** – work on Project Plan. | **1hr** – meeting with the group, discussing Project Plan, making minor changes. | **2hr** – meeting with the group, working on Project Plan. | **2hr –** meeting with the rest of the group; finishing the Project Plan. | **1hr** – group meeting, discussion on possibilities. |

**Total hours worked per group member this week**

* Monika: 1hr.
* Ignas: 2hr.
* Yoanna: 1hr.
* Teodor: 2hr.
* Vladimir: 2hr.
* Rostislav: 1hr.

## Week 4

05/03/2018 – 11/03/2018

**Planned activities**

1. Discuss URS & plan for iteration 1.
2. Create URS.
3. Create plan for iteration 1.
4. Create work division report.
5. Update project plan.

**Performed and completed activities**

1. Creating process report, including work division report in it.
2. Creating URS.
3. Creating plan for iteration 1.
4. Updating project plan.

**Agreements**

1. Pick roles and contributions
2. Group meeting with a tutor: 12-03-2018, 13:45).

**Table with activities and hours spent per group member**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Monika** | **Ignas** | **Yoanna** | **Teodor** | **Vladimir** | **Rostislav** |
| **2hr** – creating Process Report.  **1hr** – checking documentation.  **1hr** – filling in Process Report | **2hrs** – URS creation | **3hr** – checking URS and work division report, filling in/adding missing parts | **30min** – URS documentation check  **30min** – work on iteration document | **1hr** – meeting with group; discussing documentation as a whole  **1hr** – various work on documentation | **2hr** – Work on iteration document  **1hr** – Work on URS  **30min** – Meeting with group |

**Total hours worked per group member this week**

* Monika: 4hr.
* Ignas: 2hr.
* Yoanna: 3hr.
* Teodor: 1hr.
* Vladimir: 2hr.
* Rostislav: 3hr.

## Week 5

12/03/2018 – 18/03/2018

**Planned activities**

1. Discuss project.
2. Update URS.
3. Create design document.
4. Create test plan.

**Performed and completed activities**

1. Iteration 1 plan update.
2. URS update.
3. Created concept version of the test plan.
4. Updated process report.

**Agreements**

1. Pick roles and contributions
2. Group meeting with a tutor: 19-03-2018, 13:45).

**Table with activities and hours spent per group member**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Monika** | **Ignas** | **Yoanna** | **Teodor** | **Vladimir** | **Rostislav** |
| **45min** – group meeting  **30min** – mentor meeting  **1h –** process report update | **45min –** group meeting  **30min** – mentor meeting | **45min –** group meeting  **30min** – mentor meeting  **2hr** – research test documentation  **1hr 30min** – create test plan | **45min** – group meeting  **30min** – mentor meeting | **45min** – group meeting  **30min** – mentor meeting | **45min –** group meeting  **30min** – mentor meeting  **15min** – iteration 1 document work |

**Total hours worked per group member this week**

* Monika: 2hr 15min.
* Ignas: 1hr 15min.
* Yoanna: 4hr 15min.
* Teodor: 1hr 15min.
* Vladimir: 1hr 15min.
* Rostislav: 1hr 30min.

## Week 6

19/03/2018 – 25/03/2018

**Planned activities**

1. Create design document.
2. Make test cases.
3. Make use cases.
4. Code.
5. Create concept version of plan for iteration 2.

**Performed and completed activities**

1. Made test cases.
2. Made use cases.
3. Created design document.

**Agreements**

1. Pick roles and contributions
2. Group meeting with a tutor: 26-03-2018, 13:45).

**Table with activities and hours spent per group member**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Monika** | **Ignas** | **Yoanna** | **Teodor** | **Vladimir** | **Rostislav** |
| **20min –** meeting with tutor.  **20min –** meeting with group.  **3hr –** creating Test Cases, searching for information how to do them.  **20min –** edit Test Plan.  **30min –** checking Use Cases.  **40min –** update Process Report. | **20min –** meeting with tutor.  **20min –** meeting with group.  **3hr –** creating Test Cases, searching for information how to do them. | **20min –** meeting with tutor.  **20min –** meeting with group.  **1hr** – creating use cases  **2hr** – research iteration planning  **1hr 30min** – create iteration plan 2 and 3 | **20min –** meeting with tutor.  **20min –** meeting with group. | **20min –** meeting with tutor.  **20min –** meeting with group.  **1h 15m** – creating use cases  **1h** – going through and redacting helping with the redaction of other use cases and test cases  **1h –** assisting with the UML diagram creation  **40 min** - various | **20min –** meeting with tutor.  **20min –** meeting with group. |

**Total hours worked per group member this week**

* Monika: 5h and 10min.
* Ignas: 3h and 40min.
* Yoanna: 5hr 10min.
* Teodor: 40min.
* Vladimir: 3h and 45 min.
* Rostislav: 40min.

## Week 7

26/03/2018 – 01/04/2018

**Planned activities**

1. Code.
2. Make debug report.
3. Make test report.
4. Update process report.

**Performed and completed activities**

1. Finished proof of concept.
2. Made test report.
3. Updated process report.

**Agreements**

1. Group meeting with tutor: 24-04-2018, 13:45.

**Table with activities and hours spent per group member**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Monika** | **Ignas** | **Yoanna** | **Teodor** | **Vladimir** | **Rostislav** |
| **40min**  - meeting with a group and tutor.  **1h 30min** – fixing errors and bugs.  **12h**  - Researching information for making radar and grid, implementing graphics and grid with cells as an objects.  **3h**  - Making and filling test report  **30min**  - User testing and getting feedback from them.  **1h** – making iteration 2 plan, bug fixing | **40min**  - meeting with a group and tutor.  **12h**  - Researching information for GUI, implementing GUI Design, sliders, button functionality, checkpoints, saving data, loading data, simulation method(Calculation between wind/temp/prec).  **2h**  - Debugging application.  **1h**  - Filling test report data. | **40min**  - meeting with a group and tutor.  **1hr** – create database  **1hr** – implement log in  **1hr** – create test report | **40min**  - meeting with a group and tutor.  **2h** – working on documents. | **40min**  - meeting with a group and tutor  **10h** – working on implementation of different aspects of the application, mostly the pathfinding algorithm; doing research on said algorithm | **40min**  - meeting with a group and tutor.  **3h** – Documentation templates research  **2h** – Work on documentation |

**Total hours worked per group member this week**

* Monika: 18h and 40min
* Ignas: 15h and 40min
* Yoanna: 3hr and 40min
* Teodor: 2h and 40 min
* Vladimir: 10h and 40 min
* Rostislav: 5h and 40min

## Week 8

23/04/2018 – 29/04/2018

**Planned activities**

1. Make clear work division.

**Performed and completed activities**

1. Divided work between group members.

**Agreements**

1. Group meeting with tutor: 30-04-2018, 13:45.

**Table with activities and hours spent per group member**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Monika** | **Ignas** | **Yoanna** | **Teodor** | **Vladimir** | **Rostislav** |
| **50min**  - meeting with group and tutor. | **50min**  - meeting with group and tutor.  **1h**  - improving design of the GUI, adding some button functionality. | **50min**  - meeting with group and tutor. | **50min**  - meeting with group and tutor. | **30min**  - catching up on the missed meeting | **50min**  - meeting with group and tutor. |

**Total hours worked per group member this week**

* Monika: 50min
* Ignas: 1h and 50min
* Yoanna: 50min
* Teodor: 50min
* Vladimir: 30min
* Rostislav: 50min

## Week 9

07/05/2018 – 13/05/2018

**Planned activities**

1. Update iteration 2 plan.
2. Improve algorithm for finding path.

**Performed and completed activities**

1. Updated iteration 2 plan.
2. Improved algorithm.

**Agreements**

1. Group meeting: 10-05-2018, 15:00.
2. Group meeting with tutor: 14-05-2018, 13:45

**Table with activities and hours spent per group member**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Monika** | **Ignas** | **Yoanna** | **Teodor** | **Vladimir** | **Rostislav** |
| **40min**  - meeting with group and tutor.  **3h** – meeting with group. | **40min**  - meeting with group and tutor.  **3h** – meeting with group. | **40min**  - meeting with group and tutor.  **3h** – meeting with group. | **40min**  - meeting with group and tutor.  **3h** – meeting with group. | **40min**  - meeting with group and tutor.  **3h** – meeting with group.  **3h –** switching code design to a moreflexible structure and merging all the branches we had until this point | **40min**  - meeting with group and tutor.  **3h** – meeting with group.  **2h** – Path Finding Algorithm improvements research  **1h** – Path Finding debugging  **4h** – Group meeting |

**Total hours worked per group member this week**

* Monika: 3h and 40min
* Ignas: 3h and 40min
* Yoanna: 3h and 40min
* Teodor: 3h and 40min
* Vladimir: 6h and 40min
* Rostislav: 10h and 40min

## Week 10

14/05/2018 – 20/05/2018

**Planned activities**

1. Improve path finding algorithm.
2. Implement weather conditions.
3. Implement and improve already existing graphics.
4. Make login form with functionalities.

**Performed and completed activities**

1. Improved path finding algorithm.
2. Implemented weather conditions.
3. Implemented and improved already existing graphics.
4. Made login form with functionalities.

**Agreements**

1. Group meeting with tutor: 22-05-2018, 13:45

**Table with activities and hours spent per group member**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Monika** | **Ignas** | **Yoanna** | **Teodor** | **Vladimir** | **Rostislav** |
| **40min**  - meeting with a group and tutor.  **20min** – fixing local git bugs.  **1h** – organizing agendas and minutes, modifying iteration 2 plan, looking over documentation.  **1h** – Group discussion  **3h** – Checking/updating documentation.  **5h –** working on weather conditions. | **40min**  - meeting with a group and tutor.  **2h**  - adding airplanes functionality.  **1h** – Group discussion | **40min**  - meeting with a group and tutor.  **1h** – Group discussion  **2hr** – improve log in implementation  **2hr** – improving test document  **4hr** – research unit testing | **40min**  - meeting with a group and tutor.  **4h –** Working on weather conditions.  **1h** – Group discussion | **40min**  - meeting with a group and tutor.  **10h –** added the zones in the airspace, fixed which checkpoint is reachable from where, minor restructuring of parts of the code, changed the way the distance between 2 points was calculated (to time instead of just distance), path following  **1h** – Group discussion | **40min**  - meeting with a group and tutor.  **1h** – Sequence diagram polishing  **1h** – Group discussion |

**Total hours worked per group member this week**

* Monika: 11h
* Ignas: 3h and 40min
* Yoanna: 9hr and 40min
* Teodor: 5h and 40 min
* Vladimir: 11h 40min
* Rostislav: 6h and 40min

## Week 11

21/05/2018 – 27/05/2018

**Planned activities**

1. Debug.
2. Improve already existing code.
3. Update documentation.

**Performed and completed activities**

1. Debug.
2. Improve already existing code.
3. Update documentation.

**Agreements**

1. Group meeting with tutor: 28-05-2018, 13:45

**Table with activities and hours spent per group member**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Monika** | **Ignas** | **Yoanna** | **Teodor** | **Vladimir** | **Rostislav** |
| **40min**  - meeting with a group and tutor.  **40min** – implementing airplane graphics.  **4h20min**  - modifying weather conditions code.  **10min** – updating process report.  **3h** – debugging.  **30min**  - updating documentation.  **4h** – Group meeting | **40min**  - meeting with a group and tutor.  **1.5h**  - Random airplanes functionality.  **5h**  - Remaking code for uploading/loading data so it could save more fields.  **4h** – Group meeting | **40min**  - meeting with a group and tutor  **4h** – Group meeting.  **8hrs** – unit testing on newly implemented methods | **40min**  - meeting with a group and tutor.  **5h –** Working on painting weather.  **4h** – Group meeting  **1h 30 min –** checking weather conditions for bugs and improvements | **40min**  - meeting with a group and tutor.  7h – path following complete, a lot of git management, different features added (e.g. speed of simulation, etc. see git for a complete list), some code restructuring, various bugfixing  **4h** – Group meeting | **40min**  - meeting with a group and tutor.  **2h** – Path Finding Algorithm planning  **2h** – Class Diagram and Sequence Diagram research  **30min** – Class Diagram update  **30min** – Sequence Diagram update  **4h** – Group meeting  **1h** – Path Finding Algorithm debugging  **1h** – GUI improvements discussion  **30min** – GUI improvements coding |

**Total hours worked per group member this week**

* Monika: 13h and 20 minutes
* Ignas: 11h and 10 minutes
* Yoanna: 12hr and 40min
* Teodor: 11h and 10 min
* Vladimir: 11h 40min
* Rostislav: 11h and 10min

## Week 12

28/05/2018 – 03/06/2018

**Planned activities**

1. Mentor meeting
2. Debug
3. Improve simulation

**Performed and completed activities**

1. Mentor meeting
2. Debugging
3. Simulation improvements.

**Agreements**

1. Group meeting with tutor: 04-06-2018, 13:45

**Table with activities and hours spent per group member**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Monika** | **Ignas** | **Yoanna** | **Teodor** | **Vladimir** | **Rostislav** |
| **40 min –** meeting with group and tutor.  **30 min** – updating documentation. | **40 min –** meeting with group and tutor.  **2h** – fixing GUI issues.  **1.5h** – testing new functions, editing some code for improved stability. | **40 min –** meeting with group and tutor.  **5hrs** – unit testing | **40 min –** meeting with group and tutor.  **5h** – Fixing issues with weather conditions. | **40 min –** meeting with group and tutor.  **4 h –** fixing pathfinding when multiple airplanes are present; repo management;. | **3h –** Distance between points research and tests for simulating a crash  **1h**  - Danger zone creation  **2h** – Crash debugging  **2h** – GUI improvements  **2h** – Functionality and comments improvements  **30min –** Take-off alpha version |

**Total hours worked per group member this week**

* Monika: 1h 10min
* Ignas: 4h 10min
* Yoanna: 5hrs 40min
* Teodor: 5h 40min
* Vladimir: 4h 40min
* Rostislav: 10h30min

## Week 13

04/06/2018 – 10/06/2018

**Planned activities**

1. Have a meeting with a tutor.
2. Debug.
3. Improve simulation.

**Performed and completed activities**

1. Meeting with tutor.
2. Debugging.
3. Simulation improvements.

**Table with activities and hours spent per group member**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Monika** | **Ignas** | **Yoanna** | **Teodor** | **Vladimir** | **Rostislav** |
| **40 min –** meeting with group and tutor.  **30 min** – updating documentation. | **40 min –** meeting with group and tutor.  **3h** – researching and creating excel file (report) while clearing the simulation. bugs. | **40 min –** meeting with group and tutor.  **3hrs** – unit testing | **40 min –** meeting with group and tutor.  **4h** - Fixed painting weather conditions and some issues. | **40 min –** meeting with group and tutor.  **3h 30min –** fixing path display; working with Rostislav on redoing the painting in the app as a whole; fixing (and removing) message boxes; breaking the weather painting. | **40 min –** meeting with group and tutor.  **1h** - Paint event improvements  **1h** – Group meeting  **1h -**  Bugfixing and method description adding  **1h –** Code cleaning  **1h –** Take-off function creation |

**Total hours worked per group member this week**

* Monika: 1h 10min
* Ignas: 3h 40min
* Yoanna: 3hr 40min
* Teodor: 4h 40min
* Vladimir: 4h 10min
* Rostislav: 4h 40min

## Week 14

11/06/2018 – 17/06/2018

**Planned activities**

1. Improve simulation.
2. Debug.
3. Update documentation.

**Performed and completed activities**

1. Improved simulation.
2. Debugged.
3. Updated documentation.

**Table with activities and hours spent per group member**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Monika** | **Ignas** | **Yoanna** | **Teodor** | **Vladimir** | **Rostislav** |
| **40 min –** meeting with group.  **2h** – meeting with group.  **2h** – updating URS document.  **3h –** adding comments for the methods, clearing code, updating GUI.  **2h** – updating test report.  **3h** – updating process report.  **1h** – running tests | **40 min –** meeting with group.  **2h** – meeting with group.  **2h** – researching and fixing bugs.  **1h** – fixing issues with gui.  **2h** – fixing saving/loading issues for the application.  **30min** – editing saving of the excel file. | **40 min –** meeting with group.  **8hr** – unit testing | **40 min –** meeting with group.  **2h** – meeting with group.  **2h –** Cleaning code and commenting methods | **40 min –** meeting with group.  **2h** – meeting with group.  **2h –** git management  **5h –** automatic recalculation of paths upon addition/removal of checkpoints/airplanes; fixed take off; plenty of bugfixes; addition of code comments; looking into ways of generating a documentation file;  **8h –** TBD | **40 min –** meeting with group.  **2h** – meeting with group.  **1h –**GUI improvements  **2h** – GUI framework bugfixing  **30min –** PictureBox string research  **1h –** Website research |

**Total hours worked per group member this week**

* Monika: 13h 40min
* Ignas: 8h 10min
* Yoanna: 8hr 40min
* Teodor: 4h 40min
* Vladimir: 17h 40min
* Rostislav: 7h 10min

# Individual reflections

## Monika Kerulyte

In this project I learned how important is communication in group work. It’s important to communicate with each other and constantly update what each of us are doing or finished doing. At the beginning we struggled with that, but from second iteration we really improved that. Probably it’s because in time we got closer as a team.

During this project I improved C# skills, especially in graphics, so that’s a plus. Also, we had to document a lot of stuff and now I see why it’s important to think through every detail at the beginning of the project, so later we can focus more on important parts and everything goes smoothly, with no confusion.

Overall, I think that we did a good job and I’m happy I was able to work with this team. I gained more planning experience which I believe will be helpful later.

## Ignas Kybransas

I did like the project and the idea of “creating our own simulation”, where we could choose what we wanted to create and how we want to do that. This project made me feel like we are doing some important job and creating everything from 0. In the beginning it was quite difficult to understand the whole idea of the application, how we are going to implement it and what exactly we are going to do. Despite that after few meet-ups everything seemed to be clear and we started to do our (Hardest yet?) project.

In this project I learned how to be more communicative, gained a lot of information how to create/load files, serialize objects that you want to save. Gained more practice with Visual Studio on GUI side, learned how to make custom design instead of using the windows form itself (buttons like minimize, exit app). Moreover I got to know a great team which are responsible for their tasks and on the group meetings despite doing some hard work on the project, from time to time everyone was making some jokes to cheer up everyone else and this really made the project more fun to implement.

## Yoanna Borisova

The course ProCp has given me the chance learn more in-depth about unit testing and the importance of testing in general, simultaneously improving my and the team’s communication skills. I never thought that testing can be such an important aspect of a project. I have dedicated most of my time researching the importance and value of doing test driven development. Before this course, my knowledge in testing was limited to OOD1, in which I have only tested according to a waterfall approach. In this project, I have researched and developed my skills as an agile tester. I have understood the impact testing inside an agile team can improve the overall quality of the project. Compared to the waterfall approach, I was in constant contact with the developers and the client in order to create valuable user stories which could be testable. These user stories contributed to better defining the requirements of the application, and in turn improve the overall development and remove uncertainty from the project.

Overall, i did not believe that I would focus so much on testing, but after the PROCP project I can definitely bring test driven development and quality testable user stories and documentation to my future projects. The only regret I have in this project, is not having enough time to look into automated integration testing for the application. Developing automated tests during development would always make sure that any changes to the code would not have an impact on the regression.

## Teodor Genov

Very Good communication, very pleasant team, good work done overall. Did I mention.. Great team?

## Vladimir Katrandzhiev

Generally satisfied with how things were going for the most parts. We had some setbacks and communication problems in the beginning, but these were resolved after the first iteration. I was actually quite surprised that things actually got marginally better at that time. It was not always perfect and there were definitely some periods with lacking communication, but it was not anything too serious. Concerning soft skills development, I would say that I, personally, gained quite a bit in terms of acknowledging the importance of establishing and maintaining decent communication with the rest of the team members and keeping a clear track of the task division.

In terms of not-so-soft skills, I would say in the process of the project I became a lot more comfortable with working with the graphical part of the Windows Forms, which was an area, in which I had a great lack of knowledge up until now. Apart from that I got to apply and develop a variety of skills I had already had different levels of knowledge about. Looking back at it, the most I gained here was also in terms of organizational skills. This project quite clearly showed that it really would make everyone’s lives easier to establish strict rules for anything development-related. This includes things such as making people comment their code, write understandable naming for everything they use, naming conventions concerning capitalization and the likes, repo management rules, etc.

To sum it up, I would say that in the course of the project I got to develop both my soft and hard skills to different extents, but the emphasis for me personally was mostly on the soft skills part. Yes, there were definitely some challenging parts of the implementation of the project, but that was not impossible to overcome with some tinkering. In general, the difficulties were getting the group to work as an actual team and I believe the skills gained from that are the ones outweighing the purely code-related skills I gained from the project. Even when it came to “code-related knowledge”, I would say the most substantial experience I gained was related to the Git management, in which I became rather confident in the course of the project.

## Rostislav Tinchev

I will start with the fact that the overall job that the team has accomplished is nice. The communication between the members is good and we are doing well with thinking of all of the possible ways that we can achieve the final goal. We tend to work together properly.  
At first, the team was not familiar with the ways that each one of us is working and we had a bit of a struggle with managing tasks, overall communication, setting our minds on a final goal and actually understanding the issue that we are dealing with. We started slow, but with time all of us improved for the best. Communication got better, we finally are able to work with git properly and there were no major screw-ups there, the overall understanding of C# has improved for all of us and the quality of the group work is better. In that aspect, we learned a lot as a team.  
Personally, I managed to learn how to make Class Diagrams and Sequence Diagrams properly. My idea of how to use the graphics class, the timers, windows forms, delegates and events, C# as a whole has improved a lot and I believe that this subject has helped me a lot with those. I managed to polish the way that I work with git.   
The part that I did not enjoy that much was the fact that we had time until Friday to work on the project where our specialization classes occupied Thursdays and Fridays and that made our handing in of weekly deliverables harder. Saturdays and Sundays were completely free, where usually those are the days that we could invest the most time.

Overall I believe that the subject has helped, at least me, a lot to solidify the knowledge acquired by the classes from the previous semesters.

# DOT Framework

### Library

We used library DOT framework mainly for documentation if something was not clear, also for creating simulation.

### Lab

We used lab DOT framework for creating simulation.

# Agendas and minutes

## Agendas

### Week 1

|  |  |
| --- | --- |
| Location: | Common Area |
| Date: | 26/02/2018 |
| Time: | 13:45 |
| Facilitator: | Rostislav Tinchev |
| Attendees: | Chung Kuah, Vladimir Katrandzhiev, Monika Kerulyte, Teodor Genova, Yoanna Borisova, Ignas Kybransas, Rostislav Tinchev |
| Meeting Chairman | Vladimir Katrandzhiev |
| Time Taker | Rostislav Tinchev |

Agenda items

|  |  |  |
| --- | --- | --- |
| 13:45 — 14:15 | Talk concerning URS and Work Division report creation | Common Area |

### Week 5

|  |  |
| --- | --- |
| Location: | Common Area |
| Date: | 05/03/2018 |
| Time: | 13:45 |
| Facilitator: | Monika Kerulyte |
| Attendees: | Mr. Johnson, Chung Kuah, Vladimir Katrandzhiev, Monika Kerulyte, Teodor Genova, Yoanna Borisova, Ignas Kybransas, Rostislav Tinchev |
| Meeting Chairman | Ignas Kybransas |
| Time Taker | Monika Kerulyte |

Agenda items

|  |  |  |
| --- | --- | --- |
| 13:45 — 14:15 | Talk with client concerning User Requirements for application. Showing the example of similar simulation. | Common Area |

### Week 6

|  |  |
| --- | --- |
| Location: | Common Area |
| Date: | 19/03/2018 |
| Time: | 13:45 |
| Facilitator: | Rostislav Tinchev |
| Attendees: | Chung Kuah, Mr Johnson, Vladimir Katrandzhiev, Monika Kerulyte, Teodor Genova, Yoanna Borisova, Ignas Kybransas, Rostislav Tinchev |

Agenda items

|  |  |  |
| --- | --- | --- |
| 13:45 — 14:00 | Feedback on documentation | Common Area |
| 14:00 — 14:15 | GUI design showcase | Common Area |

### Week 7

|  |  |
| --- | --- |
| Location: | Common Area |
| Date: | 26/03/2018 |
| Time: | 13:45 |
| Facilitator: | Teodor Genov |
| Attendees: | Chung Kuah, Vladimir Katrandzhiev, Monika Kerulyte, Rostislav Tinchev, Yoanna Borisova, Ignas Kybransas, Rostislav Tinchev |

Agenda items

|  |  |  |
| --- | --- | --- |
| 13:45 — 14:15 | Meeting concerning Design Document, Use Cases, Test Cases. | Common Area |

### Week 8

|  |  |
| --- | --- |
| Location: | Common Area |
| Date: | 23/04/2018 |
| Time: | 13:45 |
| Facilitator: | Vladimir Katrandzhiev |
| Attendees: | Chung Kuah, Vladimir Katrandzhiev, Monika Kerulyte, Rostislav Tinchev, Yoanna Borisova, Ignas Kybransas, Rostislav Tinchev |

Agenda items

|  |  |  |
| --- | --- | --- |
| 13:45 — 14:15 | Meeting concerning feedback for itteration 1, proof of concept, URS, design documant and test report | Common Area |

### Week 10

|  |  |
| --- | --- |
| Location: | Common Area |
| Date: | 14/05/2018 |
| Time: | 13:45 |
| Facilitator: | Monika Kerulyte |
| Attendees: | Chung Kuah, Vladimir Katrandzhiev, Teodor Genov, Rostislav Tinchev, Yoanna Borisova, Ignas Kybransas, Rostislav Tinchev |

Agenda items

|  |  |  |
| --- | --- | --- |
| 13:45 — 14:15 | * GUI * deliverables for iteration 2 | Common Area |

### Week 11

|  |  |
| --- | --- |
| Location: | Common Area |
| Date: | 22/05/2018 |
| Time: | 13:45 |
| Facilitator: | Ignas Kybransas |
| Attendees: | Mr. Johnson, Chung Kuah, Vladimir Katrandzhiev, Teodor Genov, Rostislav Tinchev, Yoanna Borisova, Monika Kerulyte, Rostislav Tinchev. |

Agenda items

|  |  |  |
| --- | --- | --- |
| 13:45 — 14:15 | * Path finding / following * Design change * New ideas | Common Area |

### Week 12

|  |  |
| --- | --- |
| Location: | Common Area |
| Date: | 28/05/2018 |
| Time: | 13:45 |
| Facilitator: | Vladimir Katrandzhiev |
| Attendees: | Chung Kuah, Vladimir Katrandzhiev, Monika Kerulyte, Rostislav Tinchev, Yoanna Borisova, Ignas Kybransas, Rostislav Tinchev |

Agenda items

|  |  |  |
| --- | --- | --- |
| 13:45 — 14:15 | Meeting concerning feedback for itteration 2, prototype, design document and process report. | Common Area |

### Week 13

|  |  |
| --- | --- |
| Location: | Common Area |
| Date: | 04/06/2018 |
| Time: | 13:45 |
| Facilitator: | Monika Kerulyte |
| Attendees: | Chung Kuah, Vladimir Katrandzhiev, Monika Kerulyte, Rostislav Tinchev, Yoanna Borisova, Ignas Kybransas, Rostislav Tinchev |

Agenda items

|  |  |  |
| --- | --- | --- |
| 13:45 — 14:15 | Meeting concerning simulation | Common Area |

## Minutes

### Week 3

**Date and time:** 26-02-2018, 13:45

**Location**: Open space, Fontys R1

**Chairman**:

**Minute taker**: Monika Kerulyte

**Attendees**: Chung Kuah, Monika Kerulyte, Ignas Kybransas, Teodor Genov, Vladimir Katrandjiev, Yoanna Borisova, Rostislav Tinchev

Project Plan

* Project plan missing details
* Deviates from the project management template
* good that we have scheduling
* too much details in the version control table
* needs more spreading on the versions
* Missing stakeholders (development team, mr Johnson, tutor)
* Think about when to include teacher and when mr Johnson
* Missing project goals, that were discussed on the previous meeting
* More details about the deliverables themselves
* Remove the part where it says “none of the activities fall in the scope of the project”
* Go through phase 2, missing deliverable

URS:

* URS = Setup Document
* Use case, details

Division Report

* Kind of an process report

Overview of what its going to be done

User story

After iteration 1 we are going to need to update the setup document with use cases

To know what to do for the first iteration, we need to go through the requirements and make the iteration based on those requirements

Include mr johnoson in the attendance list and that’s it

**Meeting duration:** 26mins

### Week 4

**Date and time:** 03-05-2018, 13:45

**Location**: Open space, Fontys R1

**Chairman**:

**Minute taker**: Yoanna Borisova

**Attendees**: Chung Kuah, Monika Kerulyte, Ignas Kybransas, Teodor Genov, Vladimir Katrandjiev, Yoanna Borisova, Rostislav Tinchev

Ignas: Can we have some feedback on the project plan, what is good and what is bad

Project plan feedback:

Mentor: Benchmarking – missing in the project plan, could be done in two ways

Vladimir: User interaction (main idea)

Ignas: Can we have an explanation again to get it done ?What is benchmarking?

Mentor: explains what a simulation is: representation of real life situation and elements interacting with each other

Mentor: What is the purpose of the report that we are going to generate:

Mental note: Having a simulation means: get it straight ;dd

Mentor: there is a default case. Default case about traffic control simulation: benchmarking there is to determine the most optimal way of crossings. Change the intervals of the traffic light from red to green and see whether the results are improved or not

Vladimir: Our idea for our project: the number of checkpoints, maybe determined number of them, the user will have influence over them, we need to benchmark it somehow

Mental note: Benchmark the shit out of it until the end of today (in the project plan)

Ignas: can we have like main requirements that we need to implement?

Mentor: Deliverables are not complete – check them again

Mentor: A simulation goes from one application run to one expected result

\*Vladimir is showing the example to the mentor\*

Other questions:

Mental note: We need to request to speak with Mr Johnson – about the flipping of the plate

Mentor: What is the progress of the work division report and other documents?

Mental note again: get our shit together and start working on them

Vladimir: Can we show them on Monday not as a deliverable but as draft to ask for feedback?’

Mentor: Yes

Mentor: May I know what you are spending your time on?

Ignas: Usually we have an hour long meeting, like on Wednesday or Thursday, afterwards we try to divide our work and actually on it, we work on google doc so everyone can see real time changes

Mentor: Were you aware of the deliverables for this week?

Vladimir: We left it for Thursday, then we were shocked by the amount of work that we needed to do for POPD

Mentor: just to keep in mind, we expect you to work on multiple deliverables at the same time

Ignas: so now we need to try to send you the deliverables?

Mentor: if you want feedback before the grade of it, should be somewhere around the middle of the time, whether it is at the start or the week afterwards, somewhere in between is the best time

Ignas: if we have some deliverables for Friday morning, we need to send you the dividing work documentation, all this documents n stuff, we need to send it and ask for your opinion?

Mentor: be specific about it, so I get one hour on it, half an hour meeting? Be sure to structure it better

Rosti: if we want feedback via email should it be in the middle?

Mentor: feedback will be given during the meeting

Rosti: what if its Wednesday?

Mentor: you have the entire week, it is your choice what you spend the time on

Mental note: we got owned

Ignas: other questions

Mentor: we have a mandatory lecture next week

Vladimir: are we going to receive anything about it?

Mentor: its on sharepoint

Ignas next week?

Mentor: yeah, Monday

Ignas: we are going to improve ourselves and the documentation and definitely put more hours on the project

### Week 5

**Date and time:** 12-03-2018, 13:50

**Location**: Open space, Fontys R1

**Chairman**:

**Minute taker**: Monika Kerulyte

**Attendees**: Chung Kuah, Monika Kerulyte, Ignas Kybransas, Teodor Genov, Vladimir Katrandjiev, Yoanna Borisova, Rostislav Tinchev

* GOOD JOB!
* Design document is different from URS
  + Classes (with description) and sequence diagrams
* One test plan document with updates
* URS
  + “description of the processes”: setup part is missing (not a problem)
  + Not all exceptional cases
  + Non-functional requirements not related to the app
  + Show sub goals of the goals in MOSCOW table
  + “Must have: Benchmark-able outcome of simulation:“ - add more
* Iteration plan
  + Goal: too vague
  + Send updated version
* Work division:
  + Include overview

**Meeting duration:** 21min

### Week 6

**Date and time:** 19-03-2018, 13:50

**Location**: Open space, Fontys R1

**Chairman**: Monika Kerulyte

**Minute taker**: Yoanna Borisova

**Attendees**: Chung Kuah, Monika Kerulyte, Ignas Kybransas, Teodor Genov, Vladimir Katrandjiev, Yoanna Borisova, Rostislav Tinchev

Rosti: We would like to apologize, Vladimir will be late, will be here in a minute

Monika: we can start with the meeting, specifically the feedback from the deliverables

Mentor: update? You can ask for feedback, but you need to say which part exactly and why are you doubting it; you can get feedback once per phase and be specific which part it is

Ignas: So only once?

Mentor: per phase

Monika: so, about the test plan then. Is the structure ok, is anything missing?

Mentor: the test cases that I am interested in are missing, the test cases, focus on the test cases

Rosti: our idea was to discuss with the client how the gui will look like and everything will follow afterwards

Mentor: gui shouldn’t be related, what made you go the other way around?

Rosti: we didn’t know how it will look like

Mentor: so you misunderstood that, usually first you need the use-cases

Monika: the urs doc?

Mentor: which part are you doubting

Minika: is the table ok, are the colors fine

Mentor: I don’t know how to interpret the colors

Rosti: so, we are missing a legend?

Mentor: yes

Monika: also what overview in the process report? I already did the process report and you said that it needs an overview, for the weeks or for the project?

Mentor: both, I want to see the hours for the block etc

Monika: anyone having questions?

Rosti: we are waiting for Vladimir and the sketches, but I have an example of this with a grid style and we thought of implementing a radar, do you have any suggestions?

Mentor: its fine, but why a radar as it is a simulation

Rosti: it will be better for us, easier to understand

Mentor: you’re working with checkpoints, how many?

Rosti: like solid dots with coordinates

Mentor: can we specify the height?

Rosti: yes

Mentor: so, we have three different checkpoints with the same x and y but different z, and how can they see when they are overlapping?

Rosti: display box or sth?

Mentor: the chance of yours is to try to visualize 3d data into 2d

Rosti: we’ll think about that, that’s what I had to show

Mentor: am I correct to assume that you are doing everything in sequence and not parallel, you need to split the work on multiple things

Vladimir: sorry for being late

Mentor: you don’t need the gui to make your class diagrams

Rosti: we thought we need the gui first, but you made a good point there

Monika: we want to discuss the design

Igna:; yeah we were waiting for you

Vladi: so, it’s pretty much sth like this in the middle

Rosti: we already showed this

Vladi: did we discuss all of that? Yeah sorry

Mentor: where did you spent your time on? Popd?

Rosti: kind of

Mentor: you have 2 more weeks to deliver sth working, it’s quite some work

Monika: do we have sth else to discuss? Design? Questions?

Vladi: the test doc?

Minika: we did

Vladi: the test case

Minika; I don’t have it

Vladi: can we discuss the test case for feedback? \*shows the test case to the mentor\*

Ignas: so it’s basically the same thing?

Mentor: so, it’s the same as before?

Vladi: yeah, so as we saw now at the final design they will be a grid and here our problem was that in the second step it sounds too vague for testing and we need to specify what the user should do, is there anything else that you would like to add in the test document?

Mentor: I’m going to interpret it as someone that does not know anything and write down exactly as I see, I should be able repeating this action multiple times and give me the same result, if it works that’s good

Monika: so that’s it?

Rosti: I think so

Monika: so, we are finished we don’t have any more questions thank you

Mentor: thank you

### Week 7

**Date and time:** 19-03-2018, 13:50

**Location**: Open space, Fontys R1

**Chairman**:

**Minute taker**: Monika Kerulyte

**Attendees**: Chung Kuah, Monika Kerulyte, Ignas Kybransas, Teodor Genov, Vladimir Katrandjiev, Yoanna Borisova, Rostislav Tinchev

**Part 1**

Design document

* Everything is bidirectional associations
* Why is airspace exclusively for a weather conditions
* Add description of each class
* Bidirectional need reason

GUI design

* Even grandma has to know how to use app

**Part 2**

UML:

* Weather condition and Airspace should be switched around.
* ICheckpoint notified as array, how are we gonna implement “1 to many” to an array? ( Could be a list)
* Airplanes can only arrive to airspace but none of them can leave.
* Bidirectional needs to have a reason for (idk).?

GUI of application:

* We need to think about it by ourselves

Test Cases:

* Make it more specific on saving data test case.
* Saving data – adding more specific way for user to check it out if file is saved ( go to folder, run the file check the info blah blah blah…).
* For testing document - Add a column if that test was successful and etc.

**Meeting duration:** 26mins

### Week 8

**Date and time:** 23-04-2018, 13:45

**Location**: Open space, Fontys R1

**Chairman**: Rostislav Tinchev

**Minute taker**: Ignas Kybransas, Monika Kerulyte

**Attendees**: Chung Kuah, Monika Kerulyte, Ignas Kybransas, Teodor Genov, Yoanna Borisova, Rostislav Tinchev

0min – feedback.

* Concept is simulation for air traffic.
* Concept is not working.
* Research for algorithms.
* Not everything is done.
* Design document is class diagrams, stuff is missing.
* Test plan is not complete.
* Nice test report.
* Missing monkey behavior (what happens if you click on the same place twice).
* Grade for itteration1 is 5.
* Specify what extra will be implemented.

32min – how we will work in iteration 2

* Add to agenda to discuss work division.

36min – peer review

**Meeting duration:** 45mins

### Week 9

**Date and time:** 07-05-2018, 13:45

**Location**: Open space, Fontys R1

**Chairman**: Rostislav Tinchev

**Minute taker**: Yoanna Borisova

**Attendees**: Chung Kuah, Monika Kerulyte, Ignas Kybransas, Teodor Genov, Vladimir Katrandjiev, Yoanna Borisova, Rostislav Tinchev

R: This meeting we will show design doc, path finding algorithm up until this point and work division.

Y: We decided to keep everyone involved in development part.

T: What about project plan for iteration 2 (Something he told about last time that has to be changed).

T: What I actually request is in your goal you mentioned which of these part you are gonna deliver/implement.

R: Okay we are going to deliver it.

R: Moving up to the next part im gonna show what we have on design document now. We included description of uml classes, we have completed sequence diagram and I believe that is everything that we were missing on the design doc. And there was a part that we said we are going to update in the future deliveries and we did that part too.

T: Sequence diagram is used for certain functionality, so when I see something like this (idk what he is showing) it is weird because how it can be separately active (WAIT WAT IM LOST HELP ME GUYS)…

T: The interesting part is the simulation itself. I suppose it’s the run. You putted it in very generic and simple way which is fine for early… How these classes interact with each other and etc?

R: We will check on that and we will connect the classes.

T: What I am looking for is correct sequence diagram…

V: I can show application itself because I have complied already. It was before on development branch but now we have it working so it is how it looks as Proof-of-concept… (SHOWING UP APP AND DESCRIBING SOME WEIRD AND USUAL STUFF). That’s what we needed to show you this last meeting but…..

T: How do you represent the data structure itself?

V: Its in the link list. (WAT)

T: Basically you calculate from the airplane to checkpoint what the distance is towards the landing?

V: Actually no, most important

T: what os data structure here. Based on what you find paths in math 3?

T: how are you presenting graph?

T: If this is your graph (Shows picture of graph) how you gonna find path?

V: For example outside the grid(somewhere outside) the airplane can do whatever it wants but for example we have to land in here (The middle of grid) it has to go through specific checkpoints (painting points in grid).

T: Is this graph(oval grid) will be implemented this iteration?

V: This shouldn’t be that hard, probably yes.

R: We have to make it cause next iteration is only testing/polishing.

### Week 10

**Date and time:** 14-05-2018, 13:45

**Location**: Open space, Fontys R1

**Chairman**: Monika

**Minute taker**: Ignas Kybransas, Monika Kerulyte

**Attendees**: Chung Kuah, Monika Kerulyte, Ignas Kybransas, Teodor Genov, Vladimir Katrandjiev, Yoanna Borisova, Rostislav Tinchev

GUI:

* Mandatory checkpoints around airport so it’s smooth landing, no edges.
* Scheduling.
* Where is randoming in application? (weather can influence it).

Sequence diagram:

* Base mor on application

Iteration 2 plan:

* Good.

Something about java docs.

**Meeting duration:** 22mins

### Week 11

**Date and time:** 22-05-2018, 13:45

**Location**: Open space, Fontys R1

**Chairman**: Ignas Kybransas

**Minute taker**: Monika Kerulyte

**Attendees**: Chung Kuah, Monika Kerulyte, Ignas Kybransas, Teodor Genov, Vladimir Katrandjiev, Yoanna Borisova, Rostislav Tinchev

**00:00 Talking about linked list data type.**

Not able to serialize.

Do we need linked list data type?

You can make your own linked list data type.

**00:05 Showing application.**

Showing login part.

Showing path finding strip.

Showing flying airplanes.

Error comes when several airplanes are added.

Everything is implemented, just needs some fixes and debugging.

**00:10 Who is the target clients.**

Somebody who want to find potential routs.

Avoid danger.

To brought, narrow down target audience.

Test optimal routs with different sets of weather conditions, etc.

**00:13 What we could do**

Application can give suggestions.

**00:15 Weather conditions**

Circle’s purpose is if it crosses the checkpoint it will remove it.

If you change the temperature it will either rain or snow.

Look into graphical representation (for whole app).

**00:17 Talking about grade**

What kind of grade we will get?

Ignas – 7. If we implement better graphics, I think we will get better grade;

Vladimir – 8. We didn’t promise what we didn’t delivered;

Rostislav – 8. We delivered what we promised and better communication;

Monika – 8.

Teodor – 8.

To get 8 or 9 is possible if everything is excellent.

Do we want to change something for next iteration or are we happy with what we have?

**00:22 Talking about database.**

Showing database code.

Yoanna can take a look at how to implement safer way database (if you write in to login window name “…drop table..” what happens then).

### Week 12

**Date and time:** 28-05-2018, 13:45

**Location**: Open space, Fontys R1

**Chairman**: Vladimir Katrandijev

**Minute taker**: Monika Kerulyte, Ignas Kybransas

**Attendees**: Chung Kuah, Monika Kerulyte, Ignas Kybransas, Teodor Genov, Vladimir Katrandjiev, Yoanna Borisova, Rostislav Tinchev

**13:47 Feedback about iteration 2.**

No java docs in design document. UML diagrams better now, sequence diagrams too small, can’t read.

We have to implement take off, improve weather conditions and path algorithm.

We will focus on developing app for people in control towers. We are going to benchmark time , will show probability if it‘s safe to land. This app will help employees to improve path.

### Week 13

**Date and time:** 04-06-2018, 13:45

**Location**: Open space, Fontys R1

**Chairman**: Rostislav Tinchev

**Minute taker**: Monika Kerulyte, Ignas Kybransas

**Attendees**: Chung Kuah, Monika Kerulyte, Ignas Kybransas, Teodor Genov, Vladimir Katrandjiev, Yoanna Borisova, Rostislav Tinchev

**13:48 Talking about simulation**

Rostislav explaning what has been done during the last week.

Showing the crashing.

Thinking of having overview where shows which planes crashed and when, etc.

Some of the airplanes missing checkpoints.

Teacher: how easy is it going to be se use this poart?

It‘s a good way to go to have an overview.

Teacher: remove painting from ticking to paint event handler of the picture box.

Teacher: look into how games are created, one part is for physics, logic and other part is for drawing.

We still don‘t know how to fix the problem that some airplanes don‘t go through the checkpoints.

**14:08 End of the meeting**

# Hours worked overview per group member

Monika Kerulyte – 77h 55min

Ignas Kybransas – 64h 15min

Yoanna Borisova – 67h

Teodor Genov – 49h 45min

Vladimir Katrandijev – 79h 30min

Rostislav Tinchev – 67h