School of Computer Science and Informatics

Coursework Submission Cover Sheet

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Student Number	C1841485
Module Code	CM1202
Submission Date	29/04/2019
Hours spent on this exercise	15
Special Provision	

(Please place an x in the box above if you have provided appropriate evidence of need to the Disability & Dyslexia Service and have requested this adjustment).

Group Submission

For group submissions, *each member of the group must submit a copy of the coversheet.* Please include the student number of the group member tasked with submitting the assignment.

Student number of submitting group member	

By submitting this cover sheet you are confirming that the submission has been checked, and that the submitted files are final and complete.

Declaration

By submitting this cover sheet you are accepting the terms of the following declaration.

I hereby declare that the attached submission (or my contribution to it in the case of group submissions) is all my own work, that it has not previously been submitted for assessment and that I have not knowingly allowed it to be copied by another student. I understand that deceiving or attempting to deceive examiners by passing off the work of another writer, as one's own is plagiarism. I also understand that plagiarising another's work or knowingly allowing another student to plagiarise from my work is against the University regulations and that doing so will result in loss of marks and possible disciplinary proceedings.

Individual Report

Introduction

At the beginning of our Developing Quality Software module, we were placed into teams to design and implement a project. The aim of this project was to create a program that can enable teachers to create formative and summative assessments and manage their students. The system is also aimed at the students with features such as taking assessments and viewing grades. In this report, I will analyse my experience of participating in this software engineering task and explain how we worked together as a team. Then, I will evaluate the various techniques used in each stage of the development process. Finally, I will assess my own part in the finished product against the quality criteria set in this module.

Team Evaluation

I will be writing my team evaluation based on the principles of Professor Bruce W. Tuckman who carried out research into the theory of group dynamics. I believe our group development process was very similar to that described by Tuckman in the following ways.

The team project began with the forming stage (Tuckman,1965)[1]. My team met for the first time and everyone familiarised themselves with their fellow members, but it was evident that not everyone was fully comfortable yet. This is understandable as it takes time for people to settle to new conditions. I suggested we play a few ice breaker games, retrospectively this was an important activity to get everyone on the same page. After this, I decided it was crucial for members to understand how other members work. We based this task on the findings of team management theorist Professor Raymond Meredith Belbin.

Everybody was asked which role resembles them the most which people found very quickly. Surprisingly, there was an even mix of roles within the group which meant there

was less likely to be complications between group members (Belbin,1993) [2] or “storming” as Tuckman would say. I found it interesting how the findings of both professors interconnected, this made the evaluation of the process easier to understand.

The next step in the process accorded well with storming stage. Our group members started to voice their opinions and as a result of this, small conflicts arose between team members. This was because certain team members thought their position in the hierarchy of status was different to others. I could see this was the issue and so I strongly reinforced to everyone that all opinions are respected equally. This was similar to the findings to Tuckman however this phase was shorter than expected. For example, the task assignment process did not involve any disagreements, and everyone understood their tasks and how all roles were of equal importance to making sure our team succeeded.

Similarly, our team moved on from this stage and started working on the actual software development. It was evident that the team worked better and more efficiently during this time as everyone had built up trust in each other. This coincides with the norming stage of Tuckman’s theory. For example, when the use case diagrams task was released, the work was delegated to all team members who gladly worked together to achieve the highest quality possible. We also made sure to keep a safe time between the hand in date to evaluate the work before submission. However, it could be said that this stage did not fully match the norming stage as not everyone was fully motivated. This was because there were many other courseworks due around the same time as this one.

The performing stage of Tuckman’s theory was also very similar to where we were at then. For example, the norms and goals of the group were already set. We reached this stage just before beginning the third task which was beneficial as it was probably the most important part of the module. Surprisingly, even the disagreements were resolved very quickly such as whether to use Python or Java to design the software.

Finally, when the team had completed the task, we decided to evaluate together on what went well and what could have been improved. Tuckman’s theory after performing says it could either go back to forming or continue at high levels (adjourning). Out team took the latter, and so everyone was pleased with the result.

Team Barriers

This task was the first serious software group project for many of us in the team and therefore we did make mistakes due to our inexperience but I believe all of us improved dramatically and learned from our mistakes.

I believe the main barriers for our team were communication issues. Not establishing a good and efficient communication system in a group project can lead to significant delays, confusion and conflicts as well. For example, I finished my assigned section of the program and sent it to the team, they reviewed it and said the program crashes in a rare scenario. I assured them I would fix it and they should carry on with their tasks. However, they misunderstood me, and they thought that they should not work on anything until I have fixed the bugs. This miscommunication caused us 5 days of delay which could have been avoidable. Eventually, I fixed the bug and then my team finally carried on and implemented their assigned tasks. However, I had a discussion with the team to make sure this problem will not happen again. We all agreed that we need to communicate better. Fortunately, we did not encounter any more miscommunications and we worked even more productively and communicated better.

Managing the Software Development Progress

After we received the six main functional requirements for the system, all of us in the team agreed that this is going to be a very complex project to execute and some of my team members were even worried if we can get it all done before the deadline. We quickly realised that the only way we can complete this project on time is if we work very well together and manage this task efficiently.

We decided to create a group chat where we can reach other easily and we also agreed on having at least one weekly meeting where everyone was expected to turn up. We always managed to have these meetings and these were very helpful. I believe having face-to-face discussions are significantly more productive and efficient than online conversations because everyone is present and we are all focused on the same thing together. During these meetings we reviewed each others' code and provided feedback and support to our fellow team members. We always made sure to get our assigned tasks

completed before these meetings so we can evaluate our progress, assign new tasks and plan ahead.

I also came up with the idea of using Google Documents to share our ideas and provide feedback to each other. We also used it for planning all of the features we wanted to implement for each screen of our program. We divided the screens equally among us and we wrote down how we would like each screen to look like. It was a high priority for us to have a clean user interface because we want to provide an easy to use user experience to the students and teachers. Collaborating on Google Docs proved to be a very efficient method to manage the project's progress.

We also paid attention to understand what could go wrong during development and how we can prevent these risks. The risk assessments we completed helped us to develop new risk management strategies and realise how many things could go wrong. For example, I pointed out the importance of creating commits to GitHub regularly to prevent losing our files in case something happens to our hard drives. Another risk we identified was team members using different versions of Java. Although the impact of such risk is small because the differences between the versions of Java is insignificant, but it can still lead to syntax errors and build errors. The strategy against this particular risk was to agree which Java version we should all use and stick to it throughout the project.

Our first task in the third coursework was to setup a shared GitHub repository and invite everyone from the team. Most of us had some basic experience with using git commands so everyone was able to make commits and pull changes. However, sometimes we faced merge conflicts and these often proved to be challenging but I always offered my help to my teammates as I had a lot of experience with it from my previous projects.

Development techniques

We used a number of different development techniques throughout this project that we found very helpful. I think one of the most beneficial techniques that we encountered was the use of test cases. Our program had many features built in by the time we were getting closer to the deadline and we did not have the time to test it properly so I definitely had a feeling that our software could have quite a few hidden bugs that we are not aware of. I told my team members that we should put a lot of effort into creating our test cases to help us find as many bugs as possible. After each of us completed a test case it was time

to test them out. We went through each test case and tested our system and we were surprised how easy it was to confuse the system with unexpected user behaviour such as clicking a button too many times at once. These test cases allowed us to dramatically improve the stability and performance of our program.

Another development technique worth mentioning that proved to be very helpful to our team was the UML class diagrams. The class diagram gave us a good overview of the relationships between the classes and it also enabled us to split the work between the team members. Class diagrams made our work easier too as we did not have to spend time on thinking of all the variable and method names, we could just concentrate fully on the logic of the program.

Quality Criteria

Everyone in my team agreed that we should try to create the highest quality program as possible and in order to achieve that we carefully analysed McCall's
Quality Model. McCall's model describes various factors that every team must take into consideration to create the best possible software.

Usability

Having good usability is crucial. The software must be easy to learn, operate, prepare input and interpret output of a program. It was my responsibility to create the user interface for most of the screens using the JavaFX framework and therefore I paid special attention to make sure all of our screens are consistent and easy to follow. It is crucially important for a software to have a consistent layout across the different screens of the program. For example, our program has many screens which have very similar functionalities and it is important to keep these screens' user interfaces very similar so the user can use our program easily. I have a lot of experience with developing easy to use user interfaces from my iOS app projects and I believe we did very well to make our program as easy to use as possible without requiring our users to read a software manual.

Our program is quite simple, each screen only has a few buttons and we created helpful error messages as well to help the user understand if anything goes wrong. I made sure

that our fonts are big enough for everyone to see and also made the buttons quite big to further simplify the user experience.

We also developed a feature for our students which displays a desktop notification telling the user if there is any new assessments available. We decided to use Windows' built-in notification system instead of creating our own because the users are already familiar with this type of notifications and many other programs use it as well.

Portability

At the beginning of our third coursework, we had a discussion about whether we should use Python or Java. Most of my team members did not have any problems with using either of those two languages but I convinced my team to use Java as it runs on many platforms such as Mac, Windows and Linux. A compiled Java program runs on all platforms for which there exists a Java Virtual Machine. So it is very easy to transfer our program from one environment to another. The effort required to share our software with someone else is very little, all we need to do is send the .jar executable file to the person and the receiver can just download the file and run it without doing any additional setup.

Java is also hardware independent, which means that it does not matter what processor or system architecture the user has, the program will always run smoothly without the need of downloading any additional components.

Reliability

According to the quality model written by McCall, the software's reliability is the ability not to fail. The software must have consistency, simplicity, error tolerance and maximum accuracy as well. I took an active role in debugging, exploring new bugs and coming up with solutions to solve them. We used the test cases to check our program behaves correctly and it helped us to make our software even more reliable.

I also wrote a lot of exception handling code to make sure our program does not crash under adverse conditions. For example, if the lecturer tries to create a new assessment without adding any questions, then the user is presented with an error message, which describes what went wrong and what the user needs to do to resolve the error.

In addition, I always paid special attention to keeping my code simple, easy to follow and well structured. I also advised everyone in my team to follow a good programming style so we can reuse each other's code if needed. I also wrote a lot of comments in my source code explaining the logic of my code to my fellow teammates so they can understand and use my code for their tasks.

Conclusion

In conclusion, this project was an incredibly useful experience for me as I learned so much about working on a big software with other developers. I worked on a lot of projects previously but I never had the chance to experience what it is like to collaborate with other software engineers and this group project helped me improve my communication and management skills as well. I also learned how to use development techniques such as class diagrams and test cases to improve the quality of my software and simplify the development process. Finally I also learned about the famous McCall's quality model and gained experience in applying it to a software project.

References

1. Tuckman, B (1965), 'Developmental Sequence in Small Groups', Psychological Bulletin P.63.
2. Belbin, R. (1993). Team roles at work. Oxford: Butterworth-Heinemann.

Self & Peer Review Contribution Forms

Your ID: **1841485**

Team: **TEAM 12**

Assessment of: Marton Zeisler (Myself)

For each category, award yourself and each member of your team a rating using the scale, and your team agreement:

* * * (3 Stars) Better than expected
* * (2 stars) As expected
* (1 star) Not as good as expected
(no stars) Student has not engagement with the rest of the Team

Category	Comments, Examples, Explanations etc	Rating [*,*, *]
Group Participation and Citizenship • Attended meetings regularly and on time, • Positive attitude, encouraged and motivated team members, • Engages and provides effective contribution in discussions at meetings or online. • Supported team decisions, helped to reach team consensus, helped resolve conflicts in the team.	I attended all of our meetings and I tried to organise them too. I always had a positive attitude and always encouraged others when they were struggling with their assigned part. For example, I often offered my help when we faced merge conflicts because I had a lot of experience with git from my previous projects.	***
Time Management and Responsibility • Accepted fair share of work • Reliably completed work by required time. • Participates in Team Project Management, formally or informally ensuring the work stays on track, with everyone informed of progress.	I accepted a fair share of work and tried to manage my time very well even though we had many other coursework to do do as well at the same time. I managed to get all of my work done by the required time and ensured that we are on track.	***
Scholarly / Professional • Displayed or tried to develop a wide range of skills in the service of the project, • Provided technical insights and solutions to problems. • Willing to provide/accepts constructive criticism, willing to adapt / consider other people's perspective	I demonstrated a variety of skills during this project such as project management skills and user interface design. I also provided a lot of feedback to my teammates and they all seemed to appreciate it a lot.	***

Your ID: **1841485**

Team: **TEAM 12**

Assessment of: Andre Mansley

For each category, award yourself and each member of your team a rating using the scale, and your team agreement:

* * * (3 Stars) Better than expected
* * (2 stars) As expected
* (1 star) Not as good as expected
(no stars) Student has not engagement with the rest of the Team

Category	Comments, Examples, Explanations etc	Rating [*,*, *]
Group Participation and Citizenship • Attended meetings regularly and on time, • Positive attitude, encouraged and motivated team members, • Engages and provides effective contribution in discussions at meetings or online. • Supported team decisions, helped to reach team consensus, helped resolve conflicts in the team.	He came to all of our meetings and he always tried to support the team decisions with his skills. He was always engaged with the team. We faced a few conflicts regarding team meetings dates but he helped us resolve these issues.	***
Time Management and Responsibility • Accepted fair share of work • Reliably completed work by required time. • Participates in Team Project Management, formally or informally ensuring the work stays on track, with everyone informed of progress.	He accepted a fair share of work and he always completed his part reliably and on time and his work quality was always high.	**
Scholarly / Professional • Displayed or tried to develop a wide range of skills in the service of the project, • Provided technical insights and solutions to problems. • Willing to provide/accepts constructive criticism, willing to adapt / consider other people's perspective	He always worked professionally and his skills helped this project succeed. He always accepted any feedback and criticism we gave him.	***

Your ID: **1841485**

Team: **TEAM 12**

Assessment of: Benjamin Eddy

For each category, award yourself and each member of your team a rating using the scale, and your team agreement:

* * * (3 Stars) Better than expected
* * (2 stars) As expected
* (1 star) Not as good as expected
(no stars) Student has not engagement with the rest of the Team

Category	Comments, Examples, Explanations etc	Rating [*,*, *]
Group Participation and Citizenship • Attended meetings regularly and on time, • Positive attitude, encouraged and motivated team members, • Engages and provides effective contribution in discussions at meetings or online. • Supported team decisions, helped to reach team consensus, helped resolve conflicts in the team.	He attended every meeting on time and always participated in our discussions. He always tried to engage in the team decisions and helped us. He made sure that our meetings always took place.	**
Time Management and Responsibility • Accepted fair share of work • Reliably completed work by required time. • Participates in Team Project Management, formally or informally ensuring the work stays on track, with everyone informed of progress.	He accepted a fair share of work and he was able to complete all of it by the required time. He helped the team stay on track.	***
Scholarly / Professional • Displayed or tried to develop a wide range of skills in the service of the project, • Provided technical insights and solutions to problems. • Willing to provide/accepts constructive criticism, willing to adapt / consider other people's perspective	He always provided us feedback and gave us good suggestions for our work and helped to provide solutions as well. He always accepted any feedback we gave him.	***

Your ID: **1841485**

Team: **TEAM 12**

Assessment of: Charlie Howe

For each category, award yourself and each member of your team a rating using the scale, and your team agreement:

* * * (3 Stars) Better than expected
* * (2 stars) As expected
* (1 star) Not as good as expected
(no stars) Student has not engagement with the rest of the Team

Category	Comments, Examples, Explanations etc	Rating [*,*, *]
Group Participation and Citizenship • Attended meetings regularly and on time, • Positive attitude, encouraged and motivated team members, • Engages and provides effective contribution in discussions at meetings or online. • Supported team decisions, helped to reach team consensus, helped resolve conflicts in the team.	He attended every meeting on time and always participated in our discussions. He was always engaged and supported our decisions. He also had a very positive attitude that helped the team to work efficiently together.	***
Time Management and Responsibility • Accepted fair share of work • Reliably completed work by required time. • Participates in Team Project Management, formally or informally ensuring the work stays on track, with everyone informed of progress.	He accepted a fair share of work and he was able to complete all of it on time and ensured that his work is top quality. He always informed us of his progress and made sure everyone is up to date with his work.	**
Scholarly / Professional • Displayed or tried to develop a wide range of skills in the service of the project, • Provided technical insights and solutions to problems. • Willing to provide/accepts constructive criticism, willing to adapt / consider other people's perspective	He displayed a variety of skills that helped us complete this project on time and gave us good criticism as well. He always accepted any feedback we gave him.	***

Your ID: **1841485**

Team: **TEAM 12**

Assessment of: George Botsihhin

For each category, award yourself and each member of your team a rating using the scale, and your team agreement:

* * * (3 Stars) Better than expected
* * (2 stars) As expected
* (1 star) Not as good as expected
(no stars) Student has not engagement with the rest of the Team

Category	Comments, Examples, Explanations etc	Rating [*,*, *]
Group Participation and Citizenship • Attended meetings regularly and on time, • Positive attitude, encouraged and motivated team members, • Engages and provides effective contribution in discussions at meetings or online. • Supported team decisions, helped to reach team consensus, helped resolve conflicts in the team.	He attended every meeting on time and always participated in our discussions. He was always engaged and supported our decisions. He organised the meetings and helped us work together effectively. He also supported my decision on choosing Java as the programming language for this project.	***
Time Management and Responsibility • Accepted fair share of work • Reliably completed work by required time. • Participates in Team Project Management, formally or informally ensuring the work stays on track, with everyone informed of progress.	He accepted a fair share of work and he was able to complete all of it by the required time. He participated in project management and helped us finish this project on time.	***
Scholarly / Professional • Displayed or tried to develop a wide range of skills in the service of the project, • Provided technical insights and solutions to problems. • Willing to provide/accepts constructive criticism, willing to adapt / consider other people's perspective	He always displayed professionalism and helped our team's progress by his technical skills. He gave us good feedback all the time and helped us with his opinions.	***

Your ID: **1841485**

Team: **TEAM 12**

Assessment of: Alex Smerdon

For each category, award yourself and each member of your team a rating using the scale, and your team agreement:

* * * (3 Stars) Better than expected
* * (2 stars) As expected
* (1 star) Not as good as expected
(no stars) Student has not engagement with the rest of the Team

Category	Comments, Examples, Explanations etc	Rating [*,*, *]
Group Participation and Citizenship • Attended meetings regularly and on time, • Positive attitude, encouraged and motivated team members, • Engages and provides effective contribution in discussions at meetings or online. • Supported team decisions, helped to reach team consensus, helped resolve conflicts in the team.	He attended every meeting on time and always participated in our discussions. He always contributed to our group project. He worked very effectively on this project. He always supported our decisions.	***
Time Management and Responsibility • Accepted fair share of work • Reliably completed work by required time. • Participates in Team Project Management, formally or informally ensuring the work stays on track, with everyone informed of progress.	He accepted a fair share of work and he was able to complete all of it by the required time. He helped us finish some of the last sections of the program.	**
Scholarly / Professional • Displayed or tried to develop a wide range of skills in the service of the project, • Provided technical insights and solutions to problems. • Willing to provide/accepts constructive criticism, willing to adapt / consider other people's perspective	He always displayed professionalism and was willing to provide criticism when needed. He showed a variety of skills during this project and gave us a lot of good feedback. He developed a lot of new skills during this project.	***