

COMP4050

SOFTWARE ENGINEERING PRACTICES

STUDENT MANUAL
VERSION 2.1.0

MACQUARIE UNIVERSITY

Contents

0	<i>Introduction</i>	7
0.0	<i>Learning Outcomes</i>	7
0.1	<i>Setup</i>	7
0.2	<i>Project</i>	8
0.3	<i>Roles and Cooperation</i>	8
0.4	<i>Schedule</i>	10
0.5	<i>Assessment</i>	11
1	<i>Week 1</i>	12
1.0	<i>Introduction to Comp4050</i>	12
1.1	<i>The Project</i>	12
1.2	<i>Lecture</i>	12
1.3	<i>Meet your team</i>	12
1.4	<i>Project Applications</i>	12
2	<i>Week 2</i>	13
2.0	<i>Forming</i>	13
2.1	<i>Meet the users</i>	13
2.2	<i>Teamwork</i>	13
2.3	<i>Inter-team communication</i>	13
3	<i>Week 3</i>	14
3.0	<i>Scrum</i>	14
3.1	<i>Lecture</i>	14
3.2	<i>Teamwork</i>	14
3.3	<i>Inter-team communication</i>	14

4	<i>Week 4</i>	15	
	4.0 <i>Team Presentation</i>	15	
	4.1 <i>Sprint review</i>	15	
	4.2 <i>Meet the USer</i>	15	
	4.3 <i>Retrospective</i>	15	
	4.4 <i>Sprint Planning</i>	15	
	4.5 <i>Personal Log</i>	16	
	4.6 <i>Peer review</i>	16	
	4.7 <i>Proposal</i>	16	
5	<i>Week 5</i>	17	
	5.0 <i>Lecture</i>	17	
	5.1 <i>Teamwork</i>	17	
	5.2 <i>Inter-team communication</i>	17	
	5.3 <i>Scrum</i>	17	
6	<i>Week 6</i>	18	
	6.0 <i>Lecture</i>	18	
	6.1 <i>Meet the Users</i>	18	
	6.2 <i>Teamwork</i>	18	
	6.3 <i>Scrum</i>	18	
7	<i>Week 7</i>	19	
	7.0 <i>Plenary briefing</i>	19	
	7.1 <i>Sprint Review</i>	19	
	7.2 <i>Retrospective</i>	19	
	7.3 <i>Sprint Planning</i>	19	
	7.4 <i>Personal log</i>	19	
	7.5 <i>Peer review</i>	20	
8	<i>Week 8</i>	21	
	8.0 <i>Team Presentation</i>	21	
	8.1 <i>Teamwork</i>	21	
	8.2 <i>Scrum</i>	21	

9	<i>Week 9</i>	22
9.0	<i>Sprint Review</i>	22
9.1	<i>Retrospective</i>	22
9.2	<i>Sprint Planning</i>	22
9.3	<i>Personal log</i>	22
9.4	<i>Peer review</i>	23
10	<i>Week 10</i>	24
10.0	<i>Lecture</i>	24
10.1	<i>Teamwork</i>	24
10.2	<i>Inter-team communication</i>	24
10.3	<i>Scrum</i>	24
11	<i>Week 11</i>	25
11.0	<i>Lecture</i>	25
11.1	<i>Teamwork</i>	25
11.2	<i>Scrum</i>	25
12	<i>Week 12</i>	26
12.0	<i>Sprint Review</i>	26
12.1	<i>Final Planning</i>	26
12.2	<i>Personal log</i>	26
12.3	<i>Peer review</i>	26
12.4	<i>Repository</i>	26
13	<i>Week 13</i>	28
13.0	<i>Team Presentation</i>	28
13.1	<i>Tool Demonstration</i>	28
13.2	<i>Reflection</i>	28
A	<i>Green, Yellow and Red Cards</i>	29
B	<i>Proposal</i>	30

C	<i>Peer Reviews</i>	31
D	<i>Presentations</i>	33
E	<i>Product and Repository</i>	34
F	<i>Reflection</i>	36

Welcome

THIS UNIT allows students to practice and demonstrate their software engineering skills within a team context. You will be working in a group for 13 weeks, on an open development challenge, from the initial stages to completion. Students will work together to understand, design, modify, test and deliver non-trivial software using practices that are in use in the information technology industry. The learning outcomes of the unit focus processes on software processes and tools that a team uses, as well as individual contributions to the team effort.

THIS UNIT MANUAL will introduce the learning activities for every week; giving more background and motivation as well as what is expected from the student. This is version 2.1.0 of the manual; check regularly for updates. However, for authoritative answers regarding learning outcomes and assessments refer to the unit guide on iLearn. For updates on the schedule and assessment please refer to iLearn.

AT THE END OF THIS UNIT we hope that you have worked with a team on a product that you can stand for – as an outcome of your team effort – and also that the process helps you to learn and apply important *Software Engineering Practices*.

Welcome in COMP4050

Ansgar Fehnker and Kate Stefanov.

o Introduction

This introduction describes the setup and the project of the unit. Any questions regarding the setup can be clarified in class, and any questions regarding the unit should be clarified as part of your project. Ambiguous user requirements and expectations are par of the course.

o.o Learning Outcomes

On successful completion of this unit, you will be able to:

ULO1: perform the stages of a modern software development process to achieve non-trivial outcomes

ULO2: apply principles of software project management, particularly relating to teamwork, roles and responsibilities

ULO3: use modern software development tools such as version control systems and issue trackers

ULO4: communicate progress and results of the software development process

o.1 Setup

THE SETUP of this unit is as follows: It has four sprints of approximately 3 weeks each, starting in week 2.

Sprint 0: The aim of this sprint is to form a team and define a project. During this sprint, your team should agree on roles and responsibilities, set up basic project management tools, agree on development tools, and define requirements as well prepare an initial design. The group deliverable is a presentation that defines the roles, the project management tools, the development tools, and the project proposal. The latter defines what the team aims to develop in the remainder of the unit, and sets milestones and outcomes. The individual deliverable is a log of the individuals' activities and contributions to the sprint.

Sprint 1: The aim of this sprint is to produce a *Minimal Viable Product* (MVP). The group deliverable is a presentation that presents the MVP, obstacles and achievements, and a plan for delivery. This

sprint will conclude with a peer review of each other teams' MVP, and other team members' contributions. The individual deliverable is a log of the individual's activities and contributions to the sprint.

Sprint 2: The aim of this sprint are twofold: (1) create an integrated product (2) extend the MVP. The group deliverable is a presentation that presents the alpha version obstacles and achievements, and a plan for delivery. This sprint will conclude with a peer review of each other team's products as part of the integrated product, and a peer review of other team members' contributions. The individual deliverable is a log of the individual's activities and contributions to the sprint.

Sprint 3: The aim of this sprint is to produce the beta version of the product. This sprint will not end with a group presentation, but with a peer presentation, i.e. a presentation by the students who were your reviewers so far. The individual deliverable is a log of the individual's activities and contributions to the sprint, a peer assessment of the other team members, plus a reflection on all logs combined.

0.2 Project

THE PROJECT will see the involvement of real users, namely *The MQ Writing Center*. Some of you may have used their services. The aim is to create a tool that help with oral examination. Details on the project will be posted on iLearn, and Hazer will sometimes join the class for questions and comments.

0.3 Roles and Cooperation

THE COURSE CONVENER AND LECTURER fulfil roles with respect to the unit: they initiate team formation, facilitate group work, moderate peer reviews, give lectures on related topics, such as teamwork, set deadlines and define expectations for the assessments. They are however not a member of the team. The team can ask them for clarifications on the project, and validate the requirements, for feedback on the prototype. however, they are not the *client* either.

THE USERS are *MQ Writing Center*. They are neither the lecturer nor the convener, and their role is purely related to the product that he hopes your team delivers.

MEMBER OF A TEAM are expected to fulfill project roles, such as product owner, or scrum master. It is up to the team to define these roles, and decide if and which roles they want to define.¹ The team should set their meeting schedule (outside of the weekly sessions),

¹ It is usually a good idea to appoint one person to answer emails in a timely manner.

set their deadlines, define the acceptance criteria and miles stones, and choose the design and platform. Teams are expected to run their own project, the convener and lecturer are only running the unit. Teams can of course contact the course convener or lecturer if there are serious problems that the team cannot resolve on their own. We expect each team to nominate a project owner. The lecturers, conveners and client may communicate with the product owner regarding technical aspects of the product.

OTHER TEAMS will work on other parts of the overall system. You are however not all working on one project, and neither is this a competition. Your relationship with the other team should be that of friendly coexistence. Feel free to learn from the other team's mistakes, or from their solutions. This unit will require you to communicate with other teams, for example on the API of your system. We expect you to initiate this communication yourself. It is fine to ask them for advice or give them advice. But you should not let them do your work, or take their work without acknowledging it. Or do their work for them.

Anything that exceeds sharing of ideas and advice could become a problem if it crosses the border into plagiarism, or taking someone's intellectual property. This applies to other teams, but of course also to other resources that you may find elsewhere. In these cases, the usual university policies on academic integrity apply.

0.4 Schedule

The schedule for this unit. All dates are tentative. You may notice that it already differs from the (tentative) schedule in the unit guide. We decided to give you more time to form teams and use the mid-session break as part of a sprint. Please refer to iLearn for the latest updates.

	Week	Topic	Activity	Deliverable
Sprint 0	1	Welcome	Introducing the project	Project Application
	2	Agile refresher	Meet the peers, sprint planning	
	3	GitHub for project management		
	4		Sprint review, retrospective, sprint planning	Proposal, personal log, peer feedback.
Sprint 1	5	CI/CD and DevOps		
	6	Working in teams		
	7		Sprint review, retrospective, sprint planning	Personal log, peer feedback.
Sprint 2	8		Mid-session presentation	Slides
	-	Mid-session break		
	9		Sprint review, retrospective, sprint planning	Personal log, peer feedback.
Sprint 3	10	Protecting your IP		
	11	Delivering effective technical presentations		
	12		Sprint review.	Repo, Personal log, peer feedback
	13		Final presentation.	Slides, reflection, log

0.5 *Assessment*

The assessment tasks are defined as follows:

Name	Weighting	Hurdle	Due
Planning and Estimation	25%	No	Throughout
Development	25%	No	Throughout
Review	25%	No	Throughout
Team contribution	25%	No	Throughout

These will be assessed throughout the unit. During the semester we will provide formative feedback to both teams and individual team members. The final summative assessment will be based on the quality of your final presentation, your reflection report, the repository, the quality of the product, and peer reviews. You will find a rubric to various formative and summative assessment activities in the appendix.

1 Week 1

The project will be introduced, and you will have an opportunity to ask questions, from the convener, lecturer and the client.

1.0 *Introduction to Comp4050*

This week's lecture will cover the course setup, the project, the learning outcomes and the expectations of and from the students.

1.1 *The Project*

The second hour of the session will be an opportunity to ask us (the course convener and lecturer) questions concerning the project. This is a plenary Q&A session.

1.2 *Lecture*

This week will start with a lecture by Kate on *Agile*.

1.3 *Meet your team*

1.4 *Project Applications*

Before the end of the week, and preferably before the end of the session, you should complete the project application form. It will ask you what your preferred project is, and what your skills are that you bring to the project. We will use that information to generate balanced teams of 3 to 6 students.

2 Week 2

This is the first week of *Sprint 0*.

2.0 *Forming*

Time to form the team. Include a team-building exercise.

2.1 *Meet the users*

This week we will have (potential) users of the tool. Prepare for this meeting, by identifying questions you would like to ask. Use the user feedback to define user stories and acceptance criteria.

2.2 *Teamwork*

This week your team can first meet and then discuss the project. Please also discuss project management issues, such as who will be the product owner, and who will fill other roles. Agree on how you want to stay in contact when you want to work where, and on what platform you want to collaborate. You should create a Team GitHub repository, by following the link on iLearn. You can, however, decide to use other tools, as long as it is documented in the GitHub repo.

2.3 *Inter-team communication*

Agree with which other team you want to discuss issues. You should discuss how your product will interface with theirs. While your teams are independent, you have to agree on some basic technical choices.

3 Week 3

This is the second week of *Sprint 0*.

3.0 Scrum

We start this week's session with a Scrum, where 1 member of each team gives a brief update of what has been achieved so far.

3.1 Lecture

Kate will give a lecture on *GitHub*.

3.2 Teamwork

This week your team can first meet and then discuss the work on the project. The aim of this week is to have a first draft of the proposal which is due next week.

3.3 Inter-team communication

There is time to talk to other teams.

4 Week 4

This is the last week of *Sprint 0*. It is quite a busy session, with presentations, review sessions, meet-the user, and a retrospective.

4.0 *Team Presentation*

Each division should give a 10-minute presentation covering the following aspects:

- The Project Pitch
- Key User Stories (with MoSCoW prioritisation)
- The Proposed Architecture
- Roles and Responsibilities

How the division divides the time between teams is up to them.

4.1 *Sprint review*

At this stage, your reviewers will be asked to review your project. You will also be asked to review one other project. The review team has to complete a questionnaire on iLearn. This team of reviewers will stay together as reviewers for the rest of the project.

4.2 *Meet the User*

You will get time to prepare questions for our users. Afterwards, each team can reserve a timeslot to talk to the user. Other teams can be present while one team meets the user.

4.3 *Retrospective*

Each team should by itself hold a retrospective. They should discuss and document what worked in this sprint, which roles or processes need to be refined, and other ways in which teamwork could be improved.

4.4 *Sprint Planning*

The team has time to work on the project. The lecturers will be around to answer questions.

4.5 *Personal Log*

At the end of the week submit your personal log for *Sprint 0*. The reflection is a questionnaire on iLearn and needs to be completed before the end of the week. The reflection will contain per week of *Sprint 0* what you have done. This assessment is formative, meaning that we will give you feedback, but it will not be marked.

Note, however, that the personal log will be an appendix to the *Reflection*, the main individual deliverable for this unit, due at the end of Week 13. The reflection is a summative assessment, meaning that it will be graded and contribute to the final mark. For more information on the reflection see Appendix [F](#).

GREEN, YELLOW, AND RED CARDS can be given to team members as part of the questionnaire. For more details on the cards, refer to Appendix [A](#).

4.6 *Peer review*

You will have to complete a peer review on iLearn on the team members. This is the feedback that you want to give to other members.

4.7 *Proposal*

At the end of the week upload a proposal that describes all aspects listed in Section [2.2](#). It is due at the end of the week, and should not exceed 6 pages. The proposal is the written version of the presentation that your team gave this week. You can update the proposal after the presentation.

The proposal should cover the following topics:

- The Project Pitch
- Key User Stories (with MoSCoW prioritisation)
- The Proposed Architecture
- Roles and Responsibilities
- Project Management Tooling.
- Project timeline and deliverables.
- Detailed plan for sprint 1.

The rubric for the proposal can be found in Appendix [B](#).

5 Week 5

This week will start with a lecture but is mostly meant to give you some time for teamwork.

5.0 *Lecture*

Kate will give a lecture on *CI/CD and DevOps*.

5.1 *Teamwork*

The team has time to work on the project. The lecturers will be around to answer questions.

5.2 *Inter-team communication*

There is time to talk to other teams.

5.3 *Scrum*

We end this week's session with a Scrum, where 1 member of each team gives a brief update of what has been achieved so far.

6 Week 6

This week starts with a lecture but is mostly meant to give you some time for teamwork.

6.0 *Lecture*

Kate will give a lecture on *Working in Teams*.

6.1 *Meet the Users*

A short 30 minutes talking to the users. Prepare your questions beforehand.

6.2 *Teamwork*

The team has time to work on the project. The lecturers will be around to answer questions.

6.3 *Scrum*

We end this week's session with a Scrum, where 1 member of each team gives a brief update of what has been achieved so far.

7 Week 7

This week is the last week of Sprint 1.

7.0 *Plenary briefing*

Each team should prepare a short (max 3 minutes) briefing on the state of the project.

7.1 *Sprint Review*

Following the plenary briefing, the teams will meet with their peer reviewers for a scrum review. Please demonstrate the current product, and discuss which features have been implemented, and which will be implemented. Discuss if and where there have been changes to the initial plan and design.

The peer reviewers are asked to jointly complete a feedback form on iLearn, to record and communicate their observations, compliments, and advice. You are again reminded that you are not part of the team that you are reviewing, but that your role is that of a prospective user.

7.2 *Retrospective*

Each team should by itself hold a retrospective. They should discuss and document what worked in this sprint, which roles or processes need to be refined, and other ways in which teamwork could be improved.

7.3 *Sprint Planning*

The team should agree on the planning for the next sprint. Note, that you are expected to work on the next sprint over the mid-session break.

7.4 *Personal log*

At the end of the week submit your personal log for *Sprint 1*. The reflection is a questionnaire on iLearn and needs to be completed before the end of the week. The reflection will contain per week of *Sprint 1* what you have done. It will also ask for significant

outcomes of the retrospective, and about other team members. There is a chance to give *Green*, *Yellow*, or *Red Cards* to team members for outstanding or lack of contribution.

7.5 *Peer review*

You will have to complete a peer review on iLearn on the team members. This is the feedback that you want to give to other members.

8 Week 8

This is the week we will have time for a mid-session presentation.

8.0 *Team Presentation*

This week each team should give a 7-minute presentation covering the following aspects:

- The Minimal Viable Product
- Your Definition of Done
- Software Quality Process
- Obstacles and Accomplishments
- Remaining Sprint Planning

The presentation slides should be uploaded after the presentation and will be graded with respect to the rubric in [Appendix D](#).

8.1 *Teamwork*

The team has time to work on the project. The lecturers will be around to answer questions.

8.2 *Scrum*

We end this week's session with a Scrum, where 1 member of each team gives a brief update of what has been achieved so far.

9 Week 9

This is the last week of *Sprint 2*. Your product should have all features that you want the final product to have, even if parts of it may need a bit more work.

9.0 *Sprint Review*

The teams will meet with their peer reviewers for a scrum review. Please demonstrate the current product, and discuss which features have been implemented, and which will be implemented. Discuss if and where there have been changes to the initial plan and design.

The peer reviewers are asked to jointly complete a feedback form on iLearn, to record and communicate their observations, compliments, and advice. You are again reminded that you are not part of the team that you are reviewing, but that your role is that of a prospective user.

9.1 *Retrospective*

Each team should by itself hold a retrospective. They should discuss and document what worked in this sprint, which roles or processes need to be refined, and other ways in which teamwork could be improved.

9.2 *Sprint Planning*

The team should agree on the planning for the next sprint. Note, that the next sprint should focus on finalising the project, rather than starting new features.

9.3 *Personal log*

At the end of the week submit your personal log for *Sprint 1*. The reflection is a questionnaire on iLearn and needs to be completed before the end of the week. The reflection will contain per week of *Sprint 1* what you have done. It will also ask for significant outcomes of the retrospective, and about other team members. There is a chance to give *Green*, *Yellow*, or *Red Cards* to team members for outstanding or lack of contribution.

9.4 *Peer review*

You will have to complete a peer review on iLearn on the team members. This is the feedback that you want to give to other members.

10 Week 10

The first week of Sprint 3. This is mostly meant to be used for finalising your product, documentation, and other related artefacts.

10.0 Lecture

Kate will give a lecture on *Protecting your IP*.

10.1 Teamwork

The team has time to work on the project. The lecturers will be around to answer questions.

10.2 Inter-team communication

There is time to talk to other teams.

10.3 Scrum

We end this week's session with a Scrum, where 1 member of each team gives a brief update of what has been achieved so far.

11 Week 11

This is the second week of *Sprint 3*.

This week will start with a lecture but is mostly meant to give you some time for teamwork.

11.0 Lecture

We will give a lecture on *Delivering effective Presentations*.

11.1 Teamwork

The team has time to work on the project. The lecturers will be around to answer questions.

11.2 Scrum

We end this week's session with a Scrum, where 1 member of each team gives a brief update of what has been achieved so far.

12 Week 12

This is the last week of *Sprint 3*, which means we start this session with a sprint review.

12.0 *Sprint Review*

The teams will meet with their peer reviewers for a scrum review. Please demonstrate the current product, and discuss which features have been implemented, and which will be implemented. Discuss if and where there have been changes to the initial plan and design.

The peer reviewers are asked to jointly complete a feedback form on iLearn, to record and communicate their observations, compliments, and advice. You are again reminded that you are not part of the team that you are reviewing, but that your role is that of a prospective user.

12.1 *Final Planning*

The team should agree on the planning for the final week.

12.2 *Personal log*

At the end of the week submit your personal log for *Sprint 1*. The reflection is a questionnaire on iLearn and needs to be completed before the end of the week. The reflection will contain per week of *Sprint 1* what you have done. It will also ask for significant outcomes of the retrospective, and about other team members. There is a chance to give *Green*, *Yellow*, or *Red Cards* to team members for outstanding or lack of contribution.

12.3 *Peer review*

You will have to complete a peer review on iLearn on the team members. This is the feedback that you want to give to other members.

12.4 *Repository*

Please release have release ready version in your repository. It should contain:

- A README with
 - Description
 - Instructions on how to build
 - A list of all used third-party code
 - Acknowledgements
 - A description of the repo.
- The source code
- A doc folder with user and developer manual.

You can add more to your repo. Minor updates to the repo until the end of week 13 are fine.

13 Week 13

This is the last week of this unit. It ends with a final presentation and a final demonstration.

13.0 *Team Presentation*

This week each team should give a 7-minute presentation covering the following aspects:

- The product
- The team
- Important uses cases
- Software Quality Process
- Obstacles and Accomplishments
- A short demonstration

The presentation slides should be uploaded after the presentation and will be graded with respect to the rubric in [Appendix D](#).

13.1 *Tool Demonstration*

We conclude the unit with a demonstration of the tools. Each team can set up a little stand, where other students and lecturers can have a look and try their product. This demo together with the final repo will be the basis for the mark for the product. For more information see [Appendix E](#).

13.2 *Reflection*

At the end of the week, the students are expected to submit their personal reflections. They should be based on the personal logs that were submitted earlier, and also documents skills and capabilities that were developed during the projects, as well as a reflection on the challenges and achievements. While there is no hard page limit, you should ask yourself if the essay is not too wordy if it exceeds 8 pages, excluding appendices. For more information see [Appendix F](#).

A *Green, Yellow and Red Cards*

Team member can give as part of the questionnaire at the end of each sprint, *Green, Yellow and Red Cards*

Green cards can be used to acknowledge an extra ordinary contribution of a peer. A green card means that you think that the team member deserves a higher mark.

Yellow cards can be given to team members who do not function well. The first attempts to resolve team issues should be done by the team, but if necessary you can make your concern official by giving a *yellow card* to a team member. If necessary you should, however, not hesitate to contact the unit convener directly, rather than wait for the questionnaire.

Red Cards can only be given by all other team members together to a team member, who has consistently failed to contribute. If the team wants to give a red card, they should also contact the unit convener. A consequence of a red card could be that the team member is removed from the team.

NOTE that none of the cards will lead to an automatic increase or decrease of a student's mark. However, they will be used by the convener and lecturers to determine the final mark, together with all other artefacts produced for the course.

B Proposal

The proposal will be marked according to this rubric:

	Beyond satisfactory	Satisfactory	Unsatisfactory
Problem statement	All important aspects of the problem have been clearly identified and addressed.	Most aspects of the problem are identified, and to a fair extent addressed	The problem has not been explained, or important aspects have been omitted.
Deliverables and timeline	The deliverables as well as definite timelines for their delivery have been identified .	Most essential deliverables have been identified, with definite timeline for delivery.	Important deliverables are omitted, or the timeline is unspecific or lacking.
Project management	The team has set up all necessary tooling to facilitate team work software quality processes.	The team has set up some tooling to facilitate team work software quality processes, and a plan to fill the gap.	The team has insufficient tooling to facilitate team work software quality processes, and not an adequate plan to fill the gaps.
Team organisation	The team has defined clear roles and responsibilities, and the roles address the need of the project.	The team has identified roles and responsibilities, with some ambiguities.	There are no well defined roles and responsibilities, or ambiguous roles and responsibilities.

C Peer Reviews

PEER REVIEWS will take place from week 2 onward. You will have to work with a review team. This is a group of student who are not in your team. You yourself will also be in a a review team, and review another project.

There are three peer reviews. The first is an informal review to get to know the project in *Sprint 0*, then a peer review of the the minimal viable product at the end of *Sprint 1*, and a peer review of the *beta* version of the product, at the end of *Sprint 2*.

The questionnaire that reviewers will use, is based on the following rubric.

	Beyond satisfactory	Satisfactory	Unsatisfactory
Requirements	All important requirements have been fully addressed. This has been validated by the client/s-stakeholders.	Most requirements have been addressed to an acceptable extend, which has been validated by the clien/stakeholders.	Important requirement have not been addressed, or the stakeholder has not been able to validate their satisfaction.
Architecture	The solution employs a proven software and system architecture, that has been successfully adapted to the project. It will be stable, robust and maintainable.	The solution employs a proven software and system architecture, which seems to be addressing most needs of the project. It is mostly stable and robust.	The system and software architecture has serious flaws, and fails to address the needs of the project.
Usability	The software works seamless, is intuitive, and can be deployed without much extra effort. The software was clearly designed with usability in mind.	The software works mostly seamless, is usually intuitive. It can be deployed with some extra effort. Sometimes usability was not quite achieved.	The solution has serious usability issues, or can not be used at all. It will be difficult to impossible to deploy the solution.
Deliverables and timeline	The deliverables as well as definite timelines for their delivery have been identified. They responded to change proactively.	Most essential deliverables have been identified, with definite timeline for delivery. They responded to change when necessary.	Important deliverables are omitted, or the timeline is unspecific or lacking. They did not respond to demand for change.

Your participation in a review team will be assessed according to this rubric:

	Beyond satisfactory	Satisfactory	Unsatisfactory
Contribution	The student participated in the peer review and gave constructive and actionable advice.	The student participated in the peer review and actively engaged with the project.	The student did not participate, or did not participate in a meaningful way.
Team Work	The student fully understood their role as stakeholder and potential user, and acted accordingly.	The student acted mostly appropriate given their role as stakeholder and potential user.	The fully student did not act in line with their role as stakeholder and potential user.

D Presentations

The presentations will be marked according to the following rubric:

	Beyond satisfactory	Satisfactory	Unsatisfactory
Problem statement	All important aspects of the problem have been clearly identified and addressed.	Most aspects of the problem are identified, and to a fair extent addressed	The problem has not been explained, or important aspects have been omitted.
Requirements	All important requirements have been fully addressed. This has been validated by the client/stakeholders.	Most requirements have been addressed to an acceptable extent, which has been validated by the client/stakeholders.	Important requirement have not been addressed, or the stakeholder has not been able to validate their satisfaction.
Architecture	The solution employs a proven software and system architecture, that has been successfully adapted to the project. It will be stable, robust and maintainable.	The solution employs a proven software and system architecture, which seems to be addressing most needs of the project. It is mostly stable and robust.	The system and software architecture has serious flaws, and fails to address the needs of the project.
Achievements	The team presents all milestones and deliverables that have been completed thus far, as well as obstacles that have been successfully taken.	The team presents important milestones and deliverables that have been completed thus far.	The team fails report on important deliverables and milestones.
Software quality	The team consistently and continuously pays attention to, and shares responsibility for ensuring software quality.	The team has undertaken steps to jointly ensure software quality.	The team does not pay attention to software quality, or fails to share responsibility for it.
Project management	The team has set up all necessary tooling to facilitate team work software quality processes.	The team has set up some tooling to facilitate team work software quality processes.	The team has insufficient tooling to facilitate team work software quality processes..
Team organization	The team has defined clear roles and responsibilities, and the roles address the need of the project.	The team has identified roles and responsibilities, with some ambiguities.	There are no well defined roles and responsibilities, or ambiguous roles and responsibilities.
Team work	The team members have contributed significant according to their predefined roles, and beyond after consultation with the peers.	The team members according to their predefined roles and responsibility.	The team members did not contribute sufficiently given their predefined roles and responsibility.

E *Product and Repository*

The demo and repository will be used to mark the product according to this rubric:

	Beyond satisfactory	Satisfactory	Unsatisfactory
Requirements	All important requirements have been fully addressed. This has been validated by the client/stakeholders.	Most requirements have been addressed to an acceptable extend, which has been validated by the client/stakeholders.	Important requirement have not been addressed, or the stakeholder has not been able to validate their satisfaction.
Architecture	The solution employs a proven software and system architecture, that has been successfully adapted to the project. It will be stable, robust and maintainable.	The solution employs a proven software and system architecture, which seems to be addressing most needs of the project. It is mostly stable and robust.	The system and software architecture has serious flaws, and fails to address the needs of the project.
Software quality	The solution applies modern standards of quality software. It is indistinguishable from professionally designed software.	The solution applies many good practices for quality software, even though it is not quite at a professional level.	There are limited, failed, or no attempts to put good software quality standards into practice.
Usability	The software works seamless, is intuitive, and can be deployed without much extra effort. The software was clearly designed with usability in mind.	The software works mostly seamless, is usually intuitive. It can be deployed with some extra effort. Sometimes usability was not quite achieved.	The solution has serious usability issues, or can not be used at all. It will be difficult to impossible to deploy the solution.
Documentation	The documentation is comprehensive, concise, correct, well structured, complete and up- to-date.	The documentation covers most aspects, it has a fair structure, and has only a few omissions or anachronisms.	The documentation is absent, incorrect, poorly structured, or out- of- date.

The repository will be used to mark contribution of an individual team member according to this rubric:

	Beyond satisfactory	Satisfactory	Unsatisfactory
Software quality	The team member was continuously involved and shared responsibility for ensuring software quality.	The team member has undertaken steps to ensuring software quality.	The team member did not pay attention to software quality, or failed to share responsibility for it.
Team work	The team member has contributed significant according to their predefined roles, and beyond after consultation with the peers.	The team member has contributed according to their predefined roles and responsibility.	The team member did not contribute sufficiently given their predefined roles and responsibility.
Contribution	The team member contributed significantly to the implementation of the product.	The team member's contribution to the implementation of the product is satisfactory.	The team member's contribution to the implementation of the product is unsatisfactory.

F Reflection

The reflection should have the following main topics:

- The product
- The process
- Project challenges and achievements
- Reflection on your skills and capabilities
- As appendices: The personal logs (Do not contribute towards the page count)

The reflection essay will be marked according to the following rubric:

	Beyond satisfactory	Satisfactory	Unsatisfactory
Autonomy	Works within the agreed roles and responsibilities. Uses discretion to identify and resolve issues that affect the project. Escalate issues if necessary. Plans and monitors the work to meet given objectives.	Works within the agreed roles and uses discretion to identify and resolve issues within their role.. Participates in planning and monitoring the work to meet given objectives.	Fails to works within the agreed roles. Does not escalate issues within their responsibility. Does not plans or monitor the work to meet given objectives.
Influence	Interacts with and influences colleagues. Initiates decisions which influence the success of projects. Appreciates how own role relates to others.	Interacts with colleagues. Participates in decisions which influence the success of projects. Aware of how their how own role relates to others.	Does not sufficiently interacts with colleagues. Does not participate in decisions, or excludes colleagues from decisions. Unaware of how their role affects others.
Complexity	Performs sometimes complex and non-routine work. Approaches routine and moderately complex issue routinely. Applies creative thinking to complete tasks or resolve issues.	Performs routine and moderately complex tasks. May suggest new ways to complete tasks or resolve issues.	Fails to performs routine and moderately complex tasks. Does not suggest new ways to complete tasks or resolve issues.
Knowledge	Has thorough domain and specialist knowledge necessary to perform effectively. Is able to apply knowledge to unfamiliar situations. Absorbs and critically assesses new information.	Has sufficient domain and specialist knowledge necessary to perform effectively. Absorbs new information and applies it effectively	Has insufficient domain and specialist knowledge necessary to perform effectively. Does not absorbs new information nor apply it effectively

Note that this rubric is based on SFIA's generic attributes. Use it as a guide for the essay.