Split It

– an Android application for keeping track of debts

Group 4 – Dajoroli

Linn Hansen	920227-1004
Robin Jensen	920902-2673
Johannes Rehnberg	920109-4696
Daniel Wising	910509-3497

Processes, practices and technologies used

During this project, several processes, practices and technologies have been used. Hereinafter follows a presentation of the major processes, practices and technologies.

Scrum

Working with Scrum was central during the work process. The customer requirements were divided into separate user stories. This gave us the possibility to focus on specific stories according to the level of importance for the customer. The user stories were summarized into a product backlog, and four separate sprint backlogs, to be able to plan the work process. An important aid to visualize how the work process went according to the plan was a burndown chart. This was continuously updated to keep track on how we worked in relation to how much time that was left.

The team was self-organized – this meant that we could make decisions on how to work on our own. Being able to do this was necessary in this assignment, due to the fact that every team member had to adjust the work in this course to the work in their separate bachelor's thesis groups. The team met up regularly for scrum meetings, sprint reviews and sprint retrospectives. These meetings made it possible for everyone in the team to take part in the progress of the work process.

A disadvantage with scrum in this project was the difficulty to meet as regularly as we wanted. It would be optimal to meet daily, so that the whole team could take part in what we had accomplished and work together in an open development environment. In this way, the unique abilities of each and every individual could have been used as good as possible. Instead we had to arrange scrum meetings a few times a week. It is, however, important to keep in mind that the course went in half time speed.

Working with scrum was an efficient technique. Learning how to work with scrum did not require much time at all, and the team members believe that it gave the work process a better structure. It made it easier to plan the project, to work efficiently and to follow up the results.

The team consists of members from the Industrial Engineering and Management bachelor program. It is common that students from the Industrial Engineering and Management bachelor program take part in IT projects, where the knowledge of scrum will be well applicable. Working in all kinds of projects is common in jobs related to our field of study. The lessons from working with scrum can most likely be used in other fields of work than just software engineering. It is, however, important to keep in mind that the technique is made for software engineering projects. Hence, it won't be fully applicable to all other types of projects.

Version Control System

During the project, version control systems have been used when storing information. The main VCS used is GitHub, where all files needed in the project have been stored in a repository. When writing some documents, Google Drive has been used as well. The main advantages with using these VCSs are the possibility for the team members to work in parallel as well as the possibility to use different versions. This has made it possible to go back to a working version when encountering a problem, as well as making different changes in different versions to test several new things at a time.

The big disadvantage using the VCS GitHub has been that the project team does not have any previous experience of it. This led to that much time was spent on getting used to the technology, rather than using it. It has also led to that the technology hasn't been used in a ultimate way. Concerning the efficiency of the technology, said problem has led to a rather low ration between time spent on getting used to the technology and time saved using it. Given that, the efficiency of the technology has been low. Contrary to GitHub, the efficiency of Google Drive has been high, due to the team's experience of it.

The use of a VCS will probably be a natural part of all of our future work where the work is done in teams. Google Drive has been a part of our team work process in other courses throughout the education., and we will most likely keep using it. As for GitHub, we will probably use it if we participate in any programming projects in the future. It will, however, not be of as much use in non-programming projects such as essay and report writing.

Testing

During the project, several kinds of testing has been used to ensure that the application functions the way it is meant to do.

Static testing

The team continuously read the code to look for (common) errors, such as uninitialized variables, wrong loop conditions and array indices outside bounds. This was a simple och fast way to read, inspect and analyse the code. It is not good enough to find more difficult applications, but it worked as a way to find easy errors. It is difficult to use this technique in future projects, except for those related to programming.

Dynamic testing

Some programming errors were found when the program was run, including compilations. In this way we could test different inputs, and the outputs they resulted in. The advantage of this

technique was the fact that the built in testing functionality of Eclipse could be used – an easy, efficient and simple way to find errors. This way of testing is a suitable way to find technical errors. However, it is the only thing it does. Therefore, dynamic testing is not good to use as a way to test how the user interacts with the application, graphical problems and so on. It is difficult to use this technique in future projects, except for those related to programming.

Black box testing

This testing technique is based on providing input and checking output. We don't consider source code or internal properties. This means that we test the program without the availability of the source code. For example, if a new debt was added, the old debt was supposed to be updated according to this change. This technique made it possible to check whether or not different functionality worked, and was therefore a good way to control if the program was logically built. It is difficult to use this technique in future projects, except for those related to programming.

Unit testing

With unit testing, parts of the source code are tested. One part could be a specific method; a relevant example from this project was the method to calculate the sum of debts/owings. An advantage with unit testing was that if we would have changed parts of the code, the implemented unit tests would check whether or not the functionality still was correct or not. A disadvantage with this way of testing in this project was the difficulty to find relevant methods; we used quite few and easy operations, and most of them could easily be controlled by the graphics when the application was run. However, we managed to find a few methods where unit testing was suitable.

Acceptance tests

These tests have the purpose to test finished user stories from a customer perspective – either one by one, or more than one story at a time. These procedures were documented by the programmers, so that the customer could follow instructions on how to check the functionality of different user stories step by step. An advantage with this testing method was that we could check out if we really had fulfilled the expectations of our customer, by comparing our result with the requirements from the user. A disadvantage was that it does not check the technical functionality of the application. Therefore, the perspective could have been too narrow to control all different test cases. However, in combination with other testing techniques, the acceptance tests were considered the most relevant testing techniques for this project. Testing functionality from a customer perspective is central in many fields of work. Thus, the knowledge of acceptance tests could used by the team members in many different situations in the future. However, it's not always possible to do the acceptance tests correctly.

In some future cases the customer role may be more vague than in this project, and in those situations acceptance tests might not be suitable.

Work process

The project team consists of students from the Industrial Engineering and Management bachelor program. We know each other quite well, which has facilitated the team work. The main communication channels have been our facebook group, and direct communication when we've met in school. Deciding who is to do what has been natural, which feels good. We have chosen tasks that fit our preferences and knowledges, and thus have utilized our skills in a good way.

Tuckman explains that a group develops through four different stages. In the first stage, the group is formed. This phase was easy to enter in this project, since the team knew each other quite well in advance. The next step is called the storming stage. This was stage was also easy to pass through, and it could probably also be related to the fact that we knew each other and how we work together in a project. The third stage is called norming, and the team believes that we went through it during the project period. This would take us to the last group development stage, which is called performing – in the end, the group got more comfortable on how we work as a team, which lead to higher efficiency and better results.

The tutoring sessions have worked well, and our supervisor has been active and interested in our work. At the end of the project we were offered technical assistance by the main lecturer. The tutoring sessions as well as the assistance sessions gave concrete answers and suggestions of ways to solve our problems.

A struggle in this project was getting the technical aids to work. It is the first time that the members of our team use GitHub, and it has proven harder to set up than we initially thought. The team has had a learning curve with a rather flat gradient. The problems principally regarded syncing files to GitHub and afterward getting the synced files to work on a different computer. This led, in the beginning, to that much time was spent on fixing technical problems rather than programming.

Due to the fact that much time had to be spent on side activities, such as getting GitHub to work and learn how to make an Android application, there was not enough time to finish all user stories. This was also the first programming project that this team has made; therefore, it was difficult to estimate how much time each user story would take. Because of this, we had to prioritize the most critical user stories. This was based upon the grade of importance for each story; we started with those that had the highest grade of importance and went on in a falling order. The lower ranked user stories were seen as more optional, and therefore potential functionality to be added in future development of the application.

The course is 7,5 credits, which corresponds to five weeks of full-time work. Some of that time has been spent on lectures and tutoring sessions. Below is a table that shows the estimated distribution of the remaining time, for each team member.

Time distribution	Programming	Testing	Documenting	Managing technical aids
Daniel	65 %	10 %	15 %	10 %
Johannes	85 %	5 %	7 %	3 %
Robin	10 %	30 %	50 %	10 %
Linn	10 %	5 %	65 %	20 %

Reflections

In the planning of the project, more time would be dedicated to education regarding different tools, such as GitHub, and different techniques, such as ways of testing. This will certainly be important when working with entirely new types of projects. Good knowledge is the foundation to make good decisions – therefore, it will be necessary to educate oneself before starting up a new project. Programming an Android application was completely new to all team members. In a future project, an idea could be to bring in people with the right competence to the project. If that's not possible, then it would be necessary to dedicate time to educating the team members on how to use the new development environment. To maximize the benefits on using the available resources, it is important to weight the cost of hiring new team members between the cost of educating the current team members.

It would have been preferable with more people of different competences in the team than what was the case in this project. The team consisted of students with the same education background. In a similar project that requires competence in both programming and project management, it would have been better with a more diverse team. This would have simplified the work process and given a wider perspective on the problem.

In the start up period of the project, it is important to discuss the roles of each team member. This team knew each other quite well in advance, which lead to a natural role adaption process. However, in future projects it will be even better if the team has a discussion about who should focus on what, because it is difficult for everyone to do everything. By doing so, it will be possible to take advantage of the strong treats of every individual, and give all team members a clearer picture of what's going on and what should be done. This will probably lead to a more efficient work process. In future projects in which the team members don't know each other in advance, this becomes particularly important. A lack of delegation of work could lead to worse communication and an inefficient work process. It is although important to keep in mind that a too strict role division could result in negative consequences. By taking more floating roles, it is possible to be more flexible in the work process. In a team where all the team members have approximately the same prerequisites, the knowledge of each individual can be used at many different situations.

It was from time to time difficult to combine the amount of work with the application with the amount of work on the bachelor's theses. This led to difficulties on how to adapt each team members individual schedule. In a future project, a detailed schedule could have simplified the communication between team members regarding when to meet so that the whole team can sync their schedules between one another.