PUSS214208

v. 0.2

TimeMate

Project Final Report

Group 2

Responsible: Project Management Group

Authors: Project Management Group

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Contents

1   Document History

Version	Date	Responsible	Description
0.1	2021-03-17	PG	Document created.
0.2	2021-03-19	PG	Ready for informal review.

2   Terminology

SG	System management Group
DG	Developer Group
TG	Test Group
PG	Project Management Group
SDP	Software Development Plan
SRS	Software Requirements Specification
SVVS	Software Verification and Validation Specification
SVVI	Software Verification and Validation Instruction
STLDD	Software Top Level Design Document
SVVR	Software Verification and Validation Report
SSD	System Specification Document

Table 1: Terminology

3   Referenced Documents

- Software Development Plan, v. 1.1, Doc. number: PUSS214200.

- Project Instruction (Projekthandledningen).

4   Executive Summary

This report summarises the work done by project group 2 in the course *ETSF20, Programvaru-utveckling för stora projekt*. The project took took place during January, February and March of 2021. It involved 21 students and 3 faculty members at Lund University. The aim of this project was to give students practical experience of working in a large group with the aim to produce a time reporting system. Whilst the software was the end product, this report mainly focuses on the lessons learned during the course of the project. The group delivered a product that met the requirements and did so within the alloted time frame and thus considered as a successful project..

This report is structured as follows: Section 5 gives an overview of the project. Section 6 presents an analysis of the results and aims to answer questions regarding taken decisions and challenges that were faced. Section 7 gives six tips for future project groups, and at last, section 8 gives a conclusion that contains reflections from the entire project group.

5   Project Overview

This section aims to give an overview of the project and is structured as follows: Section 5.1 to 5.4 describes the work process for each phase as well as how they went. Figures are included which displays the reported time from each member of the group. Sections 5.5 to 5.10 describe other aspects of the project that were present throughout.

5.1   Phase 1. Week 3-5

PG started planning and gathering the group during week 2 to prepare for phase 1. The first phase started with an overwhelming amount of information that everyone had to digest. At the same time, big decisions hade to be taken such as creating groups, creating a timeplan and certain design choices.

Writing the SDP, SRS and SVVS, which would lay the ground work for the next couple of months, went well. However the first informal review failed to catch most of the critical errors, which led to the formal reviewer not approving the documents for baseline and requiring us to hand in the documents for approval after adjustments.

After reworking the documents, and our review process, we held a second informal review. This time, the remarks where significantly more useful but the meeting structure did not support the ensuing discussions. The need for a second informal review and some scheduling issues for the formal review cost us three days. During the transition into phase 2 we took what we had learned and made adjustments to our review methods.

5.2   Phase 2. Week 6-7

Due to the delay at the end of phase 1, the second phase was compressed to stay on schedule. There was a slight panic at the beginning of the phase as the document deadline was closer than some group members had anticipated. This was solved by clear and concrete scheduling and effective
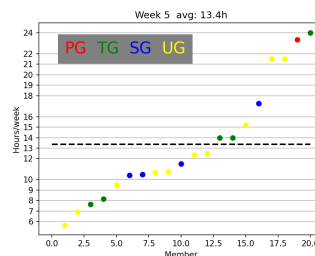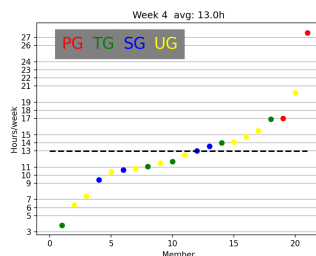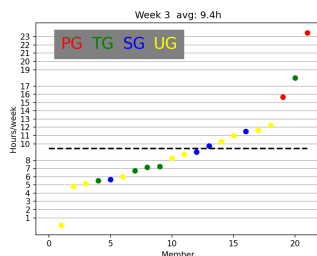
Figure 1: Worked hours week 3.   Figure 2: Worked hours week 4.   Figure 3: Worked hours week 4.

work distribuitions within the development group. They scheduled an extra work shift and dedicated 3 members to do graphics for the STLDD, which helped pipeline the writing process. DG had spent some time during phase 1 preparing for this document, which gave them a running start when it was time to write.

The writing of SVVI went straightforward as TG was very focused throughout the phase. This focus remained during the entire project and the test group never had any big issues.

The formal review went well, the reviewer only had a few remarks, but left it up to the group to correct them and put the documents in baseline. Several members from TG and DG were tasked with this, whilst the rest of the group started with development and testing for phase 3. Getting a head start in the next phase whilst others finished up the current phase became a common strategy, even if it went against the strict rules outlined in the waterfall method.
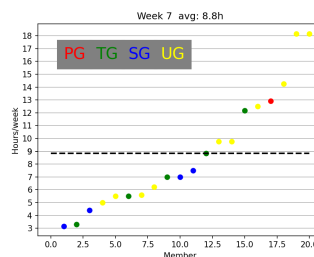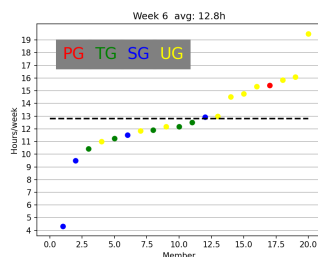
Figure 4: Worked hours week 6.

Figure 5: Worked hours week 7.

5.3   Phase 3. Week 8-9

Phase 3 *unofficially* started on time, but *officially* we were 3 days behind schedule, due to the formal review result in Phase 2. This meant that the group had roughly a week to develop the software before the first informal review. This caused some panic and many members did not believe that the deadline would be reached.

DG spent a lot of time trying to translate the contents of STLDD to code and ambiguities started

to show regarding how the system was supposed to fit together. This meant that valuable time that should have been spent producing running code, was instead speant on understanding the STLDD as well as the SRS.

The purpose and responsibilites of SG were somewhat unclear. The initial plan was that SG was to aid DG, handle the communication between DG and TG and assist any of the groups if needed. It seemed like there were either a missunderstanding of this, or a lack of communication between SG and the rest, because according to SG, no one needed help, but in reality, DG was quite far behind even early in phase 3. This lead to *heroes* emerging, group members that put in considerably more hours than others, as seen in figure 7.

The informal review was pushed forward a day and reviewing of code convention and code style was ignored due to the code being unfinished. Instead, only functional tests and system tests were performed, all of which were succesful. However, there were still minor discrepencies between the system and the SRS, as well as plenty of undocumented and ugly code.

The second informal review was pushed from Friday to the Tuesday of week 10, which was enough for the group fix the corrections. However, after this review, further fixes were required, such as deleting unused variables and adding javadoc comments. Further corrections were made and on Friday week 10 the SDDD reached baseline.
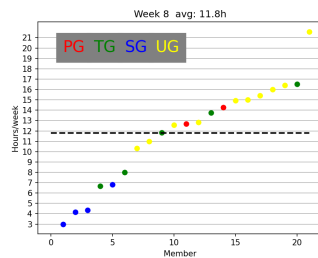

Figure 6: Worked hours week 8.
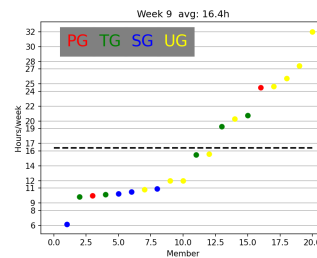
Figure 7: Worked hours week 9.

5.4   Phase 4. Week 10-11

Once the SDDD had reched baseline the project was put on hold as the group studied for the upcoming exams (week 11 was exam week). However, during the time that that DG spent finishing the software, the other groups started working on documents for phase 4. Two out of the three documents were almost done by the time phase 4 *officialy* started.

The last project group meeting was on the tuesday of week 11 and the last informal review took took place the following friday. Figure 8 clearly shows that the project was *not* a priotiy during this week. Because this report was written during week 11, its time report graph is not included.

Figure 8: Worked hours week 10.

5.5 Reported Time

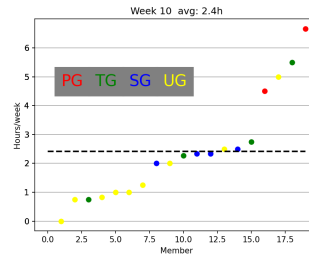Figure 9 illustrates the average hours/week spent for each week. This number (9.8h/week) is very close to the expected value stated in SDP which was 10 hours per week. However, even though the *average* hours worked during the project came out to be almost exactly what was expected, it is clear from figure 1 to 8 that the hours were *not* evenly distributed. Hereos started to emerge early on and while this was discussed as a potential risk early in the project, it seemed unavoidable.

After week 5, PG showed graphs from reported work time to point out the differences and invited the people who had spent less time to spend more, and to the ones who spent more time, to spend less as well as to ask for help. What impact this had is unknown.
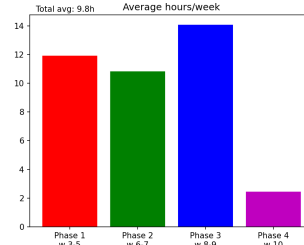

Figure 9: Summary of average worked hours during the project.

5.6 Staying on Schedule

As described in sections 5.1 to 5.4 each phase was delayed by a few days. Figure 10 illustrates the differences between the planned schedule and when baselines were actually reached.

Week	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Phase
3								1
4								
5								
6								2
7								
8								3
9								
10								4
11								
12	Hand in			Acknowledgement				

| | Informal review | Formal review | Second review | Dedicated development time | Project meeting | | | |

Figure 10: Schedule from SDP, showing when each baseline was reached.

5.7   Version Control & Configuration Management

The decision to use git as version control was taken during phase 1 and it worked quite well. The few issues that occured, were small and easy to deal with. To educate the group, PG held a 45 minute long education of basic usage of git which was also recorded so that members that missed it could watch it afterwards.

While git was used to update files, E-PUSS was used to track the version numbers of the documents. These were recorded in the Status Reports and worked well.

One thing that differed from the initial plan of git usage was when updating the version of a document that had reached baseline. For this to work efficiently, a *patch* branch was created which forked from the *development* branch. The updated document was then put into the *patch* branch which then got merged to *master*. This process took a little longer, but seemed like a solid solution that kept the *master* branch up to date, and secure.

Figure 12 and 11 illustrates the commit distribution and commit history during the project. As of writing this report, a total of 18 out of 21 group memebers have commited to the github repository with a total of 1,139 commits.

5.8   Status & Problem reports

13 problem reports were filed during the project. All of the reports resulted in an update of the documents which lead to an update of the status reports. However, some of the problem reports were logically connected and thus only resulted in a single update in the status reports.

As seen in figure 13 most documents did not require more than one or two changes after baseline was reached. Documents for phase 4 are not included in the figure since none of the documents for the phase were in baseline during the writing of this report.
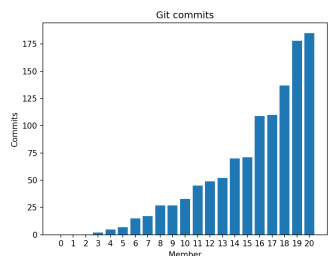
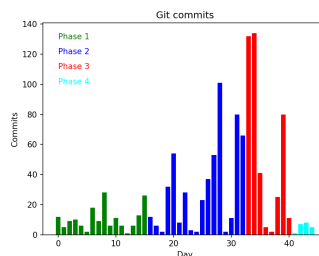Figure 11: Commit distributed throughout the group.
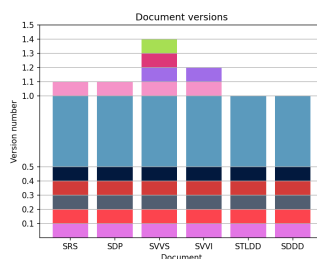

Figure 12: Commits for each phase.

Figure 13: Document version numbers from phase 1-3.

5.9   Online Communication

After the first project meeting (held on Zoom) the decision to move to Discord was taken. For the remainder of the project Discord served as the only communication channel and worked flawlessly.

However, while the online communication worked very well for the most part, it resulted in a lack of connection between group memebers. For instance, even though two of the ground rules specified in SDP were to actively participate during meetings, and, as much as possible have the camera on, this did not happen. The majority of the time during the project group meetings was spent as a monologue from the president with just a few cameras on. When discussions occured it was mostly the same people who participated, which resulted in about 15 people not saying a word during most of the meetings. This caused frustration among PG as it was difficult to gauge the opinion of the group.

5.10   Running the system locally

Getting the system to run locally caused more issues than expected and even late into phase 3 there were several members that could not get it to work. To aid people with this, a cheat sheet was created which included step by step instructions how to get the system running. Though it is unknown if and how much this helped, it seemed like reasonable solution.

5.11   Group Managers

Besides the project managers, we appointed a manager for each work group SG, DG and TG. The tasks of the system manager and test manager were outlined in the Project Instructions and were quite clear, but the role of devolpment manager was not specified and thus *not* clear. This resulted in the ambiguities regarding the responsibilites, purpose of the role. This also lead to certain tasks falling between the cracks or being delayed, such as splitting DG intro groups, telling inner groups in DG what to do, etc.

6   Analysis

This section desribes our perception of how the project went and how it lined up with our expectations. This section follows the same structure as the Project Overview.

6.1   Phase 1. Week 3-5

During the first informal review, the bulk of the remarks were made up of grammar and spelling errors, rather than flaws in the content. This was an issue since the documents being reviewed clearly needed more work, as demonstrated by them not being approved for baselien by the formal reviewer. To correct for this, we introduced a guiding document that was supposed to aid reviewers. The idea of this document was to be a reference for all future reviews, and thus cointained information about reviewing code that would have to be filtered out when reviewing a docuement and vice versa. The complexity of the document was suspecte to be an issue but it did help to some extent, because the next batch of reviewers remarks were more useful.

The influx of useful remarks exposed another flaw in our review process. The inital plan for the meeting was that each reviewer presented their remarks, which would then be either accepted or discussed further. The reference document had failed to mention how a reviewer should organize their remarks, which, along with the superfluous meeting structure, led to poorly structured presentations and discussions that were hard to follow.

To ensure the quality of future reviews we discarded the reference document and took a simpler approach that borrowed heavily from the format of the formal reviews. Reviewers got a review guide that was specific to the item being reviewed and all remarks were put into a table. The remarks were sent to the authors of the document before the meeting. During the review meeting, only remarks that warranted discussion were mentioned. This procedure was kept during the rest of the project and it worked very well.

We also aimed at improving the work distribution and staying on schedule. The following measures were taken:

- Increase the scheduled work shifts from 1 to 2 per week.

- Have PG engage more with the groups, instead of relying on group leaders to act as a bridge between management and other members.

- Redistribute tasks from PG to SG and TG.

6.2 Phase 2. Week 6-7

Group members where getting more comfortable with their roles and tools which became visible since everything worked very well. In total, the documents probably had an equal amounts of issues as the documents from phase 1 but most of these issues were found during the informal review, which were then corrected before the formal review. As a result we could make some final changes and put the documents in baseline ourselves, saving us a day or two.

6.3 Phase 3. Week 8-9

As explained in section 5.3 this phase became quite stressful and was a week late to reach baseline. The reason behind the stress and delay was probably a combination of the following:

- Important and time-consuming activites in other courses.

- Poor understanding of how the system was actually supposed to be work and be put together.

- Lack of communication between the subgroups of DG which resulted in extra work, such as different variable names between frontend/backend.

- SG feeling unsure of what to do, which meant that they were not utilized. Figure 6 and 7 clearly illustrates this as SG only spent an average of 7 hours while DG spent 17 hours on average.

- Uncertainties in SRS, which resulted in ambiguities regarding system requirements. For instance, certain design choices were either not specified or not specific enough, which resulted in DG having to improvise.

- Lack of knowledge and experience with the technologies, which meant that valuable time was spent doing research on how certain technologies or frameworks work (like jsp, tomcat etc). This should have been done earlier in the project so that phase 3 could be entirely about implementing the STLDD instead of googling.

- The waterfall method is not suited for a project when the group has zero to little experience with the technology. Because of this, we believe that an agile development method would be more suitable for this project.

Section 6.6 and 6.10 presents possible solutions to prevent some of issues mentioned.

6.4 Phase 4. Week 10-11

This phase was very straightforward and by the time phase 3 reached baseline, the larger parts of SSD and SVVR were already finished. During this phase, the tasks of the different roles are also more defined. Though we must note that as of the writing of this document phase 4 is not over, so issues may still arise.

6.5   Reported Time

While the group did agree early to avoid heroes, they did occur anyways. Unfortunately we believe that this is unavoidable and a natural result of working in a big group of people. We motivate this rather cynical statement with the fact that people take school more or less serious and have different goals and ambitions. If a group with three students where student A and B aims to learn as much as possible and are ready to work 10 hours a week, while student C only wants to pass the course and is not ready to put more than 5 hours a week, person A and B will work harder than person C.

This was not unexpected and in fact, something that PG pointed out very early on. On several occasions members were encouraged to talk about their goals and ambitions so they would get an understanding of what to expected from each other. Wether this had an impact or not is unknown, but we felt that there was not much more to do.

6.6   Staying on Schedule

The schedule was kept with minor deviations, but we did underestimate the time it would take to reach a baseline for most of the documents. We believed that baseline would be reached straight after formal review, without any marks. This turned out to be quite naive since none of the formal reviews resulted in baseline without *any* adjustments required.

Several members felt that more time should have been spent during phase 3 and this was in fact the initial plan. However, after a dicussion, the group *did* take the decision to schedule two weeks for phase 3. Whilst more time during phase 3 obviosuly would have made it less stressful, one can argue that the reason it was stressful was not because of lack of time, but rather because of poor communcation between the groups, poor preparation and the rest of the possible reasons mentioned in section 6.3. Also, if more time would be spent on phase 3, the time has to come from somewhere, for instance phase 2, but then there would be less time to do the planning. Thus we propose the following improvements if we were do the project again:

- PG should be more strict from the beginning and be *very* clear regarding what each group should do and what their responsibilities are.

- DG should choose their groups during the first week, giving them sufficient time to prepare.

6.7   Version Control & Configuration Management

As explained in section 5.7 there were 3 members that did not do a single commit to the project repository. While the cause of this is unknown we consider one of the following explanations:

1. They do not know how to use git.

2. They have worked in groups and thus not needed to commit anything themselves.

3. They have not participated in the project.

As we will not investigate this any further we do believe that it would have been better if every member was forced to do several pushes to the repository as soon as the decision to use git was

taken. This would reduce the chances that people do not know how to use the tool and thus eliminate option 1.

As a side not we would also like to mention that version control systems like git should be introduced in our education, since they are a vital part of software engineering.

6.8 Status & Problem reports

Even though the UI of E-PUSS is a bit dated, the functionality worked pretty well for creating problem reports and handling status reports. Even though git has support for both of these, the amount of work and time to ensure that everyone gets the education required to use it did not seem worth it and thus we believe that it was the right decision to use E-PUSS.

6.9 Online Communication

The biggest benefit of online communication was that it was very easy and quick to contact people and to share files, join different rooms etc. It was also easier for people to participate during meetings since no traveling was required. However, as described in section 5.9 the lack of participation and active cameras hade a negative impact on the communication.

6.10 Running the system locally

To reduce problems to get the system running locally, we conclude in the following possible solutions:

1. Set a deadline for everyone to get the system running locally. A list could be used so that each member can sign when they have the system running as well as a help list if they need guidance. This would force people to get the system running and PG and SG would notice who had not.

2. While out of our hands, the lab work in this course should have been held earlier.

6.11 Group Managers

We believe that the issue with the developer manager role could have been prevented by carefully specifying the responsibilites of the role in the beginning of the project and having more discussions with the person who had the role. Another option would be to *not* have a development manager and instead give the responsibilities to SG. This could also result in the role and purpose of SG becoming more clear, which as discussed in section 6.3 was a problem during phase 3.

7 Six tips for future project groups

To help future project groups we have compiled a list of five tips that we would like to share. They come as a result of the project and the lessons we have learned.

7.1   Tip 1

In the beginning, ensure that you spend enough time to fully understand the purpose and the responsibility for each role. Spending more time on this early on will be useful as the project goes on as it will help to ensure that everyone knows what to do, and what their responsibilites are. It is also crucial to convey this information to the groups.

7.2   Tip 2

Since this semester has four courses running in parallel, it could be a nice idea to schedule times for the group to not only work on the project, but also to study for other courses. This could improve the team building and communication within the group and ensure that people do not fall behind in other courses. As the pressure of other courses contributed to the stress felt by the group, this would also have a positive effect on group morale.

7.3   Tip 3

Ensure that you know what you want to get out of the informal reviews. The following questions can be used:

1. *Who* is reviewing?

2. *What* should the revieweer look for?

3. *Where* should the comments/notes from the reviewer be, and in what format?

Also remember that the informal reviews are meant to catch errors and *improve* the documents. It is pointless to have a review if everyone just agrees and finds nothing. We believe it is better to be *too* hard than too gentle.

7.4   Tip 4

Just like any other programming project, development time is very hard to estimate. The third phase was by far the most stressful due to optimistic planning and delays caused by earlier phases. When making a schedule for a future project, it would be wise to give development as much time as possible and take into account that things do generally do not work out of the box.

7.5   Tip 5

Use each phase as a learning experience, be open to altering your procedures based on feedback from the group, *even if* it requires making changes to baselined documents.

7.6   Tip 6

Feedback does not come on its own. Setting up a system for constant feedback from the group could aid in identifying bottle necks and in turn, improving efficiency.

8   Conclusion

An important thing to consider is the external stress factor that other courses, and seperate modules of this course, introduced. It has been a shared sentiment within the group that the work load during this semester has been overwhelming. Several group members have had issues balancing school work, some even putting other courses on hold. Whilst it is expected of a student who studies at full pace to put 40 hours/week into their school work, the reality of the situation is that most do not. The the sudden jump in time required had a big impact on the stress level felt by the group. Despite this, the group came togheter and worked hard to get results.

TimeMate was delivered on time and all requirements were met. By this metric it would be fair to say that the project went well. There are multiple lessons to take away from this project, all of which are very importnat. As preparation, as well as during, the writing of this report the group discussed the project. The perception within the group is that the project was fun and very valuable from an academic standpoint. So in conclusion, the members of project group 2 are proud of their collective effort and consider this project to have been a rather stressful, but an equally valuable experience.

9   Acknowledgements